



# **SIRE 2.0 Question Library**

## **Part 1 – Chapters 1 to 7**

### **Version 1.0**

(January 2022)

#### **The Oil Companies International Marine Forum (OCIMF)**

Vision: A global marine industry that causes no harm to people or the environment.

Mission: To lead the global marine industry in the promotion of safe and environmentally responsible transportation of crude oil, oil products, petrochemicals and gas and to drive the same values in the management of related offshore marine operations. We do this by developing best practices in the design, construction and safe operation of tankers, barges and offshore vessels and their interfaces with terminals and considering human factors in everything we do.

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# 1. Vessel, Operator and Inspection Particulars

## 1.1.1. Name of the vessel

### Data Source

SIRE 2.0 core data download:

- HVPQ (Name of ship)

## 1.1.2. Vessel IMO number

### Data Source

SIRE 2.0 core data download:

- HVPQ (LR/IMO number)

## 1.1.3. Date the inspection was completed

### Data Source

SIRE 2.0 inspection submission:

- Inspection Record > Inspection Completed Date

## 1.1.4. Was a full inspection of the vessel completed

### Data Source

SIRE 2.0 inspection submission:

- Inspection Record > Inspection Completed

## 1.1.5. Port of Inspection

### Data Source

SIRE 2.0 inspection submission:

- Inspection Record > Port of Inspection

## 1.1.6. Flag

### Data Source

SIRE 2.0 core data download:

- HVPQ (Flag)

## 1.1.7. Deadweight

### Data Source

SIRE 2.0 core data download:

- HVPQ (Summer Deadweight)

### **1.1.8. Date the vessel was delivered**

#### **Data Source**

SIRE 2.0 core data download:

- HVPQ (Delivery date as recorded in Form A or Form B Q1.8.3 of the IOPPC)

### **1.1.9. Name of the OCIMF inspecting company**

#### **Data Source**

SIRE 2.0 core data download:

- SIRE 2.0 Inspection Booking

### **1.1.10. Date and time the inspector boarded the vessel**

#### **Data Source**

SIRE 2.0 inspection submission:

- Inspection Record > Inspection Commenced Date/Time

### **1.1.11. Date and time the inspector departed the vessel**

#### **Data Source**

SIRE 2.0 inspection submission:

- Inspection Record > Inspection Completed Date/Time

### **1.1.12. Time taken for the inspection**

#### **Data Source**

SIRE 2.0 inspection submission:

- Inspection Record > Inspection Duration in Hours

### **1.1.13. Name of the inspector**

#### **Data Source**

SIRE 2.0 core data download:

- SIRE 2.0 Inspection Booking

### **1.1.14. Date the HVPQ was last updated**

#### **Data Source**

SIRE 2.0 core data download:

- HVPQ (Date last published)

### **1.1.15. Vessel's operation at the time of the inspection**

#### **Data Source**

SIRE 2.0 core data download:

- Inspection Record > Operation

### **1.1.16. Products being handled**

#### **Data Source**

SIRE 2.0 inspection submission:

- Inspection Record > Product

### **1.1.17. Vessel type**

#### **Data Source**

SIRE 2.0 core data download:

- Pre-Inspection Questionnaire > Type of Vessel

### **1.1.18. Hull Type**

#### **Data Source**

SIRE 2.0 core data download:

- HVPQ (Type of Hull)

### **1.1.19. Name of the vessel's operator**

#### **Data Source**

SIRE 2.0 core data download:

- SIRE 2.0 Inspection Booking

### **1.1.20. Date the current operator assumed responsibility for the vessel**

#### **Data Source**

SIRE 2.0 core data download:

- HVPQ (Date current operator assumed technical control of the ship)

### **1.1.21. Date of the last port state control inspection**

#### **Data Source**

SIRE 2.0 core data download:

- PIQ (Date of last port state control inspection)

### **1.1.22. Name of the classification society**

#### **Data Source**

SIRE 2.0 core data download:

- HVPQ (Classification Society)

### **1.1.23. Date of departure from the last dry dock**

#### **Data Source**

SIRE 2.0 core data download:

- HVPQ (Date of last dry dock)

### **1.1.24. With the vessel's designation as recorded on IOPP certificate**

#### **Data Source**

SIRE 2.0 core data download:

- HVPQ (What is the type of ship as described in Form A or Form B Q1.11 of the IOPPC?)

### **1.1.25. Name of the vessel's P&I club**

#### **Data Source**

SIRE 2.0 core data download:

- HVPQ (Name of P and I Club)

## 2. Certification and Documentation

### 2.1. Certification

**2.1.1. Were the Master and senior officers familiar with the company procedure for maintaining the vessel's statutory certification up to date, were all certificates and documents carried onboard up to date and was the vessel free of conditions of class or significant memoranda?**

#### Short Question Text

Maintenance of Statutory Certification

#### Vessel Types

Oil, Chemical, LPG, LNG

#### ROVIQ Sequence

Documentation, Pre-board

#### Publications

IACS: Information Paper. Classification societies – what why and how?

IMO: FAL.2/Circ.131 MEPC.1/Circ.873 MSC.1/Circ.1586 LEG.2/Circ.3. LIST OF CERTIFICATES AND DOCUMENTS REQUIRED TO BE CARRIED ON BOARD SHIPS 2017.

IMO: FAL.5/Circ.39/Rev.2 20 April 2016 GUIDELINES FOR THE USE OF ELECTRONIC CERTIFICATES

#### Objective

**To ensure that the vessel had been surveyed in accordance with all statutory requirements and that certification is onboard to confirm compliance.**

**Industry guidance:**

**IACS: Information Paper. Classification societies – what, why and how?**

**TMSA KPI 4.2.1** requires that a procedure is in place to ensure the validity and accuracy of statutory and/or classification certificates.

**IMO: ISM Code**

11.1 The Company should establish and maintain procedures to control all documents and data which are relevant to the SMS.

11.2 The Company should ensure that:

1. valid documents are available at all relevant locations,
2. changes to documents are reviewed and approved by authorized personnel, and
3. obsolete documents are promptly removed.

**IMO: FAL.2/Circ.131 MEPC.1/Circ.873 MSC.1/Circ.1586 LEG.2/Circ.3. LIST OF CERTIFICATES AND DOCUMENTS REQUIRED TO BE CARRIED ON BOARD SHIPS, 2017.**

**IMO: FAL.5/Circ.39/Rev.2 20 April 2016 GUIDELINES FOR THE USE OF ELECTRONIC CERTIFICATES**



4.3 Shipowners, operators and crews on ships that carry and use electronic certificates should ensure that these certificates are controlled through the safety management system, as described in section 11 of the International Safety Management Code.

### **Inspection Guidance**

The vessel operator should have developed a procedure which defined the process for the vessel to monitor the validity of all major and minor certificates required to be carried on board, specifically identifying those required to be carried in accordance with the List of Certificates and Documents Required to be Carried On Board Ships, 2017.

Where the vessel carried electronic certificates, these should be controlled through a process described in the vessel's safety management system.

The vessel operator should have provided data relating to the vessel's certification and survey status through the Harmonised Vessel Particulars Questionnaire (HVPQ) and pre-inspection questionnaire (PIQ) in addition to uploading a recent copy of the class status report\* to the document repository.

\*Where the Classification Society offers Class Survey Status Reports (CSSR) for the owner then this version should be provided.

The vessel operator should have declared in the PIQ the date of, and reason for, the last visit by a class surveyor.

### **Suggested Inspector Actions**

Prior to boarding:

- Review the CSSR and identify any conditions of class and/or significant memoranda and copy the details into the observation tool.
- Verify that the dates and data declared within the HVPQ were accurate as compared to the CSSR.

During the inspection:

- Sight, and where necessary review, the company procedure for managing the vessel's statutory certification and supporting documents.
- Verify that any defective structure, machinery or equipment identified through the issue of a condition of class, memoranda or issue of a short-term certificate had been entered in the defect reporting system for follow up and later closeout.
- Verify that the onboard system for the tracking of statutory and classification certificates was being maintained up to date by random sampling and review of no more than five certificates.
- Verify that the outcome from any recent class surveys had been registered in the CSSR.

### **Expected Evidence**

- The company procedure for managing statutory certification and supporting documents.
- Folders containing statutory and classification certificates and supporting surveys/test reports.
- Certificate index indicating the expiry date all statutory certification, supporting surveys and inspections.
- The Class Survey Status Report (CSSR)\*.
- List of open defects as reported in the defect reporting system.
- Details of class attendance during the past twelve months.

### **Potential Grounds for a Negative Observation**

- There was no company procedure which defined the process for managing (indexing and filing) vessel certificates and documents to ensure compliance with SOLAS, Class and Flag requirements.

- The accompanying officer was unfamiliar with the company procedure for indexing and filing certificates and documents.
- There was no systematic process in place to track the validity and file all statutory and classification certificates.
- A sampling of onboard certificates identified that a required (class or flag) certificate or a supporting survey/test report had expired or was missing.
- The onboard tracking or filing of statutory and classification certificates had not been maintained in accordance with company procedures.
- The operator had not uploaded a recent copy of the CSSR to the document repository and a copy had not been made available onboard.
- The data entered in the HVPQ or PIQ was not accurate as compared to the CSSR and vessel records.
- The vessel had been issued with:
  - A condition of class.
  - Memoranda relating to a defect to structure, machinery or equipment.
  - A short-term certificate as a result of a defect or damage to the ship's structure, machinery or equipment.

## 2.2. Management Oversight

**2.2.1. Had the vessel been attended by a company Superintendent at approximately six-monthly intervals and were reports available to demonstrate that a systematic vessel inspection had been completed during each attendance declared through the pre-inspection questionnaire?**

**Short Question Text**

Superintendent vessel inspection and report

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation

**Publications**

None

**Objective**

**To ensure that the vessel had been periodically and systematically inspected by company Marine and Technical Superintendents to provide shore management with a complete technical and operational appraisal of their managed vessel.**

**TMSA KPI 12.1.2** requires that an inspection plan covers all vessels in a fleet, with at least two inspections onboard each vessel a year.

- The inspection is conducted by suitably experienced superintendent(s) and may be carried out in conjunction with other inspections/audits.
- Following each inspection, a report is made and is reviewed/signed off by shore management.
- The inspection process provides company management with a comprehensive overview of the condition of the fleet at specified intervals.

**IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

10.2 In meeting these requirements the Company should ensure that:

1. inspections are held at appropriate intervals,
2. any non-conformity is reported with its possible cause, if known,
3. appropriate corrective action is taken, and
4. records of these activities are maintained.

**Inspection Guidance**

The vessel operator should have established a vessel inspection program which requires a vessel to be inspected at least twice a year by a combination of Marine and Technical Superintendent visits. It is expected that:

- Inspections are scheduled at six-month intervals, with a tolerance of one month, but intervals between inspections should not normally exceed seven months.
- The interval between successive inspections conducted by either a Marine Superintendent or a Technical Superintendent should not normally exceed fourteen months.

- An inspection report should record the findings of each inspection in a defined format which gives an overview of the true state of all operational and accessible areas of the vessel and its equipment in addition to providing an overview of onboard management to shore-based management.
- The inspection report should summarise structural, machinery and equipment defects identified during the inspection which should be transferred to the vessel's defect reporting system for follow up and closure.
- The inspection report should summarise any procedural weaknesses identified for follow up through the non-conformity process.
- A copy of the full inspection report for each superintendent visit should be maintained on board the vessel.

#### Remote inspections

Where a vessel operator had developed a formal remote vessel inspection programme to cover vessels which could not reasonably be visited by a company superintendent, the inspector should accept these as qualifying visits provided:

- There was a company procedure for conducting remote vessel inspections which defined:
  - The circumstances in which a remote inspection may be used to substitute for a physical inspection.
  - The condition verification processes for all areas of the ship under inspection.
  - The required content of the final inspection report.
- Completed inspection reports in accordance with the company procedure were available for each remote superintendent inspection.

The vessel operator should have declared the attendance dates for all qualifying vessel inspections by company Marine and Technical Superintendents during the previous eighteen months through the pre-inspection questionnaire.

Additional vessel visits by senior management, Electrical Superintendents or those by Marine and Technical Superintendents to deal with a specific issue which did not result in a full inspection and subsequent report being completed are not considered under this question.

#### **Suggested Inspector Actions**

Review the vessel inspection reports completed by Marine and Technical Superintendents and verify that:

- Vessel inspection reports were available onboard for each of the declared qualifying vessel inspections completed during the previous eighteen months.
- Each vessel inspection report recorded the observed condition of all operational and accessible areas of the vessel and its equipment.
- Where areas for improvement or defects were identified, the defect or non-conformity reporting system was utilised to track the corrective actions through to closure.
- Any remote inspections had been performed as required by the company procedure.

#### **Expected Evidence**

- Qualifying vessel inspection reports completed by company Marine or Technical Superintendents during the previous eighteen months.
- Evidence that defects and areas for improvement had been followed up through the company defect reporting or non-conformity reporting systems.
- The company procedure for conducting remote inspections, if applicable.

#### **Potential Grounds for a Negative Observation**

- Reports were not available onboard for each declared qualifying vessel inspection conducted by a company Marine or Technical Superintendent.

- The inspection report format did not cover all operational and accessible areas of the vessel and its equipment.
- The interval between successive qualifying inspections by either a Marine or Technical Superintendent exceeded seven months.
- It was more than fourteen months since either the previous Marine or Technical Superintendent inspection.
- Where the vessel was new to management there had been no Marine or Technical inspection completed since handover or delivery.
- Remote inspections had been conducted but there was no company procedure which defined:
  - The circumstances in which a remote inspection may be used to substitute for a physical inspection.
  - The condition verification processes for all areas of the ship under inspection.
  - The required content of the final inspection report.
- More than one remote inspection had been conducted when a physical inspection could reasonably have been carried out.
- There was no evidence that each area for improvement or defect identified within the vessel inspection reports had been followed up through the documented company processes either as non-conformities or defect reports.

**2.2.2. Were recent ISM internal audit reports available on board, had corrective action been taken on board to close-out any non-conformities and had this corrective action been verified by shore management?**

**Short Question Text**

Internal ISM audit

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation

**Publications**

IMO: ISM Code

**Objective**

**To provide assurance that the vessel had been operated in compliance with the company Safety Management System.**

**Industry Guidance**

**TMSA KPI 12A.1.1** requires that the company has documented audit procedures and standard audit formats. The formats are designed, as required, for ISM, the ISPS Code, ISO Standards and any company internal audits.

**IMO: ISM Code**

12.1 The Company should carry out internal safety audits on board and ashore at intervals not exceeding 12 months to verify whether safety and pollution-prevention activities comply with the SMS. In exceptional circumstances, this interval may be exceeded by not more than 3 months.

12.4 The audits and possible corrective actions should be carried out in accordance with documented procedures.

12.6 The results of the audits and reviews should be brought to the attention of all personnel having responsibility in the area involved.

12.7 The management personnel responsible for the area involved should take timely corrective action on deficiencies found.

**Inspection Guidance**

The vessel operator should have established a procedure for scheduling and performing internal ISM audits at intervals not exceeding twelve months. The procedure should include

- Standard formats and/or checklists for the performance of audits.
- A system for recording and tracking any non-conformities to closure.

This system, which may be paper based or electronic, should

- Be available to all those on board responsible for the areas audited.
- Include a time limit for corrective action.
- Inform the operator when corrective action has been completed.
- Record the operator's verification of corrective action and final close-out.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure for scheduling and performing internal ISM audits including standard audit formats and/or checklists.
  - Review the latest two internal ISM audit reports under the current operator.
  - Review the system for recording and tracking ISM audit non-conformities to closure.
- 
- Interview the Master or a senior officer to confirm their familiarity with the system for recording and tracking ISM audit non-conformities to closure.
  - In the case that the vessel had recently been taken over by the vessel operator and had not yet undertaken an internal audit, interview the Master or a senior officer to confirm their familiarity with the preparations necessary for the first internal audit.

Inspectors must not use operator's audit reports as a means to identify Negative Observations.

### **Expected Evidence**

- The company procedure for scheduling and performing internal ISM audits.
- The latest two internal ISM audit reports under the current operator.
- The system for recording and tracking non-conformities to closure.

### **Potential Grounds for a Negative Observation**

- There was no company procedure for scheduling and performing internal ISM audits.
- No internal ISM audit had taken place for more than:
  - 15 months
  - 12 months, with no documentation supporting exceptional circumstances.
- The latest two internal ISM audit reports under the current operator, where completed, were not available on board.
- There was no system for recording and tracking any non-conformities to closure.
- Records in the system for recording and tracking any non-conformities to closure were incomplete.
- The system for recording and tracking any non-conformities to closure:
  - Was not readily available to those responsible for implementing corrective action for any non-conformities.
  - Did not impose a time limit for corrective action to be taken.
  - Did not record when corrective actions were completed.
  - Did not record the operator's verification of corrective action completed, or the evidence upon which verification was based, for example, a superintendent's visit or photographs.
- A non-conformity had not been closed-out within the imposed time limit.
- There was no objective evidence for the corrective action recorded to close-out a non-conformity.
- The Master or senior officer interviewed was not familiar with the system for recording and tracking any internal ISM audit non-conformities to closure.
- The Master or senior officer interviewed was not familiar with the internal audit programme process.

Where the vessel operator had recently taken over management of the vessel and an internal audit had not yet taken place, enter a **comment** in the Process response tool indicating when the internal audit was planned for completion.

### **2.2.3. Was the Master fully conversant with the company's Safety Management System and had Master's Reviews of the system taken place in accordance with the ISM Code and company procedures?**

#### **Short Question Text**

Master's Review of the SMS.

#### **Vessel Types**

Oil, Chemical, LPG, LNG

#### **ROVIQ Sequence**

Documentation

#### **Publications**

IMO: ISM Code

IACS Recommendation No.41 (Rev.5 Oct 2019) Guidance for Auditors to the ISM Code

#### **Objective**

**To ensure the Master is fully conversant with the Safety Management System and that Master's Reviews contribute to the improvement of its effectiveness.**

#### **Industry Guidance**

#### **IACS Recommendation No.41 (Rev.5 Oct 2019) Guidance for Auditors to the ISM Code**

'ISM Code - paragraph 5.1.5

5.1 The Company should clearly define and document the Master's responsibility with regard to:

.5 periodically reviewing the safety management system and reporting its deficiencies to the shore-based management.'

The Master, as responsible person onboard, should inform the Company whenever there are deficiencies in the SMS relevant to the ship's operation.

Information on SMS deficiencies should include proposals for corrective action and recommendations for improving the SMS, as far as possible.

The auditor should expect that the Company has defined when and how the Master carries out the SMS reviews aboard ship. The word "periodically" clarifies that the "master's review" is not an isolated activity, it is an ongoing dynamic process aimed at continually improving the effectiveness of the safety management system.

Examples of objective evidence found at office may include:

- evidence that Master's Reviews of SMS have been received from ships at defined intervals (at least annually);

'ISM Code - paragraph 6.1.2

6.1 The Company should ensure that the Master is:

.2 fully conversant with the Company's safety management system;'

The Company should ensure that the Master is "fully conversant" with all requirements relating to the Company's safety and environmental protection policies.



**TMSA KPI 1A.1.2** requires that policy and procedures are formally reviewed at regular intervals to ensure robustness and effectiveness. Policy and procedures are reviewed at company defined intervals and amended as necessary. This review may include feedback from:

- Master's review of the SMS.

#### **IMO: ISM Code**

5.1 The Company should clearly define and document the master's responsibility with regard to:

.5 periodically reviewing the SMS and reporting its deficiencies to the shore-based management.

6.1 The Company should ensure that the Master is:

.2 fully conversant with the Company's safety management system.

#### **Inspection Guidance**

The Master should be familiar with the layout and contents of the SMS and proficient in accessing the information it contains, whether in hard copy or digital format. However, the Master should not be expected to have detailed knowledge of every procedure in the SMS.

The vessel operator should have developed a procedure requiring the periodic review of the Safety Management System (SMS) by the Master, including:

- The format and agenda for the review.
- The frequency of the review (at least annual).
- A specified time frame for company responses to the review.

The review does not need to be done all at once, provided the complete SMS is reviewed within a twelve-month period. The review may include input from the shipboard management team and the safety committee.

The review should identify deficiencies in the SMS and suitable corrective action. It should contain suggestions for improvement in the effectiveness of the SMS and should not simply be a tick box exercise.

#### **Suggested Inspector Actions**

- Interview the Master to verify their overall knowledge of, and proficiency in using, the SMS.
- Review the last two Master's Reviews of the SMS.
- Review the company responses to the last two Master's Reviews.

#### **Expected Evidence**

- The Safety Management System.
- The last two Master's Reviews.
- The company responses to the last two Master's Reviews.

#### **Potential Grounds for a Negative Observation**

- The Master was not familiar with the layout and contents of the SMS.
- The Master was not proficient in accessing the information contained in the SMS, whether in hard copy or digital format.
- There was no company procedure requiring the periodic review of the Safety Management System (SMS) by the Master, including:

- The format and agenda for the review.
  - The frequency of the review (at least annual).
  - A specified time frame for company responses to the review.
- The Master was not familiar with the company procedure requiring the periodic review of the Safety Management System (SMS).
- Master's Reviews had not been performed at the frequency required by the company procedure.
- The Master's Review(s) had not been fully completed according to the company format and/or agenda.
- The Master's Review did not:
  - Identify deficiencies in the SMS and suitable corrective action and/or,
  - Contain suggestions for improvement in the effectiveness of the SMS.
- The operator had not responded to the Master's Review(s) within the specified timeframe.

## 2.3. Structural Assessment

**2.3.1. Were the Master and Chief Engineer familiar with the company procedure to maintain the Enhanced Survey File in accordance with Classification Society rules, and was the vessel free of any visible or documentary evidence of concerns with the structural condition of the hull or cargo and ballast tank coatings?**

### Short Question Text

Structural concerns and Enhanced Survey File.

### Vessel Types

Oil, Chemical

### ROVIQ Sequence

Pre-board, Main Deck, Documentation

### Publications

IMO: ISM Code

IMO SOLAS

IMO: MSC.215 (82) Performance Standard for Protective Coatings for Dedicated Seawater Ballast Tanks.

IMO: ESP Code

IACS: Double Hull Tankers. Guidelines for Surveys Assessment and Repair of Hull Structures

IACS: UR Z10.4 Rev

16 May 2019 Hull Surveys of Double Hull Oil Tankers

IACS: UR Z10.3 Rev

19 May 2019 Hull Surveys of Chemical Tankers

### Objective

**To ensure that the structure of oil and chemical tankers was subject to enhanced survey and complete historical records of any damage, deterioration and subsequent repairs to their hull structure were available onboard.**

### **Industry Guidance**

**IACS: Double Hull Tankers Guidelines for Surveys Assessment and Repair of Hull Structures.**

**IMO: ESP Code** - International Code on the Enhanced Programme of Inspections During Surveys of Bulk Carriers and Oil Tankers, 2011 (Resolution A.1049(27)).

**IMO: MSC.215 (82) Performance Standard for Protective Coatings for Dedicated Seawater Ballast Tanks in All Types of Ships...**

3.4 Coating Technical File.

3.4.1 Specification of the coating system applied to the dedicated seawater ballast tanks and double skin spaces, record of the shipyard's and shipowner's coating work, detailed criteria for coating selection, job specifications, inspection, maintenance and repair shall be documented in the Coating Technical File and the Coating Technical File shall be reviewed by the Administration.

3.4.3 In-service maintenance, repair and partial re-coating

In-service maintenance, repair and partial re-coating activities shall be recorded in the Coating Technical File, in accordance with the Guidelines for coating maintenance and repair.

3.4.5 The Coating Technical File shall be kept on board and maintained throughout the life of the ship.

## **IACS: UR Z10.4 Rev, 16 May 2019 Hull Surveys of Double Hull Oil Tankers**

### **2.2.3.1**

Where provided, the condition of the corrosion prevention system of cargo tanks is to be examined.

A Ballast Tank is to be examined at subsequent annual intervals where:

1. a hard protective coating has not been applied from the time of construction, or
2. a soft or semi-hard coating has been applied, or
3. substantial corrosion is found within the tank, or
4. the hard protective coating is found to be in less than GOOD condition and the hard protective coating is not repaired to the satisfaction of the Surveyor.

Thickness measurements are to be carried out as deemed necessary by the surveyor.

## **IACS: UR Z10.3 Rev, 19 May 2019 Hull Surveys of Chemical Tankers**

**TMSA KPI 4.2.2** requires that cargo, void and ballast spaces are inspected to ensure their integrity is maintained.

The frequency of inspections is determined by the applicable regulations of Class, Flag State and national authorities.

### **IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

### **IMO: SOLAS**

Chapter II-1 Regulation 3-2

3. All dedicated seawater tanks arranged in oil tankers and bulk carriers constructed on or after 1 July 1998, for which paragraph 2 is not applicable, shall comply with the requirements of regulation II-1/3-2 adopted by resolution MSC.47(66).

4. Maintenance of the protective coating system shall be included in the overall ship's maintenance scheme...

### **Inspection Guidance**

The vessel operator should have developed a procedure to ensure that the Enhanced Survey File is maintained up to date as required by the vessel's classification society.

The survey report records, which may be in electronic format, should be on board for the lifetime of the ship from at least one year prior to the first special survey onwards and should include:

- Reports of structural surveys.
- Condition evaluation reports.
- Thickness measurement reports.

Supporting documents should also be available onboard including:

- Survey program.
- Main structural plans for cargo holds and ballast tanks.

- Previous repair history.
- Inspections by ship's personnel with reference to:
  - Structural deterioration in general,
  - Leakages in bulkheads and piping,
  - Condition of coating or corrosion prevention system, if any.
- Any other information that would help identify critical structure areas and/or suspect areas requiring inspection.
- The Coating Technical File. (All oil tankers built after 1 July 1998)

Where the vessel had completed the first or subsequent special surveys, the vessel operator will have uploaded the most recent Condition Evaluation Report to the document repository.

### **Suggested Inspector Actions**

- Review the Enhanced Survey File and verify that all sections had been maintained up to date with the detail required by the vessel's classification society.
  - Review the previous repair history and identify any structural repairs completed during the preceding twelve months for comparison with the vessel's defect reporting system.
  - Review the condition evaluation report and note any spaces where the coating condition of cargo or ballast tanks was reported as fair or poor.
  - Review the condition evaluation report and note any substantially corroded tanks/areas or areas with deep pitting recorded in the extract of thickness measurements.
  - Review the coating technical file and note any spaces where coating repairs had been recorded as having been undertaken.
- 
- During the physical inspection of the vessel note any concerns with hull structural integrity such as cracking, denting, distortion, significant\* corrosion or thinning of structural members. (Significant\* in this context is wastage which has visibly reduced the profile of a structural member.)

### **Expected Evidence**

- The Enhanced Survey File (which must be onboard for the lifetime of the ship from at least one year prior to the first special survey).
- The Coating Technical File, where required to be carried.
- Supporting documents required to be carried onboard according to the ESP Code.
- Inspection reports for cargo, ballast and void spaces by ship's personnel.
- Incident investigation reports relevant to structural damage and repair within the scope of the enhanced hull survey.

### **Potential Grounds for a Negative Observation**

- There was no company procedure which required that the enhanced survey file, or electronic record, was maintained in accordance with classification society guidance.
- There was no company procedure which required that the coating technical file was maintained in accordance with classification society guidance.
- The accompanying officer was unfamiliar with the company procedure for maintaining the enhanced survey file, or electronic record, and the coating technical file.
- The enhanced survey file was found to be missing required surveys and/or reports.
- Inspections by ship's staff had not been recorded.
- Structural repairs were recorded as having taken place during the previous twelve months within the enhanced survey file, but the vessel's defect reporting system did not include a similar report.
- Structural repairs were reported to have taken place following a casualty/incident but there was no incident investigation report available onboard.

- The condition evaluation report contained reports of substantially corroded tanks/areas or there were areas with deep pitting recorded within the extract of thickness measurements. (summarize the extract)
  - The condition evaluation report or any subsequent classification society reports recorded fair or poor cargo and/or ballast tank coating condition. (report which tank(s) and rating assigned).
  - Coating repairs were reported to have taken place within ballast tanks, but the coating technical file had not been updated accordingly.
  - Physical inspection of the vessel identified concerns with hull structural integrity such as cracking, denting, distortion, significant\* corrosion or thinning of structural members which had not been subject to an occasional class survey. (Where there is doubt as to whether corrosion or thinning is significant\* use the Hardware - slight superficial deterioration – comment option)
- 
- Where the vessel had completed a special survey and the condition evaluation report was not available onboard, record a **comment** within the Process response tool, recording the number of days elapsed since the survey was completed.

**2.3.2. Were the Master and Chief Engineer familiar with the company procedure to maintain the Class Survey File, and was the vessel free of any visible or documentary evidence of concerns with the structural condition of the hull or hold space and ballast tank coatings?**

**Short Question Text**

Structural concerns and Class Survey File.

**Vessel Types**

LPG, LNG

**ROVIQ Sequence**

Main Deck, Pre-board, Documentation

**Publications**

IACS: UR Z7.2 Rev

6 Feb 2015 Hull Surveys of Liquefied Gas Carriers

IMO: ISM Code

IMO SOLAS

IMO: MSC.215 (82) Performance Standard for Protective Coatings for Dedicated Seawater Ballast Tanks.

**Objective**

**To ensure that the structure of gas carriers was subject to the required surveys and complete historical records of any damage, deterioration and subsequent repairs to the hull structure were available on board.**

**Industry Guidance**

**IMO: SOLAS**

Chapter II-1 Regulation 3-2

Protective coatings of dedicated seawater ballast tanks in all types of ships and double-side skin spaces of bulk carriers.

1. Paragraphs 2 and 4 of this regulation shall apply to ships of not less than 500 gross tonnage:
  1. for which the building contract is placed on or after 1 July 2008; or
  2. in the absence of a building contract, the keels of which are laid, or which are at a similar stage of construction on or after 1 January 2009; or
  3. the delivery of which is on or after 1 July 2012.

4. Maintenance of the protective coating system shall be included in the overall ship's maintenance scheme. The effectiveness of the protective coating system shall be verified during the life of a ship by the Administration, or an organization recognised by the Administration, based on the guidelines developed by the Organization.

**IMO: MSC.215(82) Performance standard for protective coatings for dedicated seawater ballast tanks in all types of ships and double-side skin spaces of bulk carriers.**

**3.4 Coating Technical File**

3.4. 1 Specification of the coating system applied to the dedicated seawater ballast tanks and double-side skin spaces, record of the shipyard's and shipowner's coating work, detailed criteria for coating selection, job specifications, inspection, maintenance and repair shall be documented in the Coating Technical File, and the Coating Technical File shall be reviewed by the Administration.

**3.4.3 In-service maintenance, repair and partial re-coating**

In-service maintenance, repair and partial re-coating activities shall be recorded in the Coating Technical File, in accordance with the Guidelines for coating maintenance and repair.

3.4.5 The Coating Technical File shall be kept on board and maintained throughout the life of the ship.

#### **IACS: UR Z7.2 Rev, 6 Feb 2015 Hull Surveys of Liquefied Gas Carriers**

##### **4.2.2 Ballast tanks**

4.2.2.1 For ships between 5 and 10 years of age, an overall survey of representative ballast tanks is to be carried out. If there is no hard protective coating, soft or semi-hard coating or POOR coating condition, the examination is to be extended to other ballast tanks of the same type.

4.2.2.2 For ships over 10 years of age, an overall survey of all ballast tanks is to be carried out.

4.2.2.3 If such examinations reveal no visible structural defects, the examination may be limited to a verification that the corrosion prevention system remains efficient.

4.2.2.4 For ballast tanks, excluding double bottom tanks, if there is no hard protective coating, soft or semi-hard coating, or POOR coating condition and it is not renewed, the tanks in question are to be internally examined at annual intervals.

4.2.2.5 When such conditions are found in double bottom ballast tanks, the tanks in question may be internally examined at annual intervals.

**TMSA KPI 4.2.2** requires that cargo, void and ballast spaces are inspected to ensure their integrity is maintained.

The frequency of inspections is determined by the applicable regulations of Class, Flag State and national authorities.

#### **IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

#### **Inspection Guidance**

The vessel operator should have developed a procedure to ensure the vessel's Survey File is maintained complete and up to date. The file should include:

- Class status reports.
- Survey reports.
- Repair history.
- Coating technical file, where required to be carried.

#### **Suggested Inspector Actions**

- Review the Survey File and verify it has been maintained complete and up to date.
- Review the previous repair history and identify any structural repairs completed during the preceding twelve months for comparison with the vessel's defect reporting system.
- Review the Coating Technical File, where required to be carried, and note any spaces where coating repairs have been recorded as having been undertaken.



- During the physical inspection of the vessel note any concerns with hull structural integrity such as cracking, denting, distortion, significant\* corrosion or thinning of structural members. (\*Significant' in this context is wastage which has visibly reduced the profile of a structural member.)

#### **Expected Evidence**

- Survey File.
- Coating Technical File, where required to be carried.
- Inspection reports for cargo, ballast, hold and void space inspections by ship's personnel.
- Incident investigation reports relevant to structural damage and repair.

#### **Potential Grounds for a Negative Observation**

- There was no company procedure to ensure the vessel's Survey File is maintained complete and up to date.
- The Master and/or Chief Engineer were not familiar with the company procedure to ensure the vessel's Survey File is maintained complete and up to date.
- The Survey File was incomplete and did not include:
  - Class status reports.
  - Survey reports.
  - Repair history.
  - Coating Technical File, where required to be carried.
- Maintenance of the protective coating system was not included in the overall ship's maintenance plan.
- Structural repairs were recorded within the Survey File as having taken place during the previous twelve months, but the vessel's defect reporting system did not include a similar report.
- Structural repairs were recorded as having taken place following a casualty/incident but there was no incident investigation report available onboard.
- Physical inspection of the vessel identified concerns with hull structural integrity such as cracking, denting, distortion, significant\* corrosion or thinning of structural members which had not been subject to an occasional class survey. (\*Where there is doubt as to whether corrosion or thinning is significant, use the Hardware - slight superficial deterioration – comment option.)
- A survey report contained details of substantially corroded tanks/areas or areas with deep pitting. (Summarise the relevant section of the report.)
- Classification society reports recorded fair or poor ballast tank coating condition. (Report which tank(s) and rating assigned).
- Coating repairs were reported to have taken place within ballast tanks, but the coating technical file, where required to be carried, had not been updated accordingly.

**2.3.3. Were the Master and senior officers familiar with the company cargo, ballast & void space inspection and reporting procedure and, were records available to demonstrate that all inspections had been accomplished within the required time frame with reports completed in accordance with company instructions?**

**Short Question Text**

Cargo, ballast & void space inspection

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation, Cargo Control Room

**Publications**

IACS Recommendation 87. Guidelines for Coating Maintenance and Repairs for Ballast Tanks.

**Objective**

**To ensure that the condition of cargo, ballast and void spaces was properly evaluated with defects to structure, coating or fittings effectively managed.**

**Industry Guidance**

**IACS: Recommendation 87. Guidelines for Coating Maintenance and Repairs for Ballast Tanks and Combined Cargo/Ballast Tanks on Oil Tankers.**

3. Coating maintenance and repairs

b) Principles for maintenance and repair

iii In-service Condition Monitoring

It is therefore a pre-requisite that the owner initiate, as a minimum, an annual inspection of all tanks and spaces by the ship's crew, sometimes assisted by additional inspectors.

**TMSA KPI 4.2.2** requires that cargo, void and ballast spaces are inspected to ensure their integrity is maintained.

The frequency of inspections is determined by the applicable regulations of Class, Flag State and national authorities. In addition, industry recommendations are taken into account.

Guidance for inspection of compartments is provided, which may include industry/Class publications.

Records are compartment specific and made to a standard format that may include photographs as evidence of the compartment's condition.

**IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

10.2 In meeting these requirements the Company should ensure that:

1. inspections are held at appropriate intervals,

2. any non-conformity is reported with its possible cause, if known,
3. appropriate corrective action is taken, and
4. records of these activities are maintained.

## **Inspection Guidance**

The vessel operator should have developed procedures for cargo, ballast and void space inspection which:

- Define the frequency of inspections required for each type of space which includes, but is not limited to:
  - Cargo tanks.
  - Ballast tanks.
  - Hold spaces.
  - Void spaces, which includes pipe trunks and cofferdams.
- Define the actions to be taken when an inspection cannot be completed within the required timeframe.
- Requires that the condition of each space is reported in a standard format which includes details of:
  - Structural deterioration and failure.
  - The extent of any corrosion, pitting and wastage.
  - The extent of any deterioration of the coating.
  - Any leakages in bulkheads or pipework.
  - The condition of cargo handling and monitoring equipment.
  - The extent of sediment build-up.
- Provide guidance on the assessing and reporting of tank coating condition.
- Require that defects relating to structure, coating or fittings are entered into the vessel's defect reporting system for follow up.

Cargo tanks on oil and chemical tankers should be inspected by vessel staff at intervals of 2.5 years with a six-month window either side. The intention is that these inspections should align with the renewal and intermediate survey regimes.

Hold spaces on gas carriers should be inspected annually.

Ballast tanks, void spaces, pipe trunks and cofferdams on all vessel types should be inspected annually.

The vessel operator should have declared the required inspection frequency and date ranges for the previous cycle of inspections for cargo, ballast and void spaces through the pre-inspection questionnaire. This information will be inserted in the published inspection report.

## **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures for cargo, ballast & void space inspection and reporting.
- Verify that the date ranges for the inspection of cargo, ballast and void spaces provided by the operator in the pre-inspection questionnaire were accurate by spot checking inspection reports.
- Review several recent cargo, ballast or void space inspection reports and verify that the detail required by the company inspection procedure had been recorded for each space on the dedicated inspection report forms.
- Where defects relating to the structure, coating or fittings of a cargo, ballast or void space had been noted within an inspection report, verify that a defect report had been generated to follow up with the required corrective actions.
- Where conditions of class, memoranda or coating condition required more frequent inspections of cargo, ballast and/or void spaces, confirm that required inspections had been completed and documented as required.

## **Expected Evidence**

- The company procedures, and any referenced industry publications, for inspection of cargo, ballast and void spaces.
- The inspection reports for all cargo, ballast and void spaces for the previous full inspection cycle.
- Open defect reports for any defects to tank structure, coatings or fittings.
- Communications with class relating to any defects to tank structure since the previous renewal or intermediate survey.
- The enclosed space entry records and permits for recent cargo, ballast and void space inspections.

#### **Potential Grounds for a Negative Observation**

- There were no company procedures for the inspection of cargo/ballast/void spaces which gave clear guidance on the inspection frequency, the inspection process and reporting criteria.
- The required inspection frequency for ballast and void spaces exceeded twelve months.
- The required inspection frequency for cargo spaces on oil and chemical tankers exceeded thirty-six months.
- The accompanying officer was unfamiliar with the company cargo/ballast/void space inspection procedure and/or reporting criteria.
- Cargo, ballast or void space inspection(s) for any single space was overdue by more than a month according to the company defined inspection period for the space(s) in question.
- Any cargo, ballast or void space had been omitted from the onboard inspection regime.
- The cargo, ballast and/or void space inspection reports were not prepared in a standard format which permitted the reporting of coating and structural condition in defined areas of the space in question.
- Defects to tank structure, coating or fittings were reported in an inspection report but the defects(s) had not been transferred to the defect reporting system for subsequent corrective action.
- There were open defect reports specifically related to damage or defects to tank structure.
- Defects to tank structure had not been reported to the vessel's Class Society for evaluation.

**2.3.4. Were the Master and deck officers familiar with the company procedures for detecting leakage of liquids between cargo, bunker, ballast, void and cofferdam spaces which included inspecting the surface of ballast water prior to discharge, and were records available to show that the necessary checks had been performed?**

**Short Question Text**

Monitoring cargo, ballast & void spaces for leakage and contamination

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Cargo Control Room, Main Deck

**Publications**

IMO: ISM Code

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

**Objective**

**To ensure that leakage of liquids between adjacent cargo, bunker, ballast, void and cofferdam spaces or from pipelines passing through such spaces is detected.**

**Industry Guidance**

**OCIMF: International Safety Guide for Oil Tankers and Terminals. Sixth Edition**

11.3.4 Monitoring of Void and Ballast Spaces.

Void and ballast spaces in the cargo tank block should be regularly monitored for leaks from nearby tanks. Monitoring should include regular atmosphere checks for hydrocarbon content and regular sounding/ullaging of the empty spaces.

12.6.5 Discharging Segregated Ballast.

To prevent contaminated segregated ballast causing pollution, where possible the surface of the ballast should be sighted before deballasting.

**TMSA KPI 4.2.2** requires that cargo, void and ballast spaces are inspected to ensure their integrity is maintained.

**IMO: ISM Code**

7. The company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and the protection of the environment.

**Inspection Guidance**

The vessel operator should have developed procedures which described:

- The requirement to inspect the surface of ballast water in tanks adjacent to cargo or bunker tanks, or where oil pipes, including hydraulic lines, pass through the tank, prior to discharge overboard.
- The requirement to sound empty tanks and spaces periodically to detect the migration of liquids from adjacent or remote spaces through either structural failure or pipeline leakages.
- The requirement to monitor the level in full, or partially full, tanks periodically to detect the migration of liquids between adjacent or interconnected spaces.

- The requirement to test ballast lines where they pass through cargo tanks or fuel tanks and record the results.
- The actions to take when ballast water is found contaminated.
- The actions to take when there is evidence of migration of liquid between cargo, ballast, bunker, void or cofferdam spaces.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures for checking for leakage of cargo, bunker oil, hydraulic oil and ballast into empty spaces and, for inspecting the surface of segregated ballast water prior to discharge.
- Review the sounding records for empty spaces and verify that soundings had been taken in accordance with company procedure.
- Review the records for ballast water discharge and verify that the surface of the ballast in each tank adjacent to a cargo or bunker tank or, with cargo, bunker or hydraulic lines passing through it, had been inspected for contamination prior to discharge.
- Review the records of ballast line tests where they pass through cargo tanks or fuel tanks, if applicable.
- Inspect the ballast tank sighting arrangements and verify that each tank adjoining a cargo or bunker tank, or with cargo, bunker or hydraulic lines passing through it, could be readily inspected without the need to remove numerous bolts to remove the inspection hatch or, to make an enclosed space entry.

### **Expected Evidence**

- The company procedure for sighting the surface of ballast water prior to discharge where the ballast tanks were adjacent to a cargo or bunker tank or where oil pipes and/or hydraulic lines pass through the tanks.
- The company procedure to periodically sound empty tanks to detect liquid migration due to structural failure or pipeline leakage.
- Records demonstrating that the surface of ballast water had been inspected prior to discharge.
- Records demonstrating that periodic soundings of empty spaces had been taken in accordance with company procedures.
- Records demonstrating that the level in full and partially full tanks had been periodically verified to detect the migration of liquid between adjacent or interconnected spaces.
- Records of ballast line tests where they pass through cargo tanks or fuel tanks.

### **Potential Grounds for a Negative Observation**

- There was no company procedure to periodically check empty spaces for ingress of liquids from adjoining spaces or pipeline leakage or, to check the surface of ballast water for contamination prior to discharge.
- The accompanying deck officer was unfamiliar with the company procedure for periodically checking empty spaces for liquid ingress or monitoring the levels of full or partially full tanks for migration of liquid between spaces.
- The accompanying officer was unfamiliar with the company procedure for inspecting the surface of ballast water prior to discharge when a ballast tank adjoined a cargo or bunker tank or had piping containing oil passing through it.
- Records determined that periodic checks to identify the ingress of liquids into empty spaces had not been conducted as required by the company procedures.
- Records determined that the surface of ballast water contained in tanks adjacent to cargo or bunker tanks, or which had pipes containing oil passing through them, had not been inspected prior to discharge.
- Records determined that ballast lines had not been tested where they passed through cargo tanks or fuel tanks.
- Inspection of the ballast tank sighting arrangements determined that numerous bolts were required to be removed from the inspection hatch or, an enclosed space entry was needed to be made, to inspect the surface of the ballast water within a full tank.
- Records determined that liquid leakage was detected in an empty space as a result of structural or pipeline failure during the previous twelve months.

- Records determined that ballast water or a ballast tank was contaminated by oil from an adjacent space or pipeline leakage during the previous twelve months.

### **2.3.5. Had the vessel been enrolled in a Classification Society Condition Assessment Programme (CAP)?**

#### **Short Question Text**

Condition Assessment Program (CAP)

#### **Vessel Types**

Oil, Chemical, LPG, LNG

#### **ROVIQ Sequence**

Documentation, Pre-board

#### **Publications**

None

#### **Objective**

**To provide an objective assessment of the operational reliability of a vessel in critical areas at the request of a vessel's owner, typically at the third special survey and periodically thereafter.**

#### **Industry Guidance**

Each Classification Society has its own Condition Assessment Program criteria.

**TMSA KPI 4.3.4** requires that the frequency and extent of structural inspection of the vessel's cargo, ballast and void spaces is determined on risk criteria which includes vessel's age and type.

#### **IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

#### **Inspection Guidance**

Enrolment in a Condition Assessment Programme is voluntary and, where utilised, may provide a complete view of a ship addressing the risks of pollution, structural failure and machinery downtime.

A CAP rating has no validity date, but only reflects the condition of the vessel on the date of the onboard inspection. Each charterer defines the time validity of a CAP certificate within its own vetting and marine assurance procedures.

Condition Assessment Programmes differ depending upon which classification society is commissioned to assess the condition of a vessel, but common modules are:

- Hull structure.
- Propulsion and auxiliary systems.
- Cargo equipment and systems.
- Cargo containment systems (for LPG and LNG Carriers).
- Machinery and cargo systems combined.
- Bridge, navigation and radio equipment.

This question will only be generated for vessels that have passed their fifteenth anniversary from the initial delivery date and, where the vessel operator had declared that the vessel had been awarded a CAP rating in at least one module.



Where a vessel had been subject to a Condition Assessment Programme, the vessel operator should have declared the following through the pre-inspection questionnaire:

- The date range of the survey upon which the CAP certificate had been based.
- The CAP rating achieved for each module the survey was commissioned to evaluate.

The operator should have uploaded the CAP certificate to the document store.

### **Suggested Inspector Actions**

#### **Pre-Inspection**

- Review the CAP certificate uploaded to the document store and verify that the information contained therein matched the date and rating for each module as declared by the operator.

#### **On-board**

- Where the operator had not uploaded the CAP certificate to the document store, review the CAP certificate available onboard and verify that the information contained within the pre-inspection questionnaire was accurate.

### **Expected Evidence**

- The CAP certificate showing the completion date of the assessment survey and the final ratings for the modules completed.
- Where the CAP certificate only showed the issue date rather than the survey completion date, evidence to support the date(s) that the onboard survey was completed.
- Any information or records that supplemented the CAP certificate.

### **Potential Grounds for a Negative Observation**

- The information provided by the operator in the pre-inspection questionnaire was inaccurate.
- The vessel operator had claimed a CAP rating for modules that were still pending completion.
- The date of the CAP survey was inaccurately declared as the CAP certificate issue date.
- The operator did not upload the CAP certificate to the document store and the CAP certificate was not available onboard for review.

## 2.4. Defect Management

**2.4.1. Were the senior officers familiar with the company procedure for reporting defects to vessel structure, machinery and equipment to shore-based management through the company defect reporting system and was evidence available to demonstrate that all defects had been reported accordingly?**

### Short Question Text

Defect reporting system

### Vessel Types

Oil, Chemical, LPG, LNG

### ROVIQ Sequence

Documentation, Chief Engineer's Office, Anywhere

### Publications

IACS: A Guide to Managing Maintenance in accordance with the requirements of the ISM Code.

IMO: ISM Code

IACS: Information Paper. Classification societies – what why and how?

### Objective

**To ensure that defects to vessel structure, machinery and equipment are documented and reviewed by management.**

### **Industry Guidance:**

#### **IACS Information Paper. Classification Societies – what, why and how?**

Section B1 – The effectiveness of classification depends upon the shipbuilder, during construction, and the shipowner, once the vessel enters service, cooperating with the Class Society in an open and transparent manner on all issues which may affect its class status. For the shipowner, this particularly requires acting in good faith by disclosing to the Class Society any damage or deterioration that may affect the vessel's classification status. If there is the least question, the owner should notify class and schedule a survey to determine if the vessel is in compliance with the relevant class standard.

#### **IACS: Rec. 2001/Rev.2 2018 A guide to managing maintenance in accordance with the requirements of the ISM code**

Reporting and investigation of technical deficiencies and non-conformities

Clause 10.2 of the ISM Code states that the company should ensure that any non-conformity is reported, with its possible cause, if known, and that appropriate corrective action is taken.

(In this context, "non-conformity" should be taken to mean a technical deficiency which is a defect in, or failure in the operation of, a part of the ship's structure or its machinery, equipment or fittings. See also clause 9 of the ISM Code.)

Problems reported may be discovered during routine technical inspections or maintenance, following a breakdown or an accident, or at any other time.

The Company's responses should be aimed not only at the rectification of the immediate technical deficiency, but also at addressing the underlying maintenance management system failures (non-conformities) that led to the problem in the first place. Any lessons learned from the investigation of these failures should be examined for their applicability to other ships in the fleet, and the resulting trends and patterns should be used to identify opportunities for continual improvement.

The fundamental elements of an effective defect- or non-conformity investigation process are shown in the following diagram. Note that it is not enough simply to take corrective action. The effectiveness of such action must be verified

**TMSA KPI 4.1.2** requires that a defect reporting system is in place for each vessel within the fleet.

The defect reporting system covers all onboard equipment and includes Conditions of Class.

The defect reporting system may be linked to the planned maintenance system and may be computer-based.

Companies strive to correct any Conditions of Class without delay.

The defect reporting system includes:

- Guidance as to the nature of defects that are recorded and reported.
- Recording of any equipment failures or breakdowns including those identified by third parties, e.g. SIRE, PSC, CDI and barge inspection schemes.
- Reporting defects to the shore management as appropriate.
- Tracking of defects from failure to repair.

#### **IMO: ISM Code.**

10.1 The company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the company.

#### **Inspection Guidance**

The vessel operator should have developed a defect reporting system, which may be incorporated within the planned maintenance system, that will be utilised to record all defects to structure, machinery and equipment as defined within the company defect reporting procedure.

The procedure should define:

- What constitutes a defect to structure, machinery and equipment that must be reported through the defect reporting system. This should include:
  - Navigation equipment.
  - Engine machinery.
  - Deck machinery.
  - Cargo handling machinery/equipment.
  - Hull structure.
  - Electronic equipment.
- The process for entering defects into the defect reporting system.
- The timeline for entering a defect into the defect reporting system and then transmitting the report to the shore-based management.
- The process for shore-based management to acknowledge a defect and assign a timeline for corrective action to be taken.
- The process for establishing mitigating actions where the reported defect adversely affects the safe operation of the vessel.
- The requirement to submit an incident report where a defect resulted in, or was the cause of, an incident as defined elsewhere within company procedures.

The vessel should have prepared a printed list of all open defect reports existing onboard the vessel at the time of the inspection for the inspector's use. The list of open defect reports should identify any defects that have resulted in a notification to the vessel's Classification Society and/or Flag Administration.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure which described the management and operation of the defect report system.
- Review the entries in the defect reporting system and verify that they had been entered in accordance with company expectations, communicated to the shore management within the time frame specified and had been acknowledged.
- During the balance of the inspection note any obviously defective structure, machinery or equipment that was not subject to a defect report for inclusion as an observation under this question.
- Review a sample defect report and confirm that a timeline for corrective action had been assigned and any mitigating actions had been conducted as directed by shore-based management.

#### **Expected Evidence**

- The company procedure for managing defects to vessel structure, machinery and equipment through the defect reporting system.
- The defect reporting system or the planned maintenance system where the systems were integrated.
- Shore based acknowledgement of each defect entered into the defect reporting system.
- A printed list of all open defects reports entered into the defect reporting system.

#### **Potential Grounds for a Negative Observation**

- There was no defect reporting system.
- There was no company procedure for managing defects to vessel structure, machinery and equipment through the defect reporting system.
- The accompanying senior officer was unfamiliar with the company defect reporting procedure.
- Defects entered in the defect reporting system had not been acknowledged by shore management.
- Defects were evident onboard the vessel during the inspection that were required to be entered in the defect reporting system but were not.
  - In such cases identify the defective equipment in the negative observation module of the Hardware response tool.
  - Such observation should be limited to items listed on the supplements to the statutory certification or subject to class survey.
- Defects which had either caused an incident or were caused by an incident that had not been reported through the company incident reporting system for further investigation.

Where defects were properly recorded in the defect reporting system and acknowledged by shore management such defects should not result in a negative observation under this question.

**2.4.2. Where defects existed to the vessel's structure, machinery or equipment, had the vessel operator notified class, flag and/or the authorities in the port of arrival, as appropriate to the circumstances, and had short term certificates, waivers, exemptions and/or permissions to proceed the voyage been issued where necessary?**

**Short Question Text**

Defect reporting to class, flag etc

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation

**Publications**

IMO SOLAS

IACS: Information Paper. Classification societies – what why and how?

**Objective**

**To ensure that defects affecting statutory certification or class required equipment are reported to the vessel's Classification Society, Flag Administration and any affected stakeholders as appropriate.**

**Industry Guidance:**

**IACS: Information Paper. Classification societies – what, why and how?**

Section B1 – The effectiveness of classification depends upon the shipbuilder, during construction, and the shipowner, once the vessel enters service, cooperating with the Class Society in an open and transparent manner on all issues which may affect its class status. For the shipowner, this particularly requires acting in good faith by disclosing to the Class Society any damage or deterioration that may affect the vessel's classification status. If there is the least question, the owner should notify class and schedule a survey to determine if the vessel is in compliance with the relevant class standard.

**IACS: Unified Requirement Z13.** Voyage repairs and Maintenance.

**TMSA KPI 4.1.2** requires that a defect reporting system is in place for each vessel within the fleet.

The defect reporting system covers all onboard equipment and includes Conditions of Class.

**IMO : ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

10.2 In meeting these requirements the Company should ensure that:

1. inspections are held at appropriate intervals,
2. any non-conformity is reported with its possible cause, if known,
3. appropriate corrective action is taken, and
4. records of these activities are maintained.

**IMO: SOLAS**

## Chapter I. Regulation 11

Maintenance of conditions after survey.

c) Whenever an accident occurs to the ship or a defect is discovered, either of which affects the safety of the ship or the efficiency or completeness of its lifesaving appliances or other equipment, the master or owner of the ship shall report at the earliest opportunity to the Administration...

## Chapter II-1. Regulation 3-1 Structural, Mechanical and electrical requirements for ships.

In addition to the requirements contained elsewhere in the present regulations, ships shall be designed, constructed and maintained in compliance with the structural, mechanical and electrical requirements of a classification society which is recognized by the Administration in accordance with the provisions of regulation XI-1/1, or with applicable national standards of the Administration which provide an equivalent level of safety.

### **Inspection Guidance**

The vessel operator should have developed a procedure for evaluating defects to a vessel's structure, machinery and equipment to determine whether, when and how the vessel's Classification Society, Flag Administration and/or other external stakeholders should be informed.

The procedure should define:

- Which defects to vessel structure, machinery and equipment should be reported to the vessel's Classification Society, Flag Administration and/or other external stakeholders.
- When the defects are required to be reported to the vessel's Classification Society, Flag Administration and/or other external stakeholders and by whom.
- Where short term certificates and/or flag waivers have been issued, the external stakeholders that may need to be notified and by whom.
- The records that must be maintained onboard to demonstrate that the appropriate notifications had been made to the vessel's Classification Society, Flag Administration and/or other external stakeholders.

The vessel should have prepared a printed list of all open defect reports existing onboard the vessel at the time of the inspection for the inspector's use. The list of open defect reports should identify any defects that have resulted in a notification to the vessel's Classification Society and/or Flag Administration.

### **Suggested Inspector Actions**

- Review the Class Status report and identify any conditions of class, memoranda or short-term certificates that may indicate that there was a defect in the vessel's structure, machinery or equipment.
- Review the vessel's defect reporting system and identify any defects that would be reportable to the vessel's Classification Society or Flag Administration and verify that they were either reported in the class status report or communications were available to demonstrate that class and/or flag had been advised and that no further action was required.
- Where the vessel had a short-term certificate or Flag Administration waiver verify that the vessel had notified external stakeholders of the vessel deficiency, where required to do so, through the pre-arrival processes applicable to the port of arrival or transit of controlled navigational areas.
- Where the vessel's Classification Society or Flag Administration had required that specific mitigating measures were taken as a condition of the issuing a short-term certificate or flag waiver, verify that the vessel had complied with the required measures.

### **Expected Evidence**

- The company procedure for notifying the vessel's Classification Society, Flag Administration and/or other external stakeholders of defects to the vessel's structure, machinery and equipment.
- The class status report – uploaded to the document portal.

- The defect reporting system, or the planned maintenance system where systems were integrated.
- A printed list of open defect reports identifying any defects which had been reported to the vessel's Classification Society and/or Flag Administration.
- Communications from the shore-based management indicating the defect reports had been evaluated and that no external reporting to the vessel's Classification Society and/or Flag Administration was necessary or that notifications had been made and no further reporting was required.
- Communications from the vessel's Classification Society or Flag Administration relating to any mitigating actions required as a condition of issuing a short-term certificate or flag waiver.
- Pre-arrival notifications required by the port of arrival to demonstrate that defects affecting the vessels operations had been reported in accordance with local requirements.

#### **Potential Grounds for a Negative Observation**

- There was no company procedure which required that defects to vessel structure, machinery and equipment were evaluated by shore management to determine whether notifications to Class, Flag and/or other external stakeholders were required.
- The senior officers were not familiar with the company procedure for notifying Class, Flag and/or other external stakeholders of defects to the vessel's structure, machinery or equipment after shore management evaluation.
- There were open defect reports in the defect reporting system which were of a significant nature but there was no evidence that class, flag and/or external stakeholders had been informed in accordance with the company procedure. In this case identify the defective equipment in the negative observation module of the Hardware response tool.
- Class, Flag or external stakeholders had imposed conditions on the vessel as a result of a defect to the structure, machinery or equipment but the vessel had no evidence that the conditions had been complied with.

Where no defects existed that had been notified to, or would have required notification to, the vessel's Classification Society, Flag Administration and/or other external stakeholders select "*Not Answerable*" in the Hardware response tool, then select "*Not Applicable - as instructed by question guidance*".

## 2.5. Management of Change

### 2.5.1. Had the company Management of Change procedure been effectively implemented for changes affecting structure, machinery and equipment governed by Classification Society rules or statutory survey?

#### Short Question Text

Management of Change

#### Vessel Types

Oil, Chemical, LPG, LNG

#### ROVIQ Sequence

Anywhere, Documentation

#### Publications

None

#### Objective

To ensure that any change made to the vessel structure, machinery or equipment is properly managed to avoid an undesirable outcome.

#### Industry Guidance

##### IACS Information Paper. Classification societies – what, why and how?

Section B1 – The effectiveness of classification depends upon the shipbuilder, during construction, and the shipowner, once the vessel enters service, cooperating with the Class Society in an open and transparent manner on all issues which may affect its class status.

**TMSA KPI 7.1.1** requires that there is a documented procedure for management of change.

The procedure addresses both permanent and temporary changes onboard and ashore. These may include:

- Installation of new equipment and modification of existing equipment.

#### IMO: ISM Code

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

#### Inspection Guidance

The vessel operator should have developed a Management of Change (MOC) procedure which required that changes to vessel structure, machinery and equipment follow a defined process. The procedure should define:

- What changes are subject to the MOC process.
- What changes can be excluded from the MOC process such as like for like replacements.
- The process of documenting a request for change, the format of the request and the means of communicating the request to shore management.
- The approval process before a change can be carried out.
- The notification process for communicating approved changes to stakeholders.
- The supplementary documentation required to support a change request.



- The process to identify and document drawings, manuals, procedures, checklists etc. which will be affected by a change along with confirmation that updates to such documents have been undertaken on completion of the change.
- How all changes subject to the MOC process will be indexed onboard through a database, register of changes or traditional filing system.

The vessel operator should have declared any changes to vessel structure, machinery or equipment conducted within the previous twelve months through the pre-inspection questionnaire. Details of the changes undertaken will be inserted in the inspection editor and reproduced in the final report.

Changes of existing machinery and equipment for new ones with similar dimensions and characteristics, which do not entail changes in the vessel's systems performance or operations or modifications of existing structures, may not be subject to MOC process.

The scope of this question is limited to vessel structure, machinery and equipment regulated under any aspect of the applicable classification society rules or statutory survey of a vessel.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company MOC procedure.
- Review the pre-inspection questionnaire and identify whether the vessel operator had declared that any applicable changes have been carried out onboard within the previous twelve months.
- Review the vessel's MOC register or database index.
- Where changes falling within the scope of the company MOC procedure and this question had taken place, review the provided management of change request, risk assessment and associated documentation.
- During the physical inspection of the vessel and review of documentation for other questions note any apparent recent changes to vessel structure, machinery or equipment which may be within scope of this question but had not been declared.

### **Expected Evidence**

- The vessel's MOC register or database index.
- The MOC requests for all changes to vessel structure, machinery and equipment conducted onboard the vessel during the previous twelve months.
- Supporting documents such as risk assessments, training plans, updated drawings lists etc. as identified within each MOC request form.

### **Potential Grounds for a Negative Observation**

- There was no company MOC procedure covering changes affecting class and/or flag regulated structure, machinery and equipment.
- The accompanying senior officer was unfamiliar with the company MOC process, as it applied to changes falling within the scope of this question, to structure, machinery and equipment onboard the vessel.
- Changes falling within the scope of this question to vessel structure, machinery or equipment, regulated by class and/or flag, had been conducted within the previous twelve months but had not been declared on the pre-inspection questionnaire.
- Changes to vessel structure, fittings or equipment, within the scope of this question, had been conducted within the previous twelve months but there was no approved MOC request form and supporting documentation onboard.

## 2.6. Statutory Management Plans

**2.6.1. Were the Master, deck officers and engineer officers familiar with the vessel's Ballast Water Management Plan and were records available to demonstrate that ballast handling had been conducted in accordance with the plan?**

### Short Question Text

Ballast Water Management Plan

### Vessel Types

Oil, Chemical, LPG, LNG

### ROV/Q Sequence

Cargo Control Room

### Publications

IMO: Ballast Water Management Convention and BWMS Code

IMO: Resolution MEPC.252(67) Guidelines for port state control under the BWM Convention

IMO: Resolution MEPC.288(71) 2017 Guidelines for ballast water exchange

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

### Objective

**To ensure that ballast is always safely handled in accordance with the Ballast Water Management Convention and BWMS Code.**

### **Industry Guidance**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.**

Chapter 12.6 - Ballast operations

**TMSA KPI 6.2.3** requires that comprehensive procedures cover all aspects of ballast handling operations.

These procedures may include :

- Ballast water exchange.
- Ballast water treatment.

### **IMO: ISM Code**

7. The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks should be defined and assigned to qualified personnel.

### **IMO: Ballast Water Management Convention and BWMS Code**

Regulation B-1

Ballast water management plan.

Each ship shall have on board and implement a ballast water management plan. Such a plan shall be approved by the Administration taking into account guidelines developed by the Organization. The ballast water management plan shall be specific to each ship and shall at least:

1. detail safety procedures for the ship and the crew associated with ballast water management as required by this Convention;
2. provide a detailed description of the actions to be taken to implement the ballast water management requirements and supplemental ballast water management practices as set forth in this Convention
3. detail the procedures for the disposal of sediments:
  1. at sea, and
  2. to shore
4. include the procedures for coordinating shipboard ballast water management that involves discharge to the sea with the authorities of the State into whose waters such discharge will take place;
5. designate the officer on board in charge of ensuring that the plan is properly implemented;
6. contain the reporting requirements for ships provided for under this Convention; and
7. be written in the working language of the ship. If the language used is not English, French or Spanish, a translation into one of these languages shall be included.

*Regulation B-3 Ballast Water Management for Ships provides details of the dates by which ships must meet regulation D-2 (the provision and use of a ballast water treatment plant)*

#### **IMO Resolution MEPC.252(67) Guidelines for port state control under the BWM Convention.**

1.3.2.10 a ship is required to report accidents or defects that affect its ability to manage ballast water to the flag state and the port state.

#### **IMO: Resolution MEPC.288(71) 2017 Guidelines for ballast water exchange.**

##### **Inspection Guidance**

The vessel operator should have arranged for the vessel to be provided with a Ballast Water Management Plan approved by the Flag Administration and an International Ballast Water Management Certificate issued by the flag administration.

The International Ballast Water Management Certificate will identify the principal ballast water management method to be used by the vessel.

The vessel operator should have developed procedures which defined:

- When, where and how ballast is permitted to be loaded, discharged and exchanged and the processes that the vessel is required to follow.
- How ballast operations are to be recorded and by whom.
- The actions the vessel must take if it cannot comply with any aspect of the approved Ballast Water Management Plan.
- The actions the vessel must take if the ballast water treatment plant, where fitted, becomes defective.

##### **Suggested Inspector Actions**

- Sight, and where necessary review, the Ballast Water Management Plan.
- Sight the Ballast Water Management Certificate and identify the principal ballast water management method.
- Review the ballast water record book (which may be an electronic record system or be integrated into another record book or system) and verify that recent ballast handling operations were conducted and documented in accordance with the Ballast Water Management Plan and Ballast Water Management Certificate.
- Where ballast exchange had been undertaken, either as the principal ballast water management method or in addition to the use of a ballast water treatment plant, verify that the exchange was planned and conducted to minimize longitudinal and torsional stresses and other safety considerations identified in the IMO Guidelines for Ballast Water Exchange.
- Where ballast water treatment or exchange had not been completed in accordance with the Ballast Water Management Plan due to damage or defect to the ballast water treatment plant, review any communications

with the Flag and Port State Authorities and verify that any conditions placed on the vessel in respect of ballast water management had been complied with and documented accordingly.

#### **Expected Evidence**

- The Ballast Water Management Plan along with a copy of the Ballast Water Management Certificate.
- The Ballast Water Record Book or equivalent.
- Recent cargo and ballast plans along with supporting operational records to verify the times and duration of ballast operations.
- Where ballast water exchange had taken place, the exchange plan showing the sequence of exchange and the longitudinal stresses, draughts and trim at each stage of the operation.
- Where the ballast water treatment system could not be used to conduct ballast water exchange in accordance with the Ballast Water Management Plan, notifications to the Flag and Port State Authorities advising of the non-conformance.

#### **Potential Grounds for a Negative Observation**

- The vessel did not have a Ballast Water Management Plan or a valid Ballast Water Management Certificate.
- The Ballast Water Management Plan was not approved by the Flag State or recognised organisation such as a class society.
- The Ballast Water Management Plan was not ship-specific.
- The officer designated in the Ballast Water Management Plan to be in charge of ensuring that the plan was properly implemented was not familiar with its contents.
- The Ballast Water Management Plan was not written in the working language of the ship.
- The accompanying deck or engineering officer was unfamiliar with the Ballast Water Management Plan, or the entries required to be made in the ballast water record book.
- The Ballast Water Record Book had not been maintained in accordance with company procedures.
- Where ballast water exchange had taken place there was no plan showing the sequential exchange of ballast which included the longitudinal stress at each stage of the operation.
- The ballast water treatment plant was reported to be defective in any respect.
- Where ballast operations had not been completed in accordance with the Ballast Water Management Plan due to defect or accident to the ballast water treatment plant there was no evidence that the Flag and / or Port State Authorities had been notified.
- Where Flag or Port State Authorities had imposed conditions on the vessel due to the failure of the ballast water treatment plant, the vessel had not complied with the conditions imposed.
- There was evidence that the ballast water treatment plant had been bypassed in contravention to the Ballast Water Management Plan.

**2.6.2. Were the Master and officers familiar with the VOC Management Plan, and had the procedures for minimising VOC emissions set out in the Plan been implemented and documented as required?**

**Short Question Text**

VOC Management Plan.

**Vessel Types**

Oil

**ROVIQ Sequence**

Cargo Control Room

**Publications**

IMO: ISM Code

IMO: MARPOL

IMO: Resolution MEPC.185(59) Guidelines for the development of a VOC Management Plan

OCIMF: Volatile Organic Compound Emissions from Cargo Systems on Oil Tankers. First Edition 2019.

**Objective**

**To ensure VOC emissions are minimised by implementation of the VOC Management Plan.**

**Industry Guidance**

**OCIMF: Volatile Organic Compound Emissions from Cargo Systems on Oil Tankers. First Edition 2019.**

7. Operational procedures and Volatile Organic Compound Management Plan.

The purpose of the VOC Management Plan is to ensure that tanker operations, to which regulation 15.6 of MARPOL Annex VI applies, prevent or minimise VOC emissions as much as possible...

**IMO: Resolution MEPC.185(59) Guidelines for the development of a VOC Management Plan**

**1 Objectives**

.1 The purpose of the VOC management plan is to ensure that the operation of a tanker, to which regulation 15 of MARPOL Annex VI applies, prevents or minimizes VOC emissions to the extent possible.

.2 Emissions of VOCs can be prevented or minimized by:

1. optimizing operational procedures to minimize the release of VOC emissions; and/or
2. using devices, equipment, or design changes to prevent or minimize VOC emissions.

.3 To comply with this plan, the loading and carriage of cargoes which generate VOC emissions should be evaluated and procedures written to ensure that the operations of a ship follow best management practices for preventing or minimizing VOC emissions to the extent possible. If devices, equipment, or design changes are implemented to prevent or minimize VOC emissions, they shall also be incorporated and described in the VOC management plan as appropriate.

.4 While maintaining the safety of the ship, the VOC management plan should encourage and, as appropriate, set forth the following best management practices:

1. the loading procedures should take into account potential gas releases due to low pressure and, where possible, the routing of oil from crude oil manifolds into the tanks should be done so as to avoid or minimize excessive throttling and high flow velocity in pipes;

2. the ship should define a target operating pressure for the cargo tanks. This pressure should be as high as safely possible, and the ship should aim to maintain tanks at this level during the loading and carriage of relevant cargo.
3. when venting to reduce tank pressure is required, the decrease in the pressure in the tanks should be as small as possible to maintain the tank pressure as high as possible.
4. the amount of inert gas added should be minimized. Increasing tank pressure by adding inert gas does not prevent VOC release but it may increase venting and therefore increased VOC emissions; and
5. when crude oil washing is considered, its effect on VOC emissions should be taken into account. VOC emissions can be reduced by shortening the duration of the washing or by using a closed cycle crude oil washing programme.

## 2 Additional considerations

### .1 A person in charge of carrying out the plan

1. A person shall be designated in the VOC management plan to be responsible for implementing the plan and that person may assign appropriate personnel to carry out the relevant tasks.

### .2 Procedures for preventing or minimizing VOC emissions

1. Ship-specific procedures should be written or modified to address relevant VOC emissions, such as the following operations:
  1. Loading.
  2. Carriage of relevant cargo; and
  3. Crude oil washing.
2. If the ship is equipped with VOC reduction devices or equipment, the use of these devices or equipment should be incorporated into the above procedures as appropriate.

### .3 Training

1. The plan should describe the training programmes to facilitate best management practices for the ship to prevent or minimize VOC emissions.

**TMSA KPI 10.1.3** requires that procedures minimise marine and atmospheric emissions and ensure that they are always within permitted levels. Procedures may include

- VOC management

## **IMO: ISM Code**

7. The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks involved should be defined and assigned to qualified personnel.

## **IMO: MARPOL**

### Annex VI

### Chapter 3 Regulation 15

6. A tanker carrying crude oil shall have on board and implement a VOC management plan approved by the Administration. Such a plan shall be prepared taking into account the guidelines developed by the Organization. The plan shall be specific to each ship and shall at least:

1. Provide written procedures for minimizing VOC emissions during the loading, sea passage and discharge of cargo.

2. Give consideration to the additional VOC generated by crude oil washing
3. Identify a person responsible for implementing the plan, and
4. For ships on international voyages, be written in the working language of the Master and officers and, if the working language of the master and officers is not English, French or Spanish, include a translation into one of those languages.

### **Inspection Guidance**

The vessel operator should have developed a VOC Management Plan, to be implemented when carrying crude oil. This Plan should be ship specific and include:

- Written procedures for minimising VOC emissions during the loading, carriage and discharge, including crude oil washing, of crude oil cargoes.
- The identity of the person on board responsible for implementing the Plan.
- The records that are required to be maintained to demonstrate compliance with the Plan.
- A target operating pressure for the cargo tanks during loading and carriage of crude oil cargoes.
- Training programmes for ship's crew involved in cargo operations.

The cargo and ballast transfer plan and crude oil washing plan should be developed to include the requirements of the VOC Management Plan.

The target operating pressure for the cargo tanks should be clearly indicated in the cargo control room.

This question will only be allocated to oil tankers where the vessel operator had declared that the vessel was provided with a VOC Management Plan through the pre-inspection questionnaire.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the VOC Management Plan.
  - Review the records of cargo operations and tank pressures at different stages of the voyage required to be maintained by the VOC Management Plan.
  - Review the records required to be maintained by the VOC Management Plan and verify that they were being maintained for all stages of the voyage and cargo handling operations.
  - Review the cargo plan and verify that it considered any requirements of the VOC management plan applicable to the operation.
  - Review the VOC Management Plan training records.
- 
- Interview the person identified as responsible for implementing the Plan to verify their familiarity with the contents and any specific record keeping requirements.
  - Interview the accompanying officer to verify their awareness of:
    - The VOC Management Plan.
    - Any actions required to be completed during the ongoing cargo operation to comply with the Plan.

### **Expected Evidence**

- The VOC Management Plan.
- VOC Management Plan training records.
- Records required to be maintained to demonstrate compliance with the Plan.
- The cargo plan for the ongoing cargo operation.
- The deck logbook.

### **Potential Grounds for a Negative Observation**

- The VOC Management Plan was not approved by the Flag State or recognised organisation such as a Class Society.
- The VOC Management Plan was not ship specific.
- The VOC Management Plan was not in a language readily understood by the Master and officers.
- The person identified as responsible for implementing the VOC Management Plan was not familiar with its contents.
- The accompanying officer was not aware of the VOC Management Plan or familiar with the actions necessary to comply with the provisions of the Plan (which may be incorporated in the cargo transfer plan).
- There was no evidence that the training programmes set out in the VOC Management Plan had been implemented.
- There was no evidence that the procedures for minimising VOC emissions set out in the Plan had been implemented during routine crude oil loading, carriage, discharge and crude oil washing.
- The target operating pressure for the cargo tanks was not clearly indicated in the cargo control room.
- Records required to be maintained by the VOC Management Plan had not been maintained for all occasions when crude oil was being loaded, carried and discharged, including crude oil washing.
- Cargo tank pressure was maintained significantly below the target operating pressure during loading and/or carriage of crude oil, by venting to atmosphere.



### **2.6.3. Were the Master and senior officers familiar with the contents and requirements of the Ship Energy Efficiency Management Plan (SEEMP) and had these been fully implemented?**

#### **Short Question Text**

Ship Energy Efficiency Management Plan (SEEMP).

#### **Vessel Types**

Oil, Chemical, LPG, LNG

#### **ROVIQ Sequence**

Documentation, Chief Engineer's Office

#### **Publications**

IMO: ISM Code

IMO: MARPOL

IMO: Resolution MEPC.282(70) 2016 Guidelines for the development of a Ship Energy Efficiency Management Plan (SEEMP)

#### **Objective**

**To ensure the measures set out in the SEEMP to improve fuel efficiency and collect fuel consumption data have been fully implemented.**

#### **Industry Guidance**

#### **IMO: Resolution MEPC.282(70) 2016 Guidelines for the development of a Ship Energy Efficiency Management Plan (SEEMP)**

3.6 Part I of the SEEMP should be developed as a ship-specific plan by the company and should reflect efforts to improve a ship's energy efficiency through four steps: planning, implementation, monitoring, and self-evaluation and improvement. These components play a critical role in the continuous cycle to improve ship energy efficiency management. With each iteration of the cycle, some elements of part I will necessarily change while others may remain as before.

4.1.2 Recognizing that there are a variety of options to improve efficiency – speed optimization, weather routing and hull maintenance, for example – and that the best package of measures for a ship to improve efficiency differs to a great extent depending upon ship type, cargoes, routes and other factors, the specific measures for the ship to improve energy efficiency should be identified in the first place. These measures should be listed as a package of measures to be implemented, thus providing the overview of the actions to be taken for that ship.

6.2 With respect to part II of the SEEMP, these Guidelines provide guidance for developing a ship-specific method to collect, aggregate, and report ship data with regard to annual fuel oil consumption, distance travelled, hours underway and other data required by regulation 22A of MARPOL Annex VI to be reported to the Administration.

7.1 Fuel oil consumption should include all the fuel oil consumed on board including but not limited to the fuel oil consumed by the main engines, auxiliary engines, gas turbines, boilers and inert gas generator, for each type of fuel oil consumed, regardless of whether a ship is underway or not.

**TMSA KPI 10.1.1** requires that an environmental protection policy and management plan is in place. The policy, which is signed by senior management, includes a commitment to minimising the environmental impact of operations.

The policy is conspicuously posted onboard vessels and in company offices ashore. All company personnel including third party contractors are aware and familiar with the policy.

The environmental management plan may include:

- Energy management and efficiency.

#### **IMO: ISM Code**

7. The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks involved should be defined and assigned to qualified personnel.

#### **IMO: MARPOL**

Annex VI

Chapter 4 Regulation 6

Issue of endorsement of Certificates and Statement of Compliance related to fuel oil consumption reporting

Statement of Compliance – Fuel Oil Consumption Reporting

6. Upon receipt of reported data pursuant to regulation 22A.3 of this Annex, the Administration or any organisation duly authorized by it\* shall determine whether the data has been reported in accordance with regulation 22A of the Annex and, if so, issue a Statement of Compliance related to fuel oil consumption to the ship no later than five months from the beginning of the calendar year. In every case the Administration assumes full responsibility for this Statement of Compliance

Regulation 22

Ship Energy Efficiency Management Plan (SEEMP)

1. Each ship shall keep on board a ship-specific Ship Energy Efficiency Management Plan (SEEMP). This may form part of the Ship's Safety Management System (SMS).

On or before 31 December 2018, in the case of a ship of 5,000 gross tonnage and above, the SEEMP shall include a description of the methodology that will be used to collect the data required by regulation 22A.1 of this Annex and the processes that will be used to report the data to the ship's Administration.

The SEEMP shall be developed taking into account guidelines adopted by the Organization.

Refer to 2016 Guidelines for the development of a Ship Energy Efficiency Management Plan (SEEMP) (resolution MEPC.282(70))

Regulation 22A

1 From calendar year 2019, each ship of 5,000 gross tonnage and above shall collect data specified in Appendix IX to this Annex, for that and each subsequent calendar year or portion thereof, as appropriate according to the methodology included in the SEEMP.

2 except as provided for in paragraph 4, 5 and 6 of this regulation, at the end of each calendar year, the ship shall aggregate the data collected in that calendar year or portion thereof, as appropriate.

3 except as provided for in paragraphs 4, 5 and 6 of this regulation, within three months after the end of each calendar year, the ship shall report to its Administration or any organization duly authorised by it, the aggregated value for each datum specified in appendix IX to this Annex, via electronic communication and using a standardized format to be developed by the Organization.

## **Inspection Guidance**

The vessel operator should have developed a ship-specific Ship Energy Efficiency Management Plan (SEEMP). This may form part of the Ship's Safety Management System (SMS).

Part I of the SEEMP should contain ship-specific measures to improve the ship's energy efficiency, and details for their implementation, such as:

- Improved voyage planning.
- Weather routing.
- Just in time arrival.
- Speed optimization.
- Optimum trim.
- Optimum use of rudder and heading control systems (autopilots).
- Hull maintenance.

Part II should set out the method of collecting, aggregating and reporting the ship's annual fuel consumptions to the flag administration, including the:

- List of the ship's engines and other fuel consumers and the fuel types used.
- Method to measure fuel consumption.
- Method to measure distance travelled.
- Method to measure hours underway.
- Processes to be used to report the data to the flag administration.

The vessel should have been issued with a Statement of Compliance – Fuel Oil Consumption Reporting, which will confirm that the requirements of the SEEMP Part II had been met during the previous year.

The vessel's EEDI number will be extracted from HVPQ 1.1.12 and inserted in the inspection editor and the final report.

## **Suggested Inspector Actions**

- Sight and review the Ship Energy Efficiency Management Plan (SEEMP).
- Sight and review the documentary evidence that the package of measures listed in the SEEMP Part I to improve the ship's energy efficiency had been implemented and/or monitored.
- Sight and review, where applicable, records of the collection, aggregation, and reporting of ship data with regard to annual fuel oil consumptions.
- Interview the Master and/or the Chief Engineer to verify their familiarity with the contents and requirements of the Ship Energy Efficiency Management Plan (SEEMP).

## **Expected Evidence**

- Ship Energy Efficiency Management Plan (SEEMP).
- Documentary evidence that the package of measures listed in the SEEMP Part I to improve the ship's energy efficiency had been implemented and/or monitored, which may be contained in bridge and engine logbooks etc.
- On ships of 5,000 gross tonnage or above, records of the collection, aggregation, and reporting of ship data with regard to annual fuel oil consumption, distance travelled, hours underway and other data required by regulation 22A of MARPOL Annex VI to the flag Administration.
- Statement of Compliance – Fuel Oil Consumption Reporting, for ships of 5,000 gross tonnage or above.

### **Potential Grounds for a Negative Observation**

- The Master and/or the Chief Engineer were not familiar with the contents and requirements of the Ship Energy Efficiency Management Plan (SEEMP).
- The SEEMP Part I did not contain a package of measures to improve the ship's energy efficiency, and details for their implementation, such as:
  - Improved voyage planning.
  - Weather routing.
  - Just in time arrival.
  - Speed optimization.
  - Optimum trim.
  - Optimum use of rudder and heading. control systems (autopilots).
  - Hull maintenance.
- The package of measures listed in the SEEMP Part I to improve the ship's energy efficiency was not ship specific.
- There was no evidence that the package of measures listed in the SEEMP Part I to improve the ship's energy efficiency had been implemented and/or monitored.
- On a ship of 5,000 gross tonnage or above:
  - The SEEMP Part II did not include a description of the ship-specific method to collect, aggregate, and report ship data with regard to annual fuel oil consumption, distance travelled, hours underway and other data required by regulation 22A of MARPOL Annex VI to be reported to the flag administration.
  - A Statement of Compliance – Fuel Oil Consumption Reporting had not been issued.
  - There were no records of the collection, aggregation, and/or reporting of ship data with regard to annual fuel oil consumption, distance travelled, hours underway and other data required by regulation 22A of MARPOL Annex VI to the flag administration.
  - Records of fuel consumptions did not include all the fuel oil consumed on board, regardless of whether the ship was underway or not:
    - By the main engines, auxiliary engines, gas turbines, boilers and inert gas generator, if fitted, and any other fuel consumer.
    - For each type of fuel oil consumed e.g. HFO, DO, LNG etc.

## 2.7. Safety Management System

### 2.7.1. Was the relevant content of the SMS manuals easily accessible to all personnel on board in a working language(s) understood by them?

#### Short Question Text

Availability of SMS content to all crew.

#### Vessel Types

Oil, Chemical, LPG, LNG

#### ROVIQ Sequence

Documentation, Bridge, Cargo Control Room, Engine Control Room, Interview - Rating

#### Publications

IMO: ISM Code

#### Objective

To ensure that all personnel on board can access and understand the procedures and instructions relevant to them, set out in the ship's SMS manuals.

#### **Industry Guidance**

**TMSA KPI 1A.1.4** requires that procedures and instructions are easily accessible to personnel and available at appropriate locations. Sufficient electronic or hard copies of procedures and instructions are easily accessible to all personnel, including contractors, at appropriate locations which may include:

- Onboard vessels.

#### **IMO: ISM Code**

6.6 The Company should establish procedures by which the ship's personnel receive relevant information on the SMS in a working language or languages understood by them.

#### 11 Documentation

11.1 The Company should establish and maintain procedures to control all documents and data which are relevant to the SMS.

11.2 The Company should ensure that:

1. valid documents are available at all relevant locations;
2. changes to documents are reviewed and approved by authorized personnel; and
3. obsolete documents are promptly removed.

11.3 The documents used to describe and implement the SMS may be referred to as the Safety Management Manual. Documentation should be kept in a form that the Company considers most effective. Each ship should carry on board all documentation relevant to that ship.

#### **Inspection Guidance**

The content of the SMS manuals:

- May be provided in electronic format or in hard copy.
- Must be available to all personnel on board, in whatever form.

- Must be in a working language(s) understood by all the crew.
- Should be in a 'user friendly' format and easily accessible.
- Should be relevant to the ship.

If the manuals are only available in electronic format, all personnel must have ready access to a work-station and adequate training in accessing the SMS in that manner.

In any case, the operator's navigation procedures and instructions must be available on the bridge. If provided there in electronic format only, a back-up independent means of power supply to the work-station must be provided.

Procedures should be in place:

- For the control of all documentation, including the SMS manuals. All copies on board must be up to date, and obsolete documentation should be removed from all locations.
- To ensure that changes to the SMS are promptly brought to the attention of the appropriate on-board personnel and understood.

The vessel operator should have declared in which language(s) the SMS had been prepared through the Pre-Inspection Questionnaire. This information will be inserted in the inspection editor and the final report.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the SMS manuals, whether in electronic format or in hard copy.
- Sight, and where necessary review, evidence that changes to the SMS are promptly brought to the attention of the appropriate on-board personnel and understood (which may be documentary or electronic).
- Verify there is easy access to the navigation procedures and instructions on the bridge, whether in electronic format or in hard copy.
- During the inspection, note versions of procedures and checklists etc. in use for consistency.
- Interview a rating at random to verify that they have easy access to the relevant content of the SMS manuals in a working language they understand and are familiar with the means of accessing the SMS manuals.

### **Expected Evidence**

- SMS manuals.
- Evidence that changes to the SMS are promptly brought to the attention of the appropriate on-board personnel and understood (which may be documentary or electronic).

### **Potential Grounds for a Negative Observation**

- The SMS manuals were not 'user friendly' and ship staff found it difficult and/or time consuming to navigate to the appropriate information.
- A significant proportion of the content of the SMS manuals was not relevant to the ship e.g. described procedures for general cargo ships, container ships or bulk carriers.
- Manuals were in hard-copy format but there were insufficient copies at appropriate locations.
- Manuals were only available in electronic format, but not all personnel had ready access to a work-station and/or adequate training in accessing the SMS.
- The operator's navigation procedures and instructions were not available on the bridge.
- The operator's navigation procedures and instructions were available on the bridge in electronic format only, but a back-up independent means of power supply to the work-station was not provided.
- All or some of the copies of the SMS manuals had not been updated with the latest changes.

- Obsolete documentation, such as procedures or checklists which had been revised and superseded, were in use on board.
- There was no procedure to ensure that changes to the SMS were promptly brought to the attention of the appropriate on- board personnel and understood.
- There was no evidence that changes to the SMS had been promptly brought to the attention of the appropriate on-board personnel and understood.
- An interviewed rating was not familiar with the process to access the sections of the SMS relevant to their role.
- An interviewed rating was not able to understand the sections of the SMS manuals relevant to their role onboard in the language(s) in which they were provided.

**2.7.2. Did the SMS identify clear levels of authority and lines of communication between the Master, ship's officers, ratings and the company, and were all onboard personnel familiar with these arrangements as they related to their position?**

**Short Question Text**

Communication lines with the company and DPA.

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Bridge, Cargo Control Room, Engine Control Room, Interview - Rating, Interview Senior Officer

**Publications**

ICS: Bridge Procedures Guide – Fifth Edition

IMO: ISM Code

IACS Recommendation No.41 (Rev.5 Oct 2019) Guidance for Auditors to the ISM Code

**Objective**

**To ensure all onboard personnel understand the levels of authority and lines of communication between the Master, ship's officers, ratings and the company as they relate to their position.**

**Industry Guidance**

**ICS: Bridge Procedures Guide – Fifth Edition**

1.3 Company policy and procedures

The ISM Code requires every company to have an SMS which covers instructions and procedures to ensure safe operation of ships and protection of the environment. This should include practical guidance on navigational safety including:

- Company contacts, including the Designated Person Ashore (DPA);

The SMS should identify clear levels of authority and lines of communication between the Master, ship's officers, crew and the Company.

**IACS Recommendation No.41 (Rev.5 Oct 2019) Guidance for Auditors to the ISM Code**

4. Designated Person(s)

It is commonly believed that the DP must be made responsible for the entire administration of the management system documentation, for the planning and conduct of internal audits, and must act as the sole conduit for all contacts between the ships' staff and the organization ashore. This is not the case. It is better to think of the DP as the person responsible for ensuring that such processes are in place and operating as required, a role that is more likely to be effective when separated from the practical implementation.

**TMSA KPI 1A.2.2** requires that managers' roles, responsibilities and accountabilities for achieving objectives are defined within the SMS. Ways of demonstrating that roles and responsibilities are defined may include

- Organisational charts, including reporting lines.
- Job descriptions, including responsibilities and accountability.

**IMO: ISM Code**



3.2 The Company should define and document the responsibility, authority and interrelation of all personnel who manage, perform and verify work relating to and affecting safety and pollution prevention.

#### 4 Designated Person(s)

To ensure the safe operation of each ship and to provide a link between the Company and those on board, every Company, as appropriate, should designate a person or persons ashore having direct access to the highest level of management. The responsibility and authority of the DP or persons should include monitoring the safety and pollution prevention aspects of the operation of each ship and ensuring that adequate resources and shore-based support are applied, as required.

#### 5 Master's responsibility and authority

5.2 The company should ensure that the safety management system operating onboard the ship contains a clear statement emphasizing the master's authority. The company should establish in the safety management system that the master has overriding authority and the responsibility to make decisions with respect to safety and pollution prevention and to request the company's assistance as may be necessary.

### **Inspection Guidance**

The SMS manuals should identify clear levels of authority and lines of communication between the Master, ship's officers, ratings and the company. Schematics or flowcharts to document lines of authority and inter-relations between roles are acceptable.

All officers and ratings should be aware of the identity, contact details and role of the DPA.

Senior officers should also be familiar with the key members of the operator's organisation ashore to facilitate effective communication in matters relating to safety and environmental protection. Examples are the person(s) responsible for navigational standards and the vessel's technical superintendent.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the documented levels of authority and lines of communication between the Master, ship's officers, ratings and the company documented in the SMS manuals.
- Interview a senior officer to verify that they are familiar with the lines of communication with the key members of the operator's organisation ashore, including the DPA.
- Interview a junior officer or rating to verify that they are aware of the identity, contact details and role of the DPA.

### **Expected Evidence**

- The SMS manual showing documented levels of authority and lines of communication between the Master, ship's officers, ratings and the company.
- The means of informing all officers and ratings of the identity and contact details of the DPA.

### **Potential Grounds for a Negative Observation**

- The SMS did not identify clear levels of authority and lines of communication between the Master, ship's officers, ratings and the Company.
- A senior officer was not familiar with the lines of communication with the key members of the operator's organisation ashore.
- An interviewed junior officer or rating was not aware of the identity, contact details and role of the DPA.

## 2.8. General Information

**2.8.1. Was the OCIMF Harmonised Vessel Particulars Questionnaire (HVPQ) available through the OCIMF SIRE Programme database completed accurately to reflect the structure, outfitting, management and certification of the vessel?**

**Short Question Text**

HVPQ accurately completed.

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation, Pre-board

**Publications**

None

**Objective**

**To ensure that the information contained within the OCIMF HVPQ provides an accurate dataset for use by SIRE 2.0 programme participants.**

**Inspection Guidance**

The vessel operator should have updated the HVPQ in preparation for the inspection to ensure that all static and dynamic information is complete and accurate.

The HVPQ will not be released to the inspector through the inspection editor unless the vessel operator had declared through the inspection booking process that the information contained within the HVPQ was updated, complete and accurate.

The CVIQ used during the inspection will be compiled in part from the data contained within the HVPQ, therefore it is critical that the information provided is accurate.

The inspection editor software will receive the information necessary to complete the inspection when the inspector synchronises the tablet software with the OCIMF database prior to the inspection.

To ensure that the information provided through the HVPQ is correct as far as can be determined, and the inspector has familiarised themselves with the vessel, the inspector is required to review the HVPQ and other supporting documentation prior to boarding the vessel.

To assist in the review, all certificates and documents available within the OCIMF certificate repository will be uploaded to the inspection editor software.

**Suggested Inspector Actions**

Prior to boarding the vessel:

- Review the HVPQ downloaded to the inspection editor, and with reference to documents and certificates made available through the inspection editor:
  - Verify, as far as possible, the accuracy of:
    - 1 General information.
    - 2 Certificates.
    - 3 Crew.
    - 4 Navigation.
    - 7 Structural condition.

- 12 Propulsion.
- Conduct a general review of the HVPQ and make a note of:
  - Any information which appears inconsistent with the type and specialisation of the vessel.
  - Any information which will assist in better understanding the background of the questions assigned to the bespoke VIQ for the inspection.

While onboard the vessel:

- Clarify any inconsistencies identified within the HVPQ with the Master or an appropriate officer.
- Inform the Master of any verified errors or omissions within the HVPQ.
- Document any verified errors or omissions within the HVPQ in accordance with the guidance provided.

### **Expected Evidence**

The following certificates and documents will be provided, as applicable to the vessel, through the inspection software:

- HVPQ.
- SIRE Crew matrix.
- Class Status Summary Report (CSSR) (Owners version).
- Ballast Water Management Certificate.
- Certificate of Fitness for the Carriage of Chemicals or Gas.
- Certificate of Registry.
- Civil Liability Convention (1992) Certificate.
- Condition Assessment Programme (CAP) Certificate.
- Continuous Synopsis Record.
- Document of Compliance (DOC).
- International Ship Security Certificate.
- IOPP Certificate, supplemented by Form A or B.
- Load Line Certificate.
- Maritime Labour Convention (2006).
- Minimum Safe Manning Document.
- Noxious Liquid Substances (NLS) Certificate.
- P & I Club entry document.
- Safety Construction Certificate.
- Safety Equipment Certificate, supplemented by Form E.
- Safety Management Certificate.
- Safety Radio Certificate, supplemented by Form R.
- Statement of Compliance supplement.
- U.S. Coastguard Certificate of Financial Responsibility.
- U.S. Coastguard Certificate of Compliance.
- U.S. Coastguard Letter of Compliance.
- U.S. Coastguard Vessel Spill Response Plan approval letter.

### **Potential Grounds for a Negative Observation**

Where the information provided within the HVPQ misrepresented the details of the vessel through multiple systemic inaccuracies or omissions relating to ownership, class status, validity of certification or outfitting of the vessel:

- Make an **observation** within the process response tool and add a comment to identify which questions were provided with inaccurate information.

**2.8.2. Were records of the most recent Port State Control inspection available onboard, and where deficiencies had been recorded had these been corrected and closed out in accordance with the company procedure for defects or non-conformities?**

**Short Question Text**

Last Port State Control Inspection.

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation, Pre-board

**Publications**

None

**Objective**

**To provide an accurate record of the most recent Port State Control (PSC) Inspection.**

**Industry Guidance**

**OCIMF: PSC Inspection Repository.**

The PSC inspection Repository is an addition to the SIRE database to provide a convenient way for ship operators to disseminate details of PSC inspections on board their vessels.

Ship operators are invited to, on a voluntary basis, upload details of PSC inspections that have occurred on board their vessels. Ship operators upload these documents at their own risk in the full knowledge that any OCIMF member, SIRE Programme Recipient, member of registered port state entities who participate in the SIRE system can view, download, save or print any or all of these documents.

**IMO: Port State Control (IMO Website)**

**Port State Control (PSC)** is the inspection of foreign ships in national ports to verify that the condition of the ship and its equipment comply with the requirements of international regulations and that the ship is manned and operated in compliance with these rules.

These inspections were originally intended to be a back up to flag State implementation, but experience has shown that they can be extremely effective. The Organization adopted resolution A.682(17) on Regional co-operation in the control of ships and discharges promoting the conclusion of regional agreements. A ship going to a port in one country will normally visit other countries in the region and it can, therefore, be more efficient if inspections can be closely coordinated in order to focus on substandard ships and to avoid multiple inspections.

This ensures that as many ships as possible are inspected but at the same time prevents ships being delayed by unnecessary inspections. The primary responsibility for ships' standards rests with the flag State - but port State control provides a "safety net" to catch substandard ships.

Nine regional agreements on port State control - Memoranda of Understanding or MoUs - have been signed: Europe and the north Atlantic (Paris MoU); Asia and the Pacific (Tokyo MoU); Latin America (Acuerdo de Viña del Mar); Caribbean (Caribbean MoU); West and Central Africa (Abuja MoU); the Black Sea region (Black Sea MoU); the Mediterranean (Mediterranean MoU); the Indian Ocean (Indian Ocean MoU); and the Riyadh MoU. The United States Coast Guard maintain the tenth PSC regime.

**TMSA KPI 4.1.2** requires that a defect reporting system is in place for each vessel within the fleet.

The defect reporting system covers all onboard equipment and includes Conditions of Class.

The defect reporting system may be linked to the planned maintenance system and may be computer-based.

Companies strive to correct any Conditions of Class without delay.

The defect reporting system includes:

- Guidance as to the nature of defects that are recorded and reported.
- Recording of any equipment failures or breakdowns including those identified by third parties, e.g. SIRE, PSC, CDI and barge inspection schemes.
- Reporting defects to the shore management as appropriate.
- Tracking of defects from failure to repair.

#### **IMO: ISM Code.**

10.1 The company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the company.

#### **Inspection Guidance**

The vessel operator should have provided the details of the last three Port State Control Inspections through the Pre-Inspection Questionnaire (PIQ) as follows:

- Date of inspection.
- Port of inspection.
- PSC MOU Authority.
- Number of deficiencies recorded.
- Was the vessel detained.
- Was the inspection data entered in the OCIMF PSC Database.

The information provided through the PIQ will be included in the inspection editor and reproduced in the final report.

The inspector will be able to sign into their OCIMF inspection account and review any information provided by the vessel operator in the OCIMF PSC Database. An inspector can only access OCIMF PSC Database to view the PSC information for the vessel being inspected while an active inspection is assigned to them.

Where the vessel operator had not uploaded the details of PSC inspections carried out onboard the vessel being inspected, or the vessel had changed management or name since the last SIRE 2.0 inspection, data collection and verification will be based on the information provided through the PIQ.

The vessel operator should have developed a procedure for managing PSC inspections which included:

- The conduct and supervision of a PSC inspection.
- The process to correct and close out deficiencies recorded during a PSC inspection.

#### **Suggested Inspector Actions**

Sight, and where necessary review, the company procedure for managing PSC inspections.

Where the vessel operator had uploaded the details of Port State Control Inspections to the OCIMF PSC Inspection Repository:

- Prior to boarding:
  - Review the details of the PSC inspection report and verify that the data transferred to the inspection editor was correct.

- Review the PSC inspection report and any supporting documents.
- Review the documented evidence for the correction and close out of any deficiencies recorded during the last PSC inspection.
- Consider checking vessel's IMO number against the regional PSC MOU databases to confirm that the PSC report uploaded to the inspection editor was the most recent.
- When onboard:
  - Verify that the PSC inspection report uploaded to the OCIMF PSC Inspection Repository was the same as the most recent report available onboard.

Where the vessel had changed management or name since the previous SIRE 2.0 inspection:

- Prior to boarding:
  - Check the vessel's IMO number against the regional PSC MOU databases and identify the most recent PSC inspection recorded against the vessel.
- When onboard:
  - Review the most recent PSC inspection report available onboard, but if none had taken place since the change of management or name, record the data for the last recorded PSC Inspection against the IMO number. Add a **comment** in the Process response tool to record that the inspection was conducted under a different name or different operator.

Where the vessel operator was not utilising the OCIMF PSC Inspection Repository:

- Prior to boarding:
  - Consider checking vessel's IMO number against the regional PSC MOU databases to identify the most recent PSC inspection.
- While onboard:
  - Review the PSC inspection reports available onboard.
  - Review the documented evidence for the correction and close out of any deficiencies recorded during the last PSC inspection.

### **Expected Evidence**

- The company procedure for managing PSC inspections.
- All PSC inspection reports for the previous three years, or if no PSC inspections had been carried out in that period, the report for the last inspection conducted.
- Documented evidence that any deficiencies raised during the last PSC inspection had been corrected and closed out with approval from shore management through either the non-conformity reporting system or defect reporting system.

### **Potential Grounds for a Negative Observation**

- There was no company procedure for managing PSC inspections.
- Where the vessel operator was utilising the OCIMF PSC Inspection Repository, the most recent PSC Inspection Report had not been uploaded (an allowance of five days since the completion of the inspection prior to the synchronisation of the inspection editor should be allowed)
- The PSC inspection reports available onboard did not include the most recent PSC inspection available on one of the PSC MOU databases.
- Where there were documented deficiencies during the last PSC inspection, there was no documented evidence that the deficiencies had been corrected and closed out with shore management approval.
- The PSC data provided for the last inspection through the PIQ was incorrect in any respect.

Record a **comment** in the Process response tool to record the circumstances where the last inspection was conducted under a different name or different operator.

## 3. Crew Management

### 3.1. Crew Qualification

**3.1.1. Were the officers and ratings suitably qualified to serve onboard the vessel and did the officer matrix posted on the OCIMF website accurately reflect the qualifications, experience and English language capabilities of the officers onboard at the time of the inspection?**

**Short Question Text**

Crew qualifications and matrix verification.

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation

**Publications**

IMO: STCW Code

OCIMF: Guidelines for the Completion of the On-Line Officer Matrix

**Objective**

**To ensure that all officers and crew onboard are properly qualified for the type of vessel and the position they hold onboard.**

**Industry Guidelines**

**OCIMF: Guidelines for the Completion of the On-Line Officer Matrix.**

Available within the SIRE operator account.

**TMSA KPI 3.2.3** requires that the company verifies that vessel personnel quality requirements are consistently met.

Irrespective of whether this function is performed internally or by a manning agency, verification may include:

- Certification and experience.
- Compliance with manning procedures and legislative requirements.

**IMO: ISM Code**

6.2 The Company should ensure that each ship is:

1. manned with qualified, certificated and medically fit seafarers in accordance with national and international requirements; and
2. appropriately manned in order to encompass all aspects of maintaining safe operations on board.

**IMO: STCW Code**

Part A

Chapter II – Standards regarding the Master and deck department.

Chapter III- Standards regarding the engine department.

Chapter IV – Standards regarding radio operators.

Chapter V – Standards regarding special training requirements for personnel on certain types of ships:

Section A-V/1-1 – Mandatory minimum requirements for the training and qualifications of masters, officers and ratings on oil and chemical tankers.

Section A-V/1-2 – Mandatory minimum requirements for the training and qualifications of masters, officers and ratings on liquified gas tankers.

## Part B

Chapter V – Guidance regarding special training requirements for personnel on certain types of ship

Section B-V/1 Guidance regarding the training and qualifications of tanker personnel.

Person with immediate responsibility

1 The term “person with immediate responsibility” as used in paragraphs 3 and 5 of regulation V/1-1 and paragraph 3 of regulation V/1-2 means a person being in a decision-making capacity with respect to loading, discharging, care in transit, handling of cargo, tank cleaning and other cargo-related operations.

Officers and ratings assigned duties and responsibilities related to cargo or cargo equipment of oil, chemical or liquified gas tankers shall hold a certificate on basic training for oil, chemical or liquified gas tanker operations. (STCW Reg V/1-1.1 and 2.1).

Masters, Chief Engineers, Chief Mates, Second Engineers and any person with immediate responsibility for loading, discharging, care in transit, handling of cargo tank cleaning or other cargo-related operations on oil, chemical or liquified gas tankers shall hold a certificate in advanced training for oil, chemical or liquified gas tanker operations. (STCW Reg V/1-1.3, 1.5 or 2.3).

### **Inspection Guidance**

The vessel operator should have uploaded the updated crew matrix to the OCIMF website to reflect the complement on board at the time of inspection booking. The crew matrix should be updated if there are any crew changes before the inspection takes place.

The vessel operator should have developed procedures to ensure that:

- Each crew member is in possession of all statutory and company mandatory certification and course completion certificates required for their role onboard.
- Certification for each individual is presented in a standard order with an index indicating which certificates were mandatory for the role onboard.
- A consolidated record of sea service is available for each officer.

OCIMF interprets a “person with immediate responsibility” to include all watchkeeping officers in charge of cargo-related operations whether the vessel is at sea or in port. This includes the 2<sup>nd</sup> Officer, 3<sup>rd</sup> Officer, 4<sup>th</sup> Officer and Gas/Cargo Engineer. It may also include the pumpman and other ratings if engaged in direct supervision of cargo operations. These crew members should have advanced training for oil, chemical or liquified gas tanker cargo operations applicable to the type of vessel served on.

### **Suggested Inspector Actions**

- Review the officer matrix uploaded to the OCIMF website by the vessel operator and verify that:



- The information included in the matrix is accurate by randomly selecting one senior officer and junior officer from each of the deck and engine departments (to include electricians, cargo engineers and other specialist engineer officers, where carried) and cross checking their certificates of competency, endorsements and sea service records (for time in rank only).
  - All senior officers, junior deck officers and cargo/gas engineers hold a certificate in advanced training for oil, chemical or liquified gas tanker operations as applicable to the vessel type.
  - All junior engineer officers hold a certificate in basic training for oil, chemical or liquified gas tanker operations as applicable to the vessel type.
- Where ratings, including the pumpman, are assigned duties with direct supervision of cargo operations verify that they hold a certificate in advanced training for oil, chemical or liquified gas tanker operations as applicable to the vessel type.
- Select one deck rating assigned duties and responsibilities related to cargo or cargo equipment and verify that they hold a certificate of basic training for oil, chemical or liquified gas tanker operations as applicable to the vessel type.
  
- During the inspection and while interviewing the Master, Chief Engineer and other officers pay attention to the standard of English comprehension and spoken English. Where there are concerns with communication in the English language with any officer, note the degree of English recorded against the individual's rank in the published officer matrix.

#### **Expected Evidence**

- The updated officer matrix available on the OCIMF website reflecting all changes in crew that had occurred more than four days before the inspection. (it is not expected that the vessel provides a paper or electronic copy)
- The relevant documentation for each person onboard, in the following order or a standard order as defined by the vessel operator, including:
  - National certificate of competency (CoC).
  - National certificate of basic or advanced training in oil, chemical or liquified gas tanker operations.
  - Flag state endorsement of national certificate of competency (proof of application is acceptable for a period not exceeding three months).
  - Flag state endorsement of certificate of basic or advanced training for oil, chemical or liquified gas tanker operations.
  - National radio operator license.
  - Flag State endorsement of radio operator license.
  - Consolidated record of sea service supported by seaman's book(s).
  - Bridge Resource Management simulator based training course certificate (3.3.1).
  - Engine Room Resource Management simulator based training course certificate (3.3.4).
  - Cargo Operations simulator based training course certificate (3.3.3).
  - Ship Handling Training certificate (3.3.2).
  - Safety Officer Training certificate.
  - Security Officer Training certificate.(7.4.1)
  - Polar Navigation Training certificate (12.1.1).
  - Ice Navigation Training certificate.(12.6.1)
  - DP Operator Certification (3.3.5).
  - High Voltage Training certificate (3.3.5).
  - DP Control System Maintenance Course certificate (3.3.5).
  - Integrated DP/Power Management Control System Training Course certificate (3.3.5).

#### **Potential Grounds for a Negative Observation**

- The officer matrix had not been updated to reflect the officers who were on board at the time of the inspection (an allowance will be made for any officer that had changed within the previous four days).
- The accompanying senior officer was unfamiliar with the maintenance of officer and rating certification records onboard.
- The details contained in the officer matrix were inaccurate in terms of:
  - National Certificate of Competency (CoC).

- National Certificate in advanced or basic training for oil, gas or chemical service.
  - Flag endorsements of CoC or training for oil, gas or chemical service.
  - National radio operator license or flag endorsement.
  - The sea service in rank.
- An officer's CoC or Flag Endorsement included a limitation that would prevent them from performing their duties on the inspected vessel.
- A senior officer, junior deck officer or cargo/gas engineer did not hold a certificate in advanced training for oil, chemical or liquified gas tanker operations as applicable to the vessel type.
- A rating, including the pumpman, with immediate responsibility for loading, discharging, care in transit, handling of cargo tank cleaning or other cargo-related operations on oil, chemical or liquified gas tankers did not hold a certificate in advanced training for tanker operations as applicable to the vessel type.
- The sea time in rank for any officer whose records were sampled was found to be inaccurate or records were not available to verify sea time in rank. (verification checks will only cover up to thirty-six months sea service onboard).
- The flag endorsement for any individual officer did not reflect the details of the national CoC on which they were based.
- There was a concern with the standard of English language comprehension or spoken English with an officer who was recorded as having a "good" standard of English within the published officer matrix.

**3.1.2. Were procedures and instructions contained within the Safety Management System and signs posted around the vessel available in the designated working language of the vessel or a language(s) understood by the crew and, were the Master, officers and ratings able to communicate verbally in the designated working language?**

**Short Question Text**

Designated working language.

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Anywhere

**Publications**

IMO: ISM Code

IMO SOLAS

UK MCA: Code of Safe Working Practices for Merchant Seafarers

**Objective**

**To ensure that the Master, officers and ratings can read and understand procedures, instructions and safety signs onboard, and can communicate verbally in the designated working language of the vessel.**

**Industry Guidance**

**UK MCA: Code of Safe Working Practices for Merchant Seafarers. 2015 Edition.**

9 Safety signs and their use

9.1.3 Where a language other than English is the working language of the ship, any text used in conjunction with a sign should also be displayed in that language.

18.10 Training

18.10.4 All instructions or information must be in the working language of the vessel.

18.9 Information and instructions

18.9.3 Where any seafarer likely to use any item of work equipment does not understand the language in which such information and instructions are provided, appropriate measures should be taken to ensure that the information/instructions are provided in the working language of the vessel or in a language that the seafarer understands.

**TMSA KPA 1A.1.3** requires that procedures and instructions are written in plain language and contain sufficient detail to ensure that tasks can be completed correctly and consistently.

Procedures and instructions are clear, simple to use and are in the working language of the vessel.

Instructions are arranged in a clear and logical manner and in a way that makes it easy to identify each step.

**IMO: ISM Code**

6.6 The company should establish procedures by which the ship's personnel receive relevant information on the safety management system in a working language or languages understood by them.

6.7 The company should ensure that the ship's personnel are able to communicate effectively in the execution of their duties related to the safety management system

## **IMO: SOLAS**

### **Chapter V Regulation 14**

#### **Ship's manning**

3. On all ships, to ensure effective crew performance in safety matters, a working language shall be established and recorded in the ship's logbook. The company, as defined in regulation IX/1, or the master, as appropriate, shall determine the appropriate working language. Each seafarer shall be required to understand and, where appropriate, give orders and instructions and to report back in that language. If the working language is not an official language of the State whose flag the ship is entitled to fly, all plans and lists required to be posted shall include a translation into the working language.

4. On ships to which chapter I applies, English shall be used on the bridge as the working language for bridge-to-bridge and bridge-to-shore safety communications as well as for communication on board between the pilot and bridge watchkeeping personnel, unless those directly involved in the communication speak a common language other than English.

#### **Inspection Guidance**

The vessel operator should have designated the working language of the vessel and documented it within the Safety Management System.

The designated working language should be recorded in the ship's logbook.

The vessel operator should have declared the designated common working language and the language(s) of the SMS in the pre-inspection questionnaire. This information will be inserted in the inspection editor and reproduced in the final report.

It is recognised that officers and ratings may speak a language that is convenient to them when engaged in non-safety related activities. However it is expected that:

- The officers will communicate with the Inspector in English.
- While in the presence of the inspector, the officers should communicate with each other in English while discussing matters relating to the inspection. An exception can be made when the level of English had been declared as poor through the OCIMF crew matrix for one or more of the officers concerned, in which case, they should use the designated working language.
- The officers and ratings should communicate with each other in the designated working language and/or English while working with the Inspector.
- Where the inspector can conduct the inspection in the designated working language of the vessel, this is acceptable, providing sufficient English communication between officers is observed to verify the level of English declared in the OCIMF crew matrix for vessels that must use it for communication when navigating or interacting with a terminal.

Note: SOLAS Ch V Reg 14.4 clarifies when spoken English **shall** be used for navigational related communication.

#### **Suggested Inspector Actions**

- Observe the communications between the officers and between officers and ratings, during the inspection and verify that:
  - They were able to verbally communicate effectively in the designated working language of the vessel.

- The accompanying officer was able to translate a question, and the subsequent reply, directed at a rating, into English consistent with the standard of English declared within the OCIMF crew matrix.
- Observe safety signs and instructions posted around the vessel and verify that:
  - The signs or safety instructions were posted in the designated working language.
  - Where ratings were not able to read the designated working language, the safety signs or instructions were additionally posted in a language that they could read and understand.
- Observe the content of the SMS and where it had been developed in a language other than the designated working language, verify that:
  - Sections of the SMS containing safety instructions that were required to be understood by the whole crew had been translated into the designated working language and, any other languages necessary, to ensure that all officers and ratings were able to read and understand the content.
  - Checklists and safe working procedures were translated into the designated working language.

#### **Expected Evidence**

- The deck log book (or ship's log book where different) which recorded the designated working language of the vessel.
- The Safety Management System documentation, checklists etc.

#### **Potential Grounds for a Negative Observation**

- The designated working language of the vessel had not been determined by the vessel operator.
- The designated working language in use during the inspection was not the same as declared through the HVPQ and/or entered in the logbook.
- An officer or rating was observed to be unable to communicate verbally in the designated working language of the vessel.
- An officer or rating was observed to be unable to read a safety sign or instruction in any of the language(s) in which it was displayed.
- Where the common working language was not an official language of the Flag State, plans and notices required to be posted did not include a translation into the designated working language.
- The sections of the Safety Management System required to be read and understood by all onboard had not been translated into the designated working language of the vessel and, where necessary, another language(s).
- Checklists and/or safe working procedures were not available in the designated working language of the vessel.

Where there was a concern around the standard of spoken English with any officer, address the concern based on the guidance provided in question 3.1.1.

Any observation(s) arising from this question should be entered into the Process response tool.

An observation that relates to an officer or rating being unable to communicate verbally in the designated working language of the vessel is related to a deficiency in procedures and not the individual(s). The supporting comment should describe the general circumstances and not identify the personnel involved beyond officer or rating.

**3.1.3. Did the complement of officers and ratings onboard at the time of inspection meet or exceed the requirements of the Minimum Safe Manning Document and the declared company standard manning for routine operations, and had senior officers been relieved to ensure continuity of operational knowledge?**

**Short Question Text**

Minimum, standard and enhanced manning levels.

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation, Pre-board

**Publications**

IMO: Resolution A.1047(27). Principles of Safe Manning

IMO: ISM Code

IMO SOLAS

**Objective**

**To ensure that the vessel is always adequately manned for the operations expected to be undertaken based on the normal trading pattern and any foreseeable specialist operations or periods of heightened workload.**

**Industry Guidance**

**IMO: Resolution A.1047(27) Principles of Safe Manning**

Annex 2 Guidelines for determination of safe minimum manning

1.1 The minimum safe manning of a ship should be established taking into account all relevant factors, including the following:

1. size and type of ship;
2. number, size and type of main propulsion units and auxiliaries;
3. level of ship automation;
4. construction and equipment of the ship;
5. method of maintenance used;
6. cargo to be carried;
7. frequency of port calls, length and nature of voyages to be undertaken;
8. trading area(s), waters and operations in which the ship is involved;
9. extent to which training activities are conducted on board;
10. degree of shoreside support provided to the ship by the company;
11. applicable work hour limits and/or rest requirements; and
12. the provisions of the approved Ship's Security Plan.

1.4 In determining the minimum safe manning of a ship, consideration should also be given to:

1. the number of qualified and other personnel required to meet peak workload situations and conditions, with due regard to the number of hours of shipboard duties and rest periods assigned to seafarers; and
2. the capability of the master and the ship's complement to coordinate the activities necessary for the safe operation and for the security of the ship and for the protection of the marine environment.

Annex 3 Responsibilities in the application of principles of minimum safe manning

1 Responsibilities of companies

1.2 In preparing a proposal for the minimum safe manning of a ship, the company should apply the principles, recommendations and guidelines contained in this resolution and should be required to:

.1 make an assessment of the tasks, duties and responsibilities of the ship's complement required for its safe operation, for its security, for protection of the marine environment, and for dealing with emergency situations;

.5 ensure that the minimum safe manning is adequate at all times and in all respects, including meeting peak workload situations, conditions and requirements, and is in accordance with the principles, recommendations and guidelines contained in this resolution; and

.6 prepare and submit to the Administration a new proposal for the minimum safe manning of a ship in the case of changes in trading area(s), construction, machinery, equipment, operation and maintenance or management of the ship, which may affect the safe manning.

**TMSA KPI 3A.1.1** requires that procedures ensure that each vessel is appropriately manned in order to maintain safe operation onboard.

Manning levels are adequate, in terms of number and qualifications, to ensure the safety and security of the vessel and its personnel under all operating conditions.

Documentary evidence of manning level assessments is kept. This may include:

- Flag State and/or national requirements.
- Vessel type.
- Vessel trading pattern.
- Additional security requirements.
- Additional operational requirements, such as Ship to Ship (STS), or operations in ice.

#### **IMO: ISM Code**

6.2 The company should ensure that each ship is:

.1 manned with qualified, certified and medically-fit seafarers in accordance with national and international requirements; and

.2 appropriately manned in order to encompass all aspects of maintaining safe operations onboard

#### **Inspection Guidance**

The vessel operator should have developed policies and procedures for the safe manning of the vessel which set out:

- The approved manning levels for routine operations.
- The approved manning levels for defined specialist operations and high workload situations.
- The minimum interval between the relief of the senior officers from the same department.

The full manning policies and procedures may not be available onboard, but the data provided through the pre-inspection questionnaire should reflect the content.

The vessel operator should provide manning details through the pre-inspection questionnaire as follows:

- Manning required by the Minimum Safe Manning Document:
  - Number of deck officers including the Master.
  - Number of watchkeeping engineer officers including the Chief Engineer when operating in UMS mode.

- Number of watchkeeping engineer officers including the Chief Engineer when operating in manned mode.
  - Number of deck ratings.
  - Number of engine room ratings.
  - Number of general purpose ratings, where carried.
  - Number of catering ratings.
  
- Company standard manning level for the vessel during routine operations:
  - Number of deck officers including the Master.
  - Number of watchkeeping engineer officers including the Chief Engineer.
  - Number of electricians, ETOs and specialist cargo engineers.
  - Number of deck ratings including bosun and pump man.
  - Number of engine room ratings including machinists and fitters.
  - Number of general purpose ratings, where carried.
  - Number of catering ratings.
  
- Company enhanced manning provision, over and above the company standard manning level, for continuous/extended/repeated STS operations, if any:
  - Number of additional deck officers.
  - Number of additional engineer officers.
  - Number of additional deck ratings.
  
- Company enhanced manning provision, over and above the company standard manning level, for continuous/extended/repeated inter-harbour operations and/or short voyages of less than 24 hours, if any:
  - Number of additional deck officers.
  - Number of additional engineer officers.
  - Number of additional deck ratings.
  
- Company enhanced manning provision, over and above the company standard manning level, for operations requiring implementation of additional security measures, if any:
  - Number of additional deck officers.
  - Number of additional engineer officers.
  - Number of additional deck ratings.
  
- Company enhanced manning provision, over and above the company standard manning level, for other specialist operations (free text to describe), if any:
  - Number of additional deck officers.
  - Number of additional engineer officers.
  - Number of additional deck ratings.
  - Number of additional engine room ratings.
  
- The minimum interval required between the relief of the senior officers from the same department.

The information provided will be inserted in the inspection editor and the final inspection report.



### **Suggested Inspector Actions**

- Review the information provided by the vessel operator through the pre-inspection questionnaire and compare against:
  - The minimum safe manning document.
  - A copy of the arrival crew list provided by the Master.
  - The current OCIMF crew matrix available on the OCIMF SIRE database.

### **Expected Evidence**

- The Minimum Safe Manning Document.
- A copy of the arrival crew list provided by the Master.
- The current OCIMF crew matrix available on the OCIMF SIRE database.

### **Potential Grounds for a Negative Observation**

- The crew onboard on arrival at the port of inspection did not meet the requirements of the Safe Manning Document in any respect.
- The crew onboard on arrival at the port of inspection did not:
  - Meet the standard manning level declared through the pre-inspection questionnaire, or
  - Meet the company enhanced manning provision when conducting:
    - Continuous/extended/repeated STS operations.
    - Continuous/extended/repeated inter-harbour operations and/or short voyages of less than 24 hours.
    - Operations requiring implementation of additional security measures.
    - Other specialist operations
- The number of officers onboard on arrival at the port of inspection was less than declared through the OCIMF crew matrix.
- The machinery space was routinely operated in the manned mode at sea while the actual number of engineers onboard was insufficient to meet the requirements of the Safe Manning Document.
- Both senior officers from a single department were being relieved at the port of inspection with no overlap or parallel sailing period for at least one of the officers to cover the minimum relief interval declared through the pre-inspection questionnaire.

## 3.2. Crew Evaluation

**3.2.1. Was a report available onboard which confirmed that a static navigational assessment by a suitably qualified and experienced company representative had been completed as declared through the pre-inspection questionnaire?**

**Short Question Text**

Static navigational assessment

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation, Bridge

**Publications**

OCIMF A Guide to Best Practice for Navigational Assessments and Audits

**Objective**

**To verify the extent of company evaluation and oversight of navigational standards onboard managed vessels**

**Industry Guidance**

**OCIMF: A Guide to Best Practice for Navigational Assessments and Audits.**

3.2.1 Static Assessment.

A static assessment, which may be conducted in port, should include as a minimum a review of passage plans, chart corrections, navigational records, navigational equipment, compliance with company procedures and documentation.

4.2 Selection of assessors

Navigation assessments should be conducted by an experienced senior deck officer (preferably a Master Mariner with command experience), who is fully up to date with company navigational practices, the International Regulations for Preventing Collisions at Sea (COLREGS), the ICS Bridge Procedures Guide and industry best practices

**TMSA KPI 5.2.2** requires that there is a procedure in place for appropriate shore-based personnel to conduct navigational verification assessments.

The assessment, which may be conducted in port, includes as a minimum a review of passage plans, chart corrections, navigational records, navigational equipment, compliance with company procedures and verification of the master's navigational audit.

All fleet vessels are assessed at intervals not exceeding 12 months.

The navigational verification assessment is followed by a report where identified corrective actions are assigned, verified and closed out in a specified time period.

**IMO: ISM Code**

12.2 The Company should periodically verify whether all those undertaking delegated ISM related tasks are acting in conformity with the Company's responsibilities under the Code

12.3 The Company should periodically evaluate the effectiveness of the SMS in accordance with procedures established by the Company.

### **Inspection Guidance**

This question will only be generated when:

- The vessel operator had indicated that an appropriate static navigational assessment had been conducted on board the vessel being inspected within the previous twelve months and,
- A dynamic navigational audit had not been completed by a member of the company staff within the previous twelve months.

The inclusion of this question in the CVIQ does not imply an expectation by OCIMF or its members that a navigational verification assessment by an appropriate member of the shore-staff will be carried out on any vessel at any particular time.

It is an OCIMF expectation that the assessment report will include brief details of the assessor's qualifications and pertinent seafaring experience.

The inspector is not expected or required to:

- Make a qualitative assessment of the static navigation assessment report beyond the specific guidance contained herein.
- Make a qualitative assessment of the qualification and/or experience of the company representative undertaking the assessment beyond the specific guidance contained herein.

### **Suggested Inspector Actions**

Review the static navigation assessment and verify that:

- The assessment was conducted on the date declared by the operator through the pre-inspection questionnaire.
- The report was in a similar format, and covered the review items suggested by, the OCIMF publication "A Guide to Best Practice for Navigational Assessments and Audits".
- Brief details of the assessor's qualifications and experience were included within the report.
- The report contained information relating to the best practice guidance points from TMSA KPI 5.2.2
- Where the report identified areas for improvement there was evidence that follow up had been undertaken within a specified timeframe by the company and/or vessel as appropriate.

### **Expected Evidence**

- The report for the static navigational assessment declared by the operator through the pre-inspection questionnaire.
- A corrective action plan with due dates for each area for improvement identified during the static navigational assessment.
- Supporting evidence for each closed area for improvement identified and included in the corrective action plan.

### **Potential Grounds for a Negative Observation**

- The report for the static navigational assessment declared through the pre-inspection questionnaire was not available onboard.
- The details of the qualifications and pertinent seafaring experience of the assessor were not included within the report.

- The assessor did not hold or had not held a senior deck officer licence and / or had not sailed as a senior deck officer.
- The static navigational assessment report was not substantially in alignment with the guidance document “A Guide to Best Practice for Navigational Assessments and Audits” and the best practice guidance under TMSA KPI 5.2.2.
- There was no corrective action plan with defined due dates for all areas for improvement identified during the dynamic navigational assessment.
- There was no evidence that the areas for improvement identified during the dynamic navigational assessment had been closed out within the due dates indicated within the corrective action plan.

**3.2.2. Was a report available onboard which confirmed that a dynamic navigational assessment by a suitably qualified and experienced company representative had been completed while on passage as declared through the pre-inspection questionnaire?**

**Short Question Text**

Dynamic navigational assessment by a company representative

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Bridge, Documentation

**Publications**

OCIMF A Guide to Best Practice for Navigational Assessments and Audits

**Objective**

**To verify the extent of company evaluation and oversight of navigational standards onboard managed vessels**

**Industry Guidance**

**OCIMF: A Guide to Best Practice for Navigational Assessments and Audits.**

2 Purpose of a navigational assessment

The purpose of a navigational assessment should be to identify poor practices, to continuously improve navigational standards to ensure safe and efficient voyages and to assure companies that high standards of navigation and watchkeeping are being maintained.

The purpose of closely observing the interaction and effectiveness of the bridge team during pilotage and standby is to evaluate:

- Key behaviours of members of the bridge team.
- Skills of the bridge team
- Interactions between the master and pilot.

4.2 Selection of assessors

Navigation assessments should be conducted by an experienced senior deck officer (preferably a Master Mariner with command experience), who is fully up to date with company navigational practices, the International Regulations for Preventing Collisions at Sea (COLREGS), the ICS Bridge Procedures Guide and industry best practices.

**TMSA KPI 5.3.3** requires that comprehensive navigational audits\* are conducted while on passage by a suitably qualified and experienced company representative.

In addition to a navigational verification assessment\*, the purpose of the audit\* is to:

- Review and confirm that bridge practices are in compliance with international regulations and company procedures.
- Review and assess the skills and proficiency levels of the bridge team members.
- Review and evaluate the effective functioning of the bridge team during all sections of a voyage.
- Use the opportunity to promote robust navigational practices, chart-work, passage planning and good seamanship.

- Identify any additional training needs, whether this be specific to an individual or a vessel, or a fleet wide need.
- Verify adequate supervision of Junior Officers and training of cadets during critical passages.
- Verify that accurate logs are kept, and that adequate record keeping is being undertaken.

\*The terminology used in the OCIMF paper "A Guide to Best Practice for Navigational Assessments and Audits" will take precedence throughout the balance of guidance.

## **IMO: ISM Code**

12.2 The Company should periodically verify whether all those undertaking delegated ISM related tasks are acting in conformity with the Company's responsibilities under the Code

12.3 The Company should periodically evaluate the effectiveness of the SMS in accordance with procedures established by the Company.

## **Industry Guidance**

This question will only be generated when the vessel operator had indicated, through the pre-inspection questionnaire, that an appropriate dynamic navigational assessment by a suitably qualified and experienced company representative had been conducted on board the vessel being inspected within the previous two years.

The inclusion of this question in the CVIQ does not imply an expectation by OCIMF or its members that a dynamic navigational assessment by a suitably qualified and experienced company representative will be carried out on any vessel at any particular time.

It is not expected that sensitive personal data relating to the assessment of individual performance is contained within the report available onboard. Such assessment, although expected to form part of a dynamic navigational assessment, should remain confidential.

It is an OCIMF expectation that the assessment report will include brief details of the assessor's qualifications and pertinent seafaring experience.

The inspector is not expected or required to:

- Make a qualitative assessment of the navigation assessment report beyond the specific guidance contained herein.
- Make a qualitative assessment of the qualification and/or experience of the company representative undertaking the assessment beyond the specific guidance contained herein.

## **Suggested Inspector Actions**

Review the report for the dynamic navigational assessment conducted by a suitably qualified and experienced company representative and verify that:

- The assessment was conducted during the period declared by the operator through the pre-inspection questionnaire.
- The assessment covered all sections of a voyage as declared by the operator through the pre-inspection questionnaire.
- Brief details of the assessor's qualification and experience were included within the report.
- The report was in a similar format, and covered the review items suggested by, the OCIMF guidance paper "A Guide to Best Practice for Navigational Assessments and Audits".
- The report contained information relating to the majority of the best practice guidance points from TMSA KPI 5.3.3.

- Where the report identified areas for improvement there was evidence that follow up had been undertaken within a specified timeframe by the company and/or vessel as appropriate.

#### **Expected Evidence**

- The report for the dynamic navigational assessment conducted by a suitably qualified and experienced company representative as declared in the pre-inspection questionnaire.
- The Bridge Log Book to cover the period of the reported dynamic navigation assessment (for geographical verification purposes only).
- A corrective action plan with due dates for each area for improvement identified during the navigational assessment.
- Supporting evidence for each closed area for improvement identified and included in the corrective action plan.

#### **Potential Grounds for a Negative Observation**

- The report for the dynamic navigational assessment declared through the pre-inspection questionnaire was not available onboard.
- The dynamic navigational assessment did not cover the stages of the voyage or was not completed during the date range as declared by the operator through the pre-inspection questionnaire.
- The details of the qualifications and pertinent seafaring experience of the assessor were not included within the report.
- The assessor did not hold or had not held a senior deck officer licence and/or had not sailed as a senior deck officer.
- The dynamic navigational assessment report was not substantially in alignment with the guidance document "A Guide to Best Practice for Navigational Assessments and Audits" and the best practice guidance under TMSA KPI 5.3.3.
- There was no corrective action plan with defined due dates for all areas for improvement identified during the dynamic navigational assessment.
- There was no evidence that the areas for improvement identified during the dynamic navigational assessment had been closed out within the due dates indicated within the corrective action plan.

**3.2.3. Was a report available onboard which confirmed that a dynamic navigational assessment by a suitably qualified specialist contractor had been completed while on passage as declared through the pre-inspection questionnaire?**

**Short Question Text**

Dynamic navigational assessment by a specialist contractor

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation, Bridge

**Publications**

OCIMF A Guide to Best Practice for Navigational Assessments and Audits

**Objective**

**To verify the extent of company evaluation and oversight of navigational standards onboard managed vessels**

**Industry Guidance**

**OCIMF: A Guide to Best Practice for Navigational Assessments and Audits.**

**2 Purpose of a navigational assessment**

The purpose of a navigational assessment should be to identify poor practices, to continuously improve navigational standards to ensure safe and efficient voyages and to assure companies that high standards of navigation and watchkeeping are being maintained.

The purpose of closely observing the interaction and effectiveness of the bridge team during pilotage and standby is to evaluate:

- Key behaviours of members of the bridge team.
- Skills of the bridge team
- Interactions between the master and pilot.

**4.2 Selection of assessors**

Navigation assessments should be conducted by an experienced senior deck officer (preferably a Master Mariner with command experience), who is fully up to date with company navigational practices, the International Regulations for Preventing Collisions at Sea (COLREGS), the ICS Bridge Procedures Guide and industry best practices.

**TMSA KPI 5.4.1** requires that comprehensive navigational audits are conducted while on passage by a suitably qualified and experienced person.

The audit may be

- An independent navigational audit by a suitably qualified specialist contractor.

The fleet audit programme includes a combination of company and independent audits.

(Best Practice Guidance under **TMSA KPI 5.3.3** applies)



In addition to a navigational verification assessment\*, the purpose of the audit\* is to:

- Review and confirm that bridge practices are in compliance with international regulations and company procedures.
- Review and assess the skills and proficiency levels of the bridge team members.
- Review and evaluate the effective functioning of the bridge team during all sections of a voyage.
- Use the opportunity to promote robust navigational practices, chart-work, passage planning and good seamanship.
- Identify any additional training needs, whether this be specific to an individual or a vessel, or a fleet wide need.
- Verify adequate supervision of Junior Officers and training of cadets during critical passages.
- Verify that accurate logs are kept and that adequate record keeping is being undertaken.

\*The terminology used in the OCIMF paper “A Guide to Best Practice for Navigational Assessments and Audits” will take precedence throughout the balance of guidance.

### **IMO: ISM Code**

12.2 The Company should periodically verify whether all those undertaking delegated ISM related tasks are acting in conformity with the Company's responsibilities under the Code

12.3 The Company should periodically evaluate the effectiveness of the SMS in accordance with procedures established by the Company.

### **Inspection Guidance**

This question will only be generated when the vessel operator had indicated, through the pre-inspection questionnaire, that an appropriate dynamic navigational assessment by a suitably qualified specialist contractor had been conducted on board the vessel being inspected within the previous twelve months.

The inclusion of this question in the CVIQ does not imply an expectation by OCIMF or its members that a dynamic navigational assessment by a suitably qualified and experienced specialist will be carried out on any vessel at any particular time.

It is not expected that sensitive personal data relating to the assessment of individual performance is contained within the report available onboard. Such assessment, although expected to form part of a dynamic navigational assessment, should remain confidential.

It is an OCIMF expectation that the assessment report will include brief details of the assessor's qualifications and pertinent seafaring experience.

The inspector is not expected or required to:

- Make a qualitative assessment of the navigation assessment report beyond the specific guidance contained herein.
- Make a qualitative assessment of the qualification and/or experience of the contractor undertaking the assessment beyond the specific guidance contained herein.

### **Suggested Inspector Actions**

Review the report for the dynamic navigational assessment conducted by a suitably qualified and experienced specialist contractor and verify that:

- The assessment was conducted during the period declared by the operator through the pre-inspection questionnaire.

- The assessment covered all sections of a voyage as declared by the operator through the pre-inspection questionnaire.
- Brief details of the assessor's qualification and experience were included within the report.
- The report was in a similar format, and covered the review items suggested by, the OCIMF guidance paper "A Guide to Best Practice for Navigational Assessments and Audits".
- The report contained information relating to the majority of the best practice guidance points from TMSA KPI 5.3.3.
- Where the report identified areas for improvement there was evidence that follow up had been undertaken within a specified timeframe by the company and/or vessel as appropriate.

#### **Expected Evidence**

- The report for the dynamic navigational assessment conducted by a suitably qualified specialist contractor as declared in the pre-inspection questionnaire.
- The Bridge Log Book to cover the period of the reported dynamic navigation assessment. (for geographical verification purposes only)
- A corrective action plan with due dates for each area for improvement identified during the navigational assessment.
- Supporting evidence for each closed area for improvement identified and included in the corrective action plan.

#### **Potential Grounds for a Negative Observation**

- The report for the dynamic navigational assessment declared through the pre-inspection questionnaire was not available onboard.
- The dynamic navigational assessment did not cover the stages of the voyage or was not completed during the date range as declared by the operator through the pre-inspection questionnaire.
- The details of the qualifications and pertinent seafaring experience of the assessor were not included within the report.
- The assessor did not hold or had not held a senior deck officer licence and/or had not sailed as a senior deck officer.
- The dynamic navigational assessment report was not substantially in alignment with the guidance document "A Guide to Best Practice for Navigational Assessments and Audits" and the best practice guidance under TMSA KPI 5.3.3.
- There was no corrective action plan with defined due dates for all areas for improvement identified during the dynamic navigational assessment.
- There was no evidence that the areas for improvement identified during the dynamic navigational assessment had been closed out within the due dates indicated within the corrective action plan.

**3.2.4. Was a report available onboard which confirmed that an unannounced remote navigational assessment, which included review of VDR & ECDIS data by an independent contractor or specialist company representative, had been completed as declared through the pre-inspection questionnaire?**

**Short Question Text**

Unannounced remote navigational assessment

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation, Bridge

**Publications**

OCIMF A Guide to Best Practice for Navigational Assessments and Audits

OCIMF: Recommendations on the Proactive Use of Voyage Data Recorder Information (revised edition August 2020)

**Objective**

**To verify the extent of company evaluation and oversight of navigational standards onboard managed vessels.**

**Industry Guidance**

**OCIMF: A Guide to Best Practice for Navigational Assessments and Audits.**

**5.2 Remote navigational assessments using Voyage Data Recorders**

Companies may consider using Voyage Data Recorders (VDRs) to conduct remote assessments of navigational practices. This may be supplemented by downloading data from ECDIS and other electronic navigation aids.

Remote navigational assessments may be useful when:

- The trading pattern of a vessel makes it difficult to conduct a traditional assessment.
- Following up to verify the correction of non-conformances noted during a traditional assessment.
- Companies want to assess the bridge team in a more natural environment, without them being influenced by the presence of an assessor. Although everyday practices may be more accurately observed through remote assessment, subtler interactions within the bridge team may not be picked up.
- Highlighting where to focus their resources in terms of either assessment or mentoring specific subject matter with traditional assessors.

Using the VDR for remote navigational assessments should be seen as an additional assessment tool, not as a replacement for traditional navigation assessments. Both types of assessment have advantages and limitations and should not be considered mutually exclusive.

**OCIMF: Recommendations on the Proactive Use of Voyage Date Recorder Information (revised edition August 2020)**

Navigational assessments using VDR data could be undertaken on board by Masters with their bridge teams, by vessel operators in managing offices, or by using services of an independently contracted third-party company. VDR data will be replayed and analysed against the company SMS, industry best practices and regulatory requirements.

The VDR data is normally used to cover one or more high-risk sections of the voyage, such as canal transits, pilotage during arrival/departure and/or passage through high traffic density areas such as the Singapore/Malacca Straits or the English Channel.

**TMSA KPI 5.4.1** requires that comprehensive navigational audits\* are conducted while on passage by a suitably qualified and experienced person.

The audit\* may be:

- A company navigational audit\* as per 5.3.3; or
- An independent navigational audit\* by a suitably qualified specialist contractor.

This fleet audit programme includes a combination of company and independent audits. Where it is impractical for a vessel to be audited within the 12-month period due to trading pattern then an unannounced remote audit by an independent contractor, including VDR downloads may be used. All fleet vessels are audited while on passage at intervals not exceeding 12 months.

\*The terminology used in the OCIMF paper “A Guide to Best Practice for Navigational Assessments and Audits” will take precedence throughout the balance of guidance.

### **IMO: ISM Code**

12.2 The Company should periodically verify whether all those undertaking delegated ISM related tasks are acting in conformity with the Company's responsibilities under the Code

12.3 The Company should periodically evaluate the effectiveness of the SMS in accordance with procedures established by the Company.

### **Inspection Guidance**

This question will only be generated when the vessel operator had indicated, through the pre-inspection questionnaire, that a remote navigational assessment had been undertaken for the vessel being inspected within the previous twelve months.

The inclusion of this question in the CVIQ does not imply an expectation by OCIMF or its members that a remote navigation assessment will be carried out on any vessel at any particular time.

It is not expected that sensitive personal data relating to the assessment of individual performance is contained within the report available onboard. Such assessment, although expected to form part of a remote navigational assessment, should remain confidential.

It is an OCIMF expectation that the assessment report will include brief details of the assessor's qualifications and pertinent seafaring experience.

The inspector is not expected or required to:

- Make a qualitative assessment of the remote navigation assessment report beyond the specific guidance contained herein.
- Make a qualitative assessment of the qualification and/or experience of the independent contractor or specialist company representative undertaking the assessment beyond the specific guidance contained herein.

### **Suggested Inspector Actions**

Review the remote navigational assessment report and verify that:

- The remote navigational assessment included the phases of a voyage as declared in the pre-inspection questionnaire.

- The remote navigational assessment was unannounced and included the download and review of VDR and ECDIS data.
- Brief details of the assessor's qualification and experience were included within the report.
- The report was substantially in alignment with the format, and contained information, as suggested by the OCIMF publication "A Guide to Best Practice for Navigational Assessments and Audits".
- Where the report identified areas for improvement there was evidence that follow up had been undertaken by the company and/or vessel as appropriate.

#### **Expected Evidence**

- The report for the remote navigational assessment conducted by either an independent contractor or specialist company representative as declared through the pre-inspection questionnaire.
- The Bridge Log Book to cover the period of the reported remote navigation assessment (for geographical verification purposes only).
- A corrective action plan with due dates for each area for improvement identified during the remote navigational assessment.
- Supporting evidence for each closed area for improvement identified and included in the corrective action plan.

#### **Potential Grounds for a Negative Observation**

- The remote navigational assessment report for the assessment declared through the pre-inspection questionnaire was not available onboard.
- The remote navigational assessment did not include review of downloaded VDR and ECDIS data as well as supporting material such as passage plans, under-keel clearance calculations and copies (photos) of paper charts where no ECDIS was carried.
- The remote navigational assessment covered a period solely at anchor or open sea navigation where no navigational challenges were present.
- The remote navigational assessment did not cover the phases of the voyage as declared by the operator through the pre-inspection questionnaire.
- The details of the qualifications and pertinent seafaring experience of the assessor were not included within the report.
- The assessor did not hold or had not held a senior deck officer licence and/or had not sailed as a senior deck officer.
- The remote navigational assessment report was not substantially in alignment with the OCIMF guidance document "A Guide to Best Practice for Navigational Assessments and Audits"
- There was no corrective action plan with defined due dates for all areas for improvement identified during the remote navigational assessment.
- There was no evidence that the areas for improvement identified during the remote navigational assessment had been closed out within the due dates indicated within the corrective action plan.

**3.2.5. Was a report available onboard which confirmed that a comprehensive cargo audit by a suitably qualified and experienced company representative had been completed as declared through the pre-inspection questionnaire?**

**Short Question Text**

Comprehensive cargo audit by a company representative

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation, Cargo Control Room

**Publications**

OCIMF A Guide to Best Practice for Navigational Assessments and Audits

**Objective**

**To verify the extent of company evaluation and oversight of cargo, ballast and bunkering operational standards onboard managed vessels**

**OCIMF Guidance: A Guide to Best Practice for Navigational Assessments and Audits.**

*To align the expectations for comprehensive operational audits across onboard disciplines, the guidance provided in the OCIMF document "A Guide to Best Practice for Navigational Assessments and Audits" is adapted to reflect the requirements for a comprehensive cargo audit.*

**TMSA KPI 6.4.2.** requires that comprehensive cargo audits are completed by a suitably qualified and experienced company representative at least annually. The audit includes observation of cargo, ballast, tank cleaning and bunker handling operations.

All fleet vessels are audited annually. This audit may look at:

- Operational practices and compliance with industry guidelines and company procedures.
- Skills and proficiency levels of the personnel.
- Effectiveness of the team during all stages of the operations.
- The opportunity to promote robust practices.
- Identifying additional training needs, whether individual, vessel or fleet wide.
- Supervision of Junior Officers and training of cadets.
- Record keeping.

The audit is followed by a report where identified corrective actions are assigned, verified and closed out in a specified time period.

**IMO: ISM Code**

12.2 The Company should periodically verify whether all those undertaking delegated ISM related tasks are acting in conformity with the Company's responsibilities under the Code

12.3 The Company should periodically evaluate the effectiveness of the SMS in accordance with procedures established by the Company.

**Inspection Guidance**

To align the expectations for comprehensive operational audits across onboard disciplines, the guidance provided in the OCIMF document "A Guide to Best Practice for Navigational Assessments and Audits" is adapted to reflect the requirements for a comprehensive cargo audit.

Purpose of a comprehensive cargo audit.

The purpose of a comprehensive cargo audit should be to identify poor practices, to continuously improve cargo operational standards to ensure safe and efficient cargo transfer, bunker transfer and tank cleaning operations, and to assure companies that high standards of cargo and bunker operations and deck watchkeeping are being maintained onboard and across the fleet.

The purpose of closely observing the interaction and effectiveness of the cargo control room and deck teams and their interactions with the terminal staff during all stages of cargo operations is to evaluate:

- Key behaviours of members of the cargo control room and deck teams during cargo, bunkering and tank cleaning operations.
- Skills of the cargo control room and deck teams.
- Interactions between the cargo control room and deck teams and the terminal staff.

Selection of assessors

Comprehensive cargo audits should be conducted by a company representative who was, or had been, an experienced senior deck officer (preferably a Master Mariner with command experience), who was fully up to date with company cargo operational practices, the International Safety Guide for Oil Tankers and Terminals and industry best practices.

This question will only be generated when the vessel operator had indicated, through the pre-inspection questionnaire, that an appropriate comprehensive cargo audit by a suitably qualified and experienced company representative had been conducted on board the vessel being inspected within the previous twelve months.

The inclusion of this question in the CVIQ does not imply an expectation by OCIMF or its members that a comprehensive cargo audit by a suitably qualified and experienced company representative will be carried out on any vessel at any particular time.

It is not expected that sensitive personal data relating to the assessment of individual performance is contained within the report available onboard. Such assessment, although expected to form part of a comprehensive cargo audit, should remain confidential.

It is an OCIMF expectation that the audit report will include brief details of the assessor's qualifications and pertinent seafaring experience.

The inspector is not expected or required to:

- Make a qualitative assessment of the comprehensive cargo audit report beyond the specific guidance contained herein.
- Make a qualitative assessment of the qualification and/or experience of the company representative undertaking the assessment beyond the specific guidance contained herein.

### **Suggested Inspector Actions**

The inspector should sight the comprehensive cargo audit report and verify that:

- The comprehensive cargo audit was conducted during the period declared through the pre-inspection questionnaire.

- The comprehensive cargo audit covered the cargo, ballast and bunkering operations as declared through the pre-inspection questionnaire.
- Brief details of the assessor's qualification and experience were included within the report.
- The report contained information relating to the majority of the best practice points from TMSA KPI 6.4.2.
- Where the report identified areas for improvement there was evidence that follow up had been undertaken within a specified timeframe by the company and/or vessel as appropriate.

#### **Expected Evidence**

- The report for the comprehensive cargo audit conducted by a suitably qualified and experienced company representative as declared through the pre-inspection questionnaire.
- The Deck Log Book and/or Cargo Log Book to cover the period of the reported comprehensive cargo audit (for geographical and operational verification purposes only).
- A corrective action plan with due dates for each area for improvement identified during the comprehensive cargo audit.
- Supporting evidence, which may include lessons learnt documents shared across the fleet, for each closed area for improvement identified and included in the corrective action plan.

#### **Potential Grounds for a Negative Observation**

- The report for the comprehensive cargo audit declared through the pre-inspection questionnaire was not available onboard.
- The comprehensive cargo audit did not cover the cargo or bunker operations or was not completed during the date range as declared by the operator through the pre-inspection questionnaire.
- The details of the qualifications and pertinent seafaring experience of the assessor were not included within the report.
- The assessor did not hold or had not held a senior deck officer licence and/or had not sailed as a senior deck officer onboard tankers.
- The comprehensive cargo audit report was not substantially in alignment with the suggested best practice guidance of TMSA KPI 6.4.2
- There was no corrective action plan with defined due dates for all areas for improvement identified during the comprehensive cargo audit.
- There was no evidence that the areas for improvement identified during the comprehensive cargo audit had been closed out within the due dates indicated within the corrective action plan.



**3.2.6. Was a report available onboard which confirmed that a comprehensive engineering audit by a suitable qualified and experienced company representative had been completed as declared in the pre-inspection questionnaire?**

**Short Question Text**

Comprehensive engineering audit by a company representative

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation, Engine Control Room, Chief Engineer's Office

**Publications**

ICS: Engine Room Procedures Guide. First Edition.

OCIMF A Guide to Best Practice for Navigational Assessments and Audits

**Objective**

**To verify the extent of company evaluation and oversight of machinery space management, engineering and maintenance standards onboard managed vessels.**

**ICS: Engine Room Procedures Guide. First Edition.**

**11.8.2 Routine Operations**

All routine operations on board should be covered by written procedures as part of the company's SMS.

These procedures should be based on applicable statutory requirements, classification society requirements, industry good practice guidance and recognised standards. They should fully address the risks involved in carrying out routine operations, and the safeguards put in place to prevent injury or damage. The procedures should be audited regularly to ensure that they remain fit for purpose and comply with relevant regulations. Auditing should also check that procedures are followed on board and are subject to continuous improvement.

Examples of routine operations in the engine room are arrival and departure, starting and stopping an engine, and UMS rounds.

**OCIMF Guidance: A Guide to Best Practice for Navigational Assessments and Audits.** First Edition 2018

*To align the expectations for comprehensive operational audits across onboard disciplines, the guidance provided in the OCIMF document "A Guide to Best Practice for Navigational Assessments and Audits" is adapted to reflect the requirements for a comprehensive engineering audit.*

**TMSA KPI 4.4.5** requires that comprehensive engineering audits are completed by a suitably qualified and experienced company representative. The audit includes observation of engineering practices while on passage.

The purpose of the audit is to:

- Review and confirm that engineering practices are in compliance with industry standards and company procedures.
- Review and assess the skills and proficiency levels of the engineering team members.
- Review and evaluate the effective functioning of the engineering team during all sections of a voyage, e.g. manoeuvring, operations when unmanned, cargo operations.
- Use the opportunity to promote robust engineering practices and good seamanship.
- Identify any additional training needs, whether they are specific to an individual, a vessel, or a fleet wide need e.g. familiarity with the planned maintenance system.

- Verify adequate supervision of Junior Officers and training of cadets during critical operations.
- Verify that accurate logs are kept, and that adequate record keeping is being undertaken.

The audit is followed by a debrief to the engineering team. All fleet vessels are audited while on passage at intervals not exceeding one year. The audit is followed by a report where identified corrective actions are assigned, verified and closed out in a specified time period.

#### **IMO: ISM Code**

12.2 The Company should periodically verify whether all those undertaking delegated ISM related tasks are acting in conformity with the Company's responsibilities under the Code

12.3 The Company should periodically evaluate the effectiveness of the SMS in accordance with procedures established by the Company.

#### **Inspection Guidance.**

To align the expectations of comprehensive operational audits across onboard disciplines the guidance provided in the OCIMF document "A Guide to Best Practice for Navigational Assessments and Audits" is adapted to reflect the requirements for a comprehensive engineering audit.

Purpose of a comprehensive engineering audit.

The purpose of a comprehensive engineering audit should be to identify poor practices, to continuously improve engineering operational standards to ensure safe and efficient machinery operation and to assure companies that high standards of machinery space management and watchkeeping are being maintained onboard and across the fleet.

The purpose of closely observing the interaction and effectiveness of the machinery space management team, the watchkeeping team and their interactions with the navigational and cargo operational teams is to evaluate:

- Key behaviours of members of the machinery space management and watchkeeping teams during manoeuvring, cargo and maintenance operations.
- Skills of the machinery space management and watchkeeping teams.
- Interactions between the machinery space management and watchkeeping teams and the navigational and cargo operational teams.

Selection of assessors.

Comprehensive engineering audits should be conducted by a company representative who was, or had been, an experienced senior engineer officer (preferably a qualified Chief Engineer with time in rank of Chief Engineer), who was fully up to date with company machinery operational and maintenance practices, the International Safety Guide for Oil Tankers and Terminals and industry best practices.

This question will only be generated when the vessel operator had indicated, through the pre-inspection questionnaire, that an appropriate comprehensive engineering audit by a suitably qualified and experienced company representative had been conducted on board the vessel being inspected within the previous twelve months.

The inclusion of this question in the CVIQ does not imply an expectation by OCIMF or its members that a comprehensive engineering audit by a suitably qualified and experienced company representative will be carried out on any vessel at any particular time.

It is not expected that sensitive personal data relating to the assessment of individual performance is contained within the report available onboard. Such assessment, although expected to form part of a comprehensive engineering audit, should remain confidential.

It is an OCIMF expectation that the audit report will include brief details of the assessor's qualifications and pertinent seafaring experience.

The inspector is not expected or required to:

- Make a qualitative assessment of the comprehensive engineering audit report beyond the specific guidance contained herein.
- Make a qualitative assessment of the qualification and/or experience of the company representative undertaking the audit beyond the specific guidance contained herein.

### **Suggested Inspector Actions**

The inspector should sight the comprehensive engineering audit report and verify that:

- The comprehensive engineering audit was conducted during the period declared through the pre-inspection questionnaire.
- The comprehensive engineering audit covered the cargo, ballast and bunkering operations as declared through the pre-inspection questionnaire.
- Brief details of the assessor's qualification and experience were included within the report.
- The report contained information relating to the majority of the best practice points from TMSA KPI 4.4.5.
- Where the report identified areas for improvement there was evidence that follow up had been undertaken within a specified timeframe by the company and/or vessel as appropriate.

### **Expected Evidence**

- The report for the comprehensive engineering audit conducted by a suitably qualified and experienced company representative as declared through the pre-inspection questionnaire.
- The Engine Room Log Book to cover the period of the reported comprehensive engineering audit (for geographical and operational verification purposes only).
- A corrective action plan with due dates for each area for improvement identified during the comprehensive engineering audit.
- Supporting evidence, which may include lessons learnt documents shared across the fleet, for each closed area for improvement identified and included in the corrective action plan.

### **Potential Grounds for a Negative Observation**

- The report for the comprehensive engineering audit declared through the pre-inspection questionnaire was not available onboard.
- The comprehensive engineering audit did not cover the machinery space operations or was not completed during the date range as declared by the operator through the pre-inspection questionnaire.
- The details of the qualifications and pertinent seafaring experience of the assessor were not included within the report.
- The assessor did not hold or had not held a senior engineering officer licence and/or had not sailed as a senior engineer officer onboard tankers.
- The comprehensive engineering audit report was not substantially in alignment with the suggested best practice guidance of TMSA KPI 4.4.5
- There was no corrective action plan with defined due dates for all areas for improvement identified during the comprehensive engineering audit.
- There was no evidence that the areas for improvement identified during the comprehensive engineering audit had been closed out within the due dates indicated within the corrective action plan.

**3.2.7. Was a report available onboard which confirmed that a comprehensive mooring and anchoring audit by a suitably qualified and experienced company representative had been completed as declared through the pre-inspection questionnaire?**

**Short Question Text**

Comprehensive mooring and anchoring audit by a company representative

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation

**Publications**

OCIMF Anchoring Systems and Procedures 2010 edition

OCIMF A Guide to Best Practice for Navigational Assessments and Audits

OCIMF: Mooring Equipment Guidelines. Fourth Edition 2018 (MEG4)

INTERTANKO: Anchoring Guidelines: A Risk-Based Approach v.3 June 2020

**Objective**

**To verify the extent of company evaluation and oversight of mooring and anchoring operational standards onboard managed vessels.**

**Industry Guidance:**

**Intertanko: Anchoring Guidelines: A Risk-Based Approach v.3 June 2020**

Live anchoring audits

It is necessary to check and verify the behaviour of personnel engagement for anchoring operations to identify the deviations from standard practices. The live anchoring audits could be carried out by a competent person such as internal auditor or company's representative or nominated person by the company.

They should observe the anchoring operation to monitor the performance. The operation on the bridge can also be monitored when an additional auditor is available.

The stages of various operations such as preparation for anchoring, walking back/let go and heaving up anchor can be monitored during the live audit process.

**OCIMF: Anchoring Systems and Procedures 2010 edition**

Section 2 Issues Associated with Anchoring Systems and Procedures.

**OCIMF: Mooring Equipment Guidelines. (MEG4)**

Section 2 Human Factors.

**OCIMF A Guide to Best Practice for Navigational Assessments and Audits. First Edition 2018.**

*To align the expectations for comprehensive operational audits across onboard disciplines, the guidance provided in the OCIMF document "A Guide to Best Practice for Navigational Assessments and Audits" is adapted to reflect the requirements for a comprehensive mooring and anchoring audit.*

2 Purpose of a navigation assessment.

**TMSA KPI 6A.4.3** requires that comprehensive audits are completed by a suitably qualified and experienced company representative. The audit uses observation of mooring operations.

All fleet vessels are audited annually. The audit specifically observes behaviour and may look at:

- Operational practices and compliance with industry guidelines and company procedures.
- Skills and proficiency levels of the personnel.
- Leadership and effectiveness of the team during all stages of the operations.
- The opportunity to promote robust practices and good seamanship.
- Identifying additional training needs, whether individual, vessel or fleet wide.
- Supervision of Junior Officers and training of cadets.

The audit is followed by a report where identified corrective actions are assigned, verified and closed out in a specified time period.

### **IMO: ISM Code**

12.2 The Company should periodically verify whether all those undertaking delegated ISM related tasks are acting in conformity with the Company's responsibilities under the Code

12.3 The Company should periodically evaluate the effectiveness of the SMS in accordance with procedures established by the Company.

### **Inspection Guidance**

To align the expectations of comprehensive operational audits across onboard disciplines, the guidance provided in the OCIMF document "A Guide to Best Practice for Navigational Assessments and Audits" is adapted to reflect the requirements for a comprehensive mooring and anchoring audit.

Purpose of a comprehensive mooring and anchoring audit.

The purpose of a comprehensive mooring and anchoring audit should be to identify poor practices, to continuously improve mooring and anchoring operational standards to ensure safe and efficient mooring and anchoring operations and, to assure companies that high standards of mooring and anchoring oversight and management are being maintained onboard and across the fleet.

The purpose of closely observing the interaction and effectiveness of the mooring and anchoring teams, the bridge team and their interactions with the terminal mooring teams is to evaluate:

- Key behaviours of members of the mooring and anchoring teams during mooring and anchoring operations.
- Skills of the mooring and anchoring teams.
- Interactions between the mooring and anchoring teams, the bridge team and the terminal mooring teams.

Selection of assessors

Comprehensive mooring and anchoring audits should be conducted by a company representative who is, or had been, an experienced senior deck officer (preferably a Master Mariner with command experience), who is fully up to date with company mooring and anchoring operational practices, the OCIMF Mooring Equipment Guidelines, OCIMF Anchoring Systems and Procedures, and industry best practices.

This question will only be generated when the vessel operator had indicated, through the pre-inspection questionnaire, that an appropriate comprehensive mooring and anchoring audit by a suitably qualified and

experienced company representative had been conducted on board the vessel being inspected within the previous twelve months.

The inclusion of this question in the CVIQ does not imply an expectation by OCIMF or its members that a comprehensive mooring and anchoring audit by a suitably qualified and experienced company representative will be carried out on any vessel at any particular time.

It is not expected that sensitive personal data relating to the assessment of individual performance is contained within the report available onboard. Such assessment, although expected to form part of a comprehensive mooring and anchoring audit, should remain confidential.

It is an OCIMF expectation that the audit report will include brief details of the assessor's qualifications and pertinent seafaring experience.

The inspector is not expected or required to:

- Make a qualitative assessment of the comprehensive mooring and anchoring audit report beyond the specific guidance contained herein.
- Make a qualitative assessment of the qualification and/or experience of the company representative undertaking the audit beyond the specific guidance contained herein.

### **Suggested Inspector Actions**

The inspector should sight the comprehensive mooring and anchoring audit report and verify that:

- The comprehensive mooring and anchoring audit was conducted during the period declared through the pre-inspection questionnaire.
- The comprehensive mooring and anchoring audit covered the mooring and anchoring operations as declared through the pre-inspection questionnaire.
- Brief details of the assessor's qualification and experience were included within the report.
- The report contained information relating to the majority of the best practice points from TMSA KPI 6A.4.3.
- Where the report identified areas for improvement there was evidence that follow up had been undertaken within a specified timeframe by the company and/or vessel as appropriate.

### **Expected Evidence**

- The report for the comprehensive mooring and anchoring audit conducted by a suitably qualified and experienced company representative as declared through the pre-inspection questionnaire.
- The Deck Log Book to cover the period of the reported comprehensive mooring and anchoring audit (for geographical and operational verification purposes only).
- A corrective action plan with due dates for each area for improvement identified during the comprehensive mooring and anchoring audit.
- Supporting evidence, which may include lessons learnt documents shared across the fleet, for each closed area for improvement identified and included in the corrective action plan.

### **Potential Grounds for a Negative Observation**

- The report for the comprehensive mooring and anchoring audit declared through the pre-inspection questionnaire was not available onboard.
- The comprehensive mooring and anchoring audit did not cover the type of mooring and anchoring operations or was not completed during the date range as declared by the operator through the pre-inspection questionnaire.

- The details of the qualifications and pertinent seafaring experience of the assessor were not included within the report.
- The assessor did not hold or had not held a senior deck officer licence and/or had not sailed as a senior deck officer onboard tankers.
- The comprehensive mooring and anchoring audit report was not substantially in alignment with the suggested best practice guidance of TMSA KPI 6A.4.3.
- There was no corrective action plan with defined due dates for all areas for improvement identified during the comprehensive mooring and anchoring audit.
- There was no evidence that the areas for improvement identified during the comprehensive mooring and anchoring audit had been closed out within the due dates indicated within the corrective action plan.

**3.2.8. Had the vessel operator implemented a Behavioural Competency Assessment Programme onboard and was there evidence available that assessments were being conducted for navigation, cargo, mooring and engineering operations by approved assessors?**

**Short Question Text**

Behavioural Competency Assessment Programme

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation

**Publications**

OCIMF/INTERTANKO: Behavioural Competency Assessment and Verification for Vessel Operators

**Objective**

**To verify the extent of company evaluation and oversight of competency standards onboard managed vessels.**

**Industry Guidance**

**OCIMF/INTERTANKO: Behavioural Competency Assessment and Verification for Vessel Operators**

**4.3 Methods of competency-based assessment**

While observation will usually be the main method of assessment, a number of different methods can be used (either individually or in a combination) to assess a behavioural competency.

These include:

- Observation of work activities on site or in a simulator (if in a simulator, the assessor should have received appropriate guidance in instructional techniques involving the use of simulators).
- Questioning techniques (oral and written).
- Projects and assignments.
- Computer-based questions or tests.

**TMSA KPI 3.4.1** requires that procedures to assess crew members for job competency are in place.

Documented procedures may include:

- On the job observation.
- Record books.
- Written/oral assessments.
- Computer-based assessments.
- Scenario-based simulator assessments.
- Company specific assessments.
- Psychometric assessments.

Any identified competency gaps are addressed.

**IMO: ISM Code**



6.5 The Company should establish and maintain procedures for identifying any training which may be required in support of the SMS and ensure that such training is provided for all personnel concerned.

### **Inspection Guidance**

The vessel operator should have developed a competency assessment programme which is broadly in alignment with the guidance document, Behavioural Competency Assessment and Verification for Vessel Operators, with assessments being conducted by approved assessors against defined standards. Assessments should be carried out in the following areas:

- Navigation
- Mooring operations.
- Cargo operations.
- Engineering operations.

The question will only be generated when the operator had declared that a Behavioural Competency Assessment and Verification programme was in operation onboard through the pre-inspection questionnaire.

### **Suggested Inspector Actions**

Review the Behavioural Competency Assessment and Verification programme and verify that:

- The assessment programme covered as a minimum; navigation, cargo operations, mooring operations and engineering operations
- The vessel operator had defined who was considered qualified to be an approved assessor
- The vessel operator had defined the training requirement for an approved assessor
- If vessel staff onboard at the time of the inspection were considered as approved assessors, then they had evidence of the required training for an approved assessor.
- There was evidence that the staff onboard at the time of the inspection were actively involved in the competency assessment programme with historical records of their competency assessments available for their company service since the inception of the programme.

### **Expected Evidence**

- The Behavioural Competency Assessment and Verification Programme Guide.
- The qualifications for any approved assessors onboard at the time of the inspection.
- The records (summary) of competency assessments completed for all staff onboard at the time of the inspection who were included in the competency assessment programme since they joined the company or the inception of the programme.
- Sample assessments for cargo, navigation, mooring and engineering competencies.

Individual crew member records may be electronic or hard-copy but must allow the inspector to see the full training history for everyone included in the programme.

### **Potential Grounds for a Negative Observation**

- There was no evidence that there was a functional Behavioural Competency Assessment and Verification Programme in operation onboard.
- The Behavioural Competency Assessment and Verification Programme did not cover navigation, cargo operations, mooring operations and engineering operations.
- Onboard staff identified as approved assessors were not in possession of the company defined training for approved assessors.
- There were no summary records available for the staff included in the Behavioural Competency Assessment and Verification Programme which showed their achievements since joining the company or the inception of the programme.

### 3.3. Crew Training

#### 3.3.1. Had the Master and all navigation officers attended a shore-based Bridge Team Management training course within the previous five years?

##### Short Question Text

Shore-based Bridge Team Management training

##### Vessel Types

Oil, Chemical, LPG, LNG

##### ROVIQ Sequence

Documentation

##### Publications

IMO Model Course 1.22. Ship Simulator and Bridge Teamwork

##### Objective

To ensure that all navigation officers have been trained in the practical application of crew resource management in a realistic navigational environment.

##### Industry Guidance

**IMO Model Course 1.22 Ship Simulator and Bridge Teamwork.**

**TMSA KPI 5.4.4** requires that navigation officers undertake periodic refresher bridge resource management simulator training at a national or industry accredited shore establishment.

##### **IMO: ISM Code**

6.5 The Company should establish and maintain procedures for identifying any training which may be required in support of the SMS and ensure that such training is provided for all personnel concerned.

##### **Inspection Guidance**

This question will only be generated when the vessel operator has indicated that the Master and all navigation officers onboard at the time of inspection had attended a Bridge Team Management training course within the previous five years. The course must have included practical navigational exercises in a bridge simulator, with the simulator time being at least equivalent to IMO Model Course 1.22.

The operator should verify the following if relying on the STCW qualifications of their seafarers:

- That the flag state issuing the qualification required the bridge resource training element to be retaken or refreshed at each revalidation of the officer's certificate of competency.
- That the required bridge resource management training element included training within a bridge simulator which met, as a minimum, IMO Model Course 1.22 requirements of at least 19 hours bridge simulator time.

The terms Bridge Team Management and Bridge Resource Management may be considered interchangeable, however, in the context of this question, the shore-based training course must have included exercises in a navigational simulator as outlined in IMO Model Course 1.22.

##### **Suggested Inspector Actions**

Review the Bridge Team Management training certificates for the Master and navigation officers and verify that:

- The training was completed within the previous five years by each officer.
- The training was stated as being in accordance with IMO model course 1.22.

**Expected Evidence**

- The Bridge Team Management training certificates for the Master and navigation officers.
- Where the Bridge Team Management training certificate did not state that it was in accordance with IMO Model Course 1.22, evidence that the training course included a bridge simulator element which required that simulator based navigational exercises were at least equivalent to the requirements of IMO Model Course 1.22. (19 hours simulator time).

**Potential Grounds for a Negative Observation**

- The Master and/or any one of the navigation officers onboard during the inspection did not have evidence of attending a Bridge Team Simulator training course at least equivalent to IMO Model Course 1.22 within the previous five years.

### **3.3.2. Had the Master received formal ship handling training prior to promotion or when being assigned to a new type of ship having significantly different handling characteristics to ships in which they had recently served?**

#### **Short Question Text**

Formal ship handling training

#### **Vessel Types**

Oil, Chemical, LPG, LNG

#### **ROV/Q Sequence**

Documentation

#### **Publications**

IMO: STCW Code

#### **Objective**

**To ensure the Master is familiar with the ship handling characteristics of the type of ship to which they have been assigned.**

#### **Industry Guidance**

**TMSA KPI 5.3.2** requires that a formal program ensures that Senior Officers receive appropriate ship-handling training before promotion to Master or assignment to a new vessel type.

Ship-handling experience is gained by training under supervision on board, as a part of a documented competency development system, and may be supplemented by:

- Participation in manned models and/or simulator training.
- Specialist training e.g. navigation in ice, DP operations.

#### **IMO: ISM Code**

6.5 The Company should establish and maintain procedures for identifying any training which may be required in support of the SMS and ensure that such training is provided for all personnel concerned.

#### **IMO: STCW Code**

Part B Chapter V Special training requirements

Section B-V/a

Guidance regarding additional training for Master and Chief Mates of large ships and ships with unusual manoeuvring characteristics.

1 It is important that Masters and Chief Mates should have had relevant experience and training before assuming duties of Master or Chief Mate of large ships or ships having unusual manoeuvring and handling characteristics significantly different from those in which they have recently served. Such characteristics will generally be found in ships which are of considerable deadweight or length or of special design or of high speed.

3 Before initially assuming command of one of the ships referred to above, the prospective Master should have sufficient and appropriate general experience as Master or Chief Mate, and either:

.1 Have sufficient and appropriate experience manoeuvring the same ship under supervision or in manoeuvring a ship having similar characteristics or,

.2 have attended an approved ship handling simulator course on an installation capable of simulating the manoeuvring characteristics of such a ship.

### **Inspection Guidance**

The vessel operator should have developed a procedure to identify the necessary mandatory and non-mandatory training required to be completed by each individual onboard before being assigned to a vessel and/or prior to promotion. For the Master this should define:

- The ship handling training required prior to promotion to the rank of Master onboard any fleet vessel.
- The ship handling training required prior to being reassigned to a vessel with handling characteristics significantly different from those of the vessels in which they have recently served.
- Where the required training included a shore-based ship handling training course, the maximum period for which a course may be considered valid prior assignment to a vessel type before the training would need to be refreshed or repeated.

Training may consist of supervision onboard company vessels which is formally documented through a competency development process or may be delivered at an approved shore-based training centre.

Where training is delivered during a parallel voyage prior to taking over command on a vessel with significant different handling characteristics the vessel operator should have defined the activities that must have been completed by the incoming Master and assessed and documented by the incumbent Master or a suitably qualified Superintendent prior to the incoming Master taking command.

The vessel operator should have evaluated the handling characteristics of the vessel types under its management and identified the circumstances in which additional ship handling training will be required when a Master is reassigned to a vessel type having significantly different handling characteristics to those which they had recently served.

When evaluating the handling characteristics of vessels under management considerations should include the number and types of propellers / drives, the number and types of rudders and the number and types of thrusters fitted to each vessel and not be limited solely to size.

Service as Master on a vessel with a specific set of handling characteristics within the previous five years will be considered as sufficient and appropriate experience when transferring from one vessel type to another.

### **Suggested Inspector Actions**

Compare the sea service record of the Master through the tabulated record of sea service prepared by the vessel operator with their discharge book and verify the time served as Master corresponded to the value provided in the Officer Matrix uploaded to the OCIMF website.

Where the Master had served less than thirty-six months sea service in rank, request evidence that ship handling training had been provided prior to promotion to Master. This may consist of either;

- A formal in-house training program designed to meet the objectives of the STCW Code B-V/a.
- Attendance at a shore-based training course designed to meet the objectives of the STCW Code B-V/a.

Where the Master had transferred between vessel types having significantly different handling characteristics within the previous twelve months of sea service, request evidence that additional ship handling training had been provided to the Master prior to taking command of the new type of vessel. This may consist of either;

- A formal in-house training program designed to meet the objectives of the STCW Code B-V/a.
- Attendance at a shore-based training course designed to meet the objectives of the STCW Code B-V/a.

When considering what constitutes significantly different handling characteristics, be guided by the company training matrix and groupings of vessel types having similar handling characteristics. It is not expected that the inspector will comment on the evaluation of ship handling characteristics made by the vessel operator.

### **Expected Evidence**

- The Master's sea service record and discharge book.
- The company training matrix showing the mandatory and non-mandatory training requirements for the Master.
- The company matrix of the handling characteristics of vessels under management considering the number and type of propellers, rudders and thrusters fitted to a vessel as well as the vessel size, and the training requirements for transfer between vessel types.
- Where the Master had less than thirty-six months sea service in the rank of Master evidence that they had undergone a formal in-house ship handling competency development programme and/or a shore-based training course which had been developed to meet the objectives of the STCW Code B-V/a.
- Where the Master had been reassigned to a vessel type with significantly different handling characteristics, as identified by the vessel operator, evidence that they had undergone a formal in-house ship handling competency development programme and/or a shore-based training course which had been developed to meet the objectives of the STCW Code B-Va prior to taking command.

### **Potential Grounds for a Negative Observation**

- The time in rank for the Master entered in the OCIMF Officer Matrix was inaccurate in that the time in rank declared was greater than thirty-six months sea service, but the Master had less than thirty-six months sea service in rank.
  - There was no company training matrix available which clearly identified the circumstances in which ship handling training was required to be completed by a Master both at promotion and when being reassigned to a vessel having significantly different handling characteristics.
  - The vessel operator had not provided an evaluation of the handling characteristics of vessels under management and identified where training was necessary when transferring between vessel identified as having specific handling characteristics due to size or number and type of propellers, rudders or thrusters.
  - The Master had less than thirty-six months sea service in rank but was not in possession of evidence of ship handling training, designed to meet the objective of STCW Code B-Va, provided through an in-house competency development programme or a shore-based training course.
  - The Master had been reassigned to a vessel identified by the company as having significantly different handling characteristics within the previous twelve months of sea service but was not in possession of evidence of ship handling training, relevant to the new vessel's characteristics, designed to meet the objective of STCW Code B-Va, provided through an in-house competency development programme or a shore-based training course.
- 
- Where the Master had more than thirty-six months sea service in rank and had served on the same type of vessel for the more than the previous twelve months sea service select "*Not Answerable*" in the Process response tool then select "*Not Applicable - as instructed by question guidance*".

### **3.3.3. Had the Master, deck officers, and cargo/gas engineer where carried, attended a shore-based simulator course covering routine and emergency cargo operations within the previous five years?**

#### **Short Question Text**

Cargo operations shore-based simulator course

#### **Vessel Types**

Oil, Chemical, LPG, LNG

#### **ROVIQ Sequence**

Documentation

#### **Publications**

IMO: Model Course 1.35 – Liquified Petroleum Gas (LPG) Tanker Cargo & Ballast Handling Simulator.

IMO: Model Course 1.36 – Liquified Natural Gas (LNG) Tanker Cargo & Ballast Handling Simulator.

IMO: Model Course 1.37 – Chemical Tanker Cargo & Ballast Handling Simulator.

IMO: Model Course 2.06 – Oil Tanker Cargo & Ballast Handling Simulator.

#### **Objective**

**To establish whether all officers involved in cargo operations had been practically trained in routine and emergency cargo operations in a realistic simulator environment.**

#### **Industry guidance:**

IMO: Model Course 1.35 – Liquified Petroleum Gas (LPG) Tanker Cargo & Ballast Handling Simulator.

IMO: Model Course 1.36 – Liquified Natural Gas (LNG) Tanker Cargo & Ballast Handling Simulator.

IMO: Model Course 1.37 – Chemical Tanker Cargo & Ballast Handling Simulator.

IMO: Model Course 2.06 – Oil Tanker Cargo & Ballast Handling Simulator.

**TMSA KPI 6.4.1** requires that officers attend shore-based simulator courses covering routine and emergency cargo operations. These courses may be used to:

- Train junior officers.
- Assess suitability for promotion.
- Ensure continued competency of senior officers.
- Familiarise personnel with new equipment and systems.

Procedures specify the time frame for initial and refresher training.

#### **IMO: ISM Code**

6.5 The Company should establish and maintain procedures for identifying any training which may be required in support of the SMS and ensure that such training is provided for all personnel concerned.

#### **Inspection Guidance**

This question will only be generated when the vessel operator had declared through the pre-inspection questionnaire that the Master, all deck officers and cargo/gas engineers onboard at the time of inspection had attended a shore-based cargo operations simulator course applicable to the vessel type within the previous five years.

The shore-based cargo simulator courses should have been developed around the guidance provided in the appropriate IMO model course for the vessel type.

The inclusion of this question does not imply an expectation by OCIMF or its members that any or all of the Master, deck officers and cargo/gas engineers onboard will be required to have attended a shore-based cargo simulator course.

### **Suggested Inspector Actions**

Review the shore-based cargo system simulator training course certificates for the Master, deck officers, and cargo/gas engineer where carried, and verify that:

- The training had been completed within the previous five years for the Master, each deck officer and cargo/gas engineer. The training may be a refresher training course where a full course had been undertaken previously.
- The training course was conducted in a simulator representing the type of vessel being inspected i.e. oil, chemical, LPG or LNG.
- The training certificates indicated that the course content was at least equivalent to the appropriate IMO model course for the vessel type.

### **Expected Evidence**

- The shore-based cargo system simulator training certificates for the Master, deck officers and cargo/gas engineer where carried.
- Where the shore-based cargo system simulator training had been completed more than five years previously, a certificate for a refresher training course with an appropriate cargo simulator element.
- Where a refresher training course was undertaken, the supporting full course certificate must also be available for review.

### **Potential Grounds for a Negative Observation**

- The Master and/or any one of the deck officers or cargo/gas engineers onboard during the inspection did not have evidence of attending either a full or refresher cargo system simulator training course within the previous five years.
- The training courses attended by the Master and/or any one of the deck officers or cargo/gas engineers was for a vessel type other than the type of vessel being inspected.



### **3.3.4. Had the Chief Engineer and all engineer officers attended a shore-based engine room management simulator course covering routine and emergency machinery operations within the previous five years?**

#### **Short Question Text**

Shore-based engine room management simulator course

#### **Vessel Types**

Oil, Chemical, LPG, LNG

#### **ROVIQ Sequence**

Documentation

#### **Publications**

IMO: Model Course 2.07 – Engine-Room Simulator.

#### **Objective**

To ensure that the Chief Engineer and all engineer officers involved in manoeuvring operations had been practically trained in routine and emergency machinery operations in a realistic simulator environment.

#### **Industry guidance:**

**IMO: Model Course 2.07** – Engine-Room Simulator.

**TMSA KPI 3.2.2** requires that procedures are in place to provide company specific additional training for all ranks. The procedures may include:

- The type of training.
- Frequency of refresher training.
- Records of training.
- A rank specific matrix.
- Personnel career development requests.

#### **IMO: ISM Code**

6.5 The Company should establish and maintain procedures for identifying any training which may be required in support of the SMS and ensure that such training is provided for all personnel concerned.

#### **Inspection Guidance**

This question will only be generated when the vessel operator has indicated that the Chief Engineer and all engineer officers onboard at the time of inspection had attended a shore-based engine room management simulator course within the previous five years. The course should cover routine and emergency machinery operations for the type of main propulsion onboard the vessel.

The course should have been developed around the guidance given within the IMO model course 2.07 for the main propulsion type fitted onboard.

The inclusion of this question in the CVIQ does not imply an expectation by OCIMF or its members that any or all the engineer officers onboard will be required to have attended a shore-based engine room management simulator course.

#### **Suggested Inspector Actions**

Review the shore-based engine room management simulator training certificates for the Chief Engineer and all engineers onboard and verify that:

- The training had been completed within the previous five years for the Chief Engineer and each engineer officer onboard. The training may be a refresher training course where a full course had been undertaken previously.
- The training course was conducted in a simulator representing the main propulsion type of vessel being inspected.

**Expected Evidence**

- The shore-based engine room management simulator training certificates for the Chief Engineer and all engineers.
- Where the shore-based engine room management simulator training had been completed more than five years previously, a certificate for a refresher training course with an appropriate engine room simulator element.

**Potential Grounds for a Negative Observation**

- The Chief Engineer and/or any one of the engineer officers onboard during the inspection did not have evidence of attending either a full or refresher engine room management simulator course within the previous five years.
- The training courses attended by the Chief Engineer and/or any one of the engineer officers was for a propulsion type other than the type fitted to the vessel being inspected.

### **3.3.5. Did all key personnel onboard involved in Dynamically Positioned (DP) operations have appropriate training in accordance with IMO and International Marine Contractors Association (IMCA) guidelines and local regulations applicable to the area of operations?**

#### **Short Question Text**

Training for Dynamically Positioned (DP) operators

#### **Vessel Types**

Oil

#### **ROV/Q Sequence**

Documentation, Bridge

#### **Publications**

IMCA: Guidelines for The Training and Experience of Key DP Personnel. Rev. 2.

IMO: MSC.1/Circ.738/Rev.2. Guidelines for Dynamic Positioning System (DP) Operator Training.

IMO: STCW Code

#### **Objective**

**To ensure that all key personnel onboard are properly experienced, trained and qualified to participate in Dynamically Positioned (DP) operations in accordance with industry recommended best practice and local regulation.**

#### **Industry Guidance**

**IMCA: Guidelines for The Training and Experience of Key DP Personnel – Rev. 2 2016.**

Chapter 5 Key DP Personnel Identified

5.1 Master/OIM The master or offshore installation manager (OIM) has overall responsibility and authority for the safety of the vessel, all onboard and for the protection of the marine environment.

5.2 Senior DP Operator (SDPO) The person fulfilling the role of senior DPO is the lead DP watchkeeper with responsibility for the navigational safety and the DP control required to achieve the effective and efficient progression of the industrial mission of the vessel during the period of time on duty.

5.3 DP Operator (DPO) The person fulfilling the role of DPO is the second person on a DP watch and is not in charge of the watch. The DPO is responsible for fulfilling their duty as a DP control system operator during their time on watch to the extent enabled by their level of training, vessel DP system knowledge and experience.

5.4 Chief Engineer The chief engineer is the head of the technical department onboard and is responsible for ensuring all the mechanical and electrical systems of the vessel are operated and maintained in a safe and efficient manner in order to support the safe navigation and operation of the vessel.

5.5 Senior Engine Room Watchkeeper The person fulfilling the role of senior engineer on watch is responsible for ensuring that all machinery and systems necessary to maintain the DP status of the vessel are functioning correctly. They should also ensure that effective communication channels to the bridge are available.

5.6 Engine Room Watchkeeper A second engine room watchkeeper may assist the senior watchkeeper to the extent enabled by their level of knowledge and experience.

5.7 DP Electrical and Electronics Technicians Personnel fulfilling the role of electrical and electronics technicians are responsible for carrying out maintenance, repairs and replacements to systems and components with reference to the manufacturer's approved operation and maintenance procedures.

6.4 Training Courses for Key Technical DP Personnel

A good understanding of the DPO's responsibilities by technical DP personnel and onboard familiarisation with the DPO's task in controlling specific DP operations will aid quick and appropriate response to problems associated with any equipment that affects DP. It is recommended that engineers and electrical and electronics technicians attend a structured DP familiarisation course either arranged onboard or at a recognised training establishment. Details of a generic DP familiarisation course is given in Appendix 3.

All training should be appropriate to the vessel the individual works on and may include subjects covering vessel control systems, high voltage (HV) safety, DP maintenance, power management systems (PMS), fire and gas detection, emergency shutdowns (ESD) and emergency drills. Electrical technicians on vessels with HV systems should attend a course in the safe operation of HV systems<sup>2</sup>.

Key DP electrical and electronics technicians responsible for maintaining the DP control system should attend a manufacturer approved DP control system maintenance course. Guidelines covering the content of a course designed to enable understanding of the control system and the procedures necessary for fault finding is given in Appendix 2. Training on vessel-specific equipment is necessary if the equipment is sufficiently unique that training on similar equipment does not provide an adequate level of skill, knowledge and ability. It is in the interest of the vessel owners/operators to continuously improve the ability of the relevant personnel to fault find and repair the control system.

Effective training should enable key DP technical personnel to respond quickly and appropriately to equipment failures and faults that may result in DP incidents and to effectively recover the vessel to a safe DP equipment state. When considering the training requirements, the importance of a team response to situations should be taken into account. Vessel owners/operators are advised to have onboard at least one person who has received appropriate maintenance training on the vessel's DP control systems

#### **IMO: MSC.1/Circ.738/Rev.2. Guidelines for Dynamic Positioning System (DP) Operator Training.**

**TMSA KPI 3.1.3** requires that procedures are in place to identify and manage mandatory training, including refresher training, for all vessel personnel.

The procedure may include a training matrix that clearly shows the mandatory training for all vessel personnel. Records of such training are maintained.

#### **IMO: ISM Code**

6.2 The Company should ensure that each ship is:

1. manned with qualified, certificated and medically fit seafarers in accordance with national and international requirements;

6.5 The Company should establish and maintain procedures for identifying any training which may be required in support of the SMS and ensure that such training is provided for all personnel concerned.

#### **IMO: STCW Code**

Section B-V/f Guidance on the training and experience for personnel operating dynamic positioning systems.

3. The content of training and experience should include coverage of the following components of a DP system:

1. DP control station;
2. Power generation and management;
3. Propulsion units;
4. Position reference systems;
5. Heading reference systems;
6. Environmental reference systems; and
7. External force reference systems, such as hawser tension gauges.

## **Inspection Guidance**

The vessel operator should have identified an industry-recognized body which will be utilised to issue DP Operator certification to those staff who had completed the necessary training and obtained and maintained the requisite DP experience.

The vessel operator should have developed a training matrix for all onboard roles required to have any form of DP training according to IMO/IMCA guidance or local regulations applicable to the area in which the vessel conducts DP operations. The training matrix should include, as appropriate to the vessel:

- DP operator training course.
- DP refresher training either utilising an approved onboard programme or through shore-based training courses.
- Integrated DP/power management control system training course.
- High voltage training course.
- The relevant DP control system maintenance training course.
- The relevant position reference system training courses.

## **Suggested Inspector Actions**

- Review the vessel's completed DP training matrix for all staff onboard at the time of the inspection and verify that each person had completed the required training for their role onboard within the time frame specified by the company training matrix.
- Review the DP logbook and DP Operator certificate for one randomly selected DP operator and verify that the logbook had been maintained up to date with DP experience since gaining the DP operator certificate.
- Where the vessel operator required periodic refresher DP training, either by utilising the vessel's own DP equipment while not conducting actual DP operations or by attendance at a shore-based course, verify that the refresher training had been completed within the required time frame.
- Review the High Voltage, DP/Power Management or DP control system training certificate for one individual and verify that the training certificate was valid, and any refresher or top-up training required to maintain validity had been completed within the required time frame.

## **Expected Evidence**

- The company training matrix which identified the DP related certification and training requirements for each DP related role onboard.
- The vessel's populated training matrix which showed the current status of all DP related certification and training for all onboard staff having a DP related role.
- The DP Operator certificates and DP logbooks for everyone identified as a qualified DP operator.
- The DP refresher training course certificates or scheme records where onboard refresher activities had taken place as part of a recognised programme.
- The High Voltage, DP/Power Management and DP control system training certificates for each member of onboard staff required to have such training.
- The position reference system training course certificates for each member of staff required to have such training.

## **Potential Grounds for a Negative Observation**

- The vessel operator had not developed a training matrix which identified all DP related training and certification that was required to be completed by each onboard position with a DP related role.
- The vessel had not prepared a record of training and certification to demonstrate that all DP related certification and training had been completed by each individual onboard with a DP related role.
- The required training certificates or DP Operator certificates were found to be missing, expired or outdated for any individual with a DP related role.
- There was no process to provide DP refresher training to the DP operators through a periodic shore-based course or an approved onboard process.

- The High Voltage, DP/Power management or DP control system training courses required to be undertaken by the Senior Engine Room Operator and, the Electrical and Electronics Technicians in accordance with the company training matrix had not been completed.

### **3.3.6. Had the Master, officers and ratings received the required training and familiarisation before being assigned duties related to handling LNG or other low-flashpoint fuel?**

#### **Short Question Text**

LNG or other low-flashpoint fuel training and familiarisation.

#### **Vessel Types**

Oil, Chemical, LPG

#### **ROVIQ Sequence**

Documentation

#### **Publications**

IMO: ISM Code

IMO: IGF Code

ICS: Training requirements for personnel on ships subject to the IGF code

#### **Objective**

**To ensure that personnel on board ships using LNG or other low-flashpoint fuels are adequately qualified, trained, and experienced.**

#### **Industry Guidance**

##### **ICS: Training requirements for personnel on ships subject to the IGF code**

Amendments to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), 1978, were developed to support the requirement for training in the International Code of Safety for Ships Using Gases or Other Low-flashpoint Fuels (IGF Code).

The purpose of this document is to provide information and guidance on the special training requirements for personnel on ships subject to the IGF Code. It is intended to assist shipowners and operators with preparations for compliance with the IGF Code and the associated training and certification requirements in the STCW Convention, 1978, as amended.

#### **Background**

The IGF Code established an international standard for ships using gases or other low-flashpoint fuels for propulsion and entered into force on 1 January 2017. It contains mandatory provisions for the arrangement, installation, control and monitoring of machinery, equipment and systems using low-flashpoint fuels, focusing currently on LNG.

The IGF Code applies to ships using low-flashpoint fuels for which the building contract is placed on or after 1 January 2017, the keels of which are laid or which are at a similar stage of construction on or after 1 July 2017 (in the absence of a building contract), or the delivery of which is on or after 1 January 2021. Ships which commence a conversion on or after 1 January 2017 to use low-flashpoint fuels (or use additional or different low-flashpoint fuels other than those for which the ship was originally certified) will also be required to comply with the IGF Code (see SOLAS regulation II-1/56).

A functional requirement in the IGF Code (see Part D, section 19) provides that companies shall ensure that seafarers on board ships using gases or other low-flashpoint fuels shall have completed training to attain the abilities that are appropriate to the capacity to be filled and duties and responsibilities to be taken up, taking into account the provisions given in the STCW Convention, 1978, as amended. As such, new mandatory minimum requirements in the STCW Convention and Code for the training and qualifications of relevant personnel on ships subject to the IGF Code entered into force on 1 January 2017.

#### **Familiarization and Training Requirements**

New mandatory minimum requirements for the familiarization and training of Masters, officers, ratings and other personnel on ships subject to the IGF Code are established by Regulation V/3 of the STCW Convention and detailed in Section A-V/3 of the STCW Code.

All personnel serving on board ships subject to the IGF Code are to receive, prior to being assigned shipboard duties, appropriate ship and equipment specific familiarization. The training and qualification requirements apply to Masters, officers, ratings and other personnel on ships subject to the IGF Code, in accordance with their capacity, duties and responsibilities on board. Only personnel on ships subject to the IGF Code are addressed by Regulations V/3.

The new requirements establish two levels of training and resulting certification:

- Certificate in Basic Training for service on ships subject to the IGF Code.
- Certificate in Advanced Training for service on ships subject to the IGF Code.

A Certificate of Proficiency (CoP) will be issued to persons qualified in accordance with the requirements.

Applicable personnel are required to have successfully completed the required level of training and hold the appropriate CoP prior to being assigned shipboard duties. CoPs may be issued by training providers and there is no requirement that they be issued by Administrations.

CoPs issued under Regulation V/3 are not required to be issued with endorsements attesting to the recognition of the certificate (i.e., flag State endorsement). This differs from the requirements for CoPs issued to Masters and officers in accordance with the provisions of Regulations V/1-1 and V/1-2 (special training for oil, chemical and liquefied gas tankers), which require endorsement by the flag State.

#### Basic Training

Seafarers responsible for designated safety duties associated with the care, use or emergency response to the fuel on board ships subject to the IGF Code are to hold the CoP in Basic Training. Every candidate for the CoP in Basic Training for service on ships subject to the IGF Code is to have completed an approved course. There are no special seagoing service or experience requirements for this level of training.

#### Advanced Training

Masters, engineer officers and all personnel with immediate responsibility for the care and use of fuels and fuel systems on ships subject to the IGF Code, are to hold the CoP in Advanced Training.

A person/personnel with “immediate responsibility” is defined in Section B-V/3 as “a person being in a decision-making capacity with respect to handling of fuel addressed by the IGF Code or other fuel-related operations.”

Every candidate for the CoP in Advanced Training for service on ships subject to the IGF Code, whilst holding the CoP in Basic Training for service on ships subject to the IGF Code, is to have:

- Completed an approved advanced training course and meet the standard of competence specified in the STCW Code; and
- Completed at least 1 month of approved seagoing service that includes a minimum of 3 bunkering operations on board ships subject to the IGF Code, where two of the three bunkering operations may be replaced by approved simulator training on bunkering operations.

#### Continued Professional Competence Requirements

Personnel holding CoPs in accordance with Regulation V/3 shall, at intervals not exceeding 5 years, undertake appropriate refresher training or be required to provide evidence of having achieved the required standard of competence within the previous 5 years.

#### Recognition of Qualifications Related to Liquefied Gas Tankers



Personnel who have been qualified and certificated for service on liquefied gas tankers in accordance with Regulation V/1-2 (Basic Training for liquefied gas tanker cargo operations and Advanced Training for liquefied gas tanker cargo operations) are to be considered as having met the requirements for service on ships subject to the IGF Code, as appropriate (see paragraphs 6 and 9 of Regulation V/3).

- Personnel holding a CoP in Basic Training for liquefied gas tanker cargo operations or a CoP in Advanced Training for liquefied gas tanker cargo operations are considered as having met the requirements for Basic Training for service on ships subject to the IGF Code.
- Personnel holding a CoP in Advanced Training for Cargo Operations on liquefied gas tankers are considered as having met the requirements for Advanced Training for service on ships subject to the IGF Code, provided specific seagoing service and experience requirements are met:
  - Completed seagoing service of 3 months in the previous 5 years on board: ships subject to the IGF Code; tankers carrying as cargo, fuels covered by the IGF Code; or ships using gases or low-flashpoint fuel as fuel.
  - Participated in conducting 3 cargo operations onboard a liquefied gas tanker; or completion of a minimum of 3 bunkering operations on a ship subject to the IGF Code, where two of the three bunkering operations may be replaced by approved simulator training on bunkering operations.

#### Existing Qualifications for Service on Gas-Fuelled Ships

Administrations are to compare the standards of competence required of persons serving on gas-fuelled ships before 1 January 2017 with the standards of competence in Section A-V/3, and determine the need, if any, for requiring these personnel to update their qualifications (see paragraph 10 of Regulation V/3). As such, Administrations may recognize existing qualifications for service on gas-fuelled ships or require that relevant personnel update their qualifications.

**TMSA KPI 3.1.3** requires that procedures are in place to identify and manage mandatory training, including refresher training, for all vessel personnel.

The procedures may include a training matrix that clearly shows the mandatory training for all vessel personnel. Records of such training are maintained.

#### IMO: ISM Code

6.2 The Company should ensure that each ship is:

1. Manned with qualified, certificated and medically fit seafarers in accordance with national and international requirements; and
2. Appropriately manned in order to encompass all aspects of maintaining safe operations on board.

#### IMO: IGF Code

##### 19.2 Functional requirements

Companies shall ensure that seafarers on board ships using gases or other low-flashpoint fuels shall have completed training to attain the abilities that are appropriate to the capacity to be filled and duties and responsibilities to be taken up, taking into account the provisions given in the STCW Convention and Code, as amended.

#### Inspection Guidance

This question will only be generated when the vessel operator has indicated through the pre-inspection questionnaire that the vessel is outfitted in accordance with the IGF Code to use LNG as fuel.

The vessel operator should have developed a procedure to identify which officers and ratings are required to hold a certificate for Basic and Advanced training for service on ships subject to the IGF Code. This information may be provided within a company mandatory training matrix.

The IGF Code applies to ships using low-flashpoint fuels for which the building contract is placed on or after 1 January 2017, the keels of which are laid or which are at a similar stage of construction on or after 1 July 2017 (in the absence of a building contract), or the delivery of which is on or after 1 January 2021.

Crew members responsible for designated safety duties associated with the care, use or emergency response to the fuel on board ships subject to the IGF Code are to hold a certificate in Basic Training (IMO Model Course 7.13).

Masters, engineer officers and all personnel with immediate responsibility for the care and use of fuels and fuel systems on ships subject to the IGF Code, are to hold a certificate in Advanced Training (IMO Model Course 7.14).

A person/personnel with “immediate responsibility” is defined as “a person being in a decision-making capacity with respect to handling of fuel addressed by the IGF Code or other fuel-related operations.”

There is no requirement for the certificates to be endorsed by the vessel's flag state or any other authority and they may be issued by training providers.

For existing vessels using LNG or other low-flashpoint fuel that are not subject to the IGF Code, training and certification requirements will be as required by the vessel's flag state.

In all cases, personnel involved in handling LNG or other low-flashpoint fuels should have received ship-specific familiarisation with the systems fitted.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure which defined the requirement for Basic and Advanced Training for service on ships subject to the IGF Code, which may be in the form of a training matrix.
- Review:
  - A Basic Training Certificate for one engine room rating.
  - Two Advanced Training Certificates sampled from the Master, Chief Engineer and engineer officers.
  - Ship-specific familiarisation records for the LNG or low-flashpoint fuel system.

#### **Expected Evidence**

- The company procedure which defined the requirement for Basic and Advanced Training for service on ships subject to the IGF Code, which may be in the form of a training matrix.
- Basic and Advanced Training Certificates of Proficiency for service in vessels subject to the IGF Code.
- On existing vessels, alternative certification as required by the flag state.
- Records of familiarisation for the LNG or low-flashpoint fuel system.

#### **Potential Grounds for a Negative Observation**

- There was no company procedure which defined the requirement for Basic and Advanced Training for service on ships subject to the IGF Code.
- A crew member with responsibilities associated with the fuel or fuel system on board had not received ship-specific familiarisation with the systems fitted before being assigned duties.
- On a vessel subject to the IGF Code:
  - A crew member responsible for designated safety duties associated with the care, use or emergency response to the fuel on board had not received the required Basic Training.
  - The Master, an engineer officer or any other person with immediate responsibility for the care and use of the fuel and fuel systems on board had not received the required Advanced Training.
- On an existing vessel using LNG or other low-flashpoint fuel:
  - A crew member had not received the training required by the vessel's flag state administration.
- A crew member had not received training in accordance with the company procedure which defined the requirement for Basic and Advanced Training for service on ships subject to the IGF Code.

### 3.4. Crew Compliance

**3.4.1. Was there an effective system in place to record and monitor the hours of rest for all personnel onboard in compliance with STCW, MLC or the regulatory requirements applicable to the vessel?**

**Short Question Text**

Hours of rest, records and monitoring

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation

**Publications**

IMO: MSC.1/Circ.1598 Guidelines on Fatigue

ILO: Convention on Seafarers' Hours of Work and the Manning of Ships' (ILO 180)

OCIMF: Recommendations Relating to the Application of Requirements Governing Seafarers' Hours of Work and Rest

IMO: STCW Code

IMO/ILO: Guidelines for the development of tables of seafarers' shipboard working arrangements and formats of records of seafarers' hours of work and rest

**Objective**

**To ensure that there is an effective system in place to manage crew rest hours and fatigue.**

**Industry Guidance:**

**OCIMF: Recommendations Relating to the Application of Requirements Governing Seafarers' Hours of Work and Rest.**

**IMO: MSC./Circ.1598. Guidelines on Fatigue.**

**IMO/ILO: Guidelines for the development of tables of seafarers' shipboard working arrangements and formats of records of seafarers' hours of work and rest**

**TMSA KPI 3A.1.3** requires that procedures ensure that working and rest hours of all personnel are in line with the STCW, applicable flag state requirements or any relevant authority guidelines for the vessel trade and are being accurately recorded and monitored.

**IMO: ISM Code**

1.2.3 The safety management system should ensure:

.1 compliance with mandatory rules and regulations, and

.2 that applicable codes, guidelines and standards recommended by the Organization, Administrations, classification societies and maritime industry organizations are taken into account.

**IMO: STCW Code**

Chapter VIII Watchkeeping

Regulation VIII/1 Fitness for duty.

1. Each Administration shall, for the purpose of preventing fatigue:

1.1 establish and enforce rest periods for watchkeeping personnel and those whose duties involve designated safety, security and prevention of pollution duties in accordance with the provisions of section A-VIII/1 of the STCW Code.

#### Part A Chapter VIII Standards regarding watchkeeping

##### Section A-VIII/1 Fitness for duty

2. All persons who are assigned duty as officer in charge of a watch or as a rating forming part of a watch and those whose duties involve designated safety, prevention of pollutions and security duties shall be provided with a rest period of not less than:

.1 minimum of 10 hours of rest in any 24-hour period; and

.2 77 hours in any 7-day period.

3. The hours of rest may be divided into no more than two periods, one of which shall be at least 6 hours in length, and the intervals between consecutive periods of rest shall not exceed 14 hours.

9. Parties may allow exceptions from the required periods of rest in paragraphs 2.2 and 3 above provided that the rest period is not less than 70 hours in any 7-day period.

Exception from the weekly rest period provided for in paragraph 2.2 shall not be allowed for more than two consecutive weeks. The intervals between the two periods of exceptions onboard shall not be less than twice the duration of the exception.

The hours of rest provided for in paragraph 2.1 may be divided into no more than three periods, one of which shall be at least six hours in length, and neither of the other two shall be less than one hour in length. The intervals between consecutive periods of rest shall not exceed 14 hours. Exceptions shall not extend beyond two 24-hour periods in any 7-day period.

Exceptions shall, as far as possible, take into account the guidance regarding prevention of fatigue in section B-VIII/1.

#### **Inspection Guidance**

The vessel operator should have developed a procedure to define how hours of rest were to be managed and recorded based on the governing requirements of STCW, MLC, or the regulatory requirements applicable to the vessel.

The vessel operator should have provided a system that permits the recording of rest hours and the consequential calculation of conformance in any 24-hour and 7-day periods for each individual onboard taking into account any exceptions permitted. The system should identify any non-conformance with the governing requirements.

Individuals should record notes against their daily records to identify the duties they performed outside their normal working hours.

Hours of rest non-conformance reports should be provided to shore management at least monthly. Shore management should be expected to acknowledge any significant levels of non-conformance.

"Significant" in relation to this question is considered to be 3 or more days containing non-conformance for any individual(s) in any 30-day period.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure which defined how hours of rest were to be managed and recorded.
- Review the hours of rest records form and verify that it was in alignment with the prescribed IMO/ILO format.
- Review hours of rest records and compare them against log books and other records for a recently completed operation and verify that the hours of rest records realistically reflected the activities conducted by the vessel and individual seafarers.
- Review the hours of rest record summary report provided to shore management and verify that the management had acknowledge receipt and responded with an action plan where significant non-conformities were present in the summary report.

Suggested activities to review include :

- Bunkering operations including anchoring and the berthing of the bunker barge.
- Loading / discharging operations including inbound/outbound passages and mooring operations.
- Transit of straits or inland waterways with considerable standby requirements such as Singapore/Malacca Straits, Turkish Straits, English Channel / Dover Straits or similar.
- Post drydock departure and preparations to return to commercial service.
- Navigation during extended periods of restricted visibility.
- Extensive tank cleaning operations.
- Extensive enclosed space operations.

Consideration should be given to compliance with company procedures relating to:

- Bridge team composition.
- Engine room status and, when required to be manned, engine room team composition.
- Supervision and management of cargo and bunker operations.
- Supervision and management of mooring and anchoring operations.
- The conduct of emergency response drills.

The suggested activities and considerations are not exhaustive, and the inspector should exercise professional experience when conducting cross checks against records while limiting the document review to a single operation or period not exceeding three days.

#### **Expected Evidence**

- The company procedure that defined how hours of rest were to be managed and recorded.
- Completed hours of rest records for the preceding three months signed, physically or digitally as acceptable to the vessel's Administration, by the individual crewmembers and approved by the Master or their authorised representative.
- The monthly hours of rest record summary reports for the previous three months showing each hours of rest non-conformance.
- Communication with vessel operator relating to significant\* hours of rest non-conformance.
- Log books and other records which will allow review of vessel activities over the previous three months.

#### **Potential Grounds for a Negative Observation**

- There was no company procedure that defined how hours of rest were to be managed and recorded.
- The accompanying officer was not familiar with the company procedure that defined how hours of rest were to be managed and recorded and/or the process for recording and monitoring hours of rest and any non-conformance.
- The hours of rest records were not in the ILO/MLC format which clearly identified the hours of rest conformance in any twenty-four hour or seven-day period.
- Physically or digitally signed hours of rest records were not available for all crew members onboard which had been approved by the Master or their authorised representative.

- Reviewed of hours of rest records indicated that personnel had not completed the hours of rest records to accurately reflect their work and rest hours.
- There was no evidence of hours of rest conformance/non-conformance calculations.
- There was no evidence that shore management was informed at least monthly of hours of rest conformance levels on board.
- There was no evidence that the shore-based management had acknowledged significant levels of hours of rest non-conformance.

### **3.4.2. Were the Master, officers and crew familiar with the company policy and procedures for drug and alcohol abuse prevention and had unannounced drug and alcohol testing taken place onboard in accordance with the policy?**

#### **Short Question Text**

Drug and alcohol abuse prevention

#### **Vessel Types**

Oil, Chemical, LPG, LNG

#### **ROVIQ Sequence**

Documentation

#### **Publications**

OCIMF: Guidelines for the Control of Drugs and Alcohol Onboard Ship. 1995.

IMO: STCW Code

#### **Objective**

**To ensure that no seafarer will navigate a ship or operate its onboard equipment whilst impaired by drugs or alcohol.**

#### **Industry Guidance**

##### **OCIMF: Guidelines for the Control of Drugs and Alcohol Onboard Ship. 1995.**

OCIMF recommends that officers and ratings observe a period of abstinence from alcohol prior to scheduled watchkeeping duty or work periods. This may be either a fixed period, such as the 4 hours required by the USCG, or a minimum period of 1 hour of abstinence for each unit of alcohol consumed. Whichever method is used to determine the abstinence period, the objective should always be to ensure that, prior to going on scheduled duty, the blood alcohol content of the seafarer is theoretically zero. Officers and ratings should be aware that local regulations may be in place and where this is the case, it is recommended that these be strictly adhered to where they exceed these guidelines.

**TMSA KPI 3A.1.4** requires that a formal D & A (*drug and alcohol*) policy is implemented and a system is in place to monitor it on a regular basis.

The policy complies with OCIMF guidelines. The frequency and type of testing is defined.

#### **IMO: ISM Code**

6.4 The Company should ensure that all personnel involved in the Company's SMS have an adequate understanding or relevant rules, regulations, codes and guidelines.

#### **IMO: STCW Code**

Part A Chapter VIII

Standards regarding watchkeeping

Section A-VIII/1 – Fitness for duty.

10. Each Administration shall establish, for the purpose of preventing alcohol abuse, a limit of not greater than 0.05% blood alcohol level (BAC) or 0.25 mg/l alcohol in the breath or a quantity of alcohol leading to such alcohol concentration for masters, officers and other seafarers while performing designated safety, security and marine environmental duties.

## Part B Chapter VIII Watchkeeping

### Chapter VIII

#### Guidance regarding watchkeeping

##### Section B-VIII/1 – Guidance regarding fitness for duty

8. Companies should consider the implementation of a clearly written policy of drug and alcohol abuse prevention, including prohibition to consume alcohol within four hours prior to serving as member of a watch either by inclusion in the company's quality management system or by means of providing adequate information and education to the seafarers.

#### **Inspection Guidance**

The vessel operator should have developed a policy and supporting procedures to prevent drug and alcohol abuse which should define:

- Whether alcohol may be consumed on board, and if so:
  - The types of alcohol beverages and the strength and maximum container size that may be served on board.
  - The maximum permitted issue to an individual during any 24 hour period in standard alcohol units (1 unit = 10ml alcohol).
  - The person responsible for issuing alcohol to vessel staff and visitors.
  - The means of recording the issue of alcohol to each staff member and visitor.
  - The places onboard where the consumption of alcohol is permitted.
  - The process to avoid stockpiling of issued alcohol.
  - The period of abstinence before any scheduled duty.
- Where alcohol may be consumed while on shore leave:
  - The expected period of abstinence before returning to the vessel.
  - The period of abstinence before any scheduled duty.
- The documented training necessary to use the onboard alcohol testing device.
- The frequency of calibration or testing of the onboard alcohol testing device.
- The frequency of unannounced alcohol testing initiated by the company.
- The persons who are responsible for conducting and witnessing alcohol tests, including the testing of the Master.
- The means of recording the results of an alcohol test.
- The time frame within which unannounced testing must be completed after the initial notification from the company.
- The circumstances, other than unannounced testing, when an individual or group of individuals will be tested for alcohol and samples collected for drug screening where onboard sample collection equipment is provided.
- The frequency of unannounced drug screening by an independent agency or, the controlled collection of samples onboard for analysis by an independent agency.
- Where controlled collection of samples for drug screening is required as part of the company procedure, the minimum stock of sample collection kits that must be maintained on board.

The vessel operator's Drug and Alcohol Abuse Prevention Policy should be prominently displayed at appropriate locations onboard.

The vessel operator will supply information relating to the Drug and Alcohol Abuse Prevention Policy and procedure through the pre-inspection questionnaire.

#### **Suggested Inspector Actions**

Sight, and where necessary review, the company policy and supporting procedures to prevent the abuse of drugs and alcohol and verify that prior to the commencement of the inspection:



- The supply of alcohol had been managed and documented in accordance with company expectations.
- The onboard alcohol testing device had been calibrated and/or tested in accordance with the company procedure and manufacturer's instructions.
- Evidence was available that the persons required to use the onboard alcohol testing device had received training in its use.
- Records were available to demonstrate that unannounced alcohol testing had been completed in accordance with the company procedure and included;
  - The initial instruction from the company,
  - The documented breath test values for each individual tested,
  - The message to the company confirming that the tests had been completed.
- Records were available to demonstrate that the frequency of the unannounced alcohol testing was in accordance with the company procedure.
- Unannounced drug screening tests had been conducted in accordance with the frequency defined by the company procedure by either onboard collection of samples for later analysis or by the attendance of an independent agency.

#### **Expected Evidence**

- The company policy and supporting procedures to prevent the abuse of drugs and alcohol.
- Where alcohol was permitted onboard, the records of alcohol issue to onboard personnel and visitors.
- The alcohol breath testing device.
- The calibration or testing records for the alcohol breath testing device.
- Records, including results, of company initiated unannounced alcohol tests including initial instruction and vessel advice that tests were complete.
- Records, including results and chain of custody documentation, for unannounced or "for cause" drug screening either by the attendance of an independent agency or by the onboard collection of samples.
- The inventory of drug screening sample collection kits where required to be carried by the company procedure.

#### **Potential Grounds for a Negative Observation**

- There was no company policy or supporting procedures for the prevention of abuse of drugs and alcohol.
- The company policy to prevent the abuse of drugs and alcohol was not prominently displayed at appropriate locations onboard.
- The accompanying officer was unfamiliar with the company policy or supporting procedures for the prevention of abuse of drugs and alcohol.
- The accompanying officer or responsible individual was unfamiliar with the use and testing of the alcohol breath testing device.
- The vessel did not have a breath testing device.
- The breath testing device was defective.
- The onboard supply of consumable test pieces was insufficient for the resupply period.
- The breath testing device had not been tested or calibrated in accordance with the company procedure or manufacturer's instructions.
- The onboard supply of alcohol had not been administered and/or documented in accordance with company procedure.
- Records indicated that issue of alcohol had exceeded the permitted allowance to an individual on any single day.
- Company initiated unannounced alcohol testing had not been completed at the frequency required by the company procedure.
- The interval between company initiated unannounced alcohol tests was more than six months.
- The records of company initiated unannounced alcohol testing indicated that not all personnel onboard at the time of the test had been tested or the tests had not been completed within the required timeframe.
- The records of unannounced drug screening indicated that samples had not been collected and analysed from all persons onboard at the time of the screening.
- The records of unannounced drug screening indicated that the frequency of the screening was not in accordance with the company procedure.

- The interval between unannounced drug screenings was greater than twelve months.
- The vessel did not have the stipulated number of drug screening sample collection kits where these were required by the company procedure.
- Where an incident had taken place, there were no records of post incident drug and alcohol tests having taken place where required to be carried out by the company drug and alcohol abuse prevention policy.

## 3.5. Crew Familiarisation

**3.5.1. Had the company developed an effective familiarisation programme that covered the personal safety and professional responsibilities of all onboard personnel, including visitors and contractors, and were records available to demonstrate that the familiarisation had been completed as required?**

### Short Question Text

Familiarisation of crew, visitors and contractors

### Vessel Types

Oil, Chemical, LPG, LNG

### ROV IQ Sequence

Documentation, Anywhere

### Publications

IMO: ISM Code

UK MCA: Code of Safe Working Practices for Merchant Seafarers

### Objective

**To ensure that all onboard personnel, including contractors and visitors, are fully familiarised with their onboard duties, responsibilities and the equipment and machinery fitted to the vessel relevant to their role.**

### **Industry Guidance**

**UK MCA: Code of Safe Working Practices for Merchant Seafarers.**

Chapter 2 Safety Induction.

2.1.2 It is recommended that each Company should design and implement a standard induction programme for each vessel, covering the STCW and MLC requirements, and incorporating any expanded detail specific to that vessel's particular needs.

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors.

The documented procedures may include familiarisation with:

- Onboard HSSE requirements.
- The company SMS.
- Vessel specific operations and equipment.
- Roles and responsibilities.

Records of familiarisation are maintained.

### **IMO: ISM Code**

6.3 The company should establish procedures to ensure that new personnel and personnel transferred to new assignments related to safety and protection of the environment are given proper familiarization with their duties. Instructions which are essential to be provided prior to sailing should be identified, documented and given.

### **Inspection Guidance**

The vessel operator should have developed procedures to define what familiarisation is required to be undertaken by each role onboard, including visitors and contractors, and the timeframe for completion.

The procedures should define, and checklists for each person should record, the following:

- The specific familiarisation tasks that an individual crewmember, visitor or contractor are required to undertake to ensure that they are familiar with general safety, emergency responsibilities and role specific duties.
- Which visitors and/or contractors are required to undertake familiarisation and any exceptions permitted.
- The ship specific equipment that must be included in the familiarisation programme.
- The time frame by which each familiarisation task must be completed.
- The rank of the person required to deliver the familiarisation and, where different, the rank of the person required to verify the effectiveness of the familiarisation delivered.

Where crewmembers are on short contracts to the same vessel, the familiarisation procedure will define any exceptions permitted for returning staff. In such cases, initial familiarisation records must be available to support any abridged familiarisation process.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure which defined the familiarisation process for each role onboard, including visitors and contractors.
- Review the familiarisation records for the following, chosen at random, and verify that familiarisation was conducted as required by the company procedure:
  - One navigation/deck officer.
  - One engineer officer.
  - One specialist officer (ETO, Electrician, Gas/Cargo Engineer), where carried.
  - One rating.
  - One contractor or visitor.
  - One individual who had been promoted onboard or changed roles, where this has occurred.

### **Expected Evidence**

- The company procedure which defined the onboard familiarisation process for each role onboard, including visitors and contractors.
- Records of completed familiarisation as follows:

For all individuals

- Essential Initial safety training necessary prior to sailing on joining, or upon taking over new safety related assignments onboard.
- Onboard training in the use of ship's lifesaving equipment, firefighting equipment and survival craft completed within the first two weeks onboard.

For navigation/deck officers

- Familiarisation with the navigational equipment fitted onboard the vessel prior to taking over a navigational watch.
- Familiarisation with the vessel's cargo, ballast and mooring equipment before taking over a cargo watch.

For engineer officers

- Familiarisation with the main propulsion, manoeuvring, cargo and ballast management and power generating equipment fitted onboard the vessel prior to undertaking scheduled duties.

For specialist officers

- Familiarisation with the specialist equipment under their responsibility.

For contractors

- Familiarisation completed before any work was carried out onboard.

**Potential Grounds for a Negative Observation**

- There was no company procedure which defined the familiarisation process for onboard staff, contractors and visitors.
- The accompanying officer was unfamiliar with the company familiarisation procedure and/or processes.
- Familiarisation records, in accordance with the company procedure, were not available for any one of the selected personnel.
- Evidence was available that contractors, as defined by company procedures, had worked onboard but there was no documented record of their familiarisation prior to commencing work.
- The necessary familiarisation had not been carried out within the required time frame or prior to the crewmember starting the first duty period utilising the equipment fitted to the vessel.
- The familiarisation process did not address the principal safety, environmental, navigation, cargo, mooring and propulsion machinery and equipment fitted to the vessel relevant to an individual role.
- An officer or crew member demonstrated a poor understanding or familiarity with key equipment or systems under their responsibility during the balance of the inspection - which resulted in an observation under another question.

### **3.5.2. Were the Master, officers and ratings familiar with the ship's lifesaving and fire extinguishing appliances and, had ongoing onboard training and instruction taken place to maintain familiarity?**

#### **Short Question Text**

Training and instruction LSA and FFA

#### **Vessel Types**

Oil, Chemical, LPG, LNG

#### **ROVIQ Sequence**

Documentation, Anywhere

#### **Publications**

IMO SOLAS

#### **Objective**

**To ensure that all crew can use the ship's life- saving (LSA) and fire extinguishing (FFA) appliances in accordance with the equipment manufacturer's instructions to respond effectively to an emergency.**

#### **Industry Guidance**

**OCIMF: Survival Craft – A Seafarer's Guide**

Section 3 Familiarisation and Training.

A significant factor in survival craft incidents occurring in the industry has often been identified as a lack of on-board familiarisation with the equipment fitted. It is imperative that a strong focus be given by the operator to the familiarisation and training of all ship's staff in the handling of survival craft, with the aim of minimising risk factors associated with human error.

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors.

The documented procedures may include familiarisation with:

- Vessel specific operations and equipment.

Records of familiarisation are maintained.

#### **IMO: ISM Code**

6.3 The Company should establish procedures to ensure that new personnel and personnel transferred to new assignments related to safety and protection of the environment are given proper familiarization with their duties. Instructions which are essential to be provided prior to sailing should be identified, documented and given.

#### **IMO: SOLAS Reg III/19**

4 On-board training and instruction

4.1 On-board training in the use of the ship's life-saving appliances, including survival craft equipment, and the use of the ship's fire extinguishing appliances shall be given as soon as possible but not later than two weeks after a crew member joins the ship. However, if the crew member is on a regularly scheduled rotating assignment to the ship, such training shall be given not later than two weeks after the time of first joining the ship. Instructions in the use of the ship's fire-extinguishing appliances, life-saving appliances, and in survival at sea shall be given at the same

interval as the drills. Individual instruction may cover different parts of the ship's life-saving and fire-extinguishing appliances, but all the ship's life-saving and fire-extinguishing appliances shall be covered within any period of two months.

4.2 Every crew member shall be given instructions which shall include but not necessarily be limited to:

- .1 operation and use of the ship's inflatable liferafts.
- .2 Problems of hypothermia, first aid treatment for hypothermia and other appropriate first-aid procedures.
- .3 Special instructions necessary for the use of the ship's life-saving appliances in severe weather and severe sea conditions.
- .4 Operation and use of fire-fighting appliances.

4.3 On-board training in the use of davit-launched liferafts shall take place at intervals of not more than 4 months on every ship fitted with such appliances. Whenever practicable this shall include the inflation and lowering of a liferaft. This liferaft may be a special liferaft intended for training purposes only, which is not part of the ship's life-saving equipment; such a special liferaft shall be conspicuously marked.

**IMO: SOLAS Reg III/35.2** (Life-saving appliances and arrangements)

Training manual and on-board training aids.

1. A training manual complying with the requirements of paragraph 3 shall be provided in each crew mess room and recreation room or in each crew cabin.
2. The training manual, which may comprise several volumes, shall contain instructions and information, in easily understood terms, illustrated wherever possible, on the life-saving appliances provided in the ship and on the best methods of survival. Any part of such information may be provided in the form of audio-visual aids in lieu of the manual...
3. The training manual shall be written in the working language of the ship.

**IMO: SOLAS Reg II-2/15.2.3** (Construction – Fire protection, fire detection and fire extinction.)

Training manuals

- .1 A training manual shall be provided in each crew mess room and recreation room or in each crew cabin.
- .2 The training manual shall be written in the working language of the ship.
- .3 the training manual, which may comprise several volumes, shall include the instructions and information required in paragraph 2.3.4 in easily understood terms and illustrated wherever possible. Any part of such information may be provided in the form of audio visual aids in lieu of the manual.
- .4 The training manual shall explain the following in detail:
  - .1 general fire safety practice and precautions related to the dangers of smoking, electrical hazards, flammable liquids and similar common shipboard hazards;
  - .2 general instructions on fire-fighting activities and fire-fighting procedures, including procedures for notification of a fire and use of manually operated call points;
  - .3 meanings of the ship's alarms;
  - .4 operation and use of fire-fighting systems and appliances;
  - .5 operation and use of fire doors;
  - .6 operation and use of fire and smoke dampers; and
  - .7 escape systems and appliances.

**IMO: SOLAS Reg II-2/16.2** (Operations)

## Fire safety operational booklets

- .1 The required fire safety operational booklet shall contain the necessary information and instructions for the safe operation of the ship and cargo handling operations in relation to fire safety. The booklet shall include information concerning the crew's responsibilities for the general fire safety of the ship while loading and discharging cargo and while under way. Necessary fire safety precautions for handling general cargoes shall be explained. For ships carrying dangerous goods and flammable bulk cargoes, the fire safety operational booklet shall also provide reference to the pertinent fire-fighting and emergency cargo handling instructions contained in the International Maritime Solid Bulk Cargoes (IMSBC) Code, the International Bulk Chemical Code, the International Gas Carrier Code and the International Maritime Dangerous Goods Code, as appropriate.
- .2 The fire safety operational booklet shall be provided in each crew mess room and recreation room or in each crew cabin.
- .3 The fire safety operational booklet shall be written in the working language of the ship.
- .4 The fire safety operational booklet may be combined with the training manuals required in regulation 15.2.3.

## Inspection Guidance

The vessel operator should have developed procedures to ensure that:

- Updated fire training manuals, fire safety operational booklets and lifesaving training manuals in the working language of the ship are provided in each crew messroom and recreation room, or each crew cabin.
- All LSA, including survival craft equipment, and FFA, including fixed firefighting installations, provided on-board a vessel is identified and included in the onboard training and instruction program.
- Crew members are properly familiarised with the vessel's LSA & FFA by onboard training and instruction within two weeks of joining the vessel.
- All crew members received further training and instruction in the use of each item of the ship's LSA & FFA at intervals not exceeding two months.
- Where a vessel is outfitted with davit-launched liferafts, instructions are available to guide the onboard training required to take place at intervals of not more than four months.
- Where onboard training and instruction is carried out during routine fire and abandon ship drills, the LSA & FFA items covered are recorded in the standard format drill record.
- A process is in place to track and record the training and instruction provided to the crew for each item of LSA & FFA provided onboard.

## Suggested Inspector Actions

- Sight, and where necessary review, the company procedures which defined the requirements for delivering ongoing training and instruction in the use of LSA & FFA provided onboard.
- Review the list of LSA & FFA included in the onboard training and instruction program and verify that all lifesaving appliances, including survival craft equipment, and firefighting appliances, including fixed firefighting installations provided onboard were included.
- Sight a fire training manual, fire safety operational booklet and a lifesaving training manual and verify that they were written in the working language of the ship and updated to include the equipment and appliances provided onboard. (The fire training manual and fire safety operational booklet may be combined)
- Review the records of onboard training and instruction for the LSA & FFA and verify that training and instruction had been provided to the crew for each item of FFA & LSA listed within two weeks of joining the vessel and, then at intervals not exceeding two months thereafter.
- Where the vessel was provided with a davit-launched liferaft, review the instructions for delivering the required onboard training and instruction, paying attention to any guidance on the use of a training liferaft, where carried.
- Review the records of onboard training and instruction and verify that training and instruction in the use of the davit-launched liferafts, where carried, had been undertaken within the previous four months.



- During the course of the inspection, request an officer or rating to describe the use, operation and safety considerations of a nearby item of LSA or FFA and verify that they were familiar with the item selected.

#### **Expected Evidence**

- A fire training manual, fire safety operational booklet and lifesaving training manual.
- The company procedures defining the requirement for delivering ongoing training and instruction for the LSA and FFA provided onboard.
- The instructions for delivering onboard training for the davit-launched liferaft and the use of a training liferaft, where provided.
- The records of LSA and FFA training and instruction provided to the crew within two weeks of joining the ship and at intervals not exceeding two months thereafter.

#### **Potential Grounds for a Negative Observation**

- There was no company procedure which defined the requirement for delivering and recording ongoing training and instruction for each piece of LSA & FFA provided onboard.
- The fire training manual, fire safety operational booklet or lifesaving manuals were not written in the working language of the ship.
- The fire training manual, fire safety operational booklet or lifesaving manual were not provided in each crew mess room and recreation room, or in each crew cabin.
- The fire training manual, fire safety operational booklet or lifesaving manuals were not updated to reflect the LSA & FFA provided onboard.
- The onboard training and instruction records did not include all items of LSA, including survival craft equipment, and FFA, including fixed firefighting installations, provided onboard.
- There was no process to track that each crewmember had received training and instruction in each piece of LSA & FFA carried onboard within the timeframes defined within SOLAS.
- Onboard training and instruction had not been completed for all crew within the timeframes defined by SOLAS.
- Onboard training and instruction in the use of davit-launched liferafts, where carried, had not been completed within the previous four months.
- There were no instructions available for the safe use of a "training liferaft", where one was carried.
- The training liferaft, where carried, was not conspicuously marked as such.
- The accompanying officer was unfamiliar with the company procedure for conducting and recording ongoing training and instruction in the use of the ship's LSA & FFA.
- An interviewed officer or rating was unfamiliar with the use, operation or safety considerations of any piece of LSA or FFA provided onboard.

### **3.5.3. Had the Master and navigation officers been familiarised with the ECDIS equipment installed on board and were documented records of this familiarisation available?**

#### **Short Question Text**

Familiarisation with ECDIS equipment installed on board.

#### **Vessel Types**

Oil, Chemical, LPG, LNG

#### **ROV IQ Sequence**

Documentation, Bridge

#### **Publications**

Nautical Institute: Industry Recommendations for ECDIS Familiarisation

IMO: STCW.7/Circ.24 Training requirements for Electronic Chart Display and Information Systems (ECDIS) and provision of the documentation for verification

IMO: ISM Code

OCIMF: Recommendations on Usage of ECDIS and Preventing Incidents. First Edition.

#### **Objective**

**To ensure the Master and navigation officers are fully familiar with the specific type of ECDIS equipment installed on board prior to taking charge of a navigational watch.**

#### **Industry Guidance**

**OCIMF: Recommendations on Usage of ECDIS and Preventing Incidents. First edition.**

#### **3.2 Recommendations**

- Generic ECDIS training must be undertaken by all Masters and Bridge Officers. This training should as a minimum include provisions as per IMO model course 1.27.
- Additionally, ECDIS familiarisation for all Masters and Bridge Officers should be undertaken to include type-specific training as well as on board familiarisation. The familiarisation should include:
  - a) Type-specific ECDIS training for the specific system fitted on board, and developed by the respective ECDIS makers, should be provided by the company to all Masters and Deck Officers before they take charge of a navigational watch. Type-specific training could either be a course taken ashore or online training, as long as it is specific and targeted at effective use of the make/type of ECDIS fitted on board. Verification of trainee's ability to use ECDIS should be incorporated as part of the type-specific training module.
  - b) ECDIS familiarisation should be provided to all on-signing Deck Officers before they keep an independent navigational watch, and each time they join any vessel.
- Onboard ECDIS familiarisation should also include ship-specific contingency scenarios, such as power failure; loss of inputs from heading, speed, and electronic position-fixing systems; as well as spoofing and jamming errors.
- Once the Masters and Bridge Officers have been trained and are fully familiar with the use of ECDIS (including but not limited to ENCs, chart symbols, safety contours, no-go areas, passage planning policies and procedures), the challenge of retaining ECDIS proficiency remains. Masters and Officers are recommended to maintain and improve their ECDIS knowledge and proficiency regularly through continuation and refresher training. They should be capable of using ECDIS effectively at all times and to demonstrate this during navigational assessments, audits and external inspections such as Port State Control (PSC) and SIRE.

## **IMO: STCW.7/Circ.24 Training requirements for Electronic Chart Display and Information Systems (ECDIS) and provision of the documentation for verification**

11 The STCW Code contains requirements for approved training on ECDIS. In cases where the approved training has not been completed, a limitation shall be included on the certificate and endorsements issued to the seafarer. Where such a limitation is not specified, the certificate and endorsements are evidence of having successfully completed the required approved training and that the standard of competence has been achieved.

12 No requirement exists for the approved training on ECDIS equipment to be type-specific. The knowledge, understanding and proficiency required to be demonstrated is generalized to ensure seafarers have the necessary skills for basic operation of all types of equipment.

13 In accordance with regulation I/14, companies are responsible for ensuring that seafarers employed on their ships are familiarized with the installed equipment, including ECDIS.

14 It is agreed that seafarers required to have training in the use of ECDIS:

1. should not be required to provide documentation of training in ECDIS that is specific to the installed equipment; and
2. are required to be familiarized with the ECDIS equipment installed on board.

### **Nautical Institute: Industry Recommendations for ECDIS Familiarisation**

Familiarisation: Following the successful demonstration of competencies contained in the ECDIS Generic Training, Familiarisation is the process required to become familiar with any onboard ECDIS (including back-up) in order to assure and demonstrate competency in relation to a specific ship's ECDIS installation, prior to taking charge of a navigation watch.

Familiarisation should cover:

- Initial Preparation.
- Basic Operations.
- Navigational Tools and Functions.
- Route Planning and Route Monitoring.

Familiarisation includes any pertinent information required for the safe operation of the ECDIS, including all updates and alterations. Companies should have clear procedures for using ECDIS and assisting the navigators in completion of the familiarisation process.

A 'Company' can consider a wide variety of options for achieving familiarisation both onboard and ashore. These include but are not limited to:

- Shore based manufacturer training followed by installation-specific familiarisation onboard;
- Independent training on specific systems followed by installation-specific familiarisation;
- Computer Based Training (CBT), followed by installation-specific familiarisation onboard;
- Internet / Intranet Based Training (eLearning) followed by installation specific familiarisation onboard;
- Onboard training by appropriately trained crew or training personnel;
- Manufacturer provided training mode on the ECDIS, followed by installation-specific familiarisation onboard;
- Company bridge procedures and manuals.

Full familiarisation needs to be specific to the installation and may require a mix of the above methods and consideration should be given to allow adequate time for this activity, whether done ashore or onboard or both. Regardless of the method(s) used, it is essential that all watchkeeping officers must be competent in the use of the onboard ECDIS prior to taking charge of a navigational watch and remain so thereafter. It is recognised that manufacturer-provided tools for structured onboard familiarisation will enhance and possibly add value to onboard ECDIS.

Annex I (Familiarisation Checklist) of this guidance provides a detailed description of ECDIS tasks the industry expects officers of the watch of ships using ECDIS to be able to demonstrate competency in. These tasks should be considered a minimum requirement.

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors.

The documented procedures may include familiarisation with:

- Vessel specific operations and equipment.

Records of familiarisation are maintained.

### **IMO: ISM Code**

6.3 The company should establish procedures to ensure that new personnel and personnel transferred to new assignments related to safety and protection of the environment are given proper familiarization with their duties. Instructions which are essential to be provided prior to sailing should be identified, documented and given.

### **Inspection Guidance**

#### **ECDIS Training required by STCW**

The STCW Code contains requirements for approved training on ECDIS. In cases where the approved training has not been completed, a limitation shall be included on the certificate of competency and endorsements issued to the seafarer.

#### **ECDIS Familiarisation**

The vessel operator should have developed procedures to ensure the Master and all watchkeeping officers are competent in the use of the ECDIS equipment installed on board prior to taking charge of a navigational watch. The procedures should include the:

- Time scale for the familiarisation.
- Method(s) of familiarisation with the ECDIS equipment.
- Location of the familiarisation, on board or ashore.
- Identity of the appropriately trained crew or training personnel authorised to deliver the familiarisation.
- Means of demonstrating competency upon completion of the familiarisation and before taking charge of a navigational watch.
- Records to be maintained.

The checklist contained as an annex to "ECDIS - Industry Recommendations for ECDIS Familiarisation" (published by the Nautical Institute) or an equivalent document produced by the operator or equipment manufacturer may be utilised to demonstrate an officer's familiarisation with the onboard ECDIS installation.

Formal structured familiarisation is required and simply observing a more experienced officer is not an acceptable method.

The vessel operator should have identified the principal method of delivering ECDIS familiarisation for the type of ECDIS equipment installed onboard through the pre-inspection questionnaire. This information will be inserted in the inspection editor and reproduced in the final report.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures that ensured the Master and all watchkeeping officers are competent in the use of the type of ECDIS installed onboard prior to taking charge of a navigational watch.
- Review the onboard ECDIS installation familiarisation checklists for the Master and deck officers.
- Interview the accompanying officer to verify their familiarity with the onboard ECDIS installation by selecting at least two items from the onboard familiarisation checklist and requesting that they demonstrate the required actions/knowledge.

#### **Expected Evidence**

- Company procedures that ensured all watchkeeping officers are competent in the use of the onboard ECDIS prior to taking charge of a navigational watch.
- ECDIS installation specific training certificates, where required by the company familiarisation process
- Onboard ECDIS installation specific familiarisation checklists for the Master and deck officers.

#### **Potential Grounds for a Negative Observation**

- There were no company procedures that ensured all watchkeeping officers are competent in the use of the onboard ECDIS prior to taking charge of a navigational watch, that included the:
  - Time scale for the familiarisation.
  - Method of familiarisation with the ECDIS equipment.
  - Location of the familiarisation, on board or ashore.
  - Identity of the appropriately trained crew or training personnel authorised to deliver the familiarisation.
  - Means of demonstrating competency upon completion of the familiarisation and before taking charge of a navigational watch.
  - Records to be maintained.
- The accompanying officer was not familiar with the company procedures that ensured that the Master and all watchkeeping officers are competent in the use of the onboard ECDIS prior to taking charge of a navigational watch.
- The accompanying officer was found to be unfamiliar with the onboard ECDIS installation through review of items contained within the onboard ECDIS installation familiarisation checklist.
- The Master and/or deck officer(s) had not received approved training on ECDIS indicated by a limitation being included on the certificate of competency and endorsements issued to the seafarer.
- The Master and/or deck officer(s) had not been familiarised with the ECDIS equipment installed on board in accordance with company procedures.
- There were no records available, or records were incomplete, of the familiarisation of the Master and deck officers with the ECDIS equipment installed on board.
- There was evidence that the Master or a deck officer had taken charge of a navigational watch prior to being familiarised with the ECDIS equipment installed on board.
- The onboard ECDIS installation familiarisation checklist did not substantially cover the items included in the familiarisation checklist included as an annex to the Nautical Institute paper "ECDIS - Industry Recommendations for ECDIS Familiarisation".

Do not give an observation if there is no Flag Administration approved ECDIS type specific training certificate available.

## **4. Navigation and Communications**

### **4.1. Navigation Equipment**

#### **4.1.1. Were the Master and navigation officers familiar with the company procedures for the set up and operation of the ECDIS units fitted to the vessel and were records**

**available to demonstrate that the ECDIS had been operated in accordance with company procedures at all stages of a voyage?**

**Short Question Text**

ECDIS set up and operation

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Bridge

**Publications**

IMO: ISM Code

ICS: Bridge Procedures Guide – Fifth Edition

OCIMF: Recommendations on Usage of ECDIS and Preventing Incidents. First Edition.

**Objective**

**To ensure that ECDIS units fitted to the vessel were used to effectively navigate the vessel.**

**Industry Guidance**

**OCIMF: Recommendations on Usage of ECDIS and Preventing Incidents. First Edition.**

**1.2 Analysis of ECDIS-related incident findings and SIRE observations**

Table 1.1 summarises contributing factors identified from analysis of navigational incidents as well as Ship Inspection Report Programme (SIRE) findings related to ECDIS...

... Gaps in ECDIS-related knowledge and practical application by Navigating Officers and Masters remain a recurring theme when analysing incidents, as well as SIRE observations.

**4.1.3 ECDIS displays**

ECDIS displays can be broadly divided into four types:

- Display base.
- Standard display.
- Custom display.
- Full display.

...Although standard display shows more information compared to display base, information shown on standard display may still be insufficient for safe navigation under different navigational conditions.

**Recommendations**

- Standard displays or display base should not be used on their own, without the additional layers required for safe navigation.
- The minimum layers to be displayed for safe navigation (those other than standard display) should be included in the company SMS for different navigational conditions. For example, a company SMS might list the following layers to be displayed:
  - Under any navigational condition:
    - -IMO standard display, plus:
    - -Depth soundings and contours.
    - -Wrecks, obstructions and danger marks.

- -Light characteristics (at night).
- Additionally, when anchoring:
  - -Submarine cables and pipelines.
  - -Seabed characteristics.
  - -Anchorage identification.
- The company SMS should detail the procedure for customising ECDIS display layers for various navigation situations, watch handover procedures and Master's standing orders.
- Full display should be switched on when the vessel is due to breach the limiting boundaries of the XTC, the safety contour, the manual safety contour, or whenever the risk of missing navigational data could jeopardise safer navigation. Navigating officers should be aware that switching on all layers will lead to excessive data cluttering on the ECDIS. In this case, bridge manning levels should be increased, and the Master should be called immediately.
- Navigating Officers should be familiar with ECDIS symbols and how they differ from symbols on traditional paper charts.

#### 4.2.8 Look-ahead zone

The look ahead zone, also referred to as the safety frame, anti-grounding cone or look-ahead time, angle or width, needs to be set correctly, taking into account factors that include vessel speed, proximity to navigational hazards, availability of sea room, traffic concentration, geographical limitations and manoeuvrability. Correctly setting the look-ahead zone and associated alarms enables the system to generate warnings or alarms in case of navigational hazards.

This feature does not provide alarms for radars, ARPA, AIS targets or for navigational hazards on Raster Navigational Charts (RNCs).

#### Recommendations

- The parameters for the look-ahead zone should be planned so that the size of the zone is appropriate for the vessel's speed and manoeuvring characteristics. They should be set for each leg of the passage and should consider conditions such as proceeding from ocean to coastal waters, pilotage areas or speed.
- The look-ahead zone should be reassessed in CATZOC areas that have reduced position accuracy (such as B, C, D, U) to ensure the vessel has sufficient safety margin...
- The look-ahead zone should be highlighted on the display.

### 5 Alarm management

For Navigating Officers and the bridge team, proper alarm management is very important. Alarm functionality can vary from one make to another. Some ECDIS systems allow the operator to disable alarm sounds, thus downgrading to a visual indication only.

#### 5.4 Recommendations

- Alarm setting parameters should be agreed by the Master and Bridge team at the passage planning stage and captured in the relevant passage plan form.
- The criteria for setting alarms, warnings and cautions should be decided on board the vessel in accordance with the company SMS procedures for various navigational conditions.
- The alarms should be set to assist the Master and officers in maintaining their awareness and understanding of potential dangers to the vessel in a manner that reduces alarm fatigue.
- Once the alarm settings are determined this should be clearly communicated to all navigating officers.
- Alarms should not be physically or routinely disabled.
- If an alarm is to be disabled for any reason, this should be recorded on a formal tracking form to be handed over to subsequent watches and approved by the Master.
- Before acknowledging the alarm, Masters and Officers should always understand and confirm the type of alarm. The habit of acknowledging alarms for the purpose of eliminating noise and disturbance shall be avoided. The bridge team should review the alarm log on a regular basis to make sure that critical alarms have not been inadvertently overlooked.

**ICS: Bridge Procedures Guide.** Fifth Edition.

Chapter 4.13 Electronic Chart Display and Information System

Checklist B5 ECDIS Setup.

**TMSA KPI 5.1.2** requires that comprehensive procedures to ensure safe navigation are in place.

These procedures may include

- Electronic aids to navigation including ARPA, AIS and ECDIS

#### **IMO: ISM Code**

7. The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks should be defined and assigned to qualified personnel.

#### **Inspection Guidance**

Where a vessel is fitted with an ECDIS, the vessel operator should have developed procedures, which include appropriate checklists, to ensure that the unit(s) are operated and managed in accordance with the manufacturer's instructions and industry best practice.

The procedures should address:

- Display management.
- Alarm management.
- Creating and uploading passage plans.
- Changing passage plans.
- Recalling previous voyages.
- Route checking.
- Plotting manual fixes (visual bearing and radar range).
- Creating parallel index lines.
- Setting safety depths and safety contours as appropriate to the draught of the vessel.
- Setting of safety frame/safety cone.
- AIS and or radar overlay, if fitted.
- Limitations of operating in RCDS mode.
- SCAMIN and how it is displayed.
- CATZOCs and how the information should be used in operation.
- Contingency action in case of single or multiple ECDIS failure.
- Updating software in accordance with manufacturer's instructions.

The vessel operator should indicate whether ECDIS is the primary means of navigation through the pre-inspection questionnaire. The information provided will be inserted in the inspection editor and the final report.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures for ECDIS operation and management.
- Review the company procedures to verify that the required safety settings meet industry standards.
- Review the setup of an ECDIS unit with the accompanying officer and verify that settings, alarms and displays were in accordance with the provided checklists and quick reference guides.
- Review the alarm history, if available, and identify whether alarms were being generated that should have been addressed through proper set up and passage planning.



- Where the vessel is fitted with additional ECDIS, verify that all units have been set up in an identical manner.
- Review navigational records and confirm that there was a process in place to verify the ECDIS settings and record the outcome periodically throughout the voyage.

#### **Expected Evidence**

- The company procedures that defined how ECDIS units should be operated and managed.
- ECDIS checklists and quick reference guides.
- Records to demonstrate that software updates had been completed in accordance with manufacturer's instructions.
- Records to demonstrate periodic tests required by the manufacturer's instructions had been completed.
- Records to demonstrate that the ECDIS settings had been checked periodically during each voyage.

#### **Potential Grounds for a Negative Observation**

- There were no company procedures for operating and managing the ECDIS fitted.
- The company procedures did not provide clear guidance regarding:
  - Display management
  - Alarms & warnings.
  - Safety contours and depths.
  - Safety frame or safety cone.
  - Route checking.
- The accompanying navigation officer was unfamiliar with the company ECDIS management and operation procedures.
- The accompanying navigation officer was unfamiliar with the operation of the ECDIS units fitted to the vessel
- An ECDIS unit was defective in any respect. (Where the vessel carried an additional ECDIS in excess of the ECDIS carriage requirements then record as a comment providing an entry had been made in the defect reporting system. Indicate the number of ECDIS required to be carried and the total fitted onboard.)
- The second ECDIS, where required to be fitted, was not set up as a backup unit.
- There was evidence that ECDIS settings had been incorrectly entered at any stage of a voyage.
- There was no indication in the passage plan regarding required changes to ECDIS settings.

**4.1.2. Were the Master and navigation officers familiar with the company procedures for managing and operating the radar/ARPA units fitted to the vessel, and were records available to demonstrate that the units had been operated and tested in accordance with company procedures?**

**Short Question Text**

Operation and testing of radar/ARPA

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Bridge

**Publications**

ICS: Bridge Procedures Guide – Fifth Edition

IMO SOLAS

**Objective**

**To ensure that the radar/ARPA units fitted to the vessel are used effectively for navigation and collision avoidance.**

**Industry Guidance:**

**ICS: Bridge Procedures Guide.** Fifth Edition.

Chapter 4.11 Radar and Radar Plotting Aids.

**TMSA KPI 5.1.2** requires that comprehensive procedures to ensure safe navigation are in place.

These procedures may include:

- Electronic aids to navigation including ARPA, AIS and ECDIS.

**IMO: ISM Code**

7.The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks should be defined and assigned to qualified personnel.

**IMO: SOLAS**

Chapter V Regulation 19

Carriage requirements for shipborne navigational systems and equipment

**Inspection Guidance**

SOLAS Chapter V Regulation 19 requires the following:

(2.3.2) all ships of 300 gross tonnage and upwards, a 9 GHz radar.

(2.5.5) all ships of 500 gross tonnage and upwards, an automatic tracking aid

(2.7.1) all ships of 3,000 gross tonnage and upwards, a 3 GHz radar or, where considered appropriate by the Administration, a second 9GHz radar.

(2.7.2) all ships of 3,000 gross tonnage and upwards, a second automatic tracking aid

(2.8.1) all ships of 10,000 gross tonnage and upwards, an automatic radar plotting aid (ARPA), or other means, to automatically plot the range and bearing of at least 20 other targets, connected to a device to indicate speed and distance through the water, to determine collision risk and simulate trial manoeuvre.

The vessel operator should have developed procedures for the management and operation of the radar and ARPA units fitted to the vessel. The procedures should define:

- When the radar/ARPA units are required to be in operation.
- When and how periodic performance checks are to be carried out and recorded.
- The required settings of ARPA audible and visual alarms and warnings for Closest Point of Approach (CPA) and Bow Crossing Range (BCR) where fitted.
- The required ARPA speed and heading input for collision avoidance purposes.
- The process for parallel indexing set-up and use – particularly for complex passages with multiple sets of indexes.
- The use of the ARPA trial manoeuvre function.
- The danger of displaying AIS data (vectors) on ARPA units for collision avoidance purposes.
- The effect of blind sectors and clutter suppression on the radar performance.
- Restrictions in the use of radar during cargo operations.
- The planned interval for changing the magnetron in 3 GHz and 9 GHz radars.

The inspector should be aware of terminal/operational restrictions controlling the operation of the radar units during the inspection.

The operator/vessel staff should establish what functionality can be demonstrated while the radar units are on standby, particularly as it relates to the pre-programming of parallel indexing.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures for managing and operating the radar/ARPA units fitted to the vessel.
  - Where possible, review the ARPA alarm settings for CPA ,and BCR where fitted, and verify that they were set in accordance with company procedures with the audible and visual alarms functioning.
  - Where possible, review the process for programming individual, and sets of parallel index lines into the radar and compare with the inbound passage plan to verify that the parallel indexing was used as indicated by the passage plan.
  - Review onboard records and verify that the radars/ARPAs were in operation in accordance with company procedures and performance checks were conducted as required with satisfactory results.
  - Review the heading, speed and positional inputs to each radar and/or ARPA and verify that the information was consistent with the master equipment.
  - Review the radar maintenance records and verify that the magnetrons for each radar had been changed in accordance with the required schedule.
- 
- Verify that the accompanying navigation officer was aware of the difference in performance between X-band (9 GHz) and S-band (3 GHz) radars, particularly the impact of environmental conditions on the performance of each type.

### **Expected Evidence**

- The company procedures for managing and operating the radar/ARPA units fitted to the vessel.
- Any checklists or quick reference charts for the operation of the radar/ARPA units fitted to the vessel.
- Onboard records demonstrating that the radar/ARPA units had been in operation and tested in accordance with company procedures.
- Information relating to any blind sectors affecting the fitted radars.
- Onboard records relating to the routine changing of the magnetrons for each radar fitted.
- The parallel index information used for programming the radars for the previous passage.

#### **Potential Grounds for a Negative Observation**

- There were no company procedures for managing and operating the radar/ARPA units fitted to the vessel.
- The accompanying navigation officer was unfamiliar with the company procedure for managing and operating the radar/ARPA units fitted to the vessel.
- The accompanying navigation officer was unfamiliar with the hazards of using AIS data (vectors) for collision avoidance.
- The accompanying navigation officer was unfamiliar with the difference between the performance characteristics of X-band (9 GHz) and S-band (3 GHz) radars.
- The radar/ARPA units had not been in operation in accordance with company procedures.
- The radar/ARPA units had not been tested in accordance with company procedures.
- The radar/ARPA units were defective in any respect.
- The heading, speed or positional feeds to the radar/ARPA units were inaccurate when compared to the master devices.
- There was no indication of the scanner blind sectors affecting the radar coverage for each radar unit.
- The radar magnetrons had not been changed in accordance with the planned maintenance schedule.

**4.1.3. Were the Master and navigation officers familiar with the company procedures for operating and testing the steering control systems fitted to the vessel and were records available to demonstrate that operation and testing had been carried out in accordance with the procedures?**

**Short Question Text**

Operating and testing the steering control systems

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Bridge

**Publications**

USCG: Code of Federal Regulations. Title 33.

IMO SOLAS

ICS: Bridge Procedures Guide – Fifth Edition

**Objective**

**To ensure the steering control systems fitted to the vessel are tested and used in an appropriate manner with changeover procedures understood.**

**Industry Guidance:**

**ICS Bridge Procedures Guide.** Fifth Edition.

Chapter 4.2 Steering Gear and Automatic Pilot.

Annex 3 Checklists

Section B – Bridge

B1 Steering Gear Test Routines

**USCG: Code of Federal Regulations. Title 33.**

§ 164.25 Tests before entering or getting underway.

(a) Except as provided in paragraphs (b) and (c) of this section no person may cause a vessel to enter into or get underway on the navigable waters of the United States unless no more than 12 hours before entering or getting underway, the following equipment has been tested:

(1) Primary and secondary steering gear. The test procedure includes a visual inspection of the steering gear and its connecting linkage, and, where applicable, the operation of the following:

- (i) Each remote steering gear control system.
- (ii) Each steering position located on the navigating bridge.
- (iii) The main steering gear from the alternative power supply, if installed.
- (iv) Each rudder angle indicator in relation to the actual position of the rudder.

- (v) Each remote steering gear control system power failure alarm.
- (vi) Each remote steering gear power unit failure alarm.
- (vii) The full movement of the rudder to the required capabilities of the steering gear.

**TMSA KPI 5.1.2** requires that comprehensive procedures to ensure safe navigation are in place.

These procedures may include:

- Actions upon equipment failure.
- Supporting checklists.

#### **IMO: ISM Code**

7. The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks should be defined and assigned to qualified personnel.

#### **IMO: SOLAS**

##### Chapter V

Regulation 24 Use of Heading and/or Track Control Systems.

Regulation 25 Operation of Steering Gear.

Regulation 26 Steering Gear: Testing and Drills.

1 Within 12 hours before departure, the ship's steering gear shall be checked and tested by the ship's crew. The test procedure shall include, where applicable, the operation of the following:

- .1 the main steering gear;
- .2 the auxiliary steering gear;
- .3 the remote steering gear control systems;
- .4 the steering positions located on the navigation bridge;
- .5 the emergency power supply;
- .6 the rudder angle indicators in relation to the actual position of the rudder;
- .7 the remote steering gear control system power failure alarms;
- .8 the steering gear power unit failure alarms; and
- .9 automatic isolating arrangements and other automatic equipment.

2 The checks and tests shall include:

- .1 the full movement of the rudder according to the required capabilities of the steering gear;

.2 a visual inspection for the steering gear and its connecting linkage; and

.3 the operation of the means of communication between the navigation bridge and steering gear compartment

3.1 Simple operating instructions with a block diagram showing the change-over procedures for remote steering gear control systems and steering gear power units shall be permanently displayed on the navigation bridge and in the steering compartment.

3.2 All ships' officers concerned with the operation and/or maintenance of steering gear shall be familiar with the operation of the steering systems fitted on the ship and with the procedures for changing from one system to another.

### **Inspection Guidance**

The vessel operator should have developed procedures for the onboard management of the steering gear and control systems, which provided guidance on the following:

- The steering modes available for use which may include;
  - automatic steering.
  - track steering.
  - hand steering.
  - remote conning position steering.
  - non-follow up steering.
- Changing between the steering modes available.
- Limitations of and any restrictions imposed on any mode of steering. (speed, rudder limit, location etc.)
- The testing of steering control systems and power units prior to departure, prior to arrival and periodically during the voyage.
- Changing from one steering control system to another in the event of an alarm or failure.
- Actions required on the bridge to engage/permit remote emergency steering.

### **Suggested Inspector Actions**

- Sight, and where required review, the company procedure for managing, testing and operating the steering control systems provided.
- Review the records for the testing of the steering control systems provided and verify that all steering modes had been tested from each location, as appropriate, in accordance with the company procedure.
- Confirm that the procedure for changing over steering control systems and operating the emergency steering system were available and posted on the bridge, including the block diagram required.

### **Expected Evidence**

- The company procedures for managing, testing and operating the steering control systems provided.
- The vessel specific procedures for changing between steering control modes and systems.
- The vessel specific procedure for changing over to emergency steering control.
- The block diagram showing the change-over procedures for remote steering gear control systems and steering gear power units.
- Records for a recent voyage to demonstrate that steering control system tests had been completed in accordance with company procedures.

### **Potential Grounds for a Negative Observation**

- There was no company procedure for managing, testing and operating steering control systems fitted to the vessel.
- The accompanying navigation officer was unfamiliar with the company procedure for managing, testing and operating the steering control systems fitted to the vessel.

- The accompanying navigation officer was unfamiliar with the changeover procedure between modes of steering control or action to take when steering system alarms activate.
- Simple operating instructions with a block diagram showing the change-over procedures for remote steering gear control systems and steering gear power units were not permanently displayed on the navigation bridge
- The steering control systems had not been operated or tested in accordance with the company procedure.
- The steering control systems were defective in any respect.



**4.1.4. Were the Master and navigation officers familiar with the company procedures for using the Automatic Identification System (AIS) fitted to the vessel and were records available to confirm that periodic checks and tests had been carried out in accordance with the procedures?**

**Short Question Text**

Automatic Identification System (AIS)

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Bridge

**Publications**

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

ICS: Bridge Procedures Guide – Fifth Edition

IMO Resolution A.1106(29) Revised Guidelines for the Onboard Operational use of Shipborne Automatic Identification Systems (AIS)

IMO SOLAS

**Objective**

**To ensure that the Automatic Identification System (AIS) fitted to the vessel was used to safely enhance situational awareness during navigation.**

**Industry Guidance**

**ICS: Bridge Procedures Guide.** Fifth Edition.

Chapter 4.10 Automatic Identification System

It is important that AIS is operated correctly and that watchkeepers are familiar with the equipment, including how to check that all information being transmitted by AIS is both accurate and updated. Poor quality broadcast data can significantly reduce the potential value of this system.

**IMO: Resolution A.1106(29) Revised Guidelines for the Onboard Operational use of Shipborne Automatic Identification Systems (AIS).**

Operation of the transceiver unit

Activation

22 AIS should always be in operation when ships are underway or at anchor. If the master believes that the continual operation of AIS might compromise the safety or security of his/her ship or where security incidents are imminent, the AIS may be switched off. Unless it would further compromise the safety or security, if the ship is operating in a mandatory ship reporting system, the master should report this action and the reason for doing so to the competent authority. Actions of this nature should always be recorded in the ship's logbook together with the reason for doing so. The master should however restart the AIS as soon as the source of danger has disappeared. If the AIS is shut down, static data and voyage-related information remains stored. Restart is done by switching on the power to the AIS unit. Ship's own data will be transmitted after a two-minute initialization period. In ports AIS operation should be in accordance with port requirements.

Use of AIS in collision avoidance situations

40 The potential of AIS as an assistance for anti-collision device is recognized and AIS may be recommended as such a device in due time.

41 Nevertheless, AIS information may merely be used to assist in collision avoidance decision-making. When using the AIS in the ship-to-ship mode for anti-collision purposes, the following cautionary points should be borne in mind:

.1 AIS is an additional source of navigational information. It does not replace, but supports, navigational systems such as radar target-tracking and VTS; and

.2 the use of AIS does not negate the responsibility of the OOW to comply at all times with the Collision Regulations, particularly rule 7 when determining whether risk of collisions exists.

42 The user should not rely on AIS as the sole information system but should make use of all safety-relevant information available.

43 The use of AIS on board ship is not intended to have any special impact on the composition of the navigational watch, which should continue to be determined in accordance with the STCW Convention.

44 Once a ship has been detected, AIS can assist in tracking it as a target. By monitoring the information broadcast by that target, its actions can also be monitored. Many of the problems common to tracking targets by radar, namely clutter, target swap as ships pass close by and target loss following a fast manoeuvre, do not affect AIS. AIS can also assist in the identification of targets, by name or call sign and by ship type and navigational status.

#### **OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition**

##### **4.13.4 Automatic Identification Systems**

The Automatic Identification System (AIS) is required to operate while a tanker is underway and at anchor. Some port authorities may ask for the AIS to be kept on when a tanker is alongside. The AIS operates on a VHF frequency and transmits and receives information automatically, and the output power ranges between 2.0W and 12.5W. Automatic polling by another station, e.g. by port authority equipment or another tanker, could cause equipment to transmit at the higher (12.5W) level, even when it is set to low power (typically 2.0W).

When alongside a terminal or port area where hydrocarbon gases may be present, either the AIS should be switched off or the aerial isolated and the AIS given a dummy load. Isolating the aerial preserves manually inputted data that may be lost if the AIS is switched off. If necessary, the port authority should be informed.

When alongside a terminal or port area where no hydrocarbon gases are likely to be present, and if the unit has the facility, the AIS should be switched to low power.

At a Single Point Mooring (SPM) or Multi-Buoy Mooring (MBM), the AIS may be kept on, if requested by the terminal, at an adequate power level to transmit information to the terminal safety monitoring system. Tanker and terminal representatives should agree on the AIS settings.

If the AIS is switched off or isolated while alongside, it must be reactivated on leaving the berth.

The use of AIS equipment may affect the security of the tanker or the terminal at which it is berthed. The use of AIS may be determined by the port authority, depending on the security level in the port.

**TMSA KPI 5.1.2** requires that comprehensive procedures to ensure safe navigation are in place.

These procedures may include:

- Electronic aids to navigation including ARPA, AIS and ECDIS.

#### **IMO: ISM Code**

7. The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks should be defined and assigned to qualified personnel.

## **IMO: SOLAS**

### **Chapter V Regulation 19**

2.4 All ships of 300 gross tonnage and upwards engaged on international voyages and cargo ships of 500 gross tonnage and upwards not engaged on international voyages and passenger ships irrespective of size shall be fitted with an automatic identification system (AIS)....:

### **Inspection Guidance**

The vessel operator should have developed procedures for the effective onboard management of navigation equipment, including Automatic Identification Systems (AIS).

The vessel operator should have developed procedures for the operation and testing of the AIS which include guidance on:

- AIS configuration.
- Static and dynamic data input.
- Periodic checks and performance tests.
- The use of AIS data during collision avoidance.
- Limitations for operating the unit during cargo operations.
- Switching the unit on and off.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures for the operation and testing of the AIS equipment fitted onboard.
- Review checklists and records to verify that testing of the AIS system had been carried out in accordance with the company procedure.
- Verify that the navigational data feeds provided to the AIS were consistent with the output from the master equipment for heading, speed and position.
- Confirm that the vessel static data was correctly entered in the unit.
- Determine whether AIS data was transferred to the ARPA for display and verify that the vessel operator provided guidance relating to the use of AIS data for collision avoidance.

### **Expected Evidence**

- The company procedure for the operation and testing of the AIS equipment fitted onboard.
- Records of the checks and performance tests required to be carried out on the AIS equipment fitted.
- Company guidance related to the use of AIS information in collision avoidance situations.

### **Potential Grounds for a Negative Observation**

- There were no procedures for the operation and testing of the AIS system fitted onboard.
- There was no company guidance related to the use of AIS information in collision avoidance situations.

- The accompanying navigation officer was unfamiliar with the company procedures for the operation and testing of the AIS system fitted onboard
- The accompanying navigation officer was unfamiliar with the company guidance related to the use of AIS information in collision avoidance situations.
- There were no records of the checks and performance tests required to be carried out on the AIS equipment fitted.
- The AIS unit was defective in any respect.
- There was as an error in the navigational data feeds to the AIS unit.
- The vessel static data was incorrectly entered in the AIS unit.
- While alongside a terminal or port area where hydrocarbon gases may be present, the AIS was not switched off, or the aerial isolated and the AIS given a dummy load (unless at the request of the shore authorities).

**4.1.5. Were the Master and navigation officers familiar with the company procedure for the use of the Bridge Navigational Watch Alarm System (BNWAS) and were records available to demonstrate that it had been operated and tested in accordance with the procedure?**

**Short Question Text**

Bridge Navigational Watch Alarm System (BNWAS)

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Bridge

**Publications**

ICS: Bridge Procedures Guide – Fifth Edition

IMO SOLAS

IMO: MSC.128(75) Performance Standards for a Bridge Navigational Watch Alarm System (BNWAS)

**Objective**

**To ensure that the bridge was continually manned throughout a voyage, and at anchor, by vigilant watchkeeping staff.**

**Industry Guidance**

**ICS: Bridge Procedures Guide.** Fifth Edition.

Chapter 3.5 Bridge Navigational Watch Alarm System

The Bridge Navigational Watch Alarm System (BNWAS) should be in operation whenever the ship is at sea, including when the ship's heading or track control system is in use. The OOW should ensure that the BNWAS is operational and set correctly in accordance with the SMS and the Master's Standing orders.

**TMSA KPI 5.1.3** requires that procedures to ensure effective bridge resource management are in place. These procedures may include:

- Use of BNWAS.

**IMO: ISM Code**

7. The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks should be defined and assigned to qualified personnel.

**IMO: SOLAS**

Chapter V Regulation 19

2.2 All ships of 150 gross tonnage and upwards and passenger ships irrespective of size shall, in addition to the requirements of paragraph 2.1, be fitted with:

.3 a bridge navigational watch alarm system (BNWAS)...

The bridge navigational watch alarm system shall be in operation whenever the ship is underway at sea.

## **IMO: MSC.128(75) Performance Standards for a Bridge Navigational Watch Alarm System (BNWAS)**

### **4.1.3 Reset function**

4.1.3.1 It should not be possible to initiate the reset function or cancel any audible alarm from any device, equipment or system not physically located in areas of the bridge providing proper look out.

4.1.3.2 The reset function should, by a single operator action, cancel the visual indication and all audible alarms and initiate a further dormant period. If the reset function is activated before the end of the dormant period, the period should be re-initiated to run for its full duration from the time of the reset.

4.1.3.3 To initiate the reset function, an input representing a single operator action by the OOW is required. This input may be generated by reset devices forming an integral part of the BNWAS or by external inputs from other equipment capable of registering physical activity and mental alertness of the OOW.

### **Inspection Guidance**

The vessel operator should have developed procedures to define:

- When the BNWAS is required to be in operation.
- Who will activate the BNWAS and the process for doing so.
- How the system will be protected from unauthorised deactivation.
- What to do if a BNWAS stage 2 or 3 alarm is activated.
- The periodic tests and checks required to verify correct functioning of the BNWAS.

It is an OCIMF expectation that the BNWAS shall be activated at anchor in addition to while the vessel is at sea.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure for operating and testing the Bridge Navigation Watch Alarm System (BNWAS) fitted to the vessel.
- Review vessel records and verify that the BNWAS had been operated and tested in accordance with company procedure.
- Request that the process for activating and deactivating the BNWAS is described or demonstrated.
- Verify that any tests required to confirm proper functioning of the BNWAS were understood by the accompanying officer.

### **Expected Evidence**

- The company procedures for the use and testing of the BNWAS.
- Bridge Log Book.
- Bridge checklists.

### **Potential Grounds for a Negative Observation**

- There was no company procedure for operating and testing the Bridge Navigation Watch Alarm System (BNWAS) fitted to the vessel.
- The accompanying navigation officer was unfamiliar with the company procedure for the operation and testing of the BNWAS.
- The BNWAS was defective in any respect.
- The password or activation key was available to others beyond the Master and their authorised deputy.
- There were no records available to confirm that the BNWAS had been in operation in accordance with company procedures.

- There were no records available to confirm that the BNWAS had been tested in accordance with company procedures.
  - There was evidence that modifications or adaptations designed to defeat the BNWAS were in use.
- 
- Record a **negative observation** under the Process response tool if the vessel operator's navigational procedures did not require the BNWAS to be activated while the vessel was at anchor.

**4.1.6. Were the Master and navigation officers familiar with the company procedures governing the management and operation of the Global Navigation Satellite System (GNSS) receivers fitted onboard and was the fitted equipment configured, used and checked in accordance with the procedure?**

**Short Question Text**

Global Navigation Satellite System(s)

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Bridge

**Publications**

ICS: Bridge Procedures Guide – Fifth Edition

IMO SOLAS

**Objective**

**To ensure that Global Navigation Satellite System (GNSS) receivers provide reliable and accurate positional information.**

**Industry Guidance**

**ICS: Bridge Procedures Guide.** Fifth Edition.

Chapter 4.9 Electronic Position Fixing Systems

4.9.3 GNSS receivers

Whether as stand-alone equipment or as part of an integrated system, GNSS receivers provide:

- Position (including service quality information and geodetic datum corrections);
- Ground referenced course and speed; and
- Route storage and cross track distance (XTD) monitoring. By entering the passage plan into the GNSS receiver, the OOW has an independent method of monitoring the passage.

**TMSA KPI 5.1.2** requires that comprehensive procedures to ensure safe navigation are in place.

These procedures may include:

- Electronic aids to navigation including ARPA, AIS and ECDIS.

**IMO: ISM Code**

7. The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks should be defined and assigned to qualified personnel.

**IMO: SOLAS**

Chapter V Regulation 19

2.1 All ships, irrespective of size, shall have:



.6 a receiver for a global navigation satellite system or a terrestrial radionavigation system, or other means, suitable for use at all times throughout the intended voyage to establish and update the ship's position by automatic means.

### **Inspection Guidance**

The vessel operator should have developed procedures for the effective onboard management of navigation equipment, including Global Navigation Satellite System receivers. The procedure should define:

- The configuration of the equipment.
- The periodic checks and performance tests to be conducted.
- Where more than one receiver is fitted, the process to switch the output from one receiver to another.
- The periodic checks to verify that all equipment is receiving an accurate positional input.
- The actions to take in the event of a single GNSS receiver failure.
- The actions to take in the event of multiple GNSS receiver failures.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure for Global Navigation Satellite System (GNSS) receiver operation and management
- Review the configuration of the GNSS receivers and verify that the settings were in accordance with the company procedures.
- Verify that the antenna offset data was available and had been correctly entered in the GNSS receiver configuration.
- Verify that the GNSS receiver(s) had been set to WGS84 datum.
- Review onboard records to confirm that periodic checks and tests required to be carried out to the GNSS receivers had been completed as required.
- Verify that the GNSS position feed to two or more navigational systems was correct.
- Verify that onboard instructions were posted for any GNSS receiver output inter-switch arrangements.

### **Expected Evidence**

- The company procedure that defined how GNSS units should be operated and managed
- Onboard records to demonstrate that the required checks and tests had been completed
- The measurements to allow the checking / reprogramming of the antenna offset position in the GNSS receiver configuration.

### **Potential Grounds for a Negative Observation**

- There were no company procedures for operating and managing the GNSS receivers fitted.
  - The accompanying navigation officer was unfamiliar with the GNSS receiver management and operation procedures, or the equipment fitted to the vessel.
  - The GNSS receiver(s) were not configured in accordance with company requirements, or the antennae coordinates were incorrectly entered.
  - Periodic checks and tests had not been carried out in accordance with procedures.
  - A GNSS receiver was defective in any respect.
  - The positional data provided to another piece of navigation or communication equipment such as AIS, ARPA or a GMDSS transceiver was erroneous.
- 
- The vessel was not fitted with a GNSS receiver, in which case comment on what alternative terrestrial navigation system was fitted.

**4.1.7. Were the Master and navigation officers familiar with the company procedures for operating and managing the echo sounder and were records maintained to demonstrate that the equipment fitted to the vessel had been tested and operated in accordance with the company expectations?**

**Short Question Text**

Echo sounder

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Bridge

**Publications**

ICS: Bridge Procedures Guide – Fifth Edition

IMO SOLAS

**Objective**

**To ensure that the echo sounder is used effectively to monitor the under-keel clearance.**

**Industry Guidance:**

**ICS Bridge Procedures Guide.** Fifth Edition.

Chapter 4.5 Echo Sounders

The echo sounder should always be used when making a landfall and kept switched on in coastal and pilotage waters. If the echo sounder is fitted with a shallow water alarm, the alarm should be set to an appropriate safe depth to warn of approaching shallow water.

**TMSA KPI 5.1.2** requires that comprehensive procedures to ensure safe navigation are in place.

These procedures may include:

- Electronic aids to navigation including ARPA, AIS and ECDIS.

**IMO: ISM Code**

7. The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks should be defined and assigned to qualified personnel.

**IMO: SOLAS**

Chapter V Regulation 19

2.3 All ships of 300 gross tonnage and upwards and passenger ships irrespective of size, shall in addition to the requirements of paragraph 2.2 be fitted with:

.1 an echo-sounding device, or other electronic means, to measure and display the available depth of water;

**Inspection Guidance**

The vessel operator should have developed procedures for the effective onboard management of the echo sounder, or other electronic means to measure the depth of water, and the associated means to record depth history. The procedure should define:

- When the echo sounder is required to be in operation.
- Where forward and aft transducers were fitted to the vessel, considerations for the set up and display of information.
- When the echo sounder recording device was required to be operational and any time/position marking necessary.
- Where a separate printer was provided, the times the printer is required to be recording.
- The criteria for the setting of the depth alarm – where fitted.
- The requirements for periodic checks to confirm the proper functioning and accuracy of the echo sounder when compared to water of a known depth.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures for managing and operating the echo sounder and its associated recording device(s).
  - Review a recent passage and verify that the echo sounder and its recording device were in use in accordance with company procedures.
  - Review the depth alarm setting and verify that it was in accordance with company procedures for the time of the inspection or while manoeuvring to the berth.
  - Review onboard records and confirm that the accuracy of the echo sounder had been confirmed by periodic comparison in accordance with company procedures.
- 
- Request that the accompanying navigation officer demonstrate that the echo sounder is showing the expected depth indication under the keel at the time of the inspection.

#### **Expected Evidence**

- The company procedures for managing and operating the echo sounder and its associated recording device.
- Onboard records demonstrating that the echo sounder and its recording device were in operation as required by the company procedures.
- Onboard records demonstrating that the accuracy of the echo sounder had been verified.

#### **Potential Grounds for a Negative Observation**

- There were no procedures for managing and operating the echo sounder and its associated recording device.
- The accompanying navigation officer was unfamiliar with the company procedures for managing and operating the echo sounder and its associated recording device.
- The accompanying navigation officer was unfamiliar with the process to calculate the depth under the keel and verify the accuracy of the echo sounder.
- The echo sounder had not been operated or tested in accordance with the company procedures and manufacturer's instructions.
- The echo sounder was not showing the expected depth indication under the keel at the time of the inspection.
- The echo sounder or recording device was defective in any respect.
- The echo sounder depth alarm had not been set in accordance with the company procedures.

**4.1.8. Were the Master and navigation officers familiar with the company procedures for the operation and testing of the speed and distance measuring devices fitted to the vessel and were records available to demonstrate that periodic tests had been completed as required by the procedures?**

**Short Question Text**

Speed and distance measuring devices

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Bridge

**Publications**

ICS: Bridge Procedures Guide – Fifth Edition

IMO SOLAS

**Objective**

**To ensure that accurate speed data is available to navigational equipment.**

**Industry Guidance**

**ICS: Bridge Procedures Guide.** Fifth Edition.

Chapter 4.4.2 Types of Speed Log.

Electromagnetic and doppler type logs can be either single-axis and measure speed in the fore and aft direction (longitudinal) or dual-axis and measure fore and aft (longitudinal) and also athwartships (transverse) movement. When connected to rate of turn data, dual-axis logs are also able to calculate the speed and direction of movement of the bow and stern.

**TMSA KPI 5.1.2** requires that comprehensive procedures to ensure safe navigation are in place.

These procedures may include:

- Electronic aids to navigation including ARPA, AIS and ECDIS.

**IMO: ISM Code**

7. The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks should be defined and assigned to qualified personnel.

**IMO: SOLAS**

Chapter V Regulation 19

*(Ships constructed on or after 1 July 2002)*

2.3 All ships of 300 gross tonnage and upwards and passenger ships irrespective of size, shall in addition to the requirements of paragraph 2.2 be fitted with:

.4 speed and distance measuring device, or other means, to indicate speed and distance through the water.

2.9 All ships of 50,000 gross tonnage and upwards shall, in addition to meeting the requirements of paragraph 2.8, have:

.2 a speed and distance measuring device, or other means, to indicate speed and distance over the ground in the forward and athwartships direction.

*(Ships constructed before 01 July 2002 but after 01 September 1984 and over 500 gross tonnage shall have a speed and distance indicator when engaged on international voyages.)*

### **Inspection Guidance**

The vessel operator should have developed procedures, taking into account manufacturer's instructions, which defined:

- The periodic checks to verify the functionality of the speed and distance measuring devices fitted to the vessel.
- The periodic checks to verify that the speed output to remote displays and navigational equipment, such as ARPA, AIS and ECDIS, is accurate.
- The speed input(s) required to be used for navigational equipment such as ARPA, AIS and ECDIS.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures for the operation and testing of the speed and distance measuring devices fitted to the vessel.
- Verify that the speed outputs from the speed and distance measuring devices were being correctly displayed at each remote display.
- Verify that the water speed displayed by the ARPA & ECDIS units was consistent with the output from the water speed log.
- Where a dual axis doppler log was fitted, verify that the ground speed displayed by the ECDIS units was consistent with output from the dual axis log.
- Verify that function and performance checks required by the company procedures had been completed as required.
- Verify that operational verification checks for the speed input to ARPA, AIS and ECDIS had been completed as required by the company procedures.

### **Expected Evidence**

- The company procedures for the operation and testing of the speed and distance measuring devices fitted to the vessel.
- Records of the periodic accuracy and function tests for the speed and distance measuring devices fitted to the vessel.
- Records of periodic verification that the speed input to navigational equipment such as ARPA, AIS and ECDIS was accurate.

### **Potential Grounds for a Negative Observation**

- There was no company procedure for the operation and testing of the speed and distance measuring devices fitted to the vessel.
- The accompanying navigation officer was not familiar with the company procedures for the operation and testing of the speed and distance measuring devices fitted to the vessel.
- Periodic tests to verify the accuracy and/functionality of the speed and distance measuring devices fitted to the vessel required by the company procedures had not been completed as required.
- Periodic checks to verify the accuracy of the speed input to navigational equipment had not been completed in accordance with company procedures.
- The speed values displayed by remote display units and ARPA, AIS or ECDIS units were inconsistent with the master water speed and or dual axis logs as appropriate.

- A speed and distance measuring device fitted to the vessel was defective in any respect.

**4.1.9. Were the Master and navigation officers familiar with the company procedures for the use and testing of the navigation lights and shapes, and was there evidence that the navigation lights had been tested to confirm full functionality and correct visibility?**

**Short Question Text**

Navigation lights and shapes

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVQ Sequence**

Bridge

**Publications**

ICS: Bridge Procedures Guide – Fifth Edition

IMO: Resolution MSC.253(83) Adoption of the performance standards for navigation lights navigation light controllers and associated equipment.

IMO: COLREG

**Objective**

**To ensure that the vessel always displays navigation lights & shapes in accordance with the International Regulations for Preventing Collisions at Sea.**

**Industry Guidance**

**ICS: Bridge Procedures Guide.** Fifth Edition.

Chapter 4.7 Navigation Lights and Signalling Equipment

The OOW is responsible for ensuring that the navigation lights, emergency navigation lights and signalling equipment are in working order and are ready for immediate use at all times.

The condition of lights, flags and shapes should be checked at regular intervals.

Checklists B3, B6, B7 & B16.

**IMO: Resolution MSC.253(83) Adoption of the performance standards for navigation lights, navigation light controllers and associated equipment.**

**4.3 Special requirements for lights using LEDs**

The luminous intensity of LEDs gradually decreases while the electricity consumption remains unchanged. The rate of decrease of luminous intensity depends on the output of LEDs and temperatures of LEDs. To prevent shortage of luminous intensity of LEDs:

.1 An alarm function should be activated to notify the Officer of the Watch that the luminous intensity of the light reduces below the level required by COLREGs;

or

.2 LEDs should only be used within the lifespan (practical term of validity) specified by the manufacturer to maintain the necessary luminous intensity of LEDs. The lifespan of LEDs should be determined and clearly notified by the manufacturer based on the appropriate test results on the decrease of luminous intensity of the LEDs under various temperature conditions and on the temperature condition of LEDs in the light during operation, taking the appropriate margin into account.

**TMSA KPI 5.1.4** requires that the company has procedures that ensure all navigational equipment is maintained as operational.

#### **IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

#### **IMO: COLREG**

Part C. Lights and Shapes.

Annex 1. Positioning and technical details of lights and shapes.

#### **Inspection Guidance**

The vessel operator should have developed procedures to define the periodic checks and tests that are required to be carried out on the navigation lights, the navigation light controller and navigational shapes. The checks should include:

- Primary and secondary navigation lights are fully operational.
- Primary and secondary power supplies to the navigational light controller are operational.
- Power supply failure alarm is operational.
- Where LED lamps are fitted, they are within their usable lifespan for luminous intensity. This may be achieved by integrated luminous intensity or usage monitoring systems with alarms or by manual recording of usage.
- Adequate spare lamps are onboard meeting the navigation light manufacturer's specification for luminosity, or wattage, and focal plane.
- Required navigational shapes are onboard and in good condition. (three balls, one cylinder & one diamond)
- Portable navigation lights, where required to be carried, are in good working order and fitted with the necessary lanyards to permit hoisting.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures which defined the checks and tests that were required to be carried out on the navigation lights, navigation light controller and navigational shapes.
- Review the pre-departure, pre-arrival and daily navigational checklists and verify that navigation light checks and tests had been completed as required by the company procedures.
- Request that the navigation officer demonstrates the functionality of the navigation light controller and navigation lights.
- Review the inventory of spare navigation light lamps and verify that they conform to the manufacturer's specification and luminosity for each navigation light fitted to the vessel.
- Review the method of ensuring LED lamps, if fitted, are within their usable lifespan for luminous intensity.
- Where possible, and safe to do so from the deck of the vessel, sight individual navigational lights and verify that the screens, lamps and lenses were in apparent good condition.
- Sight the navigational shapes and verify that they were in good condition.
- Sight the portable navigation lights, where carried, and verify that they were in good condition and functioning.

#### **Expected Evidence**

- The company procedures which defined the checks and tests required to be carried out on the navigation lights, navigation light controller and navigational shapes.



- Checklists to confirm that the checks and tests required to be conducted on the navigation lights (fixed and portable), navigation light controller and navigational shapes had been completed as required.
- The inventory of spare navigational lamps identifying the luminosity or wattage and the navigation lights to which they may be fitted.
- Records of LED lamp usage and lifespan, where required.

#### **Potential Grounds for a Negative Observation**

- There was no company procedure defining the checks and tests required to be carried out on the navigational lights, the navigational light controller and navigational shapes.
- The accompanying navigation officer was unfamiliar with the company procedure for conducting checks and tests on the navigation lights, the navigation light controller or navigational shapes.
- The navigation lights and navigation light controller had not been tested in accordance with the company procedure.
- The navigation lights or navigation light controller were defective in any respect. (a single bulb failure on a single light would not generate an observation).
- Navigation lights or their screens were damaged, relocated or obscured in such a way that the required spacing and/or arc of visibility of any lights was apparently no longer in compliance with COLREG Annex 1 requirements.
- The required navigational shapes were not onboard or were in an unusable condition.
- Portable navigation lights, where required to be carried, were defective or not ready for rigging.
- The vessel did not have an inventory of spare lamps for each type and luminosity of navigation light fitted.
- The inventory of spare lamps did not conform to the navigation light manufacturer's specifications. (incorrect size, focal plane, luminosity, wattage or type).
- Procedures did not include guidance on the use of LED lamps, where fitted.
- There was no effective method of ensuring LED lamps were within their usable lifespan for luminous intensity
- LED lamps were in use beyond the lifespan specified by the manufacturer or were in an alarm condition for reduced luminous intensity.

**4.1.10. Were the Master and navigation officers familiar with the company procedure for managing Marine Safety Information broadcasts by NAVTEX and SafetyNET and were warnings affecting the vessel's route plotted on the voyage charts?**

**Short Question Text**

NAVTEX and SafetyNET

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Bridge

**Publications**

ICS: Bridge Procedures Guide – Fifth Edition

IMO SOLAS

IMO MSC.1/Circ. 1310/Rev.1 Revised Joint IMO/IHO/WMO Manual on Maritime Safety Information (MSI)

**Objective**

**To ensure that broadcast navigation warnings affecting a vessel's planned route are effectively managed.**

**Industry Guidance**

**ICS: Bridge Procedures Guide.** Fifth Edition.

**2.4.9 Maritime Safety Information**

Weather information (including gale warnings), NAVAREA warnings and coastal navigational warnings are broadcast by radio-telephony from coast radio stations and by NAVTEX. Long range weather warnings are broadcast via satellite communications systems, such as SafetyNET, along with NAVAREA navigational warnings as part of the World-Wide Navigational Warning Service (WWNWS).

Details of weather routing services for ships and information for shipping are contained in lists of radio signals and in Volume D of the World Meteorological Organization (WMO) Publication No 9.

**3.15.3 Maritime Safety Information**

A continuous MSI watch should be kept at sea at all times by all ships. NAVTEX should be used to meet this requirement whilst the ship is within range of a coast station broadcasting NAVTEX. Beyond this range, a watch should be kept on the appropriate MF or HF frequencies or on the ship earth station (SES) in order to receive MSI.

**IMO: MSC.1/Circ. 1310/Rev.1 Revised Joint IMO/IHO/WMO Manual on Maritime Safety Information (MSI).**

**2.3 Broadcast methods**

2.3.1 Two principal methods are used for broadcasting maritime safety information in accordance with the provisions of the International Convention for the Safety of Life at Sea, 1974, as amended, in the areas covered by these methods, as follows:

.1 NAVTEX: broadcasts to coastal waters; and

.2 SafetyNET: broadcasts which cover all the waters of the globe except for Sea Area A4, as defined by IMO resolution A.801(19), annex 3, as amended.

**TMSA KPI 5.1.2** requires that comprehensive procedures to ensure safe navigation are in place.

## **IMO: ISM Code**

7. The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks should be defined and assigned to qualified personnel.

## **IMO: SOLAS**

### **Chapter IV Regulation 12**

.2 Every ship, while at sea, shall maintain a radio watch for broadcasts of maritime safety information on the appropriate frequency or frequencies on which such information is broadcast for the area in which the ship is navigating.

## **IMO: MSC.1/Circ. 1310/Rev.1 Revised Joint IMO/IHO/WMO Manual on Maritime Safety Information (MSI).**

### **Inspection Guidance**

The vessel operator should have developed a procedure to require that the Marine Safety Information received through the NAVTEX and SafetyNet systems is promptly reviewed and, where appropriate, applied to the voyage charts and passage planning documentation.

The procedure should define the process for:

- Setting up the NAVTEX and SafetyNET EGC receivers to receive Marine Safety Information broadcasts applicable to the vessel's location and route.
- Reviewing incoming messages and transferring pertinent information to the passage charts and documentation.
- Where information is transferred directly from NAVTEX to an ECDIS unit the process for identifying warnings that will affect the vessel's route.
- Filing, retaining and disposing of Marine Safety Information broadcasts.
- Removing Marine Safety Information from electronic and paper charts once the warning has expired or is cancelled.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure for managing Marine Safety Information received through NAVTEX and SafetyNET.
- Inspect the NAVTEX receiver and verify that it was correctly set to receive navigational warnings from relevant coast radio stations.
- Review the messages received through the NAVTEX and verify they were reviewed upon receipt and, where applicable to the vessel's route, applied to the paper and / or electronic charts.
- Inspect the SafetyNET EGC receiver and verify that it was set up to receive Marine Safety Information broadcasts for the correct NAVAREA and Coastal Warning Area.
- Verify that all current NAVAREA and Coastal Warning Area warnings were available onboard and, where applicable to the vessel's route, applied to the paper and/or electronic charts.

### **Expected Evidence**

- The company procedure for managing Marine Safety Information received through NAVTEX and SafetyNET.
- NAVTEX and SafetyNET broadcast warnings filed in accordance with company procedures.
- Paper and electronic charts showing charted Marine Safety Information warnings.

### **Potential Grounds for a Negative Observation**

- There was no company procedure for managing Marine Safety Information received through NAVTEX and SafetyNET.
- The accompanying navigation officer was unfamiliar with the company procedure for managing Marine Safety Information received through NAVTEX and SafetyNET, or the equipment fitted to the vessel.
- The NAVTEX and/or SafetyNET EGC receiver was defective in any respect.
- The NAVTEX receiver was not programmed to receive Marine Safety Information broadcasts from coast radio stations appropriate to the vessel's route.
- The SafetyNET EGC receiver was not programmed to receive Marine Safety Information broadcasts for NAVAREAs and Coastal Warning Areas appropriate to the vessel's route.
- The Marine Safety Information messages received through NAVTEX and SafetyNET had not been acknowledged and filed in accordance with the company procedure.

**4.1.11. Were the Master and navigation officers familiar with the company procedure for preserving data from the VDR/S-VDR and were records available to demonstrate that tests of the equipment had been completed as required?**

**Short Question Text**

Preserving data from the VDR/S-VDR

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROV/Q Sequence**

Bridge

**Publications**

IMO: Resolution MSC.333(90) Adoption of Revised Performance Standards for Shipborne Voyage Data Recorders (VDRs)

ICS: Bridge Procedures Guide – Fifth Edition

IMO SOLAS

OCIMF: Recommendations on the Proactive Use of Voyage Data Recorder Information (revised edition August 2020)

IMO: MSC.163(78) Recommendations on Performance Standards for Shipborne Simplified Data Recorders (S-VDRs)

IMO: MSC.1/Circ.1222/Rev.1 14 June 2019 Guidelines on annual testing of voyage data recorders (VDR) and simplified voyage data recorders (S-VDR)

**Objective**

**To ensure that the VDR fitted to the vessel is continually recording all required data streams and procedures are in place to preserve records in the event of an incident.**

**Industry Guidance:**

**ICS: Bridge Procedures Guide.** Fifth Edition.

Chapter 4.8 Voyage Date Recorder.

**4.8.3 Preserving Records**

VDR and S-VDR recordings provide important information for marine accident investigators. All watchkeeping officers should be familiar with the procedures for preventing these records being overwritten.

**4.8.4 VDR Testing**

The system should include functions to carry out a performance test at any time. Testing is required annually and should always be carried out following repair or maintenance work to the VDR or to any source providing data to the VDR. This test may be conducted using the playback equipment and should ensure that all the required data items are being correctly recorded.

**OCIMF: Recommendations on the Proactive Use of Voyage Data Recorder Information (revised edition August 2020).**

**3.2 Data not being recorded**

Typically, the VDR data is only examined following an incident or accident. As a result, when an incident does happen, it is not uncommon to find that the VDR was not fully operational at the time of the incident and some or all data was not recorded correctly.

**TMSA KPI 5.2.3** requires that the person(s) responsible for navigational standards ensures that navigational procedures are regularly reviewed and updated.

The procedures are updated to reflect new legislation, technology and updated industry standards.

Examples may include:

- ECDIS and VDR including data recovery.

#### **IMO: ISM Code**

8.3 The SMS should provide for measures ensuring that the Company's organization can respond at any time to hazards, accidents and emergency situations involving its ships.

#### **IMO: SOLAS**

Chapter V Regulation 20

Voyage data recorders

1 To assist in casualty investigations, ships, when engaged on international voyages, subject to the provisions of regulation 1.4, shall be fitted with a Voyage Data Recorder (VDR) as follows:

.4 ships, other than passenger ships, of 3,000 gross tonnage and upwards constructed on or after 1 July 2002.

*(Cargo ships built prior to 1 July 2002 shall be fitted with a VDR which may be a simplified voyage data recorder (S-VDR))*

#### **IMO: Resolution MSC.333(90) Adoption of Revised Performance Standards for Shipborne Voyage Data Recorders (VDRs)**

2 Recommends Governments to ensure that VDRs:

.1 if installed on or after 1 July 2014, conform to performance standards not inferior to those specified in the annex to the present resolution; and

.2 if installed before 1 July 2014, conform to performance standards not inferior to those specified in the annex to resolution A.861(20), as amended by resolution MSC.214(81).

5.4.3 Recording should be continuous unless terminated in accordance with 5.4.2. The time for which all stored data items are retained should be at least 30 days/720 hours on the long-term recording medium and at least 48 hours on the fixed and float-free recording media. Data items which are older than this may be overwritten with new data.

#### **IMO: MSC.163(78) Recommendations on Performance Standards for Shipborne Simplified Data Recorders (S-VDRs)**

#### **IMO: MSC.1/Circ.1222/Rev.1 14 June 2019 Guidelines on annual testing of voyage data recorders (VDR) and simplified voyage data recorders (S-VDR)**

1 The annual testing of VDR/S-VDR required by SOLAS regulation V/20 should be carried out by the manufacturer or a person authorized by the manufacturer.

#### **Inspection Guidance**

The vessel operator should have developed procedures which ensure that:

- The VDR / S-VDR is subject to an annual performance test by an approved testing or servicing facility.
- The VDR / S-VDR is tested as per maker's instruction after any upgrade, maintenance or repair of the VDR / S-VDR itself.
- The VDR / S-VDR is tested as per maker's instruction after any upgrade, maintenance or repair of navigational or communications equipment providing data feeds.
- Instructions are posted near to the VDR / S-VDR controls for preserving data to prevent it being overwritten.
- The circumstances in which VDR / S-VDR data is to be preserved to capture any data that may be of value to incident investigation irrespective of whether the incident related to navigational situations.

The vessel operator should have declared the period that the long-term storage within the VDR or S-VDR retains data before being overwritten through the pre-inspection questionnaire. This information will be inserted in the final report.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure which governed the setup, use and testing of the VDR / S-VDR system fitted onboard the vessel.
- Verify that instructions for saving and preserving data were posted near the VDR / S-VDR controls.
- Verify that the annual performance testing of the VDR / S-VDR had been completed in accordance with company procedure.
- Verify that the VDR / S-VDR had been tested as per maker's instruction after any upgrade, maintenance or repair of the VDR / S-VDR itself.
- Verify that the VDR / S-VDR had been tested as per maker's instruction after any upgrade, maintenance or repair of navigational or communications equipment providing data feeds.
- Verify that the data retention period for the long-term storage stated in the pre-inspection questionnaire was correct.

### **Expected Evidence**

- The company procedure which governed the setup, use and testing of the VDR / S-VDR system fitted onboard the vessel.
- The company procedure that defined when data was required to be preserved to support investigations into navigation and any other incidents onboard.
- At least one emergency response checklist from the vessel operator's response plan indicating that VDR / S-VDR data preservation was required.
- Records demonstrating that the VDR / S-VDR annual performance tests had been completed by an approved testing or service facility.
- Records demonstrating that the VDR / S-VDR had been tested as per maker's instruction after any upgrade, maintenance or repair of the VDR / S-VDR itself.
- Records demonstrating that the VDR / S-VDR had been tested as per maker's instruction after any upgrade, maintenance or repair of navigational or communications equipment providing data feeds.
- Instructions posted near to the VDR / S-VDR recording controls on how to save event data to prevent it being overwritten.
- The VDR / S-VDR specifications showing the period that data was retained onboard before being overwritten.

### **Potential Grounds for a Negative Observation**

- There were no company procedure which governed the setup, use and testing of the VDR / S-VDR system fitted onboard the vessel.
- There was no company procedure which clearly defined the company expectation for data preservation in the event of an incident onboard.
- The accompanying navigation officer was unfamiliar with the company procedures for VDR / S-VDR management and data preservation.
- The VDR / S-VDR was defective in any respect.
- Annual performance checks by an authorised service agent or facility had not been carried out.

- The VDR / S-VDR had not been tested as per maker's instruction after any upgrade, maintenance or repair of the VDR / S-VDR itself.
- The VDR / S-VDR had not been tested as per maker's instruction after any upgrade, maintenance or repair of navigational or communications equipment providing data feeds.
- The declaration made within the pre-inspection questionnaire relating to the VDR / S-VDR data retention period was less than required.
  - If installed before 1<sup>st</sup> July 2014, minimum 12 hours before being overwritten.
  - If installed after 1<sup>st</sup> July 2014, minimum of 720 hours before being overwritten.



**4.1.12. Were the Master and navigation officers familiar with the company procedures relating to the magnetic and gyro compasses carried onboard, and were records available to demonstrate their accuracy and reliability?**

**Short Question Text**

Magnetic and gyro compasses

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROV/Q Sequence**

Bridge

**Publications**

ICS: Bridge Procedures Guide – Fifth Edition

IMO SOLAS

**Objective**

**To ensure that standard, gyro and GNSS compasses and their heading output to navigational equipment are accurate and reliable**

**Industry Guidance**

**ICS: Bridge Procedures Guide.** Fifth Edition.

Chapter 4.3 Compass Systems

**4.3.2 Gyro compass**

The gyro compass should be run continuously. Should a gyro compass stop for any reason, it should be restarted and subsequently regularly checked and only relied on again when it has “settled” and the error is known.

Where the gyro has no direct speed log or position input, manual corrections should be made as required.

The gyro will usually support a number of repeaters, including a required repeater at the emergency steering position. Gyro repeaters on the bridge should be checked against the main gyro at least once per watch and after significant manoeuvring. Other repeaters should be checked frequently.

**4.3.3 GNSS compass**

A Global Navigation Satellite System (GNSS) compass provides an alternative to a gyro compass as a non-magnetic transmitting heading device able to provide heading data to AIS, radar and automatic plotting aids. A GNSS compass or equivalent is required on ships navigating in Polar Waters at latitudes above 80 degrees.

**4.3.4 Compass errors**

As a safeguard against any wandering from the correct heading going undetected, gyro and gyro repeater headings should be frequently checked.

Magnetic and gyro compass errors should be checked and recorded each watch, where possible, using either azimuth or transit bearings.

A deviation card for the magnetic compass should be maintained and be available to the Bridge Team.

**TMSA KPI 5.1.2** requires that comprehensive procedures to ensure safe navigation are in place.

These procedures may include:

- Electronic aids to navigation including ARPA, AIS and ECDIS.

#### **IMO: ISM Code**

7. The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks should be defined and assigned to qualified personnel.

#### **IMO: SOLAS**

##### Chapter V Regulation 19

2.1 All ships irrespective of size, shall have:

2.1.1 a properly adjusted standard magnetic compass, or other means, independent of any power supply, to determine the ship's heading and display the reading at the main steering position.

2.2 All ships of 150 gross tonnage and upwards and passenger ships irrespective of size shall, in addition to the requirements of paragraph 2.1, be fitted with:

2.2.1 a spare magnetic compass, interchangeable with the magnetic compass as referred to in paragraph 2.1.1, or other means to perform the function referred to in paragraph 2.1.1 by means of replacement or duplicate equipment.

2.3 All ships of 300 gross tonnage and upwards and passenger ships irrespective of size shall, in addition to meeting the requirements of paragraph 2.2, be fitted with:

2.3.5 a properly adjusted transmitting heading device, or other means, to transmit heading information for input to the equipment referred to in paragraphs 2.3.2, 2.3.3 and 2.4. (*radar, electronic plotting aid and AIS*)

2.5 All ships of 500 gross tonnage and upwards shall....have:

2.5.1 a gyro-compass, or other means, to determine and display their heading by shipborne non-magnetic means, being clearly readable by the helmsman at the main steering position. These means shall also transmit heading information for input to the equipment referred to in paragraphs 2.3.2, 2.4 and 2.5.5 (*radar, electronic plotting aid and AIS*).

#### **Inspection Guidance**

The vessel operator should have developed procedures to ensure that:

- Standard magnetic, gyro and GNSS compasses carried onboard are properly maintained and serviced.
- Heading information for each compass is frequently checked through terrestrial, celestial and/or comparative observation.
- Frequent checks are made for heading accuracy output to all navigational equipment.
- A record of error for each compass is maintained
- An up to date deviation card is available on the bridge for the standard magnetic compass.
- The standard magnetic compass is adjusted when;
  - the deviation consistently exceeds a defined value,
  - becomes unreliable,
  - suffers damage,
  - records of compass error have not been maintained over the preceding two years.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures for standard, gyro and GNSS compass management as applicable.
- Inspect the various compasses and repeaters and verify that the heading output is consistent, and illumination is functional.
- Review the deviation card and compass error records and verify that the company expectation for compass adjustment had been complied with.
- Review the service records for the gyro compass(s) and verify that servicing had been carried out in accordance with the manufacturer's instructions.

#### **Expected Evidence**

- The company procedures for standard, gyro and GNSS compass management
- The standard compass adjustment and residual deviation certificate.
- Compass error records.
- Service records for the gyro compass(s).

#### **Potential Grounds for a Negative Observation**

- There were no company procedures for managing the standard magnetic, gyro and GNSS compasses as applicable.
- The accompanying navigation officer was unfamiliar with the company procedures, or the equipment fitted to the vessel.
- A record of compass error for each compass fitted to the vessel was not maintained as required by the company procedure.
- The compass error log book recorded a deviation of the standard magnetic compass consistently exceeding the tolerance permitted by the company procedure as compared to the deviation certificate from the previous official compass adjustment.
- The heading shown by a compass, or a repeater, was erroneous.
- Where required, manual speed and latitude corrections for a gyro compass were incorrectly set.
- A standard magnetic, gyro or GNSS compass was defective in any respect.
- The service records for a gyro compass indicated that periodic service was overdue by more than 5% of the service interval.

**4.1.13. Were the Master and navigation officers familiar with the company procedures for the operation and testing of the VHF/DSC transceivers fitted to the vessel, and were records available to demonstrate that periodic tests and checks had been completed in accordance with company expectations?**

**Short Question Text**

VHF/DSC transceivers

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Bridge

**Publications**

IMO: MSC.131 (75) Maintenance of a continuous listening watch on VHF channel 16 by SOLAS ships whilst at sea

IMO: Resolution A.954 (23). Proper use of VHF Channels at Sea

ICS: Bridge Procedures Guide – Fifth Edition

IMO SOLAS

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

**Objective**

**To ensure that VHF radio is used to enhance navigation safety and support the obligations of the vessel under SOLAS to render assistance to non-SOLAS vessels in distress.**

**Industry Guidance**

**ICS: Bridge Procedures Guide.** Fifth Edition.

Section 3.15 GMDSS watchkeeping

3.15.1 Radio watchkeeping

The OOW is responsible for ensuring compliance with the ship's watchkeeping requirements.

Section 3.12.2 Risk of Collision

Due to the risk of confusion and error, VHF radio and AIS should not be relied on for collision avoidance.

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

4.13.2.2 Very High Frequency/Ultra High Frequency equipment

Permanently and correctly installed VHF and UHF equipment are safe to use when the tanker is at the terminal, but it is recommended that the transmission is set to low power (one watt or less). The use of portable VHF/UHF radios in a terminal or on board a tanker presents no hazards if the equipment is certified and kept intrinsically safe and the power output is one watt or less.

The use of VHF/UHF radio equipment as a means of communication between tanker and terminal personnel is recommended.

**TMSA KPI 5.1.2** requires that comprehensive procedures to ensure safe navigation are in place. These procedures may include:

- Electronic aids to navigation including ARPA, AIS and ECDIS.

#### **IMO: ISM Code**

7. The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks should be defined and assigned to qualified personnel.

#### **IMO: SOLAS**

##### Chapter IV Regulation 7

1 Every ship shall be provided with :

.1 a VHF radio installation capable of transmitting and receiving ;

.1 DSC on the frequency 156.525 MHz(channel 70). It shall be possible to initiate the transmission of distress alerts on channel 70 from the position from which the ship is normally navigated ; and

.2 radiotelephony on the frequencies 156.300 MHz (channel 6), 156.650 MHz (channel 13) and 156.800 MHz (channel 16) ;

.2 a radio installation capable of maintaining a continuous DSC watch on VHF channel 70 which may be separate from, or combined with, that required by subparagraph .1.1 ;

#### **IMO: MSC.131 (75) Maintenance of a continuous listening watch on VHF channel 16 by SOLAS ships whilst at sea...**

1 Determines, having regard to SOLAS regulation IV/12.3, that every ship while at sea, shall continue to maintain, where practical, continuous listening watch on VHF channel 16, until such time as the Maritime Safety Committee may determine the cessation of this requirement...

#### **IMO: Resolution A.954 (23). Proper use of VHF Channels at Sea**

##### **Inspection Guidance**

The vessel operator should have developed procedures which define how the VHF/DSC equipment fitted to the vessel will be used, operated and tested. These procedures may include:

- The VHF frequencies and/or channels that must be monitored on a continuous basis while the vessel is at sea and/or at anchor.
- The periodic checks and tests to be carried out to verify that the VHF/DSC equipment is fully functional.
- The record-keeping requirements for the routine and emergency use of the VHF/DSC equipment.
- The company expectations regarding radio etiquette when using the VHF/DSC equipment.
- The use of VHF and compliance with the International Regulations for Preventing Collisions at Sea (COLREG).
- The need to identify any VHF units not connected to the Voyage Data Recorder and any restrictions on their use for critical communications.

##### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures for the use and operation of the VHF/DSC equipment fitted to the vessel.
- Review the records for the testing of the VHF/DSC equipment and verify that the equipment was tested and found functional in accordance with company expectations.

- Review the GMDSS Radio Log Book or other operational records for the previous voyage and verify that the appropriate VHF channels were being monitored and records were being maintained of all significant communications as defined by the company procedure.
- Review the data inputs to the VHF/DSC equipment and verify that the static data was correctly programmed, and the dynamic data was being correctly received from external feeds.
- Interview the accompanying navigation officer to verify their understanding of the company procedure and Master's standing orders relating to the use of VHF radio in collision avoidance situations.

#### **Expected Evidence**

- The company procedures for the use and operation of the VHF/DSC equipment fitted to the vessel.
- The GMDSS Radio Log Book or other records which documented which VHF channels were being monitored and details of significant communications.
- The Master's standing orders.
- Checklists that demonstrated that periodic checks and tests required to be carried out on the communications equipment, including VHF/DSC units had been completed as required by the company procedures.
- Where the vessel was fitted with multiple VHF units which were not all connected to the VDR, clear identification of the units not connected, with instructions on their use for significant communications.

#### **Potential Grounds for a Negative Observation**

- There was no company procedure which defined the expectations for the use and periodic testing of the VHF/DSC units fitted to the vessel.
- The accompanying navigation officer was unfamiliar with the company procedure for the use or testing of the VHF/DSC units fitted to the vessel.
- The accompanying navigation officer was unfamiliar with the operation of the VHF/DSC units fitted to the vessel.
- The accompanying navigation officer was unfamiliar with the hazards and limitations of using VHF radio during collision avoidance situations.
- Records indicated that periodic checks and tests required to be carried out for the VHF/DSC units had not been completed as required by the company procedure.
- Records indicated that details of critical communications had not been documented as required by company procedures.
- Records indicated that the vessel had not been monitoring the correct VHF channels as required by SOLAS, company expectations and as identified within the passage plan.
- The VHF and/or DSC units fitted to the vessel were defective in any respect.
- The static and/or dynamic data displayed by the VHF and/or DSC units were inaccurate.
- Where multiple VHF units were fitted on the bridge which were not all connected to the VDR, there was no indication of which units were connected and no instructions restricting the use of non-connected units for critical communications.

#### **4.1.14. Were the Master and navigation officers familiar with the company procedure for testing and using the daylight signalling lamp?**

##### **Short Question Text**

Daylight signalling lamp

##### **Vessel Types**

Oil, Chemical, LPG, LNG

##### **ROVIQ Sequence**

Bridge

##### **Publications**

ICS: Bridge Procedures Guide – Fifth Edition

IMO: Resolution MSC.95(72) Performance Standards for Daylight Signalling Lamps.

IMO SOLAS

##### **Objective**

**To ensure that there is a means of attracting the attention of other vessels by visual means both during daylight and during darkness.**

##### **Industry Guidance**

**ICS: Bridge Procedures Guide.** Fifth Edition.

Chapter 3.12 Compliance with the COLREGs.

The conduct of a ship's navigation should always comply with the International Regulations for the Prevention of Collisions at Sea (COLREGS). This includes displaying correct lights and shapes and making the correct sound and light signals.

**TMSA KPI 5.1.2** requires that comprehensive procedures to ensure safe navigation are in place.

##### **IMO: ISM Code**

7. The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks should be defined and assigned to qualified personnel.

##### **IMO: SOLAS**

Chapter V Regulation 19

2.2 All ships of 150 gross tonnage and upwards and passenger ships irrespective of size shall, in addition to the requirements of paragraph 2.1, be fitted with:

.2 a daylight signalling lamp, or other means, to communicate by light during day and night using an energy source of electrical power not solely dependent upon the ship's power supply.

**IMO: Resolution MSC.95(72) Performance Standards for Daylight Signalling Lamps.**

8 Back-up and fall-back arrangements

Each daylight signalling lamp should be provided with at least three spare illuminants (*i.e.*, *bulbs*) complying with the type-tested illuminant.

## **Inspection Guidance**

The vessel operator should have developed navigational procedures which define:

- The company expectations for preventing the risk of collision and the means at the disposal of the navigation officer to attract the attention of another vessel in accordance with the International Regulations for Preventing Collisions at Sea.
- The checks and tests required to be undertaken to ensure all navigation equipment is available for immediate use including the daylight signalling lamp and its battery.

## **Suggested Inspector Actions**

- Sight, and where necessary review, the procedure which defined the company expectations when attracting the attention of another vessel in a collision avoidance situation.
- Review that bridge equipment testing records and verify that the daylight signalling lamp had been periodically tested in accordance with company expectations.
- Test the daylight signalling lamp on both battery and mains power and verify that the unit is fully functional.
- Check the availability of spare bulbs and verify that at least three spare bulbs are available that comply with the manufacturer's specifications.

## **Expected Evidence**

- The procedure which defined the company expectations for the use and testing of the daylight signalling lamp.
- The bridge equipment testing records demonstrating that periodic tests had been carried out for the daylight signalling lamp.

## **Potential Grounds for a Negative Observation**

- There was no procedure which defined the company expectations for the use and testing of the daylight signalling lamp.
- The accompanying navigation officer was unfamiliar with the company procedure for the use and testing of the daylight signalling lamp.
- The daylight signalling lamp was defective in any respect.
- There were less than three spare bulbs on board and/or the spare bulbs did not meet the manufacturer's specifications.



**4.1.15. Were the Master and navigation officers familiar with the company procedures for the use and testing of the sound signalling equipment fitted to the vessel and were records available to confirm that periodic tests had been completed and the equipment used in accordance with company expectations?**

**Short Question Text**

Sound signalling equipment

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Bridge

**Publications**

ICS: Bridge Procedures Guide – Fifth Edition

IMO: COLREG

**Objective**

**To ensure that the vessel was able to make sound signals to comply with the International Regulations for Preventing Collisions at Sea (COLREG).**

**Industry Guidance**

**ICS: Bridge Procedures Guide.** Fifth Edition.

Section 3.12 Compliance with the COLREGS.

The conduct of a ship's navigation should always comply with the International Regulations for the Prevention of Collisions at Sea (COLREGS). This includes displaying correct lights and shapes and making the correct sound and light signals.

Checklist B13 – Restricted Visibility.

**TMSA KPI 5.1.2** requires that comprehensive procedures to ensure safe navigation are in place. These procedures may include:

Navigating in heavy weather/restricted visibility/ice.

**IMO: ISM Code**

7. The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks should be defined and assigned to qualified personnel.

**IMO: COLREG**

Part D -Sound and Light Signals.

Rule 33 Equipment for sound signals

- A vessel of 12m or more in length shall be provided with a whistle, a vessel of 20 m or more in length shall be provided with a bell in addition to a whistle, and a vessel of 100 m or more in length shall, in addition, be provided with a gong, the tone and sound of which cannot be confused with that of the bell. The whistle, bell and gong shall comply with the specifications in annex III to these Regulations. The bell or gong or both may

be replaced by other equipment having the same respective sound characteristics, provided that manual sounding of the required signals shall always be possible.

(Annex III Technical details of sound signal appliances.)

### **Inspection Guidance**

The vessel operator should have developed procedures to define:

- The expected use of the vessel's sound signalling equipment to comply with the COLREGs in or near an area of restricted visibility, during collision avoidance and while manoeuvring.
- The Bridge Log Book entries or checklists that will be used to confirm that sound signalling equipment was used in compliance with the COLREGs and company expectations during restricted visibility.
- The periodic tests required to be conducted to verify the effectiveness of the sound signalling equipment, including automation, provided to the vessel.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures which defined the expected use and testing of the sound signalling equipment fitted to the vessel.
- Review the bridge equipment testing records and verify that periodic tests had been completed to confirm the functionality of whistles, bells and gongs and, their automation, to conform to the requirements of the COLREGs.
- Review the Bridge Log Book and/or checklists for restricted visibility (BPG checklist B13 or equivalent) to identify any recent period of restricted visibility whilst the vessel was underway or at anchor and verify that sound signals were recorded as being sounded as required by the COLREGs.

The inspector will only be required to look back through records for the previous month to confirm that sound signals had been made during restricted visibility.

### **Expected Evidence**

- The company procedures which defined the expectations for the use and testing of sound signalling equipment fitted to the vessel.
- Bridge Log Book.
- Completed bridge checklists including restricted visibility and bridge equipment testing.

The accompanying officer should be ready to show the inspector the evidence for the previous three occasions where the sound signalling equipment was used during restricted visibility.

### **Potential Grounds for a Negative Observation**

- There was no company procedure which defined the company expectation for the use of sound signals during restricted visibility, collision avoidance and manoeuvring in compliance with the COLREGs.
- The accompanying navigation officer was unfamiliar with the company expectation for the use of sound signals during restricted visibility, collision avoidance and manoeuvring in compliance with the COLREGs.
- There were no records available to demonstrate that the sound signalling equipment and any automation provided had been periodically tested to verify its effectiveness and compliance with the COLREGs.
- The sound signalling equipment, or its automation, was defective in any way.
- There was no documented evidence that the sound signalling equipment had been used in accordance with the COLREGs during periods of restricted visibility.

## 4.2. Navigational Procedures

**4.2.1. Were the Master and navigating officers familiar with the company passage planning procedures and had all voyages been appraised, planned, executed and monitored in accordance with company procedures, industry best practice and both local and international rules?**

### Short Question Text

Passage planning

### Vessel Types

Oil, Chemical, LPG, LNG

### ROVIQ Sequence

Bridge

### Publications

ICS: Bridge Procedures Guide – Fifth Edition

IMO: ISM Code

IMO SOLAS

OCIMF: Recommendations on Usage of ECDIS and Preventing Incidents. First Edition.

### Objective

**To ensure that passages are planned and executed from berth to berth in accordance with international/local rules and industry best practice guidance.**

### **Industry Guidance**

**OCIMF: Recommendations on Usage of ECDIS and Preventing Incidents. First Edition.**

#### 4.2.2 Berth-to-berth passage plan

The IMO Assembly resolution A.893(21) Guidelines for Voyage Planning includes appraisal (gathering all information relevant to the voyage or passage); detailed planning of the whole voyage or passage from berth to berth, including the areas where a pilot is needed; execution of the plan; and monitoring the vessel's progress during implementation of the plan.

When it comes to making berth-to-berth passage plans, the principles of passage planning are broadly similar to those followed when using paper charts.

#### Recommendations

- If the destination has not been confirmed, passage should be planned from berth to a point the vessel is expected to sail towards.

All sections of the passage must be properly planned and validated on ECDIS before executing a route.

#### 4.3 Route validation

Route validation involves the following stages:

- Visual checks
- Manual and auto-validation features.
- Cross-checks by the bridge team.

- Final validation and authorisation by the Master.
- Re-validation along the route.

#### 4.3.1 Recommendations

- Route validation should be conducted before every voyage.
- Route validation should be conducted by at least the Navigating Officer and the Master, using both visual checks and route validation functions within ECDIS.
- Alarms, cautions and indications should be appropriately checked and actioned. Those that cannot be resolved and that affect the passage plan should be discussed with the Master.
- The route validation procedure should be defined in the company SMS.
- The Master should only authorise the plan once all stages of visual checks and route validation have been completed.
- The Company SMS should define the procedure for recording the Navigating Officer's route validation and the Master's passage plan authorisation.
- Route re-validation should be undertaken by the Navigating Officer after any subsequent route changes, ENC updates, software/hardware, navigational warning changes. Once complete the Master should check and then re-authorise the plan.
- The company SMS should include the procedure for post-voyage review, so that any hazards or useful information can be incorporated in future passage plans.

#### 4.4 Route execution and monitoring

Route execution and monitoring stages occur after the passage plan has been finalised and after the route validation stage is complete, including the latest supplementary information, before passage begins. This involves configuring all ECDIS, including displays, safety contour and safety depth settings and look-ahead zones, uploading manual layers, and managing overlays, according to the authorised passage plan.

#### 4.4.2 Position verification and monitoring

It is critical that the navigator is constantly aware of the vessel's position and its accuracy. The Global Navigation Satellite System (GNSS) is the standard source of position data for ECDIS, but navigators must always be aware of its limitations. The vessel's position on ECDIS can be verified using a combination of techniques that include:

- Radar Image Overlay (RIO).
- Visual or radar bearings.
- Radar range and bearings.
- Parallel indexing.
- Celestial observations.
- Depth comparison using an echo sounder.

#### Recommendations

- The company SMS should define the frequency of, and preferred methods for, position verification while using ECDIS.
- A combination of techniques should be used, including RIO, radar/visual fixes, parallel indexing and celestial navigation, as per the company SMS.
- Regular and frequent position verification should help to safeguard against GNSS errors, as well as jamming and spoofing.
- Parallel indexing should be used on radars as opposed to the ECDIS.
- Masters and Bridge Officers should be aware that hardware or software used discrepancies might arise on an ECDIS, and they should use traditional position-fixing and navigational techniques to cross-check navigational information.

**ICS: Bridge Procedures Guide.** Fifth Edition.

## Chapter 2 Passage Planning

### Chapter 2.1 Principles

The purpose of passage planning is to develop a comprehensive navigation plan for the safe conduct of the ship from berth to berth.

The plan for the intended passage should identify a route which:

- Recognises hazards and assesses associated risks and decision points.
- Ensures that sufficient sea room and depth of water is available.
- Includes appropriate position fixing opportunities.
- Complies with relevant reporting requirements and routeing measures for ships.
- Takes into account anticipated traffic and weather conditions.
- Complies with all applicable environmental protection measures.

Checklist B9 Passage Planning.

**TMSA KPI 5.1.2** requires that comprehensive procedures to ensure safe navigation are in place.

These procedures may include

- Berth to berth passage planning.
- Supporting checklists.

#### **IMO: ISM Code**

7. The company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and the protection of the environment. The various tasks should be defined and assigned to qualified personnel.

#### **IMO: SOLAS**

### Chapter V Regulation 34

Safe navigation and avoidance of dangerous situations

1. Prior to proceeding to sea, the Master shall ensure that the intended voyage has been planned using the appropriate nautical charts and nautical publications for the area concerned, taking into account the guidelines and recommendations developed by the Organization\*.
2. The voyage plan shall identify a route which:
  1. takes into account any relevant ships' routeing systems;
  2. ensures sufficient sea room for safe passage of the ship throughout the voyage;
  3. anticipates all known navigational hazards and adverse weather conditions; and
  4. takes into account the marine environmental protection measures that apply, and avoids, as far as possible, actions and activities which could cause damage to the environment.

\*Refer to Guidelines for Voyage Planning (resolution A.893(21)).

#### **Inspection Guidance**

The vessel operator should have developed procedures to ensure that onboard staff appraise, plan, execute and monitor all passages from berth to berth in accordance with international/local rules and industry best practice.

The procedures should define:

- The format of the passage plan and the minimum information that must be included which should include, but not be limited to:
  - Parallel indexing (not from floating objects unless they have first been checked for position).
  - Chart changes.
  - Methods and frequency of position fixing and/or position verification.
  - Prominent navigation and radar marks.
  - No-go areas.
  - Landfall targets and lights.
  - Clearing lines and bearings.
  - Transits, heading marks and leading lines.
  - Significant tides or current.
  - Safe speed and necessary speed alterations.
  - Changes in machinery space status, i.e. manned/unmanned.
  - Changes in machinery status, i.e. standby for manoeuvring.
  - Changes in bridge watch composition.
  - Changes to fuel and/or scrubber use.
  - Changes in security arrangements.
  - Minimum under keel clearance.
  - Positions where the echo sounder should be activated.
  - Crossing and high-density traffic areas.
  - Safe distance off navigational hazards or marks.
  - Anchor clearance.
  - Contingency plans.
  - Abort positions.
  - VTS and reporting points, etc.
  - Air draught when passing under bridges/power lines/cable cars etc.
  - Alternative or contingency routing that may be required at short notice.
  - Specific guidance provided by local routing publications where applicable to the vessel and its route.
- The process to verify that all navigational and environmental considerations have been included in the final passage plan.
- The review and approval process for a passage plan including utilising the ECDIS route checking function.
- The record keeping requirements as they relate to the progress of the passage and navigational events.
- The actions to take to update the passage plan when circumstances change requiring the vessel to deviate from the originally agreed plan.
- The requirement for preparing the passage plan on both paper charts and ECDIS where the vessel has a single ECDIS unit or has nominated paper charts as the primary means of navigation.
- The requirement for a passage plan briefing including the Master, all navigation officers and a representative from the engineering department.

A vessel should be expected to deviate from the planned passage to the extent necessary to safely comply with the collision regulations. Due consideration should be given to such when appraising the passage and developing the plan to ensure that there is adequate sea room, and the watch conditions are appropriate.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company passage planning procedure.
- Sight, and where necessary review, the company record keeping procedures as they relate to navigational activities.
- Review a recent passage plan and verify that it was in the format defined by the company passage planning procedure and contained, as a minimum, the information identified by the company procedure.
- Review the same passage plan on the paper and/or electronic charts and verify that the information required to be displayed in accordance with the company passage planning procedure had been included.
- Review the records for the same passage and verify that the records maintained contained the information required to be recorded in accordance with the company passage planning procedure.
- Verify that where two ECDIS units are fitted, both units had been loaded with the passage plan.
- Verify that route checking and scanning had been carried out utilising the ECDIS route checking function or in the case of paper charts, manually, prior to commencing a voyage and at any time changes had been made to the approved plan.

- Verify that a passage plan briefing had been attended by the Master, all navigation officers and a member of the engineering department prior to commencing a voyage or, prior to each significant portion of a voyage.

When reviewing the frequency of manually applied position fixing on an ECDIS equipped vessel, be guided by the frequency defined by the vessel operator within their navigation procedures.

#### **Expected Evidence**

- The company passage planning procedures.
- The company record keeping procedures relating to navigational activities.
- The company passage plan appraisal form / checklist for a recently completed voyage.
- The passage plan for a recently completed voyage approved by the Master and signed by the navigation officers.
- The ECDIS passage planning station and/or paper charts showing the reviewed passage plan and monitoring history.
- The Bridge Log Book, movement book and other records documenting the progress of the voyage.

#### **Potential Grounds for a Negative Observation**

- There were no company passage planning procedures.
- There were no company record keeping procedures relating to navigational activities.
- The accompanying navigation officer was not familiar with the company passage planning or navigational record keeping procedures.
- There was no standard passage planning form which required the passage plan to be documented in a consistent manner, capturing all data identified within the procedures.
- There was no passage plan appraisal form / checklist to verify that all information pertinent to the passage had been considered.
- The passage was planned or executed in clear contravention to collision regulations, company navigation procedures or guidance provided on the charts, routing guides or sailing directions.
- The charted passage plan did not include all pertinent information required to be displayed in accordance with the company procedures.
- The passage plan was not reviewed and approved in accordance with company procedures.
- Route checking and scanning had not been conducted prior to commencing a voyage or when a planned voyage had been changed or updated.
- The passage plan was not substantially followed, such as passing an island or navigational mark on the unplanned side, unless the passage plan identified alternative routes for contingency use.
- The vessel's position was not manually fixed in accordance with company navigational procedures and the planned position fixing method and interval.
- Records of the progress of a voyage had not been maintained in accordance with company procedures.

**4.2.2. Were the Master and navigation officers familiar with the company under keel clearance (UKC) policy and procedure, and were records available to demonstrate that the required calculations had been completed at the appropriate points during each voyage and the vessel had remained in compliance with the UKC policy?**

**Short Question Text**

Under keel clearance (UKC) policy

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Bridge

**Publications**

IMO: ISM Code

IMO: Resolution A.893(21) Guidelines for Voyage Planning

OCIMF: Recommendations on Usage of ECDIS and Preventing Incidents. First Edition.

**Objective**

**To ensure that the vessel always maintains a safe under keel clearance.**

**Industry guidance**

**IMO: Resolution A.893(21). Guidelines for Voyage Planning.**

**3 Planning**

3.1 On the basis of the fullest possible appraisal, a detailed voyage or passage plan should be prepared which should cover the entire voyage or passage from berth to berth, including those areas where the services of a pilot will be used.

3.2 The detailed voyage or passage plan should include the following factors:

3.2.2.2 necessary speed alterations en route, e.g., where there may be limitations because of night passage, tidal restrictions, or allowance for the increase of draught due to squat and heel effect when turning;

3.2.2.3 minimum clearance required under the keel in critical areas with restricted water depth;

**OCIMF: Recommendations on Usage of ECDIS and Preventing Incidents. First Edition.**

**4.2.5 Identification of safe water**

As identified in table 1.1, there are several contributing factors to the inappropriate understanding or application of safety contour and safety depth settings, in trying to identify safe navigable water.

Identification of safe water can be broken down into the following sub-categories:

- Under Keel Clearance (UKC) Calculations and Category Zone of Confidence (CATZOC).
- Safety depth and safety contour.
- Manual safety contour with alarmable features.
- No-go areas with alarmable features.
- Two-shade and four-shade depth display.



## Under Keel Clearance and Category Zone of Confidence

Once the UKC calculations have been completed, the resulting safety settings should be entered into the ECDIS to create the safety contour.

CATZOC gives an indication of survey reliability, like the source data diagrams on paper charts. Note that CATZOC values indicate both position and depth accuracy and provide details of seafloor coverage and survey characteristics. The accuracy of CATZOC data should be considered in the vessel's UKC calculation, unless more accurate, up-to-date information is available...

## Recommendations

The company SMS should include navigational procedures, including a UKC policy and ECDIS-specific procedures, including passage plan forms, waypoint sheets and sample UKC calculations, and how to establish the safety contour and the safety depth settings.

Masters and Navigating Officers should have a clear understanding of CATZOC and how it affects the ENC data, considering both depth and position accuracy. There is no minimum allowance currently recommended for different CATZOCs, but Masters and Navigating Officers should make an informed decision that considers factors such as additional information available from local Port Authorities, available UKC allowances as per charted depths on ENCs, the latest bathymetric data and height of tides. The CATZOC input or alternative source used should be identified within the plan...

**TMSA KPI 5.1.2** requires that comprehensive procedures to ensure safe navigation are in place.

These procedures may include

- Under keel clearance requirements.

## IMO: ISM Code

7. The company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and the protection of the environment. The various tasks should be defined and assigned to qualified personnel.

## Inspection Guidance

The vessel operator should have developed an under keel clearance (UKC) policy and procedure which defined:

- The minimum dynamic UKC required to be maintained;
  - During open sea passage.
  - During coastal / restricted waters passage.
  - Within port limits.
  - While alongside.
  - While at SBM/CBM berths.
  - At anchor.
- The factors to be considered when calculating and evaluating UKC, which should include;
  - The predicted height of the tide.
  - Changes in the predicted tidal height, which may be caused by wind speed and direction and/or high or low barometric pressure.
  - Nature and stability of the bottom e.g. sand waves, siltation etc.
  - Accuracy of hydrographic data, (references to reliability are often included on charts or in the form of CATZOC on ENCs).
  - Change of water density and the corresponding increase in draught.
  - The vessel's size and handling characteristics and the increase in draught due to heel.
  - Wave response allowance, which is the vertical displacement of the hull due to heave, roll and pitch motions.

- The reliability of draught observations and calculations, including estimates of hogging and sagging.
- Reduced depths over pipelines and other obstructions.
- The predicted increase in draught due to squat. (Squat information relevant to the vessel for both loaded and ballast passages should be readily available on the bridge.)
- When UKC calculations are to be completed.
- The method of calculating and documenting the calculations performed.
- Where the results of the UKC calculations must be communicated, e.g., Master/pilot information exchange.
- Where the results of the UKC calculations shall be used, i.e. ECDIS depth or echo sounder alarm settings.
- The need to update UKC calculations to reflect the new predicted time of passing over critical hydrographic features where a passage is delayed.
- The actions to be taken when the required UKC could not be maintained at all stages of a planned voyage.
- The required action where an external party requires an UKC in excess of the company requirement.

The vessel operator should have declared the required minimum required UKC applicable to the vessel within the pre-inspection questionnaire. This information will be inserted in inspection editor and the final report.

### **Suggested Inspector Actions**

- Review the company under keel clearance (UKC) policy and procedure and verify that the values uploaded to the pre-inspection questionnaire were accurate.
- Review the UKC calculations for a recent voyage and verify that all factors required to be considered by the company procedure had been included in the calculation and evaluation and that the resulting UKC complied with company expectations.
- Review the voyage records, including echo sounder printer or electronic records, for the same voyage and verify that the calculations were completed for the time that the vessel passed over the critical hydrographic features.
- Review a recent Master/Pilot information exchange checklist and verify that the UKC information had been recorded in accordance with company expectations.

### **Expected Evidence**

- The company procedure that defined the company under keel clearance (UKC) policy and the requirement for conducting calculations and recording the results.
- The passage planning documentation for recent voyages.
- The UKC calculation documentation to support recent voyages.
- Master/Pilot information exchange documentation which included the supporting UKC calculations.
- Bridge Log Books, bell books, echo sounder records and charted passage history to permit verification of the time of passing critical hydrographic features.

### **Potential Grounds for a Negative Observation**

- There was no procedure defining the company under keel clearance (UKC) policy and expectations for conducting UKC calculations at defined stages of the voyage.
- The accompanying officer was not familiar with the company procedure for conducting and documenting UKC calculations.
- Review of records indicated that the UKC calculations required to be carried out by the company procedures had not been completed.
- Review of records indicated that the UKC policy had been violated without explicit permission from the vessel operator.
- Review of sample calculations indicated that they had not been carried out for the predicted time of passing a critical hydrographic feature as set out in the passage plan.
- Review of sample calculations indicated that the speed used for calculation had been exceeded by more than 10% when actually passing the critical hydrographic feature.
- Review of sample calculations determined that an error had been made in either the source data or resulting calculation when passing a critical hydrographic feature.

- There was no evidence that UKC calculations had been reviewed during the Master/Pilot information exchange.
- Squat information relevant to the vessel for both loaded and ballast passages was not readily available on the bridge.

**4.2.3. Had the Master prepared Master's Standing Orders, supplemented by Daily Orders, which emphasised and reinforced the company expectations with regards to navigational requirements including restricted visibility, CPA/BCR and minimum passing distance from navigational dangers and navigational aids and, if so, had all navigation officers signed to acknowledge their understanding of the same?**

**Short Question Text**

Master's Standing Orders and Daily Orders

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Bridge

**Publications**

ICS: Bridge Procedures Guide – Fifth Edition

IMO: ISM Code

IMO: STCW Code

**Objective**

**To ensure that all deck/navigating officers are aware of the key expectations of both the company and the Master with respect to the navigation of the vessel.**

**Industry Guidance**

**ICS: Bridge Procedures Guide.** Fifth Edition.

**1.3.2.1 Master's Standing Orders**

Lines of authority on board should be in accordance with the SMS and operational procedures manuals. The Master should explain particular requirements to the Bridge Team in Master's Standing Orders. These orders should be drafted to support the SMS.

Company and Master's Standing orders should be read by all Bridge Team members upon joining the ship, signed and dated. A copy of the orders should be available on the bridge for reference.

**1.3.2.2 Bridge Order Book**

In addition to Master's Standing orders, specific instructions will be needed. At least at daily intervals, the Master should write in the Bridge Order Book what is expected of the OOW for that period. These orders should be signed by each OOW when taking over a watch, to confirm that they have read, understood and will comply with the orders.

The OOW should brief other members of the Bridge Team, as appropriate, on any particular activities or requirements for the forthcoming watch.

**TMSA KPI 5.1.3** requires that procedures to ensure effective bridge resource management are in place. These procedures may include:

- Calling the Master.

**IMO: ISM Code**

**5.1** The Company should clearly define and document the master's responsibility with regard to:

.3 issuing appropriate orders and instructions in a clear and simple manner,

## **IMO: STCW Code**

### **Part A Chapter VIII – Watchkeeping**

#### **Taking over the watch**

22 Relieving officers shall personally satisfy themselves regarding the:

.1 standing orders and other special instructions of the master relating to navigation of the ship;

#### **Inspection Guidance**

The vessel operator should have developed a procedure which required the Master to issue Master's Standing Orders, giving guidance on the mandatory and desirable content. The Master's Standing Orders should be prepared and signed by the Master upon appointment to the vessel and signed for understanding by each navigation officer when they join the vessel and before undertaking their first navigation duties.

The orders, as written, should reference company navigational procedures and identify any circumstances where the Master wishes his instructions to be stricter than the company requirement documented within the SMS. The content should include, but not be limited to:

- Defining restricted visibility and the actions to be taken by the officer of the watch upon encountering it.
- Defining the minimum Closest Point of Approach (CPA) and Bow Crossing Range (BCR) acceptable during normal\* navigational watches and the actions to be taken if these cannot be maintained.
- The minimum passing distance to navigational dangers and/or navigational aids during normal\* navigational watches and the actions to be taken if these cannot be maintained.
- Defining how the alarms and layers for use with ECDIS/ECS are required to be set, checked and in what circumstances they may be changed.
- The hazards and limitations of reliance on AIS and VHF in collision avoidance situations.
- Calling the Master.
- The process of the Master taking over the con of the vessel.

\*Normal navigational watches are when the Master or his deputy, as defined by the company, are not required to be on the bridge as part of the official bridge team composition.

The SMS procedures should require supplementary orders to be issued by the Master each day in a Bridge Order Book to cover periods when the Master may be resting or otherwise engaged. The daily orders should also be used to give additional instruction relevant to the operation of the vessel in the short term and prior to the next time the Master expects to be present or to provide further instructions. These orders should be signed by each OOW when taking over a watch, to confirm that they have read, understood and will comply with the orders.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure which defined the requirement for the Master to prepare Master's Standing Orders and Daily Orders
- Review the Master's Standing Orders and verify that:
  - They included the content defined by the company procedure.
  - They defined what constituted restricted visibility.
  - They defined the minimum CPA and BCR permitted during normal\* navigational watches.
  - They defined the minimum passing distance from navigational dangers and / or navigational hazards during normal\* navigational watches.
  - They defined how the alarms and layers for use with ECDIS/ECS are required to be set and checked, and in what circumstances they can be changed.

- They contained guidance on the hazards and limitations of reliance on AIS and VHF in collision avoidance situations.
- They defined the circumstances in which the Master must be called.
- They defined the process by which the Master would take over the con on the vessel.
- They had been signed and dated by the existing Master upon being assigned to the vessel, or at later revision.
- They had been signed by each navigation officer on joining the vessel and before taking any navigational duties.
- Review the Bridge Order Book and verify that:
  - Entries had been made by the Master at least daily.
  - Information was entered which was consistent with the operation and voyage of the vessel such as preparations for approaching critical areas due to piracy concerns, fishing vessel activity, increased traffic density or expected deteriorations in weather conditions.
  - Each entry had been dated, timed and signed by the Master.
  - The entries had been signed for understanding by each navigation officer prior to taking their watch.

#### **Expected Evidence**

- The company procedure defining the requirement for the Master to develop their own Standing and Daily Orders.
- The Master's Standing Orders signed by the Master and all navigation officers.
- The Bridge Order Book with each dated and timed entry signed by the Master, and subsequently, each OOW before taking over their watch.

#### **Potential Grounds for a Negative Observation**

- There was no procedure which required the Master to prepare Standing or Daily Orders.
- The accompanying officer was unfamiliar with the content of the Master's Standing or Daily Orders.
- The Master had not prepared their own Standing Orders which were signed and dated on being assigned to the vessel or at subsequent update.
- The navigation officers onboard at the time of the inspection had not signed the Master's Standing Orders (unless they had only joined that day).
- The content of the Master's Standing Orders degraded the company expectations documented anywhere within the Safety Management System.
- The content of the Master's Daily Orders degraded the company expectations documented anywhere within the Safety Management System.
- The Standing Orders did not define the Master's expectations in respect of:
  - - What was considered to be restricted visibility and the actions to take on encountering it.
    - Minimum CPA/BCR permitted during normal\* navigational watches.
    - Minimum passing distances from navigational dangers and/or navigational aids during normal\* navigational watches.
    - How the alarms and layers for use with ECDIS/ECS were required to be set, checked and in what circumstances they may be changed
    - Calling the Master.
    - The process for the Master to formally take the con of the vessel from the officer of the watch.
    - The hazards and limitations of reliance on AIS and VHF in collision avoidance situations.
- The Master had not prepared Daily Orders which were signed, dated and timed, to supplement their Standing Orders.
- The Master's Daily Orders did not address the navigational concerns or preparations relevant to the period under review.
- An OOW had not signed the Master's Daily Orders for understanding.
- Review of any onboard records indicated that instructions contained within the Master's Standing or Daily Orders had not been followed.

#### **4.2.4. Were the Master and navigation officers familiar with the company electronic chart management procedures and were onboard ENC's and RNC's managed, corrected and used appropriately?**

##### **Short Question Text**

Electronic chart management.

##### **Vessel Types**

Oil, Chemical, LPG, LNG

##### **ROV/Q Sequence**

Bridge

##### **Publications**

ICS: Bridge Procedures Guide – Fifth Edition

IMO SOLAS

IHO: Information on IHO Standards related to ENC and ECDIS (Ver 2.1 Feb 2020)

UKHO: Guide to ECDIS audits and inspections

OCIMF: Recommendations on Usage of ECDIS and Preventing Incidents. First Edition.

##### **Objective**

**To ensure that only fully corrected official electronic charts are used for navigation where ECDIS is required to be carried**

##### **Industry Guidance**

**ICS: Bridge Procedures Guide.** Fifth Edition.

Chapter 4.12. Charts and Nautical Publications.

Only up to date official charts and publications should be used for appraisal, planning, execution and monitoring of a passage plan.

##### **4.12.3 Electronic Charts**

Users of electronic charts should be aware that:

- ENC and RNC are official charts produced by a hydrographic office; and
- All other commercially available alternatives are unofficial or private charts.

##### **4.13.2 Chart Updates**

Procedures for updating ENC's and RNC's should be included in the SMS. Chart updates should be controlled and monitored using the on-board chart management system.

##### **IHO: Information on IHO Standards related to ENC and ECDIS (Ver 2.1 Feb 2020)**

IHO Advice for PSC Inspectors concerning IHO Standards

ii) use up to date electronic navigational charts (ENC);

Hydrographic Authorities are required to keep nautical charts up to date to include all information considered to be relevant to safety of navigation (including temporary or preliminary information); and as such regularly issue updates to their ENC's. For an ECDIS to be used for navigation it must have the correct up to date ENC's for the intended

voyage. Therefore the only indicator that the ENC data in the ECDIS is up to date is that the latest ENC update available for an ENC as issued by the Hydrographic Authority has been applied to the SENC.

There are currently two chart distribution services an international mariner can sign up to for delivery of ENCs (noting there are also several national distribution services for mariners operating exclusively in national waters).

1) Standard subscription - ENC permits are purchased for a known operating area for a fixed periods of time (3 to 12 months). This enables the decryption of these ENCs in ECDIS and enables their use for planning and navigation.

2) Pay As You Sail (PAYS) – Mariners pay a minimal planning fee for upfront use of the entire global ENC data set. A tracking service is fitted to the vessel and as they navigate across ENCs they are charged accordingly. PAYS services can give instant access to most ENC chart across the globe.

To facilitate PSC inspections and to assist mariners in satisfying themselves that their ENC data is “up to date” S-63 was updated to Edition 1.2, adding an additional annex covering the ENC Status Report. Only ECDIS type approved according to Edition 4.0 of IEC 61174 will be capable of displaying the report. The report is a concise and standardized format designed for two individual use cases:

- a) To ensure that all ENC cells loaded into the ECDIS SENC are up to date for the next leg of a particular route; and
- b) To ensure that all ENCs loaded into the SENC are up to date.

#### **UKHO: Guide to ECDIS audits and inspections.**

##### **ECDIS audit checklist**

- 8. Are official electronic charts (ENC/RNC) being used?
- 9. Are the electronic charts in use up-to-date (latest edition and updates)?
- 10. Are T&P NMs being used correctly in voyage planning and monitoring?
- 11. Is the ADMIRALTY Information Overlay (AIO) in use?
- 12. Has Weekly Notice to Mariners Section VIII and the README.TXT file been consulted?

See also Explanatory notes and references

*(representative only as other Hydrographic Organizations and electronic chart suppliers exist)*

#### **OCIMF: Recommendations on Usage of ECDIS and Preventing Incidents. First Edition.**

##### **4.2.4 Temporary and Preliminary Notices to Mariners, ENC Preliminary Notices to Mariners and Admiralty Information Overlay.**

Not all ENC producers include Temporary and Preliminary Notices to Mariners (T&P NMs) as part of their ENC updates. The UKHO provides a list of countries that include T&P NMs in their ENCs. In cases where T&P NMs are not included in local ENCs, T&P NMs issued for admiralty paper charts are available through a service called Admiralty Information Overlay (AIO).

AIO displays T&P NMs and Electronic Navigation Chart Preliminary Notices to Mariners (EP NMs), as well as areas where there is no admiralty paper chart, at an equivalent ENC scale on the ECDIS. T&P Ns and EP NMs are displayed as coloured polygons, whereas a grey hatched polygon labelled No Overlay is used where there is no paper chart at an equivalent ENC scale.

Note that there may be delays in updating AIOs from the time a T&P or EP NM has been published, updated or cancelled.

It is also important to note that AIO is a visual layer over an ENC and does not display details of the actual notice.



Where conflicts of scale occur between UKHO products and the areas covered by T&Ps, AIO will display No Overlay. In such circumstances, AIO users should gather information from other sources, such as local NMs to determine whether there are any relevant T&P notices.

#### Recommendations

- The company SMS should define policies and procedures for the OOW to display T&P NMs and use of the AIO function.
- Specific details of a T&P/EP NM should be plotted as a manual layer as opposed to a generic text box and made alarmable to highlight any navigational hazards. For example, the company SMS may require Navigating Officers to manually plot and display all T&P NMs within the XTC or within a specific number of miles either side of the planned track.
- Navigating officers should not entirely rely on AIO as they may not be updated, and applicable T&P notices should be verified against weekly notices to mariners.

**TMSA KPI 5.1.2** requires that comprehensive procedures to ensure safe navigation are in place. These procedures may include:

- Charts and publications management.

#### IMO: ISM Code

7. The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks should be defined and assigned to qualified personnel.

#### IMO: SOLAS

Chapter V Regulation 19.

2.1 All ships, irrespective of size, shall have:

.4 nautical charts and nautical publications to plan and display the ship's route for the intended voyage and to plot and monitor positions throughout the voyage. An electronic chart display and information system (ECDIS) is also acceptable as meeting the chart carriage requirements of this subparagraph. Ships to which paragraph 2.10 applies shall comply with the carriage requirements for ECDIS therein.

#### Inspection Guidance

The vessel operator should have developed procedures to manage the procurement and updating of Electronic Navigation Charts (ENCs) and Raster Navigation Charts (RNCs) to ensure compliance with the SOLAS carriage of nautical publications requirements.

The procedure should define:

- Which electronic charts must be available on board the vessel at all times.
- The process to determine which electronic charts must be available on board for a voyage.
- How to obtain or update chart permits to ensure the electronic charts required to be carried by the company or for use during a voyage are available onboard and remain valid throughout a proposed voyage.
- How to track which charts have current permits.
- How to obtain electronic chart corrections and apply them to available charts.
- How to track or view the electronic chart update history to verify that each ENC is fully corrected.
- How to manage passage planning and monitoring where full ENC coverage is not available.
- How to manage Temporary and Preliminary (T&P) notices applicable to ENCs or RNCs.

The company procedures may refer to instructions provided by a third-party supplier but the procedures available onboard must define all necessary steps and record-keeping requirements to ensure that the management of electronic charts is complete.

### **Suggested Inspector Actions**

- Confirm the primary means of navigation as declared in the pre-inspection questionnaire was correctly stated.
- Sight, and where necessary review, the company procedure for managing, ordering and updating ENC and RNCs.
- Review the onboard electronic chart management system for ENC and RNC and verify that the charts required for the previous voyage were available and permitted for use on each ECDIS.
- Verify that where RNCs had been used;
  - The ECDIS had been used in RCDS mode.
  - That ENC and RNCs were not available for the area.
  - That fully corrected paper charts were also available and in use.
- Review the chart update records and verify that each ENC and RNC in use for navigation had been maintained up to date to the most recently published Notices to Mariners, including T&P corrections.
- Review an individual ENC or RNC from the previous voyage which was identified as being affected by a T&P correction and verify that the correction was shown in the appropriate location.
- Request the accompanying officer to demonstrate how T&P notices were applied:
  - Manually.
  - By use of an overlay.
  - Incorporated as part of the update of the ENC database. (CAES and CEES S93 charts)

### **Expected Evidence**

- The company procedure that defined how ENC and RNCs were to be managed
- The onboard records identifying which ENC and RNCs were active with current permits or were available on a Pay As You Sail (PAYS) basis.
- ENC Status Report, where available.
- The previous voyage passage plan records showing which ENC and RNCs had been used.
- Where ENC coverage was incomplete for a recent voyage, passage planning records demonstrating how the gap in coverage was addressed.
- Records demonstrating that ENC and RNCs had been corrected to the latest notice to mariners, including the application of T&P notices.

### **Potential Grounds for a Negative Observation**

- There were no company procedures for managing ENC and RNCs
- The declaration relating to the primary means of navigation was incorrect
- The accompanying navigation officer was unfamiliar with the electronic chart management and correction procedures.
- The accompanying navigation officer was unfamiliar with the process for applying T&P notices to ENC and RNCs.
- There was no onboard management system to track the permits held by the vessel for ENC and RNCs.
- Individual ENC or RNC permits had expired prior to or during the predicted phase of a voyage.
- The vessel had completed a voyage with missing ENC or RNC coverage.
- The vessel had not updated the ENC and RNCs to the latest available notice to mariners (subject to a reasonable allowance for vessel activities and workload).
- A vessel had completed a part of a voyage with RNCs when ENC were available for the area in question.
- The vessels had operated in RCDS mode without availability of an appropriate folio of up to date paper charts.
- There was no onboard management system to track Notices to Mariners corrections applied to ENC and RNCs.

Where a vessel was less than 3,000 gt and was not fitted with an ECDIS select "*Not Answerable*" in each of the response tools then select "*Not Applicable - as instructed by question guidance*".

#### **4.2.5. Were the Master and navigation officers familiar with the company paper chart management procedures and were onboard paper charts managed, corrected and used appropriately?**

##### **Short Question Text**

Paper chart management

##### **Vessel Types**

Oil, Chemical, LPG, LNG

##### **ROVIQ Sequence**

Bridge

##### **Publications**

ICS: Bridge Procedures Guide – Fifth Edition

IMO SOLAS

##### **Objective**

**To ensure that the only fully corrected official paper charts are used for navigation when required to be carried or used.**

##### **Industry Guidance**

**ICS: Bridge Procedures Guide.** Fifth Edition.

Chapter 4.12 Charts and Nautical Publications

4.12.1 Carriage Of Charts And Nautical Publications

It is required that all ships carry adequate and up to date official nautical charts, sailing directions, lists of lights and radio signals, Notices to Mariners, tide tables and all other nautical publications necessary to appraise, plan, execute and monitor a passage.

Use of a chart and publication management system will help ensure that charts and publications are effectively maintained. A management system should record the charts, publications and licences/permits carried, and also when the charts and other publications were last corrected.

4.12.2 Official Charts and Nautical Publications

Official nautical charts can be either in paper or electronic format. Official nautical publications can also be in either paper or digital form.

In order for a nautical chart or publication to be considered official, it must be produced or approved by an authorised hydrographic office or relevant government institution in accordance with International Hydrographic Organization (IHO) resolutions and recommendations.

Only up to date official charts and publications should be used for appraisal, planning, execution and monitoring of a passage plan.

**TMSA KPI 5.1.2** requires that comprehensive procedures to ensure safe navigation are in place. These procedures may include:

- Charts and publications management.

**IMO: ISM Code**

7. The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks should be defined and assigned to qualified personnel.

## **IMO: SOLAS**

### **Chapter V Regulation 19**

2.1 All ships, irrespective of size, shall have:

.4 nautical charts and nautical publications to plan and display the ship's route for the intended voyage and to plot and monitor positions throughout the voyage. An electronic chart display and information system (ECDIS) is also acceptable as meeting the chart carriage requirements of this subparagraph. Ships to which paragraph 2.10 applies shall comply with the carriage requirements for ECDIS therein.

.5 back-up arrangements to meet the functional requirements of subparagraph .4 if this function is partly or fully fulfilled by electronic means.

### **Inspection Guidance**

Where a vessel carries paper charts to comply with the carriage of charts and nautical publications regulations, to mitigate gaps in ENC coverage, or for any other reason where paper charts will be used for navigational purposes, the vessel operator should have developed procedures to ensure that the paper charts are the latest edition and fully corrected before use.

The procedure should define the process for:

- Correctly identifying the paper charts required for an intended voyage.
- Ensuring paper charts required for an intended voyage are corrected prior to commencing passage planning.
- Tracking the correction status of paper charts not in use.
- Managing Temporary and Preliminary (T&P) notices.
- Procuring new editions and additional paper charts.
- The actions to be taken when directed to a port where appropriate paper charts are not onboard.
- Obtaining weekly and cumulative Notices to Mariners.
- Replacing damaged or worn paper charts.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures for paper chart management.
- Review the paper chart portfolio records and verify that all paper charts onboard were listed with their edition date.
- Review a recent passage plan and verify that paper charts used for the voyage were fully corrected by spot sampling at least two charts.
- Verify that applicable T&P corrections and NAVTEX and NAVAREA warnings had been applied to the paper charts used and that a system existed to remove them once they were cancelled.
- Verify that all paper charts, including the largest scale charts applicable to the passage reviewed, were available onboard and had been used for navigation.

### **Expected Evidence**

- The company procedures for paper chart management.
- The paper chart portfolio records.

- The paper chart correction records.
- Recent passage plan records showing which paper charts had been used.
- The paper charts, where applicable, used on the previous passage
- Communications and mitigation plan agreed with the company where a vessel had been directed to a port and the required paper charts were not onboard, if available.

**Potential Grounds for a Negative Observation**

- There was no company procedure for managing paper charts.
- The accompanying navigation officer was unfamiliar with the paper chart management and correction procedures.
- The vessel had completed a voyage with missing or inappropriate scale charts without any evidence that the company had been involved in identifying mitigating actions.
- There was no systematic process to apply and remove T&P notices and NAVTEX and NAVAREA warnings.
- The vessel had not updated voyage paper charts to the latest available Notice to Mariners (subject to a reasonable allowance for vessel activities and workload) or had used outdated editions.
- Paper charts in use were torn, stained or worn such that detail was likely to be obscured from the user.

Where the vessel is fitted with ECDIS as both the primary and back up means of navigation chart provision, and no paper charts at all are carried, then select "*Not Answerable*" in each of the response tools then select "*Not Applicable - as instructed by question guidance*".

**4.2.6. Were the Master and navigation officers familiar with the company procedures for testing the navigational equipment, main propulsion, steering gear and thrusters prior to use and prior to critical phases of a passage or operation and, did checklists or logbook entries confirm the required tests had been completed as required?**

**Short Question Text**

Testing navigational equipment, main propulsion, steering gear and thrusters

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Bridge

**Publications**

USCG: Code of Federal Regulations. Title 33.

ICS: Bridge Procedures Guide – Fifth Edition

IMO SOLAS

**Objective**

**To ensure that navigational equipment and manoeuvring machinery is confirmed as fully operational prior to critical phases of a passage or operation.**

**Industry Guidance**

**ICS: Bridge Procedures Guide.** Fifth Edition.

Chapter 3.18 Periodic Checks of Navigational Equipment.

3.18.1 Operational checks on navigational equipment should be undertaken when preparing for sea and prior to port entry and at any other time required by the SMS.

Before entering restricted or coastal waters, it is important also to check that full control of engine and steering function is available.

Checklist B1 Steering Gear Test Routines.

Checklist B6 Preparations For Sea.

Checklist B7 Preparations For Arrival.

Checklist B10 Navigation in Coastal Waters.

**USCG: Code of Federal Regulations. Title 33.**

§ 164.25 Tests before entering or getting underway.

(a) Except as provided in paragraphs (b) and (c) of this section no person may cause a vessel to enter into or get underway on the navigable waters of the United States unless no more than 12 hours before entering or getting underway, the following equipment has been tested:

(1) Primary and secondary steering gear. The test procedure includes a visual inspection of the steering gear and its connecting linkage, and, where applicable, the operation of the following:

- (i) Each remote steering gear control system.
  - (ii) Each steering position located on the navigating bridge.
  - (iii) The main steering gear from the alternative power supply, if installed.
  - (iv) Each rudder angle indicator in relation to the actual position of the rudder.
  - (v) Each remote steering gear control system power failure alarm.
  - (vi) Each remote steering gear power unit failure alarm.
  - (vii) The full movement of the rudder to the required capabilities of the steering gear.
- (2) All internal vessel control communications and vessel control alarms.
  - (3) Standby or emergency generator, for as long as necessary to show proper functioning, including steady state temperature and pressure readings.
  - (4) Storage batteries for emergency lighting and power systems in vessel control and propulsion machinery spaces.
  - (5) Main propulsion machinery, ahead and astern.

**TMSA KPI 5.1.2** requires that comprehensive procedures to ensure safe navigation are in place.

#### **IMO: ISM Code**

7. The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks should be defined and assigned to qualified personnel.

#### **IMO: SOLAS**

##### Chapter V Regulation 26

1. Within 12 hours before departure, the ship's steering gear shall be checked and tested by the ship's crew. The test procedure shall include, where applicable, the operation of the following:

1. The main steering gear,
2. The auxiliary steering gear,
3. The remote steering gear control systems,
4. The steering positions located on the navigation bridge,
5. The emergency power supply,
6. The rudder angle indicators in relation to the actual position of the rudder,
7. The remote steering gear control system power failure alarms,
8. The steering gear power unit failure alarms, and
9. Automatic isolating arrangements and other automatic equipment.

2. The checks and tests shall include:

1. The full movement of the rudder according to the required capabilities of the steering gear,
2. A visual inspection of the steering gear and its connecting linkages, and
3. The operation of the means of communication between the navigating bridge and steering gear compartment.



5. The administration may waive the requirements to carry out the checks and tests prescribed in paragraph 1 and 2 for ships which regularly engage on voyages of short duration. Such ships shall carry out these checks and tests at least once every week.

### **Inspection Guidance**

The vessel operator should have developed procedures which require navigational and manoeuvring equipment to be functionally tested at defined points prior to, and during, a passage or operation.

The procedures should define the extent of the testing required to be carried out based on regulation, local rules, risk assessment and the vessel's operation at the time of the required test.

The vessel operator should have developed checklists, adapted to reflect the equipment and systems fitted to the vessel, to ensure that comprehensive tests are carried out systematically.

Where a vessel operator had developed its procedures based on an administrative waiver of repetitive steering tests, documented evidence of such a waiver should be available onboard.

### **Suggested Inspector Actions**

- Sight, and where necessary, review the company procedures which defined the requirement for testing navigational and manoeuvring equipment.
  - Verify that the vessel operator had provided vessel specific checklists to address the following:
    - Steering Gear Test Routines (modelled on BPG B1 and supporting notes).
    - Preparations for Sea (modelled on BPG B6 and supporting notes).
    - Preparations for Arrival (modelled on BPG B7 and supporting notes).
  - Review completed checklists for the testing of navigational equipment and manoeuvring machinery to verify that testing during a recent passage or, sequence of operations, had been performed in accordance with the company procedures.
  - Verify that where a vessel was operating under an administrative waiver to conduct steering gear tests on a weekly basis, rather than prior to each departure, that the waiver was available onboard.
  - Verify that any defects, detected in either navigational equipment or manoeuvring machinery during the required testing processes, had been followed up through the onboard defect reporting system.
- 
- Review an individual checklist with the accompanying navigation officer to verify that they were familiar with individual checks or tests that were required to be carried out.

### **Expected Evidence**

- The company procedures which defined the requirements for testing navigational equipment and manoeuvring machinery.
- Completed checklists for the testing of navigational equipment and manoeuvring machinery for recent voyages.
- Bridge Log Book.
- Engine Log Book.
- Any waivers issued by the Flag Administration relating to the periodicity of steering gear tests for vessels on short voyages.

### **Potential Grounds for a Negative Observation**

- There was no procedure that required navigational equipment and manoeuvring equipment to be functionally tested at defined points prior to and during a voyage or operation.
- The accompanying navigation officer was not familiar with the company procedures for testing navigational equipment and manoeuvring equipment.

- The accompanying officer was unfamiliar with any check or test required to be carried out according to the company navigational and manoeuvring equipment checklist(s).
- There was no evidence that the timing of the rudder movement from hard-over to hard-over, using each steering gear power unit singly and together, had been checked to ensure consistency with previous tests and the manufacturer's specification.
- Tests required to be carried out by the company procedure had not been completed as required.
- There was no evidence that the governing administration had issued an appropriate waiver for a vessel on frequent voyages of short duration, where tests were not being carried out within 12 hours prior to departure.
- Defects with navigational equipment and manoeuvring machinery identified through the testing process, which could not be immediately corrected by onboard staff, had not been entered into the vessel's defect reporting system.

Where a defect(s) with an item of navigational and/or manoeuvring equipment had been identified during these tests but had NOT been rectified at the time of inspection:

- Create a negative observation in the Hardware response tool for this question 4.2.6, and
- Create a negative observation in the Hardware response tool of the question relating to the particular equipment if it is included in the CVIQ for the inspection.

**4.2.7. Were the Master and navigation officers familiar with the company procedure for the carriage and management of nautical publications and was evidence available to demonstrate that publications had been managed in accordance with the procedure?**

**Short Question Text**

Nautical publications

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Bridge

**Publications**

ICS: Bridge Procedures Guide – Fifth Edition

IMO SOLAS

UK Admiralty: Guidance on the Use of ADMIRALTY Digital Publications (ADP) and ADMIRALTY e-Nautical Publications (e-NPs)

IMO: MSC-MEPC.2/Circ.2 IMO requirements on carriage of publications on board ships

**Objective**

**To ensure nautical publications used for navigational purposes provide the most accurate information available.**

**Industry Guidance**

**ICS: Bridge Procedures Guide.** Fifth Edition.

Chapter 2.3.2 Official Nautical Publications and Additional Information.

A full appraisal of the passage plan should include a review and consideration of information additional to that on navigational charts, including but not limited to:

- Sailing Directions.
- Notices to Mariners.
- Lists of Radio Signals.
- Load Line Charts.
- Ocean Passage/Routeing Charts and Guides.
- Port Guides.
- Lists of Lights.
- Tide Tables and Tidal Stream Atlases.
- Maritime Security Charts.

**UK Admiralty: Guidance on the Use of ADMIRALTY Digital Publications (ADP) and ADMIRALTY e-Nautical Publications (e-NPs)**

3 Flag and Port State Acceptance

3.1. Where the UKHO's digital nautical publications are used to meet the SOLAS carriage requirement, the Record of Equipment attached to the ship's Safety Equipment Certificate should be appropriately endorsed to show that digital publications are being used and that appropriate backup is fitted. This endorsement can be provided by a Flag State Administration's (FSA's) Recognised Organisations (ROs), where authorised, who will also ensure that any specific FSA requirements have been implemented. It is recommended that ships carry copies of any documentation issued by their FSAs along with a copy of these guidance notes. It is also recommended that a notice of intention to use digital nautical publications is provided to the FSA

**TMSA KPI 5.1.2** requires that comprehensive procedures to ensure safe navigation are in place. These procedures may include:

- Charts and publications management.

#### **IMO: ISM Code**

7. The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks should be defined and assigned to qualified personnel.

#### **IMO: SOLAS**

Chapter V Regulation 27

Nautical charts and nautical publications.

Nautical charts and nautical publications, such as sailing directions, lists of lights, notice to mariners, tide tables and all other nautical publications necessary for the intended voyage, shall be adequate and up to date.

#### **IMO: MSC-MEPC.2/Circ.2 IMO requirements on carriage of publications on board ships.**

4 The publications may be carried in the form of electronic media such as CD-ROM in lieu of hard copies. Acceptable publications in electronic form should be those issued by IMO or an Administration or a body authorized by an Administration to ensure correctness of their contents and to safeguard against illegal copying. A medium could either contain a publication or as many publications as possible. In any case, the media should be treated in accordance with the document control procedures in the ship's SMS including procedures for timely update.

5 Notwithstanding paragraph 4 above, the publications for emergency use, such as the International Code of Signals and the IAMSAR Manual should always be available in the form of hard copies, bearing in mind that such publications need to be readily available for use in case of emergency without being restricted to a specific place and by the availability of a computer.

#### **Inspection Guidance**

The vessel operator should have developed procedures that identified which mandatory and discretionary nautical publications were required to be carried on board and the process for updating them to the latest information or edition available.

Where regulations allow for the carriage of mandatory publications in electronic format the procedure should indicate how backup provisions were to be provided onboard.

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#### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure for managing, ordering and updating nautical publications.
- Verify that the company procedure had defined which nautical publications were required to be carried, whether in hard or electronic form, and identified both mandatory and discretionary titles.
- Review the onboard nautical publication management system and verify that latest editions of nautical publications were available on board and that they had been maintained up to date.
- Verify that nautical publications carried in the electronic format required to comply with SOLAS Regulation 27 were acceptable to the flag and that the required back up provision were in place. (as indicated on the Safety Equipment Certificate Form E).

- Verify that nautical publications required to be carried in hard copy, such as the International Code of Signals and the IAMSAR Manual, were onboard.

#### **Expected Evidence**

- The nautical publications.
- The company procedure for managing, ordering and updating nautical publications.
- The inventory of nautical publications indicating their edition date and latest correction applied, where applicable.
- Where electronic publications were carried to comply with SOLAS Chapter V Regulation 27, evidence that the publications were approved by flag and the means of back up were in accordance with the Safety Equipment Certificate Form E)

#### **Potential Grounds for a Negative Observation**

- There was no company procedure for managing, ordering and updating nautical publications.
- The accompanying navigation officer was unfamiliar with the company procedure for managing, ordering and updating nautical publications.
- There was no inventory of mandatory and discretionary nautical publications required to be carried.
- Nautical publications required to be carried, in either electronic or hard copy, in accordance with the company procedure were found to be missing, obsolete or uncorrected.
- Where electronic nautical publications were carried, there was no evidence that the publications were approved by flag or that the required back up publications were available and maintained as required.

### 4.3. Bridge and Machinery Space Team Management

**4.3.1. Were the Master and navigation officers familiar with the company procedures defining the minimum bridge team composition and engine room operating mode and were records available to demonstrate that recent voyages had been planned and executed in accordance with company expectations?**

#### Short Question Text

Minimum bridge team composition

#### Vessel Types

Oil, Chemical, LPG, LNG

#### ROVIQ Sequence

Bridge

#### Publications

ICS: Bridge Procedures Guide – Fifth Edition

IMO: ISM Code

#### Objective

**To ensure that the bridge team is adequately resourced, and the machinery space operated appropriately at all stages of a voyage including while at anchor, conducting STS operations or drifting.**

#### **Industry Guidance**

**ICS: Bridge Procedures Guide.** Fifth Edition.

Section 1 Effective Bridge Organization

1.2.1 Composition of the Bridge Team

The Bridge Team should be sufficiently resourced to meet the operational requirements of the passage plan. When considering the composition of the Bridge Team and ensuring that the bridge is never left unattended at sea, the Master should take into account the following:

- Visibility, sea state and weather conditions;
- Traffic density;
- Activities occurring in the area in which the ship is navigating;
- Navigation in or near traffic separation schemes or other routing measures;
- Navigation in or near fixed or mobile installations;
- Ship operating requirements, activities and anticipated manoeuvres;
- Operational status of bridge equipment including alarm systems;
- Whether manual or automatic steering is anticipated;
- Any demands on the navigational watch that may arise as a result of exceptional circumstances; and
- Any other relevant standard, procedure or guidelines relating to watchkeeping arrangements or the activities of the vessel.

**TMSA KPI 5.1.3** requires that procedures to ensure effective bridge resource management are in place. These procedures may include:

- Bridge manning levels.

**IMO: ISM Code**

7. The company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and the protection of the environment. The various tasks should be defined and assigned to qualified personnel.

### **Inspection Guidance**

The vessel operator should have developed procedures which consider the areas within which a ship will operate and define:

- The minimum required bridge team composition considering the proximity of the vessel to navigational hazards, traffic density, weather conditions, and state of visibility.
- The minimum required bridge team composition for activities such as sitting at anchor, drifting, “at sea” STS operations, Dynamically Positioned (DP) cargo operations or underway stores / personnel transfer operations.
- The role of each bridge team member for each defined bridge team composition.
- The circumstances in which the helm will be manned.
- The circumstances in which the officer of the watch may be the sole lookout.
- The substitution of the Master during prolonged periods of enhanced bridge team composition.
- The operational status of the machinery space considering the proximity of the vessel to navigational hazards, traffic density, weather conditions and state of visibility.
- The passage planning requirement to identify the anticipated change in bridge team composition and machinery space status and, when manned, the requirement to be on standby for manoeuvring.
- The requirement to record when the bridge team composition changes from one defined level to another.
- The requirement to record when the machinery space status changes from unattended to attended and when the machinery space is on standby for manoeuvring.

When determining the bridge team composition, careful consideration should be given to non-navigational activities to ensure that the bridge team is never degraded by duties such as escorting the pilot to the embarkation station or the completion of administrative tasks.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures which define the bridge and machinery space team compositions.
- Review a recent passage plan and verify that the anticipated changes in bridge team composition and machinery space operating status had been identified and documented in alignment with the company procedure.
- Review the records for the same voyage and verify;
  - That the bridge team composition and machinery space operating mode had been maintained in accordance with the passage plan.
  - That the helm had been operated in manual mode in accordance with company procedures.
  - That the bridge team composition had been adapted to address changes in visibility or other environmental conditions.
  - The actual bridge team composition at any stage of the voyage was appropriate to the proximity of the vessel to navigational hazards, traffic density weather conditions, and state of visibility.

### **Expected Evidence**

- The company procedure(s) that defined bridge team composition and machinery space operating mode during all stages of a voyage .
- Passage plan documentation for recent voyages, (not necessarily the last voyage).
- Bridge Log Book, bell books, bridge checklists and any other supporting bridge records, either paper or electronic,

### **Potential Grounds for a Negative Observation**

- There was no procedure defining the required bridge team composition during all stages of a voyage, including while at anchor, drifting, or conducting “at sea” STS operations, DP operations or underway storing/personnel transfer operations, considering traffic density, proximity to navigational hazards, weather conditions and visibility.
- There was no procedure defining the engine room status, and when required to be manned the engine room team composition, during all stages of a voyage including while at anchor or drifting, or conducting “at sea” STS operations, DP operations or underway storing/personnel transfer operations, considering traffic density, proximity to navigational hazards, weather conditions and visibility.
- The accompanying navigation officer was not familiar with the company procedures which defined the required bridge team composition and engine room operating mode at all stages of the voyage.
- The company procedure was ambiguous with regards to the need for hand steering in any defined watch composition.
- The passage plan did not identify the required bridge team composition for all stages of a voyage.
- The passage plan did not identify the required engine room operating mode for all stages of a voyage.
- The reviewed passage plan(s) incorrectly identified the required bridge team composition or machinery space operating mode as defined by company procedure at any stage of a voyage.
- Records indicated that the required bridge team composition, as documented within the passage plan, was not complied with at any single stage of a voyage.
- Records indicated that the bridge had been operated with the officer of the watch as the sole lookout in contravention to company procedures at any stage of a voyage.
- Records indicated that the required engine room operating mode, as documented within the passage plan, was not complied with at any stage of a voyage.
- Changes in the bridge team composition from one level to another and the times of each change were not recorded in the log book or bell book

Where the review of bridge and engine room team composition identified observations relating to hours of rest non-conformance, these should be addressed under question 3.4.1



**4.3.2. Were the engineer officers familiar with the company procedures defining machinery space operating mode and, where required to be attended, the machinery space team composition during the various stages of a voyage, and were records available to confirm the machinery space had been operated accordingly?**

**Short Question Text**

Machinery space team composition

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Engine Control Room, Bridge

**Publications**

ICS: Bridge Procedures Guide – Fifth Edition

IMO SOLAS

ICS: Engine Room Procedures Guide. First Edition.

**Objective**

**To ensure that the machinery space is adequately manned or monitored at all stages of a voyage or operation.**

**Industry Guidance**

**ICS: Engine Room Procedures Guide. First Edition.**

**7.1 Manning Level Changes**

The Chief Engineer or designated representative should increase manning levels when required, whether planned or unplanned. As far as possible, the work/rest hour requirements should still be met.

**7.1.1 Planned Changes**

The Chief Engineer should identify planned changes in consultation with the Master. The planned changes should be identified for every passage of the ship. Examples of events/operations requiring planned manning changes are :

- Arrival/departure;
- Cargo operations;
- Bunkering;
- Fuel changeovers;
- Planned machinery overhauls; and
- Docking for surveys and trial runs.

**ICS: Bridge Procedures Guide. Fifth Edition.**

**Chapter 1.2.6 The Bridge Team and Internal Communication.**

The Bridge Team has the central role in maintaining communications with the engine room and all other operating areas.

It is essential that bridge and engine room personnel communicate regularly on matters including:

- Machinery and propulsion status, including defects;

- Any existing or anticipated circumstances, including fuel changeover procedures and planned maintenance, with the potential to affect machinery performance or the manoeuvrability of the ship;
- Any planned or anticipated speed changes; and
- Any environmental regulatory requirements.

The Bridge Team will co-ordinate the activities of the whole ship on behalf of the Master. This will be aided by good internal communications and a well briefed plan. This is particularly important during emergency situations when an effective response will depend on good communication and co-ordinated actions by all personnel.

Checklist B2: Example of a Bridge Manning Matrix.

**TMSA KPI 5.1.2** requires that comprehensive procedures to ensure safe navigation are in place.

#### **IMO: ISM Code**

7. The company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and the protection of the environment. The various tasks should be defined and assigned to qualified personnel.

#### **IMO: SOLAS**

Additional requirements for periodically unattended machinery spaces

Chapter II-1 Regulation 46

General

1 The arrangements provided shall be such as to ensure that the safety of the ship in all sailing conditions, including manoeuvring, is equivalent to that of a ship having the machinery spaces manned.

2 Measures shall be taken to the satisfaction of the Administration to ensure that the equipment is functioning in a reliable manner and that satisfactory arrangements are made for regular inspections and routine tests to ensure continuous reliable operation.

#### **Inspection Guidance**

The vessel operator should have developed procedures which defined:

- The circumstances in which the machinery space may be operated in the unattended mode.
- Where the machinery space is required to be attended, the required machinery space team composition considering proximity to navigational hazards, traffic density and the state of visibility.
- The minimum engine room manning requirements for activities such as drifting, "at sea" STS operations, Dynamically Positioned (DP) cargo operations or underway stores / personnel transfer operations.
- When the machinery space is required to be attended for navigational safety, the role of each machinery space team member.
- The substitution of the Chief Engineer during prolonged periods of enhanced machinery space team composition.
- The record keeping requirements for the change of machinery space status and/or machinery space team composition.
- The communication of the required machinery space status and/or manning level to the engineer officers at the passage planning stage and daily.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure which defined the required machinery space operating mode for the various stages of a voyage.
- Sight, and where necessary review, the company procedure which defined the machinery space team composition considering the proximity to navigational hazards, the traffic density and the state of visibility and other operations such as drifting, “at sea” STS operations, Dynamically Positioned (DP) cargo operations or underway stores / personnel transfer operations.
- Review the Engine Room Log Book for a recent voyage, including periods at anchor, to verify that the machinery space was attended, when required, with the appropriate team composition in accordance with the company procedure.
- Review the Engine Room Daily Order Book to verify that the anticipated times of changing the status of the machinery space from unattended to attended had been communicated to the engine room staff.

#### **Expected Evidence**

- The company procedure that defined the required machinery space status during all stages of a voyage, including while at anchor, considering traffic density, proximity to navigational hazards and the state of visibility.
- The company procedure that defined the required machinery space team composition considering traffic density, proximity to navigational hazards and the state of visibility and, during other operations such as drifting, “at sea” STS operations, Dynamically Positioned (DP) cargo operations or underway stores / personnel transfer operations.
- Engine Room Log Book, Engine Room Daily Order Book and any other supporting machinery space records.

#### **Potential Grounds for a Negative Observation**

- There was no procedure defining company expectations for operating the machinery space in either the unattended or attended mode considering traffic density, proximity to navigational hazards and state of visibility and, other operations such as at while at anchor, drifting, “at sea” STS operations, Dynamically Positioned (DP) cargo operations or underway stores / personnel transfer operations.
- There was no company procedure which defined the required machinery space team composition considering traffic density, proximity to navigational hazards and environmental conditions.
- The accompanying engineer officer was not familiar with the company procedures which defined the expectations for the operating status of the machinery space or when required to be attended, the machinery space team composition.
- The required machinery space status had not been communicated to engineering staff to permit effective resource management.
- Records indicated that the required machinery space status, as documented within the passage plan, was not complied with at any stage of a voyage.
- Records indicated that when operating in the attended status for navigational purposes, the machinery space team composition was not in accordance with the company procedure.
- Records of the machinery space status or team composition were not available.

#### **4.3.3. Were the Master and navigation officers familiar with the company procedures for integrating a pilot (or similar role\*) into the bridge team and were records available to demonstrate that the process had been followed?**

##### **Short Question Text**

Integrating a pilot (or similar role) into the bridge team

##### **Vessel Types**

Oil, Chemical, LPG, LNG

##### **ROVIQ Sequence**

Bridge

##### **Publications**

ICS: Bridge Procedures Guide – Fifth Edition

IMO: ISM Code

IMPA: Guidance on the Master - Pilot Exchange (MPX)

##### **Objective**

**To ensure that there is an effective process to integrate the pilot (or similar role\*) into the bridge team.**

##### **Industry Guidance**

**ICS: Bridge Procedures Guide.** Fifth Edition.

5 Pilotage

5.1 Overview

Efficient pilotage will depend on:

- Effective communication between the Master, Bridge Team and Pilot.
- Accurate exchange of information between the Master, Bridge Team and the Pilot, particularly on matters relating to safety, helm and telegraph orders.
- Mutual understanding of duties and responsibilities; and
- A complete awareness and understanding of the ship's systems, equipment and any deficiencies which may affect handling characteristics and manoeuvrability.

Checklist A1 Master/Pilot Information Exchange

Checklist A2 Pilot Card

##### **IMPA: Guidance on the Master-Pilot Exchange (MPX)**

As with all properly constructed supporting text on pilotage, it is necessary to begin with the core foundation of IMO Resolution A960 (23) Section 5:

5 Master – pilot information exchange.

5.4 This exchange of information should include at least:

- Presentation of a completed standard Pilot Card. In addition, information should be provided on rate of turn at different speeds, turning circles, stopping distances and, if available, other appropriate data;
- General agreement on plans and procedures, including contingency plans, for the anticipated passage.

- Discussion of any special conditions such as weather, depth of water, tidal currents and marine traffic that may be expected during the passage.
- Discussion of any unusual ship-handling characteristics, machinery difficulties, navigational equipment problems or crew limitations that could affect the operation, handling or safe manoeuvring of the ship;
- Information on berthing arrangements; use, characteristics and number of tugs; mooring boats and other external facilities;
- Information on mooring arrangements, and.
- Confirmation of the language to be used on the bridge and with external parties.

5.5 It should be clearly understood that any passage plan is a basic indication of preferred intention and both the pilot, and the master should be prepared to depart from it when circumstances so dictate.

5.6 Pilots and competent pilotage authorities should be aware of the voyage planning responsibilities of masters under applicable IMO instruments.

**TMSA KPI 5.1.3** requires that procedures to ensure effective bridge resource management are in place. These procedures may include:

- Navigation with Pilot on board.

#### **IMO: ISM Code**

7. The company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and the protection of the environment. The various tasks should be defined and assigned to qualified personnel.

#### **Inspection Guidance**

The vessel operator should have developed a procedure to ensure the pilot (or similar role\*) is integrated into the bridge team and that specific information is documented and discussed prior to any transfer of conn or responsibility takes place. The information should include but not be limited to:

- The vessel particulars and manoeuvring characteristics.
- The planned passage.
- The review of the ECDIS and the status of safety depth alarms and layers in use.
- The use of any navigational aids provided by the pilot.
- Mooring and/or anchoring requirements.
- Towage and/or tug assistance.
- Under keel clearance.
- Relevant defects and/or constraints.

The Master/Pilot exchange should be documented, discussed and agreed before any transfer of conn or responsibility takes place. The Master/Pilot exchange should be repeated whenever there is a change of pilot.

The vessel should utilise checklists which have been adapted to the specific needs of the company and vessel type, and which were aligned with:

#### **ICS Bridge Procedures Guide – Annex 3 - Checklists**

- A1 Master/Pilot Information Exchange
- A2 Pilot Card

The vessel should record the time of completion of the Master/Pilot information exchange, and where different, the time of the transfer of the conn between the Master and Pilot. The time of the transfer of the conn between Pilots and, as applicable, between the Pilot and Master on an outbound passage should also be recorded.

\*Similar role: Mooring Master, Lightering Master, Marine Advisor, Deep Sea Pilot, etc.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure for integrating a pilot\* into the bridge team.
- Review the Master/Pilot information exchange and pilot checklists from two recent operations and verify that the information required to be included had been fully and accurately entered and the pilot\* had acknowledged the handover of information, or where the pilot had refused to sign, the time of the completion of the handover had been recorded.
- Review Bridge Log Books, bell books or other records and verify that the time of the transfer of the conn between the Master and Pilot, between pilots and between the pilot and the Master had been recorded.
- Interview the accompanying navigation officer to verify that they understood the source, intent and meaning of the information required to be entered on the Master/Pilot information and/or pilot card checklists.

### **Expected Evidence**

- The company procedure for integrating a pilot\* into the bridge team.
- The Master/Pilot information exchange and pilot card checklists for recent operations.
- The Bridge Log Book, bell book and other operational records covering recent operations.

### **Potential Grounds for a Negative Observation**

- There was no procedure for integrating a pilot\* into the bridge team.
- The vessel operator had not developed Master/Pilot information and/or pilot card checklists for use onboard.
- The accompanying navigation officer was not fully familiar with the company procedure for integrating a pilot\* into the bridge team.
- The accompanying navigation officer was not familiar with the practical requirements for each item included on the Master/Pilot information and/or pilot card checklists.
- The Master/Pilot information and/or pilot card checklists were not available for all operations where a pilot\* was engaged.
- The Master/Pilot information and/or pilot card checklists reviewed were either missing, incomplete or contained erroneous safety related information pertinent to the operations being undertaken.
- The time of the completion of the Master/Pilot information exchange was not recorded for the operation(s) reviewed.
- The times of the transfer of the conn between the Master and pilot, between pilots and between the Pilot and Master, as applicable, were not recorded.
- Defective equipment affecting safe navigation, manoeuvring or mooring operations, where it existed, had not been recorded on the pilot card checklist for the reviewed operations.

#### **4.3.4. Were the Master and navigation officers familiar with the company procedures to prevent disruption and distraction on the bridge, and were these procedures being complied with?**

##### **Short Question Text**

Bridge distractions.

##### **Vessel Types**

Oil, Chemical, LPG, LNG

##### **ROV/Q Sequence**

Bridge

##### **Publications**

ICS: Bridge Procedures Guide – Fifth Edition

IMO: ISM Code

##### **Objective**

**To ensure that the bridge team can always maintain a safe navigational watch, free from disruption and distraction.**

##### **Industry Guidance**

##### **ICS: Bridge Procedures Guide – Fifth Edition**

##### **1.2.7 Duties within the Bridge Team**

Maintaining Bridge Team performance will be aided by a bridge environment which is free from distractions. To avoid disruption and distraction on the bridge it is recommended that:

- Unrestricted bridge access is limited to only those with operational bridge responsibilities;
- The use of mobile phones and other personal electronic devices should be strictly controlled (see Section 1.4); and
- Internal and external communications should generally be restricted to those related to the safe navigation of the ship (see Section 1.5).

The Bridge should be free from distractions and all non-essential activity should be avoided.

##### **1.3 Company policy and procedures**

The ISM Code requires every company to have an SMS which covers instructions and procedures to ensure safe operation of ships and protection of the environment. This should include practical guidance on navigational safety including:

- Bridge access and distraction prevention procedures.

##### **1.4 Mobile phones and personal electronic devices**

The company should have a written policy requiring that mobile phones and other personal electronic devices should only be used on the bridge in circumstances approved by the Master.

Notwithstanding occasions when use of mobile phones or personal electronic devices may be permitted, the Company policy should minimise the distraction resulting from such devices by, in general, limiting their use to operationally necessary circumstances.

## 1.5 Bridge internet and email

Where internet and email services are available on the bridge, the Company should have a policy to manage their use. Access to internet and email use by bridge watchkeepers should generally be limited to those circumstances where it is necessary for the safe navigation of the ship, in order to minimise distraction that might be caused to the Bridge Team.

Internet access and email on the bridge should usually be restricted to:

- Updates to nautical charts and publications, licences and permits;
- Weather information;
- Navigational warnings; and
- Information relevant to the ship's operations and passage plan.

**TMSA KPI 5.1.3** requires that procedures to ensure effective bridge resource management are in place.

## IMO: ISM Code

### 1.4 Functional requirements for a Safety Management System (SMS)

Every Company should develop, implement and maintain a Safety Management System (SMS) which includes the following functional requirements:

1. a safety and environmental protection policy,
2. instructions and procedures to ensure safe operation of ships and protection of the environment in compliance with relevant international and flag State legislation,

## Inspection Guidance

The vessel operator should have developed procedures to prevent disruption and distraction on the bridge including guidance on:

- Bridge access by personnel with no operational bridge responsibilities.
- The use of mobile phones and other personal electronic devices.
- Internal and external communications.
- Non-essential activity.
- Internet and email access on the bridge.
- The effective management of the bridge space where it was combined with the cargo and/or machinery control and monitoring functions.

## Suggested Inspector Actions

- Sight, and where necessary review, the company procedures to prevent disruption and distraction on the bridge.
- During the inspection of the bridge note any evidence of non-compliance with the company procedures.
- Interview the accompanying officer to verify their familiarity with the company procedures to prevent disruption and distraction on the bridge.

## Expected Evidence

- Company procedures to prevent disruption and distraction on the bridge.



### **Potential Grounds for a Negative Observation**

- There were no company procedures to prevent disruption and distraction on the bridge including guidance on:
  - Bridge access by personnel with no operational bridge responsibilities.
  - The use of mobile phones and other personal electronic devices.
  - Internal and external communications.
  - Non-essential activity.
  - Internet and email access on the bridge.
  - The effective management of the bridge space where it was combined with the cargo and/or machinery control and monitoring functions.
- The accompanying officer was not familiar with the company procedures to prevent disruption and distraction on the bridge.
- There was evidence of non-compliance with the company procedures to prevent disruption and distraction on the bridge – give details.

Where a multifunctional bridge space was provided, an observation should not be made relating to non-navigational activities occurring on the bridge provided that:

- The company procedure specifically addressed the management of potential distractions to the bridge team resulting from the operation and monitoring of the cargo and/or machinery systems.
- The bridge space was laid out and divided up such that the operation and monitoring of the cargo and/or machinery systems could be undertaken without distraction to the bridge team.

## 4.4. Communications Equipment and Procedures

### 4.4.1. Were the Master and officers familiar with the operation of the Emergency Position Indicating Radio Beacon (EPIRB) and was the EPIRB in good order with records available to demonstrate that had it been inspected, tested and maintained as required?

#### Short Question Text

Emergency Position Indicating Radio Beacon (EPIRB)

#### Vessel Types

Oil, Chemical, LPG, LNG

#### ROVIQ Sequence

Bridge

#### Publications

IMO: MSC.1/Circ.1039 Guidelines for shore-based maintenance of satellite EPIRBs

IMO: ISM Code

IMO SOLAS

IMO: MSC.1/Circ.1040/Rev.2 Guidelines on annual testing of 406 mhz satellite EPIRBs

#### Objective

To ensure the Emergency Position Indicating Radio Beacon (EPIRB) will function correctly in an emergency.

#### **Industry Guidance**

##### **IMO: MSC.1/Circ.1039 Guidelines for shore-based maintenance of satellite EPIRBs**

4 Maintenance service interval

4.1 406 MHz satellite EPIRBs should be inspected and tested in accordance with MSC/Circ.1040.

4.2 Shore-based maintenance of all satellite EPIRBs, as defined in paragraph 1.2, should be carried out in accordance with these guidelines at intervals specified by the flag Administration and not exceeding 5 years. It is recommended that the maintenance be performed at the time when the battery is to be changed.

##### **IMO: MSC.1/Circ.1040/Rev.2 Guidelines on annual testing of 406 mhz satellite EPIRBs**

1 These Guidelines are applicable to the annual testing of emergency position-indicating radio beacons (EPIRBs) that are approved to comply with the provisions of SOLAS regulation IV/15.9.

2 The testing should be carried out by appropriately trained and approved personnel using suitable test equipment capable of performing all the relevant measurements required in these Guidelines (this testing normally will be done by a radio surveyor as part of the annual radio survey). All tests of electrical parameters should be performed in the self-test mode, if possible.

3 If a distress signal is transmitted accidentally, the transmission should immediately be stopped, and the local rescue coordination centre (RCC)<sup>1</sup> should be contacted immediately and informed. The nearest Cospas-Sarsat mission control centre (MCC) should also be informed (see also Guidelines for the avoidance of false distress alerts (resolution A.814(19), as may be updated)).

4 The examination of the installed EPIRB should include:

.1 checking position and mounting of the bracket to ensure unimpeded float-free operation;

- .2 carrying out visual inspection of the EPIRB and the bracket for defects, any signs of damage, degradation or cracks to the casing, or of water ingress;
- .3 carrying out the beacon self-test routine, including the GNSS self-test, if applicable;
- .4 checking that the EPIRB identification (15 Hex ID for first-generation beacons and 23 Hex ID for second-generation beacons and other required information, including, if applicable, the AIS identity (User ID)) is clearly marked on the outside of the equipment;
- .5 decoding the EPIRB hexadecimal identification digits (15 Hex ID for first-generation beacons and 23 Hex ID for second-generation beacons) and other information from the transmitted signal, including, if applicable, the AIS identity (User ID), checking that the decoded information (Hex ID or MMSI/call sign data, as required by the Administration) is identical to the identification marked on the beacon;
- .6 verifying that the MMSI number or radio call sign, if encoded in the beacon, corresponds with that assigned to the ship;
- .7 verifying registration in an appropriate beacon registration database through documentation or through the point of contact associated with that country code;
- .8 checking the battery expiry date;
- .9 checking the hydrostatic release and its expiry date, as appropriate;
- .10 verifying the emission in the 406 MHz band using the self-test mode or an appropriate device to avoid transmission of a distress call to the satellites;
- .11 if possible, verifying emission on the 121.5 MHz frequency using the self-test mode or an appropriate device to avoid activating the SAR system;
- .12 verifying emission on the appropriate AIS frequencies, if applicable, using the self-test mode or an appropriate device to avoid creating false alerts;
- .13 verifying that the EPIRB has been maintained by an approved shore-based maintenance provider at intervals required by the Administration, in accordance with the most recent revision of MSC/Circ.1039;
- .14 after the test, remounting the EPIRB in its bracket, checking that no transmission has been started;
- .15 verifying the presence of a firmly attached lanyard in good condition; the lanyard should be neatly stowed, and should not be tied to the vessel or the mounting bracket;
- .16 checking the presence of beacon operating instructions manual; and
- .17 checking the presence of pictorial instructions for manual operation visible at the location of the beacon.

**TMSA KPI 9A.1.1** requires that safety inspections are conducted at scheduled intervals by a designated Safety Officer. Safety inspections of the ship:

- Include all accessible areas of the ship.

#### **IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

## **IMO: SOLAS**

### Chapter IV Regulation 7

1 Every ship shall be provided with:

.6 subject to the provisions of regulation 8.3, a satellite emergency position-indicating radio beacon (satellite EPIRB) which shall be:

1. capable of transmitting a distress alert through the polar orbiting satellite service operating in the 406 MHz band.
2. installed in an easily accessible position.
3. ready to be manually released and capable of being carried by one person into a survival craft.
4. capable of floating free if the ship sinks and of being automatically activated when afloat; and
5. capable of being activated manually.

### Chapter IV Regulation 15

9. Satellite EPIRBs shall be:

.1 annually tested for all aspects of operational efficiency, with special emphasis on checking the emission on operational frequencies, coding and registration, at intervals as specified below:

.1.2 on cargo ships, within 3 months before the expiry date, or 3 months before or after the anniversary date, of the Cargo Ship Safety Radio Certificate.

The test may be conducted on board the ship or at an approved testing station; and

.2 subject to maintenance at intervals not exceeding five years, to be performed at an approved shore-based maintenance facility.

### **Inspection Guidance**

The vessel operator should have developed a procedure to ensure that EPIRBs were periodically inspected, tested and maintained, and ready for immediate use in an emergency.

Most EPIRB's have a self-test facility which is usually a spring-loaded switch. When activated a light will indicate that the test circuits are operating correctly and sometimes this will also activate the strobe light. It is recommended that the self-test switch be held for no more than 2 flashes of the strobe light, or no longer than 1 minute after the first self-test mode burst transmission. When the self-test is activated on a 406 MHz EPIRB, the EPIRB is allowed to radiate a single burst which is specially coded so that it is ignored by the COSPAS-SARSAT system. The EPIRB must never be tested by actual operation.

However, self-tests will use some of the beacon's limited battery power and should only be performed in accordance with the beacon manufacturer's guidance.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure to ensure that EPIRBs were periodically inspected, tested and maintained, and ready for immediate use in an emergency.
- Review records of periodic inspections, tests and maintenance of the EPIRB.
- Inspect the EPIRB and associated fittings.

- Interview the accompanying officer to verify their familiarity with:
  - How to conduct the self-test for the EPIRB.
  - The manufacturer's instructions on the frequency of conducting the self-test function to preserve battery life.
  - The procedure to follow should the EPIRB be activated in non-emergency circumstances.
  - Manual operation of the EPIRB.

#### **Expected Evidence**

- The company procedure to ensure that EPIRBs were periodically inspected, tested and maintained and ready for immediate use in an emergency.
- The GMDSS Radio Log Book.
- Records of periodic inspections, tests and maintenance of the EPIRB.

#### **Potential Grounds for a Negative Observation**

- The accompanying officer was unfamiliar with the required inspection and testing of the EPIRB.
- The accompanying officer was unable to explain:
  - How to perform the self-test.
  - The procedure to follow if the EPIRB was accidentally activated in a non-emergency situation.
  - How to manually operate the EPIRB.
- The EPIRB was not:
  - Armed and ready for automatic activation.
  - Capable of floating-free unimpeded or being easily manually released.
  - Clearly marked with the required information and operating instructions.
  - Free of visible defects, signs of damage, degradation or cracks to the casing, or of water ingress.
- The EPIRB battery was past its expiry date
- The hydrostatic release was not in good order or past its expiry date.
- The lanyard was:
  - Tied to the vessel or the mounting bracket.
  - Not in good condition and neatly stowed.
- Records were incomplete for:
  - Periodic inspections and self-tests of the EPIRB
  - Annual tests for all aspects of operational efficiency.
  - Five-yearly maintenance at an approved shore-based maintenance facility (or more frequent if required by the flag state).
- The EPIRB was defective in any respect.
- There was no beacon operating instructions manual available.
- There were no pictorial instructions for manual operation visible at the location of the beacon.

**4.4.2. Were the Master and officers familiar with the operation of the Search and Rescue Transmitters (SARTs), and were the SARTs in good order with records available to demonstrate that had they had been inspected and tested as required?**

**Short Question Text**

Search and Rescue Transmitters (SARTs)

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Bridge, Lifeboat deck

**Publications**

IMO: ISM Code

IMO SOLAS

IMO: Resolution A.802(19) Recommendation on performance standards for survival craft radar transponders for use in search and rescue operations

IMO: Resolution MSC.246(83) Performance standards for survival craft AIS search and rescue transmitters (AIS-SART) for use in search and rescue operations

**Objective**

**To ensure the Search and Rescue Transmitters (SARTs) will function correctly in an emergency.**

**Industry Guidance**

**IMO: Resolution A.802(19) Recommendation on performance standards for survival craft radar transponders for use in search and rescue operations**

**2 General**

The SART should be capable of indicating the location of a unit in distress on the assisting units radars by means of a series of equally spaced dots (see resolution A.530(13)).

**2.1 The SART should:**

.10 be equipped with buoyant lanyard, suitable for use as a tether, if it is capable of floating.

\* If an on-board test is performed using a shipborne 9 GHz radar, activation of the SART should be limited to a few seconds to avoid harmful interference with other shipborne radars and excessive consumption of battery energy.

**4 Labelling**

In addition to the items specified in resolution A. 694(17) on general requirements, the following should be clearly indicated on the exterior of the equipment:

1. brief operating instructions; and
2. expiry date for the primary battery used.

**IMO: Resolution MSC.246(83) Performance standards for survival craft AIS search and rescue transmitters (AIS-SART) for use in search and rescue operations**

**2 General**

The AIS-SART should be capable of transmitting messages that indicate the position, static and safety information of a unit in distress. The transmitted messages should be compatible with existing AIS installations. The transmitted messages should be recognized and displayed by assisting units in the reception range of AIS-SART, and clearly distinguish the AIS-SART from an AIS installation.

2.1 The AIS-SART should:

.9 be equipped with buoyant lanyard, suitable for use as a tether, if it is capable of floating.

.17 be capable of being tested for all functionalities using specific test information.

#### 4 Labelling

In addition to the items specified in resolution A.694(17) \*\*, the following should be clearly indicated on the exterior of the equipment:

.1 brief operating and test instructions; and

.2 expiry date for the primary battery used.

**TMSA KPI 9A.1.1** requires that safety inspections are conducted at scheduled intervals by a designated Safety Officer. Safety inspections of the ship:

- Include all accessible areas of the ship.

#### **IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

#### **IMO: SOLAS**

##### Chapter III Regulation 6

##### 2.2 Search and rescue locating devices

At least one search and rescue locating device shall be carried on each side of every passenger ship and of every cargo ship of 500 gross tonnage and upwards. At least one search and rescue locating device shall be carried on every cargo ship of 300 gross tonnage and upwards but less than 500 gross tonnage. Such search and rescue locating devices shall conform to the applicable performance standards not inferior to those adopted by the Organization\*. The search and rescue locating devices\*\* shall be stowed in such location that they can be rapidly placed in any survival craft other than the liferaft or liferafts required by regulation 31.1.4. Alternatively, one search and rescue locating device shall be stowed in each survival craft other than those required by regulation 31.1.4. On ships carrying at least two search and rescue locating devices and equipped with freefall lifeboats one of the search and rescue locating devices shall be stowed in a free-fall lifeboat and the other located in the immediate vicinity of the navigation bridge so that it can be utilized on board and ready for transfer to any of the other survival craft.

\* Refer to the Recommendation on performance standards for survival craft radar transponders for use in search and rescue operations, adopted by the Organization by resolution MSC.247(83) (A.802(19)), as amended) and the Recommendation on performance standards for survival craft AIS Search and Rescue transmitter (AIS SART), adopted by the Organization by resolution MSC.246(83).

\*\* One of these search and rescue locating devices may be the search and rescue locating device required by regulation IV/7.1.3.

## Chapter IV Regulation 7

1 Every ship shall be provided with:

.3 a search and rescue locating device capable of operating either in the 9 GHz band or on frequencies dedicated for AIS, which:

.3.1 shall be so stowed that it can be easily utilized; and

.3.2 may be one of those required by regulation III/6.2.2 for a survival craft.

## Chapter III Regulation 20

### 10 Marking of stowage locations

Containers, brackets, racks, and other similar stowage locations for life-saving equipment shall be marked with symbols in accordance with the recommendations of the Organization\*, indicating the devices stowed in that location for that purpose. If more than one device is stowed in that location, the number of devices shall also be indicated.

\*Refer to the Symbols Related to Life-Saving Appliances and Arrangements, adopted by the Organization by resolution A.760(18), as amended.

### **Inspection Guidance**

The vessel operator should have developed a procedure to ensure that SARTs were periodically inspected, tested and ready for immediate use in an emergency.

All ships must be provided with at least one search and rescue transmitter (SART). Ships over 500 gross tonnage must carry two SARTs. A SART may operate either in the 9 GHz band or on frequencies dedicated for AIS.

SART self-tests will use some of the beacon's limited battery power and should only be performed in accordance with the transponder manufacturer's guidance.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure to ensure that SARTs were periodically inspected, tested and ready for immediate use in an emergency.
- Review records of periodic inspections and tests of the SART(s).
- Inspect the SART(s).
  
- Interview the accompanying officer and verify their familiarity with:
  - The purpose and operation of the SARTs carried onboard.
  - How to conduct the self-test function for each type of SART carried.

### **Expected Evidence**

- The company procedure to ensure that SARTs were periodically inspected, tested and ready for immediate use in an emergency.
- The GMDSS Radio Log Book.
- Records of periodic inspections and tests of the SART(s).

### **Potential Grounds for a Negative Observation**



- There was no company procedure to ensure that SARTs were periodically inspected, tested and ready for immediate use in an emergency.
- The accompanying officer was unfamiliar with the purpose and operation of the SARTs.
- The accompanying officer was unable to explain/demonstrate how to mount a SART on a lifeboat or liferaft.
- The accompanying officer was unable to describe how a SART transmission would be displayed on a radar screen.
- The accompanying officer was unfamiliar with the required inspection and testing of the SARTs.
- The accompanying officer was unable to explain how to perform the self-tests on the SART units provided onboard.
- The stowage location(s) of SARTs were not clearly marked with the recommended symbols.
- A SART was not clearly marked with the required operating and/or testing instructions.
- A SART battery was past its expiry date.
- The lanyard was missing from a SART.
- Records of periodic inspections and self-tests of the SARTs were incomplete.
- One or more SART was not located as required.
- One or more SART was defective in any respect.

**4.4.3. Were the Master and officers familiar with the location, purpose and operation of the survival craft portable two-way VHF radios and were they in good order with records available to demonstrate that had they been inspected and tested as required?**

**Short Question Text**

Survival craft portable two-way VHF radios

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Bridge

**Publications**

IMO: ISM Code

IMO SOLAS

IMO: Resolution MSC.149(77) Adoption of the revised performance standards for survival craft portable two-way vhf radiotelephone apparatus

**Objective**

**To ensure the survival craft portable two-way VHF radios will function correctly in an emergency.**

**Industry Guidance**

**IMO: Resolution MSC.149(77) Adoption of the revised performance standards for survival craft portable two-way vhf radiotelephone apparatus**

2.1 The equipment should be portable and capable of being used for on-scene communication between survival craft, between survival craft and ship and between survival craft and rescue unit. It may also be used for on-board communications when capable of operating on appropriate frequencies.

2.3 The equipment should:

.11 have provisions for its attachment to the clothing of the user and also be provided with a wrist or neck strap. For safety reasons, the strap should include a suitable weak link to prevent the bearer from being ensnared.

.13 be either of a highly visible yellow/orange colour or marked with a surrounding yellow/orange marking strip.

3.1 The two-way radiotelephone should be capable of operation on the frequency 156.800 MHz (VHF channel 16) and on at least one additional channel.

12.1 The source of energy should be integrated in the equipment and may be replaceable by the user. In addition, provision may be made to operate the equipment using an external source of electrical energy.

12.2 Equipment for which the source of energy is intended to be user-replaceable should be provided with a dedicated primary battery for use in the event of a distress situation. This battery should be equipped with a non-replaceable seal to indicate that it has not been used.

12.3 Equipment for which the source of energy is intended to be non-user-replaceable should be provided with a primary battery. The portable two-way radiotelephone equipment should be fitted with a non-replaceable seal to indicate that it has not been used.

12.5 Primary batteries should have a shelf life of at least 2 years, and if identified to be user replaceable should be of a colour or marking as defined in 2.3.13.

12.6 Batteries not intended for use in the event of a distress situation should be of a colour or marking such that they cannot be confused with batteries intended for such use.

13.1 In addition to the general requirements specified in resolution A.694(17), the following should be clearly indicated on the exterior of the equipment:

1. brief operating instructions; and
2. expiry date for the primary batteries.

**TMSA KPI 9A.1.1** requires that safety inspections are conducted at scheduled intervals by a designated Safety Officer. Safety inspections of the ship:

- Include all accessible areas of the ship.

## **IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

## **IMO: SOLAS**

### Chapter III Regulation 6

1 Paragraph 2 applies to all passenger ships and to all cargo ships of 300 gross tonnage and upwards.

2.1.1 At least three two-way VHF radiotelephone apparatus shall be provided on every passenger ship and on every cargo ship of 500 gross tonnage and upwards. At least two two-way VHF radiotelephone apparatus shall be provided on every cargo ship of 300 gross tonnage and upwards but less than 500 gross tonnage. Such apparatus shall conform to performance standards not inferior to those adopted by the Organization. \* If a fixed two-way VHF radiotelephone apparatus is fitted in a survival craft it shall conform to performance standards not inferior to those adopted by Organization. \*

\* Refer to the Performance Standards for Survival Craft Two-Way VHF Radiotelephone Apparatus, adopted by the Organization by resolution A.809(19), as it may be amended, annex 1 or annex 2 as applicable, and resolution MSC.149(77).

### Chapter III Regulation 7

#### 10 Marking of stowage locations

Containers, brackets, racks, and other similar stowage locations for life-saving equipment shall be marked with symbols in accordance with the recommendations of the Organization\*, indicating the devices stowed in that location for that purpose. If more than one device is stowed in that location, the number of devices shall also be indicated.

\*Refer to the Symbols Related to Life-Saving Appliances and Arrangements, adopted by the Organization by resolution A.760(18), as amended.

## **Inspection Guidance**

The vessel operator should have developed a procedure to ensure that survival craft portable two-way VHF radios were periodically inspected and tested and ready for immediate use in an emergency. Procedures should also provide guidance on the use of the radios for non-emergency communications.

The survival craft portable two-way VHF radios may be used for routine on-board communications when capable of operating on appropriate frequencies. There is no requirement for them to be Ex-rated or of an intrinsically safe type,

but if the units are being used for shipboard operations, then there must be effective measures in place to prevent them being used in the gas hazardous area.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure to ensure that survival craft portable two-way VHF radios were periodically inspected and tested and ready for immediate use in an emergency.
- Review records of periodic inspections and tests of the survival craft portable two-way VHF radios.
- Inspect the survival craft portable two-way VHF radios and replaceable primary batteries, if provided, and verify that:
  - Brief operating instructions were clearly indicated on the exterior of the equipment.
  - The expiry date of the primary battery was clearly indicated.
- Interview the accompanying officer to verify their familiarity with the purpose, operation, inspection and testing of the survival craft portable two-way VHF radios.

### **Expected Evidence**

- The company procedure to ensure survival craft portable two-way vhf radios were periodically inspected and tested and ready for immediate use in an emergency.
- The GMDSS Radio Log Book.
- Records of periodic inspections and tests of the survival craft portable two-way VHF radios.

### **Potential Grounds for a Negative Observation**

- There was no company procedure to ensure that survival craft portable two-way VHF radios were periodically inspected, tested and ready for immediate use in an emergency.
- Company procedures did not provide guidance on the use of the survival craft portable two-way VHF radios for non-emergency communications.
- The accompanying officer was unfamiliar with the purpose and operation of the survival craft portable two-way VHF radios.
- The accompanying officer was unfamiliar with the required inspection and testing of the survival craft portable two-way VHF radios.
- There were insufficient survival craft portable two-way VHF radios on board.
- The stowage location of survival craft portable two-way VHF radios was not clearly marked with the recommended symbols and the number of radios.
- Survival craft portable two-way vhf radios or replaceable primary batteries were not of a highly visible yellow/orange colour or marking.
- A survival craft portable two-way VHF radio was not clearly marked with the required operating instructions.
- A survival craft portable two-way VHF radio battery was past its expiry date.
- The seal on a replaceable primary battery or radio was broken.
- Other batteries were not clearly distinguished from primary batteries by colour or marking.
- A survival craft portable two-way VHF radio did not have provision for attachment to clothing.
- A survival craft portable two-way VHF radio did not have a wrist or neck strap with a weak link.
- Records of periodic inspections and tests of the survival craft portable two-way VHF radios were incomplete.
- The survival craft portable two-way VHF radios were defective in any respect.

#### **4.4.4. Were the Master and navigation officers familiar with the procedures for sending and receiving distress, urgency and safety messages and were suitable instructions posted by the GMDSS equipment?**

##### **Short Question Text**

Sending and receiving distress, urgency and safety messages

##### **Vessel Types**

Oil, Chemical, LPG, LNG

##### **ROVIG Sequence**

Bridge

##### **Publications**

ICS: Bridge Procedures Guide – Fifth Edition

IMO: ISM Code

IMO/ICAO International aeronautical and maritime search and rescue manual (IAMSAR) Vol III

##### **Objective**

**To ensure effective communications will be made by the vessel in an emergency situation.**

##### **Industry Guidance**

##### **ICS: Bridge Procedures Guide – Fifth Edition**

##### **3.15 GMDSS Watchkeeping**

To enable a ship to send and receive distress, urgency and safety information, the OOW should hold a General or restricted Operator's Certificate (GOC/ROC) as appropriate and be familiar with the requirements and procedures for GMDSS watchkeeping....

The International telecommunications Union (ITU) publication Manual for Use by the Maritime Mobile and Maritime Mobile Satellite Services contains relevant extracts from the ITU Radio Regulations, setting out the correct procedures to be followed.

##### **3.15.1 Radio watchkeeping**

The OOW is responsible for ensuring compliance with the ship's radio watchkeeping requirements. In general, a radio watch should be maintained on all frequencies necessary to receive distress, urgency and safety messages appropriate to the sea area in which the ship is operating.

##### **3.15.2 Emergency Communications**

The OOW should be familiar with the procedures for sending distress, urgency and safety messages contained in the International Aeronautical and Maritime Search and Rescue Manual Volume III, (IAMSAR Vol III), Section 4. Particular care should be taken to ensure that alerts and messages sent by DSC, radio-telephony and satellite communications are given an appropriate priority.

In addition, it is important for the OOW to ensure that:

- During a distress, a qualified operator is designated as being responsible for radio communications....

Every precaution should be taken to avoid false distress alerts being sent.

**IMO/ICAO: International aeronautical and maritime search and rescue manual (IAMSAR) Vol III**

## Section 2 On Distress alerts and messages

### Methods of alert - Distress alert from a vessel

Use any of the Global Maritime Distress and Safety System (GMDSS) equipment to transmit a distress alert:

- Inmarsat distress call
- VHF channel 16 (156.8 MHz FM)
- DSC on (VHF/MF or HF)
- EPIRB

Any distress transmissions on the frequency VHF channel 16, 2,182 kHz could be preceded by a digital selective call.

In remote oceans areas, the distress call should also be transmitted on a ship-to-shore HF circuit to a CRS, especially when distress calls on 2,182 kHz, or channel 16 are not replied to by other stations.

**TMSA KPI 11.1.1** requires that detailed vessel emergency response plans include initial notification procedures and cover all credible emergency scenarios.

Vessel emergency response plans are reviewed at least annually, to reflect changes in legislation, contact details, vessel equipment and changes in company procedures.

### IMO: ISM Code

7. The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks involved should be defined and assigned to qualified personnel.

### Inspection Guidance

The operator should have developed procedures for emergency communications which gave guidance on, and designated responsibility for distress communications in an emergency situation using the vessel's GMDSS equipment.

Instructions for the preparation and transmission of distress and urgency messages using the GMDSS equipment should be clearly displayed by the equipment.

### Suggested Inspector Actions

- Sight, and where necessary review, the company procedures for emergency communications using the GMDSS equipment.
- Review the entries in the GMDSS Radio Log Book and verify that distress, urgency and safety messages received had been recorded in accordance with company procedures.
- Interview the accompanying officer to assess their familiarity with the procedures for sending and receiving distress, urgency and safety messages using the GMDSS equipment.

### Expected Evidence

- The company procedures for emergency communications.
- The GMDSS Radio Log Book.
- International Aeronautical and Maritime Search and Rescue Manual (IAMSAR) Vol III.

### **Potential Grounds for a Negative Observation**

- There were no company procedures for emergency communications which gave guidance on, and designated responsibility for, distress communications in an emergency situation.
- A qualified GMDSS operator had not been designated in the emergency station bill as being responsible for radio communications in a distress.
- Instructions for the preparation and transmission of distress and urgency messages using the GMDSS equipment were not clearly displayed by the equipment.
- There was no copy of the International Aeronautical and Maritime Search and Rescue Manual Volume III, latest edition, (IAMSAR Vol III) available at the GMDSS radio station.
- The accompanying officer was unfamiliar with the:
  - Company procedures for emergency communications which gave guidance on distress communications in an emergency situation.
  - Requirements for GMDSS radio watchkeeping on their vessel.
  - Procedures for sending distress, urgency and safety messages contained in the International Aeronautical and Maritime Search and Rescue Manual Volume III, (IAMSAR Vol III), Section 4.
  - Process of preparing and transmitting distress and urgency messages using the GMDSS equipment.
  - The process for recording the details of distress, urgency and safety messages received.

#### **4.4.5. Were the Master and navigation officers familiar with the operation, testing and maintenance of the GMDSS VHF, MF and HF radio and satellite communications equipment and were records available to demonstrate the equipment was in good order?**

##### **Short Question Text**

Operation and testing of GMDSS station.

##### **Vessel Types**

Oil, Chemical, LPG, LNG

##### **ROVIG Sequence**

Bridge

##### **Publications**

ICS: Bridge Procedures Guide – Fifth Edition

IMO: ISM Code

IMO SOLAS

IMO: RESOLUTION A.702(17) Radio maintenance guidelines for the global maritime distress and safety system (GMDSS) related to sea areas A3 and A4

##### **Objective**

**To ensure effective communications in routine or emergency situations.**

##### **Industry Guidance**

##### **ICS: Bridge Procedures Guide. 5<sup>th</sup> Edition.**

##### **3.15.5 GMDSS Log keeping**

A GMDSS radio log should be kept in order to provide a record of all events connected with the radio communications facilities on board. As a minimum the following should be recorded:

- A summary of communications relating to distress, urgency and safety. This includes any period when a radio watch is discontinued and the reasons for doing so.
- The position of the ship at least daily
- The identities of other stations with which the ship communicates or attempts to communicate.
- Records of any difficulties experienced with communications.
- Incidents involving unnecessary transmissions with the identities of the stations concerned, if known; and
- Cancellation of any false alerts.

The requirement relating to the retention of radio logs are determined by the flag state and the ITU radio regulations and should be included in the SMS.

##### **3.15.6 Communications Equipment tests**

Radio equipment should be tested in accordance with the SMS (including flag state requirements) and the manufacturers' maintenance and operation manuals. Particular care should be taken to avoid the transmission of false/distress/urgency alerts when testing GMDSS equipment.

Daily, weekly and monthly radio tests should be recorded in the GMDSS radio log and demonstrate continued compliance with the functional requirements of SOLAS, and should include but not be limited to:

- Daily:
  - Function of DSC facilities (VHF, MF and HF) using built in test functions
  - Battery supplies to GMDSS equipment including charging condition



- Weekly:
  - Function of DSC facilities by way of a test call with a coastal station (if in range or at the earliest opportunity if out of range).
  - Reserve power supplies to GMDSS equipment other than batteries.
- Monthly:
  - Enhanced group calling (EGC) function.
  - Condition and security of batteries.
  - Condition of aerials and insulators.

**IMO: RESOLUTION A.702(17) Radio maintenance guidelines for the global maritime distress and safety system (GMDSS) related to sea areas A3 and A4**

**3 Shore-based maintenance for ensuring availability**

3.1 If availability is ensured by using a combination of methods which includes shore-based maintenance, an arrangement acceptable to the Administration should be established to ensure adequate support of the ship for the maintenance and repair of its radio installations. For example, the following arrangements, among others, may be suitable:

1. an agreement with a company known to cover the trading area of the ship to provide maintenance and repair facilities on a call-out basis.
2. provision of facilities at the main base of ships engaged on a regular trading pattern.

Records of Equipment (Form P, R or C) should include an indication of the types of arrangements for shore-based maintenance.

**TMSA KPI 5.1.4** requires that the company has procedures that ensure all navigational equipment is maintained as operational. Procedures include:

- Defect reporting.
- Suitably trained personnel to maintain navigational equipment or shore-based maintenance support.
- Provision of spares as appropriate.

**IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

**IMO: SOLAS**

**Chapter IV Regulation 2**

1 For the purpose of this chapter, the following terms shall have the meanings defined below:

.12 Sea area A1 means an area within the radiotelephone coverage of at least one VHF coast station in which continuous DSC alerting is available, as may be defined by a Contracting Government.

.13 Sea area A2 means an area, excluding sea area A1, within the radiotelephone coverage of at least one MF coast station in which continuous DSC alerting is available, as may be defined by a Contracting Government.

.14 Sea area A3 means an area, excluding sea areas A1 and A2, within the coverage of an INMARSAT geostationary satellite in which continuous alerting is available.

.15 Sea area A4 means an area outside sea areas A1, A2, and A3

## Chapter IV Regulation 13

### Sources of energy

1 There shall be available at all times, while the ship is at sea, a supply of electrical energy sufficient to operate the radio installations and to charge any batteries used as part of a reserve source or sources of energy for the radio installations.

2 A reserve source or sources of energy shall be provided on every ship, to supply radio installations, for the purpose of conducting distress and safety radio communications, in the event of failure of the ship's main and emergency sources of electrical power.

6 Where a reserve source of energy consists of a rechargeable accumulator battery or batteries:

1. a means of automatically charging such batteries shall be provided which shall be capable of recharging them to minimum capacity requirements within 10 hours; and
2. the capacity of the battery or batteries shall be checked, using an appropriate method, at intervals not exceeding 12 months, when the ship is not at sea.

## Chapter IV Regulation 15

### Maintenance requirements

5 The Administration shall ensure that radio equipment required by this chapter is maintained to provide the availability of the functional requirements specified in regulation 4 and to meet the recommended performance standards of such equipment.

6 On ships engaged on voyages in sea areas A1 and A2, the availability shall be ensured by using such methods as duplication of equipment, shore-based maintenance or at-sea electronic maintenance capability, or a combination of these, as may be approved by the Administration.

7 On ships engaged on voyages in sea areas A3 and A4, the availability shall be ensured by using a combination of at least two methods such as duplication of equipment, shore-based maintenance or at-sea electronic maintenance capability, as may be approved by the Administration, taking into account the recommendations of the Organization

8 While all reasonable steps shall be taken to maintain the equipment in efficient working order to ensure compliance with all the functional requirements specified in regulation 4, malfunction of the equipment for providing the general radiocommunications required by regulation 4.8 shall not be considered as making a ship unseaworthy or as a reason for delaying the ship in ports where repair facilities are not readily available, provided the ship is capable of performing all distress and safety functions.

### Inspection Guidance

The operator should have developed procedures for the operation, testing, maintenance and log keeping of the GMDSS VHF, MF and HF radio and satellite communications equipment. These should include the method chosen to ensure availability of GMDSS equipment at sea.

Details of equipment fitted can be found in the Record of Approved GMDSS Radio Installation.

SOLAS defines three methods to ensure availability of GMDSS equipment at sea.

- At sea electronic maintenance, requiring the carriage of a qualified radio/electronic officer and adequate spares and manuals.
- Duplication of certain equipment
- Shore based maintenance

Ships engaged on voyages in sea areas A1 and A2 are required to use at least one of the three maintenance methods outlined above, or a combination as may be approved by their administration. Ships engaged on voyages in sea areas A3 and A4 are required to use at least two of the methods outlined above.

In most cases, A3 ships carry duplicate equipment and use shore-based maintenance, A1 and A2 ships use shore-based maintenance only. The choice of using shore-based maintenance does not infer there should necessarily be a contract and/or agreement, but that maintenance should be carried out annually by a shore-based 'expert' organisation.

GMDSS equipment is required to be powered from three sources of supply:

- The ship's normal supply.
- The ship's emergency generator (if fitted)
- A dedicated radio battery supply.

The batteries must be charged by an automatic charger that is powered by the main and emergency generators.

The batteries are required to have the capacity to power the equipment for 1 hour on ships with an emergency generator, and 6 hours on ships not fitted with an emergency generator.

The capacity of the battery or batteries should be checked, using an appropriate method, annually. One method of checking the capacity of an accumulator battery is to fully discharge and recharge the battery, using normal operating current and period (e.g. 10 hours), when the ship is not at sea. (i.e. will not require the GMDSS equipment for watchkeeping purposes until the batteries are fully charged after the test)

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures for the operation, testing, maintenance and log keeping of the GMDSS VHF, MF and HF radio and satellite communications equipment.
- Inspect the:
  - GMDSS VHF, MF and HF radio and satellite communications equipment, including aerials and antennae.
  - GMDSS battery locker.
  - Emergency lighting for the radio station and verify that it is functioning.
- Review:
  - The GMDSS Radio Log Book.
  - A copy of the record of equipment for the cargo ship safety radio certificate Form R or Form C.
  - Any separate test and maintenance records for the GMDSS reserve batteries.
  - Any shore-based maintenance agreement for the GMDSS equipment.
- Interview the accompanying officer to verify their familiarity with:
  - Routine operation of the GMDSS VHF, MF and HF radio and satellite communications equipment.
  - Daily, weekly and monthly radio equipment tests.
  - GMDSS radio log keeping.
  - The chosen arrangement to ensure availability of GMDSS equipment at sea.

### **Expected Evidence**

- The company procedures for the operation, testing, maintenance and log keeping of the GMDSS VHF, MF and HF radio and satellite communications equipment.
- The GMDSS Radio Log Book.
- A copy of the record of equipment for the cargo ship safety radio certificate Form R or Form C.
- Test and maintenance records for the GMDSS reserve batteries.
- Any shore-based maintenance agreement for the GMDSS equipment.

### **Potential Grounds for a Negative Observation**

- There were no company procedures for the operation, testing, maintenance and log keeping of the GMDSS VHF, MF and HF radio and satellite communications equipment.
- The accompanying officer was unfamiliar with the operation of the GMDSS VHF, MF and HF radio and satellite communications equipment.
- The accompanying officer was unable to describe the daily, weekly and monthly radio tests required in accordance with the SMS (including flag state requirements) and the manufacturers' maintenance and operation manuals.
- There was no evidence that the required daily, weekly and monthly radio tests had been performed.
- The GMDSS reserve batteries were not charging correctly.
- There was no evidence that the capacity of the GMDSS reserve batteries had been tested within the last 12 months.
- The GMDSS reserve battery locker:
  - Contained damaged batteries.
  - Was not weather tight.
  - Was not properly ventilated.
  - Contained inappropriate material.
- Goggles, rubber gloves, a protective apron and an eye-wash bottle were not available in the GMDSS reserve battery locker where lead-acid/alkaline batteries were installed.
- The GMDSS Radio Log Book did not provide a record of all events connected with the radio communications facilities on board including:
- There was no evidence of a shore-based maintenance programme to ensure availability of the radio equipment where this was one of the documented maintenance choices for the vessel, or the certificate had expired.
- An item of the GMDSS VHF, MF and HF radio and satellite communications equipment was not operational or defective in any respect.
- A GMDSS printer was defective, printouts were unreadable or there were no paper rolls available.
- GMDSS equipment aerials or antennae were in poor condition, damaged or defective in any way.
- The emergency lighting for the radio station was not functioning.

**4.4.6. Were the Master, officers and crew aware of the potential danger of using radio or mobile telephone equipment during cargo and ballast handling operations and was there a sufficient number of intrinsically safe portable radios for use in operational areas?**

**Short Question Text**

Use of radio or mobile telephone equipment during cargo and ballast handling

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Bridge, Main Deck, Cargo Control Room

**Publications**

IMO: ISM Code

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

**Objective**

**To ensure a hazard is never created by the inappropriate use of radio or mobile telephone equipment during cargo or ballast operations.**

**Industry Guidance**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition**

**4.12.5 Mobile telephones and pagers**

Most mobile telephones and pagers are not intrinsically safe and are only considered safe for use in non-hazardous areas. They should be restricted to designated areas of the accommodation space where they are unlikely to interfere with the tanker's equipment. Mobile telephones should only be used on board a tanker or in the terminal as permitted by the applicable SMS. Details of restrictions on the use of mobile telephones should be prominently displayed at access locations.

Mobile telephones and pagers should be switched off when carried onto a tanker or into a terminal and only switched back on again in a non-hazardous area. The batteries can cause an incendive spark if they are damaged and then activated by a call. Intrinsically safe mobile phones and pagers are available, and these may be used in hazardous areas. They should be clearly identified as being intrinsically safe for all aspects of their operation. Terminal staff going on board a tanker, and tanker staff going into a terminal, should be able to prove their mobile telephones and pagers are intrinsically safe. Visitors to the tanker or terminal should not use mobile telephones or pagers unless prior permission has been received from the tanker or terminal, as appropriate.

**4.13.2 Ship's radio equipment**

The use of a tanker's radio equipment during cargo or ballast handling operations is potentially dangerous.

**4.13.2.1 Medium and high frequency radio transmissions**

Significant energy is radiated during medium and high frequency radio transmission (300KHz-30MHz). This energy can travel 500m from the transmitting antenna and can induce an electrical potential in unearthed equipment, e.g. cranes, derricks, rigging, mast stays, etc., that can produce an incendive spark. Transmissions can also cause arcing over the surface of antenna insulators when they have a surface coating of salt, dirt or water.

It is recommended:

- All cranes, derricks, rigging and mast stays should be earthed.

- Transmissions should not be allowed when flammable gas is likely in the region of the transmitting antenna or if the antenna comes within the terminal hazardous area.
- Main transmitting antennae should be earthed or isolated when the tanker is alongside the berth.

If the tanker's radio transmitter needs to be operated in port for servicing, the tanker and terminal should agree on procedures to ensure safety in the pre-transfer conference (see chapter 24). Precautions might include operating at low power or using a dummy antenna load to eliminate all radio transmissions to atmosphere. A safe system of work should be agreed and implemented before turning the equipment on.

#### 4.13.2.2 Very High Frequency/Ultra High Frequency equipment

Permanently and correctly installed VHF and UHF equipment is safe to use when the tanker is at the terminal, but it is recommended that the transmission is set to low power (one watt or less). The use of portable VHF/UHF radios in a terminal or on board presents no hazards if the equipment is certified and kept intrinsically safe and the power output is one watt or less.

The use of VHF/UHF radio equipment as a means of communication between the tanker and terminal personnel is recommended.

#### 4.13.2.3 Satellite communications equipment

Satellite communications equipment normally operates at 1.6GHz and the power generated is not enough to present an ignition hazard. Satellite communications equipment may be used to transmit and receive messages while a tanker is in port.

Long range Identification and Tracking (LRIT) systems are normally integrated into satellite communication systems and also do not present an ignition hazard.

#### 4.13.3 Tanker radar equipment

Radar sets, operating on 3cm and 10cm wavelengths, are designed with peak power output of 30kW. If they are properly sited, they do not present a radio ignition hazard due to induced currents.

Radar scanner motors are not rated for use in the hazardous areas but are usually positioned above terminal hazardous zones, apart from on smaller vessels. It is, therefore, safe to test radars when alongside. However, it is good practice to switch the radar off or place it on standby when alongside a terminal and to consult with the terminal before testing radar equipment during cargo operations.

#### 21.1.1 Communications equipment (*between the tanker and the terminal*)

Telephone and portable Very High Frequency/Ultra High Frequency (VHF/UHF) and radiotelephone systems should comply with the appropriate safety requirements.

The terminal is responsible for providing the means of communication, including a back-up system.

When dedicated telephones are used between the tanker and terminal, they should be continuously monitored by personnel on board and ashore, allowing immediate communication according to agreed procedures. Most mobile telephones and pagers are not intrinsically safe and are only considered safe for use in non-hazardous area (see section 4.12.5 on mobile telephones and pagers).

**TMSA KPI 6.2.1** requires that comprehensive procedure for planning cargo, ballast and bunkering operations is in place for all types of vessel within the fleet.

The planning procedure is specific to the vessel type and cargo to be carried. This may include:

- Ship/shore interface and communications.

## **IMO: ISM Code**

7. The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks involved should be defined and assigned to qualified personnel.

### **Inspection Guidance**

The operator should have developed procedures for the safe use of radio and telephone equipment during cargo and ballast handling operations, ensuring:

- While the vessel is at a terminal:
  - No MF/HF radio transmissions are made
  - Main transmitting antennae are earthed or isolated
  - Fixed VHF and UHF equipment is switched to low power (one watt or less).
  - Portable VHF or UHF radios have a power output of one watt or less.
  - Any damaged portable VHF or UHF radios are withdrawn from service and clearly marked as such.
  - Sufficient intrinsically safe VHF or UHF portable radios are provided to coordinate cargo, ballast and bunker handling operations.

In addition, procedures should ensure:

- Details of restrictions on the use of mobile telephones are prominently displayed at the gangway.
- Non-intrinsically safe mobile phones, including any provided by the terminal for ship/shore communications, are not used outside of the accommodation block.
- If the use of intrinsically safe mobile phones is allowed outside of the accommodation block, they are clearly identified, and proper certification is provided.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures for the safe use of radio and telephone equipment during cargo and ballast handling operations.
- During the course of the inspection, confirm:
  - Sufficient VHF or UHF portable radios in good working order were available to properly coordinate cargo, ballast and bunker handling operations.
  - Non-intrinsically safe mobile phones were not in use outside the accommodation block.
  - Main transmitting antennae were earthed or isolated during cargo and ballast handling operations and that no transmissions were being made for test or other purposes.
  - Fixed VHF and UHF equipment was switched to low power (one watt or less) during cargo and ballast handling operations, and that portable VHF or UHF radios in use had a power output of one watt or less.
  - Details of restrictions on the use of mobile telephones were prominently displayed at the gangway.
- If MF/HF radio or radar equipment was under repair/service, confirm this had been discussed at the pre-transfer conference and a safe system of work agreed.
- If the use of intrinsically safe mobile phones was allowed outside the accommodation block, verify any equipment observed in use was clearly marked as intrinsically safe and/or properly certificated.

### **Expected Evidence**

- The procedure for the safe use of radio and telephone equipment during cargo and ballast handling operations.
- Certification for any intrinsically safe mobile phones in use outside of the accommodation block.
- The inventory of intrinsically safe portable VHF/UHF radios used for cargo, ballast and bunker operations.

### **Potential Grounds for a Negative Observation**

- There were no company procedures for the safe use of radio and telephone equipment during cargo and ballast handling operations.
- The Master, an officer or a rating was unfamiliar with the company procedures for the safe use of radio and telephone equipment during cargo and ballast handling operations.
- There were insufficient intrinsically safe VHF or UHF portable radios available in good working order to properly coordinate cargo, ballast and bunker handling operations.
- MF/HF radio or radar equipment was under repair/service, but this had not been discussed at the pre-transfer conference and a safe system of work agreed.
- MF/HF radio transmissions were observed being made during cargo and ballast handling operations.
- Main transmitting antennae were not earthed or isolated during cargo and ballast handling operations.
- Fixed VHF and UHF equipment was not switched to low power (one watt or less) during cargo and ballast handling operations.
- Portable VHF or UHF radios in use had a power output of more than one watt.
- A damaged portable VHF or UHF radio was observed in use.
- Details of restrictions on the use of mobile telephones were not prominently displayed at the gangway.
- Non-intrinsically safe mobile phones were observed in use outside of the accommodation block.
- Where use of intrinsically safe mobile phones was permitted outside of the accommodation block, the equipment in use was not clearly marked or properly certified as being intrinsically safe.



## 4.5. DP & Shuttle Tanker Specialist Procedures and Equipment

### 4.5.1. Was the latest Annual DP Trial report available on board, were the Master and officers familiar with the contents, and had they taken part in onboard training and drills involving various DP scenarios?

#### Short Question Text

Annual DP Trial report and supporting exercises.

#### Vessel Types

Oil

#### ROV/Q Sequence

Bridge, Engine Control Room

#### Publications

IMCA M 117 Rev. 2 Guidelines for The Training and Experience of Key DP Personnel

IMO: ISM Code

IMO: MSC.1/Circ.1580 Guidelines for vessels and units with dynamic positioning (DP) systems

IMCA: M 190 Guidance for Developing and Conducting Annual DP Trials Programmes for DP Vessels. Rev 2.1

#### Objective

**To ensure that the vessel's DP system is fully operational, and that the vessel is fault tolerant according to the equipment class requirements.**

#### **Industry Guidance**

**IMCA: M 190 Guidance for Developing and Conducting Annual DP Trials Programmes for DP Vessels. Rev 2.1**

#### 4 Development of the DP Annual Trials Programme

Annual testing of the DP system, to demonstrate that the vessel remains fit for purpose for DP operations, may be conducted during an annual DP trial, incremental tests, or a combination of both. The DP annual trials programme might also provide for rolling tests that are not necessarily repeated on an annual basis. The approach to testing is to be clearly identified within the DP annual trials programme. Refer to the example matrix template of tests contained within Appendix 1.

#### 4.1 Difference Between an Annual DP Trial and an FMEA Proving Trial

The purpose of an FMEA proving trial is, as its name suggests, to prove the findings of the failure modes and effects analysis. Although an annual DP trial is closely related, the two trials have a different focus, and this will influence the types of tests included and the way they are carried out.

Tests performed on an annual basis focus on proving that the DP system is fully functional and well maintained and the redundancy concept remains intact. In addition to being a functional test of the DP system the tests, whilst not being of a destructive nature, should also seek to establish continued compliance of the system with respect to the worst case failure design intent (WCFDI) for its defined operating modes. FMEA proving trials generally focus on proving that the worst-case failure design intent is not exceeded and that failure effects are as expected. There may also be a greater degree of uncertainty regarding failure effects and the provision of alarms to indicate that the redundancy concept has been compromised. FMEA proving trials may include exploratory trials designed to provide clarity of assumptions made during the analysis or additional information about how the redundancy concept functions. Once the assumption or particular function of the redundancy concept has been verified, there may be no need to repeat those particular tests again. It should be noted that some tests during FMEA proving trials might be considered to be high risk to personnel and/or equipment.

#### 4.2 Responsibility for Developing the DP Annual Trials Programme

The vessel operator has overall responsibility to ensure that an effective DP annual trials programme is developed and implemented. The vessel operator is further responsible to ensure the competence and experience of vessel crew, persons, organisations and third parties developing, conducting and witnessing the trials.

## 5 Conduct of Annual DP Tests

### 5.1 Scheduling of Annual DP Tests

Guidelines for vessels and units with dynamic positioning systems (IMO MSC.1Circ.1580) states that annual DP tests should be carried out within three months before or after each anniversary date of the initial complete test of all systems and components. If, for example, major upgrades or conversions are carried out on a vessel or that a vessel has been reactivated following layup, all requiring a complete new FMEA proving trial, then the anniversary date may be adjusted to that date.

### 5.2 Independent Witnesses

Independent verification of testing intended to prove the integrity of systems where the consequences of failure can be severe is desirable.

The independent witnesses should be sufficiently removed from day to day operational control or responsibility for the DP system and vessel. They should also be familiar with the vessel or type of vessel and with the DP annual trials programme.

The degree of independence is a matter for the vessel operator and should be such that it provides confidence to all intended users of the Annual DP Trials Report that the results can be accepted without further verification or testing. Failure to provide users of the report with the necessary level of confidence may limit the acceptance of the document and lead to costly repetition of tests.

The independent witness should not carry out any of the tests themselves.

IMCA recommends that the independent witness is accredited according to the IMCA DP Practitioner Accreditation Scheme.

### 5.10 Generating Findings from Test Results

#### 5.10.1 Categorisation

Three categories of finding have been widely adopted and are often prefixed with a letter A, B or C. However, there is sometimes inconsistency in the categorisation of findings, and it is the intention of this document to give guidance in the categorisation of failure effects and the implications of 'findings' in each category.

##### 5.10.1.1 A – For Immediate Attention

A valid 'A' finding indicates that the vessel's DP system does not comply with requirements for the appropriate DP equipment class. Only regulatory bodies such as flag states have the authority to prevent a vessel from conducting any type of operation but an 'A' finding has serious implications as any client would likely be unwilling to allow the vessel to carry out DP operations until any 'A' findings are addressed. Naturally, this can have considerable financial consequences.

##### 5.10.1.2 B – For Action When Reasonably Convenient

A valid 'B' finding indicates a fault or failure that requires attention, but also recognises that the vessel's DP system does still comply with requirements for the appropriate DP equipment class.

##### 5.10.1.3 C – For Future Attention/Consideration

It needs to be recognised that findings in this category may be of a subjective nature and will by definition not relate to a clear breach of the relevant DP rules and guidelines. Category C findings may make reference to features, functions or practices which are generally expected by the industry while recognising that they are not an absolute requirement on the subject vessel. They may also refer to recent changes in industry guidelines or class rules which again may not apply to the subject vessel, but which may offer tangible benefits if applied to the vessel. Category C findings should only be made where they represent genuine added value and close out actions are reasonably achievable.

#### 5.10.2 Open Findings from the FMEA or Previous Annual DP Trials

As part of the assurance aspect of the DP annual trials programme, the findings of the FMEA and the previous annual DP trial should be reviewed.

If the vessel operator has an effective audit or non-conformity tracking system, then any findings arising from these sources should be documented with close out actions (even where the decision has been to take no action, along with the justification).

Any open items should be noted prior to commencing the current trials, particular care should be taken when performing incremental testing as part of the annual trials programme and the trials programme should ensure that the open item is either closed out or confirmed as a still open 'finding'. Such items which cannot be closed out should be included in the findings section of the updated annual DP trials report.

### 6 Format of the Annual DP Trials Report

#### 6.1 Description of Essential Information to be Included in the Final Report

When preparing the annual DP report, it is important to clearly identify the method used to conduct each test:

- Annual DP trial;
- Incremental test;
- Rolling test;
- Review of planned maintenance.

An example of an annual DP trials report is included at Appendix 1 to this document, but the general sections are briefly described below:

- Executive summary...
- Introduction...
- Vessel particulars...
- Conclusions – Statement that the trials showed compliance with the witnesses' interpretation of the relevant rules and guidelines, i.e., IMO, IMCA and class...
- Findings – Description of categories A, B and C. List of findings from the trials. Open findings carried forward from previous trials. Items that should be considered for updating the FMEA.

### **IMCA M 117 Rev. 2 Guidelines for The Training and Experience of Key DP Personnel**

#### Appendix 6

#### DP system emergency drills

##### Introduction

Emergency drill scenarios should be developed from the experience gained during the conduct of annual DP trials and FMEA reviews undertaken onboard the vessel. The annual trials and revised FMEA documents provide the background for specific vessel drills, and these should always be readily available for information and reference by

operational personnel. Drill scenarios can also be developed from DP station keeping events reported as part of the IMCA DP reporting scheme.

**TMSA KPI 5.1.2** requires that comprehensive procedures to ensure safe navigation are in place.

These procedures may include:

- Actions upon equipment failure.

## **IMO: ISM Code**

### 10. Maintenance of the Ship and Equipment

10.3 The Company should identify equipment and technical systems the sudden operational failure of which may result in hazardous situations. The SMS should provide for specific measures aimed at promoting the reliability of such equipment or systems. These measures should include the regular testing of stand-by arrangements and equipment or technical systems that are not in continuous use.

## **IMO: MSC.1/Circ.1580 Guidelines for vessels and units with dynamic positioning (DP) systems**

### 4 Operational requirements

4.6 The following checklists, test procedures, trials and instructions should be incorporated into the vessel-specific DP operations manuals:

Annual tests and procedures.

### 5.1 Surveys and testing

5.1.1.3 An annual survey should be carried out within three months before or after each anniversary date of the Dynamic Positioning Verification Acceptance Document. The annual survey should ensure that the DP system has been maintained in accordance with applicable parts of the Guidelines and is in good working order. The annual test of all important systems and components should be carried out to document the ability of the DP vessel to keep position after single failures associated with the assigned equipment class and validate the FMEA and operations manual. The type of tests carried out and results should be recorded and kept on board.

5.1.3 These surveys and tests should be witnessed by officers of the Administration. The Administration may, however, entrust the surveys and testing either to surveyors nominated for the purpose or to organizations recognized by it. In every case, the Administration concerned should guarantee the completeness and efficiency of the surveys and testing. The Administration may entrust the company of the vessel to carry out annual and minor repair surveys according to a test programme accepted by the Administration.

## **Inspection Guidance**

The vessel operator should have developed procedures giving guidance on the performance of Annual DP Trials within +/- 3 months of the anniversary date of the original FMEA Proving Trials or following any modifications to the onboard DP Systems.

A copy of the Annual DP Trials report should be available on board. DP operators should be familiar with the procedures for conducting Annual DP Trials and the content of the report(s).

Onboard training and drills involving various DP scenarios, (ideally based on the experience gained from the Annual DP Trials), should be conducted, and records maintained.

## **Suggested Inspector Actions**

- Sight and review the latest annual DP Trial Report, including:
    - List of findings, and closeout actions.
    - Summary statement confirming the fitness of the vessel to carry out DP operations equivalent to its DP class.
    - Test sheets from the PMS if a rolling test program is utilised.
  - Sight and review previous Annual DP Trial reports.
  - Sight and review records of training and/or drills involving DP scenarios.
- 
- Interview the accompanying officer to verify their familiarity with the annual DP trial procedures and the contents of the report.

#### **Expected Evidence**

- The latest Annual DP Trials report.
- If the Annual DP trials were being carried out as part of a rolling test programme over the year, test sheets and/or other documented evidence of compliance from the Planned Maintenance System.
- Previous Annual DP Trials reports.
- Records of training and/or drills involving DP scenarios.

#### **Potential Grounds for a Negative Observation**

- There were no company procedures giving guidance on the performance of Annual DP Trials.
- The latest DP Annual Trials report was not available on board.
- Previous Annual DP Trials reports were not available on board.
- The latest DP Annual Trials had not been carried out within three months before/after the anniversary date of the initial FMEA proving trial.
- The Annual DP Trials date had not been synchronised following a new FMEA proving trial conducted after a major upgrade or conversion.
- There was no evidence that the Annual DP Trials had been witnessed by a competent and independent third party.
- The Annual DP Trials were being carried out as part of a rolling test programme over the year as part of the planned maintenance system, but there was no documentary evidence to show that the test results were subject to independent scrutiny and approval.
- Where the Annual DP Trials were being carried out as part of a rolling test programme over the year as part of the planned maintenance system, test sheets for items tested were either incomplete, lacking detail or not signed off by the person carrying out the test.
- It could not be shown that following the Annual DP Trials, the listed category 'A' findings had been rectified.
- Findings from previous Annual DP Trials were found to be 'open' with no documented close out actions, and/or had not been recorded as deficiencies in the onboard SMS.
- The latest Annual DP Trials report did not contain a statement that the vessel was considered fit to carry out DP operations equivalent to its DP class.
- The latest Annual DP Trials report did not contain list of findings.
- There was no evidence that the Master and officers had taken part in onboard training and drills involving various DP scenarios.
- The accompanying officer was not familiar with the procedures for conducting Annual DP Trials and/or the content of the report(s).

#### **4.5.2. Were the Master and officers familiar with the company procedures for the use of Position Reference Systems (PRS), and was the equipment in satisfactory condition with sensor offset data readily available to the DPO?**

##### **Short Question Text**

DP Position Reference Systems

##### **Vessel Types**

Oil

##### **ROV/Q Sequence**

Bridge

##### **Publications**

IMCA: Guidelines on the Shared Use of Sensors for Survey and Positioning Purposes

IMO: ISM Code

OCIMF Guidelines for Offshore Tanker Operations

IMO: MSC.1/Circ.1580 Guidelines for vessels and units with dynamic positioning (DP) systems

##### **Objective**

**To ensure Position Reference Systems are in satisfactory condition with sensor offset data readily available to the DPO.**

##### **Industry Guidance**

##### **OCIMF Guidelines for Offshore Tanker Operations**

###### **6.6.8 Position Reference System**

It is recommended that in accordance with other critical DP operations, when a DP bow loading tanker is operating in auto DP mode, independent PRS operating on different principles are used. The following should be taken into account:

- The DP system should be equipped with a set of PRS, and sensors optimised for the location and contractual scope of work.
- It is recommended to have a minimum of three different PRS in use at any time while on DP offtake operation.
- Sensors and antennae should be located to reduce risk of interference and shadow zones.
- The DP system should be equipped with a minimum of two independent differential satellite positioning systems. The differential correction signals should be from different sources and have totally different signal paths.
- The use and interface of differential satellite positioning systems should be in accordance with latest IMCA guidance.

The field operations manuals and the DP bow loading tanker's operating guidelines should provide guidance on PRS at particular locations.

##### **IMCA: Guidelines on the Shared Use of Sensors for Survey and Positioning Purposes**

###### **6.3 Documentation**

Vessel equipment configuration and calibration records should include as a minimum:

- sensor offsets including clear description of CRP (common reference point) or CoG (centre of gravity), and sign convention;

- records of system or sensor changes with dates;

**TMSA KPI 5.1.2** requires that comprehensive procedures to ensure safe navigation are in place.

These procedures may include:

- Electronic aids to navigation including ARPA, AIS and ECDIS.

#### **IMO: ISM Code**

7. The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks involved should be defined and assigned to qualified personnel.

#### **IMO: MSC.1/Circ.1580 Guidelines for vessels and units with dynamic positioning (DP) systems**

##### **3.4.3 Position reference systems**

1. Position reference systems should be selected with due consideration to operational requirements, both with regard to restrictions caused by the manner of deployment and expected performance in working situations.
2. For equipment class 1, at least two independent position reference systems should be installed and simultaneously available to the DP control system during operation.
3. For equipment classes 2 and 3, at least three independent position reference systems should be installed and simultaneously available to the DP control system during operation.
4. When two or more position reference systems are required, they should not all be of the same type, but based on different principles and suitable for the operating conditions.
5. The position reference systems should produce data with adequate accuracy and repeatability for the intended DP operation.
6. The performance of position reference systems should be monitored, and warnings should be provided when the signals from the position reference systems are either incorrect or substantially degraded.
7. For equipment class 3, at least one of the position reference systems should be connected directly to the backup control system and separated by an A-60 class division from the other position reference systems.

#### **Inspection Guidance**

- The vessel operator should have developed procedures for the use of Position Reference Systems during DP operations at each offtake location and/or the procedure should reference procedures provided by the field operator.
- There should be a minimum of three different, operational, Position Reference Systems (PRS) available to the DP operator during an offtake operation.
- Controls for PRS should be accessible within easy reach of the DP control station.
- PRS sensor offsets including a clear description of the common reference point and sign convention should be adequately filed and readily available to DPOs. All offset measurements for transducers, GNSS antenna, scanner heads, taut wire gimbals etc. should be measured relative to the common reference point. This data should be updated after any change to sensor location on board.
- These procedures may form part of the vessel-specific DP operations manuals and/or field operations manuals.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, company procedures for the use of Position Reference Systems during DP operations at each offtake location.
- Sight and where necessary review, the sensor offset data file.
- Review the DP logbook and data log for any indication of PRS faults.
- Inspect the PRS equipment recognising that it might not be possible to run or demonstrate while alongside a terminal.

### **Expected Evidence**

- Company procedures for the use of Position Reference Systems during DP operations at each offtake location.
- Sensor offset data file.
- DP logbook.
- DP data log.

### **Potential Grounds for a Negative Observation**

- There were no company procedures for the use of Position Reference Systems during DP operations at each offtake location.
- The accompanying officer was not familiar with the company procedures for the use of Position Reference Systems during DP operations at each offtake location.
- One or more of the PRS was not in satisfactory operational condition.
- On a DP2 or DP3 vessel, fewer than three different, operational, Position Reference Systems (PRS) had been available to the DP operator during an offtake operation.
- The DP system was not equipped with a minimum of two independent differential satellite positioning systems.
- Controls for PRS were not accessible within easy reach of the DP control station.
- PRS sensor offsets were not adequately filed and readily available to DPOs.



#### **4.5.3. Were the Master and officers familiar with the company procedures for reporting and recording DP events and incidents, and were all DP parameters being logged and recorded?**

##### **Short Question Text**

DP events and incidents

##### **Vessel Types**

Oil

##### **ROVIQ Sequence**

Documentation, Bridge

##### **Publications**

IMO: ISM Code

Norwegian Oil and Gas recommended guidelines for offshore loading shuttle tankers Guideline No. 140

OCIMF Guidelines for Offshore Tanker Operations

OCIMF: Dynamic Positioning Failure Mode Effect Analysis Assurance Framework Risk-based Guidance 1st Ed 2020

IMCA: The Design and Operation of DP Vessels IMCA M 103 Rev. 5 June 2021

##### **Objective**

**To ensure DP events and incidents are recorded, reported and investigated, and lessons learnt from incidents used to increase industry safety standards.**

##### **Industry Guidance**

**OCIMF: Dynamic Positioning Failure Mode Effect Analysis Assurance Framework Risk-based Guidance 1st Ed 2020**

##### **2.1 Introduction**

Codes, standards and practices applied to DP vessels are based on redundancy to ensure that no single failure leads to a loss of position and/or heading, for vessels assigned DP Equipment Classes 2 and 3. Loss of Position (LOP) incidents occur when the DP redundancy concept is defeated. Investigations have revealed that common points between redundant equipment groups are significant causal and contributory factors.

##### **OCIMF Guidelines for Offshore Tanker Operations**

10.9 Primary field risk management methodology: field operator and offtake tanker technical operator interface

A field operator's SMS should ensure that:

- Field managers, offtake tanker technical managers and key offshore terminal and tanker personnel are given the opportunity to learn from previous experiences. A process should be in place to ensure open communication and information sharing about incidents and near misses.

##### **Norwegian Oil and Gas recommended guidelines for offshore loading shuttle tankers Guideline No. 140**

10.6 Incident reports, investigations, and industrial experience transfer

The OLST (Offshore Loading Shuttle Tanker) owner or operator should have a DP incident reporting system for reporting in accordance with IMCA M 103, latest edition.

A PMS data logger should be provided as a part of the DP system. Recorded data should be electronically stored and made available for Charterer(s) or field operator(s) on request.

DP related events and incidents should be investigated, and reports should be made available to Charterer(s) or field operator(s). The OLST owner or operator should identify a qualified individual within its management structure with responsibility for DP incident and occurrence investigation and closeout.

The OLST owner or operator should be member of IMCA and actively participate in IMCA's performance and improvement schemes. The OLST owners or operators should have in place a system for experience transfer of operational knowledge.

#### E.8 Independent position monitoring and logging system

The OLST should have an independent Position Monitoring System data logger unit (Parker or equivalent) fitted for real-time data acquisition, calculation, logging and displaying designed to monitor DP controlled offshore loading.

When in loading phase, the system should give an alarm (both audible and visual) if calculated speed ahead is higher than a pre-set limit. All data from the independent position monitoring system should be made available to field operator(s) in the event of incident investigations. Crude oil flow-monitoring should also be displayed and logged via this system.

The data should be stored for a period of minimum 1 year.

#### **IMCA: The Design and Operation of DP Vessels IMCA M 103 Rev. 4 January 2019**

##### 3.3.2 Recommended Documentation

The documents in Table 2 should be kept on board and in addition, where feasible, at the shore-based centres of technical and operational management. Where a periodicity for document storage is recommended, this is not to be taken as superseding any applicable regulatory requirements for the minimum storage period for such documents.

10. DP incident reports – Records of all DP station keeping and other DP related incidents, including investigation records and close outs should be retained on board permanently.

14. DP fault log – Records of all faults related to the DP system should be retained on board permanently.

15. Data logging – Records should be retained on board for the period set by the owner/operator and, where relating to a DP incident, permanently stored.

#### Appendix 19 DP Station Keeping Event Reporting

##### 2016 Review

The review concluded that the scheme should have a maximum of three well defined categories and, so as to encourage the reporting of all events, not just incidents, the scheme would be renamed 'The IMCA DP station keeping event reporting scheme'.

The three categories are listed below:

- DP incident – A major system failure or human factor which has resulted in total loss of DP capability;
- DP undesired event – A system failure or human factor which has caused a loss of redundancy and/or compromised DP capability;
- DP observation – An event that has not resulted in a loss of redundancy or compromised DP operational capability but is still deemed worthy of reporting.

**TMSA KPI 8.1.1** requires that procedures ensure prompt reporting and investigation of incidents and significant near misses. Procedures may include:

- Clear definitions of reportable incidents and significant near misses.
- Person/department responsible for investigation.
- Description of the investigation process.

#### **IMO: ISM Code**

9.1 The SMS should include procedures ensuring that non-conformities, accidents and hazardous situations are reported to the Company, investigated and analysed with the objective of improving safety and pollution prevention.

#### **Inspection Guidance**

The vessel operator should have developed procedures for recording, reporting and investigating DP related incidents, undesired events and observations:

- DP incidents – A major system failure or human factor which has resulted in total loss of DP capability.
- DP undesired events – A system failure or human factor which has caused a loss of redundancy and/or compromised DP capability.
- DP observations – An event that has not resulted in a loss of redundancy or compromised DP operational capability but is still deemed worthy of reporting.

If an independent data logger unit that records all DP parameters is not fitted, procedures should ensure relevant data is secured in the event of a DP incident.

Reports can be made either according to the vessel's ISM system or via the method set out in IMCA M 103, latest revision.

The procedures should include a system to actively transfer industry experience and operational knowledge gained from DP related incidents, undesired events and observations.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures for recording, reporting and investigating DP related incidents, undesired events and observations.
- Sight and review:
  - Records of DP related incidents, undesired events and observations.
  - Independent data logger records, if readily accessible.
  - DP fault log.
- Inspect the independent data logger.
- Interview the accompanying officer to verify their familiarity with the company procedures for recording, reporting and investigating DP related incidents, undesired events and observations.

#### **Expected Evidence**

- Company procedures for recording, reporting and investigating DP related incidents, undesired events and observations.
- Records of DP related incidents, undesired events and observations.
- Independent data logger records.
- DP fault log.

#### **Potential Grounds for a Negative Observation**

- There were no company procedures for recording, reporting and investigating DP related incidents, undesired events and observations.
- DP related incidents, undesired events and observations had not been reported according to the vessel's ISM system or via the method set out in IMCA M 103, latest revision.
- DP related incident, undesired event and observation reports had not been retained on board.
- An investigation into a DP related incident, undesired event or observation had not been closed out within a reasonable time frame.
- Records of faults related to the DP system had not been retained on board.
- The vessel was provided with an independent data logger that recorded all DP parameters; however, data was not being retained on board for a minimum of 1 year.
- The vessel was not provided with an independent data logger unit that recorded all DP parameters, and procedures did not ensure relevant data would be secured in the event of a DP incident.
- The independent data logger was defective in any respect.
- The company procedures did not include a system to actively transfer industry experience and operational knowledge gained from DP related incidents, undesired events and observations.
- The accompanying officer was not familiar with the company procedures for recording, reporting and investigating DP related incidents, undesired events and observations.

**4.5.4. Was the vessel provided with a comprehensive DP operations manual and were the Master and officers familiar with its contents, including DP checklists, capability plots, consequence analysis and activity specific operating guidelines (ASOG)?**

**Short Question Text**

DP operations manual

**Vessel Types**

Oil

**ROV/Q Sequence**

Bridge

**Publications**

IMO: ISM Code

IMO: MSC.1/Circ.1580 Guidelines for vessels and units with dynamic positioning (DP) systems

IMCA: The Design and Operation of DP Vessels IMCA M 103 Rev. 5 June 2021

**Objective**

**To ensure the Master and officers are provided with comprehensive procedures for conducting DP operations.**

**Industry Guidance**

**IMCA: The Design and Operation of DP Vessels IMCA M 103 Rev. 4 January 2019**

**3.3.2 Recommended Documentation**

4. DP Capability Plots - These should be hard copy plots of the vessel's calculated capability to maintain position in various operational scenarios. They should be readily available at the DP control location.

9. DP Operations Manual - Vessel-specific DP operations manual, to be readily accessible at the DP control location. It is recommended that owner/operators develop a standardised DP operations manual table of contents for vessels in their fleet based on the requirements of section 4.6 of IMO MSC.1/Circ 1580. Modifications and amendments to the DP operations manual should be subject to MoC processes.

**3.6 DP Capability Analysis and DP Footprints**

**3.6.1 DP Capability Analysis**

Detailed explanation and description of DP capability analysis are given in Specification for DP capability plots (IMCA M 140).

The calculated station keeping capabilities which are provided by the DP capability analysis should be supplemented by real time measurements and observations. These real time observations and measurements are used to develop DP footprint plots.

DP footprint plots measure the vessel's real station keeping performance (accuracy) in specific equipment configurators and environmental conditions. They determine the vessel's actual position keeping ability in various thruster configurations and environmental conditions and can be used for comparison with DP capability plots.

**TMSA KPI 5.1.2** requires that comprehensive procedures to ensure safe navigation are in place.

These procedures may include:

- Actions upon equipment failure.
- Actions upon encountering adverse weather...
- Supporting checklists.

#### **IMO: ISM Code**

7. The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks involved should be defined and assigned to qualified personnel.

#### **IMO: MSC.1/Circ.1580 Guidelines for vessels and units with dynamic positioning (DP) systems**

##### **3.4 DP control system**

##### **3.4.2 Computers**

4 For equipment classes 2 and 3, the DP control system should include a software function, normally known as "consequence analysis", which continuously verifies that the vessel will remain in position even if the worst-case failure occurs. This analysis should verify that the thrusters, propellers and rudders (if included under DP control) that remain in operation after the worst-case failure can generate the same resultant thruster force and moment as required before the failure. The consequence analysis should provide an alarm if the occurrence of a worst-case failure were to lead to a loss of position and/or heading due to insufficient thrust for the prevailing environmental conditions (e.g., wind, waves, current, etc.). For operations which will take a long time to safely terminate, the consequence analysis should include a function which simulates the remaining thrust and power after the worst-case failure, based on input of the environmental conditions.

##### **4 Operational requirements**

4.5 DP capability polar plots should be produced to demonstrate position keeping capacity for fully operational and post worst-case single failure conditions. The capability plots should represent the environmental conditions in the area of operation and the mission-specific operational condition of the vessel.

4.6 The following checklists, test procedures, trials and instructions should be incorporated into the vessel-specific DP operations manuals:

1. location checklist;
2. watchkeeping checklist;
3. DP operating instructions;
4. annual tests and procedures;
5. initial and periodical (5-year) tests and procedures;
6. examples of tests and procedures after modifications and non-conformities;
7. blackout recovery procedure;
8. list of critical components;
9. examples of operating modes;
10. decision support tools such as ASOG; and
11. capability plots.

#### **Inspection Guidance**

The vessel operator should have developed comprehensive procedures for DP operations contained within a DP operations manual. Procedures should include:

- DP location checklists and watchkeeping checklists.
- DP operating instructions.
- Risk assessment reviews.
- Guidance on the use of:

- Capability plots.
  - DP footprints.
  - Consequence analysis.
- Activity specific operating guidelines (ASOG).

Activity specific operating guidelines should include, for example, direction on:

- The number of generators to be online.
- Increasing the power output of generators that are already online.
- Policy on standby generators.

Risk assessment reviews should reflect changes in operating locations, position reference sensors and/or Field Operations Manuals.

### **Suggested Inspector Actions**

- Sight and review:
  - DP operations manual.
  - Completed DP location checklists and watchkeeping checklists.
  - Hard copy capability plots.
  - DP footprint records.
  - DP operations risk assessments.
- Interview the accompanying officer to verify their familiarity with the contents of the DP operations manual, including:
  - Capability plots.
  - DP footprints.
  - Consequence analysis.
  - Activity specific operational guidelines (ASOG).

### **Expected Evidence**

- DP operations manual.
- Completed DP location checklists and watchkeeping checklists.
- Hard copy capability plots.
- DP footprint records.
- DP operations risk assessments.

### **Potential Grounds for a Negative Observation**

- There was no DP operations manual available on board.
- The DP operations manual was not vessel specific.
- The DP operations manual was not in a language that could be understood by the DP operators.
- Procedures in the DP operations manual did not include:
  - DP location checklists and watchkeeping checklists.
  - DP operating instructions.
  - Risk assessment reviews.
  - Guidance on the use of:
    - Capability plots.
    - DP footprints.
    - Consequence analysis.
  - Activity specific operating guidelines.
- The accompanying officer was not familiar with the contents of the DP operations manual, including capability plots, DP footprints, consequence analysis and activity specific operational guidelines (ASOG).

- DP location checklists and watchkeeping checklists had not been completed as required.
- There were no risk assessments for specific DP operations/locations.
- The DP operations manual was not readily accessible at the DP control station.
- On a DP2 or DP3 vessel, the DP control system did not include 'consequence analysis' software.
- Following a failure of a DP component, a risk assessment had not been completed prior to resuming operations.
- DP capability plots were not readily available at the DP control location.
- Hard copies of the DP capability plots were not available.
- DP footprint plots were not available for comparison of the vessels actual position keeping ability compared with DP capability plots.



**4.5.5. Were up to date Field Operations Manuals on board for each offshore terminal to which the vessel trades, were the Master and officers familiar with their content, and were records available of the regular communication checks with terminal installations as required by Field Specific Operating Guidelines (FSOG)?**

**Short Question Text**

Field Operations Manuals

**Vessel Types**

Oil

**ROVIQ Sequence**

Bridge

**Publications**

OCIMF Guidelines for Offshore Tanker Operations

IMO: ISM Code

**Objective**

**To ensure the Master and officers are aware of the procedures and regulations at each offshore terminal to which the vessel trades, and that regular communications are established as required by Field Specific Operating Guidelines (FSOG).**

**Industry Guidance**

**OCIMF Guidelines for Offshore Tanker Operations**

**8.21.5 Field operations manual**

Field-specific operations manuals can provide the main procedures controlling cargo transfer operations across the field. Such manuals can address all terminals within a field or location and can incorporate both field operations procedures and regulations information. The field operations manual should include the following information:

- A summary of field position, field layout and offshore terminal information including plans of cargo transfer configurations and appropriate photographs, contact numbers, call signs and communications channels for both operational and emergency use.
- Description of cargo transfer equipment on each offshore terminal.
- Step by step plan covering the entire operation in-field.
- Description of standard and occasional joint operations including cargo transfer rates, line flushing, etc.
- Particulars of all tankers nominated for regular cargo transfer operations at that field.
- Tendering and accepting Notice of Readiness (NOR) and any special requirements for cargo quality, bills of lading and cargo calculations.
- Speed reduction sequence and limits on approaching offshore terminal.
- Operational limits and executive actions on exceeding limits.
- ESD systems and executive actions at each ESD level, both for the offshore terminal ESD system and any joint cargo transfer ESD system.
- Detailed checklists for the offshore terminal covering each stage of pre-transfer activities, monitoring and preparations for conventional tanker approach, hose and hawser connection, cargo transfer, conventional tanker disconnection and post transfer checking of systems and equipment.
- Detailed checklists for each type of conventional tanker covering field-specific actions and requirements not covered by the conventional tanker's own detailed checklists.
- Emergency responsibilities and procedures. This section of the field operations manual should be prepared jointly between the field management team responsible for running the terminal and offtake tanker's technical operators to ensure that there are no gaps or overlaps in cover. Some field managers may address emergency procedures by a separate bridging document or emergency response manual.

- A short synopsis describing key requirements and where to find more detailed information on each topic within the manual. This overview may be used by conventional tanker Masters to quickly obtain key information on the offshore terminal and cargo transfer operations.
- A station keeping sector limits diagram giving key operational and station keeping limits and key communications channels. This information may be on a single sheet suitable for posting on the conventional tanker bridge for immediate information.
- FSOG which list the reporting requirements for the field.
- References to the ISPS Security Plan and promulgation of security level for each terminal.

#### 8.21.6 Field Specific Operating Guidelines

FSOG help to ensure effective interaction between the offshore terminal and conventional tanker.

Development of the FSOG should be undertaken by the offshore terminal operator. Ownership of the FSOG lies with the offshore terminal and demonstrates specific requirements for cargo transfers at that field. The FSOG should be included in the field operations manual.

#### 9.3.2 Communications

As with conventional tankers, for most marine related operations, the primary means of communication between terminal, DP bow loading tanker and other vessels will be UHF or VHF radio. UHF radio is recommended as the means of communication between offshore terminals, offtake tankers and support vessels. Private UHF channels are subject to less interference than public VHF channels. VHF signals can be blocked by the large amount of steel on F(P)SOs. Other systems used at offshore fields, e.g., trunking radio systems, can be used if the terminal provides the offtake tanker with a portable station.

#### 9.7 Pre-transfer conference

On completion of mooring and hose connection, the F(P)SO OIM or CRO and the DP bow loading tanker Master must agree cargo transfer procedures by radio and confirm any email document transfers before starting the cargo transfer. Pre-transfer conference documentation should include:

- Communications methods and procedures, including periodic prescribed communications checks.

**TMSA KPI 1A.2.3** requires that relevant reference documents are provided as a supplement to the SMS both onboard and ashore. Reference documents may include regulatory publications and industry guidelines. The company has a procedure for maintaining the most up-to-date editions in all locations.

#### IMO: ISM Code

11.1 The Company should establish and maintain procedures to control all documents and data which are relevant to the SMS.

11.2 The Company should ensure that:

1. valid documents are available at all relevant locations;
2. changes to documents are reviewed and approved by authorized personnel; and
3. obsolete documents are promptly removed.

#### Inspection Guidance

The vessel operator should have developed procedures to ensure that the most up-to-date editions of the field operations manuals are on board for each offshore terminal to which the vessel trades. The Master and officers should be familiar with the content of these manuals, including Field Specific Operating Guidelines (FSOG) and contact numbers, call signs and communications channels for both operational and emergency use.

Records of the regular communication checks with terminal installations as required by FSOG should be maintained.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures to ensure that the most up-to-date editions of the field operations manuals are on board for each offshore terminal to which the vessel trades.
  - Sight the field operations manuals for each offshore terminal to which the vessel trades.
  - Sight the records of the regular communication checks with terminal installations as required by Field Specific Operating Guidelines (FSOG).
- 
- Interview the accompanying officer to verify their familiarity with the content of the manuals, including FSOG and contact numbers, call signs and communications channels for both operational and emergency use.

#### **Expected Evidence**

- Company procedures to ensure that the most up-to-date editions of the field operations manuals are on board for each offshore terminal to which the vessel trades.
- Field operations manuals for each offshore terminal to which the vessel trades.
- Records of the regular communication checks with terminal installations as required by Field Specific Operating Guidelines (FSOG).

#### **Potential Grounds for a Negative Observation**

- There were no company procedures to ensure that the most up-to-date editions of the field operations manuals for each offshore terminal to which the vessel trades are available on board.
- There was no field operations manual available on board for an offshore terminal to which the vessel trades.
- The accompanying officer was not familiar with the procedure for verifying that the field operation manual in use was the latest edition.
- The accompanying officer was not familiar with the content of the field operation manual, including Field Specific Operating Guidelines (FSOG) and contact numbers, call signs and communications channels for both operational and emergency use, for the last offshore terminal visited.
- There were no records of the regular communication checks with terminal installations as required by FSOG at the last offshore terminal visited.

## 5. Safety Management

### 5.1. Emergency Response Plans and Drills

**5.1.1. Were the Master and officers familiar with the onboard emergency response plans, and were records available to demonstrate that all mandatory and company defined emergency drills had been completed and documented as required by company procedures?**

**Short Question Text**

Records of mandatory and company defined emergency drills

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation, Bridge, Cargo Control Room

**Publications**

IMO: ISM Code

IMO Resolution A.1072(28) Revised guidelines for a structure of an integrated system of contingency planning for shipboard emergencies.

**Objective**

**To ensure that vessel staff can manage onboard emergencies through a consistent and structured process.**

**Industry Guidance**

**IMO Resolution A.1072(28)** Revised Guidelines for the Structure of an Integrated System of Contingency Planning for Shipboard Emergencies

2.1.1 The integrated system of shipboard emergency plans (hereinafter referred to as the "system") should provide a framework for the many individual contingency plans (hereinafter referred to as the "plans"), tailored for a variety of potential emergencies, for a uniform and modular designed structure.

2.1.2 Use of a modular designed structure will provide a quickly visible and logically sequenced source of information and priorities, which can reduce error and oversight during emergency situations.

**TMSA KPI 11.1.1** requires that detailed vessel emergency response plans include initial notification procedures and cover all credible emergency scenarios.

Vessel emergency response plans are reviewed at least annually, to reflect changes in legislation, contact details, vessel equipment and changes in company procedures.

They are additionally reviewed following any incident or drill where the emergency response plans have been used.

**IMO: ISM Code**

8.1 The company should identify potential emergency shipboard situations and establish procedures to respond to them.

8.2 The company should establish programmes for drills and exercises to prepare for emergency actions.

**Inspection Guidance**

The vessel operator should have:

- Identified all credible emergency scenarios for each vessel type under its management.
- Developed onboard contingency plans for each credible emergency scenario applicable to the ship type.
- Identified the frequency that each contingency plan is required to be subject to an onboard emergency response drill as required under the provisions of ISM, SOLAS, MARPOL, IGC, IGF or ISPS.
- Developed a procedure to instruct the vessel when to conduct drills, how to record the details of a drill, and what to do if a drill could not be completed within the required time frame.
- Developed a consistent procedure to record the details of drills completed onboard which included, but was not necessarily limited to:
  - The contingency plan(s) used for a drill.
  - The drill scenario.
  - Any safety considerations for conducting the drill.
  - A summary of the drill activities.
  - The equipment used or demonstrated during the drill.
  - Any lessons learnt from the drill.
  - Any training requirements identified during the drill.
  - Any areas for improvement to the contingency plan identified during the drill (and communicated to the company).
  - Any supplementary information that must be attached to the drill record, such as, risk assessments, permits etc.
- Developed a system to track completed drills to ensure that all drills applicable to the vessel type had been completed as required by legislation or company procedure.

Onboard contingency plans and records of drills will depend on the vessel type, these may include but will not be limited to:

- Abandon ship (SOLAS Reg III/19)
- Man overboard (SOLAS reg III/19))
- Fire and explosion (SOLAS Reg III/19)
- Failure of steering gear (SOLAS Reg V/26)
- Emergency towing (ISM 8.1)
- Rescue from enclosed spaces (SOLAS Reg III/19)
- Recovery of persons from the water (SOLAS Reg III/17-1)
- Terrorism or piracy (ISPS Reg A/13.4)
- Oil or NLS spills (MARPOL Annex I/5 Reg 37 & Annex II/7 Reg 17)
- Hazardous cargo reaction (ISM 8.1)
- Hazardous vapour release (ISM 8.1)
- Hazardous cargo gas release (ISM 8.1)
- Release of LNG as fuel from an oil/chemical tanker (IGF Reg 17)
- Hull failure (ISM 8.1)
- Excessive list (ISM 8.1)
- Containment system failure (IGC 18.7.1)
- Main engine failure (ISM 8.1)
- Failure of electrical power (ISM 8.1)
- Other critical machinery failures (ISM 8.1)
- Collision (ISM 8.1)
- Grounding (ISM 8.1)
- Flooding (ISM 8.1)
- Heavy weather damage (ISM 8.1)
- Treatment of serious injury (ISM 8.1)
- Helicopter operations for medical evacuation (ISM 8.1)
- Emergency assistance to another vessel

An emergency shipboard situation may involve following a number of these contingencies simultaneously. To avoid confusion and duplication of effort, the company will have developed a coherent system of shipboard emergency

plans to include all identified emergency scenarios which integrate ship and shore response. This system may be based upon an existing SOPEP or SMPEP.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure which defined:
  - The requirement to conduct emergency response drills.
  - The requirement to record the outcome of an emergency response drill in a consistent manner.
  - The requirement to track the completion of completed drills to ensure that mandatory and company required drills were completed within the required time frame.
  - The actions to take if a drill could not be completed within the required timeframe.
- Review the records of completed onboard emergency response drills and verify that each required drill had been completed within the timeframe defined by the drill schedule.

This question is designed to gain an overview of the drills required to be conducted onboard and the process for recording the planning and outcome from drills. Supplementary rotational questions will be assigned to investigate the conduct of drills in detail.

### **Expected Evidence**

- The company procedures which defined the requirements to conduct onboard emergency response drills, record the outcome and track drills to ensure completion within the defined time frame.
- The vessel's system of shipboard emergency contingency plans.
- The tracking records for completed onboard emergency response drills.
- Where a drill had not been completed within the defined time frame, communications with the company describing the reasons for deferment.

### **Potential Grounds for a Negative Observation**

- There was no company procedure which defined the requirements to conduct onboard emergency response drills, record the outcome and track drills to ensure completion within the defined time frame.
- There was no uniform system of shipboard emergency contingency plans available.
- There was no requirement to record the details of a drill which included:
  - The contingency plan(s) used for a drill.
  - The drill scenario.
  - Any safety considerations for conducting the drill.
  - A summary of the drill activities.
  - The equipment used or demonstrated during the drill.
  - Any lessons learnt from the drill.
  - Any training requirements identified during the drill.
  - Any areas for improvement to the contingency plan identified during the drill (and communicated to the company).
  - Any supplementary information that must be attached to the drill record, such as, risk assessments, permits etc.
- The accompanying officer was unfamiliar with the system of shipboard emergency contingency plans.
- The accompanying officer was unfamiliar with the company procedure for conducting drills, recording the details of drills and what to do if a drill could not be completed within the required due date.
- There was no schedule of emergency response drills required to be conducted on board to test the shipboard contingency plans.
- The schedule of drills was not aligned with the requirements of ISM, SOLAS, MARPOL, IGC, IGF or ISPS.
- Drills were overdue for completion.

- Where a drill had been deferred due to poor weather or sea conditions and, the vessel operator had acknowledged the vessel's notification of a postponement, record as a **comment** in the Process response tool.

**5.1.2. Were the Master and officers familiar with the shipboard emergency plans for the principal fire scenarios for the vessel type, and had drills taken place to test the effectiveness of the plans in accordance with the company procedures?**

**Short Question Text**

Emergency plans & drills for principal fire scenarios

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation, Bridge, Cargo Control Room

**Publications**

ICS: Bridge Procedures Guide – Fifth Edition

OCIMF/ICS: Peril at Sea and Salvage – A Guide for Masters. Sixth Edition.

IMO: ISM Code

IMO SOLAS

IMO Resolution A.1072(28) Revised guidelines for a structure of an integrated system of contingency planning for shipboard emergencies.

**Objective**

**To ensure that the crew will respond to a fire situation in accordance with the vessel's shipboard emergency response plans.**

**Industry Guidance**

**ICS: Bridge Procedures Guide.** Fifth Edition.

Checklist C7 Fire

**OCIMF/ICS: Peril at Sea and Salvage** – A Guide for Masters. Sixth Edition.

Chapter 3 Implementing the emergency response plan

3.1 General

Do what is necessary to manage the situation. Activate the most appropriate contingency plans in the SMS. Tailor decision making to the severity of the emergency by prioritising tasks and using resources where they are most effective. Use the ship's own resources where they will be most effective. Be realistic about what can be achieved before help arrives.

3.3.2 Assess a fire

When there is a fire/explosion, the Master should identify the location of the fire, the factors that will help contain it and any hazards close by that may feed the fire or cause it to spread.

**IMO Resolution A.1072(28)** Revised guidelines for a structure of an integrated system of contingency planning for shipboard emergencies.

3.2.4.12 In summary, the module should guide those responsible for developing the system on what should be included in emergency plans, namely:

1. Coordination of response effort.



2. Response procedures for the entire spectrum of possible accident scenarios, including methods that protect life, the marine environment and property.
3. The person or persons identified by title or name as being in charge of all response activities.
4. The communication lines used for ready contact with external response experts.
5. Information concerning the availability and location of response equipment.
6. Reporting and communication procedures on board ship.

**TMSA KPI 11.1.1** requires that detailed vessel emergency response plans include initial notification procedures and cover all credible emergency scenarios.

Vessel emergency response plans are reviewed at least annually, to reflect changes in legislation, contact details, vessel equipment and changes in company procedures.

They are additionally reviewed following any incident or drill where the emergency response plans have been used.

#### **IMO: ISM Code**

8.1 The company should identify potential emergency shipboard situations and establish procedures to respond to them.

8.2 The company should establish programmes for drills and exercises to prepare for emergency actions.

#### **IMO: SOLAS**

##### Chapter III Regulation 19

3.2 Every crew member shall participate in at least one abandon ship drill and one fire drill every month. The drills of the crew shall take place within 24 hours of the ship leaving a port if more than 25% of the crew have not participated in abandon ship and fire drills on board that particular ship in the previous month...

##### 3.5 Fire drills

3.5.1 Fire drills should be planned in such a way that due consideration is given to regular practice in the various emergencies that may occur depending on the type of ships and the cargo.

3.5.3 The equipment used during drills shall immediately be brought back to its fully operational condition and any faults and defects discovered during the drills shall be remedied as soon as possible.

#### **Inspection Guidance**

The vessel operator should have developed a shipboard emergency response plan for each of the principal fire scenarios which are appropriate to the vessel type, which should include, but will not necessarily be limited to:

- Fire on the cargo deck.
- Fire in a cargo tank.
- Fire in the main machinery space.
- Fire in the cargo pump room or compressor room.
- Fire in the accommodation.
- Fire in a store-room.
- Fire in the galley.

The plans should identify the steps that vessel staff must take immediately to bring the situation under control and, then in the short and medium-term, to address the dangers to personnel, the environment and property.

The vessel operator should have developed a procedure to:

- Require the vessel to conduct each type of emergency response drill applicable to the vessel at a defined frequency.
- Record the details of emergency response drills in a defined format.
- Define the action to take if a drill cannot be completed within the required timeframe.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the shipboard emergency response plans for the principal fire scenarios which were appropriate to the vessel type, which should include:
  - Fire on the cargo deck.
  - Fire in a cargo tank.
  - Fire in the main machinery space.
  - Fire in the cargo pump room or compressor room.
  - Fire in the accommodation.
  - Fire in a store-room.
  - Fire in the galley.
- Review the records of completed fire drills and verify that:
  - The required drills had been completed within the timeframe defined by the drill schedule.
  - The details of the drill had been recorded in the defined format required by the company procedure.
  - The date and time of the latest drill was consistent with the vessel's activities as recorded within the Bridge Log Book.
  - Each of the emergency response plans for fire scenarios applicable to the vessel type had been exercised within the previous six months.

### **Expected Evidence**

- The shipboard emergency response plans for the principal fire scenarios as applicable to the vessel type.
- The records for completed fire drills during the previous six months.
- The vessel's Bridge Log Book for the previous six months.
- Where a drill had been deferred due to poor weather or sea conditions, communications with the company relating to the deferment.

### **Potential Grounds for a Negative Observation**

- There was no shipboard emergency plan available for fire for one or more of the principal fire scenarios applicable to the vessel type.
  - The shipboard emergency plans for the principal fire scenarios were insufficiently ship-specific.
  - The accompanying officer was unfamiliar with the shipboard emergency plans for the principal fire scenarios applicable to the vessel.
  - The drill records were not maintained in the format defined by the company procedure.
  - The drill scenarios were unrealistic or inadequate to test the shipboard emergency plans for the principal fire scenarios applicable to the vessel type.
  - Drill dates were inconsistent with the vessel activities as recorded within the bridge Log Book.
  - One or more of the emergency response plans for the principal fire scenarios had not been exercised during a drill within the previous six months.
  - One or more emergency response drill for fire required by the company onboard emergency response procedure was overdue or had not been completed in accordance with the defined drill schedule.
  - A fire drill had not taken place within 24 hours of leaving port after a crew change that had resulted in more than 25% of the crew having not participated in a fire drill on that ship within the previous month.
- 
- Where a drill had been deferred due to poor weather or sea conditions and the vessel had notified the company, record as a **comment** within the Process response tool.

**5.1.3. Were the Master and officers familiar with the vessel's SOPEP or SMPEP, and had drills taken place to test the effectiveness of the onboard emergency response actions required by the Plan and company procedures?**

**Short Question Text**

Pollution prevention drills required by SOPEP or SMPEP

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Interview - Deck Officer, Documentation, Bridge, Cargo Control Room

**Publications**

IMO: ISM Code

IMO: MARPOL

IMO: Guidelines for the development of Shipboard Marine Pollution Emergency Plans. 2010 edition.

**Objective**

**To ensure that the crew will respond effectively to a spill situation in accordance with the vessel's Shipboard Oil Pollution Plan (SOPEP) or Shipboard Marine Pollution Emergency Plan (SMPEP).**

**Industry Guidance**

**IMO: Guidelines for the development of Shipboard Marine Pollution Emergency Plans. 2010 edition.**

As a minimum the Plan (i.e. SOPEP or SMPEP) should provide the Master with guidance to address the following:

2.5.2.1 Operational spills....

- Pipe leakage....
- Tank overflow....
- Hull leakage....

2.5.2.2 Spills resulting from casualties...

- Grounding
- Fire/explosion
- Collision with fixed or moving object
- Hull failure
- Excessive list
- Containment system failure
- Submerged/foundered
- Wrecked/stranded
- Hazardous vapour release

3.10 Plan testing: The Plan will be of little value if it is not made familiar to the personnel who will use it. Regular exercises will ensure that the Plan functions as expected and that the contacts and communications specified are accurate. Such exercises may be held in conjunction with other shipboard exercises and appropriately logged. Where ships carry response equipment, hands-on experience with it by crew members will greatly enhance safety and effectiveness in an emergency situation. Procedures for training and exercise may be defined.

**TMSA KPI 11.1.1** requires that detailed vessel emergency response plans include initial notification procedures and cover all credible emergency scenarios.

Vessel emergency response plans are reviewed at least annually, to reflect changes in legislation, contact details, vessel equipment and changes in company procedures.

They are additionally reviewed following any incident or drill where the emergency response plans have been used.

#### **IMO: ISM Code**

8.1 The company should identify potential emergency shipboard situations and establish procedures to respond to them.

8.2 The company should establish programmes for drills and exercises to prepare for emergency actions.

#### **IMO: MARPOL**

Annex 1 Chapter 5, Regulation 37 Shipboard oil pollution emergency plan (SOPEP).

1. Every oil tanker of 150 gross tonnage and above and every ship other than an oil tanker of 400 gross tonnage and above shall carry on board a shipboard oil pollution emergency plan approved by the Administration

Annex II Chapter 7, Regulation 17 Shipboard marine pollution emergency plan for noxious liquid substances (SMPEP)

1. Every ship of 150 gross tonnage and above certified to carry noxious liquid substances in bulk shall carry on board a shipboard marine pollution emergency plan for noxious liquid substances approved by the Administration
2. In the case of ships to which regulation 37 of Annex 1 of the Convention also applies, such a plan may be combined with the shipboard oil pollution emergency plan required under Regulation 37 of Annex 1. In this case, the title of such Plan shall be "Shipboard marine pollution emergency plan" (SMPEP).

#### **Inspection Guidance**

The vessel operator will have developed a SOPEP or SMPEP as appropriate. This may form the basis of an integrated system of contingency planning for all shipboard emergencies. The Master and officers should be familiar with the contents and be aware of their duties and responsibilities within the Plan.

The Plan should be kept up to date, including the list of National Operational Contact Points responsible for the receipt, transmission and processing of urgent reports on incidents involving harmful substances, including oil from ships to coastal states, which is available from the IMO website in the MSC-MEPC.6 Circular series. The official format of the circular is electronic and providing the file is readily accessible in an identified location need not be printed out in hard copy.

The vessel operator should require that a list of specific contact details should be prepared for each port visit and be displayed on the bridge and in the cargo control room. The list should at least contain contact details for the following:

- The DPA or the operator's emergency contact details.
- The port authorities.
- The vessel's P & I Club.
- The Agent.
- The national pollution reporting centre.
- Any additional contact details required by the USCG Vessel Response Plan when trading in US waters.

The vessel operator will have developed a procedure to:

- Require the vessel to conduct each type of spill response drill applicable to the vessel at a defined frequency.
- Require that the details of emergency response drills are recorded in a defined format.
- Define the action to take if a drill cannot be completed within the required timeframe.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the SOPEP or SMPEP.
- Sight the shipboard emergency response plans for operational cargo and bunker spills.
- Sight the list of specific contact details posted on the bridge or cargo control room.
- Review the records of completed spill response drills and verify that:
  - The latest drill had been completed within the timeframe defined by the drill schedule.
  - The details of the drill had been recorded in the defined format required by the company procedure.
  - The date and time of the latest drill was consistent with the vessel's activities as recorded within the Bridge Log Book.
- Interview an officer during the balance of the inspection and verify that they were familiar with their expected duties in the event of a spill incident.

#### **Expected Evidence**

- The vessel's SOPEP or SMPEP.
- The shipboard emergency response plans for defined spill situations, if not contained within the SOPEP or SMPEP.
- The list of specific contact details for the port of inspection.
- The records for completed spill emergency response drills.
- The vessel's Bridge Log Book for the previous twelve months.
- Where a drill had been deferred due to poor weather or sea conditions, communications with the company relating to the deferment.

#### **Potential Grounds for a Negative Observation**

- There was no SOPEP or SMPEP available.
- The SOPEP or SMPEP had not been maintained up to date with national operational contact points or any other information that may have become outdated over time or at change of management.
- The vessel had not prepared a list of specific contact details for the port of inspection.
- The accompanying officer was unfamiliar with the content of the vessel's SOPEP or SMPEP.
- An interviewed officer was unfamiliar with their duties during a spill incident.
- The drill scenarios were unrealistic or inadequate to test the Plan.
- The drill scenarios did not cover operational spills for both cargo and bunker operations.
- Drill dates were inconsistent with the vessel activities as recorded within the Bridge Log Book.
- The emergency response drill for a spill situation required by the SOPEP, SMPEP and/or company onboard emergency response procedure was overdue or, had not been completed in accordance with the defined drill schedule.
- Where a drill had been deferred due to poor weather or sea conditions and the vessel had notified the company, record as a **comment** within the Process response tool.

**5.1.4. Were the Master and officers familiar with the shipboard emergency plan for enclosed space rescue, and had drills taken place to test the effectiveness of the shipboard emergency response plan in accordance with company procedures?**

**Short Question Text**

Enclosed space rescue emergency response drill.

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Interview - Deck Rating, Documentation, Cargo Control Room, Main Deck

**Publications**

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: Resolution A.1050(27) Revised Recommendations for Entering Enclosed Spaces Aboard Ships.

IMO: ISM Code

IMO SOLAS

**Objective**

**To ensure that the crew will respond to an enclosed space rescue situation in accordance with the vessel's shipboard emergency response plan.**

**Industry Guidance**

**OCIMF: International Safety Guide for Oil Tankers and Terminals.** Sixth Edition.

Chapter 10.2 Safety management for entering enclosed spaces.

10.2.2 Managing controlled entry into enclosed space

Responding to a crisis.

Injuries and deaths from entering enclosed spaces often occur when personnel give in to a strong instinct to help. A delayed response from the rescue team can make this worse. It may take them several minutes to muster and ready themselves, during which Attendants may become increasingly concerned for those in the space. They may believe – wrongly – that they can hold their breath or are fit enough not to be affected in the same way as those inside. Giving them a clear list of tasks at this time (e.g. raise the alarm but do not enter the space/opening; keep talking to the people inside; set up equipment outside; brief the command centre and rescue team when they arrive) is a proven technique for keeping them focused. Reinforce this during the toolbox talk with scenarios asking them what they would do if someone collapsed and if the rescue team was delayed.

**IMO: Resolution A.1050(27)** Revised Recommendations for Entering Enclosed Spaces Aboard Ships.

6.4 Only trained personnel should be assigned the duties of entering, functioning as attendants or functioning as members of rescue teams. Ships' crews with rescue and first aid duties should be drilled periodically in rescue and first aid procedures. Training should include as a minimum:

1. Identification of the hazards likely to be faced during entry into enclosed spaces.
2. Recognition of the signs of adverse health effects caused by exposure to hazards during entry, and
3. Knowledge of personal protective equipment required for entry.

8.5 Only properly trained and equipped personnel should perform rescue operations in enclosed spaces.

**TMSA KPI 11.1.1** requires that detailed vessel emergency response plans include initial notification procedures and cover all credible emergency scenarios.

Vessel emergency response plans are reviewed at least annually, to reflect changes in legislation, contact details, vessel equipment and changes in company procedures.

They are additionally reviewed following any incident or drill where the emergency response plans have been used.

#### **IMO: ISM Code**

8.1 The company should identify potential emergency shipboard situations and establish procedures to respond to them.

8.2 The company should establish programmes for drills and exercises to prepare for emergency actions.

#### **IMO: SOLAS**

Chapter III Regulation 19, as amended by MSC. 350(92)

3.3 Crew members with enclosed space entry or rescue responsibilities shall participate in an enclosed space entry and rescue drill to be held onboard the ship at least once every two months.

3.6.1 Enclosed space entry and rescue drills should be planned and conducted in a safe manner, taking into account, as appropriate, the guidance provided in the recommendations developed by the Organization.

3.6.2 Each enclosed space entry and rescue drill shall include:

1. Checking and use of personal protective equipment required for entry.
2. Checking and use of communication equipment and procedures.
3. Checking and use of instruments for measuring the atmosphere in enclosed spaces.
4. Checking and use of rescue equipment and procedures.
5. Instructions in first aid and resuscitation techniques.

#### **Inspection Guidance**

The vessel operator should have developed a shipboard emergency response plan to identify the actions that vessel staff must take to conduct a rescue from an enclosed space in a safe manner without further endangering those involved in the operation.

The vessel operator should have developed a procedure to:

- Require the vessel to conduct each type of emergency response drill applicable to the vessel at a defined frequency.
- Record the details of emergency response drills in a defined format.
- Define the action to take if a drill cannot be completed within the required timeframe.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the shipboard emergency response plan for enclosed space rescue.
- Review the records of completed enclosed space rescue drills and verify that:
  - The latest drill had been completed within the timeframe defined by the drill schedule.
  - The details of the drill had been recorded in the defined format required by the company procedure.
  - Where the drill had been conducted utilising a defined enclosed space, the permit for the space had been attached to the drill records.
  - The date and time of the latest drill was consistent with the vessel's activities as recorded within the Bridge Log Book.

- During the physical inspection:
  - Sight the enclosed space rescue hoisting arrangement(s) provided for cargo, ballast, bunker, void and cofferdam spaces.
  - Interview an officer or rating to verify that they were familiar with the rigging and operation of the provided hoisting arrangement(s).

#### **Expected Evidence**

- The shipboard emergency response plan for enclosed space rescue.
- The records for completed enclosed space rescue drills, supplemented by enclosed space entry permits where appropriate.
- The vessel's Bridge Log Book for the previous twelve months.
- Where a drill had been deferred due to poor weather or sea conditions, communications with the company relating to the postponement.

#### **Potential Grounds for a Negative Observation**

- There was no shipboard emergency plan for enclosed space rescue available.
  - The shipboard emergency plan was insufficiently ship-specific.
  - The accompanying officer was unfamiliar with the shipboard emergency plan for enclosed space rescue.
  - An interviewed officer or rating was unfamiliar with the rigging and use of the provided enclosed space rescue hoisting arrangement(s).
  - The drill scenario was unrealistic or inadequate to test the shipboard emergency plan.
  - The drill records had not been completed in accordance with the company procedures or were missing the associated enclosed space entry permit, where required.
  - Drill dates were inconsistent with the vessel activities as recorded within the Bridge Log Book.
  - The emergency response drill for enclosed space rescue required by the company onboard emergency response procedure was overdue or had not been completed in accordance with the defined drill schedule.
  - The enclosed space rescue hoisting arrangements and any associated loose equipment provided for cargo, ballast, bunker, void and cofferdam spaces was defective in any respect.
- 
- Where a drill had been deferred due to poor weather or sea conditions and the vessel had notified the company, record as a **comment** within the Process response tool.



**5.1.5. Were the Master and Ship Security Officer (SSO) familiar with the vessel's Ship Security Plan (SSP), and had drills taken place to test the effectiveness of the measures and procedures specified by the Ship Security Plan?**

**Short Question Text**

Drills required by the Ship Security Plan (SSP)

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation, Interview - Security Officer

**Publications**

Industry : BMP5 Best Management Practices to Deter Piracy and Enhance Maritime Security in the Red Sea Gulf of Aden

Indian Ocean and Arabian Sea

Industry: BMP West Africa. Best Management Practices to Deter Piracy and Enhance Maritime Security off the Coast of West Africa including the Gulf of Guinea. 1st Edition.

IMO: Guide to Maritime Security and the ISPS Code 2012 edition

IMO: ISPS Code

**Objective**

**To ensure that the crew will respond effectively to a security threat in accordance with the vessel's Ship Security Plan.**

**Industry Guidance**

**IMO: Guide to Maritime Security and the ISPS Code. 2012 edition.**

Planning and conducting ship security drills and exercises

4.8.12 The regular conduct of ship security drills and exercises is an important aspect of ensuring that ships comply with the requirements of the maritime security measures.

4.8.13 Drills may be defined as supervised activities that are used to test a single measure or procedure in the SSP. Exercises are more complex activities which test several measures and procedures at the same time.

4.8.14 To ensure the effective implementation of the measures and procedures specified in SSPs, drills should be conducted at least every three months. They are usually organised by SSOs, who are responsible for ensuring that all shipboard personnel have received adequate training. In addition, in cases where more than 25% of the ship's personnel has been changed at any one time with personnel that have not previously participated in any drill on that ship within the last three months, a drill should be conducted within one week of the change.

4.8.15 As a minimum, SSOs should organise drills to cover such scenarios as:

1. Identification and search of unauthorised visitors on board the ship.
2. Recognition of materials that may pose a security threat.
3. Methods to deter attackers from approaching the ship.
4. Recognition of restricted areas.
5. Mustering for evacuation.

**Industry: BMP5 Best Management Practices to Deter Piracy and Enhance Maritime Security in the Red Sea, Gulf of Aden, Indian Ocean and Arabian Sea**

**(Industry: BMP West Africa. Best Management Practices to Deter Piracy and Enhance Maritime Security off the Coast of West Africa including the Gulf of Guinea. 1st Edition.)**

Section 4

Planning

Prior to entering the High Risk Area

Brief crew and conduct drills

The crew should be fully briefed on the preparations, and drills should be conducted with the SPM (Ship Protection Measures) in place. The plan should be reviewed, and all crew briefed on their duties, including familiarity with the alarm that signals an attack, an all-clear situation and the appropriate response to each. The drills should test:

- The SPM, including testing the security of all access points.
- Lock down conditions, including crew safety considerations.
- The bridge team's security knowledge.
- The crew's understanding of any different actions required in the event of a pirate attack compared to other types of attack.

**TMSA KPI 13.1.3** requires that measures have been developed to mitigate and respond to all identified threats to vessels and shore-based locations.

Mitigating measures may include:

- Access control.
- Physical security measures.
- Drills and training.
- Security patrols.
- Searches.

Contingency plans are in place to respond to any potential breaches of security.

**IMO: ISPS Code**

Drills and exercises

13.5 The objective of drills and exercises is to ensure that shipboard personnel are proficient in all assigned security levels and the identification of any security related deficiencies which need to be addressed.

13.6 To ensure the effective implementation of the provisions of the ship security plan, drills should be conducted at least once every three months. In addition, in cases where more than 25% of the ship's personnel has been changed at any one time with personnel that have not previously participated in any drill on that ship within the last three months, a drill should be conducted within one week of the change. These drills should test individual elements of the plan such as the security threats listed in paragraph 8.9

8.9 .....

1. Damage to, or destruction of, the ship or of a port facility, e.g., by explosive devices, arson, sabotage or vandalism.
2. Hijacking or seizure of the ship or of persons on board.
3. Tampering with cargo, essential ship equipment or systems or ship's stores.
4. Unauthorised access or use, including presence of stowaways.
5. Smuggling weapons or equipment, including weapons of mass destruction.
6. Use of the ship to carry those intending to cause a security incident and/or their equipment.
7. Use of the ship itself as a weapon or as a means to cause damage or destruction.
8. Attacks from seaward whilst at a berth or anchor, and

9. Attacks whilst at sea.

### **Inspection Guidance**

The vessel operator should have developed a procedure that:

- Required the vessel to conduct drills or exercises at defined intervals to test the effectiveness of security related contingency plans identified within the Ship Security Plan.
- Required the vessel to record the details of security drills or exercises in a defined format.
- Defined the action to take if a drill or exercise cannot be completed within the required timeframe.

### **Suggested Inspector Actions**

- Sight the schedule of security drills or exercises required to be conducted in accordance with the Ship Security Plan (SSP) and identified within the drill schedule.
- **Do not** request to sight either the SSP or the security contingency plans.
- Review the records of completed security drills or exercises and verify that:
  - The latest drill or exercise had been completed within the timeframe defined by the drill schedule.
  - All drill or exercise scenarios required to be undertaken by the SSP had been completed within the time frame defined by the company.
  - The details of the drill or exercise had been recorded in the defined format required by the company procedure.
  - The date and time of the latest drill was consistent with the vessel's activities as recorded within the Bridge Log Book.

### **Expected Evidence**

- The schedule of security drills or exercises required to be carried out by the Ship Security Plan.
- The records for completed security drills or exercises.
- The vessel's Bridge Log Book for the previous twelve months.
- Where a drill or exercise had been deferred due to poor weather or sea conditions, communications with the company relating to the deferment.

### **Potential Grounds for a Negative Observation**

- There was no schedule of security drills or exercises required to be undertaken by the Ship Security Plan (SSP).
  - The Master or Ship Security Officer was unfamiliar with security drills or exercises required to be undertaken to test the effectiveness of the SSP and its contingency plans.
  - The drill records were not maintained in the format defined by the company procedure.
  - Drill or exercise dates were inconsistent with the vessel activities as recorded within the Bridge Log Book.
  - The latest security drill or exercise was overdue for completion.
  - Security drill or exercise scenarios required to be undertaken according to the company drill schedule had not been completed within the defined time frame.
  - Where the ship had entered a High Risk Area in the last twelve months, suitable security drills had not been conducted with the SPM (Ship Protection Measures) in place, prior to entering the High Risk Area.
- 
- Where a drill had been deferred due to poor weather or sea conditions and the vessel had notified the company, record as a **comment** within the Process response tool.

*The ships security plan is confidential and approved by flag state. Where the master advises that the ship security plan and any other plans relating to security are confidential, the inspector should only confirm their existence by inspection of the front cover.*

*The inspector should address the question based on those documents and records that are not considered confidential in conjunction with the explanations of the accompanying officer.*

*Where a comment is required to support an observation, it must not provide any detail relating to the content of plans or risk assessments that are reported as confidential.*

**5.1.6. Were the Master, officers and ratings familiar with the procedure for launching the lifeboat(s), and had abandon ship drills taken place in accordance with company procedures and the requirements of SOLAS and the Flag Administration?**

**Short Question Text**

Launching the lifeboat(s) and abandon ship drills

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Lifeboat deck, Documentation, Bridge, Interview - Deck Rating

**Publications**

IMO: ISM Code

IMO SOLAS

IMO: MSC.1/Circ.1206/Rev.1 Measures to prevent accidents with lifeboats.

OCIMF: Survival Craft – A Seafarer’s Guide

**Objective**

**To ensure that the crew were able to safely launch the vessel’s lifeboat(s) in an emergency, and conduct abandon ship drills strictly in accordance with manufacturer’s instructions and company procedures.**

**Industry Guidance**

**OCIMF: Survival Craft. A Seafarer’s Guide.**

Familiarisation and Training

A significant factor in survival craft incidents occurring in the industry has often been identified as a lack of onboard familiarisation with the equipment fitted. It is imperative that a strong focus be given by the operator to the familiarisation and training of all ship’s staff in the handling of survival craft, with the aim of minimizing risk factors associated with human error.

**IMO: MSC.1/Circ.1206/Rev.1 Measures to prevent accidents with lifeboats.**

**ANNEX 2 Guidelines on Safety During Abandon Ship Drills Using Lifeboats.**

**1.3 Drills must be safe**

1.3.1 Abandon ship drills should be planned, organized and performed so that the recognized risks are minimized and in accordance with relevant shipboard requirements of occupational safety and health.

1.3.2 Drills provide an opportunity to verify that the life-saving system is working and that all associated equipment is in place and in good working order, ready for use.

1.3.3 Before conducting drills, it should be checked that the lifeboat and its safety equipment have been maintained in accordance with the manufacturer’s instructions, as well as noting all the precautionary measures necessary. Abnormal conditions of wear and tear or corrosion should be reported to the responsible officer immediately.

**1.4 Emphasis on learning**

Drills should be conducted with an emphasis on learning and be viewed as a learning experience, not just as a task to meet a regulatory requirement to conduct drills. Whether they are emergency drills required by SOLAS or additional special drills conducted to enhance the competence of the crew members, they should be carried out at

safe speed. During drills, care should be taken to ensure that everybody familiarizes themselves with their duties and with the equipment. If necessary, pauses should be made during the drills to explain especially difficult elements. The experience of the crew is an important factor in determining how fast a drill or certain drill elements should be carried out.

## 1.5 Planning and organizing drills

1.5.1 The 1974 SOLAS Convention requires that drills shall, as far as practicable, be conducted as if there was an actual emergency. This means that the entire drill should, as far as possible, be carried out. The point is that, at the same time, it should be ensured that the drill can be carried out in such a way that it is safe in every respect. Consequently, elements of the drill that may involve unnecessary risks need special attention or may be excluded from the drill.

1.5.2 In preparing for a drill, those responsible should review the manufacturer's instruction manual to assure that a planned drill is conducted properly. Those responsible for the drill should assure that the crew is familiar with the guidance provided in the life-saving system instruction manual.

1.5.3 Lessons learned in the course of a drill should be documented and made a part of follow-up shipboard training discussions and planning the next drill session.

1.5.4 The lowering of a boat with its full complement of persons is an example of an element of a drill that may, depending on the circumstances, involve an unnecessary risk. Such drills should only be carried out if special precautions are observed.

## 2 Abandon Ship Drills

### 2.2 Guidance to the shipowner

2.2.2 Procedures for holding safe drills should be included in the Safety Management System (SMS) of the shipping companies. Detailed procedures for elements of drills that involve a special risk should be evident from workplace assessments adjusted to the relevant life-saving appliance.

**TMSA KPI 9.2.1** requires that risk assessments for routine tasks are used to develop safe working procedures.

The risk assessment identifies all hazards associated with a task and any personnel at risk. All risk mitigation measures to address identified hazards are incorporated into the safe working procedures.

### **IMO: ISM Code**

8.1 The company should identify potential emergency shipboard situations and establish procedures to respond to them.

8.2 The company should establish programmes for drills and exercises to prepare for emergency actions

### **IMO: SOLAS**

#### Chapter III Regulation 19

#### Emergency training and drills

3.2 Every crew member shall participate in at least one abandon ship drill and one fire drill every month. The drills of the crew shall take place within 24 h of the ship leaving a port if more than 25% of the crew have not participated in abandon ship and fire drills on board that particular ship in the previous month.

#### 3.4 Abandon ship drill

3.4.1 Each abandon ship drill shall include:

1. summoning of passengers and crew to muster stations with the alarm required by regulation 6.4.2 followed by drill announcement on the public address or other communication system and ensuring that they are made aware of the order to abandon ship.
2. reporting to stations and preparing for the duties described in the muster list.
3. checking that passengers and crew are suitably dressed.
4. checking that lifejackets are correctly donned.
5. lowering of at least one lifeboat after any necessary preparation for launching.
6. starting and operating the lifeboat engine.
7. operation of davits used for launching liferafts.
8. a mock search and rescue of passengers trapped in their staterooms.
9. instruction in the use of radio life-saving appliances.

3.4.2 Different lifeboats shall, as far as practicable, be lowered in compliance with the requirements of paragraph 3.4.1.5 at successive drills.

3.4.3 Except as provided in paragraphs 3.4.4 and 3.4.5, each lifeboat shall be launched, and manoeuvred in the water by its assigned operating crew, at least once every three months during an abandon ship drill.

3.4.4 In the case of a lifeboat arranged for free-fall launching, at least once every three months during an abandon ship drill the crew shall board the lifeboat, properly secure themselves in their seats and commence launch procedures up to but not including the actual release of the lifeboat (i.e., the release hook shall not be released). The lifeboat shall then either be free-fall launched with only the required operating crew on board or lowered into the water by means of the secondary means of launching with or without the operating crew on board. In both cases the lifeboat shall thereafter be manoeuvred in the water by the operating crew. At intervals of not more than six months, the lifeboat shall either be launched by free-fall with only the operating crew on board, or simulated launching shall be carried out in accordance with the guidelines developed by the Organization\*.

\* Refer to Measures to prevent accidents with lifeboats (MSC.1/Circ.1206/Rev.1).

3.4.9 Emergency lighting for mustering and abandonment shall be tested at each abandon ship drill.

### **Inspection Guidance**

The vessel operator should have developed detailed procedures to identify the actions that vessel staff must take to conduct a lifeboat abandon ship drill in a safe manner without endangering those involved in the operation.

The vessel operator should have developed a procedure to:

- Require the vessel to conduct each type of emergency response drill applicable to the vessel at a defined frequency.
- Record the details of emergency response drills in a defined format.
- Define the action to take if a drill cannot be completed within the required timeframe.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the emergency procedure for abandoning ship.
- Sight, and where necessary review, the ship specific procedure for launching a lifeboat as part of a drill.
- Review the records of completed abandon ship drills and verify that:
  - The latest drill had been completed within the timeframe defined by the drill schedule.
  - The lifeboat(s) has been exercised and launched (simulated or actual) in accordance with SOLAS regulation for the type of lifeboat fitted.
  - The details of the drill had been recorded in the defined format required by the company procedure.
  - The date and time of the latest drill was consistent with the vessel's activities as recorded within the Bridge Log Book.

- Interview one rating and verify they were familiar with the ship specific procedure for the launching of the lifeboat during an abandon ship drill.

#### **Expected Evidence**

- The shipboard emergency procedure for abandoning ship.
- The ship specific procedure for launching a lifeboat as part of an abandon ship drill.
- The records for completed abandon ship drills.
- The vessel's Bridge Log Book for the previous twelve months.
- Where a drill had been deferred due to poor weather or sea conditions, communications with the company relating to the postponement.

#### **Potential Grounds for a Negative Observation**

- There was no emergency procedure for abandoning ship.
  - There was no ship specific procedure for launching a lifeboat as part of an abandon ship drill.
  - The shipboard procedures were insufficiently ship-specific.
  - The drill records were not maintained in the format defined by the company procedure.
  - The accompanying officer was unfamiliar with the procedure for abandon ship or the launching of a lifeboat during an abandon ship drill.
  - An interviewed rating was unfamiliar with the ship specific procedure for the launching of a lifeboat during an abandon ship drill.
  - Drill dates were inconsistent with the vessel activities as recorded within the Bridge Log Book.
  - The emergency response drills for abandon ship required by the company onboard emergency response procedure and SOLAS regulation were overdue or had not been completed in accordance with the defined drill schedule.
- 
- Where a drill had been deferred due to poor weather or sea conditions and the vessel had notified the company, record as a **comment** within the Process response tool.



**5.1.7. Were the Master and officers familiar with the shipboard emergency plan for a cargo vapour or liquid release, Including potential fire, and had drills taken place to test the effectiveness of the shipboard emergency response plan in accordance with company procedures?**

**Short Question Text**

Emergency plan & drills for a cargo vapour or liquid release, Including potential fire

**Vessel Types**

LPG, LNG

**ROVIQ Sequence**

Documentation, Cargo Control Room

**Publications**

IMO: ISM Code

IMO: IGC Code

**Objective**

To ensure that the crew will respond effectively to a cargo vapour or liquid release, including potential fire, in accordance with the vessel's shipboard emergency response plans.

**Industry Guidance**

**SIGTTO: Liquified Gas Handling Principles on Ships and Terminals. Fourth Edition**

9.5.2 Ship Emergency Procedures.

Incident Plans

In developing plans for dealing with incidents, the following scenarios will commonly be considered:

- Cargo containment leakage
- Cargo connection rupture, pipeline fracture or cargo spillage.
- Lifting of a cargo system relief valve.
- Fire following leakage of cargo.

**TMSA KPI 11.1.1** requires that detailed vessel emergency response plans include initial notification procedures and cover all credible emergency scenarios.

Vessel emergency response plans are reviewed at least annually, to reflect changes in legislation, contact details, vessel equipment and changes in company procedures.

They are additionally reviewed following any incident or drill where the emergency response plans have been used.

**IMO: ISM Code**

8.1 The company should identify potential emergency shipboard situations and establish procedures to respond to them.

8.2 The company should establish programmes for drills and exercises to prepare for emergency actions.

## **IMO: IGC Code**

18.3.1 information shall be on board and available to all concerned in the form of cargo information data sheet(s) giving the necessary data for the safe carriage of cargo. Such information shall include, for each product carried:

1. A full description of the physical and chemical properties necessary for the safe carriage and containment of the cargo.
2. Reactivity with other cargoes that are capable of being carried on board in accordance with the International certificate of Fitness for the carriage of Liquefied Gases in Bulk.
3. The actions to be taken in the event of cargo spills or leaks.
4. Countermeasures against accidental personal contact.
5. Firefighting procedures and firefighting media.
6. Special equipment needed for the safe handling of the particular cargo, and
7. Emergency procedures.

18.3.3 Contingency plans in accordance with 18.3.1.3, for spillage of cargo carried at ambient temperature, shall take account of potential local temperature cooling such as when the escaped cargo has reduced to atmospheric pressure and the potential effect of this cooling on hull steel.

## **Inspection Guidance**

The vessel operator should have developed shipboard emergency response plans applicable to the types of vessel under management which may include, but will not necessarily be limited to:

- Cargo containment leakage.
- Cargo connection rupture, pipeline fracture or cargo spillage.
- Lifting of a cargo system relief valve.
- Fire following leakage of cargo.

The plans will identify the steps that vessel staff must take immediately to bring the situation under control, and then, in the short and medium-term, to address the dangers to personnel, the environment and property.

Where specialist equipment, such as barrier punching devices, are required to be used in the mitigation or recovery from a loss of containment, the emergency response plans should include the precautions for their use.

The vessel operator should have developed a procedure to:

- Require the vessel to conduct each type of emergency response drill applicable to the vessel at a defined frequency.
- Record the details of emergency response drills in a defined format.
- Define the action to take if a drill cannot be completed within the required timeframe.

## **Suggested Inspector Actions**

- Sight, and where necessary review, the shipboard emergency plans for cargo vapour or liquid release, including potential fire.
- Review the records of completed cargo vapour or liquid release drills and verify that:
  - The required drills had been completed within the timeframe defined by the drill schedule.
  - The details of the drill had been recorded in the defined format required by the company procedure.
  - The date and time of the latest drill was consistent with the vessel's activities as recorded within the Bridge Log Book.

## **Expected Evidence**

- The shipboard emergency response plans for a cargo vapour or liquid release.
- The records for completed cargo vapour or liquid release drills.
- The vessel's Bridge Log Book for the previous 12 months.

#### **Potential Grounds for a Negative Observation**

- There were no shipboard emergency plans for a cargo vapour or liquid release available.
  - The shipboard emergency plans for cargo vapour or liquid release were insufficiently ship-specific.
  - The accompanying officer was unfamiliar with the shipboard emergency plans for cargo vapour or liquid release.
  - The drill records were not maintained in the format defined by the company procedure.
  - The drill scenario was unrealistic or inadequate to test the shipboard emergency plan.
  - Drill dates were inconsistent with the vessel activities as recorded within the Bridge Log Book.
  - The latest drill for cargo vapour or liquid release was overdue for completion.
  - One or more of the emergency response plans for cargo vapour or liquid release scenarios had not been exercised during a drill within the previous 12 months.
- 
- Where a drill had been deferred due to poor weather or sea conditions and the vessel had notified the company, record as a **comment** within the Process response tool.

**5.1.8. Were the Master and officers familiar with the shipboard emergency plan for collision, and had drills taken place to test the effectiveness of the shipboard emergency response plan in accordance with company procedures?**

**Short Question Text**

Emergency plan & drills for collision

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation, Bridge, Cargo Control Room

**Publications**

IMO: ISM Code

IMO Resolution A.1072(28) Revised guidelines for a structure of an integrated system of contingency planning for shipboard emergencies.

ICS: Bridge Procedures Guide – Fifth Edition

OCIMF/ICS: Peril at Sea and Salvage – A Guide for Masters. Sixth Edition.

**Objective**

**To ensure that the crew will respond effectively to a collision situation in accordance with the vessel's shipboard emergency response plan.**

**Industry Guidance**

**ICS: Bridge Procedures Guide.** Fifth Edition.

Checklist C4 Collision

**OCIMF/ICS: Peril at Sea and Salvage** – A Guide for Masters. Sixth Edition.

Chapter 3 Implementing the emergency response plan

3.1 General

Do what is necessary to manage the situation. Activate the most appropriate contingency plans in the SMS. Tailor decision making to the severity of the emergency by prioritising tasks and using resources where they are most effective. Use the ship's own resources where they will be most effective. Be realistic about what can be achieved before help arrives.

**IMO Resolution A.1072(28)** Revised guidelines for a structure of an integrated system of contingency planning for shipboard emergencies.

3.2.4.12 In summary, the module should guide those responsible for developing the system on what should be included in emergency plans, namely:

1. Coordination of response effort.
2. Response procedures for the entire spectrum of possible accident scenarios, including methods that protect life, the marine environment and property.
3. The person or persons identified by title or name as being in charge of all response activities.
4. The communication lines used for ready contact with external response experts.
5. Information concerning the availability and location of response equipment.
6. Reporting and communication procedures on board ship.

**TMSA KPI 11.1.1** requires that detailed vessel emergency response plans include initial notification procedures and cover all credible emergency scenarios.

Vessel emergency response plans are reviewed at least annually, to reflect changes in legislation, contact details, vessel equipment and changes in company procedures.

They are additionally reviewed following any incident or drill where the emergency response plans have been used.

#### **IMO: ISM Code**

8.1 The company should identify potential emergency shipboard situations and establish procedures to respond to them.

8.2 The company should establish programmes for drills and exercises to prepare for emergency actions.

#### **Inspection Guidance**

The vessel operator should have developed a shipboard emergency response plan for a vessel in a collision situation to identify the steps that vessel staff must take immediately to bring the situation under control and, then in the short and medium-term, to address the dangers to personnel, the environment and property.

The vessel operator should have developed a procedure to:

- Require the vessel to conduct an emergency response drill to test the crew familiarity with each credible emergency scenario applicable to the vessel type at a defined frequency.
- Require that the details of emergency response drills are recorded in a defined format.
- Define the action to take if a drill cannot be completed within the required timeframe.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the shipboard emergency response plan for a collision situation.
- Review the records of completed collision emergency response drills and verify that:
  - The latest drill had been completed within the timeframe defined by the drill schedule.
  - The details of the drill had been recorded in the defined format required by the company procedure.
  - The date and time of the latest drill was consistent with the vessel's activities as recorded within the Bridge Log Book.

#### **Expected Evidence**

- The shipboard emergency response plan for a collision situation.
- The records for completed collision emergency response drills.
- The vessel's Bridge Log Book for the previous twelve months.
- Where a drill had been deferred due to poor weather or sea conditions, communications with the company relating to the deferment.

#### **Potential Grounds for a Negative Observation**

- There was no shipboard emergency plan developed for a collision situation.
- The shipboard emergency plan was insufficiently ship-specific.
- The accompanying officer was unfamiliar with the shipboard emergency plan for a collision situation.
- The drill scenario was unrealistic or inadequate to test the shipboard emergency plan.
- Drill dates were inconsistent with the vessel activities as recorded within the Bridge Log Book.

- The emergency response drill for a collision situation required by the company onboard emergency response procedure was overdue or had not been completed in accordance with the defined drill schedule.
- Where a drill had been deferred due to poor weather or sea conditions and the vessel had notified the company, record as a **comment** within the Process response tool.

### **5.1.9. Were the Master and officers familiar with the shipboard emergency plan for grounding, and had drills taken place to test the effectiveness of the shipboard emergency response plan in accordance with company procedures?**

#### **Short Question Text**

Emergency plan & drills for grounding

#### **Vessel Types**

Oil, Chemical, LPG, LNG

#### **ROVIQ Sequence**

Documentation, Bridge, Cargo Control Room

#### **Publications**

IMO: ISM Code

IMO Resolution A.1072(28) Revised guidelines for a structure of an integrated system of contingency planning for shipboard emergencies.

#### **Objective**

**To ensure that the crew will respond effectively to a grounding situation in accordance with the vessel's shipboard emergency response plan.**

#### **Industry Guidance**

**ICS: Bridge Procedures Guide.** Fifth Edition.

Checklist C5 Stranding or Grounding

**OCIMF/ICS: Peril at Sea and Salvage** – A Guide for Masters. Sixth Edition.

Chapter 3 Implementing the emergency response plan

3.1 General

Do what is necessary to manage the situation. Activate the most appropriate contingency plans in the SMS. Tailor decision making to the severity of the emergency by prioritising tasks and using resources where they are most effective. Use the ship's own resources where they will be most effective. Be realistic about what can be achieved before help arrives.

Chapter 3.5 Action to take when the ship is aground

3.5.6 Consider stress and stability

The Master will have no accurate way of knowing whether the ship will remain stable and intact while aground or when attempting to refloat. In this case, specialist technical advice is required to predict the likely effects on the ship.

**IMO Resolution A.1072(28)** Revised guidelines for a structure of an integrated system of contingency planning for shipboard emergencies.

3.2.4.12 In summary, the module should guide those responsible for developing the system on what should be included in emergency plans, namely:

1. Coordination of response effort.
2. Response procedures for the entire spectrum of possible accident scenarios, including methods that protect life, the marine environment and property.

3. The person or persons identified by title or name as being in charge of all response activities.
4. The communication lines used for ready contact with external response experts.
5. Information concerning the availability and location of response equipment.
6. Reporting and communication procedures on board ship.

**TMSA KPI 11.1.1** requires that detailed vessel emergency response plans include initial notification procedures and cover all credible emergency scenarios.

Vessel emergency response plans are reviewed at least annually, to reflect changes in legislation, contact details, vessel equipment and changes in company procedures.

They are additionally reviewed following any incident or drill where the emergency response plans have been used.

#### **IMO: ISM Code**

8.1 The company should identify potential emergency shipboard situations and establish procedures to respond to them.

8.2 The company should establish programmes for drills and exercises to prepare for emergency actions.

#### **Inspection Guidance**

The vessel operator should have developed a shipboard emergency response plan for a vessel in a grounding situation to identify the steps that vessel staff must take immediately to bring the situation under control and, then in the short and medium-term, to address the dangers to personnel, the environment and property.

The vessel operator should have developed a procedure to:

- Require the vessel to conduct an emergency response drill to test the crew familiarity with each credible emergency scenario applicable to the vessel type at a defined frequency.
- Require that the details of emergency response drills are recorded in a defined format.
- Define the action to take if a drill cannot be completed within the required timeframe.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the shipboard emergency response plan for a grounding situation.
- Review the records of completed grounding emergency response drills and verify that:
  - The latest drill had been completed within the timeframe defined by the drill schedule.
  - The details of the drill had been recorded in the defined format required by the company procedure.
  - The date and time of the latest drill was consistent with the vessel's activities as recorded within the Bridge Log Book.

#### **Expected Evidence**

- The shipboard emergency response plan for a grounding situation.
- The records for completed grounding emergency response drills.
- The vessel's Bridge Log Book for the previous twelve months.
- Where a drill had been deferred due to poor weather or sea conditions, communications with the company relating to the deferment.

#### **Potential Grounds for a Negative Observation**

- There was no shipboard emergency plan developed for a grounding situation.
- The shipboard emergency plan was insufficiently ship-specific.



- The shipboard emergency plan for grounding did not consider:
    - Assessing a grounding situation and gathering data for evaluation by a specialist technical advisor on its impact on buoyancy, stability and structural strength and the later decisions on mitigating actions.
    - Preserving ECDIS and VDR evidence.
    - Communications with the company and third parties.
  - The accompanying officer was unfamiliar with the shipboard emergency plan for a grounding situation.
  - The drill records were not maintained in the format defined by the company procedure.
  - The drill scenario was unrealistic or inadequate to test the shipboard emergency plan.
  - Drill dates were inconsistent with the vessel activities as recorded within the Bridge Log Book.
  - The emergency response drill for a grounding situation required by the company onboard emergency response procedure was overdue or had not been completed in accordance with the defined drill schedule.
- 
- Where a drill had been deferred due to poor weather or sea conditions and the vessel had notified the company, record as a **comment** within the Process response tool.

### **5.1.10. Were the Master and officers familiar with the shipboard emergency plan for loss of propulsion, and had drills taken place to test the effectiveness of the shipboard emergency response plan in accordance with company procedures?**

#### **Short Question Text**

Emergency plan & drills for loss of propulsion

#### **Vessel Types**

Oil, Chemical, LPG, LNG

#### **ROVIQ Sequence**

Interview - Deck Officer, Interview - Engineer Officer, Documentation, Bridge, Engine Control Room

#### **Publications**

IMO: ISM Code

IMO Resolution A.1072(28) Revised guidelines for a structure of an integrated system of contingency planning for shipboard emergencies.

ICS: Bridge Procedures Guide – Fifth Edition

#### **Objective**

**To ensure that the crew will respond effectively to a loss of propulsion in accordance with the vessel's shipboard emergency response plan.**

#### **Industry Guidance**

**ICS: Bridge Procedures Guide.** Fifth Edition.

Checklist C1 Main engine failure.

**OCIMF/ICS: Peril at Sea and Salvage** – A Guide for Masters. Sixth Edition.

Chapter 3.4. Action to take when the ship is disabled but still afloat.

3.4.3 Understand the drift characteristics of a disabled ship.

If propulsion has been lost with no immediate prospect of restoring it, assess the ship's proximity to navigational or other hazards and plot the rate and direction of drift on a suitably scaled chart (paper or electronic), in conjunction with the ship's records for any previously recorded drift patterns.

Tables 1 to 5 give the ship's heading and drift directions relative to the wind and wave directions, with the ship lying with the wind on the port and starboard sides.

Use the tables to guide decisions to optimise drift behaviour:

- Placing the relative wing on the port or starboard side before momentum and steerage are lost can alter drift direction by up to 60°. This can gain a lot of sea room and might be the best step to positively influence drift direction without calling on outside help.
- If steerage has been lost, the rate and direction of drift can still be influenced by:
  - Giving the ship a list
  - Adjusting the trim, increasing or decreasing the existing trim, or even by changing from trim by the stern to trim by the head.
  - Locking the rudder hard over to the downwind side. (During model testing, locking the rudder hard over to the upwind side produced no meaningful change in drift compared to the rudder being locked amidships.).

**IMO Resolution A.1072(28)** Revised guidelines for a structure of an integrated system of contingency planning for shipboard emergencies.

3.2.4.12 In summary, the module should guide those responsible for developing the system on what should be included in emergency plans, namely:

1. coordination of response effort
2. response procedures for the entire spectrum of possible accident scenarios, including methods that protect life, the marine environment and property
3. the person or persons identified by title or name as being in charge of all response activities
4. the communication lines used for ready contact with external response experts
5. information concerning the availability and location of response equipment
6. reporting and communication procedures on board ship

**TMSA KPI 11.1.1** requires that detailed vessel emergency response plans include initial notification procedures and cover all credible emergency scenarios.

Vessel emergency response plans are reviewed at least annually, to reflect changes in legislation, contact details, vessel equipment and changes in company procedures.

They are additionally reviewed following any incident or drill where the emergency response plans have been used.

#### **IMO: ISM Code**

8.1 The company should identify potential emergency shipboard situations and establish procedures to respond to them.

8.2 The company should establish programmes for drills and exercises to prepare for emergency actions

#### **Inspection Guidance**

The vessel operator should have developed a shipboard emergency response plan for a loss of propulsion which identifies the steps that vessel staff must take immediately to bring the situation under control and, then in the short and medium-term, to address the dangers to personnel, the environment and property.

The vessel operator should have developed a procedure to:

- Require the vessel to conduct each type of emergency response drill applicable to the vessel at a defined frequency.
- Record the details of emergency response drills in a defined format.
- Define the action to take if a drill cannot be completed within the required timeframe.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the shipboard emergency response plan for a loss of propulsion.
- Review the records of completed loss of propulsion emergency response drills and verify that:
  - The latest drill had been completed within the timeframe defined by the drill schedule.
  - The details of the drill had been recorded in the defined format required by the company procedure.
  - The date and time of the latest drill was consistent with the vessel's activities as recorded within the Bridge Log Book.
- Interview one navigation officer and verify that they were familiar with a method for estimating the predicted drift of a disabled tanker, taking into account the wind, current and ship's head.

- Interview one engineer officer and verify that they were familiar with the loss of propulsion emergency response plan.

#### **Expected Evidence**

- The shipboard emergency response plan for the loss of propulsion.
- The records for completed loss of propulsion emergency response drills.
- The vessel's Bridge Log Book for the previous twelve months.
- Where a drill had been deferred due to poor weather or sea conditions, communications with the company relating to the postponement.

#### **Potential Grounds for a Negative Observation**

- There was no shipboard emergency plan for the loss of propulsion.
  - The shipboard emergency plan was insufficiently ship-specific.
  - The accompanying officer was unfamiliar with the shipboard emergency plan for the loss of propulsion.
  - An interviewed navigation officer was unfamiliar with the process for estimating the predicted drift of a disabled tanker, taking into account the wind, current and ship's head.
  - An interviewed engineer officer was unfamiliar with the location and content of the vessel's loss of propulsion emergency response plan.
  - The drill records were not maintained in the format defined by the company procedure.
  - The drill scenario was unrealistic or inadequate to test the shipboard emergency plan.
  - Drill dates were inconsistent with the vessel activities as recorded within the Bridge Log Book.
  - The emergency response drill for a loss of propulsion required by the company onboard emergency response procedure was overdue or had not been completed in accordance with the defined drill schedule.
- 
- Where a drill had been deferred due to poor weather or sea conditions and the vessel had notified the company, record as a **comment** within the Process response tool.

**5.1.11. Were the Master and officers familiar with the shipboard emergency plan for failure of electrical power, and had drills taken place to test the effectiveness of the shipboard emergency response plan in accordance with company procedures?**

**Short Question Text**

Emergency plan & drills for failure of electrical power

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Interview - Deck Officer, Interview - Engineer Officer, Documentation, Bridge, Engine Control Room

**Publications**

OCIMF/ICS: Peril at Sea and Salvage – A Guide for Masters. Sixth Edition.

IMO: ISM Code

IMO Resolution A.1072(28) Revised guidelines for a structure of an integrated system of contingency planning for shipboard emergencies.

ICS: Bridge Procedures Guide – Fifth Edition

**Objective**

**To ensure that the crew will respond effectively to a failure of electrical power in accordance with the vessel's shipboard emergency response plan.**

**Industry Guidance**

**ICS: Bridge Procedures Guide.** Fifth Edition.

Checklist C3 Total electrical power failure (Blackout)

**OCIMF/ICS: Peril at Sea and Salvage – A Guide for Masters.** Sixth Edition.

Chapter 3.4. Action to take when the ship is disabled but still afloat.

3.4.3 Understand the drift characteristics of a disabled ship.

If propulsion has been lost with no immediate prospect of restoring it, assess the ship's proximity to navigational or other hazards and plot the rate and direction of drift on a suitably scaled chart (paper or electronic), in conjunction with the ship's records for any previously recorded drift patterns.

Tables 1 to 5 give the ship's heading and drift directions relative to the wind and wave directions, with the ship lying with the wind on the port and starboard sides.

Use the tables to guide decisions to optimise drift behaviour:

- Placing the relative wind on the port or starboard side before momentum and steerage are lost can alter drift direction by up to 60°. This can gain a lot of sea room and might be the best step to positively influence drift direction without calling on outside help.
- If steerage has been lost, the rate and direction of drift can still be influenced by:
  - Giving the ship a list
  - Adjusting the trim, increasing or decreasing the existing trim, or even by changing from trim by the stern to trim by the head.
  - Locking the rudder hard over to the downwind side. (During model testing, locking the rudder hard over to the upwind side produced no meaningful change in drift compared to the rudder being locked amidships.).

**IMO Resolution A.1072(28)** Revised guidelines for a structure of an integrated system of contingency planning for shipboard emergencies.

3.2.4.12 In summary, the module should guide those responsible for developing the system on what should be included in emergency plans, namely:

1. coordination of response effort
2. response procedures for the entire spectrum of possible accident scenarios, including methods that protect life, the marine environment and property
3. the person or persons identified by title or name as being in charge of all response activities
4. the communication lines used for ready contact with external response experts
5. information concerning the availability and location of response equipment
6. reporting and communication procedures on board ship

**TMSA KPI 11.1.1** requires that detailed vessel emergency response plans include initial notification procedures and cover all credible emergency scenarios.

Vessel emergency response plans are reviewed at least annually, to reflect changes in legislation, contact details, vessel equipment and changes in company procedures.

They are additionally reviewed following any incident or drill where the emergency response plans have been used.

#### **IMO: ISM Code**

8.1 The company should identify potential emergency shipboard situations and establish procedures to respond to them.

8.2 The company should establish programmes for drills and exercises to prepare for emergency actions

#### **Inspection Guidance**

The vessel operator should have developed a shipboard emergency response plan for a failure of electrical power which identifies the steps that vessel staff must take immediately to bring the situation under control and, then in the short and medium-term, to address the dangers to personnel, the environment and property.

The shipboard emergency response plan for failure of electrical power may reference:

- A shipboard procedure for feeding back power from the emergency switchboard to the main switchboard.
- A shipboard procedure for recovering after a black out.

The vessel operator should have developed a procedure to:

- Require the vessel to conduct each type of emergency response drill applicable to the vessel at a defined frequency.
- Record the details of emergency response drills in a defined format.
- Define the action to take if a drill cannot be completed within the required timeframe.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the shipboard emergency response plan for a failure of electrical power.
- Review the records of completed failure of electrical power emergency response drills and verify that:
  - The latest drill had been completed within the timeframe defined by the drill schedule.
  - The details of the drill had been recorded in the defined format required by the company procedure.

- The date and time of the latest drill was consistent with the vessel's activities as recorded within the Bridge Log Book.
- Interview one navigation officer and verify that they were familiar with a method for estimating the predicted drift of a disabled tanker taking into account the wind, current and ship's head.
- Interview one engineer officer and verify that they were familiar with the failure of electrical power emergency response plan including shipboard procedures for recovering after a blackout.

#### **Expected Evidence**

- The shipboard emergency response plan for the failure of electrical power including any supplementary engineering procedures referenced by the plan.
- The records for completed failure of electrical power emergency response drills.
- The vessel's Bridge Log Book for the previous twelve months.
- Where a drill had been deferred due to poor weather or sea conditions, communications with the company relating to the deferment.

#### **Potential Grounds for a Negative Observation**

- There was no shipboard emergency plan for the failure of electrical power available.
- The shipboard emergency plan was insufficiently ship-specific.
- The accompanying officer was unfamiliar with the shipboard emergency plan for the failure of electrical power.
- An interviewed navigation officer was unfamiliar with the process of estimating the predicted drift of a disabled tanker taking into account the wind, current and ship's head.
- An interviewed engineer officer was unfamiliar with the location and content of the vessel's failure of electrical power emergency response plan.
- The drill records were not maintained in the format defined by the company procedure.
- The drill scenario was unrealistic or inadequate to test the shipboard emergency plan.
- Drill dates were inconsistent with the vessel activities as recorded within the Bridge Log Book.
- The emergency response drill for a failure of electrical power required by the company onboard emergency response procedure was overdue or had not been completed in accordance with the defined drill schedule.
- Where a drill had been deferred due to poor weather or sea conditions and the vessel had notified the company, record as a **comment** within the Process response tool.

**5.1.12. Were the Master and officers familiar with the shipboard emergency plan for steering gear failure, and had drills taken place to test the effectiveness of the shipboard emergency response plan in accordance with company procedures.**

**Short Question Text**

Steering gear failure emergency drill.

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation, Bridge, Steering Gear, Interview - Deck Officer

**Publications**

ICS: Bridge Procedures Guide – Fifth Edition

IMO: ISM Code

IMO SOLAS

IMO Resolution A.1072(28) Revised guidelines for a structure of an integrated system of contingency planning for shipboard emergencies.

OCIMF/ICS: Peril at Sea and Salvage – A Guide for Masters. Sixth Edition.

**Objective**

**To ensure that the crew will respond effectively to a failure of the steering gear in accordance with the vessel's shipboard emergency response plan.**

**Industry Guidance**

**ICS: Bridge Procedures Guide.** Fifth Edition.

Checklist C2 Steering failure

**OCIMF/ICS: Peril at Sea and Salvage** – A Guide for Masters. Sixth Edition.

Chapter 3.4. Action to take when the ship is disabled but still afloat.

3.4.2 Assess the ship's manoeuvring capability.

If it looks like propulsion will be lost, the Master must decide how to manoeuvre the ship to the best advantage to take it away from any navigational hazards.

3.4.2.1 Use the engines

If steering has been lost but propulsion is retained, consider the following:

- Lock the rudder in a fixed position.
- Tests have shown that with full or emergency full astern revolutions the stern of a single screw ship can be brought up into the weather. It will vary by ship, but generally, once the stern has been brought up to the weather, it is possible to maintain heading and stern way using lower revolutions. This is a useful option when closing a lee shore.
- If the rudder is locked in a hard-over position, it should be possible to keep the ship's head into the weather using careful engine manoeuvres.

3.4.3 Understand the drift characteristics of a disabled ship.



If propulsion has been lost with no immediate prospect of restoring it, assess the ship's proximity to navigational or other hazards and plot the rate and direction of drift on a suitably scaled chart (paper or electronic), in conjunction with the ship's records for any previously recorded drift patterns.

Tables 1 to 5 give the ship's heading and drift directions relative to the wind and wave directions, with the ship lying with the wind on the port and starboard sides.

Use the tables to guide decisions to optimise drift behaviour:

- Placing the relative wing on the port or starboard side before momentum and steerage are lost can alter drift direction by up to 60°. This can gain a lot of sea room and might be the best step to positively influence drift direction without calling on outside help.
- If steerage has been lost, the rate and direction of drift can still be influenced by:
  - Giving the ship a list
  - Adjusting the trim, increasing or decreasing the existing trim, or even by changing from trim by the stern to trim by the head.
  - Locking the rudder hard over to the downwind side. (During model testing, locking the rudder hard over to the upwind side produced no meaningful change in drift compared to the rudder being locked amidships.)

**IMO: Resolution A.1072(28)** Revised guidelines for a structure of an integrated system of contingency planning for shipboard emergencies.

3.2.4.12 In summary, the module should guide those responsible for developing the system on what should be included in emergency plans, namely:

1. coordination of response effort
2. response procedures for the entire spectrum of possible accident scenarios, including methods that protect life, the marine environment and property
3. the person or persons identified by title or name as being in charge of all response activities
4. the communication lines used for ready contact with external response experts
5. information concerning the availability and location of response equipment
6. reporting and communication procedures on board ship

**TMSA KPI 11.1.1** requires that detailed vessel emergency response plans include initial notification procedures and cover all credible emergency scenarios.

Vessel emergency response plans are reviewed at least annually, to reflect changes in legislation, contact details, vessel equipment and changes in company procedures.

They are additionally reviewed following any incident or drill where the emergency response plans have been used.

#### **IMO: ISM Code**

8.1 The company should identify potential emergency shipboard situations and establish procedures to respond to them.

8.2 The company should establish programmes for drills and exercises to prepare for emergency actions

#### **IMO: SOLAS**

Chapter V Regulation 26

4 In addition to the routine checks and tests prescribed in paragraphs 1 and 2, emergency steering drills shall take place at least once every three months in order to practice emergency steering procedures. These drills shall include

direct control within the steering gear compartment, the communications procedure with the navigation bridge and, where applicable the operation of alternative power supplies.

### **Inspection Guidance**

The vessel operator should have developed a shipboard emergency response plan for steering gear failure which identifies the steps that vessel staff must take immediately to bring the situation under control, and then in the short and medium-term, to address the dangers to personnel, the environment and property.

The shipboard emergency response plan should consider:

- Failure of the steering control systems from the navigation bridge.
- A single steering system failure, either electrical or hydraulic.
- A complete failure of all steering systems and or the rudder(s).

The vessel operator should have developed a procedure to:

- Require the vessel to conduct each type of emergency response drill applicable to the vessel at a defined frequency.
- Record the details of emergency response drills in a defined format.
- Define the action to take if a drill cannot be completed within the required timeframe.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the shipboard emergency response plan for steering gear failure.
- Review the records of completed emergency response drills for the failure of the steering gear and verify that:
  - The latest drill had been completed within the timeframe defined by the drill schedule.
  - The details of the drill had been recorded in the defined format required by the company procedure.
  - The drill included the testing of the emergency steering systems by direct control.
  - The date and time of the latest drill was consistent with the vessel's activities as recorded within the Bridge Log Book.
- Interview one navigation officer and verify that they were familiar with a method for estimating the drift of a disabled tanker taking into account the wind, current and ship's head.
- If safe to do so, request that an accompanying officer demonstrate the operation of the emergency steering system and describes the use of the communication system and alternative power supplies.

### **Expected Evidence**

- The shipboard emergency response plan for steering gear failure.
- The records for completed steering gear failure and emergency steering drills.
- The vessel's Bridge Log Book for the previous six months.
- Where a drill had been deferred due to poor weather or sea conditions, communications with the company relating to the deferment.

### **Potential Grounds for a Negative Observation**

- The shipboard emergency plan for steering failure was insufficiently ship-specific.
- The accompanying officer was unfamiliar with the shipboard emergency plan for steering gear failure.
- An interviewed navigation officer was unfamiliar with the process for estimating a vessel's drift rate taking into account the wind, current and ship's head.

- An officer requested to demonstrate the operation of the emergency steering system was unfamiliar with the operation of the emergency steering gear.
  - The emergency steering gear was defective in any respect.
  - The drill records were not maintained in the format defined by the company procedure.
  - The drill scenario was unrealistic or inadequate to test the shipboard emergency plan.
  - Drill dates were inconsistent with the vessel activities as recorded within the Bridge Log Book.
  - The emergency response drill for a steering gear failure required by the company onboard emergency response procedure was overdue or had not been completed in accordance with the defined drill schedule.
- 
- Where a drill had been deferred due to poor weather or sea conditions and the vessel had notified the company, record as a **comment** within the Process response tool.

**5.1.13. Were the Master and officers familiar with the shipboard emergency plan for emergency towing, including the Emergency Towing Booklet (ETB), and had drills taken place to test the effectiveness of the shipboard emergency response plan in accordance with company procedures?**

**Short Question Text**

Emergency plan & drills for emergency towing

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Bridge, Cargo Control Room, Forecastle, Interview - Deck Officer, Interview - Engineer Officer

**Publications**

IMO: ISM Code

IMO SOLAS

IMO: MSC.1/Circ.1255 Guidelines for Owners/Operators on Preparing Emergency Towing Procedures

OCIMF/ICS: Peril at Sea and Salvage – A Guide for Masters. Sixth Edition.

**Objective**

**To ensure that the crew will respond to an emergency towing situation in accordance with the vessel's shipboard emergency response plan and Emergency Towing Booklet.**

**Industry Guidance**

**OCIMF/ICS: Peril at Sea and Salvage – A Guide for Masters. Sixth Edition.**

5 Towage and salvage

5.1 General

If the ship is disabled and cannot manoeuvre, efforts must be concentrated on staying clear of navigational hazards. See Chapter 3 for more guidance.

If the ship is drifting into danger, emergency towage will be needed. The most suitable salvage vessel available should be engaged under a salvage contract designed to save a ship in danger. The choice may be limited by the time available to connect a tow before the ship is endangered.

**IMO: MSC.1/Circ.1255 Guidelines for Owners/Operators on Preparing Emergency Towing Procedures.**

1 Purpose

The purpose of these Guidelines is to assist owners/operators in preparing ship-specific emergency towing procedures for ships subject to SOLAS regulation II-1/3-4. The procedures should be considered as part of the emergency preparedness required by paragraph 8 of part A of the International Safety Management (ISM) Code.

4 Emergency Towing Booklets.

4.1 The Emergency Towing Booklet (ETB) should be ship specific and be presented in a clear, concise and ready-to-use format (booklet, plan, poster, etc.).

4.3 All procedures developed in accordance with section 5 should be presented in a clear and easy to understand format, which will aid their smooth and swift application in an emergency situation.

4.4 Comprehensive diagrams and sketches should be available and include the following:

1. assembly and rigging diagrams.
2. towing equipment and strong point locations; and
3. equipment and strong point capacities and safe working loads (SWLs).

4.5 A copy should be kept at hand by the owners/operators in order to facilitate the passing on of information to the towage company as early as possible in the emergency. A copy should also be kept in a common electronic file format, which will allow faster distribution to the concerned parties.

4.6 A minimum of three copies should be kept on board and located in:

1. the bridge.
2. a forecastle space; and
3. the ship's office or cargo control room.

5.1 Ship-specific procedures should be identified during the ship's evaluation and entered accordingly in the ETB. The procedures should include, as a minimum, the following:

1. a quick-reference decision matrix that summarizes options under various emergency scenarios, such as weather conditions (mild, severe), availability of shipboard power (propulsion, on-deck power), imminent danger of grounding, etc.;
2. organization of deck crew (personnel distribution, equipment distribution, including radios, safety equipment, etc.);
3. organization of tasks (what needs to be done, how it should be done, what is needed for each task, etc.);
4. diagrams for assembling and rigging bridles, tow lines, etc., showing possible emergency towing arrangements for both fore and aft. Rigged lines should be lead such that they avoid sharp corners, edges and other points of stress concentration;
5. power shortages and dead ship situations, which must be taken into account, especially for the heaving across of heavy towing lines;
6. a communications plan for contacting the salvage/towing ship. This plan should list all information that the ship's master needs to communicate to the salvage/towing ship. This list should include but not be limited to:
  1. damage or seaworthiness;
  2. status of ship steering;
  3. propulsion;
  4. on deck power systems;
  5. on-board towing equipment;
  6. existing emergency rapid disconnection system;
  7. forward and aft towing point locations;
  8. equipment, connection points, strong points and safe working loads (SWL);
  9. towing equipment dimensions and capacities; and
  10. ship particulars;
7. valuation of existing equipment, tools and arrangements on board the ship for possible use in rigging a towing bridle and securing a towline;
8. identification of any minor tools or equipment providing significant improvements to the "towability" of the ship;
9. inventory and location of equipment on board that can be used during an emergency towing situation;
10. other preparations (locking rudder and propeller shaft, ballast and trim, etc.); and
11. other relevant information (limiting sea states, towing speeds, etc.).

**TMSA KPI 11.1.1** requires that detailed vessel emergency response plans include initial notification procedures and cover all credible emergency scenarios.

Vessel emergency response plans are reviewed at least annually, to reflect changes in legislation, contact details, vessel equipment and changes in company procedures.

They are additionally reviewed following any incident or drill where the emergency response plans have been used.

## **IMO: ISM Code**

8.1 The company should identify potential emergency shipboard situations and establish procedures to respond to them.

8.2 The company should establish programmes for drills and exercises to prepare for emergency actions

## **IMO: SOLAS**

### **Chapter II-1 Regulation 3-4**

#### **1 Emergency towing arrangements on tankers**

1.1 Emergency towing arrangements shall be fitted at both ends on board every tanker of not less than 20,000 tonnes deadweight.

1.2 For tankers constructed on or after 1 July 2002:

.1 the arrangements shall, at all times, be capable of rapid deployment in the absence of main power on the ship to be towed and easy connection to the towing ship. At least one of the emergency towing arrangements shall be pre-rigged ready for rapid deployment; and

.2 emergency towing arrangements at both ends shall be of adequate strength taking into account the size and deadweight of the ship, and the expected forces during bad weather conditions. The design and construction and prototype testing of emergency towing arrangements shall be approved by the Administration, based on the Guidelines developed by the Organization\*.

1.3 For tankers constructed before 1 July 2002, the design and construction of emergency towing arrangements shall be approved by the Administration, based on the Guidelines developed by the Organization\*.

#### **2 Emergency towing procedures on ships**

2.2 Ships shall be provided with a ship-specific emergency towing procedure. Such a procedure shall be carried aboard the ship for use in emergency situations and shall be based on existing arrangements and equipment available on board the ship.

2.3 The procedure shall include:

1. drawings of fore and aft deck showing possible emergency towing arrangements.
2. inventory of equipment on board that can be used for towing.
3. means and method of communication.
4. sample procedures to facilitate the preparation for and conducting of emergency towing operations.

## **Inspection Guidance**

The vessel operator should have developed ship-specific emergency towing procedures contained within an Emergency Towing Booklet (ETB).

The vessel operator should have developed a procedure to:

- Require the vessel to conduct each type of emergency response drill applicable to the vessel at a defined frequency.
- Record the details of emergency response drills in a defined format.
- Define the action to take if a drill cannot be completed within the required timeframe.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the Emergency Towing Booklet (ETB).
- Review the records of completed emergency towing drills and verify that:
  - The latest drill had been completed within the timeframe defined by the drill schedule.
  - The details of the drill had been recorded in the defined format required by the company procedure.
  - The date and time of the latest drill was consistent with the vessel's activities as recorded within the Bridge Log Book.
- Interview one navigation and one engineer officer to verify that they were familiar with the location of the ETB and the deployment process for the emergency towing arrangements fitted to the vessel.

### **Expected Evidence**

- The shipboard Emergency Towing Booklets.
- The records for completed emergency towing drills
- The vessel's Bridge Log Book for the previous twelve months.
- Where a drill had been deferred due to poor weather or sea conditions, communications with the company relating to the deferment.

### **Potential Grounds for a Negative Observation**

- There were no Emergency Towing Booklets available.
- Copies of the ETB were not available on the bridge, in a forecastle space or in the ship's office or cargo control room.
- The emergency towing procedures were insufficiently ship-specific.
- The accompanying officer was unfamiliar with the emergency towing procedures.
- An interviewed navigation or engineer officer was unfamiliar with the location of the ETB or the deployment process for the emergency towing arrangements fitted to the vessel.
- The drill records were not maintained in the format defined by the company procedure.
- The drill scenario was unrealistic or inadequate to test the emergency towing procedures.
- Drill dates were inconsistent with the vessel activities as recorded within the Bridge Log Book.
- The emergency response drill for emergency towing required by the company onboard emergency response procedure was overdue or had not been completed in accordance with the defined drill schedule.
- Where a drill had been deferred due to poor weather or sea conditions and the vessel had notified the company, record as a **comment** within the Process response tool.

**5.1.14. Were the Master, officers and ratings familiar with the shipboard emergency response plan for man overboard, including the launching and recovering the rescue boat, and had drills taken place to test the effectiveness of the shipboard emergency response plan in accordance with company procedures?**

**Short Question Text**

Man overboard emergency drill.

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation, Bridge, Interview - Deck Officer, Interview - Deck Rating

**Publications**

OCIMF: Survival Craft – A Seafarer’s Guide

IMO: ISM Code

IMO SOLAS

IMO: MSC.1/Circ.1206/Rev.1 Measures to prevent accidents with lifeboats.

IMO/ICAO International aeronautical and maritime search and rescue manual (IAMSAR) Vol III

**Objective**

**To ensure that the crew will respond effectively to a man overboard situation in accordance with the vessel’s shipboard emergency response plan.**

**Industry Guidance**

**OCIMF: Survival Craft. A Seafarer’s Guide.**

Familiarisation and Training

A significant factor in survival craft incidents occurring in the industry has often been identified as a lack of onboard familiarisation with the equipment fitted. It is imperative that a strong focus be given by the operator to the familiarisation and training of all ship’s staff in the handling of survival craft, with the aim of minimising risk factors associated with human error.

**IMO: MSC.1/Circ.1206/Rev.1 Measures to prevent accidents with lifeboats.**

**ANNEX 2 Guidelines on Safety During Abandon Ship Drills Using Lifeboats.**

1.3 Drills must be safe

1.3.1 Abandon ship drills should be planned, organized and performed so that the recognized risks are minimized and in accordance with relevant shipboard requirements of occupational safety and health.

1.3.2 Drills provide an opportunity to verify that the life-saving system is working and that all associated equipment is in place and in good working order, ready for use.

1.4 Emphasis on learning

Drills should be conducted with an emphasis on learning and be viewed as a learning experience, not just as a task to meet a regulatory requirement to conduct drills. Whether they are emergency drills required by SOLAS or additional special drills conducted to enhance the competence of the crew members, they should be carried out at safe speed. During drills, care should be taken to ensure that everybody familiarizes themselves with their duties and with the equipment. If necessary, pauses should be made during the drills to explain especially difficult elements.



The experience of the crew is an important factor in determining how fast a drill or certain drill elements should be carried out.

## 1.5 Planning and organizing drills

1.5.1 The 1974 SOLAS Convention requires that drills shall, as far as practicable, be conducted as if there was an actual emergency. This means that the entire drill should, as far as possible, be carried out. The point is that, at the same time, it should be ensured that the drill can be carried out in such a way that it is safe in every respect. Consequently, elements of the drill that may involve unnecessary risks need special attention or may be excluded from the drill.

1.5.2 In preparing for a drill, those responsible should review the manufacturer's instruction manual to assure that a planned drill is conducted properly. Those responsible for the drill should assure that the crew is familiar with the guidance provided in the life-saving system instruction manual.

1.5.3 Lessons learned in the course of a drill should be documented and made a part of follow-up shipboard training discussions and planning the next drill session.

1.5.4 The lowering of a boat with its full complement of persons is an example of an element of a drill that may, depending on the circumstances, involve an unnecessary risk. Such drills should only be carried out if special precautions are observed.

2.2.2 Procedures for holding safe drills should be included in the Safety Management System (SMS) of the shipping companies. Detailed procedures for elements of drills that involve a special risk should be evident from workplace assessments adjusted to the relevant life-saving appliance.

## IMO/ICAO International aeronautical and maritime search and rescue manual (IAMSAR) Vol III

**TMSA KPI 9.2.1** requires that risk assessments for routine tasks are used to develop safe working procedures.

The risk assessment identifies all hazards associated with a task and any personnel at risk. All risk mitigation measures to address identified hazards are incorporated into the safe working procedures.

## IMO: ISM Code

8.1 The company should identify potential emergency shipboard situations and establish procedures to respond to them.

8.2 The company should establish programmes for drills and exercises to prepare for emergency actions.

## IMO: SOLAS

### Chapter III Regulation 19

3.4.3 Except as provided in paragraphs 3.4.4 and 3.4.5, each lifeboat shall be launched, and manoeuvred in the water by its assigned operating crew, at least once every three months during an abandon ship drill.

3.4.6 As far as is reasonable and practicable, rescue boats other than lifeboats which are also rescue boats, shall be launched each month with their assigned crew aboard and manoeuvred in the water. In all cases this requirement shall be complied with at least once every 3 months.

3.4.7 If lifeboat and rescue boat launching drills are carried out with the ship making headway, such drills shall, because of the dangers involved, be practiced in sheltered waters only and under the supervision of an officer experienced in such drills.

## **Inspection Guidance**

The vessel operator should have developed a shipboard emergency response plan to identify the actions that vessel staff should take in a man overboard situation.

The vessel operator should have developed detailed procedures to identify the actions that vessel staff should take to launch and recover the rescue boat and to conduct a rescue boat launching drill in a safe manner without endangering those involved in the operation.

The vessel operator should have developed a procedure to:

- Require the vessel to conduct each type of emergency response drill applicable to the vessel at a defined frequency.
- Record the details of emergency response drills in a defined format.
- Define the action to take if a drill cannot be completed within the required timeframe.

## **Suggested Inspector Actions**

- Sight, and where necessary review, the shipboard emergency response plan for man overboard.
- Sight, and where necessary review, the ship specific procedure for launching and recovering the rescue boat as part of a drill.
- Review the records of completed man overboard and rescue boat launching drills and verify that:
  - The latest drill(s) had been completed within the timeframe defined by the drill schedule.
  - The details of the drill(s) had been recorded in the defined format required by the company procedure.
  - The date and time of the latest drill(s) were consistent with the vessel's activities as recorded within the Bridge Log Book.
- Interview one navigation officer and verify they were familiar with the ship specific procedure for the launching and subsequent recovery of the rescue boat.
- Interview one rating and verify that they were familiar with their role as identified in the muster list during a man overboard situation.

If the vessel had exercised the man overboard and rescue boat launching elements of the man overboard emergency response drill separately, consider the records of both elements when reviewing the evidence and assessing the familiarity of the interviewed officer/rating.

## **Expected Evidence**

- The shipboard emergency response plan for man overboard.
- The ship specific procedure for launching and recovering the rescue boat as part of a drill.
- The records for completed man overboard and rescue boat launching drills.
- The vessel's Bridge Log Book for the previous six months.
- Where a drill had been deferred due to poor weather or sea conditions, communications with the company relating to the postponement.

## **Potential Grounds for a Negative Observation**

- There was no emergency response plan for man overboard.
- There was no ship specific procedure for launching and recovering the rescue boat as part of a drill.
- The shipboard procedures were insufficiently ship-specific.

- The accompanying officer was unfamiliar with the shipboard emergency response plan for man overboard.
  - An interviewed navigation officer was unfamiliar with the ship-specific procedure for launching and recovering the rescue boat during a drill.
  - An interviewed rating was unfamiliar with their role, as defined by the muster list, during a man overboard situation.
  - The drill records were not maintained in the format defined by the company procedure.
  - The man overboard drill scenario was unrealistic or inadequate to test the shipboard emergency plan.
  - Drill dates were inconsistent with the vessel activities as recorded within the Bridge Log Book.
  - The emergency response drills for man overboard and launching the rescue boat required by the company procedures and SOLAS regulation were overdue or had not been completed in accordance with the defined drill schedule.
- 
- Where a rescue boat launching and recovery drill had been deferred due to poor weather or sea conditions and the vessel had notified the company, record as a **comment** within the Process response tool.

**5.1.15. Were the Master, officers and ratings familiar with the shipboard emergency response plan for recovery of persons from the water, and had drills taken place to test the effectiveness of the shipboard emergency response plan in accordance with company procedures?**

**Short Question Text**

Emergency response plan & drills for recovery of persons from the water

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Interview - Rating, Documentation, Bridge

**Publications**

IMO: ISM Code

IMO SOLAS

IMO: MSC.1/Circ.1447 Guidelines for the development of plans and procedures for recovery of persons from the water.

ICS: Recovery of persons from the water. Guidelines for the development of plans and procedures.

**Objective**

**To ensure that the crew will be able to safely recover persons from the water in accordance with the vessel's shipboard emergency response plan.**

**Industry Guidance**

**ICS: Recovery of persons from the water. Guidelines for the development of plans and procedures.**

In the majority of cases, the carriage of additional dedicated equipment will probably be unnecessary.

These guidelines have been developed to assist companies when preparing to comply with the new SOLAS Regulation III/17.1 and should be used together with the IMO Guidelines for the Development of Plans and Procedures for the Recovery of Persons from the Water (MSC.1/Circ.1447), the Guide to Recovery Techniques (MSC.1/1182) and the Guide for Cold Water Survival (MSC.1/Circ.1185/Rev.1)

**MSC.1/Circ.1447** Guidelines for the development of plans and procedures for recovery of persons from the water.

1.5 The plans and procedures should be considered as a part of the emergency preparedness plan required by paragraph 8 of part A of the International Safety Management (ISM) Code

2.7 Ship-specific procedures for the recovery of persons from the water should specify the anticipated conditions under which a recovery operation may be conducted without causing undue hazard to the ship and the ship's crew, taking into account, but not limited to:

1. manoeuvrability of the ship.
2. freeboard of the ship.
3. points on the ship to which casualties may be recovered.
4. characteristics and limitations of equipment intended to be used for recovery operations.
5. available crew and personal protective equipment (PPE).
6. wind force, direction and spray.
7. significant wave height (Hs).
8. period of waves.
9. swell; and
10. safety of navigation.

### 3 Competence and familiarization

Drills should ensure that crew are familiar with the plans, procedures and equipment for recovery of persons from the water. Such drills may be conducted in conjunction with routine man-overboard drills.

**TMSA KPI 11.1.1** requires that detailed vessel emergency response plans include initial notification procedures and cover all credible emergency scenarios.

Vessel emergency response plans are reviewed at least annually, to reflect changes in legislation, contact details, vessel equipment and changes in company procedures.

They are additionally reviewed following any incident or drill where the emergency response plans have been used.

#### **IMO: ISM Code**

8.1 The company should identify potential emergency shipboard situations and establish procedures to respond to them.

8.2 The company should establish programmes for drills and exercises to prepare for emergency actions.

#### **IMO: SOLAS**

Chapter III Regulation 17-1

Recovery of persons from the water

1. All ships shall have ship-specific plans and procedures for recovery of persons from the water, taking into account the guidelines developed by the Organization. The plans and procedures shall identify the equipment intended to be used for recovery purposes and measures to be taken to minimize the risk to shipboard personnel involved in recovery operations...

#### **Inspection Guidance**

The vessel operator should have developed a shipboard emergency response plan to identify the actions that vessel staff must take to recover persons from the water in a safe manner without further endangering those involved in the operation.

The vessel operator should have developed a procedure to:

- Require the vessel to conduct each type of emergency response drill applicable to the vessel at a defined frequency.
- Record the details of emergency response drills in a defined format.
- Define the action to take if a drill cannot be completed within the required timeframe.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the shipboard emergency response plan for recovery of persons from the water
- Review the records of completed recovery from the water drills and verify that:
  - The latest drill had been completed within the timeframe defined by the drill schedule.
  - The details of the drill had been recorded in the defined format required by the company procedure.
  - The date and time of the latest drill was consistent with the vessel's activities as recorded within the Bridge Log Book.

- Interview one rating and verify that they were familiar with the recovery of persons from the water plan and their expected role in such an emergency response.

#### **Expected Evidence**

- The shipboard emergency response plan for the recovery of persons from the water.
- The records for completed recovery of persons from the water drills.
- The vessel's Bridge Log Book for the previous twelve months.
- Where a drill had been deferred due to poor weather or sea conditions, communications with the company relating to the deferment.

#### **Potential Grounds for a Negative Observation**

- There was no shipboard emergency response plan for the recovery of persons from the water available.
  - The shipboard emergency response plan for the recovery of persons from the water was insufficiently ship-specific.
  - The drill records were not maintained in the format defined by the company procedure.
  - The accompanying officer was unfamiliar with the shipboard emergency response plan for the recovery of persons from the water.
  - An interviewed deck rating was unfamiliar with the recovery of persons from the water plan and their expected role in such an emergency response.
  - The drill scenario was unrealistic or inadequate to test the shipboard emergency response plan for the recovery of persons from the water.
  - Drill dates were inconsistent with the vessel activities as recorded within the Bridge Log Book.
  - The emergency response drill for recovery of persons from the water required by the company procedures was overdue or had not been completed in accordance with the defined drill schedule.
- 
- Where a drill had been deferred due to poor weather or sea conditions and the vessel had notified the company, record as a **comment** within the Process response tool.

**5.1.16. Were the Master and officers familiar with the shipboard emergency plans for flooding, and had drills taken place to test the effectiveness of the shipboard emergency response plans in accordance with company procedures?**

**Short Question Text**

Emergency plans & drills for flooding

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation, Bridge, Cargo Control Room

**Publications**

IMO Resolution A.1072(28) Revised guidelines for a structure of an integrated system of contingency planning for shipboard emergencies.

OCIMF/ICS: Peril at Sea and Salvage – A Guide for Masters. Sixth Edition.

ICS: Bridge Procedures Guide – Fifth Edition

IMO: ISM Code

**Objective**

**To ensure that the crew will respond effectively to a flooding situation in accordance with the vessel's shipboard emergency response plan.**

**Industry Guidance**

**ICS: Bridge Procedures Guide. Fifth Edition.**

Checklist C8 Flooding / Hull Failure

**OCIMF/ICS: Peril at Sea and Salvage: A Guide for Masters. Sixth Edition.**

**3.4.1 Control accidental flooding**

Any damage causing flooding of the machinery spaces must be dealt with urgently. The consequences of flooding in the machinery spaces can be catastrophic, including:

- Loss of buoyancy, compromising the ship's ability to stay afloat in the conditions.
- Loss of propulsion, power generating capacity, and other safety critical equipment/systems.
- Reduced capability of the ship to contain the emergency, e.g. loss of bilge pumps and/or firefighting pumps.
- Loss of the ship.

**IMO Resolution A.1072(28) Revised guidelines for a structure of an integrated system of contingency planning for shipboard emergencies**

3.2.4.12 In summary, the module should guide those responsible for developing the system on what should be included in emergency plans, namely:

- coordination of response effort.
- response procedures for the entire spectrum of possible accident scenarios, including methods that protect life, the marine environment and property.
- the person or persons identified by title or name as being in charge of all response activities.
- the communication lines used for ready contact with external response experts.
- information concerning the availability and location of response equipment.

- reporting and communication procedures on board ship.

**TMSA KPI 11.1.1** requires that detailed vessel emergency response plans include initial notification procedures and cover all credible emergency scenarios.

Vessel emergency response plans are reviewed at least annually, to reflect changes in legislation, contact details, vessel equipment and changes in company procedures.

They are additionally reviewed following any incident or drill where the emergency response plans have been used.

### **IMO: ISM Code**

8.1 The company should identify potential emergency shipboard situations and establish procedures to respond to them.

8.2 The company should establish programmes for drills and exercises to prepare for emergency actions

### **Inspection Guidance**

The vessel operator should have developed a shipboard emergency response plan for each of the principal flooding scenarios which are appropriate to the vessel type, which will include where applicable, but will not necessarily be limited to:

- Machinery space flooding.
- Pumproom flooding.
- Forecastle space flooding.
- Hull breach.

The plans will identify the steps that vessel staff must take immediately to bring the situation under control, and then in the short and medium-term, to address the dangers to personnel, the environment and property.

The vessel operator should have developed a procedure to:

- Require the vessel to conduct an emergency response drill to test the crew familiarity with each credible emergency scenario applicable to the vessel type at a defined frequency.
- Require that the details of emergency response drills are recorded in a defined format.
- Define the action to take if a drill cannot be completed within the required timeframe.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the shipboard emergency response plans for the principal flooding scenarios which were appropriate to the vessel type, which should include:
  - Machinery space flooding.
  - Pumproom flooding (where fitted).
  - Forecastle space flooding.
  - Hull breach/failure.
- Review the records of completed flooding emergency response drills and verify that:
  - The latest drill had been completed within the timeframe defined by the drill schedule.
  - The details of the drill had been recorded in the defined format required by the company procedure.
  - The date and time of the latest drill was consistent with the vessel's activities as recorded within the Bridge Log Book.
  - Each of the emergency response plans for flooding scenarios applicable to the vessel type had been exercised within the previous twelve months.



### **Expected Evidence**

- The shipboard emergency response plans for the flooding scenarios applicable to the vessel type.
- The records for completed flooding emergency response drills.
- The vessel's Bridge Log Book for the previous twelve months.
- Where a drill had been deferred due to poor weather or sea conditions, communications with the company relating to the deferment.

### **Potential Grounds for a Negative Observation**

- There was no shipboard emergency plan available for one or more of the flooding scenarios applicable to the vessel type.
- The shipboard emergency plans were insufficiently ship-specific.
- The accompanying officer was unfamiliar with the shipboard emergency plans for flooding situations.
- The drill records were not maintained in the format defined by the company procedure.
- The drill scenarios were unrealistic or inadequate to test the shipboard emergency plan.
- Drill dates were inconsistent with the vessel activities as recorded within the Bridge Log Book.
- One or more of the emergency response drills for a flooding scenario required by the company onboard emergency response procedure was overdue or had not been completed in accordance with the defined drill schedule.

Where a drill had been deferred due to poor weather or sea conditions and the vessel had notified the company, record as a **comment** within the Process response tool.

**5.1.17. Were the Master and officers familiar with the shipboard emergency plans regarding LNG bunker operations, and had drills taken place to test the effectiveness of the shipboard emergency response plans in accordance with company procedures?**

**Short Question Text**

Emergency plans and drills for LNG bunker operations

**Vessel Types**

Oil, Chemical, LPG

**ROVIQ Sequence**

Engine Control Room, Documentation

**Publications**

IMO: ISM Code

IMO: IGF Code

IACS: Rec 142. LNG Bunkering Guidelines (2016)

**Objective**

**To ensure that the crew will respond effectively to an emergency situation involving LNG bunker operations in accordance with the vessel's shipboard emergency response plans.**

**Industry Guidance**

**IACS: Rec 142 LNG Bunkering Guidelines (2016)**

Chapter 1 Section 4.1.3.2 Emergency Response Plan

An Emergency Response Plan should be prepared to address cryogenic hazards, potential cold burn injuries to personnel and firefighting techniques for controlling, mitigating and elimination of a gas cloud fire, jet fire and/or an LNG pool fire.

The Emergency Response Plan should cover all emergency situations identified in the LNG Bunkering Operations Risk Assessment and may designate responsibilities for local authorities, hospitals, local fire brigades, PIC, Master and selected personnel from the bunkering facility. As a minimum, the following situations should be covered where appropriate:

- LNG leakage and spill on the receiving ship, on the bunkering facility or from the LNG transfer system
- Gas detection
- Fire in the bunkering area
- Unexpected movement of the vessel due to failure or loosening of mooring lines
- Unexpected moving of the truck tanker
- Unexpected venting on the receiving ship or on the bunkering facility
- Loss of power

**TMSA KPI 11.1.1** requires that detailed vessel emergency response plans include initial notification procedures and cover all credible emergency scenarios.

Vessel emergency response plans are reviewed at least annually, to reflect changes in legislation, contact details, vessel equipment and changes in company procedures.

They are additionally reviewed following any incident or drill where the emergency response plans have been used.

**IMO: ISM Code**

8.1 The company should identify potential emergency shipboard situations and establish procedures to respond to them.

8.2 The company should establish programmes for drills and exercises to prepare for emergency actions.

#### **IMO: IGF Code**

##### **17 Drills and emergency exercises**

Drills and emergency exercises on board shall be conducted at regular intervals.

Such gas-related exercises could include for example:

1. tabletop exercise.
2. review of fuelling procedures based in the fuel handling manual required by 18.2.3.
3. responses to potential contingencies.
4. tests of equipment intended for contingency response, and
5. reviews that assigned seafarers are trained to perform assigned duties during fuelling and contingency response.

Gas related exercises may be incorporated into periodical drills required by SOLAS.

The response and safety system for hazards and accident control shall be reviewed and tested.

##### **18 Operation**

18.2.3 the ship shall be provided with operational procedures including a suitably detailed fuel handling manual, such that trained personnel can safely operate the fuel bunkering, storage and transfer systems; and

18.2.4 the ship shall be provided with suitable emergency procedures.

18.4.2.1 The fuel handling manual required by 18.2.3 shall include but is not limited to:

5 firefighting and emergency procedures: operation and maintenance of firefighting systems and use of extinguishing agents.

8 emergency shutdown and emergency release systems, where fitted: and

9 a description of the procedural actions to take in an emergency situation, such as leakage, fire or potential fuel stratification resulting in rollover.

#### **Inspection Guidance**

The vessel operator should have developed a fuel handling manual for LNG bunkers that includes emergency procedures to identify the actions that vessel staff must take in the short and medium term to address the dangers to personnel, the environment and property in the event of an incident. These emergency procedures may be incorporated into an integrated system of shipboard emergency plans

The vessel operator should have developed a procedure to:

- Require the vessel to conduct each type of emergency response drill applicable to the vessel at a defined frequency.
- Record the details of emergency response drills in a defined format.

- Define the action to take if a drill cannot be completed within the required timeframe.

LNG bunker operations related exercises may be incorporated into other required drills such as fire drills.

The emergency response plans should have been developed to identify any actions that require the crew to respond in a counter intuitive manner such as identifying hose and pipe coupling connections that open and close in opposite directions from normal couplings in common use.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the emergency procedures contained in the fuel handling manual for LNG bunkers.
- Review the records of completed LNG bunker related drills and verify that:
  - The latest drill had been completed within the timeframe defined by the drill schedule.
  - All drill or exercise scenarios required to be undertaken by company procedures or the fuel handling manual had been completed within the time frame defined by the company.
  - The details of the drill had been recorded in the defined format required by the company procedure.
  - The date and time of the latest drill was consistent with the vessel's activities as recorded within the Bridge Log Book.

### **Expected Evidence**

- The vessel's fuel handling manual for LNG bunkers.
- The emergency response plans for LNG bunkers if not contained within the fuel handling manual.
- The records for completed LNG bunker related drills.
- The vessel's Bridge Log Book for the previous twelve months.

### **Potential Grounds for a Negative Observation**

- There was no fuel handling manual for LNG bunkers available.
  - The fuel handling manual did not include emergency procedures.
  - The emergency procedures were insufficiently ship-specific.
  - The accompanying officer was unfamiliar with the emergency procedures contained in the fuel handling manual for LNG bunkers.
  - The drill records were not maintained in the format defined by the company procedure.
  - The drill scenario was unrealistic or inadequate to test the shipboard emergency plan.
  - Drill dates were inconsistent with the vessel activities as recorded within the Bridge Log Book.
  - The latest drill was overdue for completion.
  - LNG bunkering drill or exercise scenarios required to be undertaken according to the company drill schedule had not been completed within the defined time frame.
- 
- Where a drill had been deferred due to poor weather or sea conditions and the vessel had notified the company, record as a **comment** within the Process response tool.

**5.1.18. Were the Master and officers familiar with the company procedures setting out the actions to be taken in the event of a cargo leak into a double hull tank, and was all required equipment available and in satisfactory condition?**

**Short Question Text**

Cargo leak into double hull spaces.

**Vessel Types**

Oil, Chemical

**ROVIQ Sequence**

Interview - Deck Officer, Cargo Control Room, Main Deck

**Publications**

ICS: Tanker Safety Guide (Chemicals) - Fifth Edition

IMO: ISM Code

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

**Objective**

**To ensure the crew can respond promptly and effectively in the event of a cargo leak into a double hull tank.**

**Industry Guidance**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition**

12.7 Cargo leaks into double hull tanks

12.7.1 Action to be taken

If hydrocarbon gas is detected in a tank, there are a number of options for maintaining a safe tank atmosphere:

- Continuous ventilation.
- Filling or partially filling with ballast.
- Securing with P/V valves.
- Securing with vent valves fitted with flames screens.
- A combination of these.

The chosen option will depend on several factors, especially the degree of confidence in the hydrocarbon content of the atmosphere, bearing in mind the potential problems already identified.

If inerting, fitting a P/V valve will be a way of pressing up the tank with IG after inerting to less than 8% oxygen.

When ventilating a tank, consider fitting flame screens to allow air to flow safely and maintain a non-flammable atmosphere in the air space.

Operators should develop procedures that account for the tank structure and any limitations of the available atmosphere monitoring system. These procedures should help the crew to choose the most appropriate way to make the atmosphere safe.

Ships should have written procedures on board that set out the steps to take to safely transfer the cargo from the ballast space.

12.7.2 Inerting double hull tanks

The complexity of the structure in double hull and double bottom tanks makes them more difficult to inert than conventional tanks. The operator should use these guidelines as a basis for developing procedures (similar to those in section 12.4.7) for inerting such tanks. If possible, the procedures should be developed with the ship builder and be based on actual tests and experiments as well as calculations. They should describe the process for each tank, the equipment to be used and its configuration, and the time it takes to reduce the oxygen level in the tank to less than 8% by volume.

Clearly identify the flexible hoses used for inerting double hull tanks. They should be dedicated solely to this use and stowed safely and correctly. The hose string should be electrically continuous. Verify this before putting hoses into service. Confirm that the string is properly earthed before inerting starts.

### **ICS: Tanker Safety Guide (Chemicals) - Fifth Edition**

#### **10.5.3 Tank leaks within the ship**

A leak from a cargo tank into void or ballast spaces may cause damage to the ship's structure or equipment. It may also create an explosive atmosphere and a risk to personnel.

The actions to be taken may differ depending on the product involved and other circumstances such as the weather, but should as a minimum include the following:

- Identify the products involved and the risks associated with them;
- Clear the area of all non-essential personnel;
- Identify the location of the leak;
- Transfer the product in the leaking tank to an empty tank, if possible;
- Notifying port and local authorities and the company, as appropriate; and
- Take remedial action.

Spills in confined spaces such as pumprooms should, where practicable, first be contained and then treated and collected for safe disposal. An acid spill should be prevented from entering mild steel areas of the ship as rapid corrosion can occur. In extreme cases the consequent hull corrosion can cause the ship to sink.

Leaks from one cargo tank to another, or multiple leaks where there is a risk of mixing incompatible chemicals, should always be thoroughly investigated and may need to be treated as an emergency.

Where time allows, expert advice should be sought on the possible risks involved. A non-cargo space that has had a chemical leaking into it should be treated as a cargo space and the same precautions taken. It should be cleaned and gas freed before any attempt is made for repairs.

**TMSA KPI 6.1.1** requires that procedures for cargo, ballast, tank cleaning and bunkering operations are in place for all vessel types within the fleet. The procedures include:

- Maintaining safe tank atmospheres.

### **IMO: ISM Code**

7 The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks involved should be defined and assigned to qualified personnel.

### **IMO: SOLAS**

#### **Chapter II-2 Regulation 4**

5.5.1.4 Tankers required to be fitted with inert gas systems shall comply with the following provisions:

1. double-hull spaces shall be fitted with suitable connections for the supply of inert gas.
2. where hull spaces are connected to a permanently fitted inert gas distribution system, means shall be provided to prevent hydrocarbon gases from the cargo tanks entering the double hull spaces through the system; and
3. where such spaces are not permanently connected to an inert gas distribution system, appropriate means shall be provided to allow connection to the inert gas main.

#### **IACS UI SC 272 Inert gas supply to double-hull spaces (SOLAS II-2/4.5.5.1)**

Double-hull spaces required to be fitted with suitable connections for the supply of inert gas as per SOLAS II-2/4.5.5.1.4.1 are all ballast tanks and void spaces of double-hull and double-bottom spaces adjacent to the cargo tanks, including the forepeak tank and any other tanks and spaces under the bulkhead deck adjacent to cargo tanks, except cargo pump-rooms and ballast pump-rooms.

#### **Inspection Guidance**

The vessel operator should have developed procedures setting out the actions to be taken in the event of a cargo leak into a double hull tank. These procedures should address the various options for maintaining a safe atmosphere in the tank, including:

- Identifying the cargoes involved and the risks associated with them.
- Continuous ventilation.
- Filling or partially filling with ballast.
- Securing with P/V valves.
- Securing with vent valves fitted with flames screens.
- A combination of these.

Procedures should describe the process for each tank, the equipment to be used and its configuration. They should also provide guidance on how to safely transfer the cargo from the ballast space.

Equipment required by these procedures may include:

- Emergency ballast/cargo system connection spool piece.
- Emergency ballast/inert gas system connection spool piece.
- Flexible inert gas hoses.
- P/V valves.
- Flame screens.
- Portable standpipes.
- Portable fans.

#### **Suggested Inspector Actions**

- Sight, and where necessary, review the company procedures setting out the actions to be taken in the event of a cargo leak into a double hull tank.
- During the tour of the deck, inspect the equipment required by these procedures to verify its availability, suitable stowage and satisfactory condition.
- Interview the accompanying officer to verify their familiarity with the company procedures setting out the actions to be taken in the event of a cargo leak into a double hull tank, and the location of the required equipment.

#### **Expected Evidence**

- Company procedures setting out the actions to be taken in the event of a cargo leak into a double hull tank.
- If available, an inventory of the equipment required by these procedures.
- Records of tests for electrical continuity of flexible hoses designated for inerting double hull tanks.

#### **Potential Grounds for a Negative Observation**

- There were no company procedures setting out the actions to be taken in the event of a cargo leak into a double hull tank.
- The accompanying officer was not familiar with the company procedures setting out the actions to be taken in the event of a cargo leak into a double hull tank.
- The accompanying officer was not familiar with the location of the equipment required by company procedures setting out the actions to be taken in the event of a cargo leak into a double hull tank.
- An item of equipment required by the company procedures setting out the actions to be taken in the event of a cargo leak into a double hull tank was:
  - not available on board.
  - not stowed safely and correctly.
  - defective in any respect.
- Where double-hull spaces were not permanently connected to an inert gas distribution system, there were no flexible hoses dedicated solely to inerting double hull tanks.
- There were no records of tests for electrical continuity of the flexible hoses designated for inerting double hull tanks.



**5.1.19. Were the Master and officers familiar with the emergency arrangements to pump out the spaces forward of the collision bulkhead in the event of flooding and were these arrangements prominently marked and in good order?**

**Short Question Text**

OBO forward space emergency pumping arrangements

**Vessel Types**

Oil

**ROVIQ Sequence**

Interview - Deck Officer, Bridge, Forecastle, Engine Control Room

**Publications**

IMO: ISM Code

IMO SOLAS

IACS UI SC 179 Dewatering of forward spaces of bulk carriers (Resolution MSC.188(79))

**Objective**

**To ensure forward ballast tanks and dry spaces on OBO and Ore-Oil combination carriers can be pumped out safely in the event of flooding.**

**Industry Guidance**

**IACS UI SC 179 Dewatering of forward spaces of bulk carriers (Resolution MSC.188(79))**

2.1 The valve specified under SOLAS regulation II-1/12.5.1 (12.6.1) is to be capable of being controlled from the navigation bridge, the propulsion machinery control position or enclosed space which is readily accessible from the navigation bridge or the propulsion machinery control position without travelling exposed freeboard or superstructure decks. In this context, a position which is accessible via an under deck passage, a pipe trunk or other similar means of access is not to be taken as being in the "readily accessible enclosed space".

5. Bilge wells are to be provided with gratings or strainers that will prevent blockage of the dewatering system with debris.

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors. The documented procedures may include familiarisation with:

- Vessel specific operations and equipment.

**IMO: ISM Code**

6.3 The Company should establish procedures to ensure that new personnel and personnel transferred to new assignments related to safety and protection of the environment are given proper familiarisation with their duties. Instructions which are essential to be provided prior to sailing should be identified, documented and given.

**IMO: SOLAS**

Chapter XII Regulation 13.1

Additional safety measures for bulk carriers

Availability of pumping systems

(This regulation applies to bulk carriers regardless of their date of construction)

On bulk carriers, the means for draining and pumping ballast tanks forward of the collision bulkhead and bilges of dry spaces any part of which extends forward of the foremost cargo hold shall be capable of being brought into operation from a readily accessible enclosed space, the location of which is accessible from the navigation bridge or propulsion machinery control position without traversing exposed freeboard or superstructure decks. Where pipes serving such tanks or bilges pierce the collision bulkhead, valve operation by means of remotely operated actuators may be accepted, as an alternative to the valve control specified in regulation II-1/12, provided that the location of such valve controls complies with this regulation.

### **Inspection Guidance**

This question is only applicable to OBO and Ore/Oil vessel types.

The vessel operator should have developed vessel-specific procedures to pump out the spaces forward of the collision bulkhead in the event of flooding, including guidance on:

- The use of the pumps/eductors connected to the systems, their direct suctions and overboard valves.
- The marking of system valves and controls to ensure correct operation and avoid accidental opening.

The vessel-specific instructions for pumping out the spaces forward of the collision bulkhead in an emergency may be included as part of the vessel emergency response plan for forecastle space flooding.

The remote controls for the system should not be accessed via an under deck passage, a pipe trunk or other similar means of access.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures to pump out the spaces forward of the collision bulkhead in the event of flooding.
- Inspect the arrangements to pump out the spaces forward of the collision bulkhead including:
  - Bilge wells, suctions etc. in the forecastle spaces.
  - Remote controls at the navigation bridge, engine control room or enclosed space accessible from the bridge or engine control room without traversing exposed freeboard or superstructure decks.
- Interview the accompanying officer to verify their understanding of how the forward spaces would be pumped out in an emergency utilising the system provided onboard. This should include the sequence of opening and closing valves and starting the appropriate pump.

### **Expected Evidence**

- The company procedures to pump out the spaces forward of the collision bulkhead in the event of flooding.
- The shipboard emergency response plan for forecastle space flooding.

### **Potential Grounds for a Negative Observation**

- There were no company procedures to pump out the spaces forward of the collision bulkhead in the event of flooding.
- There was no shipboard emergency response plan for forecastle space flooding.
- The company procedures to pump out the spaces forward of the collision bulkhead in the event of flooding were not ship specific.
- The accompanying officer was unfamiliar with company procedures to pump out the spaces forward of the collision bulkhead in the event of flooding.

- The condition of the arrangements to pump out the spaces forward of the collision bulkhead in the event of flooding was unsatisfactory in any respect which might make the operation difficult or impossible in an emergency, such as:
  - The suction wells in the forecastle dry spaces were obstructed by stores, ropes etc.
  - Bilge wells were not provided with gratings or strainers that would prevent blockage of the dewatering system with debris.
  - Access to the remote controls was obstructed.
- The remote controls for the arrangements to pump out the spaces forward of the collision bulkhead were not:
  - At the bridge, engine control room or in a location which was accessible from the bridge or engine control room without traversing exposed freeboard or superstructure decks.
  - Prominently marked as to their purpose.
- The arrangements to pump out the spaces forward of the collision bulkhead in the event of flooding were defective in any respect.

## 5.2. Fixed Fire Protection Systems

**5.2.1. Were the Master, officers and ratings familiar with the starting procedure for the emergency fire pump, and were records available to demonstrate that the emergency fire pump and its location had been maintained and tested in accordance with company procedures?**

### **Short Question Text**

Emergency fire pump

### **Vessel Types**

Oil, Chemical, LPG, LNG

### **ROVIQ Sequence**

Steering Gear, Aft Mooring Deck

### **Publications**

IMO: ISM Code

IMO: FSS Code

IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances.

IMO SOLAS

### **Objective**

**To ensure that crewmembers can respond effectively to a fire situation in accordance with the shipboard emergency plan.**

### **Industry Guidance**

**IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances.**

#### 2 Operational readiness

All fire protection systems and appliances should at all times be in good order and readily available for immediate use while the ship is in service. If a fire protection system is undergoing maintenance, testing or repair, then suitable arrangements should be made to ensure safety is not diminished through the provision of alternate fixed or portable fire protection equipment or other measures. The onboard maintenance plan should include provisions for this purpose.

#### 3 Maintenance and testing

3.1 Onboard maintenance and inspections should be carried out in accordance with the ship's maintenance plan, which should include the minimum elements listed in sections 4 to 10 of these Guidelines.

3.2 Certain maintenance procedures and inspections may be performed by competent crew members who have completed an advanced fire-fighting training course, while others should be performed by persons specially trained in the maintenance of such systems. The onboard maintenance plan should indicate which parts of the recommended inspections and maintenance are to be completed by trained personnel.

3.3 Inspections should be carried out by the crew to ensure that the indicated weekly, monthly, quarterly, annual, two-year, five-year and ten-year actions are taken for the specified equipment, if provided. Records of the inspections should be carried on board the ship or may be computer-based. In cases where the inspections and maintenance are carried out by trained service technicians other than the ship's crew, inspection reports should be provided at the completion of the testing.

3.4 In addition to the onboard maintenance and inspections stated in these Guidelines, manufacturer's maintenance and inspection guidelines should be followed.

3.5 Where particular arrangements create practical difficulties, alternative testing and maintenance procedures should be to the satisfaction of the Administration.

*(These guidelines set out requirements applicable to emergency fire pumps for:*

- *Monthly tests and inspections*
- *Annual tests and inspections)*

**TMSA KPI 4A.1.4** requires that procedures are in place to record the testing of critical equipment and systems that are not in continuous use. Testing is performed in accordance with mandatory requirements and manufacturers' recommendations.

#### **IMO: ISM Code**

10.3 The company should identify equipment and technical systems the sudden operational failure of which may result in hazardous situations. The SMS should provide for specific measures aimed at promoting the reliability of such equipment or systems. These measures should include the regular testing of standby arrangements and equipment or technical systems that are not in continuous use.

#### **IMO: SOLAS**

##### Chapter II-2 Regulation 4

2.2.3.4 Oil fuel pipes, which if damaged would allow oil to escape from a storage, settling or daily service tank having a capacity of 500 litres and above situated above the double bottom, shall be fitted with a cock or valve directly on the tank capable of being closed from a safe position outside the space concerned in the event of a fire occurring in the space in which such the tanks are situated.

##### Chapter II/2 Regulation 10

##### 2.2.3.2.1 Location of the space

The space containing the fire pump shall not be contiguous to the boundaries of machinery spaces of category A or those spaces containing main fire pumps. Where this is not practicable, the common bulkhead between the two spaces shall be insulated to a standard of structural fire protection equivalent to that required for a control station.

##### 2.2.3.2.2 Access to the emergency fire pump

No direct access shall be permitted between the machinery space and the space containing the emergency fire pump and its source of power. When this is impracticable, the Administration may accept an arrangement where the access is by means of an airlock with the door of the machinery space being of "A-60" class standard and the other door being at least steel, both reasonably gastight, self-closing and without any hold-back arrangements. Alternatively, the access may be through a watertight door capable of being operated from a space remote from the machinery space and the space containing the emergency fire pump and unlikely to be cut off in the event of fire in those spaces. In such cases, a second means of access to the space containing the emergency fire pump and its source of power shall be provided.

#### **IMO: FSS Code**

##### Chapter 12 – Fixed emergency fire pumps

##### 2.2.1.2 Pressure at hydrants

When the pump is delivering the quantity of water required by paragraph 2.2.1.1, the pressure at any hydrants shall be not less than the minimum pressure required by chapter II-2 of the Convention.

### 2.2.1.3 Suction heads

The total suction head and the net positive suction head of the pump shall be determined having due regard to the requirements of the Convention and this chapter on the pump capacity and on the hydrant pressure under all conditions of list, trim, roll and pitch likely to be encountered in service...

#### 2.2.2.1 Starting of diesel engine

Any diesel-driven power source for the pump shall be capable of being readily started in its cold condition down to the temperature of 0°C by hand (manual) cranking. Where ready starting cannot be assured, if this is impracticable, or if lower temperatures are likely to be encountered, and if the room for the diesel driven power source is not heated, electric heating of the diesel engine cooling water or lubricating oil system shall be fitted, to the satisfaction of the Administration. If hand (manual) starting is impracticable, the Administration may permit compressed air, electricity, or other sources of stored energy, including hydraulic power or starting cartridges to be used as a means of starting. These means shall be such as to enable the diesel-driven power source to be started at least six times within a period of 30 min. and at least twice within the first 10 min.

#### 2.2.2.2 Fuel Tank capacity

Any service fuel tank shall contain sufficient fuel to enable the pump to run on full load for a least 3 h and sufficient reserves of fuel shall be available outside the machinery space of category A to enable the pump to be run on full load for an additional 15 h.

## Inspection Guidance

The vessel operator should have developed procedures for the starting and testing of the emergency fire pump.

The vessel operator should have developed procedures to ensure access to the emergency fire pump space remains possible in all circumstances.

Ship-specific starting instructions for the emergency fire pump in the working language of the ship should be prominently displayed adjacent to the equipment. These instructions are not for the use of the qualified engineering personnel, but for others who might be required to start the emergency fire pump in an emergency.

If necessary, the emergency fire pump fuel tank should be charged with fuel designed for use in sub-zero temperatures.

The position and identification of the closing devices for the emergency fire pump fuel supply must be clearly marked.

## Suggested Inspector Actions

- Sight, and where necessary review, the company procedures for the operation and testing of the emergency fire pump.
- Review the ship-specific starting instructions posted adjacent to the emergency fire pump.
- Where the emergency fire pump location is accessed through the machinery space verify that:
  - The airlock doors between the machinery space and the space containing the emergency fire pump were closed with no indication that the doors had been held in the open position.
  - The second means of access from the deck was not locked or secured to prevent access from the outside.
- Verify that the inlet and outlet valves to the emergency fire pump were clearly marked and open.

- Provided it is safe to do so, witness the starting of the emergency fire pump and verify that the pump reaches and maintains the required pressure while discharging through the anchor washes or other outlet.
- Where the emergency fire pump was driven by a diesel engine:
  - Sight the level in the emergency fire pump fuel tank.
  - Where the vessel was operating in sub-zero temperatures verify that the fuel in the tank was designed for use in sub-zero temperatures.
  - Witness a test of the quick closing valve for the emergency fire pump engine where permitted.
- If necessary, review maintenance records to verify that testing of the emergency fire pump and quick closing valve had taken place in accordance with the maintenance plan.
- Where it was not possible to start the emergency fire pump, interview an officer or rating to verify their familiarity with the manual starting of the emergency fire pump and its diesel engine.

### **Expected Evidence**

- The company procedures for the operation and testing of the emergency fire pump.
- The ship-specific procedure for starting the emergency fire pump.
- Onboard records for the testing of the emergency fire pump and, where driven by a diesel engine, the engine and the fuel quick closing valve.

### **Potential Grounds for a Negative Observation**

- There was no company procedure for starting and testing the emergency fire pump.
- Where the access to the emergency fire pump space was through the machinery space:
  - One or both air-lock doors were either open or there was evidence that they had been held open.
  - The second access door was locked or secured to prevent access to the space from the outer decks in the event of a fire in the machinery space.
- There were no ship-specific starting instructions posted adjacent to the emergency fire pump.
- The emergency fire pump sea suction or discharge valves were closed when the pump was designed for remote operation.
- Where fitted, the remote hand pump for operating the emergency fire pump sea suction valve was inoperative.
- The posted starting instructions were unclear or inadequate.
- Officers and/or ratings were not familiar with the ship-specific starting instructions for the emergency fire pump.
- The emergency fire pump diesel engine would not start within three attempts by either the primary or manual means.
- The emergency fire pump would not gain suction or generate the required pressure and/or flow without manual intervention beyond that described in the starting instructions.
- The emergency fire pump or, where fitted, its diesel engine was defective in any respect.
- There were significant water leaks from the emergency fire pump or its pipework.
- Engineer officers were not familiar with the operating and testing procedures for the emergency fire pump, its engine or the fuel quick closing valve.
- There was not enough fuel in the tank to run for 3 hours or the required level had not been established.
- There was not enough fuel available both in the tank and outside the space to run the emergency fire pump at full load for at least 18 hours (3 + 15 h)
- The vessel was or had been trading in sub-zero temperatures but the fuel in the tank was not designed for use in sub-zero temperatures.
- The fuel quick closing valve, where required to be fitted, was not located outside the space or did not operate correctly.
- Records of maintenance and/or testing were not available or incomplete.

**5.2.2. Were the Master, officers and crew familiar with the location, purpose, testing and operation of the vessel's fire dampers, the means of closing the main inlets and outlets of all ventilation systems and the means of stopping the power ventilation systems from outside the space served?**

**Short Question Text**

Fire dampers & ventilation stops

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Interview - Engineer Officer, Exterior Decks, Forecastle, Aft Mooring Deck, Emergency Headquarters., Interview - Rating

**Publications**

IMO SOLAS

IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances.

IMO: MSC.1/Circ.1434 Unified interpretations of SOLAS chapter II-2

IMO: ISM Code

**Objective**

**To ensure that crewmembers can respond effectively to a fire situation in accordance with the shipboard emergency plan.**

**Industry Guidance**

**IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances**

**2 Operational readiness**

All fire protection systems and appliances should at all times be in good order and readily available for immediate use while the ship is in service. If a fire protection system is undergoing maintenance, testing or repair, then suitable arrangements should be made to ensure safety is not diminished through the provision of alternate fixed or portable fire protection equipment or other measures. The onboard maintenance plan should include provisions for this purpose.

**3 Maintenance and testing**

3.1 Onboard maintenance and inspections should be carried out in accordance with the ship's maintenance plan, which should include the minimum elements listed in sections 4 to 10 of these Guidelines.

3.2 Certain maintenance procedures and inspections may be performed by competent crew members who have completed an advanced fire-fighting training course, while others should be performed by persons specially trained in the maintenance of such systems. The onboard maintenance plan should indicate which parts of the recommended inspections and maintenance are to be completed by trained personnel.

3.3 Inspections should be carried out by the crew to ensure that the indicated weekly, monthly, quarterly, annual, two-year, five-year and ten-year actions are taken for the specified equipment, if provided. Records of the inspections should be carried on board the ship or may be computer-based. In cases where the inspections and maintenance are carried out by trained service technicians other than the ship's crew, inspection reports should be provided at the completion of the testing.



3.4 In addition to the onboard maintenance and inspections stated in these Guidelines, manufacturer's maintenance and inspection guidelines should be followed.

3.5 Where particular arrangements create practical difficulties, alternative testing and maintenance procedures should be to the satisfaction of the Administration.

*(These guidelines set out requirements applicable to ventilation systems and fire dampers for:*

- *Quarterly tests of all fire dampers for local operation.*
- *Annual tests of:*
  - *all fire dampers for remote operation, and*
  - *all ventilation controls interconnected with fire-protection systems for proper operation.)*

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors. The documented procedures may include familiarisation with:

- Vessel specific operations and equipment.

#### **IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

10.2 In meeting these requirements the Company should ensure that:

1. inspections are held at appropriate intervals,
2. any non-conformity is reported with its possible cause, if known,
3. appropriate corrective action is taken, and
4. records of these activities are maintained.

#### **IMO: SOLAS**

##### Chapter II-2 Regulation 5

##### 1 Purpose

The purpose of this regulation is to limit the fire growth potential in every space of the ship. For this purpose, the following functional requirements shall be met:

.1 means of control for the air supply to the space shall be provided.

##### 2 Control of air supply and flammable liquid to the space

##### 2.1 Closing appliances and stopping devices of ventilation

2.1.1 The main inlets and outlets of all ventilation systems shall be capable of being closed from outside the spaces being ventilated. The means of closing shall be easily accessible as well as prominently and permanently marked and shall indicate whether the shutoff is open or closed.

2.1.2 Power ventilation of accommodation spaces, service spaces, cargo spaces, control stations and machinery spaces shall be capable of being stopped from an easily accessible position outside the space being served. This position shall not be readily cut off in the event of a fire in the spaces served.

##### 2.2 Means of control in machinery spaces

2.2.1 Means of control shall be provided for opening and closure of skylights, closure of openings in funnels which normally allow exhaust ventilation and closure of ventilator dampers.

2.2.2 Means of control shall be provided for stopping ventilating fans. Controls provided for the power ventilation serving machinery spaces shall be grouped so as to be operable from two positions, one of which shall be outside such spaces. The means provided for stopping the power ventilation of the machinery spaces shall be entirely separate from the means provided for stopping ventilation of other spaces.

2.2.3 Means of control shall be provided for stopping forced and induced draught fans...

2.2.4 The controls required in paragraphs 2.2.1 to 2.2.3 and in regulation 4.2.2.3.4 shall be located outside the space concerned so they will not be cut off in the event of fire in the space they serve.

#### **IMO: MSC.1/Circ.1434 Unified interpretations of SOLAS chapter II-2**

Regulation II-2/5.2.1.1 Closing appliances and stopping devices of ventilation

2. Where a battery room ventilator is fitted with a closing device, then a warning notice stating, for example "This closing device is to be kept open and only closed in the event of fire or other emergency – Explosive gas", should be provided at the closing device to mitigate the possibility of inadvertent closing

#### **IMO: SOLAS**

Chapter II-2 Regulation 14

2.2.3 The maintenance plan shall include at least the following fire protection system and fire-fighting systems and appliances, where installed:

.5 ventilation systems, including fire and smoke dampers, fans and their controls.

#### **Inspection Guidance**

The vessel operator should have developed procedures which:

- Defined the frequency of inspections, tests and maintenance of fire dampers, skylights, closing devices and remote fan stops.
- Required the vessel to identify each closing device for ventilation inlet or outlet and determine whether it should be open or closed while conducting cargo operations.
- Required each closing device for ventilation inlet or outlet to be marked with its required position of either open or closed while in port and conducting cargo operations.

When determining whether a closing device for ventilation inlet or outlets should be closed in port the following should be considered:

- The potential build-up of flammable or explosive gas within a space.
- The potential build-up of heat from items such as laundry driers.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the vessel specific list of closing devices for ventilation inlets or outlets and their required status while conducting cargo operations.
- Inspect a representative sample of ventilation closing devices found onboard and verify that they were in good order, operating freely and clearly marked with:
  - The spaces they served.
  - Their open/shut positions.

- Any required warning notices e.g. battery lockers.
  - Their required position when conducting cargo operations.
- Sight the remote stops for accommodation and machinery space fans and verify that the items served by each remote stop were clearly identified.
- Where necessary, review the records of inspections, tests and maintenance carried out in the maintenance plan, confirm fan stops have been tested as required by the company procedure.
  
- Interview one officer and one rating to verify their familiarity, subject to their normal operational and emergency duties, with the location, purpose and operation of the vessel's fire dampers, skylights, closing devices and remote fan stops.

#### **Expected Evidence**

- The vessel's maintenance plan for vessel's fire protection systems and fire-fighting systems and appliances.
- The records of inspections, tests and maintenance carried out on fire dampers, skylights, closing devices and remote fan stops.
- The vessel specific list of closing devices for ventilation inlets or outlets and their required status while conducting cargo operations.

#### **Potential Grounds for a Negative Observation**

- The Master, officers or crew were not familiar with the location, purpose and operation of the vessel's fire dampers, skylights, closing devices or remote fan stops.
- Closing devices did not operate freely.
- Closing devices were ineffective due to corrosion, worn gaskets, seized dogs etc.
- Closing devices were not clearly marked with the spaces they served or their open/shut positions.
- Closing devices were not marked with required warning notices e.g. battery lockers.
- Closing devices were not marked with the required position when conducting cargo operations.
- An interviewed officer or rating was not familiar with the required position of each closing device while conducting cargo operations.
- Access to closing devices or fan stops was obstructed.
- Remote operated closing devices were found to be inhibited or prevented from closing fully by obstructions.
- The maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances did not include fire dampers, skylights, closing devices and remote fan stops or all the required inspections, tests and maintenance.
- There was no maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances available.
- The accompanying officer was unfamiliar with the maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances.
- Records of inspections, tests and maintenance carried out were incomplete.
- Inspection of the vessel's fire dampers, skylights, closing devices and remote fan stops indicated that actions recorded in the plan had not in fact taken place.
- The vessel's fire dampers, skylights, closing devices or remote fan stops were defective in any way.

**5.2.3. Were the Master and officers familiar with the location, purpose and operation of the vessel's fixed fire detection and fire alarm system, and was the equipment in good working order, regularly inspected, tested and maintained?**

**Short Question Text**

Fixed fire detection and fire alarm system

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Interview - Electrician / ETO, Bridge, Engine Control Room, Emergency Headquarters.

**Publications**

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: ISM Code

IMO SOLAS

IMO: FSS Code

IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances.

IMO: IGF Code

**Objective**

**To ensure that crewmembers can respond effectively to a fire situation in accordance with the shipboard emergency plan.**

**Industry Guidance**

**OCIMF: International Safety Guide for Oil Tankers and Terminals. Sixth Edition**

**5.8 Automatic fire detection systems**

**5.8.1 General**

Automatic fire detection and alarm systems alert personnel so they can respond promptly to a fire with the aim of saving lives and property. These systems may have one or more circuits connected to automatic fire detectors and manual activation points. They may also have one or more indicating circuits connected to alarm signals, including control panel indicator and warning lamps, outdoor flashing lights, bells and horns.

**5.8.2 Types of fire detectors**

Automatic detection systems consist of mechanical, electrical or electronic devices that detect environmental changes created by fire or by toxic or combustible gases. Fire detectors operate on one of three principles: sensitivity to heat, to smoke or gaseous by-products of combustion, or to flame radiation.

**IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances**

**2 Operational readiness**

All fire protection systems and appliances should at all times be in good order and readily available for immediate use while the ship is in service. If a fire protection system is undergoing maintenance, testing or repair, then suitable arrangements should be made to ensure safety is not diminished through the provision of alternate fixed or portable fire protection equipment or other measures. The onboard maintenance plan should include provisions for this purpose.

### 3 Maintenance and testing

3.1 Onboard maintenance and inspections should be carried out in accordance with the ship's maintenance plan, which should include the minimum elements listed in sections 4 to 10 of these Guidelines.

3.2 Certain maintenance procedures and inspections may be performed by competent crew members who have completed an advanced fire-fighting training course, while others should be performed by persons specially trained in the maintenance of such systems. The onboard maintenance plan should indicate which parts of the recommended inspections and maintenance are to be completed by trained personnel.

3.3 Inspections should be carried out by the crew to ensure that the indicated weekly, monthly, quarterly, annual, two-year, five-year and ten-year actions are taken for the specified equipment, if provided. Records of the inspections should be carried on board the ship or may be computer-based. In cases where the inspections and maintenance are carried out by trained service technicians other than the ship's crew, inspection reports should be provided at the completion of the testing.

3.4 In addition to the onboard maintenance and inspections stated in these Guidelines, manufacturer's maintenance and inspection guidelines should be followed.

3.5 Where particular arrangements create practical difficulties, alternative testing and maintenance procedures should be to the satisfaction of the Administration.

*(These guidelines set out requirements applicable to fixed fire detection and fire alarm systems for:*

- *Weekly tests and inspections*
- *Monthly tests and inspections*
- *Annual tests and inspections*)

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors. The documented procedures may include familiarisation with:

- Vessel specific operations and equipment.

#### **IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

10.2 In meeting these requirements the Company should ensure that:

1. inspections are held at appropriate intervals,
2. any non-conformity is reported with its possible cause, if known,
3. appropriate corrective action is taken, and
4. records of these activities are maintained.

#### **IMO: SOLAS**

##### Chapter II-2 Regulation 7

##### 1 Purpose

The purpose of this regulation is to detect a fire in the space of origin and to provide alarm for safe escape and fire-fighting activity. For this purpose, the following functional requirements shall be met:

1. fixed fire detection and fire alarm system installations shall be suitable for the nature of the space, fire growth potential and potential generation of smoke and gases.
2. manually operated call points shall be placed effectively to ensure a readily accessible means of notification; and
3. fire patrols shall provide an effective means of detecting and locating fires and alerting the navigation bridge and fire teams.

## 2 General requirements

2.1 A fixed fire detection and fire alarm system shall be provided in accordance with the provisions of this regulation.

3.2 The function of fixed fire detection and fire alarm systems shall be periodically tested to the satisfaction of the Administration by means of equipment producing hot air at the appropriate temperature, or smoke or aerosol particles having the appropriate range of density or particle size, or other phenomena associated with incipient fires to which the detector is designed to respond.

## 4 Protection of machinery

### 4.1 Installation

A fixed fire detection and fire alarm system shall be installed in:

.1 periodically unattended machinery spaces; and

.2 machinery spaces where:

.2.1 the installation of automatic and remote-control systems and equipment has been approved in lieu of continuous manning of the space; and

.2.2 the main propulsion and associated machinery including sources of main source of electrical power are provided with various degrees of automatic or remote control and are under continuous manned supervision from a control room; and

.3 enclosed spaces containing incinerators

## 5 Protection of accommodation and service spaces and control stations

### 5.5 Cargo ships

Accommodation and service spaces .... of cargo ships shall be protected by a fixed fire detection and fire alarm system and/or an automatic sprinkler, fire detection and fire alarm system as follows depending on a protection method adopted in accordance with regulation 9.2.3.1. (*i.e. depending upon the type of internal divisional bulkheads*)

## IMO: FSS Code

### Chapter 9 Fixed fire detection and fire alarm systems

2.1.2.4 The system may be arranged with output signals to other fire safety systems including:

1. paging systems, fire alarm or public address systems.
2. fan stops.
3. fire doors.
4. fire dampers.
5. sprinkler systems.
6. smoke extraction systems.
7. low-location lighting systems.

8. fixed local application fire-extinguishing systems.
9. closed circuit television (CCTV) systems; and
10. other fire safety systems.

2.3.1.1 Detectors shall be operated by heat, smoke or other products of combustion, flame, or any combination of these factors. Detectors operated by other factors indicative of incipient fires may be considered by the Administration provided that they are no less sensitive than such detectors.

2.3.1.6 All detectors shall be of a type such that they can be tested for correct operation and restored to normal surveillance without the renewal of any component.

2.5.1.1 The activation of any detector or manually operated call point shall initiate a visual and audible fire detection alarm signal at the control panel and indicating units. If the signals have not been acknowledged within 2 min, an audible fire alarm shall be automatically sounded throughout the crew accommodation and service spaces, control stations and machinery spaces of category A. This alarm sounder system need not be an integral part of the detection system.

2.5.1.4 Clear information shall be displayed on or adjacent to each indicating unit about the spaces covered and the location of the sections.

## 2.5.2 Testing

Suitable instructions and component spares for testing and maintenance shall be provided. Detectors shall be periodically tested using equipment suitable for the types of fires to which the detector is designed to respond.

## IMO: IGF Code

11.7.1 A fixed fire detection and fire alarm system complying with the Fire Safety Systems Code shall be provided for the fuel storage hold spaces and the ventilation trunk for fuel containment system below deck, and for all other rooms of the fuel gas system where fire cannot be excluded.

11.7.2 Smoke detectors alone shall not be considered sufficient for rapid detection of a fire.

## Inspection Guidance

The vessel operator should have developed a procedure for the operation and maintenance of the fixed fire detection and fire alarm system which defined:

- The frequency of testing individual detectors.
- The method of testing different types of detectors.
- The frequency of testing any output signals to other fire safety systems.
- The frequency of testing the audible and visual alarms on the bridge or in the continuously manned central control station.
- The actions to be taken to ensure safety is not diminished if a zone is isolated. The main machinery spaces should not be operated in the unattended status with any zone or detector in the space isolated.
- Any areas not covered by the fire detection system that required regular fire patrols.

## Suggested Inspector Actions

- Sight, and where necessary review, the company procedure which defined the operation, testing and maintenance requirements for the fixed fire detection and fire alarm system.
- Inspect the central control station for the fixed fire detection and fire alarm system and verify that:
  - The system was fully operational.
  - The system was not indicating any faults.
  - Where the spaces containing the fire alarm main or repeater control panels were not continuously manned there was no delay in sounding a fire alarm.

- Clear information was displayed on or adjacent to each indicating unit about the spaces covered and the location of the sections.
    - All zones and detectors were active unless a documented work process was taking place which required the temporary isolation of a zone or sensor.
  - Review inspection and testing data available at the central control station and verify that:
    - Detector testing had been completed at the defined frequency.
    - Fire safety system tests had been completed at the required frequency.
    - The emergency power supply had been verified as functional.
  - Verify that the correct testing devices were available to test the types of fire detectors provided onboard.
  - If necessary, review the records of inspections, tests, calibration and maintenance carried out contained within the maintenance plan.
  - Where the fire detection and alarm system was noted to be defective, verify that the machinery space had not been operated in the unattended status since the system had been reported as defective.
- 
- Interview the responsible officer to verify their familiarity with:
    - The purpose, operation and testing of the fixed fire detection and fire alarm system.
    - Any delay in sounding the fire alarm programmed into the alarm system.

#### **Expected Evidence**

- The company procedure which defined the requirements for operating and testing the fixed fire detection and fire alarm system
- The manufacturer's instruction manual for the fixed fire detection and fire alarm system.
- The inspection, calibration and maintenance records for the fixed fire detection and fire alarm system.
- The Engine Room Logbook.

#### **Potential Grounds for a Negative Observation**

- There was no company procedure which defined the operation and maintenance of the fixed fire detection and fire alarm system
- The Master or officers were not familiar with the location, purpose and operation of the vessel's fixed fire detection and fire alarm system
- The responsible officer was not familiar with the maintenance and testing of the fixed fire detection and fire alarm system.
- The vessel was not provided with the fire detector testing equipment appropriate to each type of fire/smoke detector in accordance with the manufacturer's instructions.
- Information was not displayed on or adjacent to each indicating unit about the spaces covered and the location of the sections.
- Where the fire alarm main or repeater control panels were in a space that was not continuously manned there was a delay between a fire being detected and the fire alarms sounding.
- The fixed fire detection and fire alarm system was indicating a fault.
- The fixed fire detection and fire alarm system was not operational.
- One or more individual fire detector sensor was covered or disabled in any manner.
- The machinery space had been operated in the unattended status whilst a zone was isolated, or the fire detector and alarm system was defective.
- The maintenance plan for the vessel's fire protection systems and firefighting systems and appliances did not include the fixed fire detection and fire alarm system or all the required inspections, tests and maintenance.
- There was no maintenance plan for the vessel's fire protection systems and firefighting systems and appliances available.
- The responsible officer was unfamiliar with the maintenance plan for the vessel's fire protection systems and firefighting systems and appliances.
- Records of inspections, tests and maintenance carried out were incomplete.
- Suitable instructions or component spares for testing and maintenance were not available



- Inspection of the vessel's fixed fire detection and fire alarm system indicated that actions recorded in the plan had not in fact taken place.
  - The vessel's fixed fire detection and fire alarm system was defective in any way.
- 
- Where there was evidence that fire rounds had been carried out during the hours of darkness by the designated bridge lookout, address this issue under question 4.3.1.

**5.2.4. Were the Master and officers familiar with the location, purpose and operation of the vessel's fixed carbon dioxide fire extinguishing system, and was the equipment in good working order and available for immediate use, with the release procedure and operating instructions displayed at the control stations?**

**Short Question Text**

Machinery space fixed carbon dioxide fire extinguishing system

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Aft Mooring Deck, Emergency Headquarters.

**Publications**

IMO: ISM Code

IMO SOLAS

IMO: FSS Code

IMO MSC.1/Circ.1318 Guidelines for the maintenance and inspection of fixed carbon dioxide fire-extinguishing systems.

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

**Objective**

**To ensure that crewmembers can respond effectively to a fire situation in accordance with the shipboard emergency plan.**

**Industry Guidance**

**OCIMF: International Safety Guide for Oil Tankers and Terminals. Sixth Edition**

**5.3.2.2 Carbon dioxide**

A CO<sub>2</sub> system normally consists of a battery of large cylinders. The gas is piped from the cylinder manifold to diffusing nozzles. Before the CO<sub>2</sub> is released, an alarm should warn personnel in the compartment and give them time to evacuate.

**IMO MSC.1/Circ.1318** Guidelines for the maintenance and inspection of fixed carbon dioxide fire-extinguishing systems.

These Guidelines provide the minimum recommended level of maintenance and inspections for fixed carbon dioxide fire-extinguishing systems on all ships and are intended to demonstrate that the system is kept in good working order as specified in SOLAS regulation II-2/14.2.1.2. These Guidelines are intended to supplement the fire-extinguishing system manufacturer's approved maintenance instructions. Certain maintenance procedures and inspections may be performed by competent crewmembers, while others should be performed by persons specially trained in the maintenance of such systems. The onboard maintenance plan should indicate which parts of the recommended inspections and maintenance should be completed by trained personnel.

Fixed carbon dioxide fire-extinguishing systems should be kept in good working order and readily available for immediate use. Maintenance and inspections should be carried out in accordance with the ship's maintenance plan having due regard to ensuring the reliability of the system. The onboard maintenance plan should be included in the ship's safety management system and should be based on the system manufacturer's recommendations including:

1. maintenance and inspection procedures and instructions.
2. required schedules for periodic maintenance and inspections.
3. listing of recommended spare parts; and

4. records of inspections and maintenance, including corrective actions taken to maintain the system in operable condition.

*(These guidelines set out requirements for:*

- *Monthly inspections.*
- *Annual inspections.*
- *Maintenance at each intermediate/periodical and renewal survey.)*

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors.

The documented procedures may include familiarisation with:

- Vessel specific operations and equipment.

#### **IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

10.2 In meeting these requirements the Company should ensure that:

1. inspections are held at appropriate intervals,
2. any non-conformity is reported with its possible cause, if known,
3. appropriate corrective action is taken, and
4. records of these activities are maintained.

#### **IMO: SOLAS**

##### Chapter II/2 Regulation 10

4.1.1 A fixed fire extinguishing system required by paragraph 5 below may be any of the following systems:

.1 a fixed gas fire-extinguishing system complying with the provisions of the Fire Safety Systems Code (*i.e. a carbon dioxide system*)

##### Machinery spaces

##### 5.1.1 Fixed fire-extinguishing systems

Machinery spaces of category A containing oil-fired boilers or oil fuel units shall be provided with any one of the fixed fire-extinguishing systems in paragraph 4.1. In each case, if the engine and boiler rooms are not entirely separate, or if fuel oil can drain from the boiler room into the engine-room, the combined engine and boiler rooms shall be considered as one compartment.

##### 5.2.1 Fixed fire-extinguishing systems

Machinery spaces of category A containing internal combustion machinery shall be provided with one of the fixed fire-extinguishing systems in paragraph 4.1.

##### Cargo pumprooms

## 9.1 Fixed fire-extinguishing systems

Each cargo pump-room shall be provided with one of the following fixed fire-extinguishing systems operated from a readily accessible position outside the pump-room. Cargo pumprooms shall be provided with a system suitable for machinery spaces of category A.

9.1.1 A carbon dioxide system complying with the provisions the Fire Safety Systems Code and with the following:

.1 the alarms giving audible warning of the release of fire-extinguishing medium shall be safe for use in a flammable cargo vapour/air mixture; and

.2 a notice shall be exhibited at the controls stating that due to the electrostatic ignition hazard, the system is to be used only for fire extinguishing and not for inerting purposes.

### **IMO: FSS Code.**

#### Chapter 5 Fixed gas fire extinguishing systems

2.1.1.3 Means shall be provided for the crew to safely check the quantity of the fire-extinguishing medium in the containers.

2.1.3.2 Means shall be provided for automatically giving audible and visual warning of the release of the fire extinguishing medium into..... spaces in which personnel normally work or to which they have access...

The pre-discharge alarm shall be automatically activated (e.g. by opening of the release cabinet door).

2.1.3.3 The means of control of any fixed gas fire-extinguishing system shall be readily accessible, simple to operate and.... At each location there shall be clear instructions relating to the operation of the system having regard to the safety of personnel.

2.2.2.2 .... If the box containing the controls is to be locked, a key to the box shall be in a break-glass type enclosure conspicuously located adjacent to the box.

### **Inspection Guidance**

If the CO<sub>2</sub> bottle room is locked, a key to the door should be in a break-glass type enclosure conspicuously located adjacent to the door.

Instructions for safe entry into the CO<sub>2</sub> room should be posted at each entrance and should include, but not be limited to:

- Starting the ventilation fan.
- Waiting for a set period before entering.
- The use of a personal gas monitor.
- Making notification of entry and exit

The vessel operator should have developed a maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances which will include the fixed carbon dioxide fire extinguishing system.

### **Suggested Inspector Actions**

- Review the CO<sub>2</sub> space safe entry instructions.

- Inspect the space(s) containing the machinery space fixed firefighting system carbon dioxide bottles.
  - Inspect the control station(s) for releasing the machinery space carbon dioxide fixed firefighting system and review the operating instructions.
  - Review the inspection and servicing data available in the space.
  - If necessary, review the records of inspections, tests and maintenance carried out contained in the maintenance plan.
- 
- Interview the accompanying officer to verify their familiarity with the purpose and operation of the system.

**Note.** On CO<sub>2</sub> systems there are 'pins' in the activation assembly, and traditionally, these pins had to be removed for the system to be ready for immediate use. On some modern systems, these 'pins' have to be left 'in' for the system to be ready for immediate use. When inspecting the CO<sub>2</sub> systems, the inspector should determine from the accompanying officer whether the pins should be 'in' or 'out' for the system to be ready for immediate use. If in any doubt reference should be made to the manufacturer's operating instructions.

#### **Expected Evidence**

- The vessel's maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances.
- The records of inspections, tests and maintenance for the machinery space fixed carbon dioxide firefighting system.

#### **Potential Grounds for a Negative Observation**

- There were no safety procedures for entering the CO<sub>2</sub> space posted at each entrance door.
- The accompanying officer was unfamiliar with the safety precautions for entering the CO<sub>2</sub> space.
- The CO<sub>2</sub> space or release cabinets were locked but there were no keys provided.
- The machinery space carbon dioxide fire extinguishing system release procedure, operating instructions and warning notices were not posted at the release station.
- There was no maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances available.
- The maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances did not include the vessel's fixed carbon dioxide fire extinguishing system or all the required inspections, tests and maintenance.
- Records of inspections, tests and maintenance carried out were incomplete.
- The accompanying officer was not familiar with the purpose and operation of the vessel's fixed carbon dioxide fire extinguishing system.
- The accompanying officer was unfamiliar with the maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances.
- Inspection of the vessel's fixed carbon dioxide fire extinguishing system indicated that actions recorded in the maintenance plan had not taken place.
- The machinery space carbon dioxide fixed fire extinguishing system was defective in any respect.
- The machinery space carbon dioxide fixed fire extinguishing system was not ready for immediate use for any reason, such as, branch pipes blanked, nozzles or control levers inhibited, etc.

**5.2.5. Were the Master and officers familiar with the location, purpose and operation of the vessel's machinery space fixed high-expansion foam fire extinguishing system, and was the equipment in good working order, available for immediate use, and with operating instructions clearly displayed at the control stations?**

**Short Question Text**

Machinery space fixed high-expansion foam fire extinguishing system

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Engine Room, Engine Control Room, Emergency Headquarters.

**Publications**

IMO: ISM Code

IMO: FSS Code

IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances.

IMO: MSC.1/Circ.1312 Revised guidelines for the performance and testing criteria and survey of foam concentrates for fixed fire-extinguishing systems.

**Objective**

**To ensure that crewmembers can respond effectively to a fire situation in accordance with the shipboard emergency plan.**

**Industry Guidelines**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals.** Sixth Edition.

Chapter 5 Fire Protection

5.3.2.1.1 Categories of foam

Two categories of foam concentrate are currently in use.

Protein foam concentrates are used at 3-6% by volume concentration in water. They include:

- Protein foam (P) made from hydrolysed protein materials.
- Fluoroprotein foam (FP) with added fluorinated surface-active agents.
- Alcohol resistant fluoroprotein foam (FPAR) which is resistant to break down when applied to the surface of alcohol or other solvents.

Synthetic foam concentrates are used at 1-6% by volume concentration in water. They include:

- Aqueous Film Forming Foam (AFFF), based on a mixture of hydrocarbon and fluorinated surface-active agents.
- Alcohol Resistant Aqueous Film Forming Foam (AFFF-AR) for use with alcohols and fuels blended with large amounts of alcohol.

Tankers that handle biofuel or ethyl alcohol should use alcohol resistant foams.

5.3.2.1.3 Compatibility and storage

Different foam concentrates are generally incompatible with each other and should not be mixed in storage.

**IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances.**

2 Operational readiness

All fire protection systems and appliances should at all times be in good order and readily available for immediate use while the ship is in service. If a fire protection system is undergoing maintenance, testing or repair, then suitable arrangements should be made to ensure safety is not diminished through the provision of alternate fixed or portable fire protection equipment or other measures. The onboard maintenance plan should include provisions for this purpose.

3 Maintenance and testing

3.1 Onboard maintenance and inspections should be carried out in accordance with the ship's maintenance plan, which should include the minimum elements listed in sections 4 to 10 of these Guidelines.

3.2 Certain maintenance procedures and inspections may be performed by competent crew members who have completed an advanced fire-fighting training course, while others should be performed by persons specially trained in the maintenance of such systems. The onboard maintenance plan should indicate which parts of the recommended inspections and maintenance are to be completed by trained personnel.

3.3 Inspections should be carried out by the crew to ensure that the indicated weekly, monthly, quarterly, annual, two-year, five-year and ten-year actions are taken for the specified equipment, if provided. Records of the inspections should be carried on board the ship or may be computer-based. In cases where the inspections and maintenance are carried out by trained service technicians other than the ship's crew, inspection reports should be provided at the completion of the testing.

3.4 In addition to the onboard maintenance and inspections stated in these Guidelines, manufacturer's maintenance and inspection guidelines should be followed.

*(These guidelines set out requirements applicable to fixed high-expansion foam systems for:*

- *Monthly tests and inspections*
- *Quarterly tests and inspections*
- *Annual tests and inspections*
- *Five-year servicing)*

**IMO: MSC.1/Circ.1312** Revised guidelines for the performance and testing criteria, and survey of foam concentrates for fixed fire-extinguishing systems.

1.1 Application

...These Guidelines also apply to foam concentrates for fixed foam fire-extinguishing systems in machinery spaces according to chapter 6 of the FSS Code and to portable foam applicators according to chapter 4 of the FSS Code. These Guidelines do not apply to the foam generating equipment, only the foam concentrate.

4 Periodical controls of foam concentrates stored on board

For periodical control of foam concentrates, the tests under paragraphs 4.1 to 4.7 should be performed by the shipowner or operator. They should be carried out at laboratories or authorized service suppliers acceptable to the Administration.

4.7 Chemical stability test for protein-based alcohol-resistant foam concentrates

Protein-based alcohol-resistant foam concentrates should be subjected to a stability test with acetone. A foam solution should be prepared at the approved concentration and gently applied to the surface of a tray containing acetone. The concentrate is deemed to fail the test if the foam solution mixes with the acetone.

#### 5 Intervals of periodical controls

Except for tests in accordance with paragraph 4.7 the first periodical control of foam concentrates should be performed not more than 3 years after being supplied to the ship, and after that, every year. The tests required by paragraph 4.7 should be performed prior to delivery to the ship and annually thereafter

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors.

The documented procedures may include familiarisation with:

- Vessel specific operations and equipment.

#### **IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

10.2 In meeting these requirements the Company should ensure that:

1. inspections are held at appropriate intervals,
2. any non-conformity is reported with its possible cause, if known,
3. appropriate corrective action is taken, and
4. records of these activities are maintained.

#### **IMO: SOLAS**

##### Chapter II/2 Regulation 10

4.1.1 A fixed fire extinguishing system required by paragraph 5 below may be any of the following systems:

.2 a fixed high-expansion foam fire-extinguishing system complying with the provisions of the Fire Safety Systems Code

##### Machinery spaces

##### 5.1.1 Fixed fire-extinguishing systems

Machinery spaces of category A containing oil-fired boilers or oil fuel units shall be provided with any one of the fixed fire-extinguishing systems in paragraph 4.1. In each case, if the engine and boiler rooms are not entirely separate, or if fuel oil can drain from the boiler room into the engine-room, the combined engine and boiler rooms shall be considered as one compartment.

##### 5.2.1 Fixed fire-extinguishing systems

Machinery spaces of category A containing internal combustion machinery shall be provided with one of the fixed fire-extinguishing systems in paragraph 4.1.

##### Cargo pump rooms



## 9.1 Fixed fire-extinguishing systems

Each cargo pump-room shall be provided with one of the following fixed fire-extinguishing systems operated from a readily accessible position outside the pump-room. Cargo pump rooms shall be provided with a system suitable for machinery spaces of category A.

9.1.2 A high-expansion foam system complying with the provisions of the Fire Safety Systems Code, provided that the foam concentrate supply is suitable for extinguishing fires involving the cargoes carried.

### IMO: FSS Code

#### Chapter 6

#### 3 Fixed high-expansion foam fire-extinguishing systems.

3.1.1 The system shall be capable of manual release.

3.1.7 means shall be provided for the crew to safely check the quantity of foam concentrate and take periodic control samples for foam quality.

3.1.8 Operating instructions for the system shall be displayed at each operating position.

3.1.15 Onboard procedures shall be established to require personnel re-entering the protected space after a system discharge to wear breathing apparatus to protect them from oxygen deficient air and products of combustion entrained in the foam blanket.

3.1.20 Machinery spaces, cargo pump rooms.... Shall be provided with audible and visible alarms within the protected space warning of the release of the system. The alarms shall operate for the length of time needed to evacuate the space, but in no case less than 20 seconds.

### Inspection Guidance

If the fixed high-expansion foam fire extinguishing system also provides protection to the cargo pump room, the foam concentrate must be suitable for extinguishing fires involving the cargoes carried.

The operator should have developed procedures to require personnel re-entering the protected space after a system discharge to wear breathing apparatus to protect them from oxygen deficient air and products of combustion entrained in the foam blanket.

The vessel operator should have developed a maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances which will include the fixed high-expansion foam fire extinguishing system. This plan may be integrated into the ship's computerised planned maintenance system or may stand alone. The plan should include the actions to be taken monthly, quarterly, annually (including testing foam concentrates) and five-yearly to ensure the system is kept in good working order and available for immediate use.

The first test of foam concentrates should be performed not more than **3 years after the date of manufacture**, and after that, every year. In addition, for protein-based alcohol-resistant foam concentrates a stability test should be performed prior to delivery to the ship and annually thereafter.

### Suggested Inspector Actions

- Inspect the space(s) containing the machinery space fixed high-expansion foam fire extinguishing system foam concentrate tanks(s), pump(s) and the system controls and verify that:
  - The system operating instructions, in the working language of the ship, were posted near the control station.

- The system valves were clearly identified, and the system instructions indicated their required status in the standby and operational conditions.
  - A copy of the foam concentrate annual test certificate indicated that it was fit for continued use.
  - Where the system also protected a cargo pump room, the foam contained in the tank was certified as compatible with the cargo being carried.
  - The foam tank was filled to the required level
- Review inspection and servicing data available in the space.
- If necessary, review the records of inspections, tests and maintenance carried out contained in the maintenance plan, including:
  - The annual foam concentrate test results.
  - The five-yearly test of foam proportioners or other foam mixing devices.
- Interview the accompanying officer to verify their familiarity with the purpose and operation of the fixed high-expansion foam fire extinguishing system.

#### **Expected Evidence**

- The vessel's maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances.
- The records of inspections, tests and maintenance carried out on the machinery space fixed high-expansion foam fire extinguishing system, including:
  - The annual foam concentrate test results.
  - The five-yearly test of foam proportioners or other foam mixing devices.
- The system manual showing the quantity of foam concentrate required to be in the storage tank to meet the system design criteria.

#### **Potential Grounds for a Negative Observation**

- The machinery space fixed high-expansion foam fire extinguishing system release procedure, operating instructions and warning notices, in the working language of the ship, were not posted at the release station.
- The valves and/or system controls were not clearly identified to their purpose and required status during system operation.
- The foam concentrate test had not been carried out within the required time frame.
- The foam concentrate test certificate indicated that the foam was not fit for continued use.
- Where the system also provided protection for a cargo pump room, the foam concentrate was incompatible with the cargo being carried and no alternative arrangement, to the satisfaction of the Flag Administration, had been provided.
- The foam proportioners or other foam mixing devices had not been tested as required during five yearly servicing.
- There was no maintenance plan for the vessel's fire protection systems and firefighting systems and appliances available.
- The maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances did not include the vessel's machinery space fixed high-expansion foam fire extinguishing system or all the required inspections, tests and maintenance.
- Records of inspections, tests and maintenance carried out were incomplete.
- The accompanying officer was not familiar with the purpose and operation of the vessel's machinery space fixed high-expansion foam fire extinguishing system.
- The accompanying officer was unfamiliar with the maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances.
- Inspection of the vessel's machinery space fixed high-expansion foam fire extinguishing system indicated that actions recorded in the maintenance plan had not in fact taken place.
- The machinery space fixed high-expansion foam fire extinguishing system was defective in any respect.

**5.2.6. Were the Master and officers familiar with the location, purpose and operation of the vessel's machinery space fixed pressure water-spraying fire extinguishing system, and was the equipment in good working order and available for immediate use, with operating instructions clearly displayed at the control stations?**

**Short Question Text**

Machinery space fixed pressure water-spraying fire extinguishing system

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Engine Control Room, Engine Room, Emergency Headquarters.

**Publications**

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: MSC.1/Circ.1516 Amendments to the revised guidelines for the maintenance and inspection of fire protection systems and appliances.

IMO: ISM Code

IMO SOLAS

IMO: FSS Code

IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances.

IMO: MSC/Circ.1165 Revised guidelines for the approval of equivalent water-based fire-extinguishing systems for machinery spaces and cargo pump-rooms.

**Objective**

**To ensure that crewmembers can respond effectively to a fire situation in accordance with the shipboard emergency plan.**

**Industry guidance**

**OCIMF: International Safety Guide for Oil Tankers and Terminals. Sixth Edition**

**5.3.1.2 Water mist**

Water mist fire protection systems use a spray mist to absorb heat and displace oxygen. They are effective in accommodation spaces and areas within the engine room. These systems consist of a water supply connected to an atomising distribution system that can deliver a water mist through one or more nozzles.

**MSC/Circ.1165 Revised guidelines for the approval of equivalent water-based fire-extinguishing systems for machinery spaces and cargo pump-rooms.**

10. The system should be capable of manual release.

16. The system should be supplied by both main and emergency sources of power and should be provided with an automatic change-over switch. The emergency power supply should be provided from outside the protected machinery space.

17. The system should be provided with a redundant means of pumping. The capacity of the redundant means should be sufficient to compensate for the loss of any single supply pump. The system should be fitted with a permanent sea inlet and be capable of continuous operation using seawater.

21. The system operation controls should be available at easily accessible positions outside the spaces to be protected and should not be liable to be cut off by a fire in the protected spaces.

23. A means for testing the operation of the system for assuring the required pressure and flow should be provided.

24. Activation of any water distribution valve should give a visual and audible alarm in the protected space and at a continuously manned central control station. An alarm in the central control station should indicate the specific valve activated.

25. Operating instructions for the system should be displayed at each operating position.

27. Additives should not be used for the protection of normally occupied spaces unless they have been approved for fire protection service by an independent authority. The approval should consider possible adverse health effects to exposed personnel, including inhalation toxicity.

**IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances**

As amended by

**IMO: MSC.1/Circ.1516 Amendments to the revised guidelines for the maintenance and inspection of fire protection systems and appliances.**

**2 Operational readiness**

All fire protection systems and appliances should at all times be in good order and readily available for immediate use while the ship is in service. If a fire protection system is undergoing maintenance, testing or repair, then suitable arrangements should be made to ensure safety is not diminished through the provision of alternate fixed or portable fire protection equipment or other measures. The onboard maintenance plan should include provisions for this purpose.

**3 Maintenance and testing**

3.1 Onboard maintenance and inspections should be carried out in accordance with the ship's maintenance plan, which should include the minimum elements listed in sections 4 to 10 of these Guidelines.

3.2 Certain maintenance procedures and inspections may be performed by competent crew members who have completed an advanced fire-fighting training course, while others should be performed by persons specially trained in the maintenance of such systems. The onboard maintenance plan should indicate which parts of the recommended inspections and maintenance are to be completed by trained personnel.

3.3 Inspections should be carried out by the crew to ensure that the indicated weekly, monthly, quarterly, annual, two-year, five-year and ten-year actions are taken for the specified equipment, if provided. Records of the inspections should be carried on board the ship or may be computer-based. In cases where the inspections and maintenance are carried out by trained service technicians other than the ship's crew, inspection reports should be provided at the completion of the testing.

3.4 In addition to the onboard maintenance and inspections stated in these guidelines, manufacturer's maintenance and inspection guidelines should be followed. The quality of water in automatic sprinkler systems is of particular importance and should be maintained in accordance with manufacturer guidelines. Records of water quality should be maintained on board in accordance with the manufacturer's guidelines.

3.5 Where particular arrangements create practical difficulties, alternative testing and maintenance procedures should be to the satisfaction of the Administration.

*(These guidelines set out requirements applicable to fixed pressure water-spraying fire-extinguishing system:*

- *Weekly tests and inspections*
- *Monthly tests and inspections*

- *Quarterly tests*
- *Annual tests and inspections*
- *Five-year servicing*
- *Ten-year servicing, including a hydrostatic test and internal examination for gas and water pressure cylinders).*

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors.

The documented procedures may include familiarisation with:

- Vessel specific operations and equipment.

#### **IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

10.2 In meeting these requirements the Company should ensure that:

1. inspections are held at appropriate intervals,
2. any non-conformity is reported with its possible cause, if known,
3. appropriate corrective action is taken, and
4. records of these activities are maintained.

#### **IMO: SOLAS**

##### Chapter II/2 Regulation 10

4.1.1 A fixed fire extinguishing system required by paragraph 5 below may be any of the following systems:

.3 a fixed pressure water-spraying fire-extinguishing system complying with the provisions of the Fire Safety Systems Code.

##### Machinery spaces

##### 5.1.1 Fixed fire-extinguishing systems

Machinery spaces of category A containing oil-fired boilers or oil fuel units shall be provided with any one of the fixed fire-extinguishing systems in paragraph 4.1. In each case, if the engine and boiler rooms are not entirely separate, or if fuel oil can drain from the boiler room into the engine-room, the combined engine and boiler rooms shall be considered as one compartment.

##### 5.2.1 Fixed fire-extinguishing systems

Machinery spaces of category A containing internal combustion machinery shall be provided with one of the fixed fire-extinguishing systems in paragraph 4.1.

##### Cargo pump rooms

##### 9.1 Fixed fire-extinguishing systems

Each cargo pump-room shall be provided with one of the following fixed fire-extinguishing systems operated from a readily accessible position outside the pump-room. Cargo pump rooms shall be provided with a system suitable for machinery spaces of category A.

9.1.3 A fixed pressure water-spraying system complying with the provisions of the Fire Safety Systems Code.

## **IMO: FSS Code**

### **Chapter 7 Fixed pressure water-spraying and water-mist fire-extinguishing systems**

#### **2.1 Fixed pressure water-spraying fire-extinguishing systems**

Fixed-pressure water-spraying fire-extinguishing systems for machinery spaces and cargo pump-rooms shall be approved by the Administration based on the guidelines developed by the Organization.

#### **2.2 Equivalent water mist fire-extinguishing systems**

Water mist fire-extinguishing systems for machinery spaces and cargo pump-rooms shall be approved by the Administration based on the guidelines developed by the Organization.

*Refer to the Revised Guidelines for the approval of equivalent water-based fire-extinguishing systems for machinery spaces and cargo pump-rooms (MSC/Circ.1165), as amended.*

## **Inspection Guidance**

The vessel operator should have developed a maintenance plan for the vessel's fire protection systems and firefighting systems and appliances which should include the vessel's fixed pressure water-spray or water-mist extinguishing system. This plan may be integrated into the ship's computerised planned maintenance system or may stand alone. The plan should include the actions to be taken weekly, monthly, annually, five-yearly and ten-yearly (including a hydrostatic test and internal examination for gas and water pressure cylinders), to ensure the system is kept in good working order and available for immediate use.

## **Suggested Inspector Actions**

- Inspect the space(s) containing the fixed pressure water-spray equipment and the system controls and verify that:
    - The system operating instructions, in the working language of the ship, were posted near the control station.
    - The system valves were clearly identified, and the system instructions indicated their required status in the standby and operational conditions.
    - The system was maintained at the correct pressure.
    - Inlet and outlet valves were correctly set.
  - Review inspection and servicing data available in the space.
  - If necessary, review the records of inspections, tests and maintenance carried out contained in the maintenance plan, including quarterly system water quality assessments.
- 
- Interview the accompanying officer to verify their familiarity with the purpose and operation of the fixed pressure water-spraying fire extinguishing system or the equivalent water mist fire extinguishing system.

## **Expected Evidence**

- The vessel's maintenance plan for vessel's fire protection systems and firefighting systems and appliances.
- The records of inspections, tests and maintenance carried out on the machinery space fixed pressure water-spraying fire extinguishing system, including quarterly system water quality assessments.

### **Potential Grounds for a Negative Observation**

- The machinery space fixed pressure water-spraying fire-extinguishing system or the equivalent water mist fire-extinguishing system release procedure, operating instructions and warning notices were not posted at the release stations in the working language of the ship.
- The valves and/or system controls were not clearly identified to their purpose and required status during system operation.
- There was no maintenance plan for the vessel's fire protection systems and firefighting systems and appliances available.
- The maintenance plan for the vessel's fire protection systems and firefighting systems and appliances did not include the vessel's fixed pressure water-spraying fire extinguishing system or the equivalent water mist fire extinguishing system or, all the required inspections, tests and maintenance.
- Records of inspections, tests and maintenance carried out were incomplete.
- There were no records of quarterly system water quality assessments, or records showed the system contents did not meet the manufacturers' water quality guidelines.
- The accompanying officer was not familiar with the purpose and operation of the vessel's fixed pressure water-spraying fire extinguishing system or the equivalent water mist fire extinguishing system
- The accompanying officer was unfamiliar with the maintenance plan for the vessel's fire protection systems and firefighting systems and appliances.
- Inspection of the vessel's fixed pressure water-spraying fire extinguishing system or the equivalent water mist fire extinguishing system indicated that actions recorded in the maintenance plan had not in fact taken place.
- The machinery space fixed pressure water-spraying fire extinguishing system or the equivalent water mist fire extinguishing system was defective in any respect.

**5.2.7. Were the Master and officers familiar with the location, purpose and operation of the vessel's fire pumps, fire main, fire main isolating valves and fire hydrants, and was the system and its components in good working order and available for immediate use?**

**Short Question Text**

Fire pumps, fire main, fire main isolating valves and fire hydrants

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Bridge, Engine Room, Exterior Decks, Emergency Headquarters.

**Publications**

IMO SOLAS

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances.

**Objective**

**To ensure that crewmembers can respond effectively to a fire situation in accordance with the shipboard emergency plan.**

**Industry Guidance**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.**

**5.3.1.1 Water**

All tankers have a firefighting system that consists of pumps permanently connected to the sea, a fire main with hydrant points, fire hoses with couplings and jet nozzles or preferably jet/spray nozzles. Hydrants are located to ensure that two jets of water can reach any part of the ship.

**IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances.**

**2 Operational readiness**

All fire protection systems and appliances should at all times be in good order and readily available for immediate use while the ship is in service. If a fire protection system is undergoing maintenance, testing or repair, then suitable arrangements should be made to ensure safety is not diminished through the provision of alternate fixed or portable fire protection equipment or other measures. The onboard maintenance plan should include provisions for this purpose.

**3 Maintenance and testing**

3.1 Onboard maintenance and inspections should be carried out in accordance with the ship's maintenance plan, which should include the minimum elements listed in sections 4 to 10 of these Guidelines.

3.2 Certain maintenance procedures and inspections may be performed by competent crew members who have completed an advanced fire-fighting training course, while others should be performed by persons specially trained in the maintenance of such systems. The onboard maintenance plan should indicate which parts of the recommended inspections and maintenance are to be completed by trained personnel.

3.3 Inspections should be carried out by the crew to ensure that the indicated weekly, monthly, quarterly, annual, two-year, five-year and ten-year actions are taken for the specified equipment, if provided. Records of the inspections



should be carried on board the ship or may be computer-based. In cases where the inspections and maintenance are carried out by trained service technicians other than the ship's crew, inspection reports should be provided at the completion of the testing.

3.4 In addition to the onboard maintenance and inspections stated in these Guidelines, manufacturer's maintenance and inspection guidelines should be followed.

*(These guidelines set out requirements applicable to fire mains, fire pumps and hydrants for:*

- *Monthly tests and inspections.*
- *Quarterly tests and inspections.*
- *Annual tests and inspections.)*

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors. The documented procedures may include familiarisation with:

- Vessel specific operations and equipment.

#### **IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

10.2 In meeting these requirements the Company should ensure that:

1. inspections are held at appropriate intervals,
2. any non-conformity is reported with its possible cause, if known,
3. appropriate corrective action is taken, and
4. records of these activities are maintained.

#### **IMO: SOLAS**

##### Chapter II-2 Regulation 10

###### 2.1.1 General

The arrangement of pipes and hydrants shall be such as to avoid the possibility of freezing. Suitable drainage provisions shall be provided for fire main piping. Isolation valves shall be installed for all open deck fire main branches used for purposes other than firefighting.

###### 2.1.2 Ready availability of water supply

2.1.2.2 With a periodically unattended machinery space or when only one person is required on watch, there shall be immediate water delivery from the fire main system at a suitable pressure, either by remote starting of one of the main fire pumps with remote starting from the navigating bridge and fire control station, if any, or permanent pressurization of the fire main system by one of the main fire pumps ....

2.1.4.1 Isolating valves to separate the section of the fire main within the machinery space containing the main fire pump or pumps from the rest of the fire main shall be fitted in an easily accessible and tenable position outside the machinery spaces.

2.1.4.3 Relief valves shall be provided in conjunction with fire pumps if the pumps are capable of developing a pressure exceeding the design pressure of the water service pipes, hydrants and hoses. These valves shall be so placed and adjusted as to prevent excessive pressure in any part of the fire main system.

2.1.4.4 In tankers, isolation valves shall be fitted in the fire main at poop front in a protected position and on the tank deck at intervals of not more than 40 m to preserve the integrity of the fire main system in case of fire or explosion.

#### 2.1.5 Number and position of hydrants

2.1.5.1 The number and position of hydrants shall be such that at least two jets of water not emanating from the same hydrant, one of which shall be from a single length of hose, may reach any part of the ship normally accessible to the passengers or crew while the ship is being navigated....

### 2.2 Fire pumps

#### 2.2.1 Pumps accepted as fire pumps

Sanitary, ballast, bilge or general service pumps may be accepted as fire pumps, provided that they are not normally used for pumping oil and that if they are subject to occasional duty for the transfer or pumping of oil fuel, suitable change-over arrangements are fitted.

#### 2.2.2 Number of fire pumps

Ships shall be provided with independently driven fire pumps as follows:

.2 in cargo ships of: 1,000 gross tonnage and upwards at least two

#### 2.2.3.3 Additional pumps for cargo ships

In addition, in cargo ships where other pumps, such as general service, bilge and ballast, etc., are fitted in a machinery space, arrangements shall be made to ensure that at least one of these pumps, having the capacity and pressure required by paragraphs 2.1.6.2 and 2.2.4.2, is capable of providing water to the fire main.

### Inspection Guidance

The vessel operator should have developed procedures for the operation, inspection, testing and maintenance of fire pumps, fire mains, isolating valves and hydrants which defined:

- The frequency of inspection, testing and maintenance of the system and its components.
- The actions to be taken to ensure the ready availability of the systems in sub-zero temperatures.

### Suggested Inspector Actions

- Provided it is safe to do so, witness the remote starting of a fire pump from the bridge or fire control station and verify that the pump reaches and maintains the required pressure while discharging through the anchor washes or other outlet.
- Inspect the deck fire main, particularly on the underside, for external indications of corrosion and for patching or accelerated wear caused by rope abrasion.
- Inspect the fire pumps and verify that the suction and delivery valves were open.
- Inspect the fire main in the machinery space for external indications of corrosion and for patching.
- Request an accompanying crew member to randomly check the fire hydrants and fire main isolating valves to ensure they operate freely.
- Interview the accompanying officer to verify their familiarity with the fire main system with reference to:
  - Starting the fire pumps.
  - The purpose and location of the fire main isolating valves.
  - The purpose and location of the drain point for the deck fire main.
- If necessary, review the records of inspections, tests and maintenance carried out contained in the maintenance plan.

### **Expected Evidence**

- The vessel's maintenance plan for vessel's fire protection systems and fire-fighting systems and appliances.
- The records of inspections, tests and maintenance carried out on the fire mains, fire pumps, isolating valves and hydrants.

### **Potential Grounds for a Negative Observation**

- The fire pumps could not be started remotely from the navigating bridge or fire control station.
- There was no means to verify the delivery pressure on the fire main either on the navigating bridge or at the fire control station.
- Fire hydrant valves or fire main isolating valves did not operate freely.
- Fire main isolation valves were found to be closed.
- There was hard rust, deterioration or temporary repairs to the fire main pipework.
- The fire pump suction or delivery valves were found to be closed
- The fire hydrant or fire main isolating valves were not clearly marked.
- The accompanying officer was unfamiliar with:
  - Starting the fire pumps.
  - The purpose and location of the isolating valves.
  - The purpose and location of the drain point for the deck fire main.
- The maintenance plan for the vessel's fire protection systems and firefighting systems and appliances did not include the fire mains, fire pumps, fire main isolating valves and fire hydrants and all the required inspections, tests and maintenance.
- There was no maintenance plan for the vessel's fire protection systems and firefighting systems and appliances available.
- The accompanying officer was unfamiliar with the maintenance plan for the vessel's fire protection systems and firefighting systems and appliances.
- Records of inspections, tests and maintenance carried out were incomplete.
- Inspection of the fire mains, fire pumps, fire main isolating valves and fire hydrants indicated that actions recorded in the maintenance plan had not in fact taken place.
- The fire mains, fire pumps, fire main isolating valves or fire hydrants were defective in any respect.

**5.2.8. Were the Master, officers and galley staff familiar with the location, purpose and operation of the fixed and portable fire extinguishing systems provided in the galley, were the systems in good working order and available for immediate use, and were galley ranges, exhaust vents, filter cowls free of grease or combustible material?**

**Short Question Text**

Galley fixed and portable fire extinguishing systems & fire prevention

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Interview - Galley Rating, Internal Accommodation

**Publications**

IMO: ISM Code

IMO SOLAS

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances.

IMO: MSC.1/Circ.1433 Unified interpretations of SOLAS Regulation II-2/10.6.4 and CHAPTER 9 of the FSS CODE.

**Objective**

**To ensure that the fire protection measures provided in the galley are properly maintained and crewmembers can respond effectively to a fire situation in accordance with the shipboard emergency plan.**

**Industry Guidance**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.**

4.10.9 Galley stoves and cooking appliances

The use of galley stoves and other cooking appliances that employ naked flames should be prohibited while a tanker is at a petroleum berth.

Galley personnel should be instructed on how to safely operate galley equipment. Unauthorised and inexperienced persons should not be allowed to use galley equipment.

Fires are often caused by unburnt fuel or fatty deposits that have collected in galley ranges, flue pipes and filters. These areas should be regularly inspected to make sure they are clean. Oil and deep fat fryers should be fitted with thermostats to cut off electrical power and prevent accidental fires.

Galley staff should be trained on how to handle fires and how to respond appropriately. Training should include how to operate fixed fire-extinguishing systems fitted to galley equipment. Appropriate fire extinguishers and fire blankets should be available.

The use of portable stoves and cooking appliances on board tankers should be controlled and, when in port, their use should be prohibited.

Steam cookers and other equipment heated by steam can be used any time.

**IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances.**

2 Operational readiness

All fire protection systems and appliances should at all times be in good order and readily available for immediate use while the ship is in service. If a fire protection system is undergoing maintenance, testing or repair, then suitable arrangements should be made to ensure safety is not diminished through the provision of alternate fixed or portable fire protection equipment or other measures. The onboard maintenance plan should include provisions for this purpose.

### 3 Maintenance and testing

3.1 Onboard maintenance and inspections should be carried out in accordance with the ship's maintenance plan, which should include the minimum elements listed in sections 4 to 10 of these Guidelines.

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors. The documented procedures may include familiarisation with:

- Vessel specific operations and equipment.

### IMO: ISM Code

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

10.2 In meeting these requirements the Company should ensure that:

1. inspections are held at appropriate intervals,
2. any non-conformity is reported with its possible cause, if known,
3. appropriate corrective action is taken, and
4. records of these activities are maintained.

### IMO: SOLAS

#### Chapter II-2 Regulation 9

##### 7.5.2 Requirements for cargo ships and passenger ships carrying not more than 36 passengers

When passing through accommodation spaces or spaces containing combustible materials, the exhaust ducts from galley ranges shall be constructed in accordance with paragraphs 7.2.4.1.1 and 7.2.4.1.2. Each exhaust duct shall be fitted with:

1. a grease trap readily removable for cleaning.
2. an automatically and remotely operated fire damper located in the lower end of the duct at the junction between the duct and the galley range hood and, in addition, a remotely operated fire damper in the upper end of the duct close to the outlet of the duct.
3. arrangements, operable from within the galley, for shutting off the exhaust and supply fans; and
4. fixed means for extinguishing a fire within the duct.

#### Chapter II-2 Regulation 10

##### 6.4 Deep-fat cooking equipment

Deep-fat cooking equipment installed in enclosed spaces or on open decks shall be fitted with the following

1. an automatic or manual extinguishing system tested to an international standard acceptable to the Organization.
2. a primary and backup thermostat with an alarm to alert the operator in the event of failure of either thermostat.

3. arrangements for automatically shutting off the electrical power upon activation of the extinguishing system.
4. an alarm for indicating operation of the extinguishing system in the galley where the equipment is installed; and
5. controls for manual operation of the extinguishing system which are clearly labelled for ready use by the crew.

**IMO: MSC.1/Circ.1433 Unified interpretations of SOLAS Regulation II-2/10.6.4 and CHAPTER 9 of the FSS CODE.**

**Inspection Guidance**

Fire extinguishing systems for deep-fat cooking equipment may use different fire-extinguishing mediums including wet chemical, AFFF foam and water mist. The vessel's maintenance plan should contain the weekly, monthly, annual etc. checks required for the particular system fitted as set out in the manufacturer's instructions and IMO: MSC.1/Circ.1432.

Unburned fuel or fatty deposits in galley ranges, within flue pipes and in the filter cowls of galley vents can cause fire and these must be maintained in a clean condition.

The vessel operator should have developed a procedure for maintaining fire safety in the galley which defined:

- The frequency of inspections, tests and maintenance of fixed and portable fire extinguishing systems, fire dampers and fan stop switches fitted in the galley.
- The frequency of inspection and cleaning of galley ranges, within flue pipes and in the filter cowls of galley vents.

**Suggested Inspector Actions**

- Inspect the vessel's galley and verify that:
  - Galley ranges were free of fat or other flammable material.
  - Grease traps had been recently cleaned.
  - Filter cowls of galley vents were free of accumulated fat or oil.
  - Fire dampers were properly marked and free to operate.
  - Fan stop activation points in, or near, the galley were clearly marked.
  - The deep fat fryer fixed fire extinguishing systems fitted had been serviced in accordance with the maintenance plan.
  - The deep fat fryer fixed fire extinguishing nozzles were free of grease build up and were fitted with their protective blow out caps if required by system design.
  - Portable extinguishers and fire blankets were properly stowed and free from obstructions.
  - Fire doors and serving hatch shutters were free to close automatically, if so designed, otherwise were closed except for when in use.
  - There was no evidence that deep fat frying was taking place in open pans or fryers not fitted with a fixed fire extinguishing system.
  - Fire detectors were not inhibited or disabled.
- If necessary, review the records of inspections, tests and maintenance carried out contained in the maintenance plan.
- Interview a member of the galley staff to verify their familiarity with the purpose and operation of one of the following:
  - The fixed fire extinguishing system,
  - The portable fire extinguishing appliances, or,
  - The ventilation system stopping and isolation process.

**Expected Evidence**

- The vessel's maintenance plan for vessel's fire protection systems and fire-fighting systems and appliances.
- The records of inspections, tests and maintenance carried out on the galley fire extinguishing systems.

#### **Potential Grounds for a Negative Observation**

- There were no instructions posted in the galley describing the use of the fixed fire extinguishing systems provided.
- The interviewed galley staff were not familiar with the purpose and operation of the fixed or portable fire extinguishing or fire protection systems in the galley.
- Oily or fatty deposits were found on galley ranges, in grease traps, within flue pipes, around fire extinguishing nozzles, around fire detector heads and in the filter cowls of galley vents.
- There was evidence that deep fat frying had been taking place using open pans or a fixed deep fat fryer with no fixed fire extinguishing system.
- Automatic self-closing fire doors or serving hatch shutters were found to be held back or restricted from closing fully.
- Manual self-closing fire doors were found held back.
- Portable fire extinguishing devices were found to be obstructed or missing from their designated stowage.
- The maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances did not include the fire extinguishing systems for the galley or all the required inspections, tests and maintenance.
- There was no maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances available.
- The accompanying officer was unfamiliar with the maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances.
- Records of inspections, tests and maintenance carried out were incomplete.
- Inspection of the fire-extinguishing systems indicated that actions recorded in the plan had not in fact taken place.
- A fixed fire extinguishing system provided in the galley was defective in any respect.

**5.2.9. Were the Master and officers familiar with the location, purpose and operation of the water-spray system for cooling, fire prevention and crew protection on deck, and was the equipment in good working order, regularly inspected, tested and maintained?**

**Short Question Text**

Water-spray system on deck

**Vessel Types**

LPG, LNG

**ROVIQ Sequence**

Cargo Control Room, Main Deck

**Publications**

IMO: ISM Code

IMO: IGC Code

IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances.

**Objective**

**To ensure that crewmembers can respond effectively to a fire situation in accordance with the shipboard emergency plan.**

**Industry Guidance**

**IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances**

**2 Operational readiness**

All fire protection systems and appliances should at all times be in good order and readily available for immediate use while the ship is in service. If a fire protection system is undergoing maintenance, testing or repair, then suitable arrangements should be made to ensure safety is not diminished through the provision of alternate fixed or portable fire protection equipment or other measures. The onboard maintenance plan should include provisions for this purpose.

**3 Maintenance and testing**

3.1 Onboard maintenance and inspections should be carried out in accordance with the ship's maintenance plan, which should include the minimum elements listed in sections 4 to 10 of these Guidelines.

3.2 Certain maintenance procedures and inspections may be performed by competent crew members who have completed an advanced fire-fighting training course, while others should be performed by persons specially trained in the maintenance of such systems. The onboard maintenance plan should indicate which parts of the recommended inspections and maintenance are to be completed by trained personnel.

3.3 Inspections should be carried out by the crew to ensure that the indicated weekly, monthly, quarterly, annual, two-year, five-year and ten-year actions are taken for the specified equipment, if provided. Records of the inspections should be carried on board the ship or may be computer-based. In cases where the inspections and maintenance are carried out by trained service technicians other than the ship's crew, inspection reports should be provided at the completion of the testing.

3.4 In addition to the onboard maintenance and inspections stated in these Guidelines, manufacturer's maintenance and inspection guidelines should be followed.



3.5 Where particular arrangements create practical difficulties, alternative testing and maintenance procedures should be to the satisfaction of the Administration.

*(These guidelines set out requirements applicable to fixed water spray or water mist systems for:*

- *Weekly tests and inspections*
- *Monthly tests and inspections*
- *Annual tests and inspections*
- *Five-year servicing)*

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors. The documented procedures may include familiarisation with:

- Vessel specific operations and equipment.

#### **IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

10.2 In meeting these requirements the Company should ensure that:

1. inspections are held at appropriate intervals,
2. any non-conformity is reported with its possible cause, if known,
3. appropriate corrective action is taken, and
4. records of these activities are maintained.

#### **IMO: IGC Code**

##### 11.3 Water-spray system

11.3.1 On ships carrying flammable and/or toxic products, a water-spray system, for cooling, fire prevention and crew protection shall be installed to cover:

1. exposed cargo tank domes, any exposed parts of cargo tanks and any part of cargo tank covers that may be exposed to heat from fires in adjacent equipment containing cargo such as exposed booster pumps/heaters/re-gasification or re-liquefaction plants, hereafter addressed as gas process units, positioned on weather decks;
2. exposed on-deck storage vessels for flammable or toxic products.
3. gas process units positioned on deck.
4. cargo liquid and vapour discharge and loading connections, including the presentation flange and the area where their control valves are situated, which shall be at least equal to the area of the drip trays provided.
5. all exposed emergency shut-down (ESD) valves in the cargo liquid and vapour pipes, including the master valve for supply to gas consumers.
6. exposed boundaries facing the cargo area, such as bulkheads of superstructures and deckhouses normally manned, cargo machinery spaces, store-rooms containing high fire-risk items and cargo control rooms. Exposed horizontal boundaries of these areas do not require protection unless detachable cargo piping connections are arranged above or below. Boundaries of unmanned forecastle structures not containing high fire-risk items or equipment do not require water-spray protection.
7. exposed lifeboats, liferafts and muster stations facing the cargo area, regardless of distance to cargo area; and
8. any semi-enclosed cargo machinery spaces and semi-enclosed cargo motor room.

Ships intended for operation as listed in 1.1.10 (*i.e. for periods at a fixed location in a re-gasification and gas discharge mode or a gas receiving, processing, liquefaction and storage mode*) shall be subject to special consideration (see 11.3.3.2).

11.3.2.2 On vertical surfaces, spacing of nozzles protecting lower areas may take account of anticipated rundown from higher areas. Stop valves shall be fitted in the main supply line(s) in the water-spray system, at intervals not exceeding 40 m, for the purpose of isolating damaged sections. Alternatively, the system may be divided into two or more sections that may be operated independently, provided the necessary controls are located together in a readily accessible position outside the cargo area. A section protecting any area included in 11.3.1.1 and .2 shall cover at least the entire athwartship tank grouping in that area. Any gas process unit(s) included in 11.3.1.3 may be served by an independent section.

11.3.4 The boundaries of superstructures and deckhouses normally manned, and lifeboats, liferafts and muster areas facing the cargo area, shall also be capable of being served by one of the fire pumps or the emergency fire pump if a fire in one compartment could disable both fire pumps.

11.3.5 Water pumps normally used for other services may be arranged to supply the water-spray system main supply line.

11.3.6 All pipes, valves, nozzles and other fittings in the water-spray system shall be resistant to corrosion by seawater. Piping, fittings and related components within the cargo area (except gaskets) shall be designed to withstand 925°C. The water-spray system shall be arranged with in-line filters to prevent blockage of pipes and nozzles. In addition, means shall be provided to back-flush the system with fresh water.

11.3.7 Remote starting of pumps supplying the water-spray system and remote operation of any normally closed valves in the system shall be arranged in suitable locations outside the cargo area, adjacent to the accommodation spaces and readily accessible and operable in the event of fire in the protected areas.

### **Inspection Guidance**

The vessel operator should have developed a maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances which should include the water-spray system for cooling, fire prevention and crew protection on deck.

Maintenance tasks may include:

- Periodic removal of the installed orifice plates and piping end caps and flushing any debris from the system.
- Cleaning the in-line filters.
- Flushing the system with fresh water.
- Drying the system to prevent internal corrosion.

### **Suggested Inspector Actions**

- Inspect the space(s) containing the remote controls for the water-spray system for cooling, fire prevention and crew protection on deck.
- Review the operating instructions for the system posted in the space(s) and verify that the system valves and controls are properly marked and set.
- Review inspection and servicing data available in the space(s).
- Inspect the system piping, particularly on the underside, for external indications of corrosion and for patching.
- Examine a random sample of nozzles for evidence of clogging by debris.
- Request an accompanying crew member to randomly check the isolating valves and stop valves to verify they are operating freely.
- If necessary, review the records of inspections, tests and maintenance carried out contained in the maintenance plan.
- Interview the accompanying officer to verify their familiarity with the purpose and operation of the water spray system with reference to:
  - Starting the pumps.
  - The purpose and location of the isolating valves and stop valves.

- The purpose and location of the drain point for the deck piping.

#### **Expected Evidence**

- The vessel's maintenance plan for vessel's fire protection systems and fire-fighting systems and appliances.
- The records of inspections, tests and maintenance carried out on the water-spray system for cooling, fire prevention and crew protection on deck.

#### **Potential Grounds for a Negative Observation**

- The accompanying officer was not familiar with the location, purpose and operation of the vessel's water-spray system for cooling, fire prevention and crew protection on deck.
- The accompanying officer was unfamiliar with the maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances.
- The operating instructions for the water-spray system were not posted at the control station.
- Access to the system controls was obstructed.
- The system valves and controls were not properly marked or set.
- Stop valves or isolating valves did not operate freely.
- The stop valves or isolating valves were not clearly marked.
- There was evidence of clogged nozzles.
- There was hard rust, deterioration or temporary repairs to the system pipework.
- There was no maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances available.
- The maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances did not include the vessel's water-spray system for cooling, fire prevention and crew protection on deck or, all the required inspections, tests and maintenance.
- Records of inspections, tests and maintenance carried out were incomplete.
- Inspection of the water-spray system for cooling, fire prevention and crew protection on deck indicated that actions recorded in the maintenance plan had not in fact taken place.
- There was no evidence that orifice plates or piping end caps had been removed and pipework flushed through to clear debris or scale from the system.
- The water-spray system for cooling, fire prevention and crew protection on deck was defective in any respect.

**5.2.10. Were the Master and officers familiar with the location, purpose and operation of the fixed fire extinguishing system installed within enclosed spaces containing cargo handling equipment, and was the equipment in good working order and available for immediate use, with the release procedure and operating instructions displayed at the control stations?**

**Short Question Text**

Cargo handling equipment space(s) fixed fire extinguishing system

**Vessel Types**

LPG, LNG

**ROVIQ Sequence**

Cargo Control Room, Compressor Room, Main Deck

**Publications**

IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances.

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: IGC Code

IMO: FSS Code

IMO MSC.1/Circ.1318 Guidelines for the maintenance and inspection of fixed carbon dioxide fire-extinguishing systems.

SIGTTO: Liquefied Gas Handling Principles on Ships and in Terminals. Fourth Edition.

**Objective**

**To ensure that crewmembers can respond effectively to a fire situation in accordance with the shipboard emergency plan.**

**Industry Guidance**

**IMO MSC.1/Circ.1318 Guidelines for the maintenance and inspection of fixed carbon dioxide fire-extinguishing systems.**

**1 General**

These Guidelines provide the minimum recommended level of maintenance and inspections for fixed carbon dioxide fire-extinguishing systems on all ships and are intended to demonstrate that the system is kept in good working order as specified in SOLAS regulation II-2/14.2.1.2. These Guidelines are intended to supplement the fire-extinguishing system manufacturer's approved maintenance instructions. Certain maintenance procedures and inspections may be performed by competent crewmembers, while others should be performed by persons specially trained in the maintenance of such systems. The onboard maintenance plan should indicate which parts of the recommended inspections and maintenance should be completed by trained personnel.

**3 Maintenance and inspection plan**

Fixed carbon dioxide fire-extinguishing systems should be kept in good working order and readily available for immediate use. Maintenance and inspections should be carried out in accordance with the ship's maintenance plan having due regard to ensuring the reliability of the system. The onboard maintenance plan should be included in the ship's safety management system and should be based on the system manufacturer's recommendations including:

1. maintenance and inspection procedures and instructions.
2. required schedules for periodic maintenance and inspections.
3. listing of recommended spare parts; and
4. records of inspections and maintenance, including corrective actions taken to maintain the system in operable condition.

*(These guidelines set out requirements for:*

- *Monthly inspections.*
- *Annual inspections.*
- *Maintenance at each intermediate/periodical and renewal survey.)*

**IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances.**

**2 Operational readiness**

All fire protection systems and appliances should at all times be in good order and readily available for immediate use while the ship is in service. If a fire protection system is undergoing maintenance, testing or repair, then suitable arrangements should be made to ensure safety is not diminished through the provision of alternate fixed or portable fire protection equipment or other measures. The onboard maintenance plan should include provisions for this purpose.

**3 Maintenance and testing**

3.1 Onboard maintenance and inspections should be carried out in accordance with the ship's maintenance plan, which should include the minimum elements listed in sections 4 to 10 of these Guidelines.

3.2 Certain maintenance procedures and inspections may be performed by competent crew members who have completed an advanced fire-fighting training course, while others should be performed by persons specially trained in the maintenance of such systems. The onboard maintenance plan should indicate which parts of the recommended inspections and maintenance are to be completed by trained personnel.

3.3 Inspections should be carried out by the crew to ensure that the indicated weekly, monthly, quarterly, annual, two-year, five-year and ten-year actions are taken for the specified equipment, if provided. Records of the inspections should be carried on board the ship or may be computer-based. In cases where the inspections and maintenance are carried out by trained service technicians other than the ship's crew, inspection reports should be provided at the completion of the testing.

3.4 In addition to the onboard maintenance and inspections stated in these Guidelines, manufacturer's maintenance and inspection guidelines should be followed.

*(These guidelines set out requirements applicable to fixed fire-extinguishing systems other than CO<sub>2</sub>.)*

**SIGTTO: Liquified Gas Handling Principles on Ships and in Terminals. Fourth Edition.**

**9.11.4 Carbon dioxide (CO<sub>2</sub>) systems**

Enclosed spaces, on ships and in terminals, containing cargo plant such as compressors, heat exchangers or pumps, will normally be provided with a fixed and remotely activated fire extinguishing system such as CO<sub>2</sub>. Provided no major disruption to the enclosure has occurred, these systems should be immediately effective.

It is important to be sure that there is actually a fire in one of these enclosed areas, because CO<sub>2</sub> systems are delivered as a 'single shot'. While CO<sub>2</sub> systems are effective in enclosed spaces, they have a major disadvantage in that their fire extinguishing action is achieved by reducing oxygen in the space to a level that will not support combustion or life and it is, therefore, essential that all personnel evacuate the space before injection begins. All spaces protected by CO<sub>2</sub> extinguishing systems will therefore have a safety placard to this effect.

A further concern is that the injection of CO<sub>2</sub> produces electrostatic charging, which can be an ignition hazard if CO<sub>2</sub> is injected inadvertently or as a precautionary measure into a flammable atmosphere.

## **OCIMF: International Safety Guide for Oil Tankers and Terminals. Sixth Edition**

### **5.3.4 Clean agent fire suppression systems**

Clean agents are compressed gases or vaporising liquids that extinguish fires either by chemically disrupting combustion, smothering or absorbing heat, or a combination of these.

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors.

The documented procedures may include familiarisation with:

- Vessel specific operations and equipment.

### **IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

10.2 In meeting these requirements the Company should ensure that:

1. inspections are held at appropriate intervals,
2. any non-conformity is reported with its possible cause, if known,
3. appropriate corrective action is taken, and
4. records of these activities are maintained.

### **IMO: IGC Code**

#### **1.2 Definitions**

1.2.10 Cargo machinery spaces are the spaces where cargo compressors or pumps, cargo processing units, are located, including those supplying gas fuel to the engine-room.

#### **3.3 Cargo machinery spaces and turret compartments**

3.1.1 Cargo machinery spaces shall be situated above the weather deck and located within the cargo area. Cargo machinery spaces and turret compartments shall be treated as cargo pumprooms for the purpose of fire protection according to SOLAS regulation II-2/9.2.4, and for the purpose of prevention of potential explosion according to SOLAS regulation II-2/4.5.10.

#### **11.5 Enclosed spaces containing cargo handling equipment.**

11.5.1 Enclosed spaces meeting the criteria of cargo machinery spaces in 1.2.10, and the cargo motor room within the cargo area of any ship, shall be provided with a fixed fire-extinguishing system complying with the provisions of the FSS Code and taking into account the necessary concentrations/application rate required for extinguishing gas fires.

11.5.2 Enclosed spaces meeting the criteria of cargo machinery spaces in chapter 3.3, within the cargo area of ships that are dedicated to the carriage of a restricted number of cargoes, shall be protected by an appropriate fire extinguishing system for the cargo carried.

### **IMO: FSS Code**

#### **Chapter 5 – Fixed gas fire-extinguishing systems**

2.1.1.3 Means shall be provided for the crew to safely check the quantity of the fire-extinguishing medium in the containers.

2.1.3.2 Means shall be provided for automatically giving audible and visual warning of the release of the fire extinguishing medium into..... spaces in which personnel normally work or to which they have access...

The pre-discharge alarm shall be automatically activated (e.g., by opening of the release cabinet door).

Conventional cargo spaces and small spaces (such as compressor rooms, paint lockers etc.) with only a local release need not be provided with such an alarm.

2.1.3.3 The means of control of any fixed gas fire-extinguishing system shall be readily accessible, simple to operate and.... At each location there shall be clear instructions relating to the operation of the system having regard to the safety of personnel.

2.2.2.2 .... If the box containing the controls is to be locked, a key to the box shall be in a break-glass type enclosure conspicuously located adjacent to the box.

### **Inspection Guidance**

The fire extinguishing medium may be CO<sub>2</sub> or an alternative 'clean agent'.

The vessel operator should have developed procedures for the operation, inspection and maintenance of the fixed fire extinguishing system installed within enclosed spaces containing cargo handling equipment that included:

- A description of the fixed fire extinguishing system, its components, and its functions.
- Instructions for the operation of the fixed fire extinguishing system.
- A maintenance plan.

The above may form part of the cargo system operation manual and the ship's maintenance plan.

If the control station or release cabinet door is locked, a key to the door shall be in a break-glass type enclosure conspicuously located adjacent to the door.

Instructions for safe entry into the bottle space should be posted at each entrance and should include, but not be limited to:

- Starting the ventilation fan.
- Waiting for a set period before entering.
- The use of a personal gas monitor.
- Notifying the OOW of entry into, and exit from, the space

The entrances to the enclosed space containing cargo handling equipment e.g., compressor room or motor room, should be marked with a notice indicating the space is protected by a fixed fire extinguishing system.

Where a CO<sub>2</sub> system is installed, a notice should be exhibited at the controls stating that due to the electrostatic ignition hazard, the system is to be used only for fire extinguishing and not for inerting purposes.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures for the operation, inspection and maintenance of the fixed fire extinguishing system installed within enclosed spaces containing cargo handling equipment.
- Review the bottle space safe entry instructions.
- Inspect the space(s) containing the machinery space fixed firefighting system bottles.

- Inspect the control station(s) for releasing the machinery space fixed firefighting system and review the operating instructions.
  - Review the inspection and servicing data available in the space.
  - If necessary, review the records of inspections, tests and maintenance carried out recorded in the maintenance plan.
- 
- Interview the accompanying officer to verify their familiarity with the purpose and operation of the system and the maintenance plan.

**Note.** On CO<sub>2</sub> systems there are 'pins' in the activation assembly, and traditionally, these pins had to be removed for the system to be ready for immediate use. On some modern systems, these 'pins' have to be left 'in' for the system to be ready for immediate use. When inspecting CO<sub>2</sub> systems, the inspector should determine from the accompanying officer whether the pins should be 'in' or 'out' for the system to be ready for immediate use. If in any doubt reference should be made to the manufacturer's operating instructions.

#### **Expected Evidence**

- The company procedures for the operation, inspection and maintenance of the fixed fire extinguishing system installed within enclosed spaces containing cargo handling equipment.
- Records of inspections, tests and maintenance of the fixed fire extinguishing system installed within enclosed spaces containing cargo handling equipment.

#### **Potential Grounds for a Negative Observation**

- There were no company procedures for the operation, inspection and maintenance of the fixed fire extinguishing system installed within enclosed spaces containing cargo handling equipment that included:
  - A description of the fixed fire extinguishing system, its components, and its functions.
  - Instructions for the operation of the fixed fire extinguishing system.
  - A maintenance plan.
- There was no maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances available.
- The maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances did not include the vessel's fixed fire extinguishing system installed within enclosed spaces containing cargo handling equipment or all the required inspections, tests and maintenance.
- Records of inspections, tests and maintenance carried out were incomplete.
- Inspection of the vessel's fixed fire extinguishing system installed within enclosed spaces containing cargo handling equipment indicated that actions recorded in the maintenance plan had not taken place.
- The accompanying officer was not familiar with the purpose and operation of the vessel's fixed fire extinguishing system installed within enclosed spaces containing cargo handling equipment.
- The accompanying officer was unfamiliar with the maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances.
- The accompanying officer was unfamiliar with the safety precautions for entering the bottle space.
- There were no safety procedures for entering the bottle space posted at each entrance door.
- The entrances to the space containing cargo handling equipment e.g., compressor room or motor room were not marked with a notice indicating the space was protected by a fixed fire extinguishing system.
- The bottle space or release cabinet doors were locked but there were no keys provided.
- The fixed fire extinguishing system release procedure, operating instructions and warning notices were not posted at the release station.
- The fixed fire extinguishing system installed within enclosed spaces containing cargo handling equipment was not ready for immediate use for any reason, such as, branch pipes blanked, nozzles or control levers inhibited, etc.



- The fixed fire extinguishing system installed within enclosed spaces containing cargo handling equipment was defective in any respect.

**5.2.11. Were the Master and officers familiar with the location, purpose and operation of the vessel's fixed dry chemical powder fire extinguishing system, and was the equipment in good working order and readily available for immediate use, with operating instructions clearly displayed at the control stations.**

**Short Question Text**

Fixed dry chemical powder fire extinguishing system

**Vessel Types**

LPG, LNG

**ROVIQ Sequence**

Cargo Control Room, Main Deck, Cargo Manifold

**Publications**

IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances.

IMO: ISM Code

IMO: IGC Code

IMO: MSC.1/Circ.1315 Guidelines for the approval of fixed dry chemical powder fire-extinguishing systems for the protection of ships carrying liquefied gases in bulk.

**Objective**

**To ensure that crewmembers can respond effectively to a fire situation in accordance with the shipboard emergency plan.**

**Industry Guidance**

**IMO MSC.1/Circ.1432** Revised guidelines for the maintenance and inspection of fire protection systems and appliances.

**2 Operational readiness**

All fire protection systems and appliances should at all times be in good order and readily available for immediate use while the ship is in service. If a fire protection system is undergoing maintenance, testing or repair, then suitable arrangements should be made to ensure safety is not diminished through the provision of alternate fixed or portable fire protection equipment or other measures. The onboard maintenance plan should include provisions for this purpose.

**3 Maintenance and testing**

3.1 Onboard maintenance and inspections should be carried out in accordance with the ship's maintenance plan, which should include the minimum elements listed in sections 4 to 10 of these Guidelines.

3.2 Certain maintenance procedures and inspections may be performed by competent crew members who have completed an advanced fire-fighting training course, while others should be performed by persons specially trained in the maintenance of such systems. The onboard maintenance plan should indicate which parts of the recommended inspections and maintenance are to be completed by trained personnel.

3.3 Inspections should be carried out by the crew to ensure that the indicated weekly, monthly, quarterly, annual, two-year, five-year and ten-year actions are taken for the specified equipment, if provided. Records of the inspections should be carried on board the ship or may be computer-based. In cases where the inspections and maintenance are carried out by trained service technicians other than the ship's crew, inspection reports should be provided at the completion of the testing.

3.4 In addition to the onboard maintenance and inspections stated in these Guidelines, manufacturer's maintenance and inspection guidelines should be followed.

3.5 Where particular arrangements create practical difficulties, alternative testing and maintenance procedures should be to the satisfaction of the Administration.

*(These guidelines set out requirements applicable to fixed dry chemical powder fire-extinguishing systems for:*

- *Monthly tests and inspections*
- *Annual tests and inspections*
- *Two-yearly tests and inspections*
- *Ten-year servicing)*

**IMO: MSC.1/Circ.1315 Guidelines for the approval of fixed dry chemical powder fire-extinguishing systems for the protection of ships carrying liquefied gases in bulk**

3.5 A means for pressurizing the system using an inert gas, which is normally dry nitrogen, in high pressure cylinders should be provided. .... Pressure gauges should be provided for monitoring the contents of the cylinders.

3.11 Operating instructions for the system should be placed at each operating station.

3.12 Recharging instructions should be provided on a permanent nameplate affixed to the fixed dry chemical powder unit. As a minimum, the instructions should indicate the required type of dry chemical powder, the manufacturer of the powder and the required charge. The required pressurizing medium pressure, number of cylinders and regulator valve setting should also be provided.

3.13 An approved design, installation, operation and maintenance manual should be provided to the shipowner for each type of fixed dry chemical powder unit.

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors.

- Vessel specific operations and equipment.

**IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

10.2 In meeting these requirements the Company should ensure that:

1. inspections are held at appropriate intervals,
2. any non-conformity is reported with its possible cause, if known,
3. appropriate corrective action is taken, and
4. records of these activities are maintained.

**IMO: IGC Code**

11.4.1 Ships in which the carriage of flammable products is intended shall be fitted with fixed dry chemical powder fire-extinguishing systems, .... for the purpose of firefighting on the deck in the cargo area, including any cargo liquid and vapour discharge and loading connections on deck and bow or stern cargo handling areas, as applicable.

11.4.2 The system shall be capable of delivering powder from at least two hand hose lines, or a combination of monitor/hand hose lines, to any part of the exposed cargo liquid and vapour piping, load/unload connection and exposed gas process units.

11.4.3 .... A monitor shall be arranged to protect any load/unload connection area and be capable of actuation and discharge both locally and remotely. The monitor is not required to be remotely aimed if it can deliver the necessary powder to all required areas of coverage from a single position. One hose line shall be provided at both port- and starboard side at the end of the cargo area facing the accommodation and readily available from the accommodation.

11.4.4 .... Hand hose lines shall be non-kinkable and be fitted with a nozzle capable of on/off operation .... Hand hose lines and nozzles shall be of weather-resistant construction or stored in weather resistant housing or covers and be readily accessible

## 18.2 Cargo operations manuals

18.2.1 The ship shall be provided with copies of suitably detailed cargo system operation manuals approved by the Administration such that trained personnel can safely operate the ship with due regard to the hazards and properties of the cargoes that are permitted to be carried.

18.2.2 The content of the manuals shall include, but not be limited to:

.5 firefighting procedures: operation and maintenance of firefighting systems and use of extinguishing agents;

## Inspection Guidance

Test, inspection and servicing requirements set out in MSC.1/Circ.1432 include:

- Monthly - checking pressure gauges are in the correct range.
- Annually - agitating the dry chemical charge.
- Two-yearly - testing a sample of dry chemical powder for moisture content.
- Ten-yearly - hydrostatic or non-destructive testing of the dry chemical powder containment vessels.

## Suggested Inspector Actions

- Inspect the components and operational controls of the cargo area fixed dry chemical powder fire-extinguishing system.
- Review the operation instructions for the system posted near the operational controls and verify that the system valves and controls were correctly marked.
- Review the inspection and servicing data available at the control stations.
- If necessary, review the records of inspections, tests and maintenance carried out contained within the maintenance plan, including:
  - The annual agitation of the dry powder by nitrogen.
  - The two-yearly testing of a sample of dry chemical powder for moisture content.
- Interview the accompanying officer to verify their familiarity with the purpose and operation of the cargo area fixed dry chemical powder extinguishing system.

## Expected Evidence

- The vessel's maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances.
- The records of inspections, tests and maintenance carried out on the cargo area fixed dry chemical powder extinguishing system including:

- The annual agitation of the dry powder by nitrogen.
- The two-yearly testing of a sample of dry chemical powder for moisture content.

#### **Potential Grounds for a Negative Observation**

- The cargo area fixed dry chemical powder extinguishing system operating instructions were not posted at each operating station in the working language of the ship.
- The system controls and valves were not clearly marked in accordance with the operating instructions.
- There was no maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances available.
- The maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances did not include the vessel's fixed dry chemical powder fire-extinguishing system or all the required inspections, tests and maintenance.
- The accompanying officer was not familiar with the purpose and operation of the vessel's fixed dry chemical powder fire-extinguishing system.
- The accompanying officer was unfamiliar with the maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances.
- Inspection of the vessel's fixed dry chemical powder fire-extinguishing system indicated that actions recorded in the plan had not in fact taken place.
- Records of inspections, tests and maintenance carried out were incomplete, including:
  - The annual agitation of the dry powder by nitrogen.
  - The two-yearly testing of a sample of dry chemical powder for moisture content.
- The fixed dry chemical powder fire-extinguishing system was defective in any respect.

**5.2.12. Were the Master and officers familiar with the location, purpose and operation of the fixed fire-extinguishing system in the vessel's paint locker and any other flammable liquid locker, and was the system in good working order and available for immediate use?**

**Short Question Text**

Paint locker fixed fire-extinguishing system

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Cargo Control Room, Exterior Decks

**Publications**

IMO SOLAS

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances.

IACS: UI SC199 Fire-fighting systems in cargo sampling lockers (Reg II-2/10.6.3.2)

IMO: ISM Code

IACS: UI SC201 Location of paint lockers within cargo block

**Objective**

**To ensure that crewmembers can respond effectively to a fire situation in accordance with the shipboard emergency plan.**

**Industry Guidance**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition**

**13.2.2 Paint**

Stow paint, paint thinners and associated cleaners and hardeners in approved storage areas that are protected by fixed fire-extinguishing systems approved by the Administration (SOLAS II-2 regulation 10, section 6.3 covers spaces containing flammable liquid)

**IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances.**

**2 Operational readiness**

All fire protection systems and appliances should at all times be in good order and readily available for immediate use while the ship is in service. If a fire protection system is undergoing maintenance, testing or repair, then suitable arrangements should be made to ensure safety is not diminished through the provision of alternate fixed or portable fire protection equipment or other measures. The onboard maintenance plan should include provisions for this purpose.

**3 Maintenance and testing**

3.1 Onboard maintenance and inspections should be carried out in accordance with the ship's maintenance plan, which should include the minimum elements listed in sections 4 to 10 of these Guidelines.

**IACS: UI SC199 Fire-fighting systems in cargo sampling lockers (Reg II-2/10.6.3.2)**

The requirements given in SOLAS Reg II-2/10.6.3.2 and 10.6.3.3 are not considered applicable for cargo service spaces intended for the stowage of cargo samples, when such spaces are positioned within the cargo area on board tankers

#### **IACS: UI SC201 Location of paint lockers within cargo block**

Paint lockers, regardless of their use, cannot be located above the tanks and spaces defined in SOLAS II-2/4.5.1.2 for oil tankers and the cargo area for chemical tankers.

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors. The documented procedures may include familiarisation with:

- Vessel specific operations and equipment.

#### **IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

10.2 In meeting these requirements the Company should ensure that:

1. inspections are held at appropriate intervals,
2. any non-conformity is reported with its possible cause, if known,
3. appropriate corrective action is taken, and
4. records of these activities are maintained.

#### **IMO: SOLAS**

##### Chapter II-2 Regulation 10

*(applies to ships constructed on or after 01 July 2002)*

##### 6.3 Spaces containing flammable liquid

6.3.1 Paint lockers shall be protected by:

1. a carbon dioxide system designed to give a minimum volume of free gas equal to 40% of the gross volume of the protected space.
2. a dry powder system designed for at least 0.5 kg powder/m<sup>3</sup>.
3. a water spraying or sprinkler system, designed for 5 litres/m<sup>2</sup> min. Water spraying systems may be connected to the fire main of the ship: or
4. a system providing equivalent protection, as determined by the Administration.

In any case, the system shall be operable from outside the protected space.

6.3.2 Flammable liquid lockers shall be protected by an appropriate fire-extinguishing arrangement approved by the Administration. *(Refer to the IACS UI SC 199 Fire-fighting systems in cargo sampling lockers)*

6.3.3 For lockers of a deck area of less than 4 m<sup>2</sup>, which do not give access to accommodation spaces, a carbon dioxide portable fire extinguisher sized to provide a minimum volume of free gas equal to 40% of the gross volume of the space may be accepted in lieu of a fixed system. A discharge port shall be arranged in the locker to allow the discharge of the extinguisher without having to enter into the protected space. The required portable fire extinguisher shall be stowed adjacent to the port. Alternatively, a port or hose connection may be provided to facilitate the use of fire main water.

## **Inspection Guidance**

The vessel operator should have developed a procedure to manage the storage of paint and flammable liquids which defined:

- The locations in which paints and other flammable liquids should be stored under normal circumstances.
- The locations where bulk paint or flammable liquids may be stored when the designated lockers are of insufficient capacity in circumstances such as onboard maintenance programs utilizing riding teams.
- The requirement that paints and flammable liquids must be stored in closed containers.

Note: The SOLAS requirements do not apply to cargo sample lockers positioned within the cargo area.

## **Suggested Inspector Actions**

- Inspect the vessel's paint locker, and any other flammable liquid locker, including the fixed fire-extinguishing system, where fitted, and verify that:
  - The instructions for releasing the fixed fire extinguishing system were posted outside the space.
  - Ventilation fan controls and closing devices were clearly marked.
  - Where no fixed extinguishing system was provided that the inlet for the provided portable extinguisher was marked.
  - Where a fixed carbon dioxide system was provided, a sign warning against using carbon dioxide to inert the space due to static ignition hazard was posted outside the space.
  - Where a seawater fixed extinguishing system was fitted, spray nozzles were free from salt build up.
  - Where a seawater fixed extinguishing system was fitted, the content of the store was not stacked above the height of the spray nozzles.
- Interview the accompanying officer to verify their familiarity with the purpose and operation of the fixed fire extinguishing system.
- If necessary, review the records of inspections, tests and maintenance carried out contained in the maintenance plan.

## **Expected Evidence**

- The vessel's maintenance plan for vessel's fire protection systems and fire-fighting systems and appliances.
- The records of inspections, tests and maintenance carried out on the paint or flammable liquid locker fixed fire extinguishing systems.

## **Potential Grounds for a Negative Observation**

- There were no instructions posted outside a paint or flammable liquids locker describing the use of the fixed fire extinguishing system provided.
- The accompanying officer was not familiar with the purpose and operation of the fixed fire extinguishing system in a paint or other flammable liquid locker.
- Paints or flammable liquids were found stored in lockers or locations not designed to contain flammable liquids.
- Paints or flammable liquids were stored in open containers
- The maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances did not include the fixed fire extinguishing system for paint and flammable liquid lockers or all the required inspections, tests and maintenance.
- There was no maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances available.
- The accompanying officer was unfamiliar with the maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances.
- Records of inspections, tests and maintenance carried out were incomplete.
- Inspection of the fixed fire-extinguishing system indicated that actions recorded in the plan had not in fact taken place.



- Storage of items in a paint or flammable liquids locker prevented the proper functioning of the fire extinguishing system provided, for example, stored paint tins were stacked above the level of water spray nozzles.
- Access to the controls of a paint or flammable liquid locker fire extinguishing system were obstructed.
- The fixed fire extinguishing system for the paint locker, or any other flammable liquids locker, was defective in any respect.

**5.2.13. Were the Master and officers familiar with the location, purpose and operation of the machinery space fixed water-based or equivalent local application fire-fighting system, and was the equipment in good working order and readily available for immediate use, with operating instructions clearly displayed at the control stations?**

**Short Question Text**

Machinery space fixed water-based or equivalent local application fire-fighting system

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Bridge, Engine Room, Steering Gear, Emergency Headquarters.

**Publications**

IMO: MSC.1/Circ.1516 Amendments to the revised guidelines for the maintenance and inspection of fire protection systems and appliances.

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: ISM Code

IMO SOLAS

IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances.

IMO: MSC.1/Circ.1387 Revised guidelines for the approval of fixed water-based local application fire-fighting systems for use in category A machinery spaces.

**Objective**

**To ensure that crewmembers can respond effectively to a fire situation in accordance with the shipboard emergency plan**

**Industry guidance**

**OCIMF: International Safety Guide for Oil Tankers and Terminals. Sixth Edition**

**5.3.1.2 Water mist**

Water mist fire protection systems use a spray mist to absorb heat and displace oxygen. They are effective in accommodation spaces and areas within the engine room. These systems consist of a water supply connected to an atomising distribution system that can deliver a water mist through one or more nozzles.

**IMO: MSC.1/Circ.1387 Revised guidelines for the approval of fixed water-based local application fire-fighting systems for use in category A machinery spaces.**

**1 General**

Fixed water-based local application fire-fighting systems should provide localized fire suppression in areas, as specified in SOLAS regulation II-2/10.5, for category A machinery spaces, without the necessity of engine shut-down, personnel evacuation, shutting down of forced ventilation fans, or sealing of the space.

**IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances.**

As amended by

**IMO: MSC.1/Circ.1516 Amendments to the revised guidelines for the maintenance and inspection of fire protection systems and appliances.**

## 2 Operational readiness

All fire protection systems and appliances should at all times be in good order and readily available for immediate use while the ship is in service. If a fire protection system is undergoing maintenance, testing or repair, then suitable arrangements should be made to ensure safety is not diminished through the provision of alternate fixed or portable fire protection equipment or other measures. The onboard maintenance plan should include provisions for this purpose.

## 3 Maintenance and testing

3.1 Onboard maintenance and inspections should be carried out in accordance with the ship's maintenance plan, which should include the minimum elements listed in sections 4 to 10 of these Guidelines.

3.2 Certain maintenance procedures and inspections may be performed by competent crew members who have completed an advanced fire-fighting training course, while others should be performed by persons specially trained in the maintenance of such systems. The onboard maintenance plan should indicate which parts of the recommended inspections and maintenance are to be completed by trained personnel.

3.3 Inspections should be carried out by the crew to ensure that the indicated weekly, monthly, quarterly, annual, two-year, five-year and ten-year actions are taken for the specified equipment, if provided. Records of the inspections should be carried on board the ship or may be computer-based. In cases where the inspections and maintenance are carried out by trained service technicians other than the ship's crew, inspection reports should be provided at the completion of the testing.

3.4 In addition to the onboard maintenance and inspections stated in these guidelines, manufacturer's maintenance and inspection guidelines should be followed. The quality of water in automatic sprinkler systems is of particular importance and should be maintained in accordance with manufacturer guidelines. Records of water quality should be maintained on board in accordance with the manufacturer's guidelines.

3.5 Where particular arrangements create practical difficulties, alternative testing and maintenance procedures should be to the satisfaction of the Administration.

*(These guidelines set out requirements applicable to fixed water spray or water mist systems for:*

- *Weekly tests and inspections*
- *Monthly tests and inspections*
- *Annual tests and inspections*
- *Five-year servicing*
- *Ten-year servicing, including a hydrostatic test and internal examination for gas and water pressure cylinders).*

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors.

- Vessel specific operations and equipment.

## **IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

10.2 In meeting these requirements the Company should ensure that:

1. inspections are held at appropriate intervals,
2. any non-conformity is reported with its possible cause, if known,

3. appropriate corrective action is taken, and
4. records of these activities are maintained.

## **IMO: SOLAS**

### Chapter II/2 Regulation 10

#### 5.6 Fixed local application fire-fighting systems

5.6.1 Paragraph 5.6 shall apply to passenger ships of 500 gross tonnage and above and cargo ships of 2000 gross tonnage and above.

5.6.2 Machinery spaces of category A above 500 m<sup>3</sup> in volume shall, in addition to the fixed fire extinguishing system required in paragraph 5.1.1, be protected by an approved type of fixed water-based or equivalent local application fire-fighting system, based on the guidelines developed by the Organization\*. In the case of periodically unattended machinery spaces, the fire-fighting system shall have both automatic and manual release capabilities. In the case of continuously manned machinery spaces, the fire-fighting system is only required to have a manual release capability.

5.6.3 Fixed local application fire-fighting systems are to protect areas such as the following without the necessity of engine shutdown, personnel evacuation, or sealing of the spaces:

1. the fire hazard portions of internal combustion machinery or, for ships constructed before 1 July 2014, the fire hazard portions of internal combustion machinery used for the ship's main propulsion and power generation.
2. boiler fronts.
3. the fire hazard portions of incinerators; and
4. purifiers for heated fuel oil.

5.6.4 Activation of any local application system shall give a visual and distinct audible alarm in the protected space and at continuously manned stations. The alarm shall indicate the specific system activated.

#### **Inspection Guidance**

Where the vessel was fitted with a fixed water-based or equivalent local application fire-fighting system, the company should have developed a procedure to define when the system was required to be set to the automatic release mode, where this was an option, and should include whenever the machinery space is operated in the unattended mode.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure which described the use of the automatic release mode of the fixed water-based local application fire-fighting system, where this function was provided.
- Inspect the components of the fixed water-based local application fire-fighting system and verify that:
  - The system operating instructions were posted at the control stations in the operating language of the ship.
  - The water supply valves were open to the system.
  - The dedicated tank serving the system was fitted with a low-level alarm or marked with the minimum required level.
  - All manual branch supply valves were open and marked or colour coded to identify the location they protected.
  - The control panel was powered and set for automatic and/or remote operation.
  - The local release stations near to the protected equipment were clearly marked as to their purpose.
  - The remote monitoring/control panels in the wheelhouse and other locations were powered on with all smoke, flame and heat detectors active.
- Review inspection and servicing data available at the main pump unit.
- If necessary, review the records of inspections, tests and maintenance carried out contained in the maintenance plan.

- Interview the accompanying officer to verify their familiarity with the purpose, operation and required release mode of the fixed water-based local application fire-fighting system whilst the machinery space was operated in the attended and unattended state.

Where the vessel was fitted with a machinery space fixed local application fire-fighting system which was not water-based, address the inspector actions and subsequent sections on equivalency.

### **Expected Evidence**

- The vessel's maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances.
- The records of inspections, tests and maintenance carried out on the fixed water-based local application fire-fighting system.

### **Potential Grounds for a Negative Observation**

- There was no company procedure which described the use of the automatic release mode of the fixed water-based local application fire-fighting system where this function was provided.
- The accompanying officer was not familiar with the purpose, operation and required operating mode of the system.
- The accompanying officer was unfamiliar with the maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances.
- There were no operating instructions in the working language of the ship posted at the system control stations.
- The system was not set on automatic release mode when required by the company procedure.
- The machinery space was being operated in the unattended mode with the system in manual release mode.
- The system was not ready for immediate activation either automatically or by manual release, locally or remotely, for any reason.
- The dedicated water supply tank was not fitted with a low-level alarm, or the minimum required operating level was not marked and maintained.
- The water supply valves, or individual manual branch discharge valves were closed.
- System smoke, heat or flame detectors were deactivated.
- The local release stations near to the protected equipment were not clearly marked as to their purpose.
- The maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances did not include the vessel's fixed water-based local application fire-fighting system.
- Records of inspections, tests and maintenance carried out were incomplete.
- Inspection of the vessel's fixed water-based local application fire-fighting system indicated that actions recorded in the maintenance plan had not been carried out.
- The fixed water-based local application fire-fighting system was defective in any respect.

**5.2.14. Were the Master and officers familiar with the purpose of the cargo, ballast and stripping pump temperature sensing devices, and was there evidence that alarm activation points had been correctly set and tested in accordance with company procedures and manufacturer's instructions?**

**Short Question Text**

Cargo, ballast and stripping pump temperature sensing devices

**Vessel Types**

Oil, Chemical

**ROVIQ Sequence**

Cargo Control Room, Engine Room, Pumproom

**Publications**

IMO: ISM Code

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: MSC.1/Circ. 1321 Guidelines for measures to prevent fires in engine-rooms and cargo pump-rooms.

**Objective**

**To ensure that measures specifically designed to prevent fires in the cargo pump room are effective.**

**Industry Guidance**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.**

12.1.15.7 Miscellaneous

The safety of pump rooms can be enhanced in a number of other ways, some of which are mandatory for certain ships:

- Temperature monitoring devices fitted to main cargo pumps to provide remote indication of the temperature of pump casings, bearings and bulkhead seals. Where such equipment is fitted, procedures should be developed for the action to take when alarm is triggered.

**IMO: MSC.1/Circ. 1321 Guidelines for measures to prevent fires in engine-rooms and cargo pump-rooms**

Part 4 Cargo pump-rooms Chapter 2

4.1.1 Except for pump-rooms intended solely for ballast transfer or fuel oil transfer, temperature monitoring systems for pumps should be provided.

4.1.2 The following pumps installed in cargo pump-rooms, which may be driven by shafts passing through pump-room bulkheads, are included:

- cargo pumps including slop pumps.
- ballast pumps.
- stripping pumps; and
- tank cleaning pumps.

4.1.3 The following pumps might be omitted:

- small pumps of 1 m<sup>3</sup>/h capacity or less; and
- bilge pumps.

4.2.1 Sensing points should be provided as follows:

- bulkhead shaft glands.
- bearings; and
- pump casings.

4.2.3 The range of temperature for sensors is recommended to be from 0°C to 250°C and the setting point to about 60°C to 80°C in consideration to the kind of pumps, cargoes and environmental condition, which would automatically shut down the pump when the set point is reached.

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors. The documented procedures may include familiarisation with:

- Vessel specific operations and equipment.

#### **IMO: ISM Code**

10.1 The company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the company

#### **IMO: SOLAS**

Chapter II-2 Regulation 4

5.10 Protection of cargo pump-rooms

5.10.1 In tankers:

.1 cargo pumps, ballast pumps and stripping pumps, installed in cargo pump-rooms and driven by shafts passing through pump-room bulkheads shall be fitted with temperature sensing devices for bulkhead shaft glands, bearings and pump casings. A continuous audible and visual alarm signal shall be automatically effected in the cargo control room or the pump control station.

Chapter II-2 Regulation 14

4 In addition to the fire protection systems and appliances listed in paragraph 2.2.3, tankers shall develop a maintenance plan for:

.3 fire safety arrangements in cargo pump rooms.

#### **Inspection Guidance**

This question is only applicable to vessels with pumprooms.

The vessel operator should have developed procedure for the operation and maintenance of the cargo, ballast and stripping pump temperature sensing devices which defined:

- The requirement to periodically record the temperature provided by each cargo, ballast and stripping pump sensor while the pumps were in operation.
- The actions to be taken in the event of the activation of a cargo, ballast or stripping pump high-temperature alarm.
- The frequency of the cargo, ballast and stripping pump temperature sensing device accuracy checks.
- The alarm activation value for the temperature sensing devices fitted to the bulkhead shaft glands, bearings and pump casings for cargo, ballast and stripping pumps.

- The circumstances under which the cargo pump bearing, and pump casing temperature sensing device alarm activation points may be altered and by whom.
- The frequency of each alarm activation point verification check.
- The frequency of testing the audible and visual alarms required in the cargo control room or the pump control station
- The actions to take in the event that a cargo, ballast or stripping pump temperature sensing device, or the overall temperature sensor monitoring and alarm system, fails.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures which defined the requirements for the operation and maintenance of the cargo, ballast and stripping pump temperature sensing devices.
- Inspect the cargo, ballast and stripping pump temperature sensor monitoring system panel and verify that:
  - The temperature monitoring system was fully operational.
  - The system was not displaying any faults or obviously erroneous readings.
  - The temperature indicated by sensors from different pumps in a similar service were indicating a similar reading.
  - The alarm activation settings were displayed for each sensor point.
- Review the records of cargo, ballast and stripping pump temperature sensing device readings and verify that the records had been maintained for pumps in operation.
- If safe and practical to do, request that the alarm activation set point for one temperature sensing device is demonstrated to be correctly set.
- Review the inspection and testing data for the cargo, ballast and stripping pump temperature sensor monitoring system and verify that:
  - The required sensor checks, and tests had been completed at the frequency defined by the company.
  - The alarm activation set points had been confirmed.
- If necessary, review the records of inspections, tests, calibration and maintenance carried out contained within the maintenance plan.

Where the cargo, ballast and stripping pump temperature sensing sensor device control panel was fitted in the machinery space with no display in the cargo control room, verify that:

- The officer in charge of the cargo operations could identify the temperature sensing device alarm indicator in the cargo control room.
- There was a process in place to record and assess the readings provided by the temperature sensing devices fitted to pumps in operation.

When in the cargo pumproom

- Inspect one cargo, ballast or stripping pump and verify that the temperature sensing devices were connected at the appropriate locations.
- Verify that no temporary cooling devices were rigged on any cargo, ballast or stripping pump.
- Verify that there was no leakage of cargo, either in the form of a spray or liquid, from the cargo or stripping pump mechanical seals.
- Interview the accompanying officer to verify their familiarity with the actions required in the event of a high temperature alarm activation.

### **Expected Evidence**

- The company procedures for the maintenance and operation of the cargo, ballast and stripping pump temperature sensing system.



- The records of temperature sensing device readings for cargo, ballast and stripping pumps while in operation.
- The manufacturer's instruction manual for the cargo, ballast and stripping pump temperature sensing system.
- The maintenance and testing records for the cargo, ballast and stripping pump temperature sensing system.

#### **Potential Grounds for a Negative Observation**

- There was no company procedure for the operation and maintenance of the cargo, ballast and stripping pump temperature sensing system.
- The accompanying officer was unfamiliar with the operation of the cargo, ballast and stripping pump temperature sensing system.
- The accompanying officer was unfamiliar with the alarm activation settings of the cargo, ballast and stripping pump temperature sensing system.
- There were no records maintained for the temperature of bulkhead shaft glands, bearings and pump casings for cargo, ballast or stripping pumps in operation.
- The temperature sensing devices had not been checked for proper operation and temperature comparison at the frequency defined by the company.
- The audible and visual alarms in the cargo control room or pump control station had not been tested at the frequency defined by the company.
- One or more temperature sensing devices were out of service.
- One or more alarm activation points were found to be set to activate at a higher temperature that permitted by the company procedure.
- One or more temperature sensors were found to be disconnected from the required location.
- Temporary cooling devices were found to be in use to cool pump bearings.
- One or more cargo or stripping pump mechanical seals were leaking cargo either as a liquid or a mist.

Where there was no means to observe the temperature being measured by the temperature sensing devices in either the cargo control room or the machinery space record the finding as a **comment** under the Hardware response tool.

**5.2.15. Were the Master, officers and ratings familiar with the purpose and operation of the vessel's deck foam system, including portable applicators, and was the system in good working order and available for immediate use, with operating instructions displayed at the control station?**

**Short Question Text**

Deck foam system, including portable applicators

**Vessel Types**

Oil, Chemical

**ROVIQ Sequence**

Main Deck, Cargo Manifold, Emergency Headquarters., Interview - Rating

**Publications**

IMO: ISM Code

IMO SOLAS

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: FSS Code

IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances.

IMO: MSC.1/Circ.1312 Revised guidelines for the performance and testing criteria and survey of foam concentrates for fixed fire-extinguishing systems.

**Objective**

**To ensure that crewmembers can respond effectively to a fire situation in accordance with the shipboard emergency plan.**

**Industry Guidance**

**OCIMF: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.**

Chapter 5 Fire Protection

5.3.2.1.1 Categories of foam

Two categories of foam concentrate are currently in use.

Protein foam concentrates are used at 3-6% by volume concentration in water. They include:

- Protein foam (P) made from hydrolysed protein materials.
- Fluoroprotein foam (FP) with added fluorinated surface-active agents.
- Alcohol resistant fluoroprotein foam (FPAR) which is resistant to break down when applied to the surface of alcohol or other solvents.

Synthetic foam concentrates are used at 1-6% by volume concentration in water. They include:

- Aqueous Film Forming Foam (AFFF), based on a mixture of hydrocarbon and fluorinated surface-active agents.
- Alcohol Resistant Aqueous Film Forming Foam (AFFF-AR) for use with alcohols and fuels blended with large amounts of alcohol.

Tankers that handle biofuel or ethyl alcohol should use alcohol resistant foams.

#### 5.3.2.1.3 Compatibility and storage

Different foam concentrates are generally incompatible with each other and should not be mixed in storage.

**IMO: MSC.1/Circ.1432** Revised guidelines for the maintenance and inspection of fire protection systems and appliances.

### 2 Operational readiness

All fire protection systems and appliances should at all times be in good order and readily available for immediate use while the ship is in service. If a fire protection system is undergoing maintenance, testing or repair, then suitable arrangements should be made to ensure safety is not diminished through the provision of alternate fixed or portable fire protection equipment or other measures. The onboard maintenance plan should include provisions for this purpose.

### 3 Maintenance and testing

3.1 Onboard maintenance and inspections should be carried out in accordance with the ship's maintenance plan, which should include the minimum elements listed in sections 4 to 10 of these Guidelines.

3.2 Certain maintenance procedures and inspections may be performed by competent crew members who have completed an advanced fire-fighting training course, while others should be performed by persons specially trained in the maintenance of such systems. The onboard maintenance plan should indicate which parts of the recommended inspections and maintenance are to be completed by trained personnel.

3.3 Inspections should be carried out by the crew to ensure that the indicated weekly, monthly, quarterly, annual, two-year, five-year and ten-year actions are taken for the specified equipment, if provided. Records of the inspections should be carried on board the ship or may be computer-based. In cases where the inspections and maintenance are carried out by trained service technicians other than the ship's crew, inspection reports should be provided at the completion of the testing.

3.4 In addition to the onboard maintenance and inspections stated in these Guidelines, manufacturer's maintenance and inspection guidelines should be followed.

3.5 Where particular arrangements create practical difficulties, alternative testing and maintenance procedures should be to the satisfaction of the Administration.

*(These guidelines set out requirements applicable to deck foam systems for:*

- *Monthly tests and inspections*
- *Quarterly tests and inspections*
- *Annual tests and inspections*
- *Five-year servicing)*

**IMO: MSC.1/Circ.1312** Revised guidelines for the performance and testing criteria, and survey of foam concentrates for fixed fire-extinguishing systems.

### 1.1 Application

These Guidelines apply to the foam concentrates used for fixed deck foam fire-extinguishing systems required for tankers by SOLAS regulations II-2/10.8 and chapter 14 of the International Code for Fire Safety Systems (FSS Code), and chemical tankers as specified by SOLAS regulation II-2/1.6.2.1.2 and the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code). These Guidelines also apply to foam concentrates for fixed foam fire-extinguishing systems in machinery spaces according to chapter 6 of the FSS Code and to portable foam applicators according to chapter 4 of the FSS Code. These Guidelines do not apply to the foam generating equipment, only the foam concentrate.

#### 4 Periodical controls of foam concentrates stored on board

For periodical control of foam concentrates, the tests under paragraphs 4.1 to 4.7 should be performed by the shipowner or operator. They should be carried out at laboratories or authorized service suppliers acceptable to the Administration.

##### 4.7 Chemical stability test for protein-based alcohol-resistant foam concentrates

Protein-based alcohol-resistant foam concentrates should be subjected to a stability test with acetone. A foam solution should be prepared at the approved concentration and gently applied to the surface of a tray containing acetone. The concentrate is deemed to fail the test if the foam solution mixes with the acetone.

#### 5 Intervals of periodical controls

Except for tests in accordance with paragraph 4.7 the first periodical control of foam concentrates should be performed not more than 3 years after being supplied to the ship, and after that, every year. The tests required by paragraph 4.7 should be performed prior to delivery to the ship and annually thereafter

### **IMO: FSS Code**

#### Chapter 14 Fixed deck foam systems

##### 2.1.2 The deck foam system shall be capable of simple and rapid operation.

2.2.1.4 The foam concentrate supplied on board shall be approved by the Administration for the cargoes intended to be carried. Type B foam concentrates shall be supplied for the protection of crude oil, petroleum products and non-polar solvent cargoes. Type A foam concentrates shall be supplied for polar solvent cargoes, as listed in the table of chapter 17 of the IBC Code. Only one type of foam concentrate shall be supplied, and it shall be effective for the maximum possible number of cargoes intended to be carried. For cargoes for which foam is not effective or is incompatible, additional arrangements to the satisfaction of the Administration shall be provided.

##### 2.2.2 Monitors and foam applicators

2.2.2.1 Foam from the fixed foam system shall be supplied by means of monitors and foam applicators. .... On tankers of less than 4,000 tonnes deadweight the Administration may not require installation of monitors but only applicators.

2.3.1.1 The main control station for the system shall be suitably located outside the cargo area, adjacent to the accommodation spaces and readily accessible and operable in the event of fire in the areas protected.

##### 2.3.3 Applicators

2.3.3.1 At least four foam applicators shall be provided on all tankers.

2.3.3.2 Applicators shall be provided to ensure flexibility of action during fire-fighting operations and to cover areas screened from the monitors.

##### 2.3.4 Isolation valves

2.3.4.1 Valves shall be provided in the foam main, and in the fire main when this is an integral part of the deck foam system, immediately forward of any monitor position to isolate damaged sections of those mains.

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors.

The documented procedures may include familiarisation with:

- Vessel specific operations and equipment.

#### **IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

10.2 In meeting these requirements the Company should ensure that:

1. inspections are held at appropriate intervals,
2. any non-conformity is reported with its possible cause, if known,
3. appropriate corrective action is taken, and
4. records of these activities are maintained.

#### **IMO: SOLAS**

Chapter II/2 Regulation 10

8 Cargo tank protection

8.1 Fixed deck foam systems

8.1.1 For tankers of 20,000 tonnes deadweight and upwards, a fixed deck foam system shall be provided in accordance with the requirements of the Fire Safety Systems Code, except that, in lieu of the above, the Administration, after having given consideration to the ship's arrangement and equipment, may accept other fixed installations if they afford protection equivalent to the above, in accordance with regulation I/5. The requirements for alternative fixed installations shall comply with the requirements in paragraph 8.1.2.

8.1.2 In accordance with paragraph 8.1.1, where the Administration accepts an equivalent fixed installation in lieu of the fixed deck foam system, the installation shall:

1. be capable of extinguishing spill fires and also preclude ignition of spilled oil not yet ignited; and
2. be capable of combating fires in ruptured tanks.

8.1.3 Tankers of less than 20,000 tonnes deadweight shall be provided with a deck foam system complying with the requirements of the Fire Safety Systems Code.

#### **Inspection Guidance**

The vessel operator should have developed a maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances which included the fixed deck foam system. This plan may be integrated into the ship's computerised planned maintenance system or may stand alone. The plan should include the actions to be taken monthly, quarterly, annually (including testing foam concentrates) and five-yearly to ensure the system is kept in good working order and available for immediate use.

The first test of foam concentrates should be performed not more than **3 years after the date of manufacture**, and after that, every year. In addition, for protein-based alcohol-resistant (FPAR) foam concentrates a stability test should be performed prior to delivery to the ship and annually thereafter.

#### **Suggested Inspector Actions**

- Inspect the space(s) containing the deck foam system foam concentrate tanks(s), pump(s) and the system controls and verify that:

- The system operating instructions, in the working language of the ship, were posted near the control station.
    - The system valves were clearly identified, and the system instructions indicated their required status in the standby and operational conditions.
    - A copy of the foam concentrate annual test certificate indicated that it was fit for continued use.
    - The foam contained in the tank was certified as compatible with the cargo being carried.
    - The foam tank was filled to the required level
  - Review inspection and servicing data available in the space.
  - If necessary, review the records of inspections, tests and maintenance carried out contained in the maintenance plan, including:
    - The annual foam concentrate test results.
    - The five-yearly test of foam proportioners or other foam mixing devices.
  - Inspect the deck main and/or foam main, monitors, applicators and isolating valves.
  - Where safe to do so, operate a sample of isolating valves and monitors to verify that they are free to move through their full range.
- 
- Where the foam concentrate was not effective, or incompatible, with the cargo being carried, establish what additional arrangements had been provided and that they had been verified as being to the satisfaction of the Administration.
- 
- Interview the accompanying officer to verify their familiarity with the purpose and operation of the deck foam system with reference to:
    - Extinguishing spill fires.
    - Precluding ignition of spilt oil, not yet ignited.
    - Combating fires in ruptured tanks.
  - Interview a rating and verify their familiarity with the operation and use of foam applicators and foam monitors.

#### **Expected Evidence**

- The vessel's maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances.
- The records of inspections, tests and maintenance carried out on the deck foam system, including:
  - The annual foam concentrate test results.
  - The five-yearly test of foam proportioners or other foam mixing devices.
- The system manual showing the quantity of foam concentrate required to be in the storage tank to meet the system design criteria.

#### **Potential Grounds for a Negative Observation**

- The deck foam system operating instructions, in the working language of the ship, were not posted in the space containing the foam concentrate tank, pumps and control station.
- The valves and/or system controls were not clearly identified to their purpose and required status during system operation.
- The foam storage tank was not filled to the required level.
- The foam concentrate test had not been carried out within the required time frame.
- The foam concentrate test certificate indicated that the foam was not fit for continued use.
- The foam concentrate was incompatible with the cargo being carried but no alternative arrangement, to the satisfaction of the Flag Administration, had been provided.
- The foam proportioners or other foam mixing devices had not been tested as required during five yearly servicing

- The accompanying officer was not familiar with the purpose and operation of the vessel's deck foam fire extinguishing system, including portable applicators.
- An interviewed rating was not familiar with the operation and use of the foam monitors and/or foam applicators.
- There was no maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances available.
- The maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances did not include the vessel's deck foam system or all the required inspections, tests and maintenance.
- Records of inspections, tests and maintenance carried out were incomplete, including the required foam concentrate tests.
- The accompanying officer was unfamiliar with the maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances.
- Inspection of the vessel's deck foam system indicated that actions recorded in the plan had not in fact taken place.
- The deck foam system isolation valves or monitors were not free to move through their full range of motion.
- Foam applicators prepared at the manifold were connected to the fire main rather than the foam main.
- The deck foam system was defective in any respect.

## **5.2.16. Were the Master, officers and crew familiar with the location, purpose, testing and operation of the vessel's fire doors?**

### **Short Question Text**

Fire doors

### **Vessel Types**

Oil, Chemical, LPG, LNG

### **ROVIQ Sequence**

Interview - Deck Officer, Interview - Engine Rating, Engine Room, Forecastle, Internal Accommodation

### **Publications**

IMO: ISM Code

IMO SOLAS

IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances.

### **Objective**

**To ensure that crewmembers can respond effectively to a fire situation in accordance with the shipboard emergency plan.**

### **Industry Guidance**

**IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances**

#### **2 Operational readiness**

All fire protection systems and appliances should at all times be in good order and readily available for immediate use while the ship is in service. If a fire protection system is undergoing maintenance, testing or repair, then suitable arrangements should be made to ensure safety is not diminished through the provision of alternate fixed or portable fire protection equipment or other measures. The onboard maintenance plan should include provisions for this purpose.

#### **3 Maintenance and testing**

3.1 Onboard maintenance and inspections should be carried out in accordance with the ship's maintenance plan, which should include the minimum elements listed in sections 4 to 10 of these Guidelines.

3.2 Certain maintenance procedures and inspections may be performed by competent crew members who have completed an advanced fire-fighting training course, while others should be performed by persons specially trained in the maintenance of such systems. The onboard maintenance plan should indicate which parts of the recommended inspections and maintenance are to be completed by trained personnel.

3.3 Inspections should be carried out by the crew to ensure that the indicated weekly, monthly, quarterly, annual, two-year, five-year and ten-year actions are taken for the specified equipment, if provided. Records of the inspections should be carried on board the ship or may be computer-based. In cases where the inspections and maintenance are carried out by trained service technicians other than the ship's crew, inspection reports should be provided at the completion of the testing.

3.4 In addition to the onboard maintenance and inspections stated in these Guidelines, manufacturer's maintenance and inspection guidelines should be followed.

3.5 Where particular arrangements create practical difficulties, alternative testing and maintenance procedures should be to the satisfaction of the Administration.



*(These guidelines set out requirements applicable to fire doors for:*

*Weekly testing and inspections*

- *Verify all fire door control panel indicators, if provided, are functional by operating the lamp/indicator switch.*

*Quarterly testing and inspections*

- *Test all fire doors located in main vertical zone bulkheads for local operation.*

*Annual testing and inspection*

- *Test all remotely controlled fire doors for proper release)*

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors. The documented procedures may include familiarisation with:

- Vessel specific operations and equipment.

**IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

10.2 In meeting these requirements the Company should ensure that:

1. inspections are held at appropriate intervals,
2. any non-conformity is reported with its possible cause, if known,
3. appropriate corrective action is taken, and
4. records of these activities are maintained.

**IMO: SOLAS**

Chapter II-2 Regulation 9

4.2.2 Doors required to be self-closing shall not be fitted with hold-back hooks. However, holdback arrangements fitted with remote release devices of the fail-safe type may be utilized.

Chapter II-2 Regulation 15

2.2.3 The maintenance plan shall include at least the following fire protection systems and firefighting systems and appliances, where installed:

7. fire doors including their controls.

**Inspection Guidance**

The vessel operator should have developed a procedure which defined the frequency of inspections, tests and maintenance for fire doors.

All fire doors on a ship are important, but when the high risk of Engine Room fires is considered, Engine Room fire doors should receive special attention, particularly the fire doors between the Engine Room and Steering Gear Compartment, which are often found tied open.

The inspector should be aware that local operation of a fire door may be affected if air-conditioning is still operating during a test.

### **Suggested Inspector Actions**

- Inspect a sample of fire doors throughout the accommodation, machinery and storage spaces and verify that:
    - They were free of obstructions.
    - No non-approved hold-open methods such as tiebacks, hooks, wedges or other arrangements were used to hold the door open where it was required to be self-closing.
    - Self-closing arrangements closed and latched the door without the need for human intervention.
    - The door and frame were free of corrosion or wastage.
    - There were no inappropriate cable penetrations through the door, its frame or surrounding bulkheads.
    - There were no inappropriate alterations or modifications.
    - There were no gaps between the fire door and frame.
    - There was no damage to the lock mechanism, strike plate or hinges preventing the door closing properly.
    - There was no damage to the door packing or frame.
    - There were no punctures in the outer skin of the door.
  - Where a fire door had apparently been replaced verify that the replacement door was of at least the same fire rating as shown on the fire control plan.
  - If necessary, review the records of inspections, tests and maintenance carried out in the maintenance plan.
  - If necessary, review the Fire Control Plan to verify the required specification of a fire door.
- 
- Interview one officer and one rating to verify their familiarity with the location, purpose and operation of the vessel's fire doors.

### **Expected Evidence**

- The vessel's maintenance plan for vessel's fire protection systems and fire-fighting systems and appliances.
- The records of inspections, tests and maintenance carried out on fire doors.
- The Fire Control Plan.

### **Potential Grounds for a Negative Observation**

- There was no company procedure which defined the frequency of inspections, tests and maintenance for fire doors.
- The Master, officers or ratings were not familiar with the location, purpose and operation of the vessel's fire doors.
- A replacement fire door did not meet the minimum fire rating as indicated on the Fire Control Plan.
- Fire door self-closing devices did not operate properly.
- Fire doors and/or their frames, where appropriate, were:
  - Obstructed.
  - Held back by non-approved methods such as tiebacks, hooks, wedges or other such arrangements.
  - Corroded or wasted.
  - Subject to inappropriate cable penetrations.
  - Subject to inappropriate alterations or modifications.
  - Subject to gaps between fire door and frame.
  - Subject to damage to the lock mechanism, strike plate or hinges preventing the door closing properly.
  - Subject to damage to the door packing or frame.
  - Subject to puncture damage to the outer skin on one or both sides of the door.

- The maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances did not include fire doors or all the required inspections, tests and maintenance.
- There was no maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances available.
- The accompanying officer was unfamiliar with the maintenance plan for the vessel's fire protection systems and firefighting systems and appliances.
- Records of inspections, tests and maintenance carried out were incomplete.
- Inspection of the vessel's fire doors indicated that actions recorded in the plan had not in fact taken place.
- One or more fire door was defective in any respect.

### 5.3. Portable fire fighting appliances

**5.3.1. Were the Master, officers and ratings familiar with the location and use of the vessel's firefighter's outfits including the self-contained breathing apparatus (SCBA), and was the equipment maintained in good condition and ready for immediate use in accordance with company procedures?**

**Short Question Text**

Firefighter's outfits including self-contained breathing apparatus (SCBA)

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Steering Gear, Forecastle, Emergency Headquarters.

**Publications**

UK MCA: MSIS 12 Fire protection arrangements. For the guidance of surveyors in surveying fire protection arrangements to ensure compliance with requirements covering merchant ships.

IMO: ISM Code

IMO SOLAS

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances.

IMO: FSS Code

IACS: UI SC275 Rev. 1 2016 Suitable number of spare air cylinders to be provided in connection with drills.

IACS: UI SC291 Safe Type requirements for two-way portable radiotelephone apparatus for fire-fighter's communications (SOLAS Regulation II-2/10.10.4)

**Objective**

**To ensure that crewmembers can respond effectively to a fire or enclosed space rescue situation in accordance with the shipboard emergency plans.**

**Industry Guidance**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals Sixth Edition**

10.13.4 Equipment maintenance

A responsible person should examine all respiratory equipment at regular intervals.

Defects should be made good promptly and a record should be kept of inspections and repair. Air cylinders should be recharged as soon as possible after use.

Air cylinders that are damaged or corroded should be removed from service and either repaired or replaced. All cylinders should be hydrostatically tested as required by the appropriate administration's regulation

Masks and helmets should be cleaned and disinfected after use. Any repair or maintenance must be carried out strictly according to the manufacturer's instructions.

10.13.5 Stowage

Breathing apparatus should be stowed fully assembled in a place where it is readily accessible. Air cylinders should be fully charged, and the adjusting straps kept slack. Units should be available for emergencies in different parts of the ship.

## **IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances**

### **2 Operational readiness**

All fire protection systems and appliances should at all times be in good order and readily available for immediate use while the ship is in service. If a fire protection system is undergoing maintenance, testing or repair, then suitable arrangements should be made to ensure safety is not diminished through the provision of alternate fixed or portable fire protection equipment or other measures. The onboard maintenance plan should include provisions for this purpose.

### **3 Maintenance and testing**

3.1 Onboard maintenance and inspections should be carried out in accordance with the ship's maintenance plan, which should include the minimum elements listed in sections 4 to 10 of these Guidelines.

3.2 Certain maintenance procedures and inspections may be performed by competent crew members who have completed an advanced fire-fighting training course, while others should be performed by persons specially trained in the maintenance of such systems. The onboard maintenance plan should indicate which parts of the recommended inspections and maintenance are to be completed by trained personnel.

3.3 Inspections should be carried out by the crew to ensure that the indicated weekly, monthly, quarterly, annual, two-year, five-year and ten-year actions are taken for the specified equipment, if provided. Records of the inspections should be carried on board the ship or may be computer-based. In cases where the inspections and maintenance are carried out by trained service technicians other than the ship's crew, inspection reports should be provided at the completion of the testing.

3.4 In addition to the onboard maintenance and inspections stated in these Guidelines, manufacturer's maintenance and inspection guidelines should be followed.

3.5 Where particular arrangements create practical difficulties, alternative testing and maintenance procedures should be to the satisfaction of the Administration.

*(These guidelines set out requirements applicable to breathing apparatus for:*

- *Weekly tests and inspections.*
- *Annual tests and inspections.*
- *Five-year hydrostatic testing.*

*and firefighter's outfits for:*

- *Monthly tests and inspections.)*

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors. The documented procedures may include familiarisation with:

- Vessel specific operations and equipment.

## **IMO: ISM Code**

6.3 The Company should establish procedures to ensure that new personnel and personnel transferred to new assignments related to safety and protection of the environment are given proper familiarisation with their duties. Instructions which are essential to be provided prior to sailing should be identified, documented and given

## **IMO: SOLAS**

## Chapter II-2 Regulation 10

10.2.1 Ships shall carry at least two fire-fighter's outfits.

10.2.3 In addition, in tankers, two fire-fighter's outfits shall be provided.

10.2.5 Two spare charges shall be provided for each required breathing apparatus. Passenger ships carrying not more than 36 passengers and cargo ships that are equipped with suitably located means for fully recharging the air cylinders free from contamination, need carry only one spare charge for each required apparatus.

### 10.3 Storage of fire-fighter's outfits

10.3.1 The fire-fighter's outfits or sets of personal equipment shall be kept ready for use in an easily accessible location that is permanently and clearly marked and, where more than one fire-fighter's outfit or more than one set of personal equipment is carried, they shall be stored in widely separated positions.

### 10.4 Fire-fighter's communication

For ships constructed on or after 1 July 2014, a minimum of two two-way portable radiotelephone apparatus for each fire party for fire-fighter's communication shall be carried on board. Those two-way portable radiotelephone apparatus shall be of an explosion-proof type or intrinsically safe. Ships constructed before 1 July 2014 shall comply with the requirements of this paragraph not later than the first survey after 1 July 2018.

## Chapter II-2 Regulation 15

### Instructions, onboard training and drills

2.2.6 An onboard means of recharging breathing apparatus cylinders used during drills shall be provided or a suitable number of spare cylinders shall be carried onboard to replace those used.

**IACS: UI SC275 Rev.1 2016 Suitable number of spare air cylinders to be provided in connection with drills.**

SOLAS II-2/15.2.2.6 (as added by Res. MSC.338(91), applicable from 01 July 2014)

### Interpretation

"A suitable number of spare cylinders" to be carried on board to replace those used for fire drills shall be at least one 'set of cylinders' for each mandatory breathing apparatus, unless additional spare cylinders are required by the shipboard safety management system (SMS).

'Set of cylinders' means the number of cylinders which are required to operate the breathing apparatus.

No additional cylinders are required for fire drills for breathing apparatus sets required by SOLAS Reg. II-2/19, IMSBC Code, the IBC Code or IGC Code.

**IACS: UI SC291 Safe Type requirements for two-way portable radiotelephone apparatus for fire-fighter's communications (SOLAS Regulation II-2/10.10.4)**

## IMO: FSS Code

### Chapter 3

#### 2.1 Fire-fighter's outfit

A fire-fighter's outfit shall consist of a set of personal equipment and a breathing apparatus.

### 2.1.1 Personal equipment

Personal equipment shall consist of the following:

1. protective clothing of material to protect the skin from the heat radiating from the fire and from burns and scalding by steam. The outer surface shall be water-resistant.
2. boots of rubber or other electrically non-conducting material.
3. rigid helmet providing effective protection against impact.
4. electric safety lamp (hand lantern) of an approved type with a minimum burning period of 3 hours. Electric safety lamps on tankers and those intended to be used in hazardous areas shall be of an explosion-proof type1; and
5. axe with a handle provided with high-voltage insulation.

### 2.1.2 Breathing apparatus

2.1.2.1 Breathing apparatus shall be a self-contained compressed air breathing apparatus for which the volume of air contained in the cylinders shall be at least 1,200 l, or other self-contained breathing apparatus which shall be capable of functioning for at least 30 min. All air cylinders for breathing apparatus shall be interchangeable.

2.1.2.2 Compressed air breathing apparatus shall be fitted with an audible alarm and a visual or other device which will alert the user before the volume of the air in the cylinder has been reduced to no less than 200 l.

### 2.1.3 Lifeline

For each breathing apparatus a fireproof lifeline of at least 30 m in length shall be provided. The lifeline shall successfully pass an approval test by static load of 3.5 kN for 5 min without failure. The lifeline shall be capable of being attached by means of a snap-hook to the harness of the apparatus or to a separate belt in order to prevent the breathing apparatus becoming detached when the lifeline is operated.

**UK MCA: MSIS 12 Fire protection arrangements. For the guidance of surveyors in surveying fire protection arrangements to ensure compliance with requirements covering merchant ships.**

### 9.1.11 Cylinder inspection

9.1.11.1 Each cylinder must be checked to ensure that it is within its recertification period and not due for periodic testing.

9.1.11.2 Steel cylinders should be inspected internally, externally and hydrostatically tested at intervals not exceeding 5 years.

9.1.11.3 Carbon composite cylinders, referred to in paragraph 9.1.9.2, should be similarly inspected and hydrostatically tested at intervals specified by the manufacturer or after a period not exceeding 5 years. The normal design lifetime of a carbon composite cylinder is 15 to 20 years.

### Inspection Guidance

The vessel operator should have developed a procedure for the use and maintenance of firefighter's outfits and self-contained breathing apparatus which defined:

- The frequency and method of inspection and testing of the equipment.
- Use of the compressor for recharging cylinders, where fitted.
- The provision of two-way portable radiotelephone apparatus for each fire party for firefighter's communication.

Although SOLAS recommends 'widely separated positions', firefighting training advocates that breathing apparatus should be used by personnel in pairs.

Annual inspections should be carried out to ensure that the air quality of breathing apparatus air recharging systems is satisfactory.

### **Suggested Inspector Actions**

- Check the firefighter's outfit storage areas and verify that the firefighter's outfit(s) were prepared for immediate use.
  - Check the inventory and condition of a selected firefighter's outfit.
  - Check the associated SCBA and verify that:
    - It had been serviced and inspected in accordance with the maintenance plan.
    - The bottle was fully charged.
    - The correct number of fully charged spare bottles were available.
    - The harness and facemasks had been extended for ease of donning.
  - Interview the accompanying officer to verify their familiarity with the use and maintenance of the SCBA and compressor with reference to:
    - Full cylinder endurance.
    - Correct cylinder filling pressure.
    - Cylinder changing and recharging.
    - Hygiene requirements.
  - If the vessel was provided with a breathing air compressor verify that:
    - A usage log was being maintained.
    - It had been serviced and inspected in accordance with the maintenance plan.
    - A process was in place to test the air quality at a defined interval.
    - Where bottles of different pressures were to be filled, detailed instructions for preventing of overfilling of bottles were available and understood.
  - If necessary, review the records of inspections, tests and maintenance carried out contained in the maintenance plan.
- 
- Request that an officer or rating demonstrates:
    - The donning of the SCBA.
    - The test for equipment air leaks.
    - The testing of the mask seal with the face.
    - The testing of the low air alarm.

Note: This question is not focused on the additional SCBAs required by the IGC and Chemical Codes.

### **Expected Evidence**

- The vessel's maintenance plan for vessel's fire protection systems and firefighting systems and appliances.
- The records of inspections, tests and maintenance carried out on:
  - The firefighter's outfits.
  - The SCBAs.
  - The spare SCBA cylinders.
  - The breathing air compressor including air quality checks.

### **Potential Grounds for a Negative Observation**

- The firefighter's suits or SCBAs were not stored in the correct location in accordance with the fire plan; unless they were in position for cargo operations in accordance with company procedures.
- The firefighter's outfits were incomplete or defective in any respect.
- The SCBAs and firefighter's outfits were not prepared for immediate use with a fully charged bottle and the required spare bottle(s).
- A SCBA was defective in any respect.
- The electric safety lamps were not explosion proof type 1.



- Insufficient intrinsically safe two-way portable radios were available for the number of fire teams indicated on the muster list.
- Not all SCBA cylinders were fully interchangeable.
- The SCBAs or the spare bottles had not been serviced or pressure tested in accordance with the maintenance plan.
- The accompanying officer was unfamiliar with:
  - The firefighter's outfit or the associated SCBA.
  - The process for filling the SCBA bottles with the onboard compressor, where provided.
- An officer or rating was unable to demonstrate the donning of a SCBA and the safety checks required prior to entering a hazardous environment.
- The maintenance plan for the vessel's fire protection systems and firefighting systems and appliances did not include the firefighter's outfits, SCBA and breathing air compressor or all the required inspections, tests and maintenance.
- There was no maintenance plan for the vessel's fire protection systems and firefighting systems and appliances available.
- The accompanying officer was unfamiliar with the maintenance plan for the vessel's fire protection systems and firefighting systems and appliances.
- Records of inspections, tests and maintenance carried out were incomplete.
- Inspection of the firefighter's outfits, SCBA or breathing air compressor indicated that actions recorded in the plan had not in fact taken place.

### **5.3.2. Were the Master, officers and crew familiar with the location, purpose and operation of the vessel's fire hoses, nozzles and international shore connection, and was the equipment in good working order and available for immediate use?**

#### **Short Question Text**

Fire hoses, nozzles and international shore connection

#### **Vessel Types**

Oil, Chemical, LPG, LNG

#### **ROVIQ Sequence**

Anywhere, Interview - Rating

#### **Publications**

IMO SOLAS

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: FSS Code

IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances.

IACS: UI SC98 Fire hose nozzles of a plastic type material (Reg. II-2/10.2.3.3)

IACS: UI SC146 Fire hose couplings and nozzles (Reg. II-2/10.2.3)

IMO: ISM Code

#### **Objective**

**To ensure that crewmembers can respond effectively to a fire situation in accordance with the shipboard emergency plan.**

#### **Industry Guidance**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.**

##### **5.3.1.1 Water**

All tankers have a firefighting system that consists of pumps permanently connected to the sea, a fire main with hydrant points, fire hoses with couplings and jet nozzles or preferably jet/spray nozzles. Hydrants are located to ensure that two jets of water can reach any part of the ship.

##### **5.5 International shore connection**

All tankers and terminals should be able to interconnect the fire mains on board and ashore so that an external water supply can be coupled to any hydrant in the ship's fire main. The international shore fire connection is a standardised way of connecting two systems that might have individual couplings or connections that do not match. This connection should be ready for immediate use.

The flanges on the connection should have the dimensions shown in Fig. 5.1 (*refer to ISGOTT*). It should have a flat face on one side and a coupling on the other that will fit the hydrant or hose on the ship or shore.

If fixed on a ship, the connection should be accessible from both sides of the ship and its location clearly marked.

To interconnect the two fire mains, a fire hose with a shore connection led to its counterpart and its flange joints are bolted together.

The connection should be protected from the elements and located for immediate use. All appropriate staff should know the location and purpose of this connection. It should be discussed during the joint completion of the ship/shore checklist.

**IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances.**

**2 Operational readiness**

All fire protection systems and appliances should at all times be in good order and readily available for immediate use while the ship is in service. If a fire protection system is undergoing maintenance, testing or repair, then suitable arrangements should be made to ensure safety is not diminished through the provision of alternate fixed or portable fire protection equipment or other measures. The onboard maintenance plan should include provisions for this purpose.

**3 Maintenance and testing**

3.1 Onboard maintenance and inspections should be carried out in accordance with the ship's maintenance plan, which should include the minimum elements listed in sections 4 to 10 of these Guidelines.

3.2 Certain maintenance procedures and inspections may be performed by competent crew members who have completed an advanced fire-fighting training course, while others should be performed by persons specially trained in the maintenance of such systems. The onboard maintenance plan should indicate which parts of the recommended inspections and maintenance are to be completed by trained personnel.

3.3 Inspections should be carried out by the crew to ensure that the indicated weekly, monthly, quarterly, annual, two-year, five-year and ten-year actions are taken for the specified equipment, if provided. Records of the inspections should be carried on board the ship or may be computer-based. In cases where the inspections and maintenance are carried out by trained service technicians other than the ship's crew, inspection reports should be provided at the completion of the testing.

3.4 In addition to the onboard maintenance and inspections stated in these Guidelines, manufacturer's maintenance and inspection guidelines should be followed.

3.5 Where particular arrangements create practical difficulties, alternative testing and maintenance procedures should be to the satisfaction of the Administration.

*(These guidelines set out requirements applicable to fire mains, fire pumps, hydrants, hoses and nozzles for:*

- *Monthly tests and inspections.*
- *Quarterly tests and inspections.*
- *Annual tests and inspections.)*

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors. The documented procedures may include familiarisation with:

- Vessel specific operations and equipment.

**IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

10.2 In meeting these requirements the Company should ensure that:

1. inspections are held at appropriate intervals,
2. any non-conformity is reported with its possible cause, if known,
3. appropriate corrective action is taken, and
4. records of these activities are maintained.

## **IMO: SOLAS**

### **Chapter II-2 Regulation 10**

2.1.7.1 Ships of 500 gross tonnage and upwards shall be provided with at least one international shore connection complying with the Fire Safety Systems Code.

2.1.7.2 Facilities shall be available enabling such a connection to be used on either side of the ship.

2.3.1.1 Fire hoses shall be of non-perishable material approved by the Administration and shall be sufficient in length to project a jet of water to any of the spaces in which they may be required to be used. Each hose shall be provided with a nozzle and the necessary couplings. Hoses specified in this chapter as "fire hoses" shall, together with any necessary fittings and tools, be kept ready for use in conspicuous positions near the water service hydrants or connections. .... Fire hoses shall have a length of at least 10 m, but not more than:

1. 15 m in machinery spaces.
2. 20 m in other spaces and open decks; and
3. 25 m for open decks on ships with a maximum breadth in excess of 30 m.

2.3.1.2 Unless one hose and nozzle is provided for each hydrant in the ship, there shall be complete interchangeability of hose couplings and nozzles.

#### **IACS: UI SC98 Fire hose nozzles of a plastic type material (Reg. II-2/10.2.3.3)**

Fire hose nozzles made of plastic type material, e.g. polycarbonate, are considered acceptable provided capacity and serviceability are documented and the nozzles are found suitable for the marine environment.

#### **IACS: UI SC146 Fire hose couplings and nozzles (Reg. II-2/10.2.3)**

Aluminium alloys may be used for fire hose couplings and nozzles, except in open deck areas of oil tankers and chemical tankers.

## **IMO: FSS Code**

### **2.2 Materials and accessories**

International shore connections shall be of steel or other equivalent material and shall be designed for 1.0 N/ mm<sup>2</sup> services. The flange shall have a flat face on one side, and, on the other side, it shall be permanently attached to a coupling that will fit the ship's hydrant and hose. The connection shall be kept aboard the ship together with a gasket of any material suitable for 1.0 N/ mm<sup>2</sup> services, together with four bolts of 16 mm diameter and 50 mm in length, four 16 mm nuts and eight washers.

### **Inspection Guidance**

The vessel operator should have developed a procedure for the inspection, testing and maintenance of fire hoses, nozzles and international shore connections which defined the:

- Frequency of inspection and testing.
- Frequency of pressure testing of fire hoses.
- Replacement criteria for damaged or worn hoses

### **Suggested Inspector Actions**

- Inspect a random sample of the vessel's fire hoses and nozzles from the accommodation, machinery spaces and main deck areas and verify that the washers, connecting spanners, connecting mechanisms and nozzle jet/spray controls were present and/or fully functional.

- Inspect a random sample of fire hydrants and verify that washers and connection mechanisms were present and functioning.
  - Inspect the international shore connection(s) and verify the required nuts, bolts and gasket were available and, in addition, two correctly sized spanners.
  - If necessary, review the records of inspections, tests and maintenance carried out contained in the maintenance plan.
  - If necessary, review the fire control plan to verify the required location of fire hoses and nozzles.
- 
- Interview a deck or engine rating to verify their familiarity with the purpose and operation of the fire hoses, nozzles and international shore connections.

#### **Expected Evidence**

- The vessel's maintenance plan for vessel's fire protection systems and fire-fighting systems and appliances.
- The records of inspections, tests and maintenance carried out on the fire hoses, nozzles and international shore connections.

#### **Potential Grounds for a Negative Observation**

- Fire hoses, nozzles or international shore connections were missing from the locations shown on the fire control plan unless laid out for cargo or bunker operations.
- Fire hoses, nozzles or international shore connections were not ready for immediate use.
- Fire hoses were either less than 10m in length or longer than the maximum permitted for their location.
- The required gaskets, nuts, washers or recommended spanners were missing from the international shore connection(s) storage location.
- The accompanying officer was not familiar with the purpose and operation of the fire hoses, nozzles and international shore connections.
- An interviewed rating was not familiar with the purpose and operation of the fire hoses, nozzles and international shore connections.
- The maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances did not include the fire hoses, nozzles and international shore connections or all the required inspections, tests and maintenance.
- There was no maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances available.
- The accompanying officer was unfamiliar with the maintenance plan for the vessel's fire protection systems and fire-fighting systems and appliances.
- Records of inspections, tests and maintenance carried out were incomplete.
- Inspection of the fire hoses, nozzles and international shore connections indicated that actions recorded in the plan had not in fact taken place.
- An inspected fire hose, nozzle or international shore connections was found to be defective in any respect.

**5.3.3. Were the Master, officers and ratings familiar with the location, purpose and operation of the vessel's portable fire extinguishers, and were the extinguishers in good order and readily available for immediate use with operating instructions clearly marked?**

**Short Question Text**

Portable fire extinguishers

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Cargo Control Room, Engine Control Room, Anywhere

**Publications**

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: ISM Code

IMO SOLAS

IMO: Resolution A.951(23) Improved Guidelines for Marine Portable fire extinguishers.

IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances.

IMO: MSC.1/Circ.1275 Unified interpretation of SOLAS chapter II-2 on the number and arrangement of portable fire extinguishers on board ships. Rev.1

**Objective**

**To ensure that crewmembers can respond effectively to a fire situation in accordance with the shipboard emergency plan.**

**Industry Guidance**

**OCIMF: International Safety Guide for Oil Tankers and Terminals. Sixth Edition**

All fire extinguishers should be maintained and available for immediate use. The system for managing safety should contain procedures for maintenance, including that done by service agents. As a minimum, all fire extinguishers should be formally checked once a year that they are in the right location, have the right charging pressure and are working properly.

**IMO MSC.1/Circ.1432** Revised guidelines for the maintenance and inspection of fire protection systems and appliances.

**3 Maintenance and testing**

3.1 Onboard maintenance and inspections should be carried out in accordance with the ship's maintenance plan, which should include the minimum elements listed in sections 4 to 10 of these Guidelines.

3.2 Certain maintenance procedures and inspections may be performed by competent crew members who have completed an advanced fire-fighting training course, while others should be performed by persons specially trained in the maintenance of such systems. The onboard maintenance plan should indicate which parts of the recommended inspections and maintenance are to be completed by trained personnel.

3.3 Inspections should be carried out by the crew to ensure that the indicated weekly, monthly, quarterly, annual, two-year, five-year and ten-year actions are taken for the specified equipment, if provided. Records of the inspections should be carried on board the ship or may be computer-based. In cases where the inspections and maintenance are carried out by trained service technicians other than the ship's crew, inspection reports should be provided at the completion of the testing.

**IMO: Resolution A.951(23)** Improved Guidelines for Marine Portable fire extinguishers.

## Marking of extinguishers

8.1 Each extinguisher should be clearly marked with the following minimum information:

1. name of the manufacturer.
2. types of fire and rating for which the extinguisher is suitable.
3. type and quantity of extinguishing medium.
4. approval details.
5. instructions for use and recharge (it is recommended that operating instructions be given in pictorial form, in addition to explanatory text in language understood by the likely user).
6. year of manufacture.
7. temperature range over which the extinguisher will operate satisfactorily: and
8. test pressure.

## 9 Periodical inspections and maintenance

9.1 Extinguishers should be subject to periodical inspections in accordance with the manufacturer's instructions and serviced at intervals not exceeding one year.

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors. The documented procedures may include familiarisation with:

- Vessel specific operations and equipment.

### **IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

10.2 In meeting these requirements the Company should ensure that:

1. inspections are held at appropriate intervals,
2. any non-conformity is reported with its possible cause, if known,
3. appropriate corrective action is taken, and
4. records of these activities are maintained.

### **IMO: SOLAS**

#### Chapter II/2 Regulation 10

#### 3 Portable fire extinguishers \*

\* Refer to the Improved Guidelines for Marine Portable Fire Extinguishers adopted by the Organization by resolution A.951(23) and Unified interpretation of SOLAS chapter II-2 on the number and arrangement of portable fire extinguishers on board ships (MSC.1/Circ.1275).

#### **IMO: MSC.1/Circ.1275 Unified interpretation of SOLAS chapter II-2 on the number and arrangement of portable fire extinguishers on board ships. Rev.1**

1.2 This unified interpretation should be used for ships constructed on or after 1 January 2009. For ships constructed before 1 January 2009, shipowners are encouraged to implement this unified interpretation.

2.1 The table below should be applied for the number and arrangement of portable fire extinguishers in accommodation spaces, service spaces, control stations, machinery spaces of category A, other machinery spaces, cargo spaces, weather deck and other spaces on board ships.

Table – Minimum numbers and distribution of portable fire extinguishers in the various types of spaces on board ships. (*Refer to Circular*).

### **Inspection Guidance**

Portable fire extinguishers should be located around the ship as marked on the ship's Fire Control Plan and in accordance with MSC.1/Circ.1275.

They should be clearly marked with:

- Types of fire and rating for which the extinguisher is suitable.
- Type and quantity of extinguishing medium.
- Instructions for use and recharge
- Year of manufacture.

Extinguishers should be fully charged and readily available for immediate use. There should be evidence of regular inspection and servicing and sufficient spare charges (or spare extinguishers) available.

Records of inspection, testing and servicing should be in the Maintenance Plan for Fire Protection Systems and Appliances, as required by IMO MSC.1/Circ.1432. This may be integrated into the ship's computerised planned maintenance system or may stand alone.

### **Suggested Inspector Actions**

- Inspect a representative sample of each type of portable extinguisher found onboard and verify that each fire extinguisher was:
    - Marked with the information required under A.951(23) 8.1.
    - Marked with the date of the last annual service.
    - Marked with the date of the last check by vessel staff.
    - In the correct position as indicated by the fire control plan.
  - If necessary, review the records of inspections, tests and maintenance carried out in the maintenance plan.
  - Review the inventory of spare extinguishers and spare charges and verify that there are sufficient on board for the number and type of portable fire extinguishers required to be carried.
- 
- Interview one officer or rating to verify their familiarity with the purpose and operation of a selected portable fire extinguisher.

### **Expected Evidence**

- The Fire Control Plan.
- The maintenance plan for fire protection systems and fire-fighting systems and appliances.
- Records of inspections, tests and maintenance carried out on portable fire extinguishers required by the maintenance plan.
- Inventory of spare fire extinguisher charges and/or spare fire extinguishers.

### **Potential Grounds for a Negative Observation**

- Fire extinguisher(s) were missing or not located as shown in the Fire Control Plan.
- The fire control plan did not comply with MSC.1/Circ.1275 with regards to the distribution of fire extinguishers. (for ships constructed before 1 January 2009 make a **comment** only in the Hardware response tool)
- Fire extinguisher(s) were not fully charged.
- Fire extinguisher(s) were not readily available for immediate use.



- Fire extinguisher(s) were not clearly marked with the information required by A.951(23) 8.1.
- Fire Extinguisher(s) were not marked with the date of onboard inspection or annual survey.
- The accompanying officer was unfamiliar with the inspection and maintenance plan for portable fire extinguishers.
- In service fire extinguishers(s) were found to be defective in any respect.
- Fire extinguishers were not included in the maintenance plan for fire protection systems and fire-fighting systems and appliances.
- Inspection records for inspections, tests and maintenance carried out on fire extinguishers were incomplete.
- Inspection of an extinguisher indicated that actions recorded in the maintenance plan had not in fact taken place.
- There were insufficient spare charges or extra extinguishers.
- An interviewed officer or rating was unfamiliar with the use and/or operation of a portable fire extinguisher.

**5.3.4. Were the Master, officers and ratings familiar with the location and purpose of the Emergency Escape Breathing Devices (EEBDs) carried on board, and were these devices in good order, suitably located and ready for immediate use?**

**Short Question Text**

Emergency Escape Breathing Devices (EEBDs)

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Engine Room, Pumproom, Internal Accommodation, Interview - Rating

**Publications**

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: ISM Code

IMO SOLAS

IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances.

IMO MSC/Circ.849 Guidelines for the performance location

use and care of emergency escape breathing devices (EEBDs)

MSC/Circ.1081 Unified interpretations of SOLAS regulations II-2/13.3.4 and II-2/13.4.3

**Objective**

**To ensure that Emergency Escape Breathing Devices (EEBDs) are readily available to personnel in the event of a fire or any other emergency on the vessel.**

**Industry Guidance**

**OCIMF: International Safety Guide for Oil Tankers and Terminals. Sixth Edition**

10.13.3 Emergency Escape Breathing Device

**IMO: MSC/Circ.849 Guidelines for the performance, location, use and care of emergency escape breathing devices (EEBDs)**

1.1 These Guidelines provide information and guidance on the location, use, and care of emergency escape breathing devices (EEBDs), to provide personnel breathing protection against a hazardous atmosphere while escaping to an area of safety.

2.1 An EEBD is a supplied-air or oxygen device only used for escape from a compartment that has a hazardous atmosphere and should be of approved type.

2.2 EEBDs are not to be used for fighting fires, entering oxygen deficient voids or tanks, or worn by fire-fighters. In these events, a self-contained breathing apparatus, which is specifically suited for such situations should be used.

3.1 "Face piece" means a face covering that is designed to form a complete seal around the eyes, nose and mouth which is secured in position by a suitable means.

3.2 "Hood" means a head covering which completely covers the head, neck, and may cover portions of the shoulders.

3.3 "Hazardous atmosphere" means any atmosphere that is immediately dangerous to life or health.

4.1 The EEBD should have at least a duration of service of 10 min.

4.2 The EEBD should include a hood or full-face piece, as appropriate, to protect the eyes, nose and mouth during escape. Hoods and face pieces should be constructed of flame-resistant materials and include a clear window for viewing.

4.3 An unactivated EEBD should be capable of being carried hands-free.

4.4 The EEBDs, when stored, should be suitably protected from the environment.

4.5 Brief instructions or diagrams clearly illustrating the use should be clearly printed on the EEBD. The donning procedures should be quick and easy to allow for situations where there is little time to seek safety from a hazardous atmosphere.

4.6 Unless personnel are individually carrying EEBDs, consideration should be given for placing such devices along the escape routes within the machinery spaces or at the foot of each escape ladder within the space. In addition, control spaces and workshops located within the machinery spaces should also be considered for the possible location of such devices.

5.1 The EEBD should be maintained in accordance with the manufacturer's instructions.

5.2 Spare EEBDs should be kept on board.

5.3 Maintenance requirements, manufacturer's trademark and serial number, shelf life with accompanying manufacture date and name of approving authority should be printed on each EEBD.

6.1 Training in the use of the EEBD should be considered as a part of basic safety training.

6.2 All EEBD training units should be clearly marked.

6.3 Personnel should be trained to immediately don an EEBD prior to exiting a space when the atmosphere becomes life threatening. This is necessary due to the possibility of encountering smoke during escape. Such training should be accomplished by scheduling routine escape drills for crew members working in the engineering or machinery spaces.

6.4 An EEBD may also be used to escape from a machinery space due to an accidental release of a fixed CO system and can be carried by fire-fighters for the sole purpose of providing the device to personnel in need of emergency assistance.

#### **IMO: MSC/Circ.1081 Unified interpretations of SOLAS regulations II-2/13.3.4 and II-2/13.4.3**

##### **Regulation 13.3.4 Emergency escape breathing devices (EEBD)**

The minimum number of EEBDs to be kept within accommodation spaces should be as follows:

1. for cargo ships: two (2) EEBDs and one (1) spare EEBD.
2. for passenger ships ...
3. for passenger ships ...

##### **Regulation 13.4.3 Emergency escape breathing devices (EEBD)**

1. This interpretation applies to machinery spaces where crew are normally employed or may be present on a routine basis.

2. In machinery spaces for category A containing internal combustion machinery used for main propulsion, EEBDs should be positioned as follows:

1. one (1) EEBD in the engine control room, if located within the machinery space;
2. one (1) EEBD in workshop areas. If there is, however, a direct access to an escape way from the workshop, an EEBD is not required; and
3. one (1) EEBD on each deck or platform level near the escape ladder constituting the second means of escape from the machinery space (the other means being an enclosed escape trunk or watertight door at the lower level of the space).

Alternatively, different number or location may be determined by the Administration taking into consideration the layout and dimensions or the normal manning of the space.

3. For machinery spaces of category A other than those containing internal combustion machinery used for main propulsion, one (1) EEBD should, as a minimum, be provided on each deck or platform level near the escape ladder constituting the second means of escape from the space (the other means being an enclosed escape trunk or watertight door at the lower level of the space).

4. For other machinery spaces, the number and location of EEBDs are to be determined by the Administration.

#### **IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances**

##### **2 Operational readiness**

All fire protection systems and appliances should at all times be in good order and readily available for immediate use while the ship is in service. If a fire protection system is undergoing maintenance, testing or repair, then suitable arrangements should be made to ensure safety is not diminished through the provision of alternate fixed or portable fire protection equipment or other measures. The onboard maintenance plan should include provisions for this purpose.

##### **3 Maintenance and testing**

3.1 Onboard maintenance and inspections should be carried out in accordance with the ship's maintenance plan, which should include the minimum elements listed in sections 4 to 10 of these Guidelines.

3.2 Certain maintenance procedures and inspections may be performed by competent crew members who have completed an advanced fire-fighting training course, while others should be performed by persons specially trained in the maintenance of such systems. The onboard maintenance plan should indicate which parts of the recommended inspections and maintenance are to be completed by trained personnel.

3.3 Inspections should be carried out by the crew to ensure that the indicated weekly, monthly, quarterly, annual, two-year, five-year and ten-year actions are taken for the specified equipment, if provided. Records of the inspections should be carried on board the ship or may be computer-based. In cases where the inspections and maintenance are carried out by trained service technicians other than the ship's crew, inspection reports should be provided at the completion of the testing.

3.4 In addition to the onboard maintenance and inspections stated in these Guidelines, manufacturer's maintenance and inspection guidelines should be followed.

3.5 Where particular arrangements create practical difficulties, alternative testing and maintenance procedures should be to the satisfaction of the Administration.

*(These guidelines set out requirements applicable to non-rechargeable Emergency Escape Breathing Devices as follows:*

- *Weekly – “Examine all .... EEBD cylinder gauges to confirm they are in the correct pressure range.”*

- *Annually – “check EEBDs according to maker's instructions”*

*And applicable to Breathing Apparatus*

- *Perform hydrostatic testing of all steel self-contained breathing apparatus cylinders. Aluminium and composite cylinders should be tested to the satisfaction of the Administration.*

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors. The documented procedures may include familiarisation with:

- Vessel specific operations and equipment.

#### **IMO: ISM Code**

6.3 The Company should establish procedures to ensure that new personnel and personnel transferred to new assignments related to safety and protection of the environment are given proper familiarisation with their duties. Instructions which are essential to be provided prior to sailing should be identified, documented and given

#### **IMO: SOLAS**

Chapter II-2 Regulation 13

3.4 Emergency escape breathing devices

3.4.1 Emergency escape breathing devices shall comply with the Fire Safety Systems Code. Spare emergency escape breathing devices shall be kept onboard.

3.4.2 All ships shall carry at least two emergency escape breathing devices within accommodation spaces.

4.3 Emergency escape breathing devices

4.3.1 On all ships, within the machinery spaces, emergency escape breathing devices shall be situated ready for use at easily visible places, which can be reached quickly and easily at any time in the event of fire. The location of emergency escape breathing devices shall take into account the layout of the machinery space and the number of persons normally working in the spaces.

4.3.2 The number and location of these devices shall be indicated in the fire control plan required in regulation 15.2.4.

4.3.3 Emergency escape breathing devices shall comply with the Fire Safety Systems Code.

#### **Inspection Guidance**

Non-rechargeable EEBDs

- Non-rechargeable EEBDs have a shelf life, usually 15 years, after which they should be replaced.
- Maintenance requirements, manufacturer's trademark and serial number, shelf life (expiry date) with accompanying manufacture date and name of approving authority should be printed on each EEBD.
- The cylinders do not require hydrostatic testing.

Rechargeable EEBDs

- For EEBDs that can be recharged on board using the SCBA compressor, the cylinders should be hydrostatically tested as for breathing apparatus i.e. five-yearly hydrostatic testing of all steel self-contained breathing apparatus cylinders.

- Aluminium and composite cylinders should be tested to the satisfaction of the Administration.

The vessel operator should have developed procedures for the use and maintenance of EEBDs that defined:

- The number and location of EEBDs
- Training and escape drill requirements for EEBDs
- Inspection and maintenance requirements for EEBDs

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures for the use and maintenance of EEBDs
- Sight, and where necessary review, the inspection and maintenance records for the EEBDs in the on-board maintenance plan.
- Inspect sample EEBDs in the machinery spaces, the pumproom and the accommodation spaces.
- Interview two ratings to verify their familiarity with the location and purpose of the EEBDs.

#### **Expected Evidence**

- The company procedure for the use and maintenance of EEBDs
- The inspection and maintenance records for the EEBDs contained within the onboard maintenance plan.

#### **Potential Grounds for a Negative Observation**

- There were no company procedures for the use and maintenance of EEBDs.
- The accompanying officer was not familiar with the location, inspection and maintenance of the EEBDs.
- The EEBDs were not positioned in accordance with the fire control plan.
- There were fewer spare EEBDs onboard than indicated on the fire control plan.
- An inspected EEBD was found defective in any respect, including:
  - The cylinder pressure was outside the normal range.
  - The unit was passed its expiry date.
  - The donning instructions could not be read.
  - The unit was not marked with its maintenance requirements, manufacturer's trademark and serial number, shelf life (expiry date) with accompanying manufacture date and name of approving authority.
- EEBD(s) used for training were not clearly marked.
- EEBD(s) had not been inspected and maintained according to the company procedures and manufacturer's instructions.
- Rechargeable EEBD cylinders had not been hydrostatically tested at the required interval.
- An interviewed rating was unfamiliar with the location and purpose of the EEBDs.

**5.3.5. Were the Master, officers and engine ratings familiar with the purpose and operation of the vessel's wheeled (mobile) fire extinguishers, and was the equipment in good order and available for immediate use with operating instructions clearly marked?**

**Short Question Text**

Wheeled (mobile) fire extinguishers

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Engine Room, Interview - Engine Rating

**Publications**

IMO: ISM Code

IMO SOLAS

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances.

**Objective**

**To ensure that crewmembers can respond effectively to a fire situation in accordance with the shipboard emergency plan.**

**Industry Guidance**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals Sixth Edition**

Chapter 5 Fire Protection.

All fire extinguishers should be maintained and available for immediate use. The system for managing safety should contain procedures for maintenance, including that done by service agents. As a minimum, all fire extinguishers should be formally checked once a year that they are in the right location, have the right charging pressure and are working properly. Guidelines for the maintenance and inspection of fire protection systems and appliances are in IMO publications, specifically the latest relevant Marine Safety Committee (MSC) Circular).

**IMO: MSC.1/Circ.1432 Revised guidelines for the maintenance and inspection of fire protection systems and appliances.**

**2 Operational readiness**

All fire protection systems and appliances should at all times be in good order and readily available for immediate use while the ship is in service. If a fire protection system is undergoing maintenance, testing or repair, then suitable arrangements should be made to ensure safety is not diminished through the provision of alternate fixed or portable fire protection equipment or other measures. The onboard maintenance plan should include provisions for this purpose.

**3 Maintenance and testing**

3.1 Onboard maintenance and inspections should be carried out in accordance with the ship's maintenance plan, which should include the minimum elements listed in sections 4 to 10 of these Guidelines.

3.2 Certain maintenance procedures and inspections may be performed by competent crew members who have completed an advanced fire-fighting training course, while others should be performed by persons specially trained in the maintenance of such systems. The onboard maintenance plan should indicate which parts of the recommended inspections and maintenance are to be completed by trained personnel.

3.3 Inspections should be carried out by the crew to ensure that the indicated weekly, monthly, quarterly, annual, two-year, five-year and ten-year actions are taken for the specified equipment, if provided. Records of the inspections should be carried on board the ship or may be computer-based. In cases where the inspections and maintenance are carried out by trained service technicians other than the ship's crew, inspection reports should be provided at the completion of the testing.

3.4 In addition to the onboard maintenance and inspections stated in these Guidelines, manufacturer's maintenance and inspection guidelines should be followed.

*(These guidelines set out requirements applicable to wheeled(mobile) fire extinguishers for:*

- *Monthly inspections.*
- *Annual maintenance and inspections.*
- *Five-yearly inspections*
- *Ten-yearly hydrostatic testing, including propellant cartridges.)*

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors. The documented procedures may include familiarisation with:

- Vessel specific operations and equipment.

#### **IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

10.2 In meeting these requirements the Company should ensure that:

1. inspections are held at appropriate intervals,
2. any non-conformity is reported with its possible cause, if known,
3. appropriate corrective action is taken, and
4. records of these activities are maintained.

#### **IMO: SOLAS**

##### **Chapter II-2 Regulation 10**

##### **5.1 Machinery spaces containing oil-fired boilers or oil fuel units**

5.1.2.2 .... There shall be not less than one approved foam-type extinguisher of at least 135 l capacity or equivalent in each boiler room. These extinguishers shall be provided with hoses on reels suitable for reaching any part of the boiler room. In the case of domestic boilers of less than 175 kW, or boilers protected by fixed water-based local application fire extinguishing systems as required by paragraph 5.6, an approved foam-type extinguisher of at least 135 l capacity is not required

##### **5.2 Machinery spaces of category A containing internal combustion machinery**

5.2.2.2 There shall be in each such space approved foam-type fire extinguishers, each of at least 45 l capacity or equivalent, sufficient in number to enable foam or its equivalent to be directed on to any part of the fuel and lubricating oil pressure systems, gearing and other fire hazards.

##### **5.3 Machinery spaces containing steam turbines or enclosed steam engines**



5.3.2.1 There shall be approved foam fire extinguishers each of at least 45 l capacity or equivalent sufficient in number to enable foam or its equivalent to be directed on to any part of the pressure lubrication system, on to any part of the casings enclosing pressure lubricated parts of the turbines, engines or associated gearing, and any other fire hazards. However, such extinguishers shall not be required if protection, at least equivalent to that required by this subparagraph, is provided in such spaces by a fixed fire-extinguishing system fitted in compliance with paragraph 4.1.

## Chapter II-2 Regulation 14

### Operational readiness and maintenance

2.1.2 Fire-fighting systems and appliances shall be kept in good working order and readily available for immediate use....

2.2.3 The maintenance plan shall include at least the following fire protection systems and firefighting systems and appliances, where installed:

.3 fixed fire-extinguishing systems and other fire extinguishing appliances.

### **Inspection Guidance**

Wheeled (mobile) fire extinguishers should be located in the machinery spaces as marked on the Fire Control Plan and in accordance with the requirements of SOLAS.

They should be clearly marked with:

- Types of fire and rating for which the extinguisher is suitable
- Type and quantity of extinguishing medium
- Instructions for use and recharge
- Year of manufacture

Extinguishers should be kept fully charged and readily available for immediate use. There should be evidence of regular inspection, servicing and testing and sufficient spare charges available.

Records of inspection and testing should be in the Maintenance Plan for Fire Protection Systems and Appliances as required by IMO: MSC. /Circ 1432. This may be integrated into the ship's computerised planned maintenance system or may stand alone.

### **Suggested Inspector Actions**

- Inspect the wheeled fire extinguishers in the machinery spaces and verify each extinguisher was:
  - Marked with the required information.
  - Marked with the date of the last annual service.
  - Marked with the date of the last check by vessel staff.
  - In the correct position as indicated by the fire control plan.
- If necessary, review the records of inspections, tests and maintenance carried out in the maintenance plan.
- Review the inventory of spare charges and verify that there were sufficient on board for the wheeled fire extinguishers.
  
- Interview one engineer officer or rating to verify their familiarity with the purpose and operation of the wheeled fire extinguishers.

### **Expected Evidence**

- The fire control plan
- The maintenance plan for fire protection systems and fire-fighting systems and appliances.
- Records of inspections, tests and maintenance carried out on wheeled fire extinguishers required by the maintenance plan.
- Inventory of spare charges.

**Potential Grounds for a Negative Observation**

- A wheeled fire extinguisher(s) was not:
  - Fully charged.
  - Readily available for immediate use.
  - Marked with the required information.
  - Marked with the date of onboard inspections or servicing.
  - Included in the maintenance plan for fire protection systems and fire-fighting systems and appliances.
- A wheeled fire extinguisher(s) was:
  - Missing or not located as shown in the fire control plan.
  - Defective in any respect.
- The accompanying officer was unfamiliar with the inspection and maintenance plan for wheeled fire extinguishers.
- Inspection records for inspections, tests and maintenance carried out on wheeled fire extinguishers were incomplete.
- Inspection of a wheeled fire extinguisher indicated that actions recorded in the maintenance plan had not in fact taken place.
- There were insufficient spare charges.
- An interviewed engineer officer or rating was unfamiliar with the use and/or operation of a wheeled fire extinguisher.

Where the vessel is not equipped with wheeled (mobile) fire extinguishers, select “*Not Answerable*” in each of the response tools then select “*Not Applicable - as instructed by question guidance*”.

## 5.4. Life saving appliances

**5.4.1. Were the Master and officers familiar with the operation of the davit-launched lifeboats, release mechanisms and launching appliances, and were they in good order with records available to demonstrate that they had been inspected and tested as required?**

### **Short Question Text**

Davit-launched lifeboats, release mechanisms and launching appliances

### **Vessel Types**

Oil, Chemical, LPG, LNG

### **ROVIQ Sequence**

Documentation, Lifeboat deck

### **Publications**

OCIMF: Survival Craft – A Seafarer’s Guide

IMO: LSA Code

IMO: Resolution MSC.402(96) Requirements for maintenance

thorough examination

operational testing

overhaul and repair of lifeboats and rescue boats

launching appliances and release gear

IMO: ISM Code

IMO SOLAS

### **Objective**

**To ensure the lifeboats, release mechanisms and launching appliances will be ready for immediate use in an emergency.**

### **Industry Guidance**

#### **OCIMF: Survival Craft. A Seafarer’s Guide**

Section 2.1 Maintenance and instruction manuals

Experience has revealed poor maintenance as a contributory factor to many incidents and near misses involving survival craft...

**IMO: Resolution MSC.402(96) Requirements for maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear**

4 Qualification levels and certification

4.1 Weekly and monthly inspections and routine maintenance as specified in the equipment maintenance manual(s), shall be conducted by authorized service providers, or by shipboard personnel under the direction of a senior ship's officer in accordance with the maintenance manual(s).

4.2 Annual thorough examinations and operational tests, as described in section 6.2, shall be conducted by certified personnel of either the manufacturer or an authorized service provider in accordance with section 7 and section 8. The service provider may be the ship operator provided that it is authorized in accordance with section 3 and section 7.

4.3 Five-year thorough examination, any overhaul, overload operational tests, as described in section 6.3, and repair shall be conducted by certified personnel of either the manufacturer or an authorized service provider in accordance with section 7 and section 8.

## 5 Reports and records

5.1 All reports and checklists shall be completed and signed by the person who carries out the inspection and maintenance work and countersigned by the Company's representative or the ship's master.

5.2 Records of maintenance, thorough examination, operational testing, overhaul, and repair shall be updated and filed on board the ship for the service life of the equipment.

5.3 When thorough examination, operational testing, overhaul, and repair are completed, a statement confirming that the lifeboat arrangements remain fit for purpose shall be promptly issued by the manufacturer or authorized service provider that conducted the work. A copy of valid documents of certification and authorization as appropriate shall be included with the statement.

## 6 Specific Procedures For Inspection, Maintenance, Thorough Examination, Operational Testing, Overhaul And Repair

### 6.1 Maintenance manuals

6.1.1 Any inspection, maintenance, thorough examination, operational testing, overhaul, and repair shall be carried out according to the maintenance manuals and associated technical documentation developed by the manufacturer.

6.1.2 A full set of maintenance manuals and associated technical documentation as specified in paragraph 6.1.1 shall be available on board.

**TMSA KPI 9A.1.1** requires that safety inspections are conducted at scheduled intervals by a designated Safety Officer. Safety inspections of the ship:

- Include all accessible areas of the ship.

## IMO: ISM Code

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

## IMO: LSA Code

4.4.3.5 All surfaces on which persons might walk shall have a non-skid finish.

4.4.6.12 Water-resistant instructions for starting and operating the engine shall be provided and mounted in a conspicuous place near the engine starting controls.

4.4.7.6 Every lifeboat to be launched by a fall or falls, except a free-fall lifeboat, shall be fitted with a release mechanism complying with the following requirements subject to subparagraph .17 below:

.7 the mechanism shall have two release capabilities: normal (off-load) release capability and on-load release capability:

.11 clear operating instructions shall be provided with a suitably worded warning notice using colour coding, pictograms, and/or symbols as necessary for clarity. If colour coding is used, green shall indicate a properly reset hook and red shall indicate danger of improper or incorrect setting.

.12 the release control shall be clearly marked in a colour that contrasts with its surroundings.

4.4.7.11 A manually controlled interior light or source of light shall be fitted inside the lifeboat to provide illumination for not less than 12 h to permit reading of survival and equipment instructions; however, oil lamps shall not be permitted for this purpose.

#### 4.4.8 Lifeboat equipment

All items of lifeboat equipment, whether required by this paragraph or elsewhere in section 4.4, shall be secured within the lifeboat by lashings, storage in lockers or compartments, storage in brackets or similar mounting arrangements or other suitable means. However, in the case of a lifeboat to be launched by falls the boat-hooks shall be kept free for fending off purposes. The equipment shall be secured in such a manner as not to interfere with any abandonment procedures.

4.4.9.1 The number of persons for which the lifeboat is approved shall be clearly marked on it in clear permanent characters.

4.4.9.2 The name and port of registry of the ship to which the lifeboat belongs shall be marked on each side of the lifeboat's bow in block capitals of the Roman alphabet.

4.4.9.3 Means of identifying the ship to which the lifeboat belongs, and the number of the lifeboat shall be marked in such a way that they are visible from above.

4.6.1 Totally enclosed lifeboats shall comply with the requirements of section 4.4 and in addition shall comply with the requirements of this section.

#### 4.6.2 Enclosure

Every totally enclosed lifeboat shall be provided with a rigid watertight enclosure which completely encloses the lifeboat. The enclosure shall be so arranged that:

.2 access to the lifeboat is provided by hatches which can be closed to make the lifeboat watertight.

.4 access hatches are capable of being opened and closed from both inside and outside and are equipped with means to hold them securely in open positions.

.7 it includes windows or translucent panels which admit sufficient daylight to the inside of the lifeboat with the hatches closed to make artificial light unnecessary.

4.6.3.1 Except in free-fall lifeboats, a safety belt shall be fitted at each indicated seating position.

#### 4.8 Lifeboats with a self-contained air support system

In addition to complying with the requirements of section 4.6 or 4.7, as applicable, a lifeboat with a self-contained air support system shall be so arranged that, when proceeding with all entrances and openings closed, the air in the lifeboat remains safe and breathable and the engine runs normally for a period of not less than 10 min. During this period, the atmospheric pressure inside the lifeboat shall never fall below the outside atmospheric pressure nor shall it exceed it by more than 20 hPa. The system shall have visual indicators to indicate the pressure of the air supply at all times.

#### 4.9 Fire-protected lifeboats

4.9.1 In addition to complying with the requirements of section 4.8, a fire-protected lifeboat when waterborne shall be capable of protecting the number of persons it is permitted to accommodate when subjected to a continuous oil fire that envelops the lifeboat for a period of not less than 8 min.

#### 4.9.2 Water spray system,

A lifeboat which has a water spray fire-protection system shall comply with the following:

1. water for the system shall be drawn from the sea by a self-priming motor pump. It shall be possible to turn "on" and turn "off" the flow of water over the exterior of the lifeboat.
2. the seawater intake shall be so arranged as to prevent the intake of flammable liquids from the sea surface; and
3. the system shall be arranged for flushing with fresh water and allowing complete drainage.

6.1.2.7 Where davit arms are recovered by power, safety devices shall be fitted which will automatically cut off the power before the davit arms reach the stops in order to prevent overstressing the falls or davits, unless the motor is designed to prevent such overstressing.

## **IMO: SOLAS**

### Chapter III Regulation 20

3.2 Instructions for on-board maintenance of life-saving appliances complying with regulation 36 shall be provided and maintenance shall be carried out accordingly.

3.3 The Administration may accept, in compliance with the requirements of paragraph 3.2, a shipboard planned maintenance programme, which includes the requirements of regulation 36.

### 4 Maintenance of falls

Falls used in launching shall be inspected periodically\* with special regard for areas passing through sheaves and renewed when necessary due to deterioration of the falls or at intervals of not more than 5 years, whichever is the earlier.

\* Refer to 'Measures to prevent accidents with lifeboats' (MSC.1/Circ.1206/Rev.1).

### 6 Weekly inspection

The following tests and inspections shall be carried out weekly and a report of the inspection shall be entered in the log-book:

.1 all survival craft, rescue boats and launching appliances shall be visually inspected to ensure that they are ready for use. The inspection shall include, but is not limited to, the condition of hooks, their attachment to the lifeboat and the on-load release gear being properly and completely reset.

.2 all engines in lifeboats and rescue boats shall be run for a total period of not less than 3 min, provided the ambient temperature is above the minimum temperature required for starting and running the engine. During this period of time, it should be demonstrated that the gear box and gear box train are engaging satisfactorily...

.3 lifeboats, except free-fall lifeboats, on cargo ships shall be moved from their stowed position, without any persons on board, to the extent necessary to demonstrate satisfactory operation of launching appliances if weather and sea conditions so allow.

### 7 Monthly inspection

7.1 All lifeboats, except free-fall lifeboats, shall be turned out from their stowed position, without any persons on board if weather and sea conditions so allow.

7.2 Inspection of the life-saving appliances, including lifeboat equipment, shall be carried out monthly using the checklist required by regulation 36.1 to ensure that they are complete and in good order. A report of the inspection shall be entered in the log-book.

### 10 Marking of stowage locations

Containers, brackets, racks, and other similar stowage locations for life-saving equipment shall be marked with symbols in accordance with the recommendations of the Organization\*, indicating the devices stowed in that location for that purpose. If more than one device is stowed in that location, the number of devices shall also be indicated.

Refer to 'Symbols related to life-saving appliances and arrangements' (resolution A.760(18), as amended) and/or tables 1 and 2 of 'Escape route signs and equipment location markings' (resolution A.1116(3)) as appropriate. Refer to the new symbols in tables 1 and 2 of resolution A.1116(30) where the symbols for a specific item are differently expressed in resolutions A.760(18) as amended and A.1116(30)

11 Maintenance, thorough examination, operational testing, overhaul and repair of lifeboats, rescue boats and fast rescue boats, launching appliances and release gear

11.1 Launching appliances shall be:

.1 subject to a thorough examination at the annual surveys required by regulations I/7 or I/8, as applicable: and

.2 upon completion of the examination referred to in paragraph 11.1.1, subjected to a dynamic test of the winch brake at maximum lowering speed. The load to be applied shall be the mass of the survival craft or rescue boat without persons on board, except that, at intervals of at least once every five years, the test shall be carried out with a proof load equal to 1.1 times the weight of the survival craft or rescue boat and its full complement of persons and equipment.

11.2 Lifeboat and rescue boat release gear, including fast rescue boat release gear and free-fall lifeboat release systems, shall be:

.1 subject to a thorough examination and operational test during the annual surveys required by regulations I/7 and I/8.

.2 in case of on-load release gear, operationally tested under a load of 1.1 times the total mass of the boat when loaded with its full complement of persons and equipment whenever the release gear is overhauled. Such overhauling and operational test shall be carried out at least once every five years; \*

\* Refer to Recommendation on testing of life-saving appliances (resolution A.689(17)), as amended. For life-saving appliances installed on board on or after 1 July 1999, refer to Revised Recommendations on testing of life-saving appliances (resolution MSC.81(70)), as amended.

11.4 Lifeboats and rescue boats, including fast rescue boats, shall be subject to a thorough examination and operational test during the annual surveys required by regulations I/7 and I/8.

11.5 The thorough examination, operational testing and overhaul required by paragraphs 11.1 to 11.4 and the maintenance and repair of equipment specified in paragraphs 11.1 to 11.4 shall be carried out in accordance with the Requirements for maintenance, thorough examination, operational testing, overhaul and repair, and the instructions for onboard maintenance as required by regulation 36.

### Chapter III Regulation 31

1.6 Chemical tankers and gas carriers carrying cargoes emitting toxic vapours or gases\* shall carry, in lieu of totally enclosed lifeboats complying with the requirements of section 4.6 of the Code, lifeboats with a self-contained air support system complying with the requirements of section 4.8 of the Code.

\*Refer to the products for which emergency escape respiratory protection is required in Chapter 17 of the IBC Code (resolution MSC.4(48) as amended) and in Chapter 19 of the IGC Code (resolution MSC.5(48), as amended

1.7 Oil tankers, chemical tankers and gas carriers carrying cargoes having a flash point not exceeding 60°C(closed cup test) shall carry, in lieu of totally enclosed lifeboats complying with the requirements of section 4.6 of the Code, fire-protected lifeboats complying with the requirements of section 4.9 of the Code.

Instructions for on-board maintenance of life-saving appliances shall be easily understood, illustrated wherever possible, and, as appropriate, shall include the following for each appliance:

1. a checklist for use when carrying out the inspections required by regulation 20.7.
2. maintenance and repair instructions.
3. schedule of periodic maintenance.
4. diagram of lubrication points with the recommended lubricants.
5. list of replaceable parts.
6. list of sources of spare parts; and
7. log for records of inspections and maintenance.

### **Inspection Guidance**

The vessel operator should have developed a procedure to ensure the lifeboats, release mechanisms and launching appliances were periodically inspected and tested and ready for immediate use in an emergency.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure to ensure the lifeboats, release mechanisms and launching appliances were periodically inspected and tested and ready for immediate use in an emergency.
  - Review records of periodic inspections and tests of the lifeboats, release mechanisms and launching appliances.
  - Inspect the lifeboats, release mechanisms and launching appliances.
  - Inspect the lifting hooks and their associated structure where they connect to the lifeboat keel and verify that the structure was free from corrosion which might affect the strength.
- 
- If safe to do so, request that the accompanying officer to start a lifeboat engine and demonstrate the propeller moving in the ahead and astern direction.
  - Select several items from the monthly inspection check list required by SOLAS III/ 36 and verify that the accompanying officer was familiar with how the checks or tests were performed.
  - Interview the accompanying officer to verify their familiarity with the operation, inspection and testing of the lifeboats, release mechanisms and launching appliances.

### **Expected Evidence**

- The company procedure to ensure lifeboats, release mechanisms and launching appliances were periodically inspected and tested and ready for immediate use in an emergency.
- A copy of the monthly inspection checklist required by SOLAS III/36.
- The Bridge Log Book.
- Records of periodic inspections and tests of the lifeboats, release mechanisms and launching appliances.

### **Potential Grounds for a Negative Observation**

- There was no procedure to ensure the lifeboats, release mechanisms and launching appliances were periodically inspected and tested and ready for immediate use in an emergency.
- The accompanying officer was unfamiliar with the operation of the lifeboats, release mechanisms and launching appliances.
- The accompanying officer was unfamiliar with the required inspection and testing of the lifeboats, release mechanisms and launching appliances.
- Records of weekly and monthly inspections and routine maintenance of the lifeboats, release mechanisms and launching appliances were incomplete.



- Records of annual and five-yearly thorough examinations and tests of the lifeboats, release mechanisms and launching appliances were incomplete.
- There were no checklists as required by SOLAS III/36 available for the inspection of the lifeboats, release mechanisms and launching appliances.
- Records indicated the lifeboat falls had been in service for longer than five years.
- A lifeboat was not marked as required.
- There were no clear operating instructions provided in the lifeboat for the on-load release mechanism, with a suitably worded warning notice.
- The on-load release control was not clearly marked in a colour that contrasted with its surroundings.
- Items of lifeboat equipment were damaged, missing or improperly stowed.
- A lifeboat engine would not start.
- There were no water-resistant instructions for starting and operating the engine mounted in a conspicuous place near the engine starting controls.
- When tested, it could not be demonstrated that the gear box and gear box train were engaging satisfactorily.
- Indicated pressure for the self-contained air-support system, if fitted, was not within the normal range.
- The pressurised air hoses of the self-contained air-support system, if fitted, were in poor condition.
- Nozzles for the water spray fire-protection system, if fitted, were clogged by salt and/or scale.
- The launching appliance gearcase breather vent was blocked or painted over.
- Lifeboat davit limit switches were not operating freely.
- The lifeboat falls or gripes were in poor condition.
- Inspection of the lifeboats, release mechanisms and launching appliances indicated that actions recorded in the maintenance plan had not in fact taken place.
- The lifeboats and launching appliances and their locations were not marked with the required symbols.
- Lifeboats, release mechanisms and launching appliances were defective in any respect.

**5.4.2. Were the Master and officers familiar with the operation of the free-fall lifeboat, its release systems and its launching appliance, and was the equipment in satisfactory condition with records available to demonstrate that it had been inspected and tested in accordance with company procedures?**

**Short Question Text**

Free-fall lifeboat, its release systems and its launching appliance

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation, Lifeboat deck

**Publications**

IMO SOLAS

OCIMF: Survival Craft – A Seafarer’s Guide

IMO: LSA Code

IMO: Resolution MSC.402(96) Requirements for maintenance

thorough examination

operational testing

overhaul and repair of lifeboats and rescue boats

launching appliances and release gear

**Objective**

**To ensure the free-fall lifeboat, its release system and launching appliance will be ready for immediate use in an emergency.**

**Industry Guidance**

**OCIMF: Survival Craft. A Seafarer’s Guide**

Section 2.1 Maintenance and instruction manuals

Experience has revealed poor maintenance as a contributory factor to many incidents and near misses involving survival craft...

Free-fall lifeboats

Section 5.1 Maintenance and inspection

- If suitable access is available to the boat ramp, the condition of skid plates and the freedom of rollers should be regularly checked.
- To guard against hydraulic hose failure, consideration should be given to the routine replacement of hoses during refit periods, particularly those hoses located in relatively inaccessible positions on the ramp or “A” frame/recovery gear.

Section 5.5 Post recovery

- The lifeboat should be left ready for immediate launch with safety/maintenance chains or pins removed.

**IMO: Resolution MSC.402(96) Requirements for maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear**

#### 4 Qualification Levels And Certification

4.1 Weekly and monthly inspections and routine maintenance as specified in the equipment maintenance manual(s), shall be conducted by authorized service providers, or by shipboard personnel under the direction of a senior ship's officer in accordance with the maintenance manual(s).

4.2 Annual thorough examinations and operational tests, as described in section 6.2, shall be conducted by certified personnel of either the manufacturer or an authorized service provider in accordance with section 7 and section 8. The service provider may be the ship operator provided that it is authorized in accordance with section 3 and section 7.

4.3 Five-year thorough examination, any overhaul, overload operational tests, as described in section 6.3, and repair shall be conducted by certified personnel of either the manufacturer or an authorized service provider in accordance with section 7 and section 8.

#### 5 Reports And Records

5.1 All reports and checklists shall be completed and signed by the person who carries out the inspection and maintenance work and countersigned by the Company's representative or the ship's master.

5.2 Records of maintenance, thorough examination, operational testing, overhaul, and repair shall be updated and filed on board the ship for the service life of the equipment.

5.3 When thorough examination, operational testing, overhaul, and repair are completed, a statement confirming that the lifeboat arrangements remain fit for purpose shall be promptly issued by the manufacturer or authorized service provider that conducted the work. A copy of valid documents of certification and authorization as appropriate shall be included with the statement.

#### 6 Specific Procedures For Inspection, Maintenance, Thorough Examination, Operational Testing, Overhaul And Repair

##### 6.1 Maintenance manuals

6.1.1 Any inspection, maintenance, thorough examination, operational testing, overhaul, and repair shall be carried out according to the maintenance manuals and associated technical documentation developed by the manufacturer.

6.1.2 A full set of maintenance manuals and associated technical documentation as specified in paragraph 6.1.1 shall be available on board.

#### **IMO: LSA Code**

4.4.3.5 All surfaces on which persons might walk shall have a non-skid finish.

4.4.6.12 Water-resistant instructions for starting and operating the engine shall be provided and mounted in a conspicuous place near the engine starting controls.

4.4.7.11 A manually controlled interior light or source of light shall be fitted inside the lifeboat to provide illumination for not less than 12 h to permit reading of survival and equipment instructions; however, oil lamps shall not be permitted for this purpose.

##### 4.4.8 Lifeboat equipment

All items of lifeboat equipment, whether required by this paragraph or elsewhere in section 4.4, shall be secured within the lifeboat by lashings, storage in lockers or compartments, storage in brackets or similar mounting arrangements or other suitable means. However, in the case of a lifeboat to be launched by falls the boat-hooks shall be kept free for fending off purposes. The equipment shall be secured in such a manner as not to interfere with any abandonment procedures.

4.4.9.1 The number of persons for which the lifeboat is approved shall be clearly marked on it in clear permanent characters.

4.4.9.2 The name and port of registry of the ship to which the lifeboat belongs shall be marked on each side of the lifeboat's bow in block capitals of the Roman alphabet.

4.4.9.3 Means of identifying the ship to which the lifeboat belongs, and the number of the lifeboat shall be marked in such a way that they are visible from above.

4.6.1 Totally enclosed lifeboats shall comply with the requirements of section 4.4 and in addition shall comply with the requirements of this section.

#### 4.6.2 Enclosure

Every totally enclosed lifeboat shall be provided with a rigid watertight enclosure which completely encloses the lifeboat. The enclosure shall be so arranged that:

.2 access to the lifeboat is provided by hatches which can be closed to make the lifeboat watertight.

.4 access hatches are capable of being opened and closed from both inside and outside and are equipped with means to hold them securely in open positions.

.7 it includes windows or translucent panels which admit sufficient daylight to the inside of the lifeboat with the hatches closed to make artificial light unnecessary.

4.7.2.1 ... Each seat shall be provided with a suitable locking harness capable of quick release under tension to restrain the body of the occupant during launching.

#### 4.7.6 Lifeboat fittings

Each free-fall lifeboat shall be fitted with a release system which shall:

.1 have two independent activation systems for the release mechanisms which may only be operated from inside the lifeboat and be marked in a colour that contrasts with its surroundings.

.3 be adequately protected against accidental or premature use.

.4 be designed to test the release system without launching the lifeboat.

#### 4.8 Lifeboats with a self-contained air support system

In addition to complying with the requirements of section 4.6 or 4.7, as applicable, a lifeboat with a self-contained air support system shall be so arranged that, when proceeding with all entrances and openings closed, the air in the lifeboat remains safe and breathable and the engine runs normally for a period of not less than 10 min. During this period, the atmospheric pressure inside the lifeboat shall never fall below the outside atmospheric pressure nor shall it exceed it by more than 20 hPa. The system shall have visual indicators to indicate the pressure of the air supply at all times.

#### 4.9 Fire-protected lifeboats

4.9.1 In addition to complying with the requirements of section 4.8, a fire-protected lifeboat when waterborne shall be capable of protecting the number of persons it is permitted to accommodate when subjected to a continuous oil fire that envelops the lifeboat for a period of not less than 8 min.

#### 4.9.2 Water spray system,

A lifeboat which has a water spray fire-protection system shall comply with the following:

1. water for the system shall be drawn from the sea by a self-priming motor pump. It shall be possible to turn "on" and turn "off" the flow of water over the exterior of the lifeboat.
2. the seawater intake shall be so arranged as to prevent the intake of flammable liquids from the sea surface; and
3. the system shall be arranged for flushing with fresh water and allowing complete drainage.

6.1.2.7 Where davit arms are recovered by power, safety devices shall be fitted which will automatically cut off the power before the davit arms reach the stops in order to prevent overstressing the falls or davits, unless the motor is designed to prevent such overstressing.

6.1.4.5 The launching appliance shall be arranged so as to preclude accidental release of the lifeboat in its unattended stowed position. If the means provided to secure the lifeboat cannot be released from inside the lifeboat, it shall be so arranged as to preclude boarding the lifeboat without first releasing it.

**TMSA KPI 9A.1.1** requires that safety inspections are conducted at scheduled intervals by a designated Safety Officer. Safety inspections of the ship:

- Include all accessible areas of the ship.

#### **IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

#### **IMO: SOLAS**

##### Chapter III Regulation 20

3.2 Instructions for on-board maintenance of life-saving appliances complying with regulation 36 shall be provided and maintenance shall be carried out accordingly.

3.3 The Administration may accept, in compliance with the requirements of paragraph 3.2, a shipboard planned maintenance programme, which includes the requirements of regulation 36.

##### 4 Maintenance of falls

Falls used in launching shall be inspected periodically\* with special regard for areas passing through sheaves and renewed when necessary due to deterioration of the falls or at intervals of not more than 5 years, whichever is the earlier.

\* Refer to 'Measures to prevent accidents with lifeboats' (MSC.1/Circ.1206/Rev.1).

##### 6 Weekly inspection

The following tests and inspections shall be carried out weekly and a report of the inspection shall be entered in the log-book:

1. all survival craft, rescue boats and launching appliances shall be visually inspected to ensure that they are ready for use. The inspection shall include, but is not limited to, the condition of hooks, their attachment to the lifeboat and the on-load release gear being properly and completely reset.
2. all engines in lifeboats and rescue boats shall be run for a total period of not less than 3 min, provided the ambient temperature is above the minimum temperature required for starting and running the engine. During this period of time, it should be demonstrated that the gear box and gear box train are engaging satisfactorily...

## 7 Monthly inspection

7.2 Inspection of the life-saving appliances, including lifeboat equipment, shall be carried out monthly using the checklist required by regulation 36.1 to ensure that they are complete and in good order. A report of the inspection shall be entered in the log-book.

## 10 Marking of stowage locations

Containers, brackets, racks, and other similar stowage locations for life-saving equipment shall be marked with symbols in accordance with the recommendations of the Organization\*, indicating the devices stowed in that location for that purpose. If more than one device is stowed in that location, the number of devices shall also be indicated.

Refer to 'Symbols related to life-saving appliances and arrangements' (resolution A.760(18), as amended) and/or tables 1 and 2 of 'Escape route signs and equipment location markings' (resolution A.1116(3)) as appropriate. Refer to the new symbols in tables 1 and 2 of resolution A.1116(30) where the symbols for a specific item are differently expressed in resolutions A.760(18) as amended and A.1116(30)

11 Maintenance, thorough examination, operational testing, overhaul and repair of lifeboats, rescue boats and fast rescue boats, launching appliances and release gear

### 11.1 Launching appliances shall be:

1. subject to a thorough examination at the annual surveys required by regulations I/7 or I/8, as applicable: and

11.2 Lifeboat and rescue boat release gear, including fast rescue boat release gear and free-fall lifeboat release systems, shall be:

1. subject to a thorough examination and operational test during the annual surveys required by regulations I/7 and I/8.
2. -
3. notwithstanding paragraph 11.2.2, the operational testing of free-fall lifeboat release systems shall be performed either by free-fall launch with only the operating crew on board or by a test without launching the lifeboat carried out based on the Requirements for maintenance, thorough examination, operational testing, overhaul and repair.

11.4 Lifeboats and rescue boats, including fast rescue boats, shall be subject to a thorough examination and operational test during the annual surveys required by regulations I/7 and I/8.

11.5 The thorough examination, operational testing and overhaul required by paragraphs 11.1 to 11.4 and the maintenance and repair of equipment specified in paragraphs 11.1 to 11.4 shall be carried out in accordance with the requirements for maintenance, thorough examination, operational testing, overhaul and repair, and the instructions for onboard maintenance as required by regulation 36.

## Chapter III Regulation 31

1.6 Chemical tankers and gas carriers carrying cargoes emitting toxic vapours or gases\* shall carry, in lieu of totally enclosed lifeboats complying with the requirements of section 4.6 of the Code, lifeboats with a self-contained air support system complying with the requirements of section 4.8 of the Code.

\*Refer to the products for which emergency escape respiratory protection is required in Chapter 17 of the IBC Code (resolution MSC.4(48) as amended) and in Chapter 19 of the IGC Code (resolution MSC.5(48), as amended

1.7 Oil tankers, chemical tankers and gas carriers carrying cargoes having a flash point not exceeding 60°C(closed cup test) shall carry, in lieu of totally enclosed lifeboats complying with the requirements of section 4.6 of the Code, fire-protected lifeboats complying with the requirements of section 4.9 of the Code.

## Chapter III Regulation 36

### Instructions for on-board maintenance

Instructions for on-board maintenance of life-saving appliances shall be easily understood, illustrated wherever possible, and, as appropriate, shall include the following for each appliance:

1. a checklist for use when carrying out the inspections required by regulation 20.7.
2. maintenance and repair instructions.
3. schedule of periodic maintenance.
4. diagram of lubrication points with the recommended lubricants.
5. list of replaceable parts.
6. list of sources of spare parts; and
7. log for records of inspections and maintenance.

### Inspection Guidance

The vessel operator should have developed procedures to ensure the free-fall lifeboat, its release systems, launching appliance and recovery equipment were periodically inspected and tested and ready for immediate use in an emergency.

### Suggested Inspector Actions

- Sight, and where necessary review, the company procedures to ensure the free-fall lifeboat, its release systems, launching appliance and recovery equipment were periodically inspected and tested and ready for immediate use in an emergency.
  - Review records of periodic inspections and tests of the free-fall lifeboat, its release systems, launching appliance and recovery equipment.
  - Inspect the free-fall lifeboat, its equipment and release systems, considering the regulatory requirements and with reference to a copy of the vessel's monthly inspection checklist, and verify that the lifeboat, its equipment and release systems were in good order.
  - Inspect the free-fall lifeboat launching and recovery systems and stowage arrangements, considering the regulatory requirements and with reference to a copy of the vessel's monthly inspection checklist, and verify that the lifeboat launching, recovery and stowage systems were in good order
- 
- If safe to do so, request that the accompanying officer starts the lifeboat engine and demonstrate the propeller moving in the ahead and astern direction.
  - Select several items from the monthly inspection check list required by SOLAS III/36 and verify that the accompanying officer was familiar with how the checks or tests were performed.
  - Interview the accompanying officer to verify their familiarity with the operation, inspection and testing of the free-fall lifeboat, its release system and launching appliance.

### Expected Evidence

- The company procedure to ensure the free-fall lifeboat, its release system and launching appliance were periodically inspected and tested and ready for immediate use in an emergency.
- A copy of the monthly inspection checklist required by SOLAS III/36.
- The Bridge Log Book.
- Records of thorough examination and operational tests of the free-fall lifeboat, its release systems, launching appliance and recovery equipment.

### Potential Grounds for a Negative Observation

- There was no company procedure to ensure the free-fall lifeboat, its release systems, launching appliance and recovery equipment were periodically inspected and tested and ready for immediate use in an emergency.
- The accompanying officer was unfamiliar with the operation of the free-fall lifeboat, its release systems, launching appliance and recovery equipment.
- The accompanying officer was unfamiliar with the required inspection and testing of the free-fall lifeboat, its release systems, launching appliance and recovery equipment.
- Records of weekly and monthly inspections and routine maintenance of the free-fall lifeboat, its release systems, launching appliance and recovery equipment were incomplete.
- Records of annual and five-yearly thorough examinations and tests of the free-fall lifeboat, its release systems, launching appliance and recovery equipment were incomplete.
- There were no checklists as required by SOLAS III/36 available for the inspection of the free-fall lifeboat, its release systems, launching appliance and recovery equipment.
- Records indicated the lifeboat falls had been in service for longer than five years.
- The lifeboat was not marked as required.
- There were no clear operating instructions provided in the lifeboat for the release system.
- The release system was not adequately protected against accidental or premature release.
- The release system was not clearly marked in a colour that contrasted with its surroundings.
- Items of lifeboat equipment were damaged, missing or improperly stowed.
- The locking seat harnesses were not in good order.
- The lifeboat engine would not start.
- There were no water-resistant instructions for starting and operating the engine mounted in a conspicuous place near the engine starting controls.
- When tested, it could not be demonstrated that the lifeboat gear box and gear box train were engaging satisfactorily.
- Indicated pressure for the self-contained air-support system, if fitted, was not within the normal range.
- Nozzles for the water spray fire-protection system, if fitted, were clogged by salt and/or scale.
- Recovery limit switches, if fitted, were not operating freely.
- The means provided to secure the lifeboat in the stowed position were in poor condition.
- The free-fall lifeboat was not properly secured in the stowed position.
- Safety/maintenance chains or pins were still place.
- Hydraulic hoses appeared to be in poor condition
- The rollers and/or skid ramp appeared to be in poor condition
- The free-fall lifeboat, its release systems, launching appliance and recovery equipment were not marked with the required symbols.
- Inspection of the free-fall lifeboat, its release systems, launching appliance and recovery equipment indicated that actions recorded in the maintenance plan had not in fact taken place.
- The free-fall lifeboat, its release systems, launching appliance and recovery equipment were defective in any respect.



**5.4.3. Were the Master and officers familiar with the operation of the dedicated rescue boat and launching appliance, and were they in good order with records available to demonstrate that they had been inspected and tested as required?**

**Short Question Text**

Dedicated rescue boat and launching appliance

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation, Lifeboat deck

**Publications**

IMO: ISM Code

IMO SOLAS

OCIMF: Survival Craft – A Seafarer’s Guide

IMO: LSA Code

IMO: Resolution MSC.402(96) Requirements for maintenance

thorough examination

operational testing

overhaul and repair of lifeboats and rescue boats

launching appliances and release gear

**Objective**

**To ensure the rescue boat will be ready for immediate use in an emergency.**

**Industry Guidance**

**OCIMF: Survival Craft. A Seafarer’s Guide**

Section 2.1 Maintenance and instruction manuals

Experience has revealed poor maintenance as a contributory factor to many incidents and near misses involving survival craft...

**IMO: Resolution MSC.402(96) Requirements for maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear**

**4 Qualification levels and certification**

4.1 Weekly and monthly inspections and routine maintenance as specified in the equipment maintenance manual(s), shall be conducted by authorized service providers, or by shipboard personnel under the direction of a senior ship's officer in accordance with the maintenance manual(s).

4.2 Annual thorough examinations and operational tests, as described in section 6.2, shall be conducted by certified personnel of either the manufacturer or an authorized service provider in accordance with section 7 and section 8. The service provider may be the ship operator provided that it is authorized in accordance with section 3 and section 7.

4.3 Five-year thorough examination, any overhaul, overload operational tests, as described in section 6.3, and repair shall be conducted by certified personnel of either the manufacturer or an authorized service provider in accordance with section 7 and section 8.

**5 Reports and records**

5.1 All reports and checklists shall be completed and signed by the person who carries out the inspection and maintenance work and countersigned by the Company's representative or the ship's master.

5.2 Records of maintenance, thorough examination, operational testing, overhaul, and repair shall be updated and filed on board the ship for the service life of the equipment.

5.3 When thorough examination, operational testing, overhaul, and repair are completed, a statement confirming that the lifeboat arrangements remain fit for purpose shall be promptly issued by the manufacturer or authorized service provider that conducted the work. A copy of valid documents of certification and authorization as appropriate shall be included with the statement.

6 Specific procedures for inspection, maintenance, thorough examination, operational testing, overhaul and repair

6.1.1 Any inspection, maintenance, thorough examination, operational testing, overhaul, and repair shall be carried out according to the maintenance manuals and associated technical documentation developed by the manufacturer.

6.1.2 A full set of maintenance manuals and associated technical documentation as specified in paragraph 6.1.1 shall be available on board.

#### **IMO: LSA Code**

5.1.1.1 Except as provided by this section, all rescue boats shall comply with the requirements of paragraphs 4.4.1 to 4.4.7.4 inclusive, (excluding paragraph 4.4.6.8), and 4.4.7.6, 4.4.7.7, 4.4.7.9, 4.4.7.10 and 4.4.9, except that, for all rescue boats, an average mass of 82.5 kg shall apply to paragraph 4.4.2.2.1

4.4.6.12 Water-resistant instructions for starting and operating the engine shall be provided and mounted in a conspicuous place near the engine starting controls.

4.4.7.6 Every lifeboat to be launched by a fall or falls, except a free-fall lifeboat, shall be fitted with a release mechanism complying with the following requirements subject to paragraph .17 below:

.17 where a single fall and hook system is used for launching a lifeboat or rescue boat in combination with a suitable painter, the requirements of paragraphs 4.4.7.6.7, 4.4.7.6.8 and 4.4.7.6.15 need not be applicable; in such an arrangement a single capability to release the lifeboat or rescue boat, only when it is fully waterborne, will be adequate.

5.1.1.3 Rescue boats may be either of rigid or inflated construction or a combination of both....

5.1.1.8 A rescue boat shall be fitted with an inboard engine or outboard motor. If it is fitted with an outboard motor, the rudder and tiller may form part of the engine. Notwithstanding the requirements of paragraph 4.4.6.1, petrol-driven outboard engines with an approved fuel system may be fitted in rescue boats provided the fuel tanks are specially protected against fire and explosion.

#### **5.1.2 Rescue boat equipment**

5.1.2.1 All items of rescue boat equipment, with the exception of boat-hooks which shall be kept free for fending off purposes, shall be secured within the rescue boat by lashings, storage in lockers or compartments, storage in brackets or similar mounting arrangements, or other suitable means. The equipment shall be secured in such a manner as not to interfere with any launching or recovery procedures. All items of rescue boat equipment shall be as small and of as little mass as possible and shall be packed in suitable and compact form.

5.1.2.2 The normal equipment of every rescue boat shall consist of:

1. sufficient buoyant oars or paddles to make headway in calm seas. Thole pins, crutches or equivalent arrangements shall be provided for each oar. Thole pins or crutches shall be attached to the boat by lanyards or chains;

2. a buoyant bailer;
3. a binnacle containing an efficient compass which is luminous or provided with suitable means of illumination;
4. a sea-anchor and tripping line if fitted with a hawser of adequate strength not less than 10 m in length;
5. a painter of sufficient length and strength, attached to the release device complying with the requirements of paragraph 4.4.7.7 and placed at the forward end of the rescue boat;
6. one buoyant line, not less than 50 m in length, of sufficient strength to tow a liferaft as required by paragraph 5.1.1.7;
7. one waterproof electric torch suitable for Morse signalling, together with one spare set of batteries and one spare bulb in a waterproof container;
8. one whistle or equivalent sound signal;
9. a first-aid outfit in a waterproof case capable of being closed tightly after use;
10. two buoyant rescue quoits, attached to not less than 30 m of buoyant line;
11. a searchlight with a horizontal and vertical sector of at least 6 degrees and a measured luminous intensity of 2500 cd which can work continuously for not less than 3 h;
12. an efficient radar reflector;
13. thermal protective aids complying with the requirements of section 2.5 sufficient for 10% of the number of persons the rescue boat is permitted to accommodate or two, whichever is the greater; and
14. portable fire-extinguishing equipment of an approved type suitable for extinguishing oil fires.

5.1.2.3 In addition to the equipment required by paragraph 5.1.2.2, the normal equipment of every rigid rescue boat shall include:

1. a boat-hook;
2. a bucket; and
3. a knife or hatchet.

5.1.2.4 In addition to the equipment required by paragraph 5.1.2.2, the normal equipment of every inflated rescue boat shall consist of:

1. a buoyant safety knife;
2. two sponges;
3. an efficient manually operated bellows or pump;
4. a repair kit in a suitable container for repairing punctures; and
5. a safety boat-hook.

**TMSA KPI 9A.1.1** requires that safety inspections are conducted at scheduled intervals by a designated Safety Officer. Safety inspections of the ship:

- Include all accessible areas of the ship.

## **IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

## **IMO: SOLAS**

### Chapter III Regulation 14

Rescue boats shall be stowed:

.1 in a state of continuous readiness for launching in not more than 5 min, and if the inflated type, in a fully inflated condition at all times.

### Chapter III Regulation 20

3.2 Instructions for on-board maintenance of life-saving appliances complying with regulation 36 shall be provided and maintenance shall be carried out accordingly.

3.3 The Administration may accept, in compliance with the requirements of paragraph 3.2, a shipboard planned maintenance programme, which includes the requirements of regulation 36.

#### 6 Weekly inspection

The following tests and inspections shall be carried out weekly and a report of the inspection shall be entered in the log-book:

.1 all survival craft, rescue boats and launching appliances shall be visually inspected to ensure that they are ready for use. The inspection shall include, but is not limited to, the condition of hooks, their attachment to the lifeboat and the on-load release gear being properly and completely reset.

.2 all engines in lifeboats and rescue boats shall be run for a total period of not less than 3 min, provided the ambient temperature is above the minimum temperature required for starting and running the engine. During this period of time, it should be demonstrated that the gear box and gear box train are engaging satisfactorily. If the special characteristics of an outboard motor fitted to a rescue boat would not allow it to be run other than with its propeller submerged for a period of 3 min, a suitable water supply may be provided. In special cases, the Administration may waive this requirement for ships constructed before 1 July 1986.

#### 7 Monthly inspection

7.2 Inspection of the life-saving appliances, including lifeboat equipment, shall be carried out monthly using the checklist required by regulation 36.1 to ensure that they are complete and in good order. A report of the inspection shall be entered in the log-book.

8.4 All repairs and maintenance of inflated rescue boats shall be carried out in accordance with the manufacturer's instructions. Emergency repairs may be carried out on board the ship; however, permanent repairs shall be affected at an approved servicing station.

#### 10 Marking of stowage locations

Containers, brackets, racks, and other similar stowage locations for life-saving equipment shall be marked with symbols in accordance with the recommendations of the Organization\*, indicating the devices stowed in that location for that purpose. If more than one device is stowed in that location, the number of devices shall also be indicated.

\* Refer to the Symbols Related to Life-Saving Appliances and Arrangements, adopted by the Organization by resolution A.760(18), as amended.

11 Maintenance, thorough examination, operational testing, overhaul and repair of lifeboats, rescue boats and fast rescue boats, launching appliances and release gear

#### 11.1 Launching appliances shall be:

.1 subject to a thorough examination at the annual surveys required by regulations I/7 or I/8, as applicable: and

.2 upon completion of the examination referred to in paragraph 11.1.1, subjected to a dynamic test of the winch brake at maximum lowering speed. The load to be applied shall be the mass of the survival craft or rescue boat without persons on board, except that, at intervals of at least once every five years, the test shall be carried out with a proof load equal to 1.1 times the weight of the survival craft or rescue boat and its full complement of persons and equipment.

11.2 Lifeboat and rescue boat release gear, including fast rescue boat release gear and free-fall lifeboat release systems, shall be:

.1 subject to a thorough examination and operational test during the annual surveys required by regulations I/7 and I/8.

11.4 Lifeboats and rescue boats, including fast rescue boats, shall be subject to a thorough examination and operational test during the annual surveys required by regulations I/7 and I/8.

11.5 The thorough examination, operational testing and overhaul required by paragraphs 11.1 to 11.4 and the maintenance and repair of equipment specified in paragraphs 11.1 to 11.4 shall be carried out in accordance with the Requirements for maintenance, thorough examination, operational testing, overhaul and repair, and the instructions for onboard maintenance as required by regulation 36.

## Chapter III Regulation 36

### Instructions for on-board maintenance

Instructions for on-board maintenance of life-saving appliances shall be easily understood, illustrated wherever possible, and, as appropriate, shall include the following for each appliance:

1. a checklist for use when carrying out the inspections required by regulation 20.7.
2. maintenance and repair instructions.
3. schedule of periodic maintenance.
4. diagram of lubrication points with the recommended lubricants.
5. list of replaceable parts.
6. list of sources of spare parts; and
7. log for records of inspections and maintenance.

### Inspection Guidance

The vessel operator should have developed a procedure to ensure the rescue boat and launching appliance were periodically inspected and tested and ready for immediate use in an emergency.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure to ensure the rescue boat and launching appliance were periodically inspected and tested and ready for immediate use in an emergency.
- Review records of periodic inspections and tests of the rescue boat and launching appliance.
- Inspect the rescue boat and launching appliance.
  
- If safe to do so, request that the accompanying officer:
  - Starts the rescue boat engine and engages the drive.
  - Demonstrates that the launching appliance can be slewed manually and/or by reserve power.
- Interview the accompanying officer to verify their familiarity with the operation, inspection and testing of the rescue boat and its launching appliance.

### **Expected Evidence**

- The company procedure to ensure the rescue boat and launching appliance were periodically inspected and tested and ready for immediate use in an emergency.
- The Bridge Log Book.

- Records of periodic inspections and tests of the rescue boat and launching appliance.

#### **Potential Grounds for a Negative Observation**

- The accompanying officer was unfamiliar with the operation of the rescue boat and launching appliance.
- The accompanying officer was unfamiliar with the required inspection and testing of the rescue boat and launching appliance.
- Records of weekly and monthly inspections and routine maintenance of the rescue boat and launching appliance were incomplete.
- Records of annual and five-yearly thorough examinations and tests of the rescue boat and launching appliance were incomplete.
- A full set of maintenance manuals and associated technical documentation for the rescue boat and launching appliance were not available on board.
- Emergency repairs had been made to an inflatable rescue boat on board and were pending permanent repair at an approved servicing station.
- The rescue boat was not in a state of continuous readiness, for instance, an inflatable rescue boat was not fully inflated.
- Items of rescue boat equipment were damaged, missing or improperly stowed.
- The rescue boat engine would not start.
- There were no water-resistant instructions for starting and operating the engine mounted in a conspicuous place near the engine starting controls.
- When tested, it could not be demonstrated that the gear box and gear box train were engaging satisfactorily.
- Inspection of the rescue boat and launching appliances indicated that actions recorded in the maintenance plan had not in fact taken place.
- The rescue boat launching device could not be slewed manually or by reserve power in accordance with its operating instructions.
- The rescue boat or its launching device were defective in any respect.
- There was no checklist available for the inspection of the rescue boat and launching appliance.
- The rescue boat and launching appliance and their locations were not marked with the required symbols.

**5.4.4. Were the Master and Officers familiar with the location, purpose and operation of the rocket parachute flares and line throwing appliances and were they in good order, with records available to demonstrate that had they had been inspected as required?**

**Short Question Text**

Rocket parachute flares and line throwing appliances

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Bridge

**Publications**

IMO: ISM Code

IMO SOLAS

IMO: LSA Code

**Objective**

**To ensure the rocket parachute flares and line throwing appliances will function correctly in an emergency.**

**Industry Guidance**

**IMO: LSA Code**

**3.1 Rocket parachute flares**

**3.1.1 The rocket parachute flare shall:**

1. be contained in a water-resistant casing;
2. have brief instructions or diagrams clearly illustrating the use of the rocket parachute flare printed on its casing;
3. have integral means of ignition; and
4. be so designed as not to cause discomfort to the person holding the casing when used in accordance with the manufacturer's operating instructions.

**7.1 Line-throwing appliances**

**7.1.1 Every line-throwing appliance shall:**

1. be capable of throwing a line with reasonable accuracy.
2. include not less than four projectiles each capable of carrying the line at least 230 m in calm weather.
3. include not less than four lines each having a breaking strength of not less than 2 kN; and
4. have brief instructions or diagrams clearly illustrating the use of the line-throwing appliance.

7.1.2 The rocket, in the case of a pistol-fired rocket, or the assembly, in the case of an integral rocket and line, shall be contained in a water-resistant casing. In addition, in the case of a pistol-fired rocket, the line and rockets together with the means of ignition shall be stowed in a container which provides protection from the weather.

**TMSA KPI 9A.1.1** requires that safety inspections are conducted at scheduled intervals by a designated Safety Officer. Safety inspections of the ship:

- Include all accessible areas of the ship.

**IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

## **IMO: SOLAS**

### Chapter III Regulation 6

#### 3 Distress flares

Not less than 12 rocket parachute flares, complying with the requirements of section 3.1 of the (LSA) Code, shall be carried and be stowed on or near the navigation bridge.

### Chapter III Regulation 20

#### 10 Marking of stowage locations

Containers, brackets, racks, and other similar stowage locations for life-saving equipment shall be marked with symbols in accordance with the recommendations of the Organization\*, indicating the devices stowed in that location for that purpose. If more than one device is stowed in that location, the number of devices shall also be indicated.

\*Refer to the Symbols Related to Life-Saving Appliances and Arrangements, adopted by the Organization by resolution A.760(18), as amended.

### Chapter III Regulation 18

A line-throwing appliance complying with the requirements of section 7.1 of the (LSA) Code shall be provided.

### Chapter V Regulation 29

#### Life-saving signals to be used by ships, aircraft or persons in distress

An illustrated table describing the life-saving signals\* shall be readily available to the officer of the watch of every ship to which this chapter applies. The signals shall be used by ships or persons in distress when communicating with life-saving stations, maritime rescue units and aircraft engaged in search and rescue operations.

\* Such life-saving signals are described in the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual, Volume III, Mobile Facilities, and illustrated in the International Code of Signals, as amended.

## **Inspection Guidance**

The vessel operator should have developed a procedure to ensure that rocket parachute flares and line throwing appliances were periodically inspected and ready for immediate use in an emergency.

The lines and rockets of line throwing appliances should not be stowed apart. Self-contained line throwing units are often disassembled for transporting to the vessel. Inspectors should check to ensure that the equipment has been reassembled and rockets correctly positioned ready for immediate use.

## **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure to ensure that rocket parachute flares and line throwing appliances were periodically inspected and ready for immediate use in an emergency.
- Review records of periodic inspections of the rocket parachute flares and line throwing appliances.
- Inspect the rocket parachute flares and line throwing appliances and their stowage location.



- Interview the accompanying officer to verify their familiarity with the purpose, operation and inspection of the rocket parachute flares and line throwing appliances.

#### **Expected Evidence**

- The company procedure to ensure that rocket parachute flares and line throwing appliances were periodically inspected and ready for immediate use in an emergency.
- Records of periodic inspections of the rocket parachute flares and line throwing appliances.

#### **Potential Grounds for a Negative Observation**

- There was no company procedure to ensure that rocket parachute flares and line throwing appliances were periodically inspected and ready for immediate use in an emergency.
- The accompanying officer was unfamiliar with the purpose and operation of the rocket parachute flares and line throwing appliances.
- The accompanying officer was unfamiliar with the required inspection of the rocket parachute flares and line throwing appliances.
- There were insufficient rocket parachute flares or line throwing appliances on board.
- The stowage location(s) of rocket parachute flares and line throwing appliances were not clearly marked with the recommended symbols and the number of devices stowed there.
- Rocket parachute flares or line throwing appliances were not stowed on or near the bridge.
- The stowage of rocket parachute flares or line throwing appliances was not water or weatherproof as required.
- Rocket parachute flares or line throwing appliances were not clearly marked with brief operating instructions.
- Any of the following were past their expiry date:
  - Rocket parachute flares.
  - Line throwing rockets.
  - Rocket lines.
- Rocket parachute flares or line throwing appliances were not ready for immediate use, e.g. rockets and lines were stowed apart.
- There was no table of lifesaving signals on the bridge.
- Records of periodic inspections of the rocket parachute flares and line throwing appliances were incomplete.
- Any one of the rocket parachute flares or line throwing appliances were defective in any respect.

**5.4.5. Were the Master and officers familiar with the operation of the liferafts, hydrostatic releases and liferaft launching appliances, where provided, and were they in good order with records available to demonstrate that they had been serviced, inspected and tested as required?**

**Short Question Text**

Liferafts, hydrostatic releases and liferaft launching appliances

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Forecastle, Lifeboat deck

**Publications**

IMO: ISM Code

IMO SOLAS

IMO: LSA Code

IMO: MSC.1/Circ.1490/Rev 1. Revised Unified Interpretation of SOLAS Regulation III/31.1.4 (MSC.1/Circ.1490)

**Objective**

**To ensure that liferafts, hydrostatic releases and, liferaft launching appliances, where fitted, will function correctly in an emergency.**

**Industry Guidance**

**IMO: LSA Code**

4.1.6 Float-free arrangements for liferafts,

4.1.6.3 Hydrostatic release units

If a hydrostatic release unit is used in the float-free arrangements, it shall:

1. be permanently marked on its exterior with its type and serial number.
2. be permanently marked on the unit or identification plate securely attached to the unit, with the date of manufacture, type, and serial number and whether the unit is suitable for use with a liferaft with a capacity of more than 25 persons.
3. if disposable, in lieu of the requirement in paragraph 4.1.6.3.6 be marked with a means of determining its date of expiry.

4.2.6.3 The container shall be marked with:

1. maker's name or trademark.
2. serial number.
3. name of approving authority and the number of persons it is permitted to carry.
4. type of emergency pack enclosed.
5. date when last serviced.
6. length of painter.
7. maximum permitted height of stowage above waterline (depending on drop-test height and length of painter); and
8. launching instructions.

6.1.6 Embarkation ladders

6.1.6.1 Handholds shall be provided to ensure a safe passage from the deck to the head of the ladder and vice versa.

6.1.6.2 The steps of the ladder shall be:

1. made of hardwood, free from knots or other irregularities, smoothly machined and free from sharp edges and splinters, or of suitable material of equivalent properties.
2. provided with an efficient nonslip surface either by longitudinal grooving or by the application of an approved nonslip coating.
3. not less than 480 mm long, 115 mm wide and 25 mm in depth, excluding any nonslip surface or coating; and
4. equally spaced not less than 300 mm or more than 380 mm apart and secured in such a manner that they will remain horizontal.

6.1.6.3 The side ropes of the ladder shall consist of two uncovered manila ropes not less than 65 mm in circumference on each side. Each rope shall be continuous with no joints below the top step. Other materials may be used provided the dimensions, breaking strain, weathering, stretching and gripping properties are at least equivalent to those of manila rope. All rope ends shall be secured to prevent unravelling.

**IMO: MSC.1/Circ.1490/Rev 1. Revised Unified Interpretation of SOLAS Regulation III/31.1.4 (MSC.1/Circ.1490)**

1. Liferafts required by SOLAS regulation III/31.1.4 shall be regarded as "remotely located survival craft" with regard to SOLAS regulation III/7.2.1.4.
2. The area where these remotely located survival craft are stowed shall be provided with:

.1 a minimum number of two lifejackets and two immersion suits;

.2 adequate means of illumination complying with reg. III/16.7, either fixed or portable, which shall be capable of illuminating the liferaft stowage position as well as the area of water into which the liferaft should be launched. Portable lights, when used, shall have brackets to permit their positioning on both sides of the vessel;

.3 an embarkation ladder or other means of embarkation enabling descent to the water in a controlled manner\* as per reg. III/11.7; and

.4 self-contained battery-powered lamps (i.e. luminaires) may be accepted as means of illumination for complying with reg. III/16.7. Such lamps shall be capable of being recharged from the ship's main and emergency source of electrical power and shall be stowed under charge. When disconnected from the ship's power, the lamp shall give a minimum duration of 3 hours of undiminished performance...

\* Note: Controlled manner: a knotted rope is not acceptable for this purpose.

**TMSA KPI 9A.1.1** requires that safety inspections are conducted at scheduled intervals by a designated Safety Officer. Safety inspections of the ship:

- Include all accessible areas of the ship.

**IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

**IMO: SOLAS**

Chapter III Regulation 11

Survival craft muster and embarkation arrangements

7 An embarkation ladder complying with the requirements of paragraph 6.1.6 of the Code extending, in a single length, from the deck to the waterline in the lightest seagoing condition under all conditions of trim of up to 10° and a

list of up to 20° either way shall be provided at each embarkation station or at every two adjacent embarkation stations for survival craft launched down the side of the ship.

### Chapter III Regulation 13

#### Stowage of survival craft

1 Each survival craft shall be stowed:

.3 in a state of continuous readiness so that two crew members can carry out preparations for embarkation and launching in less than 5 min.

4.1 Every liferaft shall be stowed with its painter permanently attached to the ship.

4.2 Each liferaft or group of liferafts shall be stowed with a float-free arrangement complying with the requirements of paragraph 4.1.6 of the Code so that each float free and, if inflatable, inflates automatically when the ship sinks.

4.3 Liferafts shall be so stowed as to permit manual release of one raft or container at a time from their securing arrangements.

4.4 Paragraphs 4.1 and 4.2 do not apply to liferafts required by regulation 31.1.4. (*"remotely located survival craft"*)

5 Davit-launched liferafts shall be stowed within reach of the lifting hooks, unless some means of transfer is provided which is not rendered inoperable within the limits of trim and list prescribed in paragraph 1.2 or by ship motion or power failure.

6 Liferafts intended for throw-overboard launching shall be so stowed as to be readily transferable for launching on either side of the ship unless liferafts, of the aggregate capacity required by regulation 31.1 to be capable of being launched on either side, are stowed on each side of the ship.

### Chapter III Regulation 20

#### Operational readiness, maintenance and inspections

1 This regulation applies to all ships. The requirements of paragraphs 3.2, 3.3 and 6.2 shall be complied with, as far as is practicable, on ships constructed before 1 July 1986.

#### 2 Operational readiness

Before the ship leaves port and at all times during the voyage, all life-saving appliances shall be in working order and ready for immediate use.

#### 3 Maintenance

3.2 Instructions for on-board maintenance of life-saving appliances complying with regulation 36 shall be provided and maintenance shall be carried out accordingly.

3.3 The Administration may accept, in compliance with the requirements of paragraph 3.2, a shipboard planned maintenance programme, which includes the requirements of regulation 36.

#### 6 Weekly inspection

The following tests and inspections shall be carried out weekly and a report of the inspection shall be entered in the log-book:

.1 all survival craft, rescue boats and launching appliances shall be visually inspected to ensure that they are ready for use. The inspection shall include, but is not limited to, the condition of hooks, their attachment to the lifeboat and the on-load release gear being properly and completely reset.

## 7 Monthly inspection

7.2 Inspection of the life-saving appliances, including lifeboat equipment, shall be carried out monthly using the checklist required by regulation 36.1 to ensure that they are complete and in good order. A report of the inspection shall be entered in the log-book.

## 8 Servicing of inflatable liferafts, inflatable lifejackets, marine evacuation systems and maintenance and repair of inflated rescue boats

8.1 Every inflatable liferaft, inflatable lifejacket, and marine evacuation system shall be serviced:

1. at intervals not exceeding 12 months, provided where in any case this is impracticable, the Administration may extend this period to 17 months; and
2. at an approved servicing station which is competent to service them, maintains proper servicing facilities and used only properly trained personnel. \*

## 9 Periodic servicing of hydrostatic release units

Hydrostatic release units, other than disposable hydrostatic release units, shall be serviced:

.1 at intervals not exceeding 12 months, provided where in any case this is impracticable, the Administration may extend this period to 17 months\*; and

## 10 Marking of stowage locations

Containers, brackets, racks, and other similar stowage locations for life-saving equipment shall be marked with symbols in accordance with the recommendations of the Organization\*, indicating the devices stowed in that location for that purpose. If more than one device is stowed in that location, the number of devices shall also be indicated.

\* Refer to the Symbols Related to Life-Saving Appliances and Arrangements, adopted by the Organization by resolution A.760(18), as amended.

11.3 Davit-launched liferaft automatic release hooks shall be:

1. subject to a thorough examination and operational test during the annual surveys required by regulations I/7 and I/8: and
2. operationally tested under a load of 1.1 times the total mass of the liferaft when loaded with its full complement of persons and equipment whenever the automatic release hook is overhauled. Such overhauling and operational test shall be carried out at least once every five years.

## Chapter III Regulation 31

### Survival craft and rescue boats

#### 1 Survival craft

1.1 Cargo ships shall carry:

.1 one or more totally enclosed lifeboats complying with the requirements of section 4.6 of the Code of such aggregate capacity on each side of the ship as will accommodate the total number of persons on board; and

.2 in addition, one or more inflatable or rigid liferafts, complying with the requirements of section 4.2 or 4.3 of the Code, of a mass of less than 185 kg and stowed in a position providing for easy side-to-side transfer at a single open deck level, and of such aggregate capacity as will accommodate the total number of persons on board. If the liferaft or liferafts are not of a mass of less than 185 kg and stowed in a position providing for easy side-to-side transfer at a single open deck level, the total capacity available on each side shall be sufficient to accommodate the total number of persons on board.

1.2 In lieu of meeting the requirements of paragraph 1.1, cargo ships may carry:

.1 one or more free-fall lifeboats, complying with the requirements of section 4.7 of the Code, capable of being free-fall launched over the stern of the ship of such aggregate capacity as will accommodate the total number of persons on board; and

.2 in addition, one or more inflatable or rigid liferafts complying with the requirements of section 4.2 or 4.3 of the Code, on each side of the ship, of such aggregate capacity as will accommodate the total number of persons on board. The liferafts on at least one side of the ship shall be served by launching appliances.

1.4 Cargo ships where the horizontal distance from the extreme end of the stem or stern of the ship to the nearest end of the closest survival craft is more than 100 m shall carry, in addition to the liferafts required by paragraphs 1.1.2 and 1.2.2, a liferaft stowed as far forward of aft, or one as far forward and another as far aft, as is reasonable and practicable. Such liferaft or liferafts may be securely fastened so as to permit manual release and need not be of the type which can be launched from an approved launching device. (*"remotely located survival craft"*)

## Chapter III Regulation 36

### Instructions for on-board maintenance

Instructions for on-board maintenance of life-saving appliances shall be easily understood, illustrated wherever possible, and, as appropriate, shall include the following for each appliance:

1. a checklist for use when carrying out the inspections required by regulation 20.7.
2. maintenance and repair instructions.
3. schedule of periodic maintenance.
4. diagram of lubrication points with the recommended lubricants.
5. list of replaceable parts.
6. list of sources of spare parts; and
7. log for records of inspections and maintenance.

### Inspection Guidance

The vessel operator should have developed a procedure to ensure that liferafts, hydrostatic releases and, liferaft launching appliances, where provided, were periodically inspected and tested and ready for immediate use in an emergency.

### Suggested Inspector Actions

- Sight, and where necessary review, the company procedure to ensure that liferafts, and launching appliances if fitted, were periodically inspected and tested and ready for immediate use in an emergency.
- Review the records of periodic servicing by an authorised service station for the liferafts, hydrostatic releases and, launching appliances, where provided.
- Where necessary review the records of onboard inspections of the liferafts, hydrostatic releases and, launching appliances, where provided.
- Inspect the liferafts, hydrostatic releases and, liferaft launching appliances, where provided, and verify that they were stowed and ready for immediate release in accordance with the applicable regulations.

- Interview the accompanying officer to verify their familiarity with the operation, inspection and testing of the liferafts, hydrostatic releases and, liferaft launching appliances, where fitted.

#### **Expected Evidence**

- The company procedure to ensure liferafts, and launching appliances if fitted, were periodically inspected and tested and ready for immediate use in an emergency.
- The Bridge Log Book.
- Records of periodic servicing, inspection and tests of the liferafts, hydrostatic releases and, launching appliances, where provided.

#### **Potential Grounds for a Negative Observation**

- The accompanying officer was unfamiliar with the operation of the liferafts, hydrostatic releases and, liferaft launching appliances, where provided.
- The accompanying officer was unfamiliar with the required servicing, inspection and testing of the liferafts, hydrostatic releases and, liferaft launching appliances, where provided.
- There was insufficient liferaft capacity for the number of people on board.
- A liferaft was not in a state of continuous readiness in any respect except where the liferafts had been removed for shore servicing after arrival in port and would be replaced before departure.
- A liferaft, other than a remotely located survival craft, was not capable of floating free from the ship.
- Liferafts were not stowed so as to allow manual release of one raft or container at a time.
- A liferaft painter was not permanently attached to the ship.
- The rigging of a hydrostatic release unit was not in accordance with the manufacturer's instructions.
- A non-disposable hydrostatic release unit was not marked, or had not been serviced, as required.
- A disposable hydrostatic release unit was not marked with, or was past, its expiry date.
- A liferaft was not marked, or had not been serviced, as required.
- A liferaft embarkation ladder was not provided as required or was in poor condition.
- A liferaft launching appliance, where provided, was defective in any respect.
- A remotely stowed liferaft was not provided with illumination or, an embarkation ladder or other means of embarkation.
- Where a remotely stowed liferaft was provided with self-contained battery lamps as the required means of illumination, there was no evidence that recent tests had confirmed that the lamp would provide three hours of undiminished performance.
- There were no handholds to ensure a safe passage from the deck to the head of an embarkation ladder and vice versa.
- Servicing of liferafts, hydrostatic releases and liferaft launching appliances, where fitted, by an authorised service station had not been completed at the required interval.
- Records of weekly and monthly inspections of liferafts, hydrostatic releases and, liferaft launching appliances, where provided, were incomplete.

Where the liferafts fitted had an extended service interval due to provision of a service kit for use on board, enter a **comment** in the Hardware response tool and provide details of:

- The extended service interval.
- Who was trained to conduct the onboard servicing using the kit provided.
- The evidence that the extended service interval was accepted by the Flag Administration.

#### **5.4.6. Were the lifebuoys, and associated lights, smoke floats and lifelines, in good order, clearly marked and correctly distributed around the ship?**

##### **Short Question Text**

Lifebuoys, and associated lights, smoke floats and lifelines

##### **Vessel Types**

Oil, Chemical, LPG, LNG

##### **ROVIQ Sequence**

Main Deck, Mooring Decks, Bridge

##### **Publications**

IMO: ISM Code

IMO SOLAS

IMO: LSA Code

IMO: Resolution A 658 (16) Use and fitting of retro-reflective materials on life-saving appliances

##### **Objective**

**To ensure that all life-saving appliances are in working order and ready for immediate use.**

##### **Industry Guidance**

##### **IMO: LSA Code 2.1.1**

Every lifebuoy shall:

.7 If it is intended to operate the quick-release arrangement provided for the self-activated smoke signals and self-igniting lights, have a mass of not less than 4 kg.

##### **IMO: Resolution A.658 (16) Use and fitting of retro-reflective materials on life-saving appliances**

3 Lifebuoys

Retro-reflective materials of a sufficient width (approximately 5 cm) should be applied around or on both sides of the body of the lifebuoy at four evenly spaced points.

**TMSA KPI 9A.1.1** requires that safety inspections are conducted at scheduled intervals by a designated Safety Officer. Safety inspections of the ship:

- Include all accessible areas of the ship.

##### **IMO: ISM Code**

10 Maintenance of the Ship and Equipment

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

##### **IMO: SOLAS**

Chapter III Regulation 7



## Personal life-saving appliances

### 1 Lifebuoys

1.1 Lifebuoys complying with the requirements of paragraph 2.1.1 of the (LSA) Code shall be:

.1 so distributed as to be readily available on both sides of the ship and as far as practicable on all open decks extending to the ship's side; at least one shall be placed in the vicinity of the stern; and

.2 so stowed as to be capable of being rapidly cast loose, and not permanently secured in any way.

1.2 At least one lifebuoy on each side of the ship shall be fitted with a buoyant lifeline complying with the requirements of paragraph 2.1.4 of the Code equal in length to not less than twice the height at which it is stowed above the waterline in the lightest seagoing condition, or 30 m, whichever is the greater.

1.3 Not less than one half of the total number of lifebuoys shall be provided with lifebuoy self-igniting lights complying with the requirements of paragraph 2.1.2 of the Code, not less than two of these shall also be provided with lifebuoy self-activating smoke signals complying with the requirements of paragraph 2.1.3 of the Code and be capable of quick release from the navigation bridge; lifebuoys with lights and those with lights and smoke signals shall be equally distributed on both sides of the ship and shall not be the lifebuoys provided with lifelines in compliance with the requirements of paragraph 1.2.

1.4 Each lifebuoy shall be marked in block capitals of the Roman alphabet with the name and port of registry of the ship on which it is carried.

## Chapter III Regulation 20

### 7 Monthly inspections

7.2 Inspection of the life-saving appliances, including lifeboat equipment, shall be carried out monthly using the checklist required by regulation 36.1 to ensure that they are complete and in good order.

### 10 Marking of stowage locations

Containers, brackets, racks, and other similar stowage locations for life-saving equipment shall be marked with symbols in accordance with the recommendations of the Organization\*, indicating the devices stowed in that location for that purpose. If more than one device is stowed in that location, the number of devices shall also be indicated.

\*Refer to the Symbols Related to Life-Saving Appliances and Arrangements, adopted by the Organization by resolution A.760(18), as amended.

## Chapter III Regulation 32

### 1 Lifebuoys

1.1 Cargo ships shall carry not less than the number of lifebuoys complying with the requirements of regulation 7.1 and section 2.1 of the Code prescribed in the following table:

| Length of ship in metres | Minimum number of lifebuoys |
|--------------------------|-----------------------------|
|--------------------------|-----------------------------|

- |                     |    |
|---------------------|----|
| • under 100         | 8  |
| • 100 and under 150 | 10 |
| • 150 and under 200 | 12 |
| • 200 and over      | 14 |

1.2 Self-igniting lights for lifebuoys on tankers required by regulation 7.1.3 shall be of an electric battery type.

### **Inspection Guidance**

The vessel operator should have developed a procedure to ensure that lifebuoys, and associated lights, smoke floats and lifelines, were in good order, clearly marked and correctly distributed around the ship.

Lifebuoy self-igniting lights do not need to be intrinsically safe if located outside of the gas hazardous area. However, there must be strict controls in place to avoid those non-intrinsically safe lights being misplaced into the gas hazardous zone. This may include highlighting or marking of those non-intrinsically safe lights or other appropriate means.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure to ensure that lifebuoys, and associated lights, smoke floats and lifelines, were in good order, clearly marked and correctly distributed around the ship.
- Inspect a selection of the ship's lifebuoys, and associated lights, smoke floats and lifelines.

Any matters relating to the lifebuoy and light provided for safe access will be addressed by the appropriate questions except where the lifebuoy light was found to be unsafe for use in a gas hazardous zone.

### **Expected Evidence**

- The company procedure to ensure that lifebuoys, and associated lights, smoke floats and lifelines, were in good order, clearly marked and correctly distributed around the ship.
- The checklist and log for records of monthly inspections and maintenance of the lifebuoys.

### **Potential Grounds for a Negative Observation**

- There was:
  - Less than the required number of lifebuoys.
  - An insufficient number of lifebuoys with lights
  - A lifebuoy fitted with both light and lifeline.
  - No lifebuoy on either side with a buoyant lifeline of the required length.
- Lifebuoys were not readily available on both sides of the ship, on each open deck or in the vicinity of the stern.
- Lifebuoy stowage locations were not clearly marked with the approved symbols.
- Lifebuoys were:
  - Not marked with retro-reflective tape.
  - Not clearly marked with ship's name and port of registry.
  - Secured in their brackets and not ready for immediate use.
  - Fitted with defective self-igniting lights.
  - Fitted with self-igniting lights not of an electric battery type.
  - Fitted with a non-intrinsically safe light when located within the gas hazardous area of the vessel.
- A self-activating smoke float was past its expiry date.
- The self-activating smoke float quick release mechanism was not operating freely.
- A lifebuoy attached to a self-activating smoke float was less than 4 kg.
- Records of inspections and maintenance carried out were incomplete.
- Inspection of the lifebuoys indicated that recorded inspections and maintenance had not taken place
- Lifebuoys, associated lights, smoke floats or lifelines were defective in any respect.
- The accompanying officer and/or the Safety Officer was unfamiliar with the required maintenance and inspection of the lifebuoys, and associated lights, smoke floats and lifelines.

**5.4.7. Were the Master, officers and ratings familiar with the immersion suits, and were the immersion suits in good order, readily accessible and their location(s) clearly indicated?**

**Short Question Text**

Immersion suits

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Bridge, Forecastle, Lifeboat deck

**Publications**

IMO: ISM Code

IMO SOLAS

IMO: LSA Code

IMO: MSC/Circ.1047 Guidelines for monthly shipboard inspection of immersion suits and anti-exposure suits by ships' crews

IMO: MSC/Circ.1114 Guidelines for periodic testing of immersion suit and anti-exposure suit seams and closures

Norwegian Maritime Authority Circular- Series 5 No 14/2017 Vacuum packed immersion suits

**Objective**

**To ensure that all life-saving appliances are in working order and ready for immediate use.**

**Industry Guidance**

**IMO: LSA Code**

2.3 Immersion suits

2.3.1 General requirements for immersion suits

2.3.1.1 An immersion suit shall be constructed with waterproof materials such that:

.1 it can be unpacked and donned without assistance within 2 min, taking into account donning of any associated clothing, donning of a life jacket if the immersion suit is to be worn in conjunction with a lifejacket to meet the requirements of paragraph 2.3.1.2, and inflation of orally inflatable chambers if fitted.

2.3.1.4 An immersion suit which has buoyancy and is designed to be worn without a lifejacket shall be fitted with a light complying with the requirements of paragraph 2.2.3 and the whistle prescribed by 2.2.2.14.

2.3.1.5 An immersion suit which has buoyancy and is designed to be worn without a lifejacket shall be provided with a releasable buoyant line or other means to secure it to a suit worn by another person in the water.

2.3.1.6 An immersion suit which has buoyancy and is designed to be worn without a lifejacket shall be provided with a suitable means to allow a rescuer to lift the wearer from the water into a survival craft or rescue boat.

2.3.1.7 If an immersion suit is to be worn in conjunction with a lifejacket, the lifejacket shall be worn over the immersion suit. Persons wearing such an immersion suit shall be able to don a lifejacket without assistance. The immersion suit shall be marked to indicate that it must be worn in conjunction with a compatible life jacket.

2.3.2 Thermal performance requirements for immersion suits

2.3.2.1 An immersion suit made of material which has no inherent insulation shall be:

.1 marked with instructions that it must be worn in conjunction with warm clothing.

**IMO: MSC/Circ.1047 Guidelines for monthly shipboard inspection of immersion suits and anti-exposure suits by ships' crews**

When carrying out the inspection of immersion suits and anti-exposure suits required by SOLAS regulation III/20.7, the following procedure is recommended.

1. Check closures on storage bag as well as general condition of bag for ease of removal of suit. Ensure donning instructions are legible. Confirm that suit is the type and size identified on the bag.
2. Lay the suit on a clean, flat surface. Make sure the suit is dry inside and out. Visually check for damage. Rips, tears or punctures should be repaired in accordance with manufacturer's instructions by a suitable repair station\*.
3. Check the zipper by sliding it up and down to check for ease of operation. Using lubricant recommended by the manufacturer, lubricate the front and back of the zipper and the slide fastener. If the zipper is not functional, the suit should be removed from service and discarded or returned to the manufacturer or a suitable repair station.
4. If fitted, check inflatable head support and/or buoyancy ring for damage and ensure that it is properly attached. Check inflation hose(s) for deterioration. At least quarterly, the head support/buoyancy ring should be inflated and tested for leaks (this test does not apply to integral inflatable lifejackets). Leaks should be repaired in accordance with manufacturers' instructions by a suitable repair station.
5. Check retro reflective tape for condition and adhesion. Replace if necessary.
6. If fitted, check whistle and expiration date of light and battery.
7. Replace suits in the bag with zippers fully opened.
8. The opportunity should be taken at such monthly inspections for the crew to practice donning the immersion suits or anti-exposure suit.

**IMO: MSC/Circ.1114 Guidelines for periodic testing of immersion suit and anti-exposure suit seams and closures**

1 Research performed by several Member Governments has demonstrated that the seams and closures of immersion suits and anti-exposure suits experience deterioration over time. The rate and severity of deterioration may vary widely, depending upon the specific components and procedures employed in the manufacture of the suit and the conditions under which the suit is stored. However, even under ideal conditions, the materials and adhesives used have a finite service life and will inevitably experience a reduction in strength and/or loss of watertightness with age.

2 The Guidelines for monthly shipboard inspection of immersion suits and anti-exposure suits (MSC/Circ.1047) are very helpful in identifying obvious problems with a suit, but do not adequately address deterioration of seams and closures (zippers, etc.) which may not be readily apparent by visual inspection. Such deterioration can be detected by pressurization of the suit with air, and testing of the seams and closures for leaks with a soapy water solution.

3 To ensure the maintenance of adequate strength and watertightness of seams and closures of immersion suits and anti-exposure suits with age, it is recommended that each suit be subjected to an air pressure test such as the following, at intervals not exceeding three years, or more frequently for suits over ten years of age...

**Norwegian Maritime Authority Circular- Series 5 No 14/2017 vacuum packed immersion suits**

The Norwegian Maritime Authority (NMA) is aware that approved immersion suits are being offered for sale as vacuum-packed units. Such vacuum-packed suits cannot be unpacked and inspected as provided by SOLAS Chapter III. Nevertheless, the NMA accepts this kind of packaging, and considers such vacuum-packed suits to satisfy the requirements of SOLAS regulation III/20.7 and III/36 when the following conditions are met:

- Instructions for monthly inspections of vacuum-packed units from the manufacturer or the manufacturer's representative shall be available on board. The NMA accepts such instructions in lieu of the monthly inspection procedure described in MSC/Circ.1047.
- A sufficient number of immersion suits in standard packaging, of the same type as the suits that are vacuum packed, must be available to the ship's crew for drills.

- The packaging of the suits must be inspected in accordance with SOLAS III/20.7 and III/36. Should the packaging be damaged or if there is a loss of vacuum, the suits must either be removed from the packaging and inspected in accordance with MSC/Circ.1047 and MSC/Circ.1114 or sent to the manufacturer or a service station for service and repacking.
- MSC/Circ.1114 recommends that immersion suits undergo a pressure test every three years, but the circular does not concern vacuum-packed immersion suits. The NMA accepts that pressure testing of vacuum-packed immersion suits is carried out in accordance with intervals set out by the manufacturer. If the manufacturer has not laid down test intervals, MSC/Circ.1114 shall be followed.
- Immersion suits that have been removed from its vacuum packaging must be treated as suits in standard packaging in respect of the inspections specified in SOLAS chapter III.

**TMSA KPI 9A.1.1** requires that safety inspections are conducted at scheduled intervals by a designated Safety Officer. Safety inspections of the ship:

- Include all accessible areas of the ship.

#### **IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

#### **IMO: SOLAS**

##### Chapter III Regulation 32

##### 3 Immersion suits

3.2 An immersion suit of an appropriate size, complying with the requirements of section 2.3 of the Code shall be provided for every person on board the ship.

However, for ships other than bulk carriers, as defined in regulation IX/1, these immersion suits need not be required if the ship is constantly engaged on voyages in warm climates where, in the opinion of the Administration, immersion suits are unnecessary.

3.3 If a ship has any watch or work stations which are located remotely from the place or places where immersion suits are normally stowed, including remotely located survival craft carried in accordance with regulation 31.1.4 additional immersion suits of an appropriate size shall be provided at these locations for the number of persons normally on watch or working at those locations at any time.

3.4 Immersion suits shall be so placed as to be readily accessible, and their position shall be plainly indicated.

3.5 The immersion suits required by this regulation may be used to comply with the requirements of regulation 7.3.

##### Chapter III Regulation 7

##### 3 Immersion suits and anti-exposure suits

An immersion suit, complying with the requirements of section 2.3 of the Code or an anti-exposure suit complying with section 2.4 of the Code, of an appropriate size, shall be provided for every person assigned to crew the rescue boat or assigned to the marine evacuation system party. If the ship is constantly engaged in warm climates\* where, in the opinion of the Administration thermal protection is unnecessary, this protective clothing need not be carried

##### Chapter III Regulation 20

## 10 Marking of stowage locations

Containers, brackets, racks, and other similar stowage locations for life-saving equipment shall be marked with symbols in accordance with the recommendations of the Organization\*, indicating the devices stowed in that location for that purpose. If more than one device is stowed in that location, the number of devices shall also be indicated.

\*Refer to the Symbols Related to Life-Saving Appliances and Arrangements, adopted by the Organization by resolution A.760(18), as amended.

### **Inspection Guidance**

The vessel operator should have developed procedures to ensure that immersion suits were in good order, readily accessible and their location(s) clearly indicated. The procedure should include guidance on:

- The number, type and sizes of immersion suit provided on board.
- The location(s) and stowage of the immersion suits.
- Monthly inspections.
- Periodic air-pressure testing both before and after an immersion suit reaches ten years in service.

Some Administrations may accept immersion suits as vacuum-packed units, provided, for instance, that:

- Manufacturer's instructions for monthly inspections are followed.
- Sufficient non vacuum-packed units are available for training.
- Units with open or damaged packaging are treated as if they were non-vacuum-packed units.
- Air pressure testing should be to manufacturer's instructions or, if these are not available, at intervals not exceeding three years, or more frequently for suits over ten years of age.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures to ensure that immersion suits are in good order, readily accessible and their location(s) clearly indicated.
  - Inspect the ship's immersion suits at one stowage location.
  - Sight the immersion suits at any other location(s).
  - Review the records of monthly inspections and periodic air-pressure tests of the ship's immersion suits.
- 
- Interview an officer or rating to verify their familiarity with donning an immersion suit.

### **Expected Evidence**

- The company procedures to ensure that immersion suits are in good order, readily accessible and their location(s) clearly indicated.
- Records of monthly inspections and periodic air-pressure tests of the ship's immersion suits.

### **Potential Grounds for a Negative Observation**

- There was no company procedure which defined the actions to be taken to ensure that immersion suits are in good order, readily accessible and their location(s) clearly indicated.
- The accompanying officer was unfamiliar with the required inspection and tests required to be carried out for the immersion suits in accordance with the company procedures.
- An interviewed officer or rating was not familiar with the instructions for donning an immersion suit.
- An immersion suit of an appropriate size was not provided for each person on board.

- The stowage location(s) of immersion suits were not clearly marked, including the number of suits in that location, with the recommended symbols.
- Immersion suits of an appropriate number were not provided at the location of the forward liferaft or any other required remote location.
- Immersion suits were not readily accessible.
- Donning instructions were not legible.
- Immersion suits did not match the description on their storage bags – size, type, etc.
- There was visible damage to immersion suits, e.g. failed seams, detached zips.
- Immersion suit zippers did not slide up and down easily or were not functional.
- Retro-reflective tape was in poor condition or missing.
- Whistles, if fitted, were missing or damaged.
- Lights, if fitted, were missing or past their battery expiry date.
- If required, immersion suits were not clearly marked to show that a lifejacket must be worn.
- If required, immersion suits were not clearly marked to show that warm clothing must be worn under the suit.
- If suits were vacuum-packed:
  - Packaging was damaged and/or vacuum lost.
  - There were no loose immersion suits available for training purposes.
  - Air-pressure tests had not been performed either to manufacturer's instructions or at intervals not exceeding three years, or more frequently for suits over ten years of age.
- Records of inspections and air-pressure tests carried out were incomplete.
- Inspection of the immersion suits indicated that recorded inspections and tests had not taken place.
- One or more immersion suits was defective in any respect.

#### **5.4.8. Were the Master, officers and ratings familiar with the lifejackets and personal flotation devices (PFDs) provided on board, and was the equipment in good condition, and properly maintained?**

##### **Short Question Text**

Lifejackets and personal flotation devices (PFDs)

##### **Vessel Types**

Oil, Chemical, LPG, LNG

##### **ROVIQ Sequence**

Bridge, Forecastle, Engine Control Room, Interview - Rating, Lifeboat deck

##### **Publications**

IMO: ISM Code

IMO SOLAS

UK MCA: Code of Safe Working Practices for Merchant Seafarers

IMO: LSA Code

IMO: Resolution A 658 (16) Use and fitting of retro-reflective materials on life-saving appliances

##### **Objective**

**To ensure that all life-saving appliances are in working order and ready for immediate use.**

##### **Industry Guidance**

##### **IMO: LSA Code**

2.2.1.13 Each lifejacket shall be provided with means of securing a lifejacket light...

2.2.1.14 Each lifejacket shall be fitted with a whistle firmly secured by a lanyard.

2.2.1.15 Lifejacket lights and whistles shall be selected and secured to the lifejacket in such a way that their performance in combination is not degraded.

2.2.1.16 A lifejacket shall be provided with a releasable buoyant line or other means to secure it to a lifejacket worn by another person in the water.

2.2.1.17 A lifejacket shall be provided with a suitable means to allow a rescuer to lift the wearer from the water into a survival craft or rescue boat.

##### **UK MCA: Code of Safe Working Practices for Merchant Seafarers**

8.12 Protection against drowning

8.12.1 Where work is being carried out overside or in an exposed position where there is a reasonably foreseeable risk of falling or being washed overboard, or where work is being carried out in or from a ship's boat, a lifebuoy with sufficient line should be provided. In addition, and, as appropriate, a working lifejacket, a personal flotation device or a buoyancy aid should be worn. Where necessary, personnel should be provided with thermal protective clothing to reduce the risks of cold shock.

##### **IMO: Resolution A.658(16) Use and fitting of retro-reflective materials on life-saving appliances**

5 Lifejackets



Lif jackets should be fitted with patches of retro-reflective materials with a total area of at least 400 cm<sup>2</sup> distributed so as to be useful for search from air and surface craft from all directions. In the case of a reversible lif jacket, the arrangement should be complied with no matter which way the lif jacket is put on. Such material should be placed as high up on the lif jacket as possible.

**TMSA KPI 9A.1.1** requires that safety inspections are conducted at scheduled intervals by a designated Safety Officer. Safety inspections of the ship:

- Include all accessible areas of the ship.

#### **IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

#### **IMO: SOLAS**

##### Chapter III Regulation 7

requirements of paragraph 2.2.1 or 2.2.2 of the Code shall be provided for every person on board the ship....

.4 a sufficient number of lif jackets shall be carried for persons on watch and for use at remotely located survival craft stations. The lif jackets carried for persons on watch should be stowed on the bridge, in the engine control room and at any other manned watch station....

2.2 Lif jackets shall be so placed as to be readily accessible and their position shall be plainly indicated. Where, due to the particular arrangements of the ship, the lif jackets provided in compliance with the requirements of paragraph 2.1 may become inaccessible, alternative provisions shall be made to the satisfaction of the Administration which may include an increase in the number of Lif jackets to be carried.

2.3 The lif jackets used in totally enclosed lifeboats, except free-fall lifeboats, shall not impede entry into the lifeboat or seating, including operation of the seat belts in the lifeboat.

2.4 Lif jackets selected for free-fall lifeboats, and the manner in which they are carried or worn, shall not interfere with entry into the lifeboat, occupant safety or operation of the lifeboat.

##### Chapter III Regulation 20

##### 10 Marking of stowage locations

Containers, brackets, racks, and other similar stowage locations for life-saving equipment shall be marked with symbols in accordance with the recommendations of the Organization\*, indicating the devices stowed in that location for that purpose. If more than one device is stowed in that location, the number of devices shall also be indicated.

\*Refer to the Symbols Related to Life-Saving Appliances and Arrangements, adopted by the Organization by resolution A.760(18), as amended.

##### Chapter III Regulation 20

##### 7 Monthly inspection

7.2 Inspection of the life-saving appliances, including lifeboat equipment, shall be carried out monthly using the checklist required by regulation 36.1 to ensure that they are complete and in good order. A report of the inspection shall be entered in the log-book.

8 Servicing of inflatable liferafts, inflatable lifejackets, marine evacuation systems and maintenance and repair of inflated rescue boats

8.1 Every inflatable liferaft, inflatable lifejacket, and marine evacuation system shall be serviced:

.1 at intervals not exceeding 12 months, provided where in any case this is impracticable, the Administration may extend this period to 17 months; and

.2 at an approved servicing station which is competent to service them, maintains proper servicing facilities and used only properly trained personnel.

#### Chapter III Regulation 32

2.2 On cargo ships, each lifejacket shall be fitted with a lifejacket light complying with the requirements of paragraph 2.2.3 of the Code.

### **Inspection Guidance**

The vessel operator should have developed procedures to ensure that the lifejackets required by SOLAS were in good order, readily accessible and their location(s) clearly indicated.

Procedures should also provide guidance for the use of “working lifejackets” (also known as workvests, continuous use lifejackets or PFDs), including the servicing of inflatable lifejackets, if carried.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures to ensure that the lifejackets required by SOLAS were in good order, readily accessible and their location(s) clearly indicated.
  - Sight, and where necessary review, the company procedures providing guidance on the use of “working lifejackets”, including the servicing of inflatable lifejackets, if carried.
  - Inspect the lifejackets at one stowage location.
  - Sight the lifejackets at any other location(s).
  - Inspect a sample of “working lifejackets”.
  - Review the records of monthly inspections of all lifejackets.
  - Review the records of annual servicing of inflatable lifejackets, if carried.
- 
- Interview a rating to verify their familiarity with the company procedures for the use of “working lifejackets”.

### **Expected Evidence**

- The company procedures to ensure that the lifejackets required by SOLAS were in good order, readily accessible and their location(s) clearly indicated.
- The company procedures providing guidance on the use of “working lifejackets”, including the servicing of inflatable lifejackets, if carried.
- Records of monthly inspections of all lifejackets.
- Records of annual servicing of inflatable lifejackets, if carried.

### **Potential Grounds for a Negative Observation**

- There were no company procedures to ensure that the lifejackets required by SOLAS were in good order, readily accessible and their location(s) clearly indicated.

- The accompanying officer was not familiar with the company procedures to ensure that the lifejackets required by SOLAS were in good order, readily accessible and their location(s) clearly indicated.
- There was no company procedure providing guidance on the use of “working lifejackets”, including the servicing of inflatable lifejackets, if carried.
- An interviewed rating was not familiar with the company procedures for the use of “working lifejackets”.
- The lifejackets required by SOLAS, as provided, were not suitable for the type of lifeboat installed.
- The stowage locations of lifejackets were not clearly marked, including the number of lifejackets in that location, with the recommended symbols.
- Lifejackets of an appropriate number were not provided on the bridge, in the engine room, at the location of the forward life-raft or any other required remote location.
- Lifejackets were not readily accessible.
- The retro-reflective tape required to be fitted on lifejackets was in poor condition or missing.
- Lifejacket whistles were missing or damaged.
- Lifejacket lights were missing or past their battery expiry date.
- Releasable buoyant lines, if fitted, were missing or defective.
- Means to lift the wearer of the lifejacket, if fitted, were missing or defective.
- Records of monthly inspections carried out were incomplete.
- Records of annual servicing of inflatable lifejackets, if carried, were incomplete.
- Inspection of the lifejackets indicated that recorded inspections and servicing had not taken place.
- One or more lifejacket was defective in any respect.
- “Working lifejackets” were not available for when crew members were carrying out work overside or in an exposed position where there is a reasonably foreseeable risk of falling or being washed overboard, or where work is being carried out in or from a ship’s boat.

**5.4.9. Were the Master and officers familiar with the company procedures for the periodic testing and maintenance of the emergency lighting system, was there evidence of periodic testing, and was the system in proper operating condition?**

**Short Question Text**

Emergency lighting.

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Interview - Electrician / ETO, Engine Room, Steering Gear, Pumproom, Forecastle, Mooring Decks, Lifeboat deck

**Publications**

IMO: ISM Code

IMO SOLAS

IACS: UI SC 213 Arrangements for remotely located survival craft

USCG: Code of Federal Regulations. Title 46.

**Objective**

**To ensure that the emergency lighting system will operate correctly in the event of a loss of primary power and lighting.**

**Industry Guidance**

**USCG: Code of Federal Regulations. Title 46.**

97.15-30 Emergency lighting and power systems.

(a) Where fitted, it shall be the duty of the master to see that the emergency lighting and power systems are operated and inspected at least once in each week that the vessel is navigated to be assured that the system is in proper operating condition.

(d) The date of the tests and the condition and performance of the apparatus shall be noted in the official logbook.

**TMSA KPI 4A.1.4** requires that procedures are in place to record the testing of critical equipment and systems that are not in continuous use. Testing is performed in accordance with mandatory requirements and manufacturers' recommendations.

**IMO: ISM Code**

10.3 The company should identify equipment and technical systems the sudden operational failure of which may result in hazardous situations. The SMS should provide for specific measures aimed at promoting the reliability of such equipment or systems. These measures should include the regular testing of standby arrangements and equipment or technical systems that are not in continuous use.

**IMO: SOLAS**

Chapter II-1 Regulation 43

2 The electrical power available shall be sufficient to supply all those services that are essential for safety in an emergency, due regard being paid to such services as may have to be operated simultaneously. The emergency source of electrical power shall be capable, having regard to starting currents and the transitory nature of certain loads, of supplying simultaneously at least the following services for the periods specified hereinafter, if they depend upon an electrical source for their operation:

2.1 For a period of 3h, emergency lighting at every muster and embarkation station and over the sides as required by regulations III/11.4 and III/16.7.

2.2 For a period of 18h, emergency lighting:

1. in all service and accommodation alleyways, stairways and exits, personnel lift cars and personnel lift trunks;
2. in the machinery spaces and main generating stations including their control positions;
3. in all control stations, machinery control rooms, and at each main and emergency switchboard;
4. at all stowage positions for firemen's outfits;
5. at the steering gear;
6. at the fire pump referred to in paragraph 2.5, at the sprinkler pump, if any, and at the emergency bilge pump, if any, and at the starting positions of their motors; and
7. in all cargo pump-rooms of tankers constructed on or after 1 July 2002.

#### Chapter II-2 Regulation 4

##### 5.10.1

2. lighting in cargo pump-rooms, except emergency lighting, shall be interlocked with ventilation such that the ventilation shall be in operation when switching on the lighting.

#### Chapter III Regulation 11

4 Muster and embarkation stations shall be adequately illuminated by lighting supplied from the emergency source of electrical power required by regulation II-1/42 or II-1/43, as appropriate.

5 Alleyways, stairways and exits giving access to the muster and embarkation stations shall be lighted. Such lighting shall be capable of being supplied by the emergency source of electrical power required by regulation II-1/42 or II-1/43, as appropriate.

#### Chapter III Regulation 16

##### Survival craft launching and recovery arrangements

7 During preparation and launching, the survival craft, its launching appliance, and the area of water into which it is to be launched shall be adequately illuminated by lighting supplied from the emergency source of electrical power required by regulation II-1/42 or II-1/43, as appropriate.

#### Chapter III Regulation 19

3.4.9 Emergency lighting for mustering and abandonment shall be tested at each abandon ship drill.

#### **IACS: UI SC 213 Arrangements for remotely located survival craft**

##### Interpretation

1. Liferafts required by reg. III/31.1.4 shall be regarded as "remotely located survival craft" with regard to reg. III/7.2.1.4.

2. The area where these remotely located survival craft are stowed shall be provided with:

.2 adequate means of illumination complying with reg. III/16.7, either fixed or portable, which shall be capable of illuminating the liferaft stowage position as well as the area of water into which the liferaft should be launched. Portable lights, when used, shall have brackets to permit their positioning on both sides of the vessel; and

.4 self-contained battery-powered lamps (i.e. luminaires) may be accepted as means of illumination for complying with reg. III/16.7. Such lamps shall be capable of being recharged from the ship's main and emergency source of electrical power and shall be stowed under charge. When disconnected from the ship's power, the lamp shall give a minimum duration of 3 hours of undiminished performance. The lamps shall comply with the requirements of the LSA Code section 1.2.3.

### **Inspection Guidance**

The vessel operator should have developed procedures for the inspection and testing of the emergency lighting system including:

- Instructions for inspection and testing.
- The frequency and recording of inspection and testing.

These procedures may form part of the vessel's maintenance plan.

### **Suggested Inspector Actions**

- Sight and where necessary review, the company procedures for the inspection and testing of the emergency lighting system.
  - Check records to verify that inspection and testing of the emergency lighting had taken place in accordance with the company procedures.
  - Request a demonstration of the emergency lighting.
  - Inspect a representative sample of the emergency lights and verify that they are working.
  - During the balance of the inspection, note any defects to emergency lights.
  - In at least one location, verify that arrangements for lighting the area of water into which survival craft would be launched were in satisfactory condition.
- 
- Interview the officer responsible for electrical systems to verify their familiarity with company procedures for the inspection and testing of the emergency lighting system.

### **Expected Evidence**

- Company procedures for the inspection and testing of the emergency lighting system.
- Records of inspection and testing of the emergency lighting system.

### **Potential Grounds for a Negative Observation**

- There were no company procedures for the inspection and testing of the emergency lighting system.
- Company procedures did not require the emergency lighting to be inspected and tested at least once per week.
- The responsible officer was not familiar with company procedures for the inspection and testing of the emergency lighting system.
- The accompanying officer was not familiar with the location of the switches to turn on the emergency source of lighting.
- Records indicated that emergency lighting had not been inspected and tested in compliance with company procedures.
- There were no records of the inspection and testing of the emergency lighting system.
- One or more emergency lights were:
  - Not working.
  - Dirty/obscured.
  - Filled with water.

- Arrangements for lighting the area of water into which survival craft would be launched were not in satisfactory condition.
- The emergency lighting system was defective in any respect.

## 5.5. Permits to work

**5.5.1. Were the Master, officers and ratings familiar with the company enclosed space entry procedures, and was evidence available to demonstrate that all enclosed space entries had been made in strict compliance with the procedures?**

### Short Question Text

Enclosed space entry procedures

### Vessel Types

Oil, Chemical, LPG, LNG

### ROVIQ Sequence

Documentation, Cargo Control Room, Engine Control Room, Interview - Rating

### Publications

IMO: ISM Code

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: Resolution A.1050(27) Revised Recommendations for Entering Enclosed Spaces Aboard Ships.

### Objective

**To ensure that enclosed space entry is always strictly controlled and conducted in accordance with industry best practice.**

### **Industry Guidance:**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.**

Chapter 1 Basic Properties and Hazards of Petroleum

1.4.3.2 Exposure limits

The toxic hazards personnel are exposed to in tanker and terminal operations arise almost entirely from liquids, gases or vapours of various kinds. Many of these substances have Occupational Exposure Limits (OELs). These limits protect personnel against harmful exposures in the working environment.

Exposure limits are set by international organisation, national administrations or by local regulatory bodies and should never be exceeded. The limits set by different organisations may differ and operators should adopt those set by their flag or appropriate administration. The limits should be detailed in the Safety Management System (SMS).

1.4.5.2 Benzene

Tank entry

Before anybody enters a tank that has recently contained petroleum, the tank should be tested for benzene concentrations. This is in addition to the requirements for entering enclosed spaces given in chapter 10.

Chapter 10 Enclosed Spaces.

10.1 Introduction to enclosed space entry safety.

Despite precautions that operators take to protect people entering enclosed spaces, deaths and injuries still happen. This chapter recommends protections and controls that can reduce the risk from entering enclosed spaces.

10.6 Authorisation of entry.



No one should open or enter an enclosed space unless:

- Authorised by the Master or the nominated Responsible Person.
- Appropriate safety procedures have been followed.

An enclosed space entry permit should be issued by the Master or the nominated Responsible Person and completed by the personnel who are to enter the space before they enter.

#### 10.7.1 Control of entry into enclosed spaces.

A Competent Person, designated by the company's SMS, should conduct a preliminary risk assessment to identify the potential hazards and appropriate safeguards. This should take into account previous cargoes carried, the ventilation, structure, coating type and other relevant factors...

#### 10.7.2 Atmosphere tests before entry.

The atmosphere should be tested using suitable instruments for oxygen, flammable gases or vapours, carbon monoxide, H<sub>2</sub>S and other toxic gases as appropriate...

For entry purposes, steady readings of all the following should be obtained before the enclosed space entry permit can be approved and entry permitted:

- Oxygen: any space with less than 21% oxygen by volume should NOT be entered until the reason for the low level has been established and resolved. If any doubt remains about the cause of oxygen deficiency, the space should be considered hazardous.
- Flammable vapour: the concentration of flammable vapour must be below 1% of the LFL before anybody can enter.
- Occupational exposure limit (OEL): no more than 50% of the OEL of any toxic vapours and gases.

If these conditions cannot be met, apply additional ventilation to the space and re-test after a suitable interval.

#### 10.7.3 Enclosed space entry permit.

On completion of the initial gas testing the ventilation fans should be restarted and continue to operate throughout the period of entry as a condition of the entry permit which should be approved and issued before allowing personnel to enter an enclosed space.

The entry permit should have a clear period of validity that does not exceed 12 hours and remain valid only as long as the permit conditions are met...

...The administrative burden can be simplified by restricting approvals, such as entry permits, so that all cargo tanks safe to enter are shown on one document. This can also avoid overlapping permits and reduce any possible confusion about which approval applies to which tank.

#### 10.12.1 Cargo pumproom entry procedures.

Before anyone enters a cargo pumproom, it should be thoroughly ventilated, the oxygen content of the atmosphere verified and the atmosphere checked for hydrocarbons or any toxic gas associated with the current or recent cargoes...

Written procedures should control pumproom entry. These procedures should:

- Be based on risk assessment.
- Ensure that risk mitigation measures are followed.
- Ensure that entries in the space are recorded.

Notices should be displayed at the pumproom entrance prohibiting entry without formal permission and to indicate the presence of people in the space.

**IMO: Resolution A.1050(27) Revised recommendations for entering enclosed spaces aboard ships.**

2.1 Enclosed space means a space which has any of the following characteristics:

1. limited openings for entry and exit;
2. inadequate ventilation; and
3. is not designed for continuous worker occupancy,

and includes, but is not limited to, cargo spaces, double bottoms, fuel tanks, ballast tanks, cargo pump-rooms, cargo compressor rooms, cofferdams, chain lockers, void spaces, duct keels, inter-barrier spaces, boilers, engine crankcases, engine scavenge air receivers, sewage tanks, and adjacent connected spaces. This list is not exhaustive, and a list should be produced on a ship-by-ship basis to identify enclosed spaces.

8.2 Persons entering enclosed spaces should be provided with calibrated and tested multi-gas detectors that monitor the levels of oxygen, carbon monoxide and other gases as appropriate.

**11 Conclusion**

Failure to observe simple procedures can lead to persons being unexpectedly overcome when entering enclosed spaces. Observance of the principles and procedures outlined above will form a reliable basis for assessing risks in such spaces and for taking necessary precautions.

**TMSA KPI 9.1.4** requires that a documented permit to work system is in place.

The permit to work is used to control the risks associated with hazardous tasks, such as enclosed space entry and hot work.

**IMO: ISM Code**

7. The company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks should be defined and assigned to qualified personnel.

**Inspection Guidance:**

The vessel operator should have developed procedures for enclosed space entry which:

- Defined the term enclosed space entry.
- Identified spaces onboard managed vessels which were defined as enclosed spaces.
- Identified enclosed spaces onboard managed vessels which did not require the issue of an enclosed space entry permit but were subject to controlled entry procedures.
- Identified the persons onboard who may assume the roles of Competent Person, Responsible Person and Attendant.
- Identified the OEL standard that had been adopted by the company.
- Provided the following OEL values for each gas likely to be encountered:
  - The Time Weighted Average (TWA)
  - The Short-Term Exposure Limit (STEL)
  - The Ceiling Value.
- Defined the process that must be followed when an enclosed space entry must be made, including:
  - Identifying potential hazards through a documented risk assessment completed by a Competent Person.
  - Identifying the toxic, flammable, explosive or asphyxiant gasses that may be present in an enclosed space and the tests required to detect their presence.

- Identifying any additional precautions required prior to entering ballast tanks as a result of the use of the Ballast Water Management System
- Ventilating the space before and during entry.
- Segregating the space by blanking off or isolating all connecting pipelines or valves and electrical power/equipment.
- Cleaning the space in accordance with documented criteria based on the previous content of the space.
- Testing the atmosphere of the space before and during entry for gasses that may be present due to the previous content or machinery operating within the space.
- Securing the space for entry and providing proper illumination.
- Instructing an attendant to remain at the entrance to the space while it is occupied.
- Positioning rescue and resuscitation equipment at the entrance to the space.
- Properly clothing and equipping personnel for entry and subsequent tasks.
- Issuing and authorising a permit.
- Identified the circumstances in which more than one tank or space could be included on the same enclosed space entry permit.
- Prohibited the use of Compressed Air Breathing Apparatus (CABA), Emergency Life Support Apparatus (ELSA) or Emergency Escape Breathing Devices (EEBD) as an alternative to properly cleaning and gas freeing a space for safe entry.
- Identified the precautions during entry:
  - The atmosphere should be retested frequently while the space is occupied.
  - Persons entering enclosed spaces should be provided with calibrated and tested multi-gas detectors that monitor the levels of oxygen, carbon monoxide and other gases as appropriate.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company enclosed space entry procedures.
- Review the categorisation of enclosed spaces onboard which identified spaces that:
  - Required the issue of an enclosed space entry permit.
  - Did not require the issue of an enclosed space entry permit but where entry was controlled through an alternative documented process.
- Identify through the review of the planned maintenance system or recent cargo operations where enclosed space entry would have taken place and review an enclosed space entry permit for at least two of the following types of enclosed spaces:
  - Cargo spaces.
  - Double bottom space.
  - Fuel tank.
  - Ballast tank.
  - Cargo pumproom.
  - Cargo compressor room.
  - Cofferdam.
  - Chain locker.
  - Void space.
  - Duct keel.
  - Inter-barrier space.
  - Engine crank case or scavenge air receiver.
  - Sewage tank.
  - Boiler.
  - Nitrogen generator room.
  - Inert gas plant room.
  - Ballast water treatment plant room.
- Review the selected enclosed space entry permits and verify that:
  - A detailed risk assessment had been developed and/or reviewed prior to each enclosed space entry.
  - The permit period of validity was clearly indicated and did not exceed 12 hours.
  - Each space had been cleaned as required, in accordance with the company procedure. Consider cross referencing with the oil record book or the garbage log to establish how any wash water or residues were disposed of.
  - The pre-entry atmosphere checks for oxygen content and flammable, toxic, explosive and/or asphyxiant vapours or gasses were appropriate for the space and its previous content or usage.

- The permits or supplementary documentation identified the connecting pipelines, valves and/or electrical power/equipment that had been blanked or isolated
- The balance of the permits had been completed as required.
- The permits had been signed by:
  - The Master or nominated responsible person in accordance with the company procedure.
  - The attendant.
  - The person(s) entering the space.
  - The responsible person supervising entry.
- The permits had not been approved by the same individual who was making the enclosed space entry.
- Where company procedures did not require the issue of a permit for entry into the cargo pumproom, cargo compressor room, nitrogen generator room, inert gas plant room or ballast water treatment plant room, verify that the checks required by the company procedure for entry into such spaces were being adhered to with documented records of gas measurements and entry and exit times for each entry.
- Interview one rating to verify their familiarity with their role in enclosed space entry, when and how they were briefed and, the process for signing a permit as either an attendant or as a person entering the space.

#### **Expected Evidence**

- The company procedures which defined the enclosed space entry requirements for the identified enclosed spaces found onboard.
- The enclosed space entry permits for the previous six months for:
  - Spaces under the control of the engineering department.
  - Spaces under the control of the deck department.
- The cargo pumproom, cargo compressor room, nitrogen generator room, inert gas plant room and/or ballast water treatment plant room entry records for the previous two months.
- The Bridge Log Book for the previous six months
- The planned maintenance system.

#### **Potential Grounds for a Negative Observation**

- There were no company enclosed space entry procedures.
- The company enclosed space entry procedures had not identified all spaces that were considered to be enclosed spaces along with corresponding precautions for entering each type of identified enclosed space.
- There was no evidence that documented risk assessments were completed and/or reviewed before each enclosed space entry.
- The company enclosed entry procedure did not give clear guidance on the requirement to clean cargo, bunker and ballast tanks prior to entry based on the previous content.
- Company procedures did not require the completion of an enclosed space entry permit when entering a space meeting the definition of an enclosed space. (This does not include where an alternative documented procedure existed for entering the cargo pumproom, cargo compressor room, nitrogen generator room, inert gas plant room or ballast water treatment plant room).
- Where company procedures did not require the completion of an enclosed space entry permit when entering a cargo pumproom, cargo compressor room, nitrogen generator room, inert gas plant room or ballast water treatment plant room, there was no alternative procedure requiring:
  - Atmosphere measurements for oxygen content and toxic, flammable, explosive or asphyxiant gasses were taken and recorded prior to entry.
  - That the entry and exit time of each individual who entered the space was recorded.
- The company enclosed space entry procedures had not identified any additional precautions required prior to entering ballast tanks as a result of the use of the Ballast Water Management System.
- Evidence was available that enclosed space entry had taken place without the issue of an enclosed entry permit in accordance with company procedures.
- Evidence was available that a cargo pumproom, compressor room, nitrogen generator room, inert gas plant room or ballast water treatment plant room had been entered without the issue of an enclosed space entry

permit or, where a permit was not required, recording of atmosphere checks prior to entry and recording the entry and exit times for each individual.

- Evidence was available that CABA, ELSA or EEBD sets had been used for routine enclosed space entry as a substitute for cleaning and gas freeing a space for safe entry.
- The accompanying officer was unfamiliar with the company enclosed space entry procedure and/or the process of using or retaining the company enclosed space entry permits.
- An interviewed rating was unfamiliar with the enclosed space entry procedure and their role in signing the enclosed space entry permit as either an attendant or someone who enters the space.
- A reviewed enclosed space entry permit was found to be incomplete or missing information required to be entered in accordance with the company enclosed space entry procedure.
- A reviewed enclosed space entry permit indicated that not all atmosphere measurements appropriate to the previous content or use of the space had been taken and recorded.
- There was no documented evidence for segregating a space by blanking off or isolating all connecting pipelines or valves and electrical power/equipment during a reviewed enclosed space entry, where such isolation would have been necessary.
- A cargo tank had been entered without being cleaned in accordance with the company enclosed space entry procedure.
- An enclosed space entry permit was completed and approved by the same individual who entered the space.
- Personal multi-gas detectors were not required to be used during enclosed space entry.
- Dedicated rescue and/or resuscitation equipment was observed to be in poor condition.

**5.5.2. Were the Master, officers and, where directly involved, ratings familiar with the company hot work procedure, and was evidence available to demonstrate that hot work had been conducted in accordance with the procedure?**

**Short Question Text**

Hot work procedure

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation, Engine Room, Main Deck, Interview - Engine Rating

**Publications**

IMO: ISM Code

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

**Objective**

**To ensure that hot work is always carried out in a controlled manner.**

**Industry Guidance:**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.**

Chapter 9.4 Hot work

9.4.1 Definition of hot work

Hot work is any work that involves sources of ignition or temperature high enough to ignite a flammable gas or liquid or material. This includes, but is not limited to:

- Welding (electric arc or gas).
- Cutting, burning, gouging (electric or gas).
- Heating (blow torch or heat gun).
- Soldering (electric or blow torch).

Use of the following temporary/portable equipment in a hazardous area should be classed as hot work:

- Power tools (electrical or electric power tools)
- Non-intrinsically safe electronic equipment.
- Internal combustion engines (driving air compressors, pumps, pressure washers, etc).

9.4.2 Control of hot work

The SMS should include adequate guidance on the control of hot work and should be robust enough to ensure compliance. An absence of guidance should be taken to mean work is prohibited rather than approved.

9.4.3 Hot work inside a designated space

A space where conditions are safe for hot work should be designated, such as the engine room workshop. Whenever possible, hot work should be carried out in that space.

The designated space should be assessed for possible risks, and the SMS should define the conditions for carrying out hot work in that space, including additional controls such as notifications, fire watches or restrictions. Hot work

should be prohibited during bunkering, cargo operations, crude oil washing, tank cleaning operations and whenever cargo tank vapours are released. If it is necessary for hot work to be done, these operations should stop until the hot work is completed.

#### 9.4.4 Hot work outside a designated space

Hot work done outside the designated space should be controlled under the SMS by a permit to work system and defined requirements...

#### **IMO: MSC/Circ.1084 Principles for hot work on board all types of ships.**

4. the annexed list of principles takes account of existing guidelines such as the publication "Accident Prevention on Board Ship at Sea and in Port" (ILO) as well as the "International Safety Guide for Oil Tankers and Terminals (ISGOTT)" (ICS, OCIMF and IAPH).

**TMSA KPI 9.1.4** requires that a documented permit to work system is in place.

The permit to work is used to control the risks associated with hazardous tasks such as enclosed space entry and hot work

The system requires company management approval for higher risk activities such as hot work in defined hazardous areas.

#### **IMO: ISM Code.**

7. The company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks should be defined and assigned to qualified personnel.

#### **Inspection Guidance**

The vessel operator should have developed procedures for managing hot work onboard which should include but not be limited to:

- The definition of hot work.
- The control of hot work.
- Work planning, risk assessment and the issue of hot work permits.
- Hot work inside a designated space.
- Hot work outside a designated space.
  - Hot Work in a gas safe area.
  - Hot work inside the machinery space.
  - Hot work over the side.
- Hot work in dangerous or hazardous areas.
  - Hot work in cargo tanks.
  - Hot work in ballast tanks.
  - Hot work in the pumproom.
  - Hot work within the cargo tank deck area.
  - Hot work in the vicinity of bunker tanks.
  - Hot work on pipelines.
- Levels of approval required for authorising hot work.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the company hot work procedures.
- If hot work had taken place within any hazardous area during the previous six months, select not more than two permits, and verify that:

- A hot work plan had been developed for the proposed hot work showing separate responsibilities for work supervision and safety.
  - A risk assessment had been prepared for the proposed hot work.
  - A work planning meeting had been completed.
  - Documented shore management approval had been obtained to complete the hot work as planned.
  - A hot work permit had been issued, completed and approved on board in accordance with the hot work plan and the terms of the shore management approval.
- If hot work had not taken place in any hazardous areas during the previous six months, select not more than two permits for hot work outside the designated space, but within other parts of the non-hazardous area, and verify that:
  - A hot work plan had been developed for the proposed hot work showing separate responsibilities for work supervision and safety.
  - A risk assessment had been prepared for the proposed hot work.
  - A work planning meeting had been completed.
  - A hot work permit had been issued, completed and approved on board in accordance with the hot work plan and the company hot work procedure.
- While in the designated space, typically, but not necessarily, the machinery space workshop, review the onboard instructions for undertaking hot work in the space and verify they included instructions regarding:
  - When hot work may be conducted in the designated space.
  - When hot work is prohibited in the designated space.
  - Who is permitted to conduct hot work in the designated space.
  - The requirement to complete or review a risk assessment during a work planning meeting.
  - The requirement to work in the designated space with a shield or curtain erected.
  - The requirement to gain authorisation from the Master or Responsible Officer before hot work may begin.
  - Considerations around preventing unintended activation of the ship's fire alarm system.
- During the balance of the inspection verify that no recent undocumented hot work had taken place outside of the designated space, without a hot work permit.
- Interview one engine room rating to verify their understanding of the hot work instructions for the designated space.

#### **Expected Evidence**

- The company hot work procedures.
- The hot work permits issued onboard the vessel during the previous six months, supplemented by:
  - The risk assessment relating to the specific hot work task.
  - The work plan relating to the specific hot work task.
  - Evidence that a work planning meeting had been held.
  - Documented approval for the hot work from shore management, where required.
- The onboard instructions for conducting hot work in the designated space.

#### **Potential Grounds for a Negative Observation**

- There were no company hot work procedures.
- The company hot work procedures were not in alignment with the guidance provided by ISGOTT Chapter 9.
- Evidence was available that hot work had been conducted anywhere outside of the designated space without the issue of a hot work permit.
- Hot work permits had been issued without:
  - A risk assessment being prepared for the specific hot work task.
  - A work plan being prepared for the specific hot work task.
  - A work planning meeting taking place.
  - Documented approval for the hot work from the shore management being provided, where required by the company hot work procedure.
  - Approval by the Master or, a designated Responsible Officer, where the company procedure specifically permitted a permit to be approved by anyone other than the Master.



- There were no instructions for conducting hot work posted in the designated space.
- The instructions for conducting hot work in the designated space did not define:
  - When hot work may be conducted in the designated space.
  - When hot work must not be conducted in the designated space.
  - Who may conduct hot work in the designated space.
  - The requirement to work in the designated space with a shield or curtain erected.
  - The requirement to gain permission from the Master or designated Responsible Officer before conducting hot work in the designated space.
- The accompanying officer was unfamiliar with the company hot work procedures, any aspect of the hot work permit process or the safety precautions referred to within the company hot work procedures or permit.
- Evidence was available that hot work had taken place in the designated space in contravention to the onboard instructions or the guidance provided in ISGOTT chapter 9.
- An interviewed engine rating was unfamiliar with the designated space hot work instructions.

**5.5.3. Were the Master, officers and ratings familiar with the company procedure for working at height, and was there evidence that risk control measures such as permits to work or documented risk assessments were consistently used whenever work was undertaken at height?**

**Short Question Text**

Working at height

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Cargo Control Room, Exterior Decks, Interview - Rating

**Publications**

IMO: ISM Code

UK MCA: Code of Safe Working Practices for Merchant Seafarers

**Objective**

**To ensure that work at height is always conducted in a controlled manner with procedures to manage and mitigate risk to workers.**

**Industry Guidance**

**UK MCA: Code of Safe Working Practices for Merchant Seafarers.**

Chapter 14.2 Permit to work systems

14.2.1 There are many types of operation on board ship when the routine actions of one person may inadvertently endanger another, or when a series of action steps need to be taken to ensure the safety of those engaged in a specific operation. In all circumstances it is necessary, before the work is done, to identify the hazards and then to ensure they are eliminated or effectively controlled. Ultimate responsibility rests with the Company to see that this is done.

14.2.3 the safety management systems for individual ships will determine when permit to work systems should be used, and the form of the permit to work.

Annex 14.1 Permits to work

Permits to work would normally be required for the following categories of work:

- Working at height / over the side

Chapter 17 Work at Height

17.1.2 Work at height should be subject to risk assessment, and suitable control measures should be taken to protect those who may be put at risk. Depending on the severity of the risk, a permit to work may be required (e.g. for working aloft)

**TMSA KPI 9.1.4** requires that a documented permit to work system is in place.

The permit to work is used to control the risks associated with hazardous tasks such as enclosed space entry and hot work

**IMO: ISM Code**

7 The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks involved should be defined and assigned to qualified personnel.

### **Inspection Guidance**

The vessel operator should have developed safe working procedures which included the controls required to be in place whenever work at or above a defined height is planned or undertaken.

The procedures should include:

- The definition of working at height.
- The height at or above which working at height control measures must be implemented.
- The method of documenting the risk control measures that need to be put in place before work can be authorised, either through a permit to work, risk assessment or other work management process.
- Any exclusions from the requirement for documenting the control measures when working at height in either a permit or risk assessment.
- The personal protective equipment (PPE) such as lifelines, harnesses, fall arresters, etc. that must be used when working at height.
- The specialist equipment, such as bosun's chairs, stages, portable scaffolding, safety nets, etc. that must be used when working at height.
- The requirement to check PPE and specialist working at height equipment periodically and record the inventory and condition of the equipment.
- The requirement to check PPE and specialist working at height equipment before each use.
- The level of supervision that must be maintained for the duration of work at height.
- The level of authority required to approve permits or risk assessments for working at height.
- Any additional permits that may be considered or applicable when working at height.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company safe work procedure for working at height.
- Review several recent work at height permits or risk assessments and verify that:
  - The work described in the permits and/or risk assessments reflected the circumstances found onboard the vessel being inspected.
  - The permits and/or risk assessments were approved in accordance with the company procedure.
- Review the work at height PPE and specialist equipment inventory and periodic inspection checklist and verify that checks had been completed in accordance with the company work at height procedure.
- Inspect a selection of specialist working at height PPE and equipment provided onboard and verify that the condition reflected that as reported in the most recent periodic check.
  
- Interview a deck or engine rating to verify their understanding of the company safe working procedure for working at height and their involvement with either the permit or risk assessment review process.

### **Expected Evidence**

- The company safe work procedures for working at height.
- The working at height permits or risk assessments for the previous two months.
- Records of the periodic checks of working at height PPE and specialist equipment.

### **Potential Grounds for a Negative Observation**

- There was no company safe working procedure which included working at height.

- There was no requirement to complete a permit or risk assessment when working at height unless the company procedure provided specific exclusions.
- There was no requirement to check PPE and specialist working at height equipment periodically and record the inventory and condition of the equipment.
- The accompanying officer was unfamiliar with the company working at height safe work procedures.
- The accompanying officer was unfamiliar with the requirement to conduct periodic checks on specialist working at height PPE and equipment.
- There was evidence that work at height had been undertaken that required either a work at height permit or a documented risk assessment but where neither was available for review.
- Reviewed permits or risk assessments did not reflect the work at height described and/or circumstances found onboard the inspected vessel.
- Work at height permits or risk assessments has not been approved at the appropriate level in accordance with the company procedure.
- There were no records of inventory and/or periodic checks of specialist working at height PPE and equipment.
- Specialist working at height PPE and/or equipment was found to be in apparently poor condition.
- An interviewed rating was unfamiliar with the company safe working procedures for working at height and either the related permit or risk assessment review process.

**5.5.4. Were the Master, officers and ratings familiar with the company procedures for working over the side, and was there evidence that risk control measures such as standard work procedures, permits to work or documented risk assessments were consistently used whenever work was undertaken over the side?**

**Short Question Text**

Working over the side

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation, Main Deck, Interview - Deck Rating

**Publications**

UK MCA: Code of Safe Working Practices for Merchant Seafarers

**Objective**

**To ensure that work over the side is always conducted in a controlled manner with procedures to manage and mitigate risk to workers.**

**Industry Guidance**

**UK MCA: Code of Safe Working Practices for Merchant Seafarers.**

Chapter 14.2 Permit to work systems

14.2.1 There are many types of operation on board ship when the routine actions of one person may inadvertently endanger another, or when a series of action steps need to be taken to ensure the safety of those engaged in a specific operation. In all circumstances it is necessary, before the work is done, to identify the hazards and then to ensure they are eliminated or effectively controlled. Ultimate responsibility rests with the Company to see that this is done.

14.2.3 the safety management systems for individual ships will determine when permit to work systems should be used, and the form of the permit to work.

Annex 14.1 Permits to work

Permits to work would normally be required for the following categories of work:

- Working at height / over the side

Chapter 17 Work at Height

17.2.7 Other than in emergency situations, personnel should not work overside whilst the vessel is underway. If such work has to be undertaken, lifeboats or rescue boats should be ready for immediate use. Any such work should be closely monitored/watched by a responsible person.

Chapter 10.5 Safety for seafarers rigging accommodation and pilot ladders.

10.5.2 The dangers associated with this work activity should be risk assessed as working overside, requiring a permit to work and the use of control measures such as safety line, fall prevention device, safety harness and wearing of lifejackets...

**TMSA KPI 9.1.4** requires that a documented permit to work system is in place.

The permit to work is used to control the risks associated with hazardous tasks such as enclosed space entry and hot work

### **IMO: ISM Code**

7 The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks involved should be defined and assigned to qualified personnel.

### **Inspection Guidance**

The vessel operator should have developed safe working procedures which included the controls required to be in place whenever work over the side is planned or undertaken.

The procedures should include:

- The definition of working over the side.
- The prohibition of working over the side while the vessel is underway except in defined circumstances such as:
  - Rigging, adjusting or recovering a combination ladder before or after boarding or disembarking a pilot where this requires a seafarer to work outside the side rail.
  - Rigging, adjusting or recovering an accommodation ladder as part of port arrival or departure operations where this requires a seafarer to work outside the side rail.
  - Launching or recovering a lifeboat or rescue boat as part of an exercise or emergency response.
- Any exclusions from the requirement to document the control measures on each occasion when work takes place over the side by utilising a standard procedure developed through risk assessment, such as:
  - Rigging, adjusting or recovering a combination ladder.
  - Rigging, adjusting or recovering an accommodation ladder.
  - Rigging, adjusting or recovering a gangway while in port
- The method of documenting the risk control measures that need to be put in place before work can be authorised, either through a permit to work, risk assessment or other work management process.
- The personal protective equipment (PPE) such as lifejackets, lifelines, harnesses, fall arresters, etc. that must be used when working over the side.
- The specialist equipment, such as bosun's chairs, stages, safety nets, etc. that must be used when working over the side.
- The requirement to check PPE and specialist working at height and over the side equipment periodically and record the inventory and condition of the equipment.
- The requirement to check PPE and specialist working at height and over the side equipment before each use.
- The level of supervision that must be maintained on deck at the work location for the duration of work over the side.
- The level of supervision that must be maintained on the bridge for the duration of the work if the work over the side takes place while the vessel is underway.
- The status of the main propulsion machinery and maximum permitted speed of the vessel when work over the side takes place while the vessel is underway and making way for tasks such as rigging a combination ladder.
- The level of authority required to approve working over the side.
- Any additional permits that may be considered or applicable when working over the side.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company safe work procedures for working over the side.
- Review any standard work procedures for working over the side while the vessel was underway such as for rigging a combination or accommodation ladder.
- Review several recent work over the side permits or risk assessments and verify that:
  - The work described in the permits and/or risk assessments reflected the circumstances found onboard the vessel being inspected.

- The permits and/or risk assessments were approved in accordance with the company procedure.
- Review the working at height and over the side PPE and specialist equipment inventory and periodic inspection checklist. Verify that checks had been completed in accordance with the company work at height and over the side procedure.
- Inspect a selection of specialist working at height and over the side PPE and equipment provided onboard and verify that the condition reflected that as reported in the most recent periodic check.
- Interview a deck rating to verify their understanding of the company safe working procedure for working over the side with specific reference to:
  - Their involvement with either the permit or risk assessment review process.
  - Rigging a combination or an accommodation ladder while the ship was underway and the required level of supervision on deck and from the bridge.

#### **Expected Evidence**

- The company safe work procedures for working over the side.
- Standard work procedures for work over the side that did not require a permit or risk assessment to be prepared on each occasion.
- The work over the side permits or risk assessments for the previous six months.
- Records of the periodic checks of specialist working at height and over the side PPE and equipment.

#### **Potential Grounds for a Negative Observation**

- There was no company safe working procedure which included working over the side.
- There was no requirement to complete a permit or risk assessment when working over the side unless the company procedures provided specific exclusions.
- The accompanying officer was unfamiliar with the company working over the side safe work procedure.
- The accompanying officer was unfamiliar with the requirement to conduct periodic checks on specialist working at height and over the side PPE and equipment.
- There was evidence that work over the side had been undertaken that required either a work over the side permit or a documented risk assessment, but where neither was available for review.
- Reviewed permits or risk assessments did not reflect the work over the side described and/or circumstances found onboard the inspected vessel.
- Work over the side permits or risk assessments has not been approved at the appropriate level in accordance with the company procedure.
- There were no records of inventory and/or periodic checks of specialist working at height and over the side PPE and equipment.
- Specialist working at height and over the side PPE and/or equipment was found to be in apparently poor condition.
- An interviewed rating was unfamiliar with the company safe working procedure for working over the side and either the related standard procedure(s) or, the permit or risk assessment review process.

**5.5.5. Were the Master and officers familiar with the company procedures for working on electrical equipment and systems, and was there evidence that risk control measures such as permits to work and/or documented risk assessments were consistently used whenever work was undertaken on electrical equipment and systems?**

**Short Question Text**

Working on electrical equipment and systems

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Steering Gear, Bridge, Engine Room, Forecastle, Engine Control Room, Interview - Electrician / ETO

**Publications**

IMO: ISM Code

UK MCA: Code of Safe Working Practices for Merchant Seafarers

**Objective**

**To ensure that work on electrical equipment and systems is always conducted in a controlled manner with procedures to manage and mitigate risk to workers.**

**Industry Guidance**

**UK MCA: Code of Safe Working Practices for Merchant Seafarers.**

Chapter 14.2 Permit to work systems

14.2.1 There are many types of operation on board ship when the routine actions of one person may inadvertently endanger another, or when a series of action steps need to be taken to ensure the safety of those engaged in a specific operation. In all circumstances it is necessary, before the work is done, to identify the hazards and then to ensure they are eliminated or effectively controlled. Ultimate responsibility rests with the Company to see that this is done.

14.2.3 the safety management systems for individual ships will determine when permit to work systems should be used, and the form of the permit to work.

Annex 14.1 Permits to work

Permits to work would normally be required for the following categories of work:

- General electrical (under 1000 volts)
- Electrical high voltage (over 1000 volts)

Chapter 20.12 Electrical equipment

20.12.1 The risks of electric shock are much greater on board ship than they are normally ashore because wetness, high humidity and high temperature (including sweating) reduce the contact resistance of the body. In those conditions, severe and even fatal shocks may be caused at voltages as low as 60V...

20.12.2 A notice of instructions on the treatment of electric shock should be posted in every place containing electric equipment and switchgear. Immediate on-the-spot treatment of an unconscious patient is essential.

20.12.3 Before any work is done on electrical equipment, fuses should be removed, or circuit breakers opened to ensure that all related circuits are dead. If possible, switches and circuit breakers should be locked open... The work



should be carried out by, or under the direct supervision of, a competent person with sufficient technical knowledge and a permit to work system should be operated. Additional precautions are necessary to ensure safety when work is to be undertaken on high-voltage equipment (designed to work at a nominal system voltage in excess of 1000V).

**TMSA KPI 9.1.4** requires that a documented permit to work system is in place.

The permit to work is used to control the risks associated with hazardous tasks such as enclosed space entry and hot work

#### **IMO: ISM Code**

7 The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks involved should be defined and assigned to qualified personnel.

#### **Inspection Guidance**

The vessel operator should have developed safe working procedures which included the controls required to be in place whenever work on electrical equipment or systems is planned or undertaken.

The procedure should include:

- The definition of working on electrical equipment or systems.
- The definitions of general electrical work and high-voltage electrical work.
- The method of documenting the risk control measures that need to be put in place before work on electrical equipment or systems can be authorised, either through a permit to work, risk assessment or other work management process.
- The additional risk control measures that must be in place and documented when:
  - Conducting work on high-voltage equipment or systems.
  - Conducting work on or near live electrical equipment or systems.
  - Conducting work on live electrical test benches.
  - Conducting work on electrical equipment in hazardous areas
- The personal protective equipment (PPE) such as insulating mats, insulating gloves, eye protection, footwear and clothing without metal fittings, etc. that must be used when working on electrical equipment or systems.
- The dangers of wearing jewellery while working on or near electrical equipment or systems.
- The specialist equipment that must be used when working on electrical equipment or systems.
- The requirement to post a notice of instructions on the treatment of electric shock in spaces containing electric equipment and switchgear.
- The requirement to check PPE and specialist electrical work equipment before each use.
- The level of supervision or direct oversight that must be maintained for the duration of work on electrical equipment or systems.
- The level of authority required to approve work on electrical equipment or systems.
- Any additional permits that may be considered or applicable when working on electrical equipment or systems.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the company safe work procedures for working on electrical equipment or systems.
- Where necessary, review the planned maintenance system or daily work planning meeting records to identify when work on electrical equipment or systems may have taken place.
- Review at least two recent permits and/or risk assessments for work on electrical equipment or systems and verify that:
  - The work described in the permits and/or risk assessments reflected the circumstances found onboard the vessel being inspected.

- The permits and/or risk assessments were approved in accordance with the company procedure.
- During the general inspection of the vessel, confirm that a notice of instructions on the treatment of electric shock was posted in spaces containing electric equipment and switchgear.
- Interview the electrician or, where no electrician was on board, an appropriate engineer officer to verify their understanding of:
  - The company safe working procedure for working on electrical equipment or systems.
  - The electrical work permit and/or risk assessment development, review and approval processes.
  - The additional control measures required when working on:
    - High-voltage systems and equipment.
    - Live electrical equipment.
    - Live electrical test benches.
    - Electrical equipment or systems in hazardous areas.

#### **Expected Evidence**

- The company safe work procedure for working on electrical equipment or systems.
- The work on electrical equipment or systems permits and/or risk assessments for the previous two months.
- Access to the planned maintenance system.
- Access the daily work planning meeting records.

#### **Potential Grounds for a Negative Observation**

- There was no company safe working procedure which included working on electrical equipment or systems.
- There was no requirement to complete a permit and/or risk assessment when working on electrical equipment or systems.
- The accompanying officer was unfamiliar with the company safe work procedure for working on electrical equipment or systems.
- An interviewed electrician or engineer officer was unfamiliar with
  - The company safe working procedure for working on electrical equipment or systems and either the related permit and/or risk assessment development, review and approval process.
  - The additional control measures required when working on:
    - High-voltage systems and equipment.
    - Live electrical equipment.
    - Live electrical test benches.
    - Electrical equipment or systems in hazardous areas.
- There was evidence that work on electrical equipment or systems had been undertaken that required either a permit and/or a documented risk assessment but the required documentation had not been completed or was not available for review.
- Reviewed permits and/or risk assessments did not reflect the work on electrical equipment or systems described and/or the circumstances found onboard the inspected vessel.
- Work on electrical equipment or systems permits or risk assessments had not been approved at the appropriate level in accordance with the company procedure.
- There was no documented supervision/oversight for tasks where the company procedure required such oversight to be in place.
- Notices of instructions for the treatment of electric shock were not posted in spaces containing electric equipment and switchgear.

Where no permits and/or risk assessments for work on electrical equipment or systems had been completed or approved during the previous two months, make a **comment** in the Process response tool noting the date of the last occasion when work on electrical equipment or systems had been documented.

**5.5.6. Were the Master and officers familiar with the company procedures for the control of hazardous energy, and was evidence available, through documented risk assessment or permits, that hazardous energy sources were routinely identified and isolated before working on, or in, machinery, systems or spaces where hazardous energy could be present?**

**Short Question Text**

Control of hazardous energy

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Cargo Control Room, Engine Control Room, Interview - Deck Officer, Interview - Engineer Officer

**Publications**

IMO: ISM Code

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

**Objective**

**To ensure that hazardous energy sources are always identified and effectively isolated before work starts on, or in, machinery, systems or spaces where hazardous energy sources could be present.**

**Industry Guidance**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.**

Chapter 4.4 Lock-out/Tag-out

Specially designed LO/TO equipment is widely available that provides a system for preventing a valve or device being operated until the lock or tag has been removed, usually under a documented system of safe management control. Uses vary but could include the isolation of overboard sea valves and tanks during safe entry.

Hazardous energy control procedures may also include a LO/TO system that places a lock and/or tag on an energy isolating device, e.g. a valve or breaker. This stops the energy isolating device being operated until the lock or tag has been removed.

Chapter 4.5 Control of hazardous energy

4.5.1 Hazardous energy

Hazardous energy is any electrical, mechanical, hydraulic, pneumatic, chemical, nuclear, thermal, gravitational, sound, motion, biological or other energy that can harm personnel. Examples of hazardous energy include:

- Pressure in a cargo pipeline due to stored pressure.
- Pressure in a cargo pipeline section due to temperature variations.
- Gas pressure in an IG line.
- Air pressure in reservoirs.
- Stored electrical energy in electrical switchboards.
- Hydrostatic pressure on ship side valves.

4.5.2 Hazardous energy controls

A hazardous energy control procedure should be developed to identify and control hazardous energy. An example five step procedure is given below:

1. Gather information.
2. Perform SCTA. (*Safety Critical Task Analysis*)
3. Perform risk assessment.
4. Implement controls.
5. Communicate and train.

When implemented these should prevent:

- Injuries by and initial uncontrolled release of hazardous energy.
- Injuries by residual energy remaining in a system after shutdown.
- Release of a pollutant to air, the sea, the ground or on deck.
- Uncontrolled sea water entering machinery or other spaces.

Procedures should aim to establish that a zero energy state has been achieved and independently verified before work starts. If this zero energy state cannot be established, work should not start until more risk assessment and control measures are established. Procedures should identify the steps to be followed when a zero energy state cannot be established. Figure 4.1 provides a flowchart setting out the recommended steps to control hazardous energy.

**TMSA KPI 9.2.4** requires that procedures ensure that all identified mitigation measures are completed prior to commencing work

Procedures may include:

- Use of the permit to work system for both planned and unplanned tasks.
- Use of the risk assessment form to confirm implementation.

Final approval for commencement of work is subject to implementation of mitigation measures.

## **IMO: ISM Code**

7. The company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks should be defined and assigned to qualified personnel.

## **Inspection Guidance**

The vessel operator should have developed procedures which:

- Described potential sources of hazardous energy, and the methods of controlling them, when planning and conducting work on, or in, machinery, systems or spaces where an uncontrolled release of energy could cause harm to personnel or the environment.
- Provided instructions on:
  - When the process of carrying out the identification of hazardous energy sources should be conducted, such as;
    - During the daily work planning meeting.
    - As part of a standard work procedure for a defined job.
    - As part of the work instructions contained within the planned maintenance system.
    - Through the risk assessment process for a new or unplanned job.
  - How hazardous energy sources are to be identified, such as;
    - Through technical drawing review.
    - Through onsite survey using hazard identification tools.
    - A combination of both.

- How hazardous energy sources are secured against uncontrolled release, such as through lock-out/tag-out (LO/TO) or another documented work procedure.
- How the hazardous energy source isolation points are required to be documented, such as;
  - The use of a dedicated LO/TO permit.
  - As a subsection of another permit used to control work.
  - A job specific risk assessment.
  - A Safety Critical Task Assessment.
  - Another documented work process.
- How to achieve and verify a zero energy state before work starts on, or in, any machinery, system or space with hazardous energy source(s).
- How to complete the independent verification of isolation points
- The authorisation process for work on, or in, machinery, systems or spaces with hazardous energy source(s).
- The process to temporarily reinstate energy sources for testing purposes.
- How to reinstate energy sources upon completion of the planned work.
- The requirement to test machinery or systems after removal of isolation to ensure full system functionality.
- Defined the type and quantity of specialist LO/TO equipment that must be available onboard.
- Required that an inventory of specialist LO/TO equipment must be maintained.
- Defined who is authorised to:
  - Undertake the LO/TO or other documented isolation process.
  - Undertake the independent verification of isolation points.
  - Approve the permit, risk assessment or other documented work process for the isolation of hazardous energy sources.
- Defined the training required for all personnel involved in the isolation of hazardous energy process.
- Prohibited work on equipment or systems where a zero energy state could not be achieved except where specialist procedures had been developed for working on energised systems.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company control of hazardous energy procedures.
- Review at least two recent permits, risk assessments or other work process documents which were used to identify and control hazardous energy sources before work on, or in, machinery, systems or spaces.
- If necessary, review the planned maintenance system to confirm that tasks that would require the identification and control of hazardous energy sources in accordance with the company procedure had an accompanying permit, risk assessment or other work process document available.
- Interview one deck or engineer officer to verify their understanding of:
  - The company control of hazardous energy procedures and the use of permits, risk assessment or other documented work processes to identify and document sources of hazardous energy before starting work.
  - The process to verify a zero-energy state of a source of hazardous energy.

### **Expected Evidence**

- The company control of hazardous energy procedures.
- Permits, Safety Critical Task Assessments, risk assessments or other documented work processes that had been used to identify and control hazardous energy sources for the previous three months.
- The daily work planning records.
- The Bridge Log Book.
- The Engine Room Logbook.
- The planned maintenance system.
- The inventory of specialist LO/TO equipment.

### **Potential Grounds for a Negative Observation**

- There were no company control of hazardous energy procedures.
- There was no specialist LO/TO equipment available onboard.
- There was no inventory of specialist LO/TO equipment.
- Work had been completed that required either a permit, risk assessment or other documented work procedure to identify and control hazardous energy sources according to the company procedure, but none had been completed.
- An interviewed deck or engineer officer was unfamiliar with the company control of hazardous energy procedures.
- An interviewed deck or engineer officer was unfamiliar with the process to identify and document the isolation of hazardous energy sources before starting work on, or in, machinery, systems or spaces where hazardous energy sources were present.
- LO/TO equipment was found to be attached to machinery or systems during the inspection but there were no accompanying permits, risk assessment or other documented work process to document the reason for the equipment being locked and/or tagged out.
- Permits, risk assessment or other documented work processes were in force for hazardous energy isolation, but the isolation points identified were not locked and/or tagged out as required by the company procedure.
- Machinery or systems were found disassembled or under repair with no isolation of hazardous energy sources.

Where no records were available for the control of hazardous sources of energy for the previous three months, make a **comment** in the Process response tool and note the date of the last occasion for which control measures for hazardous energy had been documented.

## 5.6. Fixed and portable gas detecting systems

**5.6.1. Were the Master and officers familiar with the purpose, operation, testing, maintenance and calibration of the vessel's portable and personal gas measurement instruments, and was the equipment on board sufficient, in good working order, regularly tested and periodically calibrated?**

### Short Question Text

Portable and personal gas measurement instruments

### Vessel Types

Oil, Chemical, LPG, LNG

### ROVIQ Sequence

Cargo Control Room, Pumproom

### Publications

IMO: ISM Code

IMO SOLAS

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: IGC Code

IMO: IBC Code

IMO: MSC.1/Circ.1456 Unified interpretations of SOLAS Chapter II-2 and the FSS and FTP codes

IMO: MSC.1/Circ.1477. Guidelines to facilitate the selection of portable atmosphere testing instruments for enclosed spaces as required by SOLAS Regulation XI-1/7.

IMO: MSC.1/Circ.1561 Unified interpretation of SOLAS regulation XI-1/7

### Objective

**To ensure sufficient calibrated portable and personal gas measurement instruments are always available on board to enable safe enclosed space entry and cargo operations.**

### **Industry Guidance**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition**

#### 2.4.2 Gas measurement instruments

Some gas measurement instruments can analyse only one type of gas. Other can analyse several pre-set types of gases at the same time (multi-gas detectors) and have a range of capabilities based on different technologies. They can be divided into personal, portable and fixed gas measurement instruments and can be further classed by their function.

#### 2.4.1 Provision of gas measurement instruments

Tankers should be equipped with at least two instruments capable of measuring, as a minimum, concentrations of oxygen, flammable gases or vapours (% LFL), H<sub>2</sub>S and CO in order to carry out the tests required for enclosed space entry.

Note that enclosed spaces might have additional atmospheric hazards that may not be detected by these instruments. If this is known to be the case, additional means to measure the toxic gases in the cargoes being carried should be provided. An up to date inventory of the instruments should be maintained on board.

Tankers equipped with IG or nitrogen padding should ensure that the instruments are also capable of measuring oxygen and hydrocarbon content (% Vol) in an inert atmosphere.

Every instrument should have a manual that describes its features, settings and alarms and explains calibration, testing, operation and maintenance. The information in the manuals should be available in the working language of the tanker.

#### 1.4.6.3 Guidance for handling cargo and bunkers containing hydrogen sulphide

##### 1.4.6.3.1 Vapour monitoring

Personal H<sub>2</sub>S gas monitoring instruments for personnel engaged in cargo operations is strongly recommended

#### 10.8 Precautions during entry into enclosed spaces

The initial entry should be carried out by one or two crew members, depending on the size nature and layout of the space. Each should carry an Emergency Escape Breathing Device (EEBD) and a personal gas monitor.

##### 11.1.7.2 Entry into cargo tanks

The safety precautions in chapter 10 should be observed, including the carrying of a personal gas detector.

#### 2.4.7 Testing and calibrating gas measurement instruments.

##### 2.4.7.1 Operational testing (self-testing) gas measurement instruments

Gas measurement instruments should be tested in line with the manufacturer's instructions before daily use. Such tests are meant to ensure the instrument is in good working condition.

##### 2.4.7.2 Testing gas measurement instruments

Portable and fixed gas measurement instruments should be tested at minimum recommended frequency using test gases as per the manufacturer's instructions and the company's SMS.

In any case, portable and fixed gas measurement instruments should be tested at least every month or after any fault.

##### 2.4.7.3 Calibrating gas measurement instruments

Calibration, adjustment and additional maintenance should be carried out in line with the manufacturer's recommendations.

##### 2.4.7.4 Disposable personal gas monitors

To confirm they are working properly, disposable gas monitors should be tested regularly and in line with manufacturer's recommendations.

Disposable gas detection monitors cannot be re-calibrated and should be safely discarded when they reach the calibration expiry date. It is important to record the date when disposable instruments are first commissioned in order to establish their expiry date.

### **IMO: MSC.1/Circ.1456 Unified interpretations of SOLAS Chapter II-2 and the FSS and FTP codes**

#### 1 Gas measurement and detection – portable instruments (regulation II-2/4.5.7.1)

The requirement of regulation II-2/4.5.7.1 for one portable instrument for measuring oxygen and one for measuring flammable vapour concentrations, and spares for both, should be considered as being satisfied when a minimum of two instruments, each capable of measuring both oxygen and flammable vapour concentrations are provided on



board. Alternatively, two portable instruments for measuring oxygen and two portable instruments for measuring flammable vapour concentrations could be provided on board.

**IMO: MSC.1/Circ.1477. Guidelines to facilitate the selection of portable atmosphere testing instruments for enclosed spaces as required by SOLAS Regulation XI-1/7.**

Introduction

1. These guidelines are to facilitate the selection of a portable atmosphere testing instrument for enclosed spaces as required by SOLAS regulation XI-1/7. They are intended to be read in conjunction with this SOLAS regulation and the Revised recommendations for entering enclosed spaces aboard ships (resolution A.1050(27)). They are not intended to constitute a performance standard for such equipment.

**IMO: MSC.1/Circ.1561 Unified interpretation of SOLAS regulation XI-1/7**

Provision of suitable means of the calibration of portable atmosphere testing instruments.

Compliance with the provision “suitable means shall be provided for the calibration of all such instruments” in SOLAS regulation XI-1/7, as adopted by resolution MSC.380(94), may be achieved by portable atmosphere testing instruments being calibrated on board or ashore in accordance with the manufacturer's instructions.

For the avoidance of any doubt, the above clarification refers to the calibration of portable atmosphere testing instruments, as required by SOLAS regulation XI-1/7, and not to any pre-operational accuracy tests as recommended by the manufacturer.

**IMO: ISM Code**

7. The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks involved should be defined and assigned to qualified personnel.

**TMSA KPI 6.1.2** requires that procedures for pre-operational tests and checks of cargo and bunkering equipment are in place for all vessel types within the fleet. Tests and checks of equipment may include:

- Gas monitoring equipment.

**IMO: SOLAS**

Chapter II Regulation 4

Probability of ignition

5.7 Gas measurement and detection

5.7.1 Portable instruments

Tankers shall be equipped with at least one portable instrument for measuring oxygen and one for measuring flammable vapour concentrations, together with a sufficient set of spares. Suitable means shall be provided for the calibration of such instruments.

5.7.2 Arrangements for gas measurement in double-hull spaces and double-bottom spaces

5.7.2.1 Suitable portable instruments for measuring oxygen and flammable vapour concentrations in double-hull spaces and double-bottom spaces shall be provided. In selecting these instruments, due attention shall be given to their use in combination with the fixed gas sampling line systems referred to in paragraph 5.7.2.2.

5.7.2.2 Where the atmosphere in double-hull spaces cannot be reliably measured using flexible gas sampling hoses, such spaces shall be fitted with permanent gas sampling lines. The configuration of gas sampling lines shall be adapted to the design of such spaces.

#### **IMO: IBC Code**

##### **13.2 Vapour detection**

13.2.1 Ships carrying toxic or flammable products, or both shall be equipped with at least two instruments designed and calibrated for testing for the specific vapours in question. If such instruments are not capable of testing for both toxic concentrations and flammable concentrations, then two separate sets of instruments shall be provided.

13.2.2 Vapour-detection instruments may be portable or fixed. If a fixed system is installed, at least one portable instrument shall be provided.

#### **IMO: IGC Code**

13.6.3 Gas detection equipment shall be designed, installed and tested in accordance with recognized standards and shall be suitable for the cargoes to be carried in accordance with column "f" in table of chapter 19. (*i.e. asphyxiant or flammable and/or toxic*)

13.6.19 Every ship shall be provided with at least two sets of portable gas detection equipment that meet the requirement of 13.6.3 or an acceptable national or international standard.

13.6.20 A suitable instrument for the measurement of oxygen levels in inert atmospheres shall be provided.

#### **Inspection Guidance**

The vessel operator should have developed procedures for the operation, testing, maintenance and calibration of the vessel's portable and personal gas measurement instruments which defined:

- The type and number of portable and personal gas measurement instruments to be carried on board.
- The toxic gases or vapours for which tubes, chips or other consumables should be available.
- The purpose(s) and function(s) of each instrument, including the sensor technology utilised and whether the instrument can be used:
  - in an inert atmosphere.
  - at above atmospheric pressure.
- The circumstances under which each instrument sensor may be poisoned.
- The description and quantity of spare parts and test gases to be carried on board.
- The method and frequency of testing and calibrating the gas measurement instruments, including a requirement that all oxygen and hydrocarbon analysers are checked for correct operation before each use.
- The records of equipment, testing and calibration to be maintained.
- The circumstances under which personal gas measurement instruments must be worn, e.g. enclosed space, cargo tank, pump room entry or when handling cargo or bunkers with high H<sub>2</sub>S concentrations.

The procedures may refer to the manufacturer's manuals for detailed guidance on individual instruments.

#### **Suggested Inspector Actions**

- Sight, and where necessary review the:
  - Company procedures for the operation, testing, maintenance and calibration of the portable and personal gas measurement instruments.
  - Instruction manuals for the portable and personal gas measurement instruments.

- Inspect the:
  - Portable and personal gas measurement instruments.
  - Associated spare parts and test gases.
  - The tubes, chips or other consumables available on board for measuring toxic gases.
  - Hoses or cables used to sample tank atmospheres and verify that they were of sufficient length to reach the bottom of the deepest tank.
  
- Review the:
  - Inventory of portable and personal gas measurement instruments, spare parts, test gases and tubes, chips or other consumables for measuring toxic gases.
  - Test and calibration records for the portable and personal gas measurement instruments.
  - Records of the date when each disposable personal gas monitor was first commissioned.
  
- Interview the accompanying officer to assess their familiarity with the:
  - Purpose and operation of the portable and personal gas measurement instruments.
  - Testing, maintenance and calibration of the portable and personal gas measurement instruments, including the correct use of test gases.
  - Records required to be kept for the portable and personal gas measurement instruments.
  
- Request that the accompanying officer demonstrates the pre-operational accuracy test, in accordance with the manufacturer's instructions, for a selected portable or personal gas measurement instrument.

Where the vessel was provided with portable gas measuring equipment and consumables from different manufacturer's the vessel staff must be able to demonstrate that the items are mutually compatible through manufacturer's instructions. (Particularly when considering gas testing tubes and hand pumps)

### **Expected Evidence**

- The company procedures for the operation, testing, maintenance and calibration of the vessel's portable and personal gas measurement instruments.
- The inventory of portable and personal gas measurement instruments, spare parts, test gases and tubes, chips or other consumables for measuring toxic gases.
- Instruction manuals for the portable and personal gas measurement instruments.
- Test and calibration records for the portable and personal gas measurement instruments.
- Records of the date when each disposable personal gas monitor was first commissioned.

### **Potential Grounds for a Negative Observation**

- There were no company procedures for the operation, testing, maintenance and calibration of the portable and personal gas measurement instruments.
- The accompanying officer was unable to explain or demonstrate:
  - The type and number of portable and personal gas measurement instruments required to be carried on board.
  - The toxic gases or vapours for which tubes, chips or other consumables required to be carried onboard.
  - The purpose(s) and function(s) of each instrument, including the sensor technology utilised and whether the instrument can be used in an inert atmosphere and/or at above atmospheric pressure.
  - The circumstances under which some sensors fitted in measurement instruments provided may be poisoned.
  - The description and quantity of spare parts and test gases required to be carried on board.
  - The method and frequency of testing and calibrating the gas measurement instruments.

- The records of equipment, testing and calibration required to be maintained.
  - The circumstances under which personal gas measurement instruments must be worn, e.g. enclosed space, cargo tank and pump room entry.
- The accompanying officer was unfamiliar with the purpose and/or operation of the portable and personal gas measurement instruments.
- An item of the required portable and personal gas measurement instruments was damaged or not operational.
- An item of equipment required to permit the restricted or closed sampling of a tank atmosphere was missing or defective.
- The accompanying officer was unable to describe the testing, maintenance and calibration of the portable and personal gas measurement instruments required in accordance with the SMS and the manufacturers' maintenance and operation manuals.
- There was no evidence that the required testing, maintenance and calibration of the portable and personal gas measurement instruments had been performed in accordance with the SMS and the manufacturers' maintenance and operation manuals.
- The vessel was not equipped with at least two instruments capable of measuring concentrations of oxygen, flammable gases or vapours (% LFL), H<sub>2</sub>S and CO in order to carry out the tests required for enclosed space entry.
- The vessel was not equipped with the required means to measure concentrations of toxic gases or vapours that might be found in the cargoes carried.
- There were insufficient tubes, chips or other consumables available on board for the instruments used to measure toxic gases.
- Hoses or cables used to sample tank atmospheres were of insufficient length to reach the bottom of the deepest tank.
- The tubes, chips or other consumables available on board for measuring toxic gases were not suitable for the toxic gases or vapours that might be found in the cargo being carried.
- The tubes, chips or other consumables available on board for measuring toxic gases were past their expiry date.
- A tanker equipped with inert gas or that utilised nitrogen padding did not have an instrument(s) capable of measuring oxygen and hydrocarbon content (% Vol) in an inert atmosphere.
- An instrument was used for measuring hydrocarbon content in an inert atmosphere that was not suitable for this purpose.
- The vessel was not equipped with sufficient operational personal gas monitors to meet the requirements of the SMS for enclosed space, cargo tank or pump room entry.
- The vessel was not equipped with sufficient operational personal H<sub>2</sub>S gas monitors for personnel involved in cargo and / or bunker operations where the cargo or bunkers were known or suspected of having a high H<sub>2</sub>S content.
- There was no inventory available of the portable and personal gas measurement instruments, spare parts and test gases carried on board.
- Records of the testing, maintenance and calibration of the portable and personal gas measurement instruments required in accordance with the SMS and the manufacturers' maintenance and operation manuals were missing or incomplete.
- The date when each disposable personal gas monitor was first commissioned was not recorded in order to establish their expiry date.
- Disposable personal gas monitors were in use past their expiry date.
- Manuals, in the working language of the ship, were not available for each item of portable and personal gas measurement instruments carried on board.
- There were insufficient test gases available for the portable and personal gas measurement instruments.
- Test gases available on board were unsuitable for the portable and personal gas measurement instruments carried.
- An incorrect test gas had been used to test a portable instrument.
- Records indicated the manufacturers' recommended intervals for servicing the equipment and/or for the replacement of parts such as filters had not been observed.

Do not make a written observation where portable or personal gas detecting equipment was defective or out of service, providing:

- The vessel carried sufficient operational equipment to meet regulatory and operational requirements.

- Defective equipment was clearly marked as out of service.
- Defective equipment had been reported within the defect reporting system.

**5.6.2. Were the Master and deck officers familiar with the company procedures for testing the atmosphere in double-hull and double bottom spaces for flammable gas, and were records available to confirm that appropriate measurements had been taken using the equipment fitted to, or provided on, the vessel?**

**Short Question Text**

Testing the atmosphere in double-hull and double bottom spaces for flammable gas

**Vessel Types**

Oil, Chemical

**ROVIQ Sequence**

Cargo Control Room

**Publications**

IMO SOLAS

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: FSS Code

**Objective**

**To ensure that structural failures between cargo tanks adjacent to ballast tanks and void spaces of double-hull and double-bottom spaces are promptly detected.**

**Industry Guidance**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition**

11.3.4 Monitoring of Void and Ballast Spaces.

Void and ballast spaces in the cargo tank block should be regularly monitored for leaks from nearby tanks. Monitoring should include regular atmosphere checks for hydrocarbon content and regular sounding/ullaging of the empty spaces.

**TMSA KPI 4.2.2** requires that cargo, void and ballast spaces are inspected to ensure their integrity is maintained.

**IMO: SOLAS**

Chapter II-2 Regulation 4

5.7.2.1 Suitable portable instruments for measuring oxygen and flammable vapor concentrations on double hull spaces and double-bottom spaces shall be provided...

5.7.2.2 Where the atmosphere in double-hull spaces cannot be reliably measured using flexible gas sampling hoses, such spaces shall be fitted with permanent gas sampling lines...

5.7.3.1 ... oil tankers of 20,000 dwt and above, constructed after 01 January 2012, shall be provided with a fixed hydrocarbon gas detecting system complying with the Fire Safety System Code for measuring hydrocarbon gas concentrations in all ballast tanks and void spaces of double-hull and double-bottom spaces adjacent to cargo tanks, including the forepeak tank...

**IMO: FSS Code**

Chapter 16 – Fixed hydrocarbon gas detection systems

2.1.2 The system shall be comprised of a central unit to gas measurement and analysis and gas sampling pipes in all ballast tanks and void spaces of double-hull and double-bottom spaces adjacent to the cargo tanks, including the forepeak tank and any other tanks and spaces under the bulkhead deck adjacent to cargo tanks.

2.2.1.3 The configuration of gas sampling lines shall be adapted to the design and size of each space. Except as provided in paragraphs 2.2.1.4 and 2.2.1.5. the sampling system shall allow for a minimum of two hydrocarbon gas sampling points, one located on the lower and one on the upper part where sampling is required.

2.2.3.2 means shall be provided to enable measurements with portable instruments in case the fixed system is out of order or for system calibration. In case the system is out of order, procedures shall be in place to continue to monitor the atmosphere with portable instruments and to record the measurement results.

### **Inspection Guidance**

The vessel operator should have developed procedures which described:

- The method and frequency of detecting and monitoring flammable gas concentrations in double hull , double bottom and void spaces applicable to the vessel type and considering the equipment fitted on, or provided to, the vessel.
- The requirement to record the measurement results obtained from monitoring the double hull, double bottom and void spaces required to be protected, with portable instruments.
- The requirement to record the periods during which a fixed hydrocarbon gas detection system was monitoring the double hull, double bottom and void spaces required to be protected.
- The action to be taken when hydrocarbon/flammable gas is detected in double-hull, double-bottom or void spaces.
- The action to take if the fixed hydrocarbon gas detection system is defective.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures for detecting and monitoring flammable gas concentrations in double-hull, double-bottom and void spaces.
- Review the records of flammable gas measurements in double-hull and double-bottom spaces and verify that tests had been completed in accordance with company procedures.
- Where a vessel is required to be fitted with a fixed hydrocarbon gas detecting system in accordance with the FSS Code, verify that sensors were isolated consistent with the ballast level in the individual tanks.
- Where a vessel was fitted with a fixed flammable gas detecting system outside the requirement of the FSS Code, verify that manual gas measurements were made in accordance with company procedures whenever a sensor was isolated due to ballast water content within a tank.
- Review the operation of the fixed flammable gas detecting system, where fitted, and confirm that the system was fully operational with flammable gas alarm settings in accordance with the guidance provided under 2.2.3.3 of the FSS Code. (not more than 30% of the lower flammable limit).
- Review the fixed gas detecting system sensor calibration record and verify that calibration had been completed in accordance with company procedures.

### **Expected Evidence**

- The company procedures for detecting and monitoring flammable gas concentrations in double-hull, double-bottom and void spaces.
- Records to demonstrate that hydrocarbon gas measurements had been undertaken in accordance with the company procedure.
- Records to demonstrate that the fixed gas detecting system, where fitted, had been in continuous operation and where individual tank sensors, or groups of sensors, had been isolated, the times of isolation and reconnection.
- Calibration records for the fixed gas detecting system sensor(s).
- Incident investigation reports where flammable gas had been detected in ballast tanks and void spaces of double-hull and double-bottom spaces adjacent to the cargo tanks.

### **Potential Grounds for a Negative Observation**

- There was no company procedure which defined the process and frequency for testing double-hull, double-bottom and void spaces. for hydrocarbon gas accumulation.
- The accompanying deck officer was unfamiliar with the company procedure for monitoring double-hull, double-bottom and void spaces for hydrocarbon gas accumulation.
- Records, or absence of records, indicated that gas measurements had not been taken and recorded in accordance with company procedures.
- Records, or absence of records, indicated that fixed gas detector tank sensors had been isolated without appropriate manual gas measurements being taken in accordance with company procedures.
- The fixed gas detecting system fitted to the vessel was defective in any way.
- The fixed gas detector sensors had not been calibrated and/or the flammable gas alarm had not been set in accordance with company procedures.
- There was no functioning portable flammable gas detector available to take manual gas readings.
- Flammable gasses had been detected in double-hull, double-bottom or void spaces as a result of a structural defect within the previous twelve months.



**5.6.3. Were the Master and officers familiar with the location, purpose and operation of the vessel's fixed gas detection systems required by the IGC Code, and was the equipment in good working order, regularly maintained and calibrated?**

**Short Question Text**

Fixed gas detection systems required by the IGC Code

**Vessel Types**

LPG, LNG

**ROVIQ Sequence**

Bridge, Cargo Control Room

**Publications**

SIGTTO: Liquefied Gas Handling Principles on Ships and in Terminals. Fourth Edition.

IMO: ISM Code

IMO: IGC Code

**Objective**

**To ensure that the vessel staff can detect unintentional releases or leaks from the cargo system.**

**Industry Guidance**

**SIGTTO: Liquefied Gas Handling Principles on Ships and in Terminals.** Fourth Edition.

4.11.5 Gas detection systems

Releases of flammable or toxic gases pose an immediate threat to both personnel and equipment. It is necessary to detect accidental discharge as early as possible to avoid the possibility of confined or partially confined vapour cloud explosions, flash fires and the presence of asphyxiating chemical gases...

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors. The documented procedures may include familiarisation with:

- Vessel specific operations and equipment.

**IMO: ISM Code**

6.3 The Company should establish procedures to ensure that new personnel and personnel transferred to new assignments related to safety and protection of the environment are given proper familiarisation with their duties. Instructions which are essential to be provided prior to sailing should be identified, documented and given.

**IMO: IGC Code**

13.6 Gas detection

13.6.1 Gas detection equipment shall be installed to monitor the integrity of the cargo containment, cargo handling and ancillary systems, in accordance with this section.

13.6.2 A permanently installed system of gas detection and audible and visual alarms shall be fitted in:

1. all enclosed cargo and cargo machinery spaces (including turrets compartments) containing gas piping, gas equipment or gas consumers.
2. other enclosed or semi-enclosed spaces where cargo vapours may accumulate, including interbarrier spaces and hold spaces for independent tanks other than type C tanks.

3. spaces in gas-fired internal combustion engines, referred to in 16.7.3.3.
4. ventilation hoods and gas ducts required by chapter 16.
5. cooling/heating circuits, as required by 7.8.4.
6. inert gas generator supply headers; and
7. motor rooms for cargo handling machinery.

13.6.3 Gas detection equipment shall be designed, installed and tested in accordance with recognized standards and shall be suitable for the cargoes to be carried in accordance with column "f" in table of chapter 19.

13.6.4 Where indicated by an "A" in column "f" in the table of chapter 19 ships certified for carriage of non-flammable products, oxygen deficiency monitoring shall be fitted in cargo machinery spaces and hold spaces for independent tanks other than type C tanks. Furthermore, oxygen deficiency monitoring equipment shall be installed in enclosed or semi-enclosed spaces containing equipment that may cause an oxygen-deficient environment such as nitrogen generators, inert gas generators or nitrogen cycle refrigerant systems.

13.6.5 In the case of toxic products or both toxic and flammable products, except when column "i" in the table of chapter 19 refers to 17.5.3, portable equipment can be used for the detection of toxic products as an alternative to a permanently installed system. This equipment shall be used prior to personnel entering the spaces listed in 13.6.2 and at 30-minute intervals while they remain in the space.

13.6.6 In the case of gases classified as toxic products, hold spaces and interbarrier spaces shall be provided with a permanently installed piping system for obtaining gas samples from the spaces. Gas from these spaces shall be sampled and analysed from each sampling head location.

13.6.7 Permanently installed gas detection shall be of the continuous detection type, capable of immediate response. Where not used to activate safety shutdown functions required by 13.6.9 and chapter 16, sampling type detection may be accepted.

13.6.8 When sampling type gas detection equipment is used, the following requirements shall be met:

1. the gas detection equipment shall be capable of sampling and analysing for each sampling head location sequentially at intervals not exceeding 30 min...

13.6.9 The gas detection equipment may be located in a non-hazardous space, provided that the detection equipment such as sample piping, sample pumps, solenoids and analysing units are located in a fully enclosed steel cabinet with the door sealed by a gasket. The atmosphere within the enclosure shall be continuously monitored. At gas concentrations above 30% lower flammable limit (LFL) inside the enclosure, the gas detection equipment shall be automatically shut down.

13.6.13 Any alarms status within a gas detection system required by this section shall initiate an audible and visible alarm:

1. on the navigation bridge.
2. at the relevant control station(s) where continuous monitoring of the gas levels is recorded; and
3. at the gas detector readout location.

13.6.14 In the case of flammable products, the gas detection equipment provided for hold spaces and interbarrier spaces that are required to be inerted shall be capable of measuring gas concentrations of 0% to 100% by volume.

13.6.15 Alarms shall be activated when the vapour concentration by volume reaches the equivalent of 30% LFL in air.

13.6.16 For membrane containment systems, the primary and secondary insulation spaces shall be able to be inerted and their gas content analysed individually. The alarm in the secondary insulation space shall be set in accordance with 13.6.15, that in the primary space is set at a value approved by the Administration or recognized organization acting on its behalf.

13.6.17 For other spaces described by 13.6.2, alarms shall be activated when the vapour concentration reaches 30% LFL and safety functions required by chapter 16 shall be activated before the vapour concentration reaches 60% LFL. The crankcases of internal combustion engines that can run on gas shall be arranged to alarm before 100% LFL.

13.6.18 Gas detection equipment shall be so designed that it may readily be tested. Testing and calibration shall be carried out at regular intervals. Suitable equipment for this purpose shall be carried on board and be used in accordance with the manufacturer's recommendations. Permanent connections for such test equipment shall be fitted.

13.6.19 Every ship shall be provided with at least two sets of portable gas detection equipment that meet the requirement of 13.6.3 or an acceptable national or international standard.

13.6.20 A suitable instrument for the measurement of oxygen levels in inert atmospheres shall be provided.

13.7 Additional requirements for containment systems requiring a secondary barrier

13.7.1 Integrity of barriers

Where a secondary barrier is required, permanently installed instrumentation shall be provided to detect when the primary barrier fails to be liquid-tight at any location or when liquid cargo is in contact with the secondary barrier at any location. This instrumentation shall consist of appropriate gas detecting devices according to 13.6. However, the instrumentation need not be capable of locating the area where liquid cargo leaks through the primary barrier or where liquid cargo is in contact with the secondary barrier.

### **Inspection Guidance**

Depending upon the cargoes to be carried, vessels operating under the IGC Code must be fitted with fixed systems for:

- Flammable vapour detection
- Toxic vapour detection
- Oxygen deficiency detection (for asphyxiant cargoes including nitrogen and carbon dioxide)

However, toxic vapour detection can be provided by portable instruments, except when carrying cargoes requiring a type 1G ship, including sulphur dioxide, methyl bromide, ethylene oxide and chlorine.

The vessel operator should have developed procedures for the operation and maintenance of the fixed gas detecting systems required under the IGC Code which defined:

- The required frequency of fixed gas detector sensor calibration in accordance with the manufacturer's instructions.
- The required frequency of verification of the alarm and automated shut down activation point (where fitted) settings for each sensor location.
- The required frequency of testing the audible and visual alarms on the bridge, in the relevant control station and at the gas detector read out station.
- The required frequency of testing the automated gas safety system shut down arrangements, where fitted.
- The identification of portable gas detecting equipment supplied to meet the requirements of the IGC code.
- Where the vessel was utilizing portable gas detecting equipment to meet the requirements of the IGC code, the routine gas monitoring that was required to be undertaken and included:
  - Locations subject to routine monitoring for toxic gases.
  - The required frequency of routine monitoring for toxic gases.
  - The method of recording the gas measurements obtained.
- The action to take in the circumstances that the fixed gas detection system was defective in any respect.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures for the operation and maintenance of the fixed gas detecting systems required under the IGC code.
  - Inspect the central control station for the fixed gas detection systems and verify that:
    - The fixed gas detecting systems were monitoring all sensors provided.
    - There were no fault alarms showing for either the systems or individual sensors.
    - The value shown by each sensor was normal based on the location and atmosphere being sampled.
    - The alarm set points for each sensor had been adjusted to the requirements of the IGC code and the company procedure.
    - Where a sensor was sampling from an inert atmosphere, the alarm set points had been adjusted to activate when the vapour concentration by volume reached the equivalent of 30% LFL in air.
    - Where the vessel could carry different grades of cargo, the individual alarm sensor set points had been adjusted to reflect the cargo being carried at the time.
  - Review the calibration data available at the central control station and verify:
    - The individual sensors had been calibrated in accordance with the manufacturer's instructions and company procedure.
    - The alarm set points had been confirmed as correct.
    - The automatic shutdown set points, where applicable, had been confirmed as correct.
  - Sight the list of portable gas detecting equipment provided to comply with the IGC code and verify the equipment was available.
  - Review the inventory of calibration gases and equipment and verify that sufficient materials were onboard to conduct sensor calibrations in accordance with the manufacturer's instructions.
  - Where the vessel was utilising portable gas detecting equipment to comply with the monitoring of toxic gases, verify that routine gas measurements had been taken and recorded in accordance with the company procedure.
  - If necessary, review the records of inspections, tests and maintenance carried out contained in the maintenance plan.
- 
- Interview the accompanying or responsible officer to verify their familiarity with the purpose and operation of the fixed gas detecting system.

The maintenance and calibration of portable gas detecting equipment required under the IGC code is dealt with in a separate question.

#### **Expected Evidence**

- The company procedures for the operation and maintenance of the fixed gas detecting systems required under the IGC code.
- Inspection, calibration and maintenance records for the fixed gas detection systems.
- The list of fixed gas detector sensors and the corresponding alarm (and where appropriate, automatic shutdown) set points.
- The manufacturer's calibration instructions for the fixed gas detecting systems and sensors.
- Where the vessel was utilising portable gas detecting equipment to comply with the IGC code, the records of routine toxic gas monitoring measurements.
- The list of portable gas detector equipment carried to comply with the IGC code.
- The inventory of sensor calibration gases and equipment.

#### **Potential Grounds for a Negative Observation**

- There was no company procedure for the operation and maintenance of the fixed gas detecting systems required by the IGC code.
- The fixed gas detection systems required by the IGC code were:
  - Not monitoring all sensors provided by the systems.

- Indicating a system fault.
  - Indicating that one or more sensors was defective.
- The alarm (and, where appropriate, automated shut down) set points for each fixed gas detector sensor were not set as required by the IGC code or the company procedure.
- Fixed gas detector sensors had not been calibrated in accordance with manufacturer's instructions and company procedures.
- Fixed gas detector sensor alarms set points had not been adjusted to the appropriate value corresponding to the cargo being carried.
- The calibration gases available onboard were either of the incorrect type or out of date.
- Calibration equipment required to conduct sensor calibration in accordance with the manufacturer's instructions was not available onboard.
- The gas detection equipment was located in a non-hazardous space, but the steel enclosure was not capable of being sealed or was routinely left open.
- Portable gas detecting equipment required to be carried in accordance with the IGC code was not available.
- Where portable gas detecting equipment had been used to comply with the requirements of the IGC code, there were no records available for the routine gas monitoring required to be undertaken in accordance with company procedures.
- The accompanying officer was not familiar with the purpose and operation of the vessel's fixed gas detection systems.
- The accompanying or responsible officer was not familiar with the calibration procedure for the fixed gas detection systems.
- The maintenance plan did not include the vessel's fixed gas detection systems or all the required inspections, tests, and maintenance, including calibrations.
- Records of inspections, tests, maintenance and calibrations carried out were incomplete.
- Inspection of the vessel's fixed gas detection systems indicated that actions recorded in the plan had not in fact taken place.
- The fixed gas detecting systems required by the IGC code were defective in any respect.

**5.6.4. Were the Master and officers familiar with the location, purpose and operation of the vessel's fixed gas detection system required by the IGF Code, and was the equipment in good working order, regularly maintained and calibrated in accordance with company procedures and manufacturer's instructions?**

**Short Question Text**

Fixed gas detection system required by the IGF Code

**Vessel Types**

Oil, Chemical, LPG

**ROVIQ Sequence**

Bridge, Engine Control Room

**Publications**

IMO: ISM Code

IMO: IGF Code

IMO: A 31/Res.1140 Survey guidelines under the harmonized system of survey and certification (HSSC)

**Objective**

**To ensure that the vessel is protected from the consequences of unintentional releases or leaks from the gas or other low-flashpoint fuel system.**

**Industry Guidance**

**IMO: A 31/Res.1140** Survey guidelines under the harmonized system of survey and certification (HSSC)

*(Cargo Ship Safety Construction Certificate, Annual Survey)*

2.2.5.5 confirming the availability of test and calibration records of the gas detection systems (IGF Code ch.15).

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors. The documented procedures may include familiarisation with:

- Vessel specific operations and equipment.

**IMO: ISM Code**

10.1 The company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the company

**IMO: IGF Code.**

15.8 Regulations for gas detection

15.8.1 Permanently installed gas detectors shall be fitted in:

1. the tank connection spaces.
2. all ducts around fuel pipes.
3. machinery spaces containing gas piping, gas equipment or gas consumers.
4. compressor rooms and fuel preparation rooms.
5. other enclosed spaces containing fuel piping or other fuel equipment without ducting.
6. other enclosed or semi-enclosed spaces where fuel vapours may accumulate including interbarrier spaces and fuel storage hold spaces of independent tanks other than type C.
7. gas heating circuit expansion tanks.

8. motor rooms associated with the fuel systems; and
9. at ventilation inlets to accommodation and machinery spaces if required based on the risk assessment required in 4.2.

15.8.6 An audible and visible alarm shall be activated at a gas vapour concentration of 20% of the lower explosion limit (LEL). The safety system shall be activated at 40% of LEL at two detectors (Table 1 Footnote 1 *Two independent gas detectors located close to each other are required for redundancy reasons. If the gas detector is of self-monitoring type the installation of a single gas detector can be permitted.*).

15.8.7 For ventilated ducts around gas pipes in the machinery spaces containing gas-fuelled engines, the alarm limit can be set to 30% LEL. The safety system shall be activated at 60% of LEL at two detectors (15.2.2 *a gas safety system shall be arranged to close down the gas supply system automatically, upon failure in systems as described in table 1 and upon other fault conditions which may develop too fast for manual intervention*).

15.8.8 Audible and visible alarms from the gas detection equipment shall be located on the navigation bridge or in the continuously manned central control station.

15.8.9 Gas detection required by this section shall be continuous without delay.

### **Inspection Guidance**

The vessel operator should have developed procedures for the operation and maintenance of the fixed gas detecting system required under the IGF Code which defined:

- The frequency of gas sensor calibration.
- The frequency of verification of the alarm and shut down activation point for each sensor.
- The frequency of testing the audible and visual alarms on the bridge or in the continuously manned central control station.
- The frequency of testing the automated gas safety system shut down arrangements.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure which defined the operation and maintenance requirements for the fixed gas detecting system required by the IGF Code.
  - Inspect the central control station for the gas detection system and verify that:
    - The gas detecting system was fully operational.
    - The system was not indicating any faults.
    - The alarm activation set point for a selected sensor was in accordance with the IGF code requirements.
  - Review the inspection and calibration data available at the central control station and verify that:
    - Sensor calibration had been completed at the defined frequency.
    - Safety system shut down tests had been completed at the required frequency.
  - Inspect the calibration gas used to calibrate/test the gas detector sensors and verify that it met the specifications as defined by the manufacturer.
  - If necessary, review the records of inspections, tests, calibration and maintenance carried out contained within the maintenance plan.
- 
- Interview the accompanying officer to verify their familiarity with the purpose, operation and calibration of the fixed gas detecting system.

### **Expected Evidence**

- The company procedure which defined the requirements for operating and testing the fixed gas detecting system required under the IGF Code.

- The manufacturer's instruction manual for the fixed gas detecting system.
- The Inspection, calibration and maintenance records for the fixed gas detection system.

#### **Potential Grounds for a Negative Observation**

- There was no company procedure which defined the requirements for operating and testing the fixed gas detecting system required under the IGF Code.
- The vessel's maintenance plan did not include the fixed gas detecting system required under the IGF Code.
- The maintenance plan did not define the frequency of sensor calibration and automated gas safety system shut down tests.
- The accompanying officer was not familiar with the company procedure for the operation and maintenance of the fixed gas detection system.
- The accompanying officer was not familiar with the maintenance plan tasks for fixed gas detector sensor calibration or gas safety system shut down tests.
- The fixed gas detecting system sensors had not been calibrated in accordance with the maintenance plan.
- The calibration gas used for calibrating the sensors did not meet the manufacturer's specification or was out of date.
- Records of inspections, tests, maintenance and calibrations were incomplete.
- The audible and visible alarms located on the navigation bridge or in the continuously manned central control station had not been tested in accordance with the company procedure.
- The fixed gas detector alarm or automatic shutdown activation set points were not in accordance with the requirements of the IGF Code.
- One or more gas detector sensors were out of service.
- One or more gas detector sensors were inhibited or disconnected from the sampling sequence.
- The fixed gas detecting system was defective in any respect.



**5.6.5. Were the Master and officers familiar with the operation and maintenance of the cargo pump room fixed gas detection system, and was the equipment fully operational with sensors calibrated and alarm activation points set in accordance with company procedures and manufacturer's instructions?**

**Short Question Text**

Cargo pump room fixed gas detection system

**Vessel Types**

Oil, Chemical

**ROVIQ Sequence**

Cargo Control Room, Pumproom

**Publications**

IMO: ISM Code

IMO SOLAS

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: MSC.1/Circ. 1321 Guidelines for measures to prevent fires in engine-rooms and cargo pump-rooms.

IMO: MSC/Circ.1120 Unified interpretations of SOLAS Chapter II-2

The FSS Code

The FTP Code and related fire test procedures.

**Objective**

**To ensure that measures specifically designed to prevent fire in the pumproom are effective.**

**Industry Guidance**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.**

12.1.14.7

The safety of pump rooms can be enhanced in a number of other ways, some of which are mandatory for certain ships:

A fixed gas detection system capable of continuously monitoring for hydrocarbon, oxygen and toxic gases. Where such equipment is fitted, procedures should be developed to ensure it is regularly inspected and calibrated. Procedures should also be developed for the action to take when an alarm is triggered, especially for vacating the space and stopping the cargo pumps. Whenever practicable, gas detection should monitor a number of levels within the pump room, not just the lower area.

A fixed sampling arrangement to monitor oxygen content within the pump room from the deck by a portable meter before entering the pump room. Where such an arrangement is fitted, it should ensure that remote parts of the pump room can be monitored.

2.6.1.3

The following onboard maintenance should be carried out monthly and after any fault condition:

- Visual inspection
- Testing audible and visual alarms
- Span gas checking

Additional maintenance should be carried out as specified by the manufacturer's instructions.

The maintenance and testing described above should be included in the tanker's maintenance plan.

If a fixed gas detection system should fail, manual checks should be made.

**IMO: MSC.1/Circ. 1321 Guidelines for measures to prevent fires in engine-rooms and cargo pump-rooms.**

Part IV Chapter 3 paragraph 2. Gas detection systems:

2.1 Design requirements

.9 sample gas should be provided with or connected to the analysing unit for regular calibration, otherwise calibration records carried out by a specialist should be kept on board.

2.2 The setting value:

.1 audible and visual alarms should be activated by the hydrocarbon gas with the concentration of a pre-set level which is no higher than 10% of the lower flammable limit (LFL);

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors. The documented procedures may include familiarisation with:

- Vessel specific operations and equipment.

**IMO: ISM Code**

10.1 The company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the company

**IMO: SOLAS**

Chapter II-2 Regulation 4

5.10 Protection of cargo pump-rooms

5.10.1 In tankers:

.3 a system for continuous monitoring of the concentration of hydrocarbon gases shall be fitted. Sampling points or detector heads shall be located in suitable positions in order that potentially dangerous leakages are readily detected. When the hydrocarbon gas concentration reaches a pre-set level which shall not be higher than 10% of the lower flammable limit, a continuous audible and visual alarm signal shall be automatically effected in the pump-room, engine control room, cargo control room and navigation bridge to alert personnel to the potential hazard.

**Chapter II-2 Regulation 14**

In addition to the fire protection systems and appliances listed in paragraph 2.2.3, tankers shall develop a maintenance plan for:

3.1 fire safety arrangements in cargo pump rooms.

**IMO: MSC/Circ.1120 Unified interpretations of SOLAS Chapter II-2, The FSS Code, The FTP Code and related fire test procedures.**

SOLAS II-2/4.5.10.1.3

Monitoring the concentration of hydrocarbon gases in cargo pump-rooms on oil tankers

1. Sequential sampling is acceptable as long as it is dedicated for the pump room only, including exhaust ducts, and the sampling time is reasonably short.

2. Detection positions are the zones where air circulation is reduced (e.g. recessed corners).

### **Inspection Guidance**

The vessel operator should have developed procedures for the operation and maintenance of the cargo pump room gas detection system which defined:

- The actions to be taken in the event of the activation of a pump room flammable or toxic gas alarm.
- The actions to be taken in the event of a low oxygen alarm.
- The frequency of the pump room hydrocarbon gas detection sensor calibration.
- The process to verify that the hydrocarbon alarm point setting values were correct when changing cargo type.
- The frequency of testing the audible and visual alarms required on the bridge, in the cargo control room and/or in the pump room as appropriate.
- The calibration interval and alarm activation values where the gas detection system was additionally fitted with oxygen and/or toxic gas detectors.
- The actions to take in the event that the pump room gas detection system fails.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure for the operation and maintenance of the cargo pump room fixed gas detection system.
- Inspect the central control station for the pump room fixed gas detection system and verify that:
  - The gas detection system was fully operational.
  - The system was not indicating any faults.
  - The alarm activation setting for a selected hydrocarbon sensor was in accordance with the SOLAS requirement of not greater than 10% LFL.
  - The alarm activation setting for selected oxygen and toxic gas sensors, where fitted, were in accordance with the company procedure.
- Review the inspection and calibration data for the gas detection system available in the cargo control room and verify that:
  - Each gas detection sensor had been calibrated at the frequency defined by the company.
  - The hydrocarbon gas alarm activation set point for each sensor had been verified as being appropriate to the cargo being carried.
  - The audible and visual alarms in the pump room, the cargo control room and on the bridge had been tested at the frequency defined by the company.
  - Calibration of each sensor had been carried out with an appropriate span gas in accordance with the manufacturer's instructions.
- If necessary, review the records of inspections, tests, calibration and maintenance carried out contained within the maintenance plan.
- Interview the accompanying officer to verify their familiarity with the purpose, operation and calibration of the cargo pump room fixed gas detection system.

For this question the sensors fitted in the exhaust ducts should not be considered, as any gas going into the ducts is heavily diluted and provides a false sense of security if the gas alarm for the duct is set to a level similar to that for the pump room sensors.

### **Expected Evidence**

- The company procedures for the maintenance and operation of the cargo pumproom gas detection system.
- The manufacturer's instruction manual for the pumproom fixed gas detection system.
- The maintenance and calibration records for the cargo pumproom gas detection system.
- Where the fixed gas detection system was out of service, records of manual atmosphere measurements.

### **Potential Grounds for a Negative Observation**

- There was no company procedure for the maintenance and operation of the pumproom gas detection system.
- The accompanying officer was unfamiliar with the operation and maintenance of the pumproom gas detection system.
- The alarm activation point of one or more hydrocarbon gas sensors was more than 10% LFL.
- The gas detection sensors had not been calibrated in accordance with manufacturer's instructions at the frequency defined by the company.
- The audible and visual alarms in the cargo control room, pumproom and on the bridge had not been tested at the frequency defined by the company.
- The calibration gas used for calibration of the hydrocarbon, toxic gas or oxygen sensors was out of date or not appropriate for use with the system.
- One or more hydrocarbon gas, toxic gas or oxygen sensors were out of service.
- One or more hydrocarbon gas, toxic gas or oxygen sensors were inhibited or disconnected from the sampling sequence.
- The gas detection system was defective in any respect.
- Where the pumproom gas detection system was out of service, there was no record of manual atmosphere measurements having been taken.

**5.6.6. Were the Master and officers familiar with the operation and maintenance of the oxygen sensors and associated alarms fitted in the space, or spaces, containing the inert gas system, and was the equipment fully operational with sensors calibrated and alarm activation points set in accordance with company procedures and manufacturer's instructions?**

**Short Question Text**

Oxygen sensors in inert gas system spaces.

**Vessel Types**

Oil, Chemical

**ROVIQ Sequence**

Engine Room, Engine Control Room

**Publications**

IMO: ISM Code

IMO SOLAS

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: FSS Code

**Objective**

**To ensure that entry into the space, or spaces, containing the inert gas plant is always made safely.**

**Industry Guidance**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition**

**10.4.3 Risk from inert gas including nitrogen**

IG produced from boiler flue gas, or an IG generator, may contain carbon monoxide (CO) and CO<sub>2</sub>, both of which can cause death.

CO is a toxic gas that may be present in cargo tank atmospheres after gas freeing and in spaces containing components of the IG plant.

CO<sub>2</sub> is not toxic but is a smothering hazard. Adequate ventilation is required to maintain a normal oxygen level in air of 21% by volume in the space and to eliminate any hazard.

Nitrogen is a colourless and odourless gas that will cause oxygen deficiency in confined spaces, and at exhaust openings on deck, during the purging of tanks and void spaces.

People exposed to nitrogen gas are not aware of any danger and may even feel a state of euphoria before they lose the stimulus to breathe and are asphyxiated. Exposure to high concentrations of nitrogen is usually fatal unless immediate action is taken.

**IMO: FSS Code**

**Chapter 15**

**2.1.2 Inert gas system** includes inert gas systems using flue gas, inert gas generators, and nitrogen generators and means the inert gas plant and inert gas distribution together with means for preventing backflow of cargo gases to machinery spaces, fixed and portable measuring instruments and control devices.

2.2.4.5.4 Two oxygen sensors shall be positioned at appropriate locations in the space or spaces containing the inert gas system. If the oxygen level falls below 19%, these sensors shall trigger alarms, which shall be both visible and audible inside and outside the space or spaces and shall be placed in such a position that they are immediately received by responsible members of the crew.

**TMSA 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors. The documented procedures may include familiarisation with:

- Vessel specific operations and equipment.

#### **IMO: ISM**

6.3 The Company should establish procedures to ensure that new personnel and personnel transferred to new assignments related to safety and protection of the environment are given proper familiarisation with their duties. Instructions which are essential to be provided prior to sailing should be identified, documented and given.

#### **IMO: SOLAS**

##### Chapter II-2 Regulation 4

5.5.1.2 For tankers of 8,000 tonnes deadweight and upwards constructed on or after 1 January 2016 when carrying cargoes described in regulation 1.6.1 or 1.6.2, the protection of the cargo tanks shall be achieved by a fixed inert gas system in accordance with the requirements of the Fire Safety Systems Code, except that the Administration may accept other equivalent systems or arrangements, as described in paragraph 5.5.4.

#### **Inspection Guidance**

The vessel operator should have developed procedures for the operation and maintenance of the oxygen sensors and associated alarms fitted in the space, or spaces, containing the inert gas system which described:

- The frequency of testing the audible and visual alarms.
- The calibration interval and alarm activation values for the oxygen sensors.
- The actions to take in the event that the oxygen sensors and/or associated alarms fitted in the space, or spaces, containing the inert gas system fail.
- The actions to be taken in the event of a low oxygen alarm.

This question will be allocated to all oil and chemical tankers:

- Fitted with an inert gas system, and
- Constructed on or after 1 January 2016, or
- Where the vessel was constructed before 1 January 2016, but the oxygen sensors referred to in the FSS code had been fitted.

In the case that the vessel was constructed before 2016 but was fitted with the oxygen sensors, the vessel operator should have declared this as follows:

- Oil Tankers: HVPQ question 9.15.5
- Oil/chemical tankers: HVPQ question 9.15.5
- Chemical tankers: through the pre-inspection questionnaire.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures that described the calibration, testing and maintenance of the oxygen sensors and associated alarms fitted in the space, or spaces, containing the inert gas system.

- Inspect the control panel for the oxygen sensors and associated alarms fitted in the space, or spaces, containing the inert gas system and verify that:
    - The oxygen sensors and alarms were fully operational.
    - The system was not indicating any faults.
    - The alarm activation setting for the oxygen sensors was in accordance with the company procedure.
  - Review the inspection and calibration data for the oxygen sensors and verify that:
    - Each oxygen sensor had been calibrated at the frequency defined by the company.
    - The calibration of each sensor had been carried out with an appropriate span gas in accordance with the manufacturer's instructions.
    - The audible and visual alarms had been tested at the frequency defined by the company.
  - If necessary, review the records of inspections, tests, calibration and maintenance carried out contained within the maintenance plan.
- 
- Interview the accompanying officer to verify their familiarity with the purpose, operation and calibration of the oxygen sensors and associated alarms fitted in the space, or spaces, containing the inert gas system.

#### **Expected Evidence**

- The company procedures for the maintenance and operation of the oxygen sensors and associated alarms fitted in the space or spaces containing the inert gas system.
- The manufacturer's instruction manual for the oxygen sensors and associated alarms fitted in the space, or spaces, containing the inert gas system.
- The maintenance and calibration records for the oxygen sensors fitted in the space, or spaces, containing the inert gas system.
- Where the fixed oxygen sensor(s) were out of service, records of manual atmosphere measurements prior to, and during, entry to the space, or spaces, containing the inert gas system while the inert gas system was in operation.

#### **Potential Grounds for a Negative Observation**

- There was no company procedure describing the maintenance and operation of the oxygen sensors and associated alarms fitted in the space, or spaces, containing the inert gas system.
- The accompanying officer was unfamiliar with the operation and maintenance of the oxygen sensors and associated alarms fitted in the space, or spaces, containing the inert gas system.
- The oxygen sensors had not been calibrated in accordance with manufacturer's instructions at the frequency defined by the company.
- The audible and visual alarms had not been tested at the frequency defined by the company.
- The calibration gas used for calibration of the oxygen sensors was out of date or not appropriate for use with the system.
- One or more oxygen sensors were out of service.
- One or more oxygen sensors were inhibited or disconnected from the sampling sequence.
- The oxygen sensors and/or associated alarms were defective in any respect.
- Where the oxygen sensors and/or associated alarms fitted in the space or spaces containing the inert gas system were out of service, there was no record of manual atmosphere measurements having been taken prior to, and during, entry to the space, or spaces, while the inert gas system was in operation.

## 5.7. Safety Management

**5.7.1. Had all onboard incidents been reported and investigated in accordance with company procedures, and was an incident investigation report or a summarised lessons learned bulletin available for each incident at or above a defined threshold?**

### **Short Question Text**

Incident investigation reports for defined incidents

### **Vessel Types**

Oil, Chemical, LPG, LNG

### **ROVIQ Sequence**

Documentation, Pre-board

### **Publications**

IMO: ISM Code

OCIMF/INTERTANKO: Sharing Lessons Learned from Incidents (first edition 2018)

### **Objective**

**To ensure that seafarers can learn from incidents which occurred onboard their vessel to improve safety and pollution prevention standards.**

### **Industry Guidance**

**OCIMF / INTERTANKO: Sharing Lessons Learned from Incidents. First Edition 2018.**

#### **Purpose and Scope**

The shipping industry has worked hard in recent years to eliminate personal injuries and reduce damage to the environment and assets. Though we have taken big steps towards ensuring that each day ends safely for everybody in our industry, we still need to do more.

In particular, we must make sure that we learn the lessons from incidents. Following any incident, we have programmes and procedures for investigating what happened and why. The point of this work is that we learn from what happened and do all we can to ensure that it doesn't happen again.

This information paper outlines the most effective ways that vessel operators can share the lessons that we learn from incident investigations.

**TMSA KPI 8.1.4** requires that procedures ensure that incidents are investigated and analysed.

Corrective and preventative actions are identified and implemented.

The investigation and analysis is sufficiently detailed to accurately establish the root causes of the incident with the objective of improving safety and pollution prevention.

Actions are identified to prevent reoccurrence.

### **IMO: ISM Code**

9 Reports and Analysis of Non-conformities, Accidents and Hazardous Occurrences

9.1 The SMS should include procedures ensuring that non-conformities, accidents and hazardous situations are reported to the Company, investigated and analysed with the objective of improving safety and pollution prevention.



9.2 The Company should establish procedures for the implementation of corrective action, including measures intended to prevent recurrence

### Inspection Guidance

The vessel operator should have developed procedures to ensure that all onboard incidents are reported and subsequently investigated by personnel at an appropriate level of management, which may include the Flag Administration, to accurately establish the root causes of the incident with the objective of improving safety and pollution prevention.

The procedures should define what is considered to be an incident and should include, but not necessarily be limited to:

- A pollution incident that resulted in release to the environment of any substance covered by MARPOL Annex I, II, IV, V and VI in excess of that permitted by the applicable regulations.
- An uncontrolled release of LNG/LPG vapour.
- A grounding incident where the vessel had:
  - Been hard aground.
  - Touched bottom.
  - Been suspected of touching bottom.
- A collision/allision with another vessel irrespective of whether damage had been caused to either vessel.
- An allision with a fixed or floating structure or navigation mark irrespective of whether damage had been caused to the vessel or the fixed or floating structure or navigation mark.
- An allision with a terminal during a berthing manoeuvre which resulted in damage to either the vessel or the terminal structure.
- A breach of the hull plating which did not result in flooding.
- Total loss of main propulsion/blackout while navigating in open waters.
- Partial loss of main propulsion while navigating in open waters.
- Total loss of main propulsion/blackout while navigating in territorial waters or within 12 miles of land.
- Partial loss of main propulsion while navigating in territorial waters or within 12 miles of land.
- Blackout while at a berth or at anchor.
- Total loss, even momentarily, of steering capability at any time while the vessel was underway.
- Contained hydrocarbon/chemical spill greater than 1.0m<sup>3</sup> anywhere onboard (deck, pumproom, machinery spaces, mooring deck, etc.).
- Loss of one or both anchors.
- Damage to a windlass restricting the ability to recover an anchor without repairs.
- Mooring tail/line (ship supplied) failure while moored at a conventional/CBM berth or while conducting STS operations.
- Break out/away from a berth resulting in the vessel being out of the normal operating envelope for the Marine Loading Arms (MLA) or hoses.
- Cargo hose crane wire failure while connecting or disconnecting hoses at a terminal.
- Accommodation ladder hoisting wire failure.
- Notification of an investigation into an alleged violation of international regulations such as MARPOL / COLREGS.
- Structural or pipeline system failure causing migration of liquid within or between the cargo, ballast or bunker spaces.
- Contamination of ballast water by hydraulic oil.
- Flooding of any space directly from the sea.
- Fire or Explosion anywhere onboard.
- A work related lost time injury.
- A work related fatality.

Definitions for the purpose of this question:

- Total loss of main propulsion: The main propulsion unit(s) shut down without warning, even momentarily.

- Partial loss of main propulsion: The vessel needed to slow down or stop for repairs or reset equipment to regain full manoeuvrability and/or propulsive power.
- Total blackout: The main generating plant stopped providing electrical power to the main switchboard, even momentarily.

The vessel operator should provide brief details of any of the incidents listed above which had occurred during the eighteen months prior to the inspection through:

The Harmonised Vessel Particulars Questionnaire (HVPQ):

- 1.8.4 Has ship been involved in a pollution incident during the past 12 months?
- 1.8.5 Has ship been involved in a grounding incident during the past 12 months?
- 1.8.6 Has ship been involved in a collision during the past 12 months?

The Pre-inspection Questionnaire (PIQ).

The PIQ will prompt data entry for each incident type listed in the guidance notes as follows:

- Has an incident of this type occurred during the previous 18 months. Yes/No/multiple.
- If multiple, how many events.
- If yes or multiple, what was the date of the incident(s)
- Has the incident investigation been completed. Yes/No
- Has the incident investigation report been uploaded to the SIRE incident database? Yes/no.
- Where an incident investigation is ongoing provide the date when the report is expected to be completed.

The data provided through the HVPQ and PIQ will be extracted and inserted in the inspection editor and final inspection report.

### **Suggested Inspector Actions**

- Review the incidents reported through the HVPQ and the PIQ and verify that either an incident investigation report or a lesson learned bulletin was available onboard for each reported incident where the vessel operator had declared that the incident investigation had been completed.
- Review the onboard system for recording and tracking incident and near-miss reports and verify that the incident data provided by the vessel operator through the HVPQ and PIQ included all incident information requested.
- The inspector is not required or expected to comment on the quality of the incident investigation report or lessons learned bulletins.

### **Expected Evidence**

- The company procedures that required incidents and near-misses were promptly reported and investigated.
- The system for tracking incident and near-miss reports to closure.
- Incident investigation reports or lessons learned for any of the incident types listed in the guidance notes which had occurred during the 12 months prior to the inspection.

### **Potential Grounds for a Negative Observation**

- There was no incident investigation report or lessons learned bulletin available onboard for one or more of the incidents reported through the HVPQ or PIQ, unless the vessel operator had declared that the incident investigation was ongoing.

- There was evidence that the vessel had been involved in one of the incident types listed in the inspection guidance during the 12 months prior to the inspection but the incident had not been reported through the HVPQ and/or the PIQ.

**5.7.2. Were the Master, officers and ratings familiar with the company incident and near-miss reporting procedure and was evidence available to demonstrate that incidents and near-misses had been investigated and closed out in accordance with the company procedure?**

**Short Question Text**

Incident and near-miss reporting procedure

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation, Interview - Rating

**Publications**

IMO: ISM Code

IMO: MSC-MEPC.7/Circ.7 Guidance on near-miss reporting

IMO: MSC-MEPC.7/Circ.8 Revised guidelines for the operational implementation of the international safety management (ISM) code by companies

OCIMF/INTERTANKO: Sharing Lessons Learned from Incidents (first edition 2018)

**Objective**

**To ensure that seafarers can learn from incidents and near-misses onboard their vessel to improve safety and pollution prevention.**

**Industry Guidance**

**OCIMF / INTERTANKO: Sharing Lessons Learned from Incidents (First edition 2018)**

**1.1 Background: why we need guidelines**

Vessel operators have different ways of managing the lessons learned from incidents. Some have detailed programmes, while some use simpler procedures. In either case, an operator's response will have evolved over time to suit its own organisational structure and needs.

While each of these programmes has its pros and cons, we felt we needed to assemble a clear and universal set of guidelines that operators could follow in order to share the lessons that these programmes expose. The big advantage for operators of following the guidelines is that no matter what programme you use, they will help you get the full value of the resources you spend on investigating incidents.

Most importantly, the guidelines will ensure that lessons learned are meaningful to the people who matter most – the crew and other staff. This in turn will help you to prevent repeat incidents and to promote a working culture that prizes safety.

**IMO: MSC-MEPC.7/Circ.7 Guidance on near-miss reporting**

1.1 Companies should investigate near-misses as a regulatory requirement under the Hazardous Occurrences part of the ISM Code.

2.1 Near-miss: A sequence of events and/or conditions that could have resulted in loss. This loss was prevented only by a fortuitous break in the chain of events and/or conditions. The potential loss could be human injury, environmental damage, or negative business impact (e.g., repair or replacement costs, scheduling delays, contract violations, loss of reputation).

2.2 Some general examples of a near-miss help to illustrate this definition:

.1 Any event that leads to the implementation of an emergency procedure, plan or response and thus prevents a loss. For example, a collision is narrowly avoided; or a crew member double checks a valve and discovers a wrong pressure reading on the supply side.

.2 Any event where an unexpected condition could lead to an adverse consequence, but which does not occur. For example, a person moves from a location immediately before a crane unexpectedly drops a load of cargo there; or a ship finds itself off-course in normally shallow waters but does not ground because of an unusual high-spring tide.

.3 Any dangerous or hazardous situation or condition that is not discovered until after the danger has passed. For example, a vessel safely departs a port of call and discovers several hours into the voyage that the ship's radio was not tuned to the Harbour Masters radio frequency; or it is discovered that ECDIS displays scale does not match the scale, projection, or orientation of the chart and radar images.

### **IMO: MSC-MEPC.7/Circ.8 Revised guidelines for the operational implementation of the international safety management (ISM) code by companies**

#### **6 Reporting and analysing of non-conformities, observations, accidents and hazardous occurrences**

6.1 The SMS should contain procedures to ensure that non-conformities, observations and hazardous occurrences are reported to the responsible person of the management. The Company should have a system in place for recording, investigating, evaluating, reviewing and analysing such reports, and to take action as appropriate.

6.2 The system should ensure such reports are reviewed and evaluated by the responsible person(s) in order to determine appropriate corrective action and to ensure that recurrences are avoided. The evaluation of reports may result in:

1. appropriate corrective actions.
2. amendments to existing procedures and instructions; and
3. development of new procedures and instructions.

6.3 The responsible person should properly monitor the follow-up and closing-out of the non-conformities/deficiency reports. The receipt of reports should be acknowledged to those persons who have raised the reports. This should include the status of the report and any decisions made.

6.4 The Company should encourage the reporting of near-misses to maintain and improve safety awareness. The reporting and analysis of such incidents are essential for an effective risk assessment by the Company, especially where accident information is not available.

**TMSA 8.1.1** requires that procedures ensure prompt reporting and investigation of incidents and significant near-misses. Procedures may include:

- Clear definitions of reportable incidents and significant near-misses.
- Person/department responsible for investigation.
- Description of the investigation process.

### **IMO: ISM Code**

9.1 The SMS should include procedures ensuring that non-conformities, accidents and hazardous situations are reported to the Company, investigated and analysed with the objective of improving safety and pollution prevention.

9.2 The Company should establish procedures for the implementation of corrective action, including measures intended to prevent recurrence.

### **Inspection Guidance**

The vessel operator should have developed a procedure which required that incidents and near-misses were promptly reported by all ranks, investigated at an appropriate level and that corrective action was taken where required.

The procedure should describe the:

- Definitions of reportable incidents and near-misses.
- Process of reporting and documenting incidents and near-misses onboard.
- Required time frame for reporting incidents and near-misses to shore-based management.
- Level of management, either onboard or ashore, responsible for conducting investigations into incidents or near misses based on defined criteria.
- Investigation process to be followed for each defined level of near-miss or incident.
- Process to identify and implement corrective and preventative actions.
- System for tracking incidents and near miss reports to closure, which may be paper-based or electronic.
- Process to communicate the outcome of an incident or near-miss investigation to the vessel's complement.

The vessel operator should have declared the number of near-miss reports submitted by the vessel during the 12 months preceding the inspection through the pre-inspection questionnaire. This data will be inserted in the inspection editor and reproduced in the final report.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure that required incidents and near-misses were promptly reported and investigated.
- Review the system for recording and tracking incident and near-miss reports, select two reports and verify that:
  - The details of each incident or near-miss had been recorded in the format required by the company procedure.
  - Each incident or near-miss report had been communicated to shore-based management within the time frame defined by the company procedure.
  - Each incident or near-miss report had been acknowledged by shore-based management.
  - Each incident or near-miss had been investigated at the required management level using the appropriate incident investigation process.
  - Where corrective and/or preventative actions had been identified, there was evidence that these had been implemented.
  - Each report had been closed out and the tracking system updated.
  - The outcome of each incident or near-miss investigation had been shared with the vessel's complement.
- Interview a rating to verify their understanding of the onboard process to report a near-miss.

#### **Expected Evidence**

- The company procedure that required incidents and near-misses were promptly reported by all ranks and investigated.
- The system for tracking incident and near-miss reports to closure.
- Shore-based management acknowledgement of incident and near-miss reports.
- Incident and near-miss reports generated by the vessel during the previous three months.
- Incident and near-miss investigation reports where these were a separate document from the initial report.

#### **Potential Grounds for a Negative Observation**

- There was no company procedure that required incidents and near-misses were promptly reported by all ranks and investigated.
- The Master or accompanying officer was unfamiliar with the process to:
  - Track each incident and near-miss through to closure.
  - Document onboard incidents and near-misses.
  - Report incidents or near-misses to shore-based management.
  - Investigate incidents and near-misses assigned to vessel staff.
  - Implement and document corrective and preventative actions.
  - Communicate the outcome of a completed incident or near-miss investigation to the vessel's complement.
- Incident and near-miss reports had not been:
  - Reported to shore-based management within the required time frame.
  - Acknowledged by shore-based management.
  - Investigated at the appropriate level of management either onboard or ashore.
  - Closed out with evidence of implementation of corrective and preventative action.
- There was no system to track incident and near-miss reports through to closure.
- An interviewed rating was unfamiliar with the process to report a near-miss.
- There was no evidence that the outcome of completed incident and near-miss investigations had been communicated to the vessel's complement.

Where there had been no near-miss reports generated during the previous three months make a **comment** in the Process response tool and record the date of the last documented near miss.

**5.7.3. Were the Master, officers and ratings familiar with the company procedure for holding and documenting shipboard safety meetings and was evidence available that safety concerns raised at the meetings were acknowledged and addressed by shore management?**

**Short Question Text**

Shipboard safety meetings

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation, Interview - Rating

**Publications**

IMO: ISM Code

UK MCA: Code of Safe Working Practices for Merchant Seafarers

**Objective**

**To ensure that there is an effective two-way dialogue between the vessel staff and shore-based management in matters relating to safety and pollution prevention at both the fleet and individual vessel level.**

**UK MCA: Code of Safe Working Practices for Merchant Seafarers**

1.2.2 Effective communication and workforce involvement is crucial in ensuring a safe living and working environment. Communication is a two-way process. There is a need to be able to gain information and knowledge that can be acted upon and passed on to others who need it, and systems need to be in place to facilitate this at all levels in the organization. Some examples include:

- ensuring information posters, signs and instructions are clear and can be understood;
- ensuring safety alerts, memos and newsletters are clear and can be understood;
- encouraging feedback, improvement suggestions and safety observations, and acting on the information received;
- safety meetings should be minuted and the reports distributed and acted upon where appropriate.

13.3.4.1 The Company is required to appoint a safety committee on every ship with five or more seafarers. The committee must be chaired by the master, and members will include, as a minimum, the safety officer and any elected safety representatives.

13.7.2 The frequency of meetings will be determined by circumstances, but the committee should meet regularly, taking into account the pattern of operation of the ship and the arrangement for manning and with sufficient frequency to ensure continuous improvement in safety. In particular, a meeting should also be held after any serious incident or accident on the ship, if the normal meeting is not due within a week.

13.7.11 Relevant extracts of agreed minutes should be forwarded through the master to the Company... A record of response or action taken by the Company should be maintained.

**TMSA KPI 9A.1.3** requires that onboard safety meetings are held at least monthly. In addition, extraordinary meetings are held as soon as practical after any serious incident onboard or within the fleet.

Meetings are attended by all available personnel and minutes recorded.

Safety meetings are an open forum which encourages vessel personnel to actively participate.

The meeting is used to:



- Raise safety awareness.
- Voice safety concerns and identify remedial actions.
- Promulgate lessons learnt.

The company reviews and responds to monthly and extraordinary safety meetings from the vessel.

#### **IMO: ISM Code**

9.1 The safety management system should include procedures ensuring that non-conformities, accidents and hazardous situations are reported to the company, investigated and analysed with the objective of improving safety and pollution prevention.

9.2 The company should establish procedures for implementation of corrective action, including measures to prevent recurrence.

#### **Inspection Guidance**

The vessel operator should have developed procedures for shipboard safety meetings which required the following:

- To hold a shipboard safety meeting:
  - At a defined frequency.
  - After a serious incident onboard or in the fleet.
  - During shore management representative visits onboard, where practical based on shipboard operations and hours of rest considerations.
- To define who should attend.
- To provide a means for those personnel not able to attend a meeting to report concerns to the safety committee through the safety representatives.
- To follow a defined agenda for discussion items.
- To record the minutes of each safety meeting in a defined format.
- To submit the minutes of each safety meeting for shore management review.
- That shore management acknowledge safety meeting minutes and address any matters requiring management assistance or intervention.

Safety Committee Meetings are intended to permit discussion among the vessel's officers and ratings about safety and pollution prevention matters. Safety meetings should not be used for the purposes of instruction or training.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures which defined the requirements for holding shipboard safety meetings.
- Review the safety meeting minutes held within the previous six months, select one for detailed review and verify that:
  - A routine safety meeting had been held at approximately monthly intervals.
  - An extraordinary safety meeting had been held during a shore management visit, where practical, or within a week of a serious incident onboard.
  - The minutes of the meeting were in accordance with the defined company format and included details of who attended.
  - The meeting was not held on the bridge while at sea or at anchor nor in the cargo control room during cargo or tank cleaning operations.
  - The minutes had been submitted for shore management review.
- Review the response from shore management for the selected safety meeting and verify that it addressed any matters requiring their assistance or intervention.

- Interview one rating to understand whether they attended the most recent safety meeting and, if not, how they would communicate issues of concern around safety and pollution prevention to the safety committee.

#### **Expected Evidence**

- The company procedures relating to shipboard safety meetings.
- The safety committee meeting minutes for all meetings conducted during the previous six months.
- The shore management response to all safety committee meetings conducted during the previous six months except for minutes submitted within one week of the inspection.

#### **Potential Grounds for a Negative Observation**

- There were no company procedures which defined the process for holding shipboard safety meetings, recording the minutes and shore management review of the minutes of each meeting.
- Shipboard safety meetings had not been held at the frequency defined by the company procedure or at approximately monthly intervals.
- Extraordinary safety meetings had not been held after a serious incident onboard or during a shore management visit, where practical.
- The minutes of shipboard safety meetings had not been documented in accordance with the required company format.
- The minutes of shipboard safety meetings had not been submitted for shore management review.
- Shore management had not acknowledged submitted safety meeting minutes.
- Shore management had failed to address matters included in safety meeting minutes that required their assistance or intervention.
- There was evidence that a safety meeting had been held on the bridge while at sea or at anchor or in the cargo control room while conducting cargo or tank cleaning operations.
- The accompanying officer was unfamiliar with the company procedure for conducting and recording the minutes of shipboard safety meetings.
- An interviewed rating was unfamiliar with the process of contributing to a safety meeting either as an attendee or in the circumstances that they could not attend a shipboard safety meeting.

**5.7.4. Were the Master, officers and ratings familiar with the company work planning procedures and were records available to demonstrate that onboard work planning meetings had been conducted and documented in accordance with the procedures?**

**Short Question Text**

Work planning procedure

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation, Interview - Rating, Cargo Control Room, Engine Control Room

**Publications**

IMO: ISM Code

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

**Objective**

**To ensure that all onboard work activities are planned to agree the scope of work and specific safety requirements applicable to each task, and to avoid operational, departmental or rest hour conflicts.**

**Industry Guidance**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.**

**4.7.5 Work Planning Meetings**

Work planning meetings should be held to ensure that operations and maintenance tasks are correctly planned and managed, with the aim of completing all tasks safely and efficiently. These meetings may include discussion of:

- Risk assessments.
- Work permits.
- Isolation and tagging requirements.
- The need for safety briefings, toolbox talks and correct procedures.

The format and frequency of work planning meetings should be in line with the requirements of the operator's SMS and will be determined by the tanker or terminal's activities.

It may be appropriate to have two levels of meeting – one for management and another for the practical issues related to specific tasks.

**TMSA KPI 9A.1.4** requires that procedures require daily work planning meetings to take place.

Work planning:

- Agrees the scope of the work to be undertaken.
- Identifies any operational or departmental conflict.
- Identifies personnel requirements.
- Identifies tools and equipment required.
- Establishes appropriate PPE requirements.
- Ensures compliance with work and rest hours.

**IMO: ISM Code**

5.1 The company should clearly define and document the master's responsibility with regards to:

1. implementing the safety and environmental-protection policy of the company;
2. motivating the crew in the observation of that policy;
3. issuing appropriate orders and instructions in a clear and simple manner;
4. verifying that specific requirements are observed....

### **Inspection Guidance**

The vessel operator should have developed a procedure to ensure that:

- Work planning meetings are conducted at defined intervals, whenever possible, daily.
- Meetings are attended, as far as is possible, by those undertaking the work as well as those planning the work.
- Meetings follow a defined agenda.
- The outcome of a meeting is documented in a standard format to include, but not necessarily limited to, the guidance points provided by ISGOTT 4.7.5 and TMSA KPI 9A.1.4.
- Meeting records are made available to those that could not attend the meeting before they start work.
- Where unplanned tasks arise during the period covered by a work planning meeting, the existing work planning meeting record is reviewed and updated.
- The agreed work planning record and any amendment is approved at a defined onboard management level.

In anticipation of periods of high workload, meetings may be held to cover several days' activities.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure which defined the requirements for documented work planning meetings.
- Review several work planning meeting records from the previous month and verify that:
  - Work planning meetings had been held at the frequency defined by the company procedure.
  - The outcome of the work planning meetings was documented in the format defined by the company procedure.
  - The work planning meeting records had been approved in accordance with the company procedure
  - The scope of the planned work reflected the activities of the vessel for the dates reviewed.
  - The detail of each task identified was enough to understand:
    - What the job entailed.
    - Whether permits, risk assessments or detailed work plans were required.
    - What PPE was required to be used.
    - Whether shore management approval was required.
    - Who was responsible for supervising the work.
  - Select a task that required either a permit, a risk assessment or a detailed work plan and verify that the relevant document existed.
- Interview a rating to verify their understanding of the work planning meeting process and where they would find details of the work planned for the current period.
- Verify that the daily work planning record was available in the location described by the rating.

### **Expected Evidence**

- The company procedure which defined the requirements for documented work planning meetings.
- The work planning meeting records for the previous month.
- Permits, risk assessments and detailed work plans referenced by work planning meeting records.
- The Bridge Log Book.

### **Potential Grounds for a Negative Observation**

- There was no company procedure which defined the requirements for documented work planning meetings.
- Work planning meetings were not being held at the frequency defined by the company procedure.
- Work planning meeting records had not been approved onboard in accordance with the company procedures.
- The outcome from work planning meetings was not being recorded in the format defined by the company procedure.
- The detail included in the work planning meeting records was not enough to understand what a job entailed.
- Work planning meeting tasks required permits, risk assessments or detailed work plans to be used but these were not available.
- Reviewed work planning records did not reflect the actual activities of the vessel during the period of review.
- Work planning meeting tasks required shore management approval but there was no evidence that approval had been provided.
- The accompanying officer was unfamiliar with the company work planning procedure or the documentation of the outcome of work planning meetings.
- An interviewed rating was unfamiliar with the location or content of the current work planning meeting record.

### **5.7.5. Were the Master, officers and ratings familiar with the purpose and implementation of the company Stop Work Authority policy and procedure?**

#### **Short Question Text**

Stop Work Authority

#### **Vessel Types**

Oil, Chemical, LPG, LNG

#### **ROVIQ Sequence**

Anywhere

#### **Publications**

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

#### **Objective**

**To ensure that vessel staff are aware of their responsibility and authority to stop unsafe work.**

#### **Industry Guidance**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition**

Chapter 4.2 Stop Work Authority

It is recommended that tanker and terminal safety management systems include a Stop Work Authority (SWA) policy and procedure. The SWA gives employees and contractors the responsibility and obligation to intervene and stop work if they see something unsafe that may cause an accident.

A typical SWA procedure includes five steps:

- Stop the unsafe activity.
- Tell the person in charge so the issue can be addressed.
- Discuss the concerns with those involved and correct the issue as necessary,
- Start the activity again.
- Share what has been learned with other employees and contractors who may be affected.

**TMSA KPI 9A.2.1** requires that intervention to prevent unsafe acts and unsafe conditions occurring is actively encouraged. Safety intervention techniques used may include:

- Stop work authority.

#### **IMO: ISM Code**

3.2 The Company should define and document the responsibility, authority and interrelation of all personnel who manage, perform and verify work relating to and affecting safety and pollution prevention.

#### **Inspection Guidance**

The vessel operator should have developed a Stop Work Authority (SWA) policy and procedure which encourages all company staff and contractors to stop any work that is believed to present a danger to people, the environment or property. The procedure should define:

- What Stop Work Authority means within the company safety culture.
- How the instruction to Stop Work should be delivered to avoid misunderstanding.

- The expected actions of the person or persons receiving the Stop Work instruction.
- The commitment by the vessel operator at all levels of management, both ashore and onboard, to support the use of Stop Work Authority.
- The commitment by the vessel operator that the use of Stop Work Authority will never result in disciplinary action or discrimination even if it later turns out that the perceived danger was not present.
- The means by which the Stop Work Authority will be communicated across the workforce during work planning to ensure full understanding and acceptance in all circumstances.

The company policy and procedure may use different terminology to “Stop Work Authority” but should have the same purpose.

### **Suggested Inspector Actions**

- Review the company Stop Work Authority policy and procedure.
- Randomly question at least three, but not more than five, crewmembers during the inspection about the company Stop Work Authority procedure to verify their understanding.
- Under no circumstances deliberately commit any act to test whether a crew-member is aware of the company expectations or will invoke their Stop Work Authority.
- If Stop Work Authority is used during the inspection by a crewmember, immediately stop work and follow the instructions of the onboard staff relating to the use of Stop Work.

### **Expected Evidence**

- The company Stop Work Authority policy and procedure.
- Any onboard work planning tools such as tool-box talks, risk assessments, daily work planning meetings or safety meetings which highlight the use of Stop Work Authority.

### **Potential Grounds for a Negative Observation**

- There was no company Stop Work Authority policy and procedure.
- There was no evidence that Stop Work Authority was included and discussed in work planning processes such as tool-box talks, risk assessments, daily work planning meetings or safety meetings.
- More than one crewmember was unfamiliar with the company Stop Work Authority policy and/or procedure.

**5.7.6. Were the Master, officers and ratings familiar with the company procedures for risk assessment, as appropriate to their duties, and was there evidence of the development and review of risk assessments in accordance with the procedures?**

**Short Question Text**

Risk assessments for new, non-routine, unplanned or specified tasks

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation, Interview - Rating, Interview Senior Officer

**Publications**

IMO: ISM Code

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IACS: Rec No.127. A Guide to Risk Assessment in Ship Operations

UK MCA: Code of Safe Working Practices for Merchant Seafarers

**Objective**

**To ensure that new, non-routine or unplanned tasks, not covered by existing procedures, are subject to risk assessment before work starts, and that risk assessments are reviewed before work starts on other specified tasks such as enclosed space entry or hot-work.**

**Industry Guidance**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.**

Chapter 4.2.2 Risk Assessment

A key tool used by the industry, and a function of all SMSs for managing potential risks, is the process of a risk assessment. A risk assessment can identify potential hazards, i.e. anything that may cause harm, and analyse the likelihood and severity of a hazard arising and the consequence of it happening. A risk assessment is, typically, a five step process, the results of which may be expressed in a quantitative or qualitative fashion:

1. Identify the hazards.
2. Decide who might be harmed and how.
3. Evaluate the risks and decide on preventative and mitigating measures or controls.
4. Record significant findings.
5. Review the assessments and update following the *International Safety Management (ISM) Code* or operator's SMS.

Risk assessments should provide the basis for developing policies and procedures that cover all tanker and terminal operations.

All new or non-routine activities not covered by existing procedures should be risk assessed before starting, e.g. emergency repairs.

Risk assessments should consider the possibility of human error introducing a hazard or a control failure. In this situation, Safety Critical Task Analysis (SCTA)(see chapter 7) may be used to help prevent, detect or respond to human error.

To ensure all hazards are identified, risk assessments should be completed by a team of suitably trained and experienced personnel. They should, preferably, not be completed by a single person.

**UK MCA: Code of Safe Working Practices for Merchant Seafarers.**



## 1.25 Risk awareness and risk assessment

If seafarers are fully informed and aware of the risks to their health, safety and welfare, they are much more likely to ensure they avoid the risks and remain safe...

### Risk assessment

The risk assessment process identifies hazards present in a work undertaking, analyses the level of risk, considers those in danger and evaluates whether hazards are adequately controlled, taking into account the measures already in place.

Effective risk assessments:

- Correctly and accurately identify all hazards;
- Identify who may be harmed and how;
- Quantify the severity of the harm;
- Identify and disregard inconsequential risks;
- Record the significant findings;
- Provided the basis for implementing or improving control measures; and
- Provide a basis for regular review and updating.

### IACS: Rec No.127. A Guide to Risk Assessment in Ship Operations

What the Code says about risk assessment

Paragraph 1.2.2.2 of the ISM Code states, *"Safety management objectives of the company should .... establish safeguards against all identified risks"*. Although there is no further, explicit reference to this general requirement in the remainder of the Code, risk assessment of one form or another is essential to compliance with most of its clauses.

It is important to recognize that the company is responsible for identifying the risks associated with its particular ships, operations and trade. It is no longer sufficient to rely on compliance with generic statutory and class requirements, and with general industry guidance. These should now be seen as a starting point for ensuring the safe operation of the ship.

The ISM Code does not specify any particular approach to the management of risk, and it is for the company to choose methods appropriate to its organizational structure, its ships and its trades. The methods may be more or less formal, but they must be systematic if assessment and response are to be complete and effective, and the entire exercise should be documented so as to provide evidence of the decision-making process.

**TMSA KPI 9.2.2** requires that the risk assessment process includes provisions for assessing new, non-routine and unplanned tasks.

- Where no safe working procedure exists, a risk assessment is carried out, reviewed and approved at an appropriate level defined by the company.
- The risk assessment process results in alternative methods of work being considered and documented where the residual risk has been determined to be unacceptable.

### IMO: ISM Code

1.2.2 Safety management objectives of the Company should, inter alia:

1. provide for safe practices in ship operation and a safe working environment,
2. assess all identified risks to its ships, personnel and the environment and establish appropriate safeguards; and

3. continuously improve safety management skills of personnel ashore and aboard ships, including preparing for emergencies related both to safety and environmental protection.

### **Inspection Guidance**

The vessel operator should have developed procedures for risk assessment that describe:

- In what circumstances a new risk assessment is required to be developed on board, prior to commencement of work, which should include for any new, non-routine or unplanned task, not covered by existing procedures.
- In what circumstances an available risk assessment is required to be reviewed, prior to commencement of work, which should specify tasks including:
  - Hot work outside the designated space.
  - Enclosed space entry.
  - Working aloft.
  - Working over the side.
  - Launching of a lifeboat or rescue boat.
  - Working on energised electrical circuits.
  - Working on equipment which has the potential to move.
  - Working on any system which has the potential to release stored energy.
- The process for developing a risk assessment.
- The process for recording the results of a risk assessment.
- Who is responsible for completing a risk assessment.
- Who should be involved in the development of a risk assessment.
- Who is responsible for approving a risk assessment.
- Who is required to review a risk assessment before work starts on a task.

The company should provide a standard format for recording the results of a risk assessment.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure for developing and / or reviewing a risk assessment.
- Review two sample risk assessments relating to new, non-routine, unplanned or specified tasks onboard during the previous three months and verify that they:
  - Contained details that were pertinent and relevant to the task that was being risk assessed.
  - Referred to equipment and circumstances relevant to the ship and its equipment.
  - Had been completed in the format defined by the company procedures.
  - Identified appropriate preventative and mitigative measures that must be implemented before commencement of a task.
  - Had been approved at the appropriate management level as defined by the company procedures.
- Interview an appropriate senior officer(s) and verify their familiarity with the risk assessment procedure and the work described in the selected risk assessments.
- Interview a rating to verify that they had been involved in the review of a risk assessment prior to commencing work on a new, unplanned or defined task.

### **Expected Evidence**

- The company procedure describing the risk assessment development and review processes.
- The risk assessments used onboard during the previous three months.

### **Potential Grounds for a Negative Observation**

- There was no company procedure describing the risk assessment development and review processes.
- The company risk assessment procedure did not define:
  - The circumstances in which a risk assessment must be developed or reviewed.
  - The process for developing a risk assessment.
  - The process for recording the results of a risk assessment.
  - The process for reviewing an available risk assessment.
  - Who is responsible for completing a risk assessment.
  - Who should be involved in the development of a risk assessment.
  - Who is responsible for approving a risk assessment.
  - Who is required to review a risk assessment before work starts on a task.
- A reviewed risk assessment was not relevant to the vessel, its circumstances or equipment.
- A reviewed risk assessment was from a generic risk assessment library, but had not been updated to reflect the vessel, its circumstances or its equipment.
- A risk assessment had not been approved at the appropriate management level as defined by the company procedure.
- There was evidence that a specified task had been completed without an appropriate risk assessment being reviewed.
- There was evidence that a new, non-routine or unplanned task that required a risk assessment in accordance with the company procedure had been completed without an appropriate risk assessment being developed and approved.
- An interviewed senior officer was unfamiliar with the company risk assessment procedure or any aspect of a risk assessment completed, reviewed or approved by them.
- An interviewed rating was unfamiliar with:
  - The risk assessment review process prior to starting a task requiring a risk assessment.
  - The existence or content of a risk assessment for a task that they had been directly involved with.

Where there had been no risk assessments undertaken during the previous three months, make a **comment** in the Process response tool and record the date of the last risk assessment that had been developed or reviewed.

**5.7.7. Were Safety Data Sheets (SDS) available on board for all cargo, bunkers, chemicals, paints and other products being handled, and were crew members familiar with their use?**

**Short Question Text**

Safety Data Sheets.

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Cargo Control Room, Cargo Control Room, Engine Room, Steering Gear, Forecastle

**Publications**

IMO: Resolution MSC.286(86) Recommendations for material safety data sheets (MSDS) for MARPOL Annex I oil cargo and oil fuel

IMO: ISM Code

IMO SOLAS

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: IGC Code

ICS: Tanker Safety Guide (Chemicals) - Fifth Edition

IMO: MSC/Circ.1095 Revised minimum safety standards for ships carrying liquids in bulk containing benzene

**Objective**

**To ensure crew members are provided with clear, accurate information on the health and environmental effects of all hazardous and toxic substances carried on board, including guidance on their safe handling.**

**Industry Guidance**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition**

**1.4.4 Safety Data Sheets**

The Safety Data Sheets (SDSs) should indicate the type and probable concentrations of hazardous or toxic components in the cargo or bunkers to be loaded, particularly H<sub>2</sub>S and benzene. The SDS should be United Nations Globally Harmonized System of Classification and Labelling of Chemicals (UN GHS) compliant.

The supplier is responsible for providing the relevant SDS to a tanker before it starts loading an oil cargo or bunker fuel. The tanker is responsible for providing the receiver with an SDS for the cargo to be discharged. The tanker should also advise the terminal, and any tank inspectors or surveyors, whether the previous cargo contained any toxic substances.

An SDS does not guarantee that all the hazardous or toxic components of the cargo or bunkers being loaded have been identified or documented. An SDS can be generic and may not directly reflect the specific composition of the cargo or fuel described. Tanker and terminal operators should have procedures and equipment to verify the actual levels of toxic components present in cargoes and/or bunkers loaded or discharged.

For International Convention for the Prevention of Pollution from Ships (MARPOL) Annex I cargoes, the term Material Safety Data Sheets (MSDSs) may still be used and referenced in industry documents.

**13.2.1 General**

Any chemical or hazardous material on board a ship as stores should have an SDS. If an SDS is not provided, the material should be isolated and stored in line with the guidance on its container or packaging. Do not use until satisfactory user information is available.

Assess what PPE, first aid and eye wash equipment should be kept at each location. Ensure it is appropriate to the product stored.

All containers and packages should be stowed closed. Keep the storage location clean and tidy.

### **ICS: Tanker Safety Guide (Chemicals) - Fifth Edition**

#### **1.8.1 Safety data sheet**

SOLAS requires that a safety data sheet (SDS) must be provided for each MARPOL Annex I cargo to be loaded. There is not a corresponding SOLAS requirement for MARPOL Annex II cargoes. Nevertheless, the IBC Code requires that 'Information shall be on board, and available to all concerned, giving the necessary data for the safe carriage of the cargo in bulk'.

For MARPOL Annex 1 cargoes, the term material safety data sheets (MSDS) may still be used and referenced in industry documents.

In effect the IBC Code requires that an SDS is provided by the shipper to the ship before loading for each MARPOL ANNEX II cargo.

The Master should ensure that, as far as practical and as part of the ship/shore exchange, a copy of the 'data for the safe carriage of the cargo in bulk' provided to the ship is provided to the cargo receiver (terminal or transshipment ship/barge) so that risk-control measures taken during loading, carriage and discharging are based on accurate information.

It is important that:

- An SDS is provided for each cargo;
- The IBC Code product name, ship type and pollution category are known; and
- Other required information on properties and emergency measures is provided in specific sections of the SDS.

### **IMO: IGC Code**

18.3.1 Information shall be on board and available to all concerned in the form of a cargo information data sheet(s) giving the necessary data for the safe carriage of the cargo.

### **IMO: MSC/Circ.1095 Revised minimum safety standards for ships carrying liquids in bulk containing benzene**

#### **1 Information to the master**

1.1 Prior to loading, the shipper should provide both to the master and the Company, as defined in the ISM Code, a Material Safety Data Sheet (MSDS) formatted in accordance with resolution MSC.150(77), (*replaced by MSC.286(86)*) for cargoes containing benzene.

1.2 The cargoes that may contain benzene are, for example, the cargoes listed in Appendix I to Annex I to MARPOL 73/78, and the following bulk liquids:

1. benzene and benzene mixtures;
2. naphtha, varnish makers and paints (75%); and
3. white spirit.

**TMSA KPI 1A.2.3** requires that relevant reference documents are provided as a supplement to the SMS both onboard and ashore. Reference documents may include regulatory publications and industry guidelines. The company has a procedure for maintaining the most up-to-date editions in all locations.

## **IMO: ISM Code**

11.1 The Company should establish and maintain procedures to control all documents and data which are relevant to the SMS.

11.2 The Company should ensure that:

1. valid documents are available at all relevant locations;
2. changes to documents are reviewed and approved by authorized personnel; and
3. obsolete documents are promptly removed.

## **IMO: SOLAS**

Chapter VI Regulation 5-1

Material Safety Data Sheets

Ships carrying oil or oil fuel, as defined in regulation 1 of Annex 1 of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto, shall be provided with material safety data sheets, based on the recommendations developed by the Organization (MSC.286(86) ), prior to the loading of such oil as cargo in bulk or bunkering of oil fuel.

### **IMO: Resolution MSC.286(86) Recommendations for material safety data sheets (MSDS) for MARPOL Annex I oil cargo and oil fuel**

Adopts:

.1 the Recommendations for material safety data sheets (MSDS) for marine use suitable to meet the particular needs of the marine industry containing safety, handling, and environmental information to be supplied to a ship prior to the loading of MARPOL Annex I type oil as cargo in bulk and the bunkering of oil fuel, as set out in Annex 1 to the present resolution; and

.2 the Guidelines for the completion of MSDS for the MARPOL Annex I type oil as cargo in bulk and oil fuel, as set out in Annex 2 to the present resolution.

## **Inspection Guidance**

The vessel operator should have developed procedures to ensure that up to date Safety Data Sheets (SDS) are readily available for all hazardous or toxic substances carried on board and to give guidance on the handling and stowage of these substances, including PPE requirements. These substances include, where carried:

- All oil, chemical and/or gas cargoes.
- All grades of bunkers.
- Hydraulic oils.
- Lubricating oils.
- Paints, protective coatings and thinners.
- All chemicals used or stored onboard.

Appropriate PPE, first aid and eye wash equipment should be available at each location where chemicals, paints, protective coatings and any other hazardous or toxic materials are stored.

All containers and packages should be kept closed, and properly stowed to prevent uncontrolled movement. The storage location should be suitable, clean and tidy. Incompatible substances should not be stowed together.

Crew members who handle the materials in question must be aware of the purpose of the SDS and be able to demonstrate familiarity with it. The SDS may be printed on the container. If it is not, then the SDS data must be prominently posted or readily available to the user.

MSDS data sheets for Annex I cargoes and fuel oil are recommended to comply with the format in MSC 286 (86). MSDS for other products carried on board such as chemicals for use on board, paint thinners etc. should be fit for purpose and should be in a format broadly based on the format laid out in MSC 286(86).

(For the purposes of this question the terms SDS and MSDS should be considered interchangeable.)

### **Suggested Inspector Actions**

- Sight and where necessary review the company procedures to ensure that up to date Safety Data Sheets (SDS) are readily available for all hazardous or toxic substances carried on board and to give guidance on the handling and stowage of these substances, including PPE requirements.
- Sight the SDS(s) for the oil, chemical or gas cargo(es) on board at the time of the inspection.
- During the course of the inspection, inspect those locations where other toxic or hazardous substances are stored and verify that:
  - Appropriate PPE is available at all storage locations.
  - SDSs are available locally for all toxic or hazardous substances.
  - SDSs contain the required information.
  - The stowage of containers and packages is satisfactory.
  - Containers and packages are correctly labelled to identify their content.
  - Storage locations are suitable, clean and tidy.
- Interview an accompanying officer at any relevant location during the inspection to verify their familiarity with the purpose and content of the SDSs relevant to products stored in, or handled from, the chosen location.

### **Expected Evidence**

- Company procedures to ensure that up to date Safety Data Sheets are readily available for all hazardous or toxic substances carried on board and to give guidance on the handling and stowage of these substances.
- SDSs for, where carried:
  - All oil, chemical and/or gas cargoes.
  - All grades of bunkers.
  - Hydraulic oils.
  - Lubricating oils.
  - Paints, protective coatings and thinners.
  - All chemicals used or stored onboard.

### **Potential Grounds for a Negative Observation**

- There were no company procedures to ensure that up to date Safety Data Sheets are readily available for all hazardous or toxic substances carried on board and to give guidance on the handling and stowage of these substances, including PPE requirements.
- The accompanying officer was not familiar with the purpose and content of the relevant SDSs.
- There was no SDS available for a cargo or fuel oil on board at the time of the inspection.
- The (M)SDS for an Annex I cargo or fuel oil on board at the time of the inspection was not in compliance with the requirements of IMO: Resolution MSC.286(86).
- The (M)SDS for a cargo containing benzene was not in compliance with the requirements of IMO: Resolution MSC.286(86).
- The (M)SDS for an Annex II or gas cargo on board at the time of the inspection did not include the information for safe carriage as required by the IBC and IGC code.
- There was no SDS available locally for a toxic or hazardous substance on board at the time of the inspection.

- Appropriate PPE, first aid and eyewash equipment was not available at the storage location of a toxic or hazardous substance.
- The stowage of containers or packages containing a toxic or hazardous substance was unsatisfactory.
- The storage location of a toxic or hazardous substance was not clean and tidy.
- Incompatible toxic or hazardous substances were stowed together.
- Toxic or hazardous substances were contained in unmarked or incorrectly marked containers.
- Toxic or hazardous substances had been transferred to, and were contained in, unsuitable containers.
- Toxic or hazardous substances were stored in an unsuitable location.



**5.7.8. Were the Master, officers and ratings familiar with the company Simultaneous Operations (SIMOPS) procedure and was there evidence that SIMOPS were considered during work planning and the required controls implemented for the duration of such operations?**

**Short Question Text**

Simultaneous Operations (SIMOPS) procedure

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Cargo Control Room, Engine Control Room, Interview - Rating, Documentation

**Publications**

IMO: ISM Code

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

**Objective**

**To ensure that the impact of Simultaneous Operations (SIMOPS) is understood and managed effectively.**

**Industry Guidance**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.**

Chapter 4.6 Simultaneous Operations

Simultaneous Operations (SIMOPS) are activities that take place at the same time in the same area or that could directly or indirectly affect the safety of any other activity on the ship or at the terminal.

SIMOPS should be established at an early stage so that the risk assessment can include the individual risks of each operation and the risks from their interaction. If the operations are only risk assessed individually, additional risks might not be identified.

**4.6.2 Managing Simultaneous Operations**

**4.6.2.1 Simultaneous Operations risk assessment**

Avoid SIMOPS whenever practicable. If this cannot be avoided, then SIMOPS should be carefully managed through risk assessment, toolbox talks and work practices.

A SIMOPS risk assessment should study the intended operations and identify any additional hazards introduced by undertaking the activities simultaneously...

**4.6.2.2 Simultaneous Operations plan**

This will enable a SIMOPS plan/interface document to be prepared, which will outline planned controls to be confirmed as in place to ensure the operation is managed effectively and risks reduced to an acceptable level.

The plan may vary in scope from a simple pre-job meeting to a detailed interface document that considers some or all the following, depending on the complexity and scale of the operation, the number of different activities and the personnel involved:

- Purpose of the operation and identified SIMOPS.

- Risks and their mitigations, along with controls measures and safe operating procedures.
- Reporting lines and overall control authority.
- Communications and contingency plans.
- MOC requirements.

#### 4.6.2.3 Simultaneous Operations preparation

Toolbox talks should then be used to review the SIMOPS plan, and these should include discussion on the implementation of the control measures and any potential conflicts or challenges.

Examples of SIMOPS include:

- Bunkering or storing operations at the same time as cargo operations.
- Maintenance operations at the same time as bunkering or cargo operations.
- Testing equipment at the same time as bunkering or cargo operations.
- Enclosed space entries at the same time as bunkering or cargo operations.
- Emergency exercises at the same time as cargo operations.
- Diving operations at the same time as cargo operations.
- Inspections, e.g. Port State Control, Flag State or Ship Inspection Report Programmed (SIRE), at the same time as cargo operations.
- Ship to Ship (STS) transfer operations. Bridge watchkeeping at the same time as cargo watchkeeping.

#### 4.6.3 Decision Matrix

It is recommended that SIMOPS procedures include a decision matrix to help identify the level at which approval is required within the organization.

#### 4.6.4 Matrix of permitted operations

Procedures may include a matrix of permitted operations. This provides a visual guide to the level of risk identified in SIMOP. The matrix will identify activities that are:

- Permitted to occur simultaneously without restriction.
- Permitted with restrictions.
- Not permitted at all.

**TMSA KPI 9.2.4** requires that procedures ensure that all identified mitigation measures are completed prior to commencing work

Procedures may include:

- Use of the permit to work system for both planned and unplanned tasks.
- Use of the risk assessment form to confirm implementation.

Final approval for the commencement of work is subject to implementation of mitigation measures.

#### **IMO: ISM Code**

7. The company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks should be defined and assigned to qualified personnel.

#### **Inspection Guidance**

The vessel operator should have developed a procedure which:

- Defined the term Simultaneous Operations (SIMOPS).
- Provided guidance on identifying the circumstances when SIMOPS should be considered as taking place.
- May include tools for identifying and managing SIMOPS, such as:
  - A decision matrix.
  - A matrix of permitted operations.
- Provided instructions on how considerations regarding SIMOPS should be developed and documented such as:
  - Work planning meetings and their associated records.
  - The development and approval of a risk assessment.
  - A SIMOPS plan/interface document developed to address activities falling under the definition of SIMOPS.
- Provide instruction on how the considerations regarding SIMOPS should be communicated to those involved in the impacted operations, such as:
  - Toolbox talks.
  - Risk assessment review.
  - The SIMOPS plan/interface document review and approval process.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure which provided guidance and instruction on Simultaneous Operations.
- Review the SIMOPS guidance tools, where provided:
  - The decision matrix.
  - The matrix of permitted operations.
- Review recent examples where the vessel staff had identified potential SIMOPS and documented the appropriate controls in documents such as:
  - Work planning meeting records.
  - Risk assessments.
  - SIMOPS plan/interface documents.
- Interview the accompanying officer to verify their understanding of the company SIMOPS procedure and its implementation and documentation during shipboard activities.
- Interview a deck or engine rating to understand how they are informed of SIMOPS and what the expectations are of them in terms of remaining focused on the task to which they have been assigned while SIMOPS are ongoing.

### **Expected Evidence**

- The company procedure which provided guidance and instruction on Simultaneous Operations (SIMOPS).
- The SIMOPS decision matrix, if provided as part of the SIMOPS procedure.
- The SIMOPS matrix of permitted operations, if provided as part of the SIMOPS procedure.
- The daily work planning meeting records.
- Risk assessments dealing with SIMOPS for the previous three months.
- SIMOPS plan/interface documents.
- The Bridge Log Book.

### **Potential Grounds for a Negative Observation**

- There was no company procedure which gave guidance and instruction on Simultaneous Operations (SIMOPS).
- The accompanying officer was unfamiliar with the company SIMOPS procedure.

- The accompanying officer was unfamiliar with the decision matrix or the matrix of permitted operations, where these were provided and required to be used for assessing SIMOPS.
- There were no records available to demonstrate that SIMOPS had been considered during the onboard work planning process.
- Records of SIMOPS controls had not been maintained in accordance with the company SIMOPS procedure through documents such as:
  - Work planning meeting records.
  - Risk assessments.
  - SIMOPS plan/interface documents.
- There was evidence of SIMOPS taking place that would have required the company SIMOPS work review and documentation process to be used but no records were available for review.
- There was evidence of SIMOPS taking place which were specifically prohibited by the company SIMOPS procedure.
- An interviewed rating was unfamiliar with the term SIMOPS and what their responsibilities would be with regards to their assigned task when SIMOPS were being undertaken.

If there were no records of SIMOPS having taken place during the previous three months, make a **comment** in the Process response tool noting the date of the last documented SIMOPS.

## 5.8. Area Safety Inspections

### 5.8.1. Were the Master and officers familiar with the company procedure for safety inspections of the main deck areas, and had inspections been effective in identifying hazards to health, safety and the environment?

#### Short Question Text

Safety inspection of the main deck and mooring areas.

#### Vessel Types

Oil, Chemical, LPG, LNG

#### ROVIQ Sequence

Main Deck, Mooring Decks

#### Publications

IMO: ISM Code

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

UK MCA: Code of Safe Working Practices for Merchant Seafarers

OCIMF: Mooring Equipment Guidelines. Fourth Edition 2018 (MEG4)

#### Objective

To ensure that the main deck areas are always maintained in a safe condition.

#### Industry Guidance

#### UK MCA: Code of Safe Working Practices for Merchant Seafarers

##### 2.5 Good housekeeping

2.5.1 All ships move in a seaway and as space is very limited aboard any vessel, good housekeeping is essential for safe working/access and hygiene control. Attention should be paid in particular to the:

- safe and secure stowage of loose items;
- proper securing of doors, etc.;
- adequate illumination of all work/transit areas.

#### OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

##### 4.8.2 Slip, trip and fall hazards

Non-skid coatings or gratings should be provided in working areas and on walkways. These areas should be clearly marked so that personnel are aware of their existence and extent. Areas for consideration include:

- Mooring areas.
- Manifold areas.
- Dipping and sampling locations.
- Access walkways.
- Pipeline step-overs.
- External stairways.

Trip hazards e.g. high plate edges at the top of ladders and unevenly spaced steps, should be avoided. Where the design cannot be modified, trip hazards should be clearly marked or highlighted with contrasting paint.

#### 4.11.7 Inspection, maintenance and testing of electrical equipment

##### 4.11.7.1 Inspection and checks

Typical inspections should include checking:

- Cracks in metal casings or covers, cracked or broken glass, or failure of cement around glass in flame-proof or explosion-proof enclosures.
- Covers of flame-proof enclosures, to ensure that they are tight, that no bolts are missing and that no gaskets are present between mating metal surfaces.
- Each connection to ensure that it is properly connected.
- Possible slackness of joints in conduit runs and fittings.
- Clamping of cable armouring.
- Stresses on cables that might cause fracture.

##### 4.11.7.2 Maintenance

Incorrect maintenance procedures can compromise the safety of electrical equipment. Even simple repairs and maintenance can compromise safety e.g. paint covering safety features such as relief holes, passages etc. Changing a lightbulb could damage explosion proof lights if the cover is closed incorrectly.

#### 13.5.7 Forecastle spaces and midships stores

Do not carry packaged petroleum or other flammable liquids in the forecastle spaces, midship stores or any other space unless they have been specifically designed and classified.

#### 13.5.8 Deck cargo

Protect any drums or other receptacles carried on deck against the sea and weather. They should normally be stowed only one tier high.

Stow all packages well clear of deck fittings, including tank and valve controls, fire hydrants, safety equipment, steam pipes, deck lines, tank washing openings, tank vents, hatches, doorways, emergency exits and ladders. Use sufficient dunnage and secure them properly to strong points on the ship's structure.

#### **OCIMF: Mooring Equipment Guidelines. Fourth Edition 2018.**

##### 5.7.4 Factors influencing performance

###### 5.7.4.5 Abrasion – external

Roller fairleads or other rotating deck equipment should be well maintained and kept free to rotate as originally designed.

##### 5.7.6 Usage and care

###### 5.7.6.3 Maintenance

Synthetic lines can be susceptible to cuts and abrasion and should not be exposed to conditions that might damage them. If they are used in fairleads previously used with wires, it is necessary to ensure that surfaces have not become grooved or roughened by the wires.

##### 7.3.7 Marking of mooring and towing fittings

### 7.3.7.1 For all ships

Each fitting should be clearly marked by a weld bead outline with its SWL, in addition to any markings required by applicable standards. The SWL should be expressed in tonnes (t) and be located so that it is not obstructed during operation of the fitting. It should also be noted that the unit 't' is to be used rather than the technically correct 'kN', as some operators may not be familiar with the metric system and a fitting may be dangerously overloaded if 'kN' is confused with 't'.

**TMSA KPI 9A.1.1** requires that procedures require that safety inspections are conducted at scheduled intervals by a designated Safety Officer.

Safety inspections of the vessel:

- Identify hazards and potential hazards to health, safety and the environment.
- Include all accessible areas of the vessel.

### **IMO: ISM Code**

7 The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks involved should be defined and assigned to qualified personnel.

### **Inspection Guidance**

The vessel operator should have developed a procedure which requires that safety inspections of all the accessible areas of the ship, including the main deck areas, are conducted at appropriate intervals by the designated Safety Officer.

An appropriate checklist should have been developed to facilitate these inspections.

Weathertight doors to deck houses should be in a satisfactory condition and capable of being properly secured.

Flammable liquids should not be stored in deck houses which were not specifically designed and classified.

Care should be taken over the storage of lube oil and other oils in drums on deck. They should be well secured with suitable rope or wire lashings on pallets rather than directly on the deck, and where possible within a containment area. The top of the drum should be covered to prevent potential water standing and subsequent ingress and contamination.

The main deck areas should be free of leakage from cargo, cargo heating, inert gas or hydraulic systems.

All deck lights should be operational. The level of deck lighting should be adequate to allow:

- Sufficient visibility to permit safe access to all areas of the deck.
- The safe use of mooring equipment.
- The monitoring of the deck area for spills and leakages.
- The monitoring of all deck areas and the adjacent surrounding areas to prevent unauthorised access.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure which requires that safety inspections of the main deck are conducted at appropriate intervals by the designated Safety Officer to identify hazards and potential hazards to health, safety and the environment
- Where necessary review the records of safety inspections of the main deck areas, including associated checklists.

- Request that the deck lighting is tested, even if in daylight, to ensure the system is fully operational.
- Inspect the main deck areas and verify that:
  - Non-skid coatings or gratings are provided in working areas and on walkways.
  - Working areas and/or walkways are clearly marked.
  - Trip hazards are clearly marked or highlighted with contrasting paint.
  - Light fittings in gas-hazardous areas do not have:
    - Cracks in metal casings or covers.
    - Cracked or broken glass.
    - Failure of cement around glass in flame-proof or explosion-proof enclosures.
    - Flame-proof enclosures that were not tight or had missing bolts.
    - Gaskets present between mating metal surfaces.
    - Paint covering safety features such as relief holes, passages etc.
  - Deck wiring and conduit runs were in a satisfactory condition.
  - There is no leakage from a cargo, cargo heating, inert gas or hydraulic system on deck.
  - All deck lights are operational.
  - Deck lighting is adequate to allow:
    - Sufficient visibility to permit safe access to all areas of the deck.
    - The safe use of mooring equipment.
    - The monitoring of the deck area for spills and leakages.
    - The monitoring of all deck areas and the adjacent surrounding areas to prevent unauthorised access.
  - Roller fairleads and other items of rotating deck equipment are well maintained and free to rotate.
  - Fairleads being used with synthetic lines are not grooved or roughened.
  - Mooring and towing fittings are clearly marked with their SWL in tonnes (t) by weld bead outline.
  - Weathertight doors to deck houses etc. are in satisfactory condition and capable of being properly secured.
  - Flammable liquids are not stored in a deck house which was not specifically designed and classified.
  - If present, lube oil, other oil drums or spare parts/stores are safely stowed and secured on deck.
  - If present, drums stowed on deck were not marked to indicate their content.

#### **Expected Evidence**

- The company procedure which requires that safety inspections of the main deck areas are conducted at appropriate intervals by the designated Safety Officer to identify hazards and potential hazards to health, safety and the environment.
- Records of safety inspections of the main deck areas including associated checklists.

#### **Potential Grounds for a Negative Observation**

- There was no company procedure which required that safety inspections of the main deck areas were conducted at appropriate intervals by the designated Safety Officer to identify hazards and potential hazards to health, safety and the environment.
- Records of safety inspections of the main deck areas were missing or incomplete.
- There was no checklist provided to facilitate the safety inspections of the main deck areas.
- The accompanying officer was unfamiliar with the company procedure which required that safety inspections of the main deck areas were conducted at appropriate intervals by the designated Safety Officer.
- The accompanying officer was unfamiliar with any of the checks required to be conducted in accordance with the company main deck areas inspection checklist.
- Safety inspections of the main deck areas were ineffective as demonstrated by any of the potential deficiencies listed below:
  - Non-skid coatings or gratings were not provided in working areas or on walkways.
  - Working areas and/or walkways were not clearly marked.
  - Trip hazards were not clearly marked or highlighted with contrasting paint.
  - Light fittings in gas-hazardous areas had:
    - Cracks in metal casings or covers.
    - Cracked or broken glass.
    - Failure of cement around glass in flame-proof or explosion-proof enclosures.



- Flame-proof enclosures that were not tight or had missing bolts.
  - Gaskets present between mating metal surfaces.
  - Paint covering safety features such as relief holes, passages etc.
- Deck wiring and/or conduit runs were not in a satisfactory condition.
- There was leakage from a cargo, cargo heating, inert gas or hydraulic system on deck.
- A number of deck lights were not operational.
- Deck lighting was not adequate to allow:
  - Sufficient visibility to permit safe access to all areas of the deck.
  - The safe use of mooring equipment.
  - The monitoring of the deck area for spills and leakages.
  - The monitoring of all deck areas and the adjacent surrounding areas to prevent unauthorised access.
- A roller fairlead or other item of rotating deck equipment was not well maintained and free to rotate.
- Fairleads being used with synthetic lines were grooved or roughened.
- A mooring or towing fitting was not clearly marked with its SWL in tonnes (t) by weld bead outline.
- A weathertight door to a deck house was not in a satisfactory condition and capable of being properly secured.
- Flammable liquids were stored in a deck house which was not specifically designed and classified.
- Lube oil, other oil drums or spare parts/stores were not safely stowed and secured on deck.
- Drums stowed on deck were not marked with their content.

Where a hardware defect was noted as evidence of ineffective safety inspections of the main deck, this should be documented within the Hardware response tool for this question unless identified by a specific question relating to the hardware included in the CVIQ.

### **5.8.2. Were the Master and officers familiar with the company procedure for safety inspections of the machinery spaces, and had inspections been effective in identifying hazards to health, safety and the environment?**

#### **Short Question Text**

Safety inspection of the machinery space.

#### **Vessel Types**

Oil, Chemical, LPG, LNG

#### **ROV/Q Sequence**

Engine Room, Steering Gear, Engine Control Room

#### **Publications**

IMO: ISM Code

IMO SOLAS

UK MCA: Code of Safe Working Practices for Merchant Seafarers

ICS: Engine Room Procedures Guide. First Edition.

#### **Objective**

**To ensure that the machinery spaces are always maintained in a safe condition.**

#### **Industry Guidance**

**ICS: Engine Room Procedures Guide. First Edition.**

11.14 Essential Engine Room Seamanship.

Good housekeeping is a routine matter that should not be neglected in an engine room, even during times of heavy workload or in the event of reactive breakdown maintenance. Ships are huge moving objects on frequently unstable seas. Good housekeeping is therefore essential to ensure safety, hygiene and security. A clean and tidy workplace is normally a safe workplace.

Some routine measures to implement include...

#### **UK MCA: Code of Safe Working Practices for Merchant Seafarers**

##### **5.5 Machinery spaces**

5.5.1 All personnel should be made fully aware of the precautions necessary to prevent fire in machinery spaces – in particular, the maintenance of clean conditions, the prevention of oil leakage and the removal of all combustible materials from vulnerable positions.

5.5.2 Suitable metal containers with an integral cover should be provided for the storage of cotton waste, cleaning rags or similar materials after use. Such containers should be emptied at frequent intervals and the contents disposed of safely.

5.5.3 Wood, paints, solvents, oil and other flammable materials should not be stored in boiler rooms or machinery spaces including steering gear compartments.

8.7.1 The main causes of eye injury are:

- infra-red rays (gas welding).
- ultra-violet rays (electric welding).
- exposure to chemicals; or

- exposure to flying particles and foreign bodies.

9.1.2 Safety signs that include hazard warnings should be used to indicate hazards and obstructions or control measures to be taken where the hazard or obstruction cannot be removed.

9.2.1 The Company should ensure that safety signs are displayed where appropriate.

9.8.8 Colour coding of pipelines may vary from ship to ship and seafarers moving from one ship to another should check with a competent officer what the colours mean on each particular vessel.

11.5.4 Lighting facilities should be properly maintained. Broken or defective lights should be reported to the responsible person and repaired as soon as practicable.

11.6.1 Hatchways that are open for handling cargo or stores, through which persons may fall or on which they may trip, should be closed as soon as work stops, except during short interruptions or where they cannot be closed without prejudice to safety or mechanical efficiency because of the heel or trim of the ship.

11.6.2 The guardrails or fencing should have no sharp edges and should be properly maintained. Where necessary, locking devices and suitable stops or toe-boards should be provided. Each course of rails should be kept substantially horizontal and taut throughout their length.

11.6.3 Guardrails or fencing should consist of an upper rail at a height of 1 metre and an intermediate rail at a height of 0.5 metres. The rails may consist of taut wire or taut chain.

20.2.4 Safety guards on machinery or equipment should only be removed when the machinery is not operating. If removal is essential for maintenance or examination of the equipment, the following precautions should be taken:

- Removal should be authorised by a responsible person, and only a competent person should carry out the work or examination.
- There should be adequate clear space and lighting for the work to be done.
- Anyone working close to the machinery should be told what the risks are and instructed in safe systems of work and precautions to take.
- A warning notice should be conspicuously posted.

20.2.5 Whenever floor plates or handrails are removed, warning notices should be posted, the openings should be effectively fenced or guarded, and the area well illuminated. Floor plates and handrails should be secured in place on completion of the work being undertaken.

20.3.1 Every dangerous part of a ship's machinery or other equipment should have guards or protection devices to prevent access to danger zones or to halt movements of dangerous parts before the danger zones are reached.

20.3.2 All steam pipes, exhaust pipes and fittings, which by their location and temperature present a hazard, should be adequately lagged or otherwise shielded. The insulation of hot surfaces should be properly maintained, particularly in the vicinity of oil systems. This can be monitored through thermographic survey or the use of infra-red thermometers to ensure that surface temperatures do not exceed 220°C.

20.3.5 The source of any oil leakage should be located and repaired as soon as practicable

20.3.6 Waste oil should not be allowed to accumulate in the bilges or on tank tops. .... Tank tops and bilges should, wherever practicable, be painted a light colour and kept clean and well illuminated in the vicinity of pressure oil pipes so that leaks may be readily located.

20.3.9 Engine room bilges should at all times be kept clear of rubbish and other substances so that mud-boxes are not blocked, and the bilges may be readily and easily pumped.

20.3.12 Care should be taken to ensure that spare gear is properly stowed and items of machinery under overhaul are safely secured so that they do not break loose and cause injury or damage even in the heaviest weather.

20.5.7 Spare gear, tools and other equipment or material should never be left lying around, especially near to stabiliser or steering gear rams, switchboards and batteries.

20.5.9 When guards or other safety devices have been removed from machinery, they should be replaced immediately once the work is completed and before the machinery or equipment is tested.

20.12.5 Flammable materials should never be left or stored near switchboards.

**TMSA KPI 9A.1.1** requires procedures that require that safety inspections are conducted at scheduled intervals by a designated Safety Officer.

Safety inspections of the vessel:

- Identify hazards and potential hazards to health, safety and the environment.
- Include all accessible areas of the vessel.

### **IMO: ISM Code**

7. The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks involved should be defined and assigned to qualified personnel.

### **IMO: SOLAS**

#### Chapter II-2 Regulation 4

2.2.5.3 Oil fuel lines shall not be located immediately above or near units of high temperature including boilers, steam pipelines, exhaust manifolds, silencers or other equipment required to be insulated by paragraph 2.2.6. As far as practicable, oil fuel lines shall be arranged far apart from hot surfaces, electrical installations or other sources of ignition and shall be screened or otherwise suitably protected to avoid oil spray or oil leakage onto the sources of ignition. The number of joints in such piping systems shall be kept to a minimum.

#### 2.2.6 Protection of high temperature surfaces

2.2.6.1 Surfaces with temperatures above 220 degrees C which may be impinged as a result of a fuel system failure shall be properly insulated.

2.2.6.2 Precautions shall be taken to prevent any oil that may escape under pressure from any pump, filter or heater from coming into contact with heated surfaces.

### **Inspection Guidance**

The vessel operator should have developed a procedure which required that safety inspections of all the accessible areas of the ship, including the machinery spaces, are conducted at appropriate intervals by the designated Safety Officer.

An appropriate checklist should have been developed to facilitate these inspections.

In addition to the guidance stated above:

- Purifier rooms and fuel and lubricating oil handling areas should be ventilated and clean.
- Gauge glass closing devices on oil tanks should be of a self-closing, fail-safe type and not inhibited.

- Self-closing sounding devices to double bottom tanks should be in good order, closed and capped.
- All fire doors on a ship are important, but when the high risk of machinery space fires is considered, machinery space fire doors should receive special attention, particularly the fire doors between the machinery space and Steering Gear Compartment, which are often found tied open.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure which required that safety inspections of the machinery spaces were conducted at appropriate intervals by the designated Safety Officer to identify hazards and potential hazards to health, safety and the environment
- Where necessary review the records of safety inspections of the machinery spaces including associated checklists.
- Inspect the machinery spaces, including purifier rooms, fuel and lubricating oil handling areas, workshops, compressor rooms, chemical stores, spare gear stores, electrician's store/workshop, IG rooms, boiler rooms and the steering gear compartment with reference to the safety officer's checklist and verify:
  - Suitable metal containers with an integral cover were provided for the storage of cotton waste, cleaning rags or similar materials after use, and these were emptied frequently.
  - Wood, paints, solvents, oil or other flammable materials were not stored in boiler rooms or machinery spaces including steering gear compartments unless specifically identified areas had been prepared and approved for storage of such items.
  - Suitable eye-protection and PPE was readily available where required, for example for welding, handling chemicals or operating a lathe or fixed or portable grinding wheel.
  - Lagging and insulation on all high temperature surfaces such as steam pipes, exhaust pipes etc. was in place, in good condition and free from oil.
  - Safety notices and signs appropriate to the specific compartments were posted to indicate hazards and obstructions or control measures to be taken where the hazard or obstruction could not be removed.
  - Pipelines were colour coded or labelled to indicate their contents.
  - There were no broken or defective light fittings.
  - There were no unprotected open hatchways through which persons may fall or on which they may trip.
  - The guardrails or fencing of any protected open hatchway were in good order.
  - Floor plates had not been removed and the opening left unguarded or insufficiently lit.
  - Floor plates were secured, level and even.
  - Safety guards were in place for all machinery, rotating shafts or equipment, as necessary.
  - There were no visible oil leaks from any machinery.
  - Purifier rooms and fuel and lubricating oil handling areas were ventilated and clean.
  - There was no accumulation of waste oil in the bilges or in save-alls in way of machinery space fuel, lube and hydraulic oil service, settling and storage tanks.
  - Tank tops and bilges were painted a light colour so that leaks may be readily located.
  - Engine-room bilges were clear of rubbish or other substances that might prevent the bilges being readily and easily pumped.
  - Spare gear was properly stowed and items of machinery under overhaul were safely secured so that they do not break loose and cause injury or damage even in the heaviest weather.
  - Spare gear, tools and other equipment or material was not left lying around, especially near to steering gear rams, switchboards or batteries.
  - There were no flammable materials left or stored near switchboards.
  - Gauge glass closing devices on oil tanks were of a self-closing, fail-safe type and were not inhibited.
  - Self-closing sounding devices to double bottom tanks were in good order and closed with caps properly fitted.
  - No non-approved hold-open methods such as tiebacks, hooks, wedges or other arrangements were used to hold any fire door open where it was required to be self-closing.
- Select several items from the machinery space inspection checklist and request that the accompanying officer describes or demonstrates what was required to be checked.

### **Expected Evidence**

- The company procedure which required that safety inspections of the machinery spaces were conducted at appropriate intervals by the designated Safety Officer to identify hazards and potential hazards to health, safety and the environment.
- Records of safety inspections of the machinery spaces including associated checklists.

### **Potential Grounds for a Negative Observation**

- There was no company procedure which required that safety inspections of the machinery spaces were conducted at appropriate intervals by the designated Safety Officer to identify hazards and potential hazards to health, safety and the environment.
- Records of safety inspections of the machinery spaces were missing or incomplete.
- There was no checklist provided to facilitate the safety inspections of the machinery spaces.
- The accompanying officer was unfamiliar with the company procedure which required that safety inspections of the machinery spaces were conducted at appropriate intervals by the designated Safety Officer.
- The accompanying officer was unfamiliar with any of the checks required to be conducted in accordance with the company machinery spaces inspection checklist.
- Safety inspections of the machinery spaces were ineffective as demonstrated by any of the potential deficiencies listed below:
  - Suitable metal containers with an integral cover were not provided for the storage of cotton waste, cleaning rags or similar materials after use, and/or these were not emptied frequently.
  - Wood, paints, solvents, oil or other flammable materials were stored in boiler rooms or machinery spaces including steering gear compartments unless specifically identified areas had been prepared and approved for storage of such items.
  - Suitable eye-protection and PPE was not readily available where required, for example for welding, handling chemicals or operating a lathe or fixed or portable grinding wheel.
  - Lagging and insulation on high temperature surfaces such as steam pipes, exhaust pipes etc. was missing, in poor condition or impregnated with oil.
  - Safety notices and signs appropriate to the specific compartments were not posted to indicate hazards and obstructions or control measures to be taken where the hazard or obstruction could not be removed.
  - Pipelines were not colour coded or labelled to indicate their contents.
  - There were broken or defective light fittings in the machinery spaces.
  - There were unprotected open hatchways through which persons may fall or on which they may trip.
  - The guardrails or fencing of any protected open hatchway were not in good order.
  - Floor plates had been removed and the opening left unguarded or insufficiently lit.
  - Floor plates were unsecured, uneven, or having gaps, presenting a trip and fall hazard.
  - Safety guards were not in place for all machinery, rotating shafts or equipment, as necessary.
  - There were visible oil leaks from any machinery.
  - Purifier rooms and fuel and lubricating oil handling areas were not ventilated and/or clean.
  - There was an accumulation of waste oil in the bilges or in save-alls in way of machinery space fuel, lube and hydraulic oil service, settling and storage tanks.
  - Tank tops and bilges were not painted a light colour so that leaks may be readily located.
  - Engine-room bilges contained rubbish or other substances that might prevent the bilges being readily and easily pumped.
  - Spare gear was not properly stowed and/or items of machinery under overhaul were not safely secured to prevent them breaking loose and causing injury or damage in heavy weather.
  - Spare gear, tools and other equipment or material was left lying around, especially near to steering gear rams, switchboards or batteries.
  - Flammable materials were left or stored near switchboards.
  - Gauge glass closing devices on oil tanks were not of a self-closing, fail-safe type or were inhibited.
  - Self-closing sounding devices to double bottom tanks were not in good order, closed and capped.
  - Non-approved hold-open methods such as tiebacks, hooks, wedges or other arrangements were used to hold any fire door in the machinery spaces open where it was required to be self-closing.
- There was a safety deficiency of any kind in the machinery spaces.

Where a hardware defect was noted as evidence of ineffective safety inspections of the machinery spaces, this should be recorded within the Hardware response tool for this question unless identified by a specific question relating to the hardware included in the CVIQ.

**5.8.3. Were the Master and officers familiar with the company procedure for safety inspections of the cargo pumproom, and had inspections been effective in identifying hazards to health, safety and the environment?**

**Short Question Text**

Safety inspections of the cargo pumproom

**Vessel Types**

Oil, Chemical

**ROVIQ Sequence**

Cargo Control Room, Pumproom

**Publications**

IMO: ISM Code

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: MSC.1/Circ. 1321 Guidelines for measures to prevent fires in engine-rooms and cargo pump-rooms.

**Objective**

**To ensure that the cargo pump room is always maintained in a safe condition.**

**Industry Guidance**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition**

4.11.7 Inspection, maintenance and testing of electrical equipment

4.11.7.1 Inspection and checks

Typical inspections should include checking:

Cracks in metal casings or covers, cracked or broken glass, or failure of cement around glass in flame-proof or explosion-proof enclosures.

Covers of flame-proof enclosures, to ensure that they are tight, that no bolts are missing and that no gaskets are present between mating metal surfaces.

10.12.2 Cargo pumproom ventilation

Given the potential presence of hydrocarbon gas in the pumproom, mechanical ventilation by extraction is required in a safe atmosphere....

The pumproom ventilation should be interlocked with the pumproom lighting so that the ventilation operates when the lights are switched on. This does not apply to emergency lighting.

During cargo handling, the pumproom ventilation system should be operating at the correct (lower) suction.

12.1.15.2 Cargo and ballast line draining procedures

On some ships, no provision is made for effective line draining where the practice is to drain final line contents to the pumproom bilge. It is an unsafe practice and volatile product should not be drained to the bilge.

12.1.15.3 Routine maintenance and housekeeping issues



It is important that the integrity of pipelines and pumps is maintained and that any leaks are detected and rectified as soon as possible.

Pumproom bilges should be kept clean and dry. Particular care should be taken to prevent hydrocarbon liquids or vapour escaping into the pumproom.

Valve glands and drain cocks should be regularly inspected to ensure they do not leak.

Bulkhead penetrations should be routinely checked to ensure the seals are effective....

The pumproom rescue harness and rope should be checked regularly to ensure it is fit for use and rigged for immediate operation....

Emergency escape routes should be regularly checked to ensure they are properly marked and clear of obstructions. Where an escape trunk is fitted, check doors for ease of operation. Door seals should be effective and lighting within the trunk should be operational.

#### 12.1.15.5 Inspecting and maintaining pumproom ventilation fans

Pumproom ventilation fans operate by drawing air out of the space. If a gas is in the pumproom and the blades of the fan impeller touch the casing, or the fan bearings or seals overheat, the vapours could ignite.

Pumproom extractor fans, including impellers, shafts and gas seals, should be inspected regularly.

### **IMO: MSC.1/Circ.1321 Guidelines for measures to prevent fires in engine-rooms and cargo pump-rooms**

#### Part IV Cargo Pump-Rooms

##### Chapter 1 – Control Of Flammable Materials

1.1 Requirements described below should be applied to vessels carrying oils with flashpoints not exceeding 60°C (closed cup test).

Equipment and fittings on cargo piping systems

2.2.2 Spray shields or spray protection covers should be provided on any detachable connections and around the glands of cargo handling pumps in order to reduce the formation of mist.

**TMSA KPI 9A.1.1** requires that procedures require that safety inspections are conducted at scheduled intervals by a designated Safety Officer.

Safety inspections of the vessel:

- Identify hazards and potential hazards to health, safety and the environment.
- Include all accessible areas of the vessel.

### **IMO: ISM Code**

7 The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks involved should be defined and assigned to qualified personnel.

### **Inspection Guidance**

The vessel operator should have developed a procedure which required that safety inspections of all the accessible areas of the ship, including the cargo pumproom, are conducted at appropriate intervals by the designated Safety Officer.

An appropriate checklist should have been developed to facilitate these inspections.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure which required that safety inspections of the cargo pumproom were conducted at appropriate intervals by the designated Safety Officer to identify hazards and potential hazards to health, safety and the environment
- Where necessary review the records of safety inspections of the cargo pumproom including associated checklists.
- Inspect the cargo pumproom with reference to the safety officer's checklist and verify:
  - Entry procedures for the pumproom were clearly displayed at the entrance.
  - Lights were fully operational with no damage or defects to fittings or covers.
  - Ventilation was fully operational with only lower suction open.
  - The emergency ventilation dampers, where fitted, were clearly marked and fully operational.
  - Pumproom fans were not running noisily or with excessive vibration.
  - Bilges were clean and free of combustible material.
  - Items stored in the pumproom were properly secured against movement.
  - No paint or other flammable material was stored in the pumproom.
  - Cargo and hydraulic systems were free of oil leaks.
  - Ballast systems were free of significant leaks.
  - Cargo and ballast piping were free of patches or temporary repairs.
  - Spray shields or spray protection covers were fitted around the glands of cargo pumps or detachable connections.
  - Bulkhead seals and penetrations were in apparent good order.
  - A rescue harness and means of recovery was rigged ready for immediate use.
  - All exposed rotating shafts were protected with guards.
  - Pipe lagging, where fitted, was clean and free from oil impregnation.
  - Safety chains were in place to prevent falling down open vertical ladder accesses.
  - Gratings or removable deck plates were in good condition and properly fitted.
  - Cargo and ballast pump emergency stop buttons were clearly marked.
  - The pumproom telephone was fully operational.
- Select several items from the cargo pumproom inspection checklist and request that the accompanying officer describe or demonstrate what was required to be checked.

### **Expected Evidence**

- The company procedure which required that safety inspections of the cargo pumproom were conducted at appropriate intervals by the designated Safety Officer to identify hazards and potential hazards to health, safety and the environment.
- Records of safety inspections of the cargo pumproom including associated checklists.

### **Potential Grounds for a Negative Observation**

- There was no company procedure which required that safety inspections of the cargo pumproom be conducted at appropriate intervals by the designated Safety Officer to identify hazards and potential hazards to health, safety and the environment.
- Records of safety inspections of the cargo pumproom were missing or incomplete.
- There was no checklist provided to facilitate the safety inspections of the cargo pumproom.
- The accompanying officer was unfamiliar with the company procedure which required that safety inspections of the cargo pumproom were conducted at appropriate intervals by the designated Safety Officer.

- The accompanying officer was unfamiliar with any of the checks required to be conducted in accordance with the company cargo pumproom inspection checklist.
- Safety inspections of the cargo pumproom were ineffective as demonstrated by any of the potential deficiencies listed below:
  - Pumproom lighting was not fully operational.
  - Pumproom lighting was inadequate to illuminate the space.
  - Pumproom light fittings had:
    - Cracks in metal casings or covers.
    - Cracked or broken glass.
    - Failure of cement around glass in flame-proof or explosion-proof enclosures.
    - Flame-proof enclosures that were not tight or had missing bolts.
    - Gaskets present between mating metal surfaces.
  - The pumproom ventilation was not:
    - operating in extraction mode.
    - interlocked with the pumproom lighting.
    - operating at the correct (lower) suction.
  - The pumproom fan(s) were running noisily or with excessive vibration.
  - The pumproom bilges were not clean and dry.
  - Cargo residue had been drained to the pumproom bilge.
  - There were leaks from pumps, pipelines, valve glands or instrumentation.
  - Cargo or ballast pipelines were temporarily repaired with patches or bandages.
  - Spray shields or spray protection covers around the glands of cargo pumps or detachable connections were missing or damaged.
  - Bulkhead seals were defective in any respect.
  - Exposed rotating shafts were not protected with guards.
  - Pipe lagging was impregnated with oil or missing from sections of hot piping intended to be lagged.
  - Items stored in the pumproom were not properly secured against movement.
  - Paint or other flammable material was stored in the pumproom unless contained within an area specifically designed and designated for such storage.
  - The pumproom rescue harness was not fit for use and rigged for immediate operation.
  - Safety chains to prevent falling through open vertical ladder accesses were missing or not connected.
  - Cargo and ballast pump emergency stop buttons were not clearly marked.
  - The pumproom telephone was defective.
- There was a safety deficiency of any kind in the pumproom.

Where the entry procedures for the pumproom posted at the entrance were not in alignment with the enclosed space entry procedure contained in the SMS, or cargo pumproom entry was authorised during the inspection without full compliance with the enclosed space entry procedure, make a negative observation under the Process response tool of question 5.5.1.

Where a hardware defect was noted as evidence of ineffective safety inspections of the cargo pumproom, this should be recorded within the Hardware response tool for this question unless identified by a specific question relating to the hardware included in the CVIQ.

**5.8.4. Were the Master and officers familiar with the procedure for safety inspections of the cargo machinery rooms, and had inspections been effective in identifying hazards to health, safety and the environment?**

**Short Question Text**

Cargo machinery rooms safety inspections

**Vessel Types**

LPG, LNG

**ROVIQ Sequence**

Compressor Room, Main Deck

**Publications**

IMO: ISM Code

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: IGC Code

ICS: Tanker Safety Guide (Gas) - Third Edition

**Objective**

**To ensure that cargo machinery rooms are always maintained in a safe condition.**

**Industry Guidance**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition**

4.11.7 Inspection, maintenance and testing of electrical equipment

4.11.7.1 Inspection and checks

Typical inspections should include checking:

Cracks in metal casings or covers, cracked or broken glass, or failure of cement around glass in flame-proof or explosion-proof enclosures.

Covers of flame-proof enclosures, to ensure that they are tight, that no bolts are missing and that no gaskets are present between mating metal surfaces.

**ICS: Tanker Safety Guide (Gas) - Third Edition**

2.11 Cargo Machinery Room Precautions

Cargo vapour may be present in cargo pump or compressor rooms, and gas detection systems are installed to warn of its presence. In ships carrying cargoes whose vapours may be lighter than air (for example ammonia) or heavier than air (for example LPG), gas detector point should be fitted at high and low levels within compartments. The appropriate gas detector points should be used for the cargo carried.

Ventilation systems are provided to disperse any vapour that may collect in the pump or compressor room. The space should be ventilated for no less than ten minutes before cargo operations begin and throughout cargo operations. Ventilation systems should be used whenever a cargo liquid or vapour leakage is suspected.

Ventilation systems should be maintained in accordance with the recommendations of original equipment manufacturers and should be available at all times. If the fans fitted are of non-sparking design, then these should not be modified in any way.

The precautions given in Section 8.5.4 should be observed before personnel enter cargo machinery rooms (*i.e. entry into enclosed spaces*).

All electrical equipment in cargo machinery rooms, including the lighting systems, should be certified safe for use in hazardous areas and maintained in accordance with the recommendations of original equipment manufacturers. Additional lighting, if required, should be of a suitable safe type (see Section 5.6.2).

Gas-tight bulkhead gland seals and airlock doors to cargo machinery electric motor rooms should be carefully checked and maintained to ensure the seals remain intact and effective in preventing cargo vapour entry.

### 8.5.3 Cargo Control Rooms

Any cargo control or instrument room which is not classified as gas-free should be ventilated thoroughly before entry, but access doors or hatches should never be left open. Ventilation and gas detection equipment should be operated and checked throughout the period that the room is in use. If fixed equipment is not fitted or is not working, portable equipment should be used.

In ships designed to carry cargoes whose vapours are either lighter than air or heavier than air, alternative upper and lower ventilation points and gas sampling heads are normally provided. The changeover devices should be set according to the relative vapour density of the cargo.

### 8.5.4 Cargo Pump or Compressor Rooms, Motor Rooms and Airlocks

In addition to the precautions required for cargo control rooms (See Section 8.5.3), the following precautions should be observed for cargo pump or compressor rooms, motor rooms and airlocks.

Ventilation fans should be running continuously for at least 10 minutes before cargo operations begin, and throughout their duration. Fans should also be run continuously when leakage of vapour or liquid into the space is suspected.

Safety interlocks are provided to ensure that no machinery can be started until the ventilation system has been operating for at least 10 minutes, long enough to have dispersed any toxic or flammable vapour that may have collected in cargo pump rooms or compressor rooms, and to build up sufficient pressure in motor rooms and airlocks. Loss of ventilation pressure can cause shutdown of equipment.

Regular inspection should be undertaken of inlet and outlet grilles to ensure that they have not become obstructed.

**TMSA KPI 9A.1.1** requires that procedures require that safety inspections are conducted at scheduled intervals by a designated Safety Officer.

Safety inspections of the vessel:

- Identify hazards and potential hazards to health, safety and the environment.
- Include all accessible areas of the vessel.

### IMO: ISM Code

7 The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks involved should be defined and assigned to qualified personnel.

### IMO: IGC Code

1.2.54 Turret compartments are those spaces and trunks that contain equipment and machinery for retrieval and release of the disconnectable turret mooring system, high-pressure hydraulic operating systems, fire protection arrangements and cargo transfer valves.

### 3.3 Cargo machinery spaces and turret compartments

3.3.5 Arrangements of cargo machinery spaces and turret compartments shall ensure safe unrestricted access for personnel wearing protective clothing and breathing apparatus, and in the event of injury to allow unconscious personnel to be removed. At least two widely separated escape routes and doors shall be provided in cargo machinery spaces, except that a single escape route may be accepted where the maximum travel distance to the door is 5 metres or less.

3.3.6 All valves necessary for cargo handling shall be readily accessible to personnel wearing protective clothing. Suitable arrangements shall be made to deal with drainage of pump and compressor rooms.

### 3.6 Airlocks

3.6.1 Access between hazardous area on the open weather deck and non-hazardous spaces shall be by means of an air lock. This shall consist of two self-closing, substantially gastight, steel doors without any holding back arrangements, capable of maintaining the overpressure, at least 1.5 metres but no more than 2.5 metres apart. The air lock space shall be artificially ventilated from a non-hazardous area and maintained at an overpressure to the hazardous area on the weather deck.

3.6.3 An audible and visible alarm system to give a warning on both sides of the air lock shall be provided. The visible alarm shall indicate if one door is open. The audible alarm shall sound if doors on both sides of the air lock are moved from the closed positions.

3.6.4 In ships carrying flammable products, electrical equipment that is located in spaces protected by air locks and not of the certified safe type, shall be de-energised in case of loss of overpressure in the space.

3.6.6 The air lock space shall be monitored for cargo vapours (see 13.6.2).

### 12.1 Spaces required to be entered during normal cargo handling operations

12.1.1 Electric motor rooms, cargo compressor and pump rooms, spaces containing cargo handling equipment and other enclosed spaces where cargo vapours may accumulate, shall be fitted with fixed artificial ventilation systems capable of being controlled from outside such space. The ventilation shall be run continuously to prevent the accumulation of toxic and or flammable vapours, with the means of monitoring acceptable to the Administration to be provided. A warning notice requiring the use of such ventilation prior to entering shall be placed outside the compartment.

12.1.4 Where a space has an opening into an adjacent more hazardous space or area, it shall be maintained at an overpressure. It may be made into a less hazardous space or non-hazardous space by overpressure protection in accordance with recognised standards.

### **Inspection Guidance**

The vessel operator should have developed a procedure which required that safety inspections of all the accessible areas of the ship, including the cargo machinery rooms, are conducted at appropriate intervals by the designated Safety Officer.

An appropriate checklist(s) should have been developed to facilitate these inspections.

Cargo machinery room air-lock audible and visual alarms and shut-down systems should be regularly tested.

Ethylene and Propylene Oxide – piping between cargo compressors and cargo containment should be blanked or spool pieces removed when these cargoes are carried.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure which required that safety inspections of the cargo machinery rooms were conducted at appropriate intervals by the designated Safety Officer to identify hazards and potential hazards to health, safety and the environment.
- Where necessary review the records of safety inspections of the cargo machinery rooms including associated checklists.
- Where necessary review the records of cargo machinery room air-lock audible and visual alarms and shut-down systems tests.
- Inspect the cargo machinery rooms with reference to the safety officer's checklist and verify:
  - Entry procedures and ventilation requirements for the cargo machinery rooms are clearly displayed at the entrance.
  - Lights are fully operational with no damage or defects to fittings or covers.
  - Ventilation is fully operational.
  - Cargo machinery room fans are not running noisily or with excessive vibration.
  - Gas sampling heads are correctly set.
  - Where applicable, air-locks and associated alarms are in satisfactory condition
  - Cargo machinery room electrical fittings are not damaged/modified.
  - Where fitted, bulkhead seal lubricator reservoirs contain sufficient oil. (Bulkhead shaft seals on LNG vessels are normally provided by means of pressurised nitrogen.)
  - All exposed rotating shafts are protected with guards.
  - No paint or other flammable material is stored in the cargo machinery room.
  - Items stored in the cargo machinery room are properly secured against movement and do not obstruct access.
  - Drainage arrangements are satisfactory.
  - Compressors are isolated whilst carrying a cargo of Ethylene Oxide or Propylene Oxide.
- Select several items from the cargo machinery room inspection checklist and request that the accompanying officer describe or demonstrate what was required to be checked.

#### **Expected Evidence**

- The company procedure which required that safety inspections of the cargo machinery rooms be conducted at appropriate intervals by the designated Safety Officer to identify hazards and potential hazards to health, safety and the environment.
- Records of safety inspections of the cargo machinery rooms including associated checklists.
- Records of regular testing of cargo machinery room air-lock audible and visual alarms and shut-down systems.

#### **Potential Grounds for a Negative Observation**

- There was no company procedure which required that safety inspections of the cargo machinery rooms be conducted at appropriate intervals by the designated Safety Officer to identify hazards and potential hazards to health, safety and the environment.
- Records of safety inspections of the cargo machinery rooms were missing or incomplete.
- There was no checklist(s) provided to facilitate the safety inspections of the cargo machinery rooms.
- The accompanying officer was unfamiliar with the company procedure which required that safety inspections of the cargo machinery rooms were conducted at appropriate intervals by the designated Safety Officer.
- The accompanying officer was unfamiliar with any of the checks required to be conducted in accordance with the company cargo machinery rooms inspection checklist(s).
- Safety inspections of the cargo machinery rooms were ineffective as demonstrated by any of the potential deficiencies listed below:
  - Entry requirements were not posted at the entrance to the cargo machinery rooms.
  - There was no warning notice posted outside the cargo machinery rooms requiring the use of ventilation prior to entry.
  - Cargo machinery room lighting was not fully operational.
  - Cargo machinery room lighting was inadequate to illuminate the space.
  - Cargo machinery room light fittings had:

- Cracks in metal casings or covers.
- Cracked or broken glass.
- Failure of cement around glass in flame-proof or explosion-proof enclosures.
- Flame-proof enclosures that were not tight or had missing bolts.
- Gaskets present between mating metal surfaces.
- The compressor room ventilation system was not maintaining negative relative pressure.
- The motor room ventilation system was not maintaining relative positive pressure.
- The air-lock ventilation system was not maintaining relative positive pressure
- The cargo machinery room fan(s) were running noisily or with excessive vibration.
- There were gas leaks evident in the compressor room.
- Cargo machinery room ventilation inlet or outlet grilles were obstructed.
- The cargo machinery room gas sampling heads and/or ventilation points were incorrectly set for the cargo being carried.
- The accompanying officer was unfamiliar with the location and/or status of the gas sampling heads in the cargo machinery room.
- Audible and/or visual air lock alarms were not operational.
- There were no records of tests of the air lock alarm and shut down system.
- Airlock door seals were damaged or ineffective.
- Hold back arrangements were fitted to air-lock doors and/or doors were held open.
- Cargo machinery room electrical fittings were found to be damaged/modified.
- A bulkhead seal between the compressor and motor rooms was not gas tight and operating effectively e.g. a lubricating oil reservoir was low or empty.
- An exposed rotating shaft was not protected with a guard.
- Flammable materials were found stowed in a cargo machinery room.
- Items stored in the cargo machinery room were not properly secured against movement.
- Materials were stowed in a cargo machinery room that obstructed safe unrestricted access to operate valves or rescue an injured person.
- Arrangements to deal with drainage of the cargo machinery room were blocked/ineffective.
- Compressors were not isolated whilst carrying a cargo of Ethylene Oxide or Propylene Oxide.

Where the entry procedures for the compressor room posted at the entrance were not in alignment with the enclosed space entry procedure contained in the SMS or, compressor room entry was authorised without full compliance with the enclosed space entry procedure, make a **negative observation** under question 5.5.1.

Where a hardware defect was noted as evidence of ineffective safety inspections of the cargo machinery rooms, this should be documented within the Hardware response tool for this question unless identified by a specific question relating to the hardware included in the CVIQ.



**5.8.5. Were the Master and officers familiar with the company procedure for safety inspections of the forecastle, and had inspections been effective in identifying hazards to health, safety and the environment?**

**Short Question Text**

Safety inspection of the forecastle spaces

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Forecastle

**Publications**

IMO: ISM Code

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

UK MCA: Code of Safe Working Practices for Merchant Seafarers

**Objective**

**To ensure that the forecastle is always maintained in a safe condition.**

**Industry Guidance**

**UK MCA: Code of Safe Working Practices for Merchant Seafarers**

**2.5 Good housekeeping**

2.5.1 All ships move in a seaway and as space is very limited aboard any vessel, good housekeeping is essential for safe working/access and hygiene control. Attention should be paid in particular to the:

- safe and secure stowage of loose items;
- adequate illumination of all work/transit areas;

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.**

**10.3 Identifying enclosed spaces**

A list of identified enclosed spaces should be available on board every ship and these spaces should be clearly marked. Examples include:

- Chain lockers.
- Thruster spaces.

The Master should ensure that all entrances to unattended enclosed spaces on the ship are kept closed or otherwise secured against entry.

**13.5.7 Forecastle spaces and midships stores**

Do not carry packaged petroleum or other flammable liquids in the forecastle spaces, midship stores or any other space unless they have been specifically designed and classified.

**TMSA KPI 9A.1.1** requires that procedures require that safety inspections are conducted at scheduled intervals by a designated Safety Officer.

Safety inspections of the vessel:

- Identify hazards and potential hazards to health, safety and the environment.
- Include all accessible areas of the vessel.

#### **IMO: ISM Code**

7 The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks involved should be defined and assigned to qualified personnel.

#### **Inspection Guidance**

The vessel operator should have developed a procedure which required that safety inspections of all the accessible areas of the ship, including the forecastle, are conducted at appropriate intervals by the designated Safety Officer.

An appropriate checklist should have been developed to facilitate these inspections.

Weathertight doors to the forecastle space should be in satisfactory condition and capable of being properly secured.

Forecastle spaces should be well illuminated, free of water, and clean and tidy.

Starter panels should be protected from leakage from SW line flanges and the watertight entrance door to the space.

Any stores, spare parts etc. should be properly secured against movement.

There should be no flammable liquids stored in the forecastle unless it has been specifically designed and classified.

Access to bitter end securing arrangements, safety equipment and bilge wells/alarms should be clear and unobstructed.

Chain lockers should be clearly marked as enclosed spaces and the doors securely closed.

Access to interconnected spaces such as bow thruster rooms, transfer pumprooms etc. should be clearly marked with the entry controls in accordance with the company enclosed spaces entry procedures.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure which required that safety inspections of the forecastle were conducted at appropriate intervals by the designated Safety Officer to identify hazards and potential hazards to health, safety and the environment.
- Where necessary review the records of safety inspections of the forecastle, including associated checklists.
- Inspect the forecastle spaces and verify that:
  - Weathertight doors to the forecastle space are in satisfactory condition and capable of being properly secured.
  - Forecastle spaces are well illuminated, free of water, and clean and tidy.
  - Any stores, spare parts etc. are properly secured against movement.
  - No flammable liquids are stored in the forecastle unless it has been specifically designed and classified.
  - Access to bitter end securing arrangements, safety equipment and bilge wells/alarms is clear and unobstructed.
  - Chain lockers are clearly marked as enclosed spaces and the doors securely closed.
  - Thruster rooms, transfer pump rooms or other any other interconnected spaces are clearly marked with the required safe entry controls and requirements.
  - Any electrical or hydraulic equipment or other machinery in the forecastle spaces is in satisfactory condition.

### **Expected Evidence**

- The company procedure which required that safety inspections of the forecastle were conducted at appropriate intervals by the designated Safety Officer to identify hazards and potential hazards to health, safety and the environment.
- Records of safety inspections of the forecastle including associated checklists.

### **Potential Grounds for a Negative Observation**

- There was no company procedure which required that safety inspections of the forecastle were conducted at appropriate intervals by the designated Safety Officer to identify hazards and potential hazards to health, safety and the environment.
- Records of safety inspections of the forecastle were missing or incomplete.
- There was no checklist provided to facilitate the safety inspections of the forecastle.
- The accompanying officer was unfamiliar with the company procedure which required that safety inspections of the forecastle were conducted at appropriate intervals by the designated Safety Officer.
- The accompanying officer was unfamiliar with any of the checks required to be conducted in accordance with the company forecastle inspection checklist.
- Safety inspections of the forecastle were ineffective as demonstrated by any of the potential deficiencies listed below:
  - Weathertight doors to the forecastle space were not in satisfactory condition and capable of being properly secured.
  - Forecastle spaces were not well illuminated, free of water, and/or clean and tidy.
  - Stores, spare parts etc. were not properly secured against movement.
  - Flammable liquids were stored in the forecastle which was not specifically designed and classified.
  - Access to bitter end securing arrangements, safety equipment and bilge wells/alarms was not clear and unobstructed.
  - Chain lockers were not clearly marked as enclosed spaces and/or the doors securely closed.
  - Thruster rooms, transfer pump rooms or other any other interconnected spaces were not clearly marked with required safe entry controls and requirements.
  - Electrical or hydraulic equipment or other machinery in the forecastle spaces was not in satisfactory condition.
  - Starter panels were not protected from leakage from SW line flanges and/or the watertight entrance door to the space.
  - There was evidence of leakage from the anchor wash SW lines into the space.

Where a hardware defect was noted as evidence of ineffective safety inspections of the forecastle spaces, this should be documented within the Hardware response tool for this question unless identified by a specific question relating to the hardware included in the CVIQ.

### **5.8.6. Were the Master and officers familiar with the company procedure for safety inspections of the accommodation, and had inspections been effective in identifying hazards to health, safety and the environment?**

#### **Short Question Text**

Safety inspections of the accommodation spaces

#### **Vessel Types**

Oil, Chemical, LPG, LNG

#### **ROVIQ Sequence**

Internal Accommodation

#### **Publications**

IMO: ISM Code

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

UK MCA: Code of Safe Working Practices for Merchant Seafarers

#### **Objective**

**To ensure that the accommodation is always maintained in a safe condition.**

#### **Industry Guidance**

#### **UK MCA: Code of Safe Working Practices for Merchant Seafarers**

2.2.3 Fire aboard a vessel can be disastrous. Common causes are:

- faulty electrical appliances/circuitry;
- overloading of electrical circuitry;
- careless disposal of cigarette ends;
- damp storage of linen/materials;
- galley fires due to overheating of cooking oils;
- carelessness with hand-pressing irons; or
- incorrect methods of drying laundry.

2.2.4 Personnel should be made aware of these risks and ensure at all times that fire risks are removed where possible or kept to a minimum through good housekeeping, regular inspection and maintenance of electrical circuitry and appliances, etc.

#### **2.5 Good housekeeping**

2.5.1 All ships move in a seaway and as space is very limited aboard any vessel, good housekeeping is essential for safe working/access and hygiene control. Attention should be paid in particular to the:

- safe and secure stowage of loose items;
- proper securing of doors, etc.;
- good maintenance of fittings and fixtures;
- adequate illumination of all work/transit areas;
- avoidance of overloading of electrical circuits;
- clear and legible signs/operational notices; and
- proper clearance and disposal of garbage/waste materials.

#### **23.9 Refrigerated rooms and store-rooms**

- All refrigerated room doors should be fitted with a means of opening the door from both sides. It should be possible to sound an alarm from inside the room.
- A routine testing of the alarm bell and checking of the door clasps and inside release should be carried out regularly, at least at weekly intervals.
- Those using the refrigerated room should make themselves familiar with the operation, in darkness, of the inside release for the door and the location of the alarm button.
- All refrigerated room doors should be fitted with an arrangement of adequate strength to hold the door open in a seaway and should be secured open while stores are being handled. These doors are extremely heavy and can cause serious injury to a person caught between the door and the jamb.
- Anyone going into a refrigerated room should take the padlock, if any, inside with them. Another person should be informed.
- Cold stores or refrigerated rooms should not be entered if it is suspected that there has been a leakage of refrigerant. A warning notice to this effect should be posted outside the doors.
- All stores and crates should be stowed securely so that they do not shift or move in a seaway.
- When wooden boxes or crates are opened, protruding fastenings should be removed or made safe.
- Metal meat hooks not in use should be stowed in a special container provided for the purpose. Where hooks cannot be removed easily, they should be kept away from passageways or areas where people are working.
- For entry into meat and fish storage rooms, appropriate thermal personal protective equipment should be readily available.

**TMSA KPI 9A.1.1** requires that procedures require that safety inspections are conducted at scheduled intervals by a designated Safety Officer.

Safety inspections of the vessel:

- Identify hazards and potential hazards to health, safety and the environment.
- Include all accessible areas of the vessel.

#### **IMO: ISM Code**

7 The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks involved should be defined and assigned to qualified personnel.

#### **Inspection Guidance**

The vessel operator should have developed a procedure which required that safety inspections of all the accessible areas of the ship, including the accommodation, are conducted at appropriate intervals by the designated Safety Officer.

An appropriate checklist should have been developed to facilitate these inspections.

In addition to the guidance stated above:

- Weathertight doors, windows and portholes should be in good order and capable of being properly secured.
- The ship's hospital, where provided, should be ready for immediate use. The ship's hospital should not be used as an additional cabin or used as a storeroom.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure which required that safety inspections of the accommodation were conducted at appropriate intervals by the designated Safety Officer to identify hazards and potential hazards to health, safety and the environment
- Where necessary review the records of safety inspections of the accommodation, including associated checklists.

- Where necessary review the records of testing the refrigerated room alarm.
- Inspect the accommodation spaces, including public spaces, sanitary areas, laundries, food store handling spaces, refrigerated spaces, galley, pantries and the hospital with reference to the safety officer's checklist and verify that:
  - Accommodation spaces are well illuminated, clean, tidy, in a hygienic condition and obstruction free.
  - There are no overloaded electrical sockets.
  - The condition of electrical equipment is satisfactory.
  - Smoking regulations are being observed.
  - Laundries are free of accumulations of clothing that could constitute a fire hazard.
  - Laundry driers and vents are free of accumulations of lint and fluff that could constitute a fire hazard.
  - Weathertight doors, windows and portholes are in good order and capable of being properly secured.
  - The ship's hospital, where provided, is ready for immediate use and not being used as an additional cabin or storeroom.
  - The refrigerated room alarm is operational and regularly tested.

#### **Expected Evidence**

- The company procedure which required that safety inspections of the accommodation were conducted at appropriate intervals by the designated Safety Officer to identify hazards and potential hazards to health, safety and the environment.
- Records of safety inspections of the accommodation including associated checklists.
- Records of regular testing of the refrigerated room alarm.

#### **Potential Grounds for a Negative Observation**

- There was no company procedure which required that safety inspections of the accommodation were conducted at appropriate intervals by the designated Safety Officer to identify hazards and potential hazards to health, safety and the environment.
- Records of safety inspections of the accommodation were missing or incomplete.
- There was no checklist provided to facilitate the safety inspections of the accommodation.
- The accompanying officer was unfamiliar with the company procedure which required that safety inspections of the accommodation were conducted at appropriate intervals by the designated Safety Officer.
- The accompanying officer was unfamiliar with any of the checks required to be conducted in accordance with the company accommodation inspection checklist.
- Safety inspections of the accommodation were ineffective as demonstrated by any of the potential deficiencies listed below:
  - Accommodation spaces were not well illuminated, clean, tidy, in a hygienic condition and/or obstruction free.
  - There were overloaded electrical sockets.
  - The condition of electrical equipment was not satisfactory (give details).
  - Smoking regulations were not being observed.
  - Laundries contained accumulations of clothing that could constitute a fire hazard.
  - Laundry driers and/or vents contained accumulations of lint and fluff that could constitute a fire hazard.
  - A weathertight door, window or porthole was not in good order and capable of being properly secured.
  - The ship's hospital was not ready for immediate use but was being used as an additional cabin or storeroom.
  - The refrigerated room alarm was not operational.
  - The refrigerated room alarm had not been regularly tested.

Where a hardware defect was noted as evidence of ineffective safety inspections of the accommodation spaces, this should be documented within the Hardware response tool for this question unless identified by a specific question relating to the hardware included in the CVIQ.

**5.8.7. Were the Master and officers familiar with the company procedure for safety inspections of the ballast and/or bunker pumproom, and had inspections been effective in identifying hazards to health, safety and the environment?**

**Short Question Text**

Ballast and/or bunker pumproom safety inspection

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Main Deck

**Publications**

IMO: ISM Code

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

**Objective**

**To ensure that the ballast and/or bunker pump room is always maintained in a safe condition.**

**Industry Guidance**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition**

4.11.7 Inspection, maintenance and testing of electrical equipment

4.11.7.1 Inspection and checks

Typical inspections should include checking:

Cracks in metal casings or covers, cracked or broken glass, or failure of cement around glass in flame-proof or explosion-proof enclosures.

Covers of flame-proof enclosures, to ensure that they are tight, that no bolts are missing and that no gaskets are present between mating metal surfaces.

12.1.15.3 Routine maintenance and housekeeping issues

It is important that the integrity of pipelines and pumps is maintained and that any leaks are detected and rectified as soon as possible.

Pumproom bilges should be kept clean and dry. Particular care should be taken to prevent hydrocarbon liquids or vapour escaping into the pumproom.

Valve glands and drain cocks should be regularly inspected to ensure they do not leak.

Bulkhead penetrations should be routinely checked to ensure the seals are effective....

The pumproom rescue harness and rope should be checked regularly to ensure it is fit for use and rigged for immediate operation....

Emergency escape routes should be regularly checked to ensure they are properly marked and clear of obstructions. Where an escape trunk is fitted, check doors for ease of operation. Door seals should be effective and lighting within the trunk should be operational.

#### 12.1.15.5 Inspecting and maintaining pumproom ventilation fans

Pumproom ventilation fans operate by drawing air out of the space. If a gas is in the pumproom and the blades of the fan impeller touch the casing, or the fan bearings or seals overheat, the vapours could ignite.

Pumproom extractor fans, including impellers, shafts and gas seals, should be inspected regularly.

**TMSA KPI 9A.1.1** requires that procedures require that safety inspections are conducted at scheduled intervals by a designated Safety Officer.

Safety inspections of the vessel:

- Identify hazards and potential hazards to health, safety and the environment.
- Include all accessible areas of the vessel.

#### **IMO: ISM Code**

7 The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks involved should be defined and assigned to qualified personnel.

#### **Inspection Guidance**

The vessel operator should have developed a procedure which required that safety inspections of all the accessible areas of the ship, including the ballast and/or bunker pumproom, are conducted at appropriate intervals by the designated Safety Officer.

An appropriate checklist should have been developed to facilitate these inspections.

Pumproom fans must be operating in the extraction mode. On some vessels with ballast or fuel oil transfer pumprooms only one extraction fan is fitted. In the event of failure, alternative temporary arrangements combined with a risk assessment/enclosed space entry permit must be made prior to entry.

Ballast and bunker pumprooms do not have to comply with the requirements of SOLAS Chapter II-2 Regulation 4.5.10 for temperature sensing devices, interlocked lighting, gas detection or bilge level monitoring.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure which required that safety inspections of the ballast and/or bunker pumproom were conducted at appropriate intervals by the designated Safety Officer to identify hazards and potential hazards to health, safety and the environment
- Where necessary review the records of safety inspections of the ballast and/or bunker pumproom including associated checklists.
- Inspect the ballast and/or bunker pumproom with reference to the Safety Officer's checklist and verify:
  - Entry procedures for the pumproom were clearly displayed at the entrance.
  - Lights were fully operational with no damage or defects to fittings or covers.
  - Ventilation was fully operational with only lower suction, (if higher suction is fitted), open.
  - The emergency ventilation dampers, (if fitted), were clearly marked and fully operational.
  - Pumproom fan(s) were not running noisily or with excessive vibration.
  - Bilges were clean and free of combustible material.
  - Items stored in the pumproom were properly secured against movement.
  - No paint or other flammable material was stored in the pumproom.



- Bunker and hydraulic systems were free of oil leaks.
  - Ballast systems, including ballast water treatment plant, were free of significant leaks.
  - Bunker and ballast piping were free of patches or temporary repairs.
  - Bulkhead seals and penetrations were in apparent good order, and, if fitted with oil/grease cups, these were filled above the minimum level.
  - A rescue harness and means of recovery was rigged ready for immediate use.
  - All exposed rotating shafts were protected with guards.
  - Pipe lagging, where fitted, was clean and free from oil impregnation.
  - Safety chains were in place to prevent falling down open vertical ladder accesses.
  - Gratings or removable deck plates were in good condition and properly fitted.
  - Bunker and ballast pump emergency stop buttons were clearly marked.
  - The pumproom telephone, if fitted, was fully operational.
- Select several items from the ballast and/or bunker pumproom inspection checklist and request that the accompanying officer describe or demonstrate what was required to be checked.

#### **Expected Evidence**

- The company procedure which required that safety inspections of the ballast and/or bunker pumproom were conducted at appropriate intervals by the designated Safety Officer to identify hazards and potential hazards to health, safety and the environment.
- Records of safety inspections of the ballast and/or bunker pumproom including associated checklists.

#### **Potential Grounds for a Negative Observation**

- There was no company procedure which required that safety inspections of the ballast and/or bunker pumproom be conducted at appropriate intervals by the designated Safety Officer to identify hazards and potential hazards to health, safety and the environment.
- Records of safety inspections of the ballast and/or bunker pumproom were missing or incomplete.
- There was no checklist provided to facilitate the safety inspections of the ballast and/or bunker pumproom.
- The accompanying officer was unfamiliar with the company procedure which required that safety inspections of the ballast and/or bunker pumproom were conducted at appropriate intervals by the designated Safety Officer.
- The accompanying officer was unfamiliar with any of the checks required to be conducted in accordance with the company ballast and/or bunker pumproom inspection checklist.
- Safety inspections of the ballast and/or bunker pumproom were ineffective as demonstrated by any of the potential deficiencies listed below:
  - Pumproom lighting was not fully operational.
  - Pumproom lighting was inadequate to illuminate the space.
  - Pumproom light fittings had:
    - Cracks in metal casings or covers.
    - Cracked or broken glass.
    - Failure of cement around glass in flame-proof or explosion-proof enclosures.
    - Flame-proof enclosures that were not tight or had missing bolts.
    - Gaskets present between mating metal surfaces.
  - The pumproom ventilation was not:
    - Operating in extraction mode.
    - Operating at the correct (lower) suction.
    - Operational due to the failure of the single fan fitted. (Give details of alternative temporary arrangements in place.)
  - The pumproom fan(s) was running noisily or with excessive vibration.
  - The pumproom bilges were not clean and dry.
  - There were leaks from pumps, pipelines, valve glands or instrumentation.
  - Bunker or ballast pipelines were temporarily repaired with patches or bandages.
  - Bulkhead seals were defective in any respect including grease/oil cups that were cracked/broken/missing or below the minimum level.

- Exposed rotating shafts were not protected with guards.
- Pipe lagging was impregnated with oil or missing from sections of hot piping intended to be lagged.
- Items stored in the pumproom were not properly secured against movement.
- Paint or other flammable material was stored in the pumproom unless contained within an area specifically designed and designated for such storage.
- The pumproom rescue harness was not fit for use and rigged for immediate operation.
- Safety chains to prevent falling through open vertical ladder accesses were missing or not connected.
- Bunker and ballast pump emergency stop buttons were not clearly marked.
- The pumproom telephone was defective.
- There was a safety deficiency of any kind in the pumproom.

Where the entry procedures for the pumproom posted at the entrance were not in alignment with the enclosed space entry procedure contained in the SMS or, ballast and/or bunker pumproom entry was authorised during the inspection without full compliance with the enclosed space entry procedure, make a **negative observation** in the Process response tool of question 5.5.1.

Where a hardware defect was noted as evidence of ineffective safety inspections of the ballast and/or bunker pumproom, this should be recorded within the Hardware response tool for this question unless identified by a specific question relating to the hardware included in the CVIQ.

## 5.9. Lifting and Rigging

**5.9.1. Were the Master, officers and ratings familiar with the company lifting and rigging procedures, and was evidence available to demonstrate that each item of lifting and rigging equipment had been maintained, inspected and tested in accordance with the procedure?**

### **Short Question Text**

Lifting and rigging equipment procedures, maintenance and inspection

### **Vessel Types**

Oil, Chemical, LPG, LNG

### **ROVIQ Sequence**

Cargo Control Room, Engine Room, Main Deck, Interview - Rating

### **Publications**

IMO: ISM Code

UK MCA: Code of Safe Working Practices for Merchant Seafarers

OCIMF: Recommendations for the Tagging/Labeling

Testing and Maintenance

Documentation/Certification for Ships' Lifting Equipment May 2005

### **Objective**

**To ensure that all lifting and rigging equipment has been thoroughly inspected at least annually and is always fit for purpose when used.**

### **Industry Guidance**

**OCIMF: Recommendations for the Tagging/Labeling, Testing and Maintenance, Documentation/Certification for Ships' Lifting Equipment May 2005**

**UK MCA: Code of Safe Working Practices for Merchant Seafarers.**

Chapter 19 Lifting Equipment and Operations

19.1.2 'Lifting equipment' means work equipment used for lifting or lowering loads and includes the attachments used for anchoring, fixing or supporting it.

19.1.3 'Loose gear' means any gear by means of which a load can be attached to lifting equipment but which does not form an integral part of either the lifting equipment or the load.

19.2.1 A valid certificate of testing and thorough examination by a competent person should be in force for every item of lifting equipment, accessory for lifting and loose gear...

A certificate for ship's lifting equipment is valid for no more than five years.

19.3.2 When there is any suspicion that any lifting equipment or any part of that equipment may have been subjected to excessive loads, exceeding the SWL, or subject to treatment likely to cause damage, it should be taken out of service until it can be subjected to a thorough examination by a competent person.

19.4.2 Any lifting equipment or accessory for lifting that is, or has been, exposed to conditions that could cause deterioration in its condition should be:

- Thoroughly examined;

- In the case of lifting equipment for lifting persons or an accessory or lifting, at least every six months;
- In the case of other lifting equipment, at least every 12 months; or
- In either case, in accordance with an examination scheme; and
- Whenever exceptional circumstances that are liable to jeopardize the safety of the lifting equipment have occurred; and
- Where appropriate, inspected by a competent person at suitable intervals.

19.7.1 All vessels are required to maintain records of manufacture, examination, inspection and testing of lifting equipment. Records and service history should be kept of equipment, of dates when and where it is brought into use, its safe working load, plus any repairs, modifications, tests and examinations carried out.

19.9.5 No person should be lifted except where the equipment is designed or specially adapted and equipped for that purpose, or for rescue in emergencies.

**TMSA KPI 9A.1.1** procedures require that safety inspections are conducted at scheduled intervals by a designated Safety Officer.

Safety inspections of the vessel:

- Identify hazards and potential hazards to health, safety and the environment.
- Include all accessible areas of the vessel.

#### **IMO: ISM Code**

7 The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks involved should be defined and assigned to qualified personnel.

#### **Inspection Guidance**

Lifting equipment with a safe working load (SWL) of 1000kg or greater and its associated loose gear will generally be inspected and certified by the vessel's Classification Society in accordance with Flag Administration rules.

Rigging equipment is considered to be any equipment used for lifting, pulling, dragging or moving objects that is not defined as either lifting equipment or loose gear.

The vessel operator should have developed a procedure for the management of lifting and rigging equipment in the following categories:

- Lifting equipment and loose gear inspected and certified by the vessel's Classification Society. The procedure should provide guidance on:
  - The maintenance of the required certification in accordance with the Flag Administration rules.
  - The routine maintenance and onboard inspection by a competent person.
  - The requirement to retain certificates for each fall wire or topping lift wire.
  - The company mandatory retirement criteria for fall wires and topping lift wires
- Lifting equipment, loose gear and rigging equipment not inspected or certified by the vessel's Classification Society, which remains the sole responsibility of vessel staff to verify as fit for purpose. The procedure should provide guidance on:
  - The definition of all equipment considered to fall under this classification.
  - The retention of certificates, or equivalent, for each item of lifting or rigging equipment, including fall wires.
  - The inspection of each item of equipment by a competent person at a defined interval.
  - The marking of each item of equipment with a unique identifier.
  - The marking of each item of equipment with its SWL.
  - The marking of each item of equipment with a ready means to identify that the equipment remains fit for continued use.

- The development and maintenance of an inventory of all such equipment which includes:
  - The normal storage location of each item of equipment.
  - The date each item of equipment was brought into service.
  - The safe working load (SWL) of each item of equipment.
  - The date of the last inspection by a competent person of each item of equipment.
  - The date of the last proof load test, where required.
- The retirement criteria for the rigging equipment.
- The retirement criteria for fall wires of davits and hoists.
- The age at which mandatory retirement of specific items of rigging equipment must take place.
- The requirement that each item of lifting and rigging equipment is inspected by the work supervisor prior to each use to verify that it remained fit for continued use.

Colour coding may be considered as a convenient method to identify the inspection status of each item of lifting or rigging equipment.

Items of lifting equipment, loose gear and rigging equipment that should be considered under this question.

- Cranes, derricks, davits, beam chain blocks, lifting beams and pad eyes (which form part of the vessel's outfitting)
- Chain blocks, wire hoists, snatch blocks, webbing slings, hose slings, wire rope slings, multi-leg bridles, shackles, hooks, tripods, shear legs, mucking winches and tank rescue hoists. (which do not form part of the vessel's outfitting)

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure for the management of lifting and rigging equipment.
- Verify the validity of the certificates for lifting equipment and loose gear required to be inspected and certified under the vessel's Classification Society and/or Flag administration rules.
- Review the inventory of lifting and rigging equipment not covered by a Classification Society inspection and certification process and verify that:
  - The inventory listed all items of equipment defined by the company lifting and rigging procedure and included for each item:
    - The normal storage location.
    - The date brought into service.
    - The SWL.
    - The date of the last inspection by a competent person.
  - Manufacturer's certificates or equivalent were available for each item.
  - Proof load test certificates were available, where required by the company procedure.
  - Inspections had been completed and documented in accordance with the company procedure.
- During the general inspection, inspect a selection of lifting and rigging equipment and verify:
  - That each item was marked with a unique identifier, its SWL and an indicator that it had been inspected in accordance with the company procedure.
  - That each item was in apparently satisfactory condition and fit for continued use.
- Interview a rating to verify their understanding of the markings on a selected item of lifting or rigging equipment and the checks they would undertake before using it during routine work.

### **Expected Evidence**

- The company procedure for the management of lifting and rigging equipment.

- The certificates for each item of lifting equipment covered by a Classification Society programme.
- The records of periodic inspections by a competent person required to be maintained for each item of lifting equipment and loose gear covered by a Classification Society programme.
- The inventory of lifting and rigging equipment not covered by a Classification Society programme.
- The manufacturer's certificates for **all** lifting equipment wire falls and topping lift wires.
- The manufacturer's test certificates or equivalent for all items of lifting or rigging equipment not covered by a Classification Society programme.
- The proof load test certificates for items not covered by a Classification Society programme where such tests were required by the company lifting and rigging procedure.

#### **Potential Grounds for a Negative Observation**

- There was no company procedure for the management of lifting and rigging equipment.
- The accompanying officer was unfamiliar with the company procedure for the management of lifting and rigging equipment.
- Certification for lifting equipment and loose gear covered by a Classification Society programme had not been maintained in accordance with the Classification Society requirements:
- An item of lifting equipment and loose gear covered by a Classification Society programme was out of service.
- An item of lifting equipment or loose gear covered by a Classification Society programme was found to be defective in any respect.
- There was no inventory of lifting and rigging equipment for all equipment that was not covered by a Classification Society programme.
- The inventory of lifting or rigging equipment had not been maintained in accordance with company rigging and lifting procedure:
- Manufacturer's test certificates were not available for each item of rigging equipment and, lifting equipment fall and topping lift wires.
- Items of rigging equipment or, fall or topping lift wires, had not been removed from service in accordance with the company retirement criteria.
- Items of lifting or rigging equipment were not marked in accordance with the company lifting and rigging procedure.
- Items of lifting or rigging equipment had not been periodically inspected by a competent person in accordance with the company procedure.
- Items of lifting or rigging gear which had not been removed from service were found to be in an apparently unsatisfactory condition.
- The accompanying officer was unfamiliar with the inventory of lifting and rigging equipment.
- An interviewed rating was unfamiliar with the markings required on each item of lifting or rigging equipment and/or the checks required to be undertaken before using the item during routine work.

**5.9.2. Where the vessel was fitted with a single cargo hose handling crane, was a risk assessment available which identified the minimum spare parts that must be carried onboard to ensure continued operation in the event of a single component failure, and were the identified spare parts available onboard?**

**Short Question Text**

Spare parts for a single cargo hose handling crane.

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Engine Room, Chief Engineer's Office

**Publications**

IMO: ISM Code

**Objective**

**To ensure that a hose crane is always available to connect and disconnect cargo hoses.**

**Industry Guidance**

**TMSA KPI 4.1.1** requires that each vessel in the fleet is covered by a planned maintenance system and spare parts inventory which reflects the company's strategy.

The company identifies all equipment and machinery required to be included in the planned maintenance system, for example:

- Deck machinery.
- Cargo handling machinery/equipment.

The spare parts inventory may be standalone or integrated into the planned maintenance system.

**IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

**Inspection Guidance**

To ensure that cargo hoses can be safely disconnected in the event of a single component failure of the cargo hose crane, there should be the capability to replace a defective hydraulic hose or other essential mechanical component with an available spare.

Where a vessel is fitted with two identical hose handling cranes, hydraulic hoses and other critical mechanical components can be exchanged between cranes as a temporary measure.

Where a vessel is fitted with a single hose handling crane, the vessel operator should have conducted a risk assessment to identify those crane components that may fail during operation and then to have made provision for an appropriate stock of spare parts to be carried. Items to be considered by the risk assessment should include but not be limited to:

- Hydraulic hoses.
- Complete winch motors or a comprehensive set of manufacturers recommended spare parts.

- Complete hydraulic pumps or a comprehensive set of manufacturers recommended spare parts.
- Lifting and luffing wires as appropriate to the design of the crane.

It is an OCIMF expectation that at least one hydraulic hose of each size and length fitted to the hose handling crane should be carried as a spare.

Where a vessel is fitted with a special purpose crane for lightering or offshore hose handling in addition to two standard hose handling cranes, the special purpose crane should be treated as if it were a single crane unless it shared the same components as the standard hose handling cranes.

This question will only be allocated where a vessel is fitted with a single hose handling crane. (HVPQ question 10.9.2.1 or 10.9.3.1 answered as 1)

### **Suggested Inspector Actions**

- Review the risk assessment for the continued operation of a single hose crane.
- Review the inventory of spare hydraulic hoses for the cargo hose handling crane and verify that at least one spare hose with the same specification and rating was available for each diameter and length of hydraulic hose fitted to the crane.
- Review the inventory of any other items or spare parts identified by the risk assessment.
- Sight the spare hydraulic hoses and any other spare parts required to be carried by the risk assessment.

### **Expected Evidence**

- The risk assessment for the continued operation of a single hose crane.
- The inventory of spare parts for the hose crane including hydraulic hoses, with details of length, diameter and hose end fittings.
- The hose crane operations and maintenance manual which included the full list of hydraulic hoses, including diameter and length, fitted to the hose handling crane.

### **Potential Grounds for a Negative Observation**

- There was no risk assessment available which identified the minimum spare parts that must be carried for a single hose handling crane.
- There was not at least one spare hydraulic hose suitable to replace any hydraulic hose fitted to the hose handling crane.
- Any other spare parts identified by the risk assessment as being essential for the continued use of the hose handling crane were not available onboard.



## 5.10. Safe Access

**5.10.1. Were the Master, deck officers and deck ratings familiar with the company procedures for rigging the pilot boarding arrangements, and was the equipment provided in satisfactory condition and used in accordance with industry best practice?**

### Short Question Text

Pilot boarding arrangements

### Vessel Types

Oil, Chemical, LPG, LNG

### ROVIQ Sequence

Interview - Deck Rating, Main Deck

### Publications

ICS: Bridge Procedures Guide – Fifth Edition

IMO: ISM Code

IMO SOLAS

IMO: Resolution A.1045(27) Recommendation on pilot transfer arrangements

IMO: Resolution A.1108(29) Amendments to the Recommendation on pilot transfer arrangements

### Objective

**To ensure pilot boarding arrangements are always correctly rigged under the supervision of a responsible officer.**

### **Industry Guidance**

**ICS: Bridge Procedures Guide. Fifth Edition.**

#### 5.3.2 Embarking the Pilot

The Master should ensure the availability of a properly maintained means of pilot embarkation and disembarkation that is positioned, rigged, checked and manned in accordance with IMO recommendations (see Checklist A4) and, where applicable, local requirements...

The Pilot should:

- Use appropriate personal protective equipment; and
- Liaise with the Master so that the ship is positioned and manoeuvred to permit safe boarding.

The Pilot may be expected to check that boarding equipment appears properly rigged and manned.

Checklist A4 Required Boarding Arrangements for Pilots

**IMO: Resolution A.1045(27) Recommendation on pilot transfer arrangements**

*Basis for ICS Bridge Procedures Guide Checklist A4*

**IMO: Resolution A.1108(29) Amendments to the Recommendation on pilot transfer arrangements**

The existing paragraphs 5.1 and 5.2 are amended to read as follows:

.1 a gateway in the rails or bulwark, adequate handholds should be provided at the point of embarking on or disembarking from the ship on each side which should be not less than 0.7 m or more than 0.8 m apart. Each handhold should be rigidly secured to the ship's structure at or near its base and also at a higher point, should be not less than 32 mm in diameter and should extend not less than 1.2 m above the deck to which it is fitted; and

.2 a bulwark ladder, two separate handhold stanchions should be fitted at the point of embarking on or disembarking from the ship on each side which should be not less than 0.7 m or more than 0.8 m apart. The bulwark ladder should be securely attached to the ship to prevent overturning. Each stanchion should be rigidly secured to the ship's structure at or near its base and also at a higher point, should be not less than 32 mm in diameter and should extend not less than 1.2 m above the top of the bulwarks. Stanchions or handrails should not be attached to the bulwark ladder.

**TMSA KPI 9.2.1** requires that risk assessments for routine tasks are used to develop safe working procedures.

The risk assessment identifies all hazards associated with a task and any personnel at risk. All risk mitigation measures to address identified hazards are incorporated into the safe working procedures.

Reference sources from industry organisations, the Code of Safe Working Practices for Merchant Seafarers and International Maritime Organization (IMO) Guidelines are referred to when compiling a risk assessment.

#### **IMO: ISM Code**

7. The company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and the environment. The various tasks should be defined and assigned to qualified personnel.

#### **IMO: SOLAS**

##### Chapter V Regulation 23

2.2 The rigging of the pilot transfer arrangements and the embarkation of the pilot shall be supervised by a responsible officer having means of communication with the navigation bridge and who shall also arrange for the escort of the pilot by a safe route to and from the navigation bridge. Personnel engaged in rigging and operating any mechanical equipment shall be instructed in the safe procedures to be adopted and equipment shall be tested prior to use.

2.3 A Pilot ladder shall be certified by the manufacturer as complying with this regulation or with an international standard acceptable to the organization.

2.4 All pilot ladders used for pilot transfer shall be clearly identified with tags or other permanent marking so as to enable identification of each appliance for the purposes of survey, inspection and record keeping. A record shall be kept on the ship as to the date the identified ladder is placed into service and any repairs effected.

3.2 In all ships, where the distance from sea level to the point of access to, or egress from, the ship exceeds 9m, and when it is intended to embark pilots by means of the accommodation ladder, or other equally safe and convenient means in conjunction with a pilot ladder, the ship shall carry such equipment on either side, unless the equipment is capable of being transferred for use on either side.

7.1 The following associated equipment shall be kept at hand ready for immediate use when persons are being transferred:

1. two manropes of not less than 28mm and not more than 32mm in diameter properly secured to the ship if required by the pilot...
2. a lifebuoy equipped with a self-igniting light
3. a heaving line

7.2 When required by paragraph 4 above, stanchions and bulwark ladders shall be provided.

## 8 Lighting

Adequate lighting shall be provided to illuminate the transfer arrangements overside and the position on deck where a person embarks or disembarks.

### Inspection Guidance

The vessel operator should have developed a procedure for the safe rigging of the pilot boarding arrangements, which included :

- The inspection of the pilot boarding equipment before each use.
- The required rigging process for pilot boarding arrangements.
- The required level of supervision during the rigging and recovery of the pilot boarding arrangement.
- The required level of supervision during pilot transfer.

The procedure may refer to, or incorporate, industry best practice and/or ship pilot boarding arrangement drawings.

### Suggested Inspector Actions

- Sight, and where necessary review, the company procedure which described the requirements for the rigging and recovery of the pilot boarding arrangements.
- Where necessary review the certification and maintenance records for the pilot ladders.
- Inspect at least one pilot ladder and verify that:
  - The ladder was clearly identified with tags or other permanent marking to allow connection to certification and maintenance records.
  - The side ropes were continuous with no shackles, splices or knots.
  - The steps were equally spaced.
  - The steps were horizontal and tightly secured.
  - Each spreader was integral to a step was not a separate item lashed between steps.
  - The side ropes were equally spaced.
  - The steps were not painted, varnished, dirty or slippery.
  - The steps were free of cracks or crush damage.
  - There were no loops or tripping lines to present a tripping hazard or that could foul the pilot launch.
  - The ladder was apparently constructed in accordance with the guidance provided in the Bridge Procedures Guide (BPG) checklist A4.
  - Where the ladder had been repaired with replacement steps, the number of replacement steps and the means of inserting them was in accordance with the manufacturer's guidance.
- Inspect the pilot ladder securing arrangements and verify that the weight of the ladder was taken by the side ropes and not by a step.
- Inspect the access to deck and verify that deck securing points, handhold stanchions and a bulwark ladder were provided as appropriate to the pilot boarding arrangement provided.
- Inspect the deck at the pilot boarding position and verify that the deck was provided with an anti-slip finish.
- Inspect the gateway in the rails or bulwark, where provided, and verify that it opened inwards, was provided with holdback arrangements and that it did not impede the safe passage of the pilot when boarding or disembarking.
- Verify that the pilot boarding position was within the parallel body length of the vessel for all normal operating draughts.
- Inspect the lifebuoy and self-igniting light and verify that the heaving line was **not** connected to the lifebuoy. (as required by ICS BPG5 Checklist A4)
- Request that the pilot boarding illumination is switched on and demonstrated as functioning.

Interview the accompanying officer to verify their familiarity with:

- The required level of supervision for the rigging and recovery of the pilot boarding arrangements.

- The method of securing the pilot ladder and accommodation ladder to the ship's side when rigging a combination ladder.
- The safety precautions required when working over the side while rigging or recovering a pilot ladder or combination ladder.

Interview a deck rating to verify their understanding of the process to rig and recover the pilot boarding arrangement especially as it related to working over the side.

#### **Expected Evidence**

- The company procedure for the safe rigging of the pilot boarding arrangements.
- The manufacturer's certificates for each pilot ladder.
- The manufacturer's repair instructions, where provided.
- The maintenance records for each pilot ladder which included the date the ladder was put in service.

#### **Potential Grounds for a Negative Observation**

- There was no company procedure for the safe rigging of the pilot boarding arrangements.
- An inspected pilot ladder was found:
  - Without any identification to connect it to its manufacturer's certificate or maintenance records.
  - With defects or arrangements which were specifically identified as unacceptable on BPG Checklist A4.
  - Constructed with materials or in a manner that did not comply with BPG Checklist A4.
  - Without manufacturer's certificates or maintenance records.
  - To have been repaired in a manner which did not conform to the manufacturer's instructions.
- The pilot access arrangements did not conform to the requirements of BPG Checklist A4.
- The pilot boarding position was not within the parallel body length of the vessel for all normal operating draughts.
- Where a combination ladder was required due to the vessel's freeboard, the means to secure the pilot ladder and the accommodation ladder to the ship's side was missing or broken.
- The accompanying officer was unfamiliar with the company procedure for rigging and recovering the pilot boarding arrangements.
- The accompanying officer was unfamiliar with the pilot boarding arrangements provided.
- An interviewed deck rating was unfamiliar with the process to safely rig and recover the pilot boarding arrangements.
- An item of equipment related to the pilot boarding arrangement was found to be missing or defective.
- The pilot boarding illumination was defective.
- The pilot ladder securing arrangement did not ensure that the weight of the pilot ladder was supported by the side ropes.
- The gateway in the rails or bulwark opened outwards, did not have a means to hold it open or impeded the safe passage of the pilot when embarking or disembarking.
- The deck area in the vicinity of the pilot boarding area did not have a non-slip finish.
- Where a pilot boarding arrangement was in the rigged condition during the inspection it was observed to be rigged in a manner that did not conform to ICS BPG5 Checklist A4 or the vessel's pilot boarding arrangement rigging drawings.
- A damaged or retired pilot ladder was retained onboard but was not clearly marked to prevent its use for either pilot transfer or any other purpose

**5.10.2. Were the Master, deck officers and deck ratings familiar with the company procedures for rigging the accommodation ladders, and were the accommodation ladders in good order and used in accordance with the company procedure and manufacturer's instructions?**

**Short Question Text**

Accommodation ladders

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation, Interview - Deck Rating, Main Deck

**Publications**

IMO: MSC.1/Circ.1331 Guidelines for Construction

Installation

Maintenance and Inspection/Survey of Means of Embarkation and Disembarkation.

IMO: ISM Code

IMO SOLAS

**Objective**

**To ensure accommodation ladders are always correctly rigged under the supervision of a responsible person or officer.**

**Industry Guidance**

**IMO: MSC.1/Circ.1331 Guidelines for Construction, Installation, Maintenance and Inspection/Survey of Means of Embarkation and Disembarkation.**

**3.3 Lifebuoy**

A lifebuoy equipped with a self-igniting light and a buoyant lifeline should be available for immediate use in the vicinity of the embarkation and disembarkation arrangement when in use.

**3.5 Marking**

Each accommodation ladder or gangway should be clearly marked at each end with a plate showing the restrictions on the safe operation and loading, including the maximum and minimum permitted design angles of inclination, design load, maximum load on bottom end plate, etc. Where the maximum operational load is less than the design load, it should also be shown on the marking plate.

**3.7 Positioning**

3.7.1 ...accommodation ladders should not be used at an angle greater than 55° from the horizontal, unless designed and constructed for use at angles greater than these and marked as such, as required by paragraph 3.5.

3.7.3 Adequate lighting for means of embarkation and disembarkation and the immediate approaches should be ensured from the ship and/or the shore in hours of darkness.

**3.8 Rigging (safety net)**

A safety net should be mounted in way of the accommodation ladders and gangways where it is possible that a person may fall from the means of embarkation and disembarkation or between the ship and quayside.

4.1 Accommodation ladders and gangways, including associate winch and fittings, should be properly maintained and inspected at appropriate intervals as required by SOLAS regulation III/20.7.2, in accordance with manufacturers' instructions. Additional checks should be made each time the accommodation ladder and gangway is rigged, looking out for signs of distortion, cracks and corrosion. Close examination for possible corrosion should be carried out, especially when an aluminium accommodation ladder/gangway has fittings made of mild steel.

4.2 Bent stanchions should be replaced or repaired, and guard ropes should be inspected for wear and renewed where necessary.

4.3 Moving parts should be free to turn and should be greased as appropriate.

4.4 The lifting equipment should be inspected, tested and maintained paying careful attention to the condition of the hoist wire. The wires used to support the means of embarkation and disembarkation should be renewed, when necessary, as required by SOLAS regulation II-1/3-9.

4.5 Arrangements should also be made to examine the underside of gangways and accommodation ladders at regular intervals.

4.6 All inspections, maintenance work and repairs of accommodation ladders and gangways should be recorded in order to provide an accurate history for each appliance. The information to be recorded appropriately on board should include the date of the most recent inspection, the name of the person or body who carried out that inspection, the due date for the next inspection and the dates of renewal of wires used to support the embarkation and disembarkation arrangement.

#### 5.1.1 Accommodation ladder

5.1.1.1 The following items should be thoroughly examined during annual surveys required by SOLAS regulations I/7 and I/8 and checked for satisfactory condition of the accommodation ladder:

1. steps;
2. platforms;
3. all support points such as pivots, rollers, etc.;
4. all suspension points such as lugs, brackets, etc.;
5. stanchions, rigid handrails, hand ropes and turntables;
6. davit structure, wire and sheaves, etc.; and
7. any other relevant provisions stated in these Guidelines.

5.1.1.2 At every five-yearly survey, upon completion of the examination required by paragraph 5.1.1.1, the accommodation ladder should be operationally tested with the specified maximum operational load of the ladder.

**TMSA KPI 9.2.1** requires that risk assessments for routine tasks are used to develop safe working procedures.

The risk assessment identifies all hazards associated with a task and any personnel at risk. All risk mitigation measures to address identified hazards are incorporated into the safe working procedures.

Reference sources from industry organisations, the Code of Safe Working Practices for Merchant Seafarers and International Maritime Organization (IMO) Guidelines are referred to when compiling a risk assessment.

#### **IMO: ISM Code**

7 The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks involved should be defined and assigned to qualified personnel.

#### **IMO: SOLAS**

## Chapter II-1 Regulation 3-9

### Means of embarkation on and disembarkation from ships

1. Ships constructed on or after 1 January 2010 shall be provided with means of embarkation on and disembarkation from ships for use in port and in port-related operations, such as gangways and accommodation ladders, in accordance with paragraph 2, unless the Administration deems compliance with a particular provision is unreasonable or impractical
2. The means of embarkation and disembarkation required in paragraph 1 shall be constructed and installed based on the guidelines developed by the Organization.
3. For all ships the means of embarkation and disembarkation shall be inspected and maintained in suitable condition for their intended purpose, taking into account any restrictions related to safe loading. All wires used to support the means of embarkation and disembarkation shall be maintained as specified in regulation III/20.4.

## Chapter III Regulation 20

### 4 Maintenance of falls

Falls used in launching shall be inspected periodically with special regard for areas passing through sheaves, and renewed when necessary due to deterioration of the falls or at intervals of not more than 5 years, whichever is earlier.

### Inspection Guidance

The vessel operator should have developed a procedure for the safe rigging of the accommodation ladder, which included but was not limited to:

- The inspection of the accommodation ladder before each use.
- The rigging process for the accommodation ladder.
- The required level of supervision during the rigging and recovery of the accommodation ladder.
- The provision of a lifebuoy, light and line in the vicinity of the accommodation ladder when in use.
- The circumstances in which a safety net is required to be rigged
- Any restrictions imposed on the use of the accommodation ladder for personnel transfer while the vessel is underway.
- The required level of supervision during personnel transfer.

The procedure may refer to, or incorporate, industry best practice and/or accommodation ladder arrangement drawings.

The line should be attached to the lifebuoy and light and marked with the symbol described by IMO Res. A.1116(30) LSS008

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure which described the requirements for the rigging and recovery of the accommodation ladders.
- Where necessary, review the manufacturer's instructions and/or drawings for the accommodation ladders.
- Where necessary review the maintenance and load test records for the accommodation ladders, including the date of the fall wires installation.
- Inspect one accommodation ladder and its hoisting arrangement and verify that:
  - The accommodation ladder was clearly marked at each end with a plate or other markings showing the restrictions on the safe operation and loading, including the maximum and minimum permitted design angles of inclination, design load, maximum load on bottom end plate.
  - The fall wire(s) were in apparent good order.

- There was sufficient wire remaining on the winch storage drum when the accommodation ladder was deployed at the maximum freeboard (It is not expected that the inspector requests that this is demonstrated)
- The visible parts of the accommodation ladder and its hoisting arrangement were in apparent good order and free from:
  - Cracks or fractures.
  - Excessive corrosion especially in areas where dissimilar metals are used.
  - Bucking or deformation of the individual steps or main structure.
  - Missing, broken or deformed stanchions or handrails.
  - Seized turntables, rollers or pivots.
  - Damage to lifting and support points.
  - Missing locking or securing pins for adjusting the lower platform angle.
- Request that the accommodation ladder illumination is switched on and demonstrated as functioning.

Interview the accompanying officer to verify their familiarity with:

- The required level of supervision for the rigging and recovery of the accommodation ladder.
- The safety precautions required when working over the side or outside the ship's rail while rigging or recovering an accommodation ladder, where this was required.
- Any restriction, or additional precautions, for the use of the accommodation ladder while the vessel was underway.
- The circumstances where a safety net was required to be rigged when using an accommodation ladder.

Interview a deck rating to verify their understanding of the process to rig and recover the accommodation ladder arrangement especially as it related to working over the side or outside the ship's rails, where this was required.

Where the information plate for a portable gangway was missing and the vessel had marked the required information on the accommodation ladder in some other manner, the vessel must be able to demonstrate that the information was an exact representation of the information shown on the original plate.

### **Expected Evidence**

- The company procedure for the safe rigging of the accommodation ladders.
- The manufacturer's instructions and/or design drawings for the accommodation ladders.
- The maintenance records for each accommodation ladder.
- The certificate and date of installation for each accommodation ladder fall wire.
- The certificate for the five-yearly load test for each accommodation ladder.
- Evidence of thorough examination of the portable gangway during annual surveys.

### **Potential Grounds for a Negative Observation**

- There was no company procedure that described the safe rigging of an accommodation ladder.
- The maintenance records for the accommodation ladders were missing or incomplete.
- The certificate(s) for the five-yearly load test of an accommodation ladder was not available or the test had not been completed within the required time frame.
- There was no evidence that the accommodation ladder fall wires had been replaced within the previous five years or, the manufacturer's certificate was not available for a fall wire in service.
- The fall wire was not long enough to permit the accommodation ladder to be deployed at the maximum freeboard whilst leaving sufficient turns on the winch drum.
- An inspected accommodation ladder was found:
  - Without plates or markings showing the restrictions on the safe operation and loading, including the maximum and minimum permitted design angles of inclination, design load, maximum load on bottom end plate.
  - With defects such as fractures, corrosion or deformation, to the structure of the ladder, steps, handrails, stanchions, turntables, rollers, pivots or lifting arrangements.



- With defects to its hoisting arrangements.
  - With defective fall wire(s).
  - To have temporary repairs to the main structure or strength members of the ladder or its hoisting system.
  - Any other defect that compromised its safe use.
- The accompanying officer was unfamiliar with the company procedure for rigging and recovering an accommodation ladder.
- The accompanying officer was unfamiliar with the operation or rigging of the accommodation ladder provided.
- An interviewed deck rating was unfamiliar with the process to safely rig and recover an accommodation ladder.
- The accommodation ladder illumination was defective.
- Where an accommodation ladder was rigged during the inspection:
  - It was observed to be rigged or used in a manner that did not conform to the accommodation ladder design limitations.
  - The bottom platform had not been adjusted to keep it level when deployed at the boarding level.
  - A safety net had not been rigged when required by the company procedure.
  - There was no lifebuoy, light and line available at the gangway landing area. (The line should be connected to the lifebuoy and light)

**5.10.3. Were the Master, officers and ratings familiar with the company procedure for providing safe access to the vessel while alongside a terminal/berth, and was safe access provided by the ship's portable gangway, the vessel's accommodation ladder or a shore gangway?**

**Short Question Text**

Safe access to the vessel while alongside a terminal/berth

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Main Deck, Interview - Deck Rating

**Publications**

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: MSC.1/Circ.1331 Guidelines for Construction

Installation

Maintenance and Inspection/Survey of Means of Embarkation and Disembarkation.

**Objective**

**To ensure safe access is always provided between the ship and a berth, whether by a ship's portable gangway, accommodation ladder or a gangway provided by the terminal.**

**Industry Guidance**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.**

Chapter 16.4 Tanker/terminal access

16.4.2 Provision of tanker/terminal access

Responsibility for the provision of safe tanker/terminal access is jointly shared between tanker and terminal personnel. Requirements for provision of safe access should be detailed in the pre-arrival communications. The preferred means of access between a tanker and a terminal is a shore based gangway.

Irrespective of whether safe access is provided by the terminal or tanker, the gangway should be subject to part of the ship/shore safety checks that are carried out at regular intervals throughout the ship's stay at the berth.

16.4.3 Access Equipment

All means of access should meet the following criteria:

- Clear walkway.
- Continuous handrails on both sides.
- Electrically insulated to eliminate continuity between tanker and terminal.
- Adequate lighting.
- For gangways without self-levelling treads or steps, the maximum safe operating angle should be marked.
- Lifebuoys should be available with light and line on both tanker and terminal.
- Marked with SWL or maximum number of persons.
- Means of access should be placed as close as possible to the accommodations.
- Means of access also provide a means of escape. The location of any portable gangway should be carefully considered to ensure that it provides a safe access to any escape route from the jetty.

- The jetty area for landing a tanker's gangway should be open, clearly identified and unobstructed with access to the area maintained clear.

#### 16.4.3.2 Portable gangways (tanker or terminal)

A portable gangway consists of a straight, lightweight bridging structure with side stanchions and handrails. The walking surface has a non-slip surface or transverse bars to provide foot grips for when it is at an incline. It is rigged perpendicular to the tanker's side and the working deck of the berth.

Portable gangways should not be landed on tanker's handrails unless the handrails are designed for this purpose. When gangways are mounted over the tanker's handrails, access steps with handrails (bulwark ladders) should be provided to enable safe access to and from the deck.

Where practical, the gangway should be deployed at a gate in the tanker's handrails.

Portable gangways provided should be of adequate minimum length to safely operate throughout all states of tide, changes in freeboard and motions of the tanker.

#### 16.4.3.4 Safety nets

Safety nets are not required if the gangway is fixed to the shore and provided with a permanent system of handrails. For other types of gangways and those fitted with rope or chain handrails or removable posts, correctly rigged safety nets should be provided.

The safety net should be rigged to prevent any person from falling into the water or directly onto the jetty/ground. It should extend from the ship's side at the boarding point to the bottom landing platform and suitability should be checked by the responsible person.

#### 23.10.1 Notices on the tanker

On arriving at a terminal, a tanker should display notices at the gangway in appropriate languages stating:

##### WARNING

- No Naked Lights
- No Smoking
- No Unauthorised Persons
- No Use of Mobile Phones without Master's Permission

**IMO: MSC.1/Circ.1331 Guidelines for Construction, Installation, Maintenance and Inspection/Survey of Means of Embarkation and Disembarkation.**

#### 3.5 Marking

Each accommodation ladder or gangway should be clearly marked at each end with a plate showing the restrictions on the safe operation and loading, including the maximum and minimum permitted design angles of inclination, design load, maximum load on bottom end plate, etc. Where the maximum operational load is less than the design load, it should also be shown on the marking plate.

#### 3.7 Positioning

3.7.1 Gangways should not be used at an angle of inclination greater than 30° from the horizontal... unless designed and constructed for use at angles greater than these and marked as such, as required by paragraph 3.5.

3.7.2 Gangways should never be secured to a ship's guardrails unless they have been designed for that purpose. If positioned through an open section of bulwark or railings, any remaining gaps should be adequately fenced.

3.7.3 Adequate lighting for means of embarkation and disembarkation and the immediate approaches should be ensured from the ship and/or the shore in hours of darkness.

### 3.8 Rigging (safety net)

A safety net should be mounted in way of the accommodation ladders and gangways where it is possible that a person may fall from the means of embarkation and disembarkation or between the ship and quayside.

4.1 Accommodation ladders and gangways, including associate winch and fittings, should be properly maintained and inspected at appropriate intervals as required by SOLAS regulation III/20.7.2, in accordance with manufacturers' instructions. Additional checks should be made each time the accommodation ladder and gangway is rigged, looking out for signs of distortion, cracks and corrosion. Close examination for possible corrosion should be carried out, especially when an aluminium accommodation ladder/gangway has fittings made of mild steel.

4.2 Bent stanchions should be replaced or repaired and guard ropes should be inspected for wear and renewed where necessary.

4.3 Moving parts should be free to turn and should be greased as appropriate.

4.5 Arrangements should also be made to examine the underside of gangways and accommodation ladders at regular intervals.

4.6 All inspections, maintenance work and repairs of accommodation ladders and gangways should be recorded in order to provide an accurate history for each appliance. The information to be recorded appropriately on board should include the date of the most recent inspection, the name of the person or body who carried out that inspection, the due date for the next inspection and the dates of renewal of wires used to support the embarkation and disembarkation arrangement.

### 5.1.2 Gangway

5.1.2.1 The following items should be thoroughly examined during annual surveys required by

SOLAS regulations I/7 and I/8 and checked for satisfactory condition of the gangway:

1. treads;
2. side stringers, cross-members, decking, deck plates, etc.;
3. all support points such as wheel, roller, etc.;
4. stanchions, rigid handrails, hand ropes; and
5. any other relevant provisions stated in these Guidelines.

5.1.2.2 At every five-yearly survey, upon completion of the examination required by paragraph 5.1.2.1, the gangway should be operationally tested with the specified maximum operational load of the gangway.

**TMSA KPI 9.2.1** requires that risk assessments for routine tasks are used to develop safe working procedures.

The risk assessment identifies all hazards associated with a task and any personnel at risk. All risk mitigation measures to address identified hazards are incorporated into the safe working procedures.

Reference sources from industry organisations, the Code of Safe Working Practices for Merchant Seafarers and International Maritime Organization (IMO) Guidelines are referred to when compiling a risk assessment.

### IMO: ISM Code

7. The company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and the environment. The various tasks should be defined and assigned to qualified personnel.

## **IMO: SOLAS**

### **Chapter II-1 Regulation 3-9**

#### **Means of embarkation on and disembarkation from ships**

1. Ships constructed on or after 1 January 2010 shall be provided with means of embarkation on and disembarkation from ships for use in port and in port-related operations, such as gangways and accommodation ladders, in accordance with paragraph 2, unless the Administration deems compliance with a particular provision is unreasonable or impractical
2. The means of embarkation and disembarkation required in paragraph 1 shall be constructed and installed based on the guidelines developed by the Organization.
3. For all ships the means of embarkation and disembarkation shall be inspected and maintained in suitable condition for their intended purpose, taking into account any restrictions related to safe loading...

#### **Inspection Guidance**

The vessel operator should have developed a procedure to ensure safe access to the vessel when alongside a terminal/berth, which included:

- The inspection of the ship's portable gangway or accommodation ladder before each use.
- The rigging process for the ship's portable gangway including the use of strengthened rails and bulwark ladders, where applicable.
- The required level of supervision during the rigging and recovery of the ship's portable gangway or accommodation ladder.
- The use of a safety net when using a ship's portable gangway or accommodation ladder.
- The circumstances where a safety net must be used when using a terminal provided gangway.
- The required level of supervision during personnel transfer.
- The provision of a lifebuoy, light and line at the head of the gangway.
- The provision of warning signs which include:
  - Guidance in alignment with ISGOTT6 23.10.1.
  - Specific warnings relating to the cargo being handled, such as high H<sub>2</sub>S content.
  - Specific warnings relating to onboard processes such as generating and using nitrogen.

The procedure may refer to, or incorporate, industry best practice and/or safe access arrangement drawings.

The line should be attached to the lifebuoy and light and marked with the symbol described by IMO Res. A.1116(30) LSS008

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure which described the requirements for providing safe access to the vessel while alongside a terminal/berth.
- Where necessary, review the manufacturer's instructions and/or drawings for the ship's portable gangway, where provided.
- Where necessary review the maintenance and load test records for the ship's portable gangway, where provided.
- Inspect the portable gangway, where provided, and verify that:
  - It was clearly marked at each end with a plate showing the restrictions on the safe operation and loading, including the maximum and minimum permitted design angles of inclination, design load...
  - The visible parts of the portable gangway were in apparent good order and free from:
    - Cracks or fractures.

- Excessive corrosion especially in areas where dissimilar metals are used.
  - Bucking or deformation of the individual steps or main structure.
  - Missing, broken or deformed stanchions or handrails.
  - Seized rollers or wheels.
  - Damage to lifting and support points.
  - Missing or damaged locking or securing arrangements for portable stanchions.
- Request that the gangway illumination is switched on and demonstrated as functioning.
- Where the ship's portable gangway or accommodation ladder was deployed verify that:
  - It was rigged in accordance with its design limitations.
- Where the ship's portable gangway or accommodation ladder, or shore gangway was deployed verify that:
  - Where it was resting on handrails, the handrails were designed to take the load.
  - A safety net had been rigged when required.
  - It was rigged in accordance with the guidance provided in ISGOTT6.
- Interview the accompanying officer to verify their familiarity with:
  - The required level of supervision for the rigging and recovery of the portable gangway, where provided.
  - The safety precautions required when working over the side or outside the ship's rail while rigging or recovering the portable gangway, where provided.
  - The provision of a safety net when using the ship's portable gangway, accommodation ladder or where a shore gangway without fixed railings was provided.
- Interview a deck rating to verify their understanding of the process to rig and recover the portable gangway arrangement, especially as it related to working over the side or outside the ship's rails prior to the rigging of the safety net.

This question relates to portable gangways and safe access at a terminal. If an accommodation ladder is in use as a means of access focus on the means of access rather than the technical details of the accommodation ladder.

Where the information plate for a portable gangway was missing and the vessel had marked the required information on the gangway in some other manner, the vessel must be able to demonstrate that the information was an exact representation of the information shown on the original plate.

### **Expected Evidence**

- The company procedure which described the requirements for providing safe access to the vessel while alongside a terminal/berth.
- Where a portable gangway was provided:
  - The manufacturer's instructions and/or design drawings for the portable gangway.
  - The maintenance records for the portable gangway.
  - The certificate for the five-yearly load test for the portable gangway.
  - Evidence of thorough examination of the portable gangway during annual surveys.

### **Potential Grounds for a Negative Observation**

- There was no company procedure which described the requirements for providing safe access to the vessel while alongside a terminal/berth.
- The maintenance records for the portable gangway, where provided, were missing or incomplete.
- Where a portable gangway was provided:
  - The certificate for the five-yearly load test of the portable gangway was not available or the test had not been completed within the required time frame.
  - The portable gangway was found:
    - Without plates or markings showing the restrictions on the safe operation and loading, including the maximum and minimum permitted design angles of inclination and design load.

- With defects such as fractures, corrosion or deformation, to the structure of the ladder, steps, handrails, stanchions, rollers, or lifting arrangements.
  - With deteriorated tread/non-skid provision on each step surface.
  - To have temporary repairs to the main structure or strength members of the gangway.
  - Any other defect that compromised its safe use.
- The embarkation and disembarkation area illumination provided by the vessel was defective.
- Where a ship's portable gangway or accommodation ladder was rigged during the inspection as a means of embarkation or disembarkation to the terminal, it was observed to be rigged or used in a manner that did not conform to the design limitations of the equipment.
- A safety net had not been rigged where required by the company procedure and/or the guidance provided by ISGOTT6 16.4.3.4.
- A portable gangway was resting on handrails not designed to take the load.
- Where a gangway was resting on the ship's handrails or bulwark, there was no bulwark ladder provided to give safe access between the deck and the head of the gangway.
- There was no lifebuoy, light and line available at the gangway landing area. (The line should be connected to the lifebuoy and light)
- There was no warning sign displayed at the gangway required by the company procedure and/or ISGOTT6 23.10.1.
- There was no sign displayed at the gangway warning of the specific dangers of the cargo being handled (e.g. High H<sub>2</sub>S) or operations being undertaken (i.e. nitrogen purging).
- The accompanying officer was unfamiliar with the company procedure for providing safe access to the vessel while alongside a terminal/berth.
- The accompanying officer was unfamiliar with the safe rigging of a portable gangway or accommodation ladder while at a terminal/berth.
- An interviewed deck rating was unfamiliar with the process to safely rig and recover the portable gangway, where provided.

**5.10.4. Were the Master and officers familiar with the company personnel transfer by crane procedure, and where a personnel transfer basket (PTB) and accessories were provided, were these in satisfactory condition and used in accordance with company procedures and manufacturer's recommendations?**

**Short Question Text**

Personnel transfer by crane

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Cargo Control Room, Main Deck

**Publications**

IMO: ISM Code

OCIMF: Transfer of Personnel by Crane between Vessels. First Edition

**Objective**

**To ensure personnel transfer by crane is always conducted in accordance with industry best practice guidance.**

**Industry Guidance**

**OCIMF: Transfer of Personnel by Crane between Vessels. First Edition**

**1 Introduction**

...Crane transfers are typically completed using a Personnel Transfer Basket (PTB). In this paper, the term PTB is used to describe the piece of equipment in which personnel are transferred and includes collapsible basket and rigid capsule types.

It is recommended that the transfer of personnel between vessels should be kept to an absolute minimum. If a transfer is being considered, the means of transfer should be evaluated by risk assessment, bearing in mind the residual risks may still be unacceptable and the decision not to transfer should always be considered as an option.

**3.2 Personnel Transfer Basket**

PTBs should be certified and meet Flag State and Classification Society requirements.

The PTB should be clearly marked with the SWL or capacity.

The following features are recommended for PTBs:

- The SWL should be based on appropriate testing and application of safety factors, which should be documented.
- Associated hooks/slides/shackles shall have equivalent testing/certification and markings.
- The empty weight of the PTB should be clearly stated.
- All PTBs should float, and rigid capsule types should be self-righting.
- A crane hook pennant that is long enough to keep the crane block well clear of the personnel being transferred should be used, but not too long to prevent the PTB from being lifted safely over the rail.

It is recommended that two tag lines are secured to each PTB. Tag lines should be appropriate for the specific operation, should never be wrapped around or secured to a strong point, and should:



- Have a diameter between 16mm and 19mm (5/8" – 3/4").
- Be secured at opposing ends of the base ring of the PTB or at the lowest point reasonably accessible. This ensures best control of the PTB, particularly when the crane is slewed.
- Be long enough to reach the water at the lightship draught of the active vessel with sufficient handling allowance.
- Have ends that are seized. Knots or back-splices should not be used as they may get snagged, causing the PTB to tip.

A policy should be in place requiring the inspection, maintenance and replacement of PTBs at specified intervals which should, as a minimum, conform to any published guidance by the manufacturer (see section 4).

The personnel transfer procedure should follow the policy and should include the method of maintenance and storage, together with instruction to inspect the PTB shortly before the transfer begins to confirm it is safe to use (see section 7).

#### 4 Maintenance, inspection and testing of equipment

A rigorous maintenance and inspection programme should be in place for personnel transfer equipment in accordance with the Classification Society requirements, the manufacturer's recommendation and the vessel's SMS.

##### 4.1 Documentation

Documentation showing that equipment has been properly tested, inspected and maintained should be available. This documentation could include:

- Valid certificates for the cranes, PTBs and accessories.
- A record of any outstanding or pending operational or maintenance issues.
- A record of any issues that have been resolved.
- Past maintenance and service records.
- Recommendations from manufacturers of required maintenance intervals and equipment to be checked.

##### 4.2 Inspection

A structured inspection programme should be in place in accordance with, as a minimum, the manufacturer's recommendations. All inspections should be completed before the transfer, in accordance with the guidance in section 3.

##### 4.3 Testing

The scope and frequency of tests should be in accordance with, as a minimum, the manufacturer's recommendations and, where applicable, with the certifying authority.

All tests should be carried out before the transfer, in accordance with the guidance in section 7.

**TMSA KPI 9.2.1** requires that risk assessments for routine tasks are used to develop safe working procedures.

The risk assessment identifies all hazards associated with a task and any personnel at risk. All risk mitigation measures to address identified hazards are incorporated into the safe working procedures.

#### **IMO: ISM Code**

7 The company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and the environment. The various tasks should be defined and assigned to qualified personnel.

## **Inspection Guidance**

Where transfer of personnel by crane is permitted and/or a personnel transfer basket (PTB) is provided, the vessel operator should have developed a procedure in alignment with the OCIMF information paper 'Transfer of Personnel by Crane between Vessels'. First Edition

This question will be included in the inspection question pool when the following HVPQ question is answered in the affirmative:

- 13.1.6 Does the Operator's SMS provide instructions regarding the transfer of personnel using derricks or cranes?

and/or the vessel operator had declared the vessel carries a PTB through the pre-inspection questionnaire (PIQ).

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure describing the requirements for personnel transfer by crane.
- Sight the manufacturer's test certificates for the PTB and any accessories.
- Where the vessel declared that the crane(s) were certified for personnel transfer through HVPQ 13.1.7, sight the appropriate crane certification.
- Sight the training records for the personnel designated for personnel transfer by crane operations.
- Where necessary review the onboard maintenance and inspection records for the crane, PTB and accessories.
- Where personnel transfer by crane had taken place within the previous three months, review the risk assessment and personnel transfer by crane plan for one transfer or group of transfers.
- Inspect the PTB and accessories and verify that:
  - Each item of equipment was in apparent good order.
  - Each item of equipment was marked with its SWL or capacity.
  - The PTB was marked with its empty weight.
  - A crane hook pennant was available to keep the main crane hook clear of the PTB.
  - Two tag lines were available which met the specifications provided in the OCIMF information paper.
- Interview the accompanying officer to verify their familiarity with:
  - The company procedure which described the transfer of personnel by crane.
  - The risk assessment and personnel transfer by crane plan development process.
  - The contingency plan for crane failure during a personnel transfer by crane.
  - The use of the PTB and accessories provided.

Where no PTB or accessories were provided on board, focus on the procedural and familiarity aspects of the question and guidance.

### **Expected Evidence**

- The company procedure describing personnel transfer by crane.
- The manufacturer's test certificates for the PTB and accessories.
- The crane certification for personnel transfer use, where HVPQ question 13.1.7 had been declared as affirmative.
- The training records for the personnel designated for personnel transfer by crane operations.
- The onboard maintenance and inspection records for the crane, PTB and accessories.
- Where personnel transfer by crane had taken place within the previous three months, the risk assessment and personnel transfer by crane plan for one transfer or group of transfers.

### **Potential Grounds for a Negative Observation**

- There was no company procedure describing the requirements for transfer of personnel by crane.
- The accompanying officer was not familiar with:
  - The company procedure describing the requirements for transfer of personnel by crane.
  - The use of the PTB or accessories for personnel transfer by crane.
  - The checks on the PTB and accessories required to be carried out before personnel transfer by crane is undertaken.
  - The risk assessment and personnel transfer by crane plan development process.
  - The contingency plan for crane failure during personnel transfer by crane.
- There were no manufacturer's test certificates available for the PTB or lifting accessories.
- The crane(s) used for personnel transfer were not certified for personnel transfer contrary to the response to HVPQ question 13.1.7.
- There was no contingency plan for the failure of the crane during personnel transfer.
- There were no training records available for the personnel designated for personnel transfer by crane operations.
- Maintenance, inspection or testing of the crane, PTB or accessories had not been conducted in accordance with the company procedure or the manufacturer's recommendations.
- Records of maintenance, inspection or testing for the crane, PTB or accessories were incomplete or missing.
- The PTB or lifting accessories were not marked with:
  - The SWL or capacity.
  - The empty weight.
- Taglines meeting the recommendations of the OCIMF information paper were not provided.
- Taglines were terminated with knots or back-splices.
- The PTB had not been replaced in accordance with the company PTB retirement policy or manufacturer's recommendations.
- Personnel transfers by crane had taken place without a risk assessment and/or personnel transfer by crane plan being developed to address the circumstances at the time of transfer.
- There was evidence that personnel transfer by crane had taken place using a device or arrangement other than an approved PTB provided by either the passive or active vessel.

Where no PTB or accessories were provided on board, select "*Not Answerable*" in the Hardware response tool then select "*Not Applicable - as instructed by question guidance*".

### **5.10.5. Were the Master and officers familiar with the company procedures for helicopter/ship operations, and had these procedures been complied with?**

#### **Short Question Text**

Helicopter operations

#### **Vessel Types**

Oil, Chemical, LPG, LNG

#### **ROVIQ Sequence**

Cargo Control Room, Main Deck

#### **Publications**

OCIMF Guidelines for Offshore Tanker Operations

ICS: Guide to Helicopter/Ship Operations 5th Edition

#### **Objective**

**To ensure helicopter/ship operations are performed safely and in a controlled manner.**

#### **Industry Guidance**

##### **OCIMF: Guidelines for Offshore Tanker Operations**

##### **7.4 - Helicopter transfer**

##### **7.4.1 Conventional tankers**

Conventional tankers do not usually have specialised offshore helicopter facilities. Any helicopter transfer operations should follow the guidance and practices in the International Chamber of Shipping (ICS) publication Guide to Helicopter/Ship Operations.

The helicopter operating company will need to be consulted before deciding on this method of transfer, because the type of helicopter available and the experience of their pilots will determine whether the proposed transfer operation is possible. The helicopter operating company will need to know whether the helicopter is required to land on the offtake tanker, or hover and transfer personnel by winch or sling. Confirming the tanker's structural layout and capabilities are an equally important part of the decision-making process.

For safe transfer of personnel, it is normally better to have the helicopter landed on the deck of the offtake tanker. For such an operation to be undertaken safely, there must be an appropriately marked landing and winching area on the deck, with no high deck structures and deck edge handrails capable of being folded down to deck level. Very High Frequency (VHF) radio communications will normally be used between the tanker and the helicopter, and all personnel should be familiar with the procedures and expectations in the Guide to Helicopter/Ship Operations.

##### **ICS: Guide to Helicopter/Ship Operations 5th Edition**

##### **2.2.2 Helicopter operations risk assessment**

A ship planning to undertake helicopter operations should produce a risk assessment that identifies the hazards and evaluates the risk in terms of probability and severity of consequences. The helicopter operations risk assessment should be reviewed on a regular basis in line with company requirements.

This guidance cannot provide an exhaustive list for individual risk assessments and mitigations, but examples include: *(headings only here)*

- Weather conditions.

- Ship movement (pitch, heave and roll).
- Crash on deck/ditching.
- Noise.
- Downdraught/loose articles/flying objects.
- Rotating blades.
- Communication.
- Static electricity.

#### 2.2.4 Master

The ship's Master is also responsible for:

- Appointing the RO (Responsible Officer), deck crew and administrator from among the officers and crew members. These functions, which in this instance are specifically related to helicopter operations, are additional to their other shipboard functions.
- Ensuring that ship's crew members involved in helicopter/ship operations are trained and understand the standards and procedures necessary to maintain the safety of the ship, its crew and the helicopter air crew.
- Making sure that the RO and the deck crew are fully familiar with equipment for winching and landing operations and are trained and regularly drilled in the tasks required of them in both routine operations and emergencies; and
- Confirming the radio frequency being monitored to give landing clearance, when appropriate, and for warning the helicopter pilot if an unsafe situation develops.

#### 4.7 Firefighting appliances and rescue equipment

Summary of required firefighting and rescue equipment

Emergency tools/equipment

As a minimum, the following equipment, ready for immediate use and stored to protect it from the elements:

- Red emergency signalling lamp (intrinsically safe if located on the deck area of tankers)
- Large axe
- Crowbar
- Adjustable wrench
- Fire resistant blanket
- 60cm bolt/wire cutters
- Grab or salving hook (insulated handle)
- Heavy duty hacksaw, complete with six spare blades
- Ladder
- Lifeline, 5mm diameter x 15m in length
- Side cutting pliers
- Set of assorted screwdrivers
- Harness knife complete with sheath
- First aid kit

#### 6.1.3 Pre-arrival checks on the ship

The RO should check all operational requirements on deck shortly before the arrival of the helicopter (see also section 4.5). Some ships may require special checks (See Chapter 8). A checklist which may be used is set out in Appendix C.

Appendix C Shipboard safety checklist for helicopter operations

## Appendix E Helicopter landing/operating area plan

The ship should expect the shipyard to have supplied a diagram of the helicopter landing/operating area plan, at the time the ship was built. The scale of the diagram should be clearly highlighted.

If no helicopter landing/operating area plan has been provided by the shipyard, one should be made.

**TMSA KPI 1A.1.1** requires that management ensures that company policy and the supporting procedures and instructions cover all the activities undertaken.

### IMO: ISM Code

7 The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks involved should be defined and assigned to qualified personnel.

### Inspection Guidance

The vessel operator should have developed procedures providing guidance on helicopter/ship operations including:

- Helicopter operations risk assessment.
- Training and emergency drill requirements.
- Preparation of a Helicopter Landing/Operating Area Plan.
- Use of the ICS Shipboard Safety Checklist for Helicopter Operations (or equivalent).
- Responsible Officer and deck crew assignment.
- Emergency tools and equipment requirements.
- Restrictions on cargo / crane operations during helicopter/ship operations.

This question will only be allocated to vessels where HVPQ 5.2.1.1 is answered as yes.

### Suggested Inspector Actions

- Sight, and where necessary review, the company procedures providing guidance on helicopter/ship operations.
- Review the helicopter operations risk assessment and evidence of last review.
- Sight the ICS Guide to Helicopter/Ship Operations.
- Review completed ICS Shipboard Safety Checklists for Helicopter Operations (or equivalent).
- Review records of training and emergency drills for helicopter/ship operations.
- During the course of the inspection, inspect the emergency tools and equipment required by the ICS Guide to Helicopter/Ship Operations.

### Expected Evidence

- Company procedures providing guidance on helicopter/ship operations.
- Helicopter operations risk assessment and evidence of last review.
- ICS Guide to Helicopter/Ship Operations.
- Records of training and emergency drills in helicopter/ship operations.
- Completed ICS Shipboard Safety Checklists for Helicopter Operations (or equivalent).
- Inventory of helicopter tools and equipment required for routine and emergency operations.

### Potential Grounds for a Negative Observation

- There were no procedures providing guidance on helicopter/ship operations including:
  - Helicopter operations risk assessment.

- Training and emergency drill requirements.
- Preparation of a Helicopter Landing/Operating Area Plan.
- Use of the ICS Shipboard Safety Checklist for Helicopter Operations (or equivalent).
- Deck Party Officer and Deck Party Crew assignment.
- Emergency tools and equipment requirements.
- Restrictions on cargo operations during helicopter/ship operations.
- The accompanying officer was not familiar with the procedures providing guidance on helicopter/ship operations or the ICS Guide to Helicopter/Ship Operations.
- There was no helicopter operations risk assessment available.
- There was no evidence that the helicopter operations risk assessment had been reviewed in accordance with the company procedures.
- There was no record of the required training and emergency drills taking place.
- There was no copy of the ICS Guide to Helicopter/Ship Operations on board.
- There was no Helicopter Landing/Operating Area Plan available.
- The ICS Shipboard Safety Checklist for Helicopter Operations (or equivalent) had not been completed prior to performing helicopter/ship operations.
- The emergency tools and equipment required by the ICS Guide to Helicopter/Ship Operations were not readily available.
- Restrictions on cargo / crane operations during helicopter/ship operations had not been complied with.

### **5.10.6. Were the Master and officers familiar with the company procedures for helicopter/ship operations, and had the crew involved received appropriate training?**

#### **Short Question Text**

Helicopter facilities

#### **Vessel Types**

Oil

#### **ROVIQ Sequence**

Documentation, Main Deck

#### **Publications**

IMO: ISM Code

IMO SOLAS

OCIMF Guidelines for Offshore Tanker Operations

ICS: Guide to Helicopter/Ship Operations 5th Edition

Civil Aviation Authority: CAP437 Standards for Offshore Helicopter Landing Areas (2018)

#### **Objective**

**To ensure helicopter/ship operations on vessels equipped with helicopter facilities are performed safely and in a controlled manner.**

#### **Industry Guidance**

##### **OCIMF: Guidelines for Offshore Tanker Operations**

##### **7.4 - Helicopter transfer**

##### **7.4.2 DP bow loading tankers with helidecks**

DP bow loading tankers are normally fitted with offshore standard helicopter decks. These decks are normally constructed and equipped to comply with the Civil Aviation Authority (CAA) publication CAP437: Standards for Offshore Helicopter Landing Areas. Although this is a UK publication it is used in many parts of the world as the definitive guide for offshore standard helicopter decks and operational expectations. Where some countries have similar rules, CAP437 equivalence is normally agreed, even where slight differences exist (e.g. the orientation of the 'H' marking can be 90 degrees different from CAP437). The latest version of CAP437 incorporates the International Civil Aviation Organization (ICAO) Standards and Recommended Practices (SARPS), covering relevant issues such as lighting, markings, etc.

On DP bow loading tankers, the crews are normally trained in helicopter operations and emergency procedures to the same standard as on most offshore terminals, and the equipment and facilities are also equivalent. Personnel transferring from the offtake tanker will have a pre-departure briefing on helicopter safety before being allowed to board the helicopter. In most locations, there is also a requirement that transit suits are worn.

Some operational safety factors are specific to the offtake tankers (and not included in CAP437) but should be part of the tanker technical operator's SMS and the field operations manual. Tanker-specific operational safety factors include:

- Cargo operations should be suspended during helicopter flights to the offtake tanker.
- Cargo tank inert gas pressure should be minimised, and all vents closed. Pressure should be continually monitored when the helicopter is close to or on the tanker and helicopter operations should be aborted if the inert gas pressure rises towards release valve settings.
- Communications are normally conducted on air band frequencies, and in the case of isolated terminals, the offtake tanker may have to take on the flight-watch duties until the helicopter is able to communicate with another radio station. This should be factored into the watchkeeping arrangements.



- During times of absolute calm, vented hydrocarbons may form a cloud around the offtake tanker and terminal. This may force the cancellation of helicopter movements until the area is confirmed gas free. Additionally, if the helideck is sheltered behind a high structure, some helicopters may have difficulty lifting off the offtake tanker helideck because of insufficient air movement. The tanker may be required to disconnect from the terminal and move clear.

## **Civil Aviation Authority: CAP437 Standards for Offshore Helicopter Landing Areas (2018)**

Vessels supporting offshore mineral workings and specific standards for landing areas on merchant vessels

9.1 Helidecks on vessels used in support of the offshore oil and gas industry should be designed to comply with the requirements of the preceding chapters of this publication.

9.2 The International Chamber of Shipping (ICS) has published a 'Guide to Helicopter/Ship Operations', updated in 2008, which comprehensively describes physical criteria and procedures on ships having shipboard heliport landing or winching area arrangements. Other than to address the basic design criteria and marking and lighting schemes related to shipboard heliport landing area arrangements, it is not intended to reproduce detail from the ICS document here in CAP 437. However, it is recommended that the 2008 4th edition of the ICS 'Guide to Helicopter/Ship Operations' should be referenced in addition to this chapter and, where necessary, in conjunction with Chapter 10 which includes information relating to shipboard heliport winching area arrangements.

## **ICS: Guide to Helicopter/Ship Operations 5th Edition**

### **2.2.2 Helicopter operations risk assessment**

A ship planning to undertake helicopter operations should produce a risk assessment that identifies the hazards and evaluates the risk in terms of probability and severity of consequences. The helicopter operations risk assessment should be reviewed on a regular basis in line with company requirements.

This guidance cannot provide an exhaustive list for individual risk assessments and mitigations, but examples include: *(headings only here)*

- Weather conditions.
- Ship movement (pitch, heave and roll).
- Crash on deck/ditching.
- Noise.
- Downdraught/loose articles/flying objects.
- Rotating blades.
- Communication.
- Static electricity.

### **2.2.4 Master**

The ship's Master is also responsible for:

- Appointing the RO (Responsible Officer), deck crew and administrator from among the officers and crew members. These functions, which in this instance are specifically related to helicopter operations, are additional to their other shipboard functions.
- Ensuring that ship's crew members involved in helicopter/ship operations are trained and understand the standards and procedures necessary to maintain the safety of the ship, its crew and the helicopter air crew.
- Making sure that the RO and the deck crew are fully familiar with equipment for winching and landing operations and are trained and regularly drilled in the tasks required of them in both routine operations and emergencies; and
- Confirming the radio frequency being monitored to give landing clearance, when appropriate, and for warning the helicopter pilot if an unsafe situation develops.

#### 4.7 Firefighting appliances and rescue equipment

##### Summary of required firefighting and rescue equipment

##### Emergency tools/equipment

As a minimum, the following equipment, ready for immediate use and stored to protect it from the elements:

- Red emergency signalling lamp (intrinsically safe if located on the deck area of tankers)
- Large axe
- Crowbar
- Adjustable wrench
- Fire resistant blanket
- 60cm bolt/wire cutters
- Grab or salving hook (insulated handle)
- Heavy duty hacksaw, complete with six spare blades
- Ladder
- Lifeline, 5mm diameter x 15m in length
- Side cutting pliers
- Set of assorted screwdrivers
- Harness knife complete with sheath
- First aid kit

#### 6.1.3 Pre-arrival checks on the ship

The RO should check all operational requirements on deck shortly before the arrival of the helicopter (see also section 4.5). Some ships may require special checks (See Chapter 8). A checklist which may be used is set out in Appendix C.

##### Appendix C Shipboard safety checklist for helicopter operations

**TMSA KPI 1A.1.1** requires that management ensures that company policy and the supporting procedures and instructions cover all the activities undertaken.

##### **IMO: ISM Code**

7 The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks involved should be defined and assigned to qualified personnel.

##### **IMO: SOLAS**

##### Chapter II-2 Regulation 3

##### Definitions

27 "Helicopter facility" is a helideck including any refuelling and hangar facilities

##### Chapter II-2 Regulation 18

##### Helicopter facilities

The purpose of this regulation is to provide additional measures in order to address the fire safety objectives of this chapter for ships fitted with special facilities for helicopters. For this purpose, the following functional requirements shall be met:

4 operation manuals and training shall be provided.

### **Inspection Guidance**

The vessel operator should have developed procedures in the form of an operations manual providing guidance on routine and emergency helicopter/ship operations including:

- Helicopter operations risk assessment.
- Identification of job roles and responsibilities for all personnel involved.
- Training requirements of all personnel involved.
- Emergency drill requirements.
- Use of the ICS Shipboard Safety Checklist for Helicopter Operations (or equivalent).
- Emergency tools and equipment requirements.
- Restrictions on cargo operations during helicopter/ship operations.
- Reasons for, and extent of, any operational limitations.

The training of personnel involved in helicopter/ship operations should include appropriate formal accredited courses such as Offshore Helicopter Landing Officer (HLO) and Offshore Helideck Assistant (HDA) followed by ship-specific familiarisation of the helicopter facilities and operations.

The vessel may have been issued with a Helicopter Landing Area Certificate (HLAC) issued by one of the Aviation Inspection Bodies (AIBs) recognised by the flag Administration. An HLAC can be taken as evidence of suitable training of personnel involved in helicopter/ship operations.

### **Suggested Inspector Actions**

- Sight and where necessary, review the company procedures providing guidance on helicopter/ship operations.
  - Review the helicopter operations risk assessment and evidence of last review.
  - Sight the Helicopter Landing Area Certificate (HLAC) if available.
  - If no HLAC is available, review records of appropriate formal accredited training courses such as Offshore Helicopter Landing Officer (HLO) and Offshore Helideck Assistant (HDA) followed by ship-specific familiarisation of the helicopter facilities and operations.
  - Review records of emergency drills in helicopter/ship operations.
  - Sight the ICS Guide to Helicopter/Ship Operations.
  - Review completed ICS Shipboard Safety Checklists for Helicopter Operations (or equivalent).
- 
- During the course of the inspection, inspect the required emergency tools and equipment as set out in the ICS Guide to Helicopter/Ship Operations.

### **Expected Evidence**

- Company procedures providing guidance on helicopter/ship operations.
- Helicopter operations risk assessment and evidence of last review.
- Helicopter Landing Area Certificate (HLAC) if available.
- If no HLAC is available, records of appropriate formal accredited training courses such as Offshore Helicopter Landing Officer (HLO) and Offshore Helideck Assistant (HDA) followed by ship-specific familiarisation of the helicopter facilities and operations.
- Records of emergency drills in helicopter/ship operations.

- ICS Guide to Helicopter/Ship Operations.
- Completed ICS Shipboard Safety Checklists for Helicopter Operations (or equivalent).

#### **Potential Grounds for a Negative Observation**

- There were no procedures providing guidance on helicopter/ship operations including:
  - Helicopter operations risk assessment.
  - Identification of job roles and responsibilities for all personnel involved.
  - Training requirements of all personnel involved.
  - Emergency drill requirements.
  - Use of the ICS Shipboard Safety Checklist for Helicopter Operations (or equivalent).
  - Emergency tools and equipment requirements.
  - Restrictions on cargo operations during helicopter/ship operations.
  - Reasons for, and extent of, any operational limitations.
- The accompanying officer was not familiar with the procedures providing guidance on helicopter/ship operations or the ICS Guide to Helicopter/Ship Operations.
- There was no helicopter operations risk assessment available.
- There was no evidence that the helicopter operations risk assessment had been reviewed in accordance with the company procedures.
- No HLAC was available, and there were no/incomplete records of appropriate formal accredited training courses such as Offshore Helicopter Landing Officer (HLO) and Offshore Helideck Assistant (HDA) followed by ship-specific familiarisation of the helicopter facilities and operations for all personnel involved.
- There were no records of emergency drills in helicopter/ship operations.
- There was no copy of the ICS Guide to Helicopter/Ship Operations on board.
- The ICS Shipboard Safety Checklist for Helicopter Operations (or equivalent) had not been completed prior to performing helicopter/ship operations.
- The required emergency tools and equipment as set out in the ICS Guide to Helicopter/Ship Operations were not readily available.
- Restrictions on cargo operations during helicopter/ship operations had not been complied with.

**5.10.7. Were the Master, officers and crew familiar with the escape routes from the machinery spaces, pump rooms, compressor rooms, accommodation spaces and, when in port, from the vessel, and were these routes clearly marked, unobstructed and well illuminated?**

**Short Question Text**

Escape routes

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Engine Room, Pumproom, Compressor Room, Main Deck, Internal Accommodation, Interview - Rating

**Publications**

IMO Resolution A.1116(30) Escape route signs and equipment location markings

IMO: MSC/Circ.1120 Unified interpretations of SOLAS Chapter II-2

The FSS Code

The FTP Code and related fire test procedures.

IMO: ISM Code

IMO SOLAS

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

UK MCA: Code of Safe Working Practices for Merchant Seafarers

OCIMF: Guidelines to Harden Vessels. First Edition.

**Objective**

**To ensure that there are marked escape routes available to ship and shore personnel in the event of an emergency on the vessel.**

**Industry Guidance**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.**

12.1.15 Pumproom operational procedures

12.1.15.3 Routine maintenance and housekeeping issues

Emergency escape routes should be regularly checked to ensure they are properly marked and clear of obstructions. When an escape trunk is fitted, check doors for ease of operation. Door seals should be effective and lighting within the trunk should be operational

16.4 Tanker/terminal access

16.4.3 Access equipment

All means of access should meet the following criteria:

- Means of access also provide means of escape. The location of any portable gangway should be carefully considered to ensure it provides a safe access to any escape route from the jetty.

23 Tanker and terminal precautions for cargo operations

23.1 External openings in superstructures

Doors should not normally be locked in port. However, if there are security concerns, the measures to prevent unauthorised access should also ensure that personnel have an escape route.

#### 23.9.1 Notices on the tanker

On arriving at a terminal ....

Photo luminescent notices stating "emergency escape route" should be displayed at appropriate locations, together with directional signs.

#### 20.5.4 Tanker evacuation

There should be an agreement between tankers and terminals in any evacuation plan, and it is important that masters of all tankers using a terminal are aware of emergency evacuation plans. These agreements should be discussed at the pre-transfer conference and identified when the ship/shore safety checklist is finished.

Pre-transfer SSSCL Ref. 40. Means of emergency escape from both tanker and terminal are established

### **UK MCA: Code of Safe Working Practices for Merchant Seafarers**

#### 9.4 Signs and notices

9.4.1 The international standards for safety signs are explained in the following paragraphs. Colours and symbols, when used appropriately, can provide information and warnings of hazards that can be understood by anyone, regardless of what language they speak.

9.4.9 Green signs mean emergency escape or a first-aid sign. The sign is a green square or rectangle, with safety information shown by words or a symbol in white. For example, a white arrow on a green background points to an emergency exit.

### **OCIMF: Guidelines to Harden Vessels. First Edition.**

#### 4.2.2.3 Restricted areas

Restricted areas are covered in the vessel's SSP and should be monitored. The control of access to restricted areas may be enhanced by using key or combination locks, padlocks, key code pads or door sensor locks. While it may be possible to breach locked doors and get access, this may alert vessel staff and raise the alarm.

In an emergency, shipboard personnel should be able to access and exit the accommodation block and machinery spaces. When berthed alongside, contingency plans should consider how access is granted to firefighting crews and emergency services. This may include identifying key access doors and staff responsible for ensuring they are unlocked.

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors. The documented procedures may include familiarisation with:

- Vessel specific operations and equipment.

### **IMO: ISM Code**

6.3 The Company should establish procedures to ensure that new personnel and personnel transferred to new assignments related to safety and protection of the environment are given proper familiarisation with their duties. Instructions which are essential to be provided prior to sailing should be identified, documented and given.

### **IMO: SOLAS**

## Chapter II-2 Regulation 13

### 1 Purpose

The purpose of this regulation is to provide means of escape so that persons on board can safely and swiftly escape to the lifeboat and liferaft embarkation deck. For this purpose, the following functional requirements shall be met:

1. safe escape routes shall be provided;
2. escape routes shall be maintained in a safe condition, clear of obstacles; and
3. addition aids for escape shall be provided as necessary to ensure accessibility, clear marking, and adequate design for emergency situations.

### 3.3 Means of escape in cargo ships.

#### 3.3.1 General

At all levels of accommodation there shall be at least two widely separated means of escape from each restricted space or group of spaces.

#### **IMO: MSC/Circ.1120 Unified Interpretations of SOLAS Chapter II-2, the FSS Code, the FTP Code and Related Fire Test Procedures.**

SOLAS Chapter II-2 Reg 13.3.3 Interpretation or reference

Locking arrangements and accessibility to embarkation decks

1. The escape routes are routes for escape and also for access. Accordingly, the locking arrangement should be such that it does not obstruct these two objectives (escape and access). Doors along any designated escape routes which require keys to unlock them when moving in the direction of escape should not be permitted.
2. The embarkation deck should be accessible from the open decks to which escapes routes

#### **IMO: Resolution A.1116(30) Escape route signs and equipment location markings.**

4. INVITES Contracting Governments to note that these escape route signs and equipment location markings should take effect on ships constructed on or after 1 January 2019 or ships which undergo repairs, alterations, modifications and outfitting within the scope of SOLAS chapters II-2 and/or III, as applicable, on or after 1 January 2019, and that they should be used, as appropriate, in combination with resolution A.952(23) for the preparation of the shipboard fire control plans required by SOLAS regulation II-2/15.2.4.

### **Inspection Guidance**

The vessel operator should have developed a procedure that ensured:

- The identification and marking of escape routes from:
  - Accommodation spaces.
  - Machinery spaces.
  - Compressor rooms.
  - Thruster rooms.
  - Any other space where the means of escape may not be obvious when disorientated.
- Means of escape were unobstructed but, where external doors were locked for security reasons, a rapid means of opening the door from the inside was provided.
- Where company security procedures did not explicitly require exterior doors to be locked and secured to prevent access from the outside, the doors either remained unlocked or secured in a manner that would permit access from the outside to a properly equipped firefighting party.
- Whilst the vessel was in port, the escape route to the terminal means of access was marked.

Escape routes should be marked by signs that are a green square or rectangle, with safety information shown by words or a symbol in white.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure defining the requirements for identifying and marking escape routes.
- Inspect the designated escape routes from the accommodation spaces, machinery spaces, pump room, etc. and verify that:
  - The escape routes were clearly identified by signs in accordance with IMO guidance.
  - Where an escape route terminated at a door, the door was either unlocked or, where the door was locked for security reasons, there was a rapid means of opening the door from the inside.
  - Where an escape route was provided with a self-closing fire door, the door was able to close and latch properly without external assistance.
  - Where the escape route was an enclosed trunk, the emergency lighting was fully maintained with functioning bulbs in every lamp.
  - The escape routes, or doors forming part of an emergency escape route, were not obstructed.
- Inspect the escape route from the accommodation to the means of shore access and verify that it was clearly marked with signs and, so far as possible, routed around mooring lines under tension and/or the cargo manifolds in use.
- Where an external door forming part of an escape route was locked for security reasons:
  - Request that an officer or rating demonstrate the opening of the door from the inside without the need for a key or tools.
  - Request that an officer or rating describes how a properly equipped firefighting party would open the door from the outside in an emergency.

Unless documented security procedures override access in an emergency, then a means of access through a door forming part of an emergency escape route should be possible from both directions.

### **Expected Evidence**

- The company procedure defining the requirements for identifying and marking emergency escape routes.

### **Potential Grounds for a Negative Observation**

- There was no company procedure which defined the requirements for identifying and marking escape routes.
- The escape routes from within the accommodation spaces, machinery spaces, pump rooms, compressor rooms, thruster rooms or any other spaces where a person could become disorientated in an emergency were not marked with signs in accordance with IMO guidance.
- The accompanying officer could not direct the inspector to the escape route from any location within the vessel where there was potential to take a route to a dead end or space with no exit to an outside deck.
- External doors forming part of an escape route were locked or bolted with no means of rapid opening from the inside.
- An officer or rating was unable to demonstrate the opening of an external door which formed part of an escape route from the inside.
- Except in circumstances where security procedures required external doors to be secured to make entry from the outside impossible, the accompanying officer was unable to explain how a properly equipped firefighting team would be able to access through an external door forming part of an emergency escape route.
- A means of escape was blocked or obstructed.
- Self-closing doors forming part of an escape route would not close and latch without intervention when released.
- More than one bulb was unlit in any enclosed escape trunk.



- The escape route from the accommodation to the shore means of access was not marked.
- The escape route from the accommodation to the shore means of access was routed over moorings lines under tension or passed across the outboard side the cargo manifold in use unless there was no alternative to such routing.

## 5.11. Sample Management

**5.11.1. Were the Master and officers familiar with the company procedures addressing the management of samples of bunker fuel oil and Annex I and/or Annex II cargoes as applicable, and were samples being properly stored and eventually disposed of?**

### Short Question Text

Cargo and bunker sample management.

### Vessel Types

Oil, Chemical, LPG, LNG

### ROVIQ Sequence

Cargo Control Room, Main Deck, Chief Engineer's Office

### Publications

IMO: MEPC/Circ.864/Rev.1 2019 Guidelines for on board sampling for the verification of the sulphur content of the fuel used on board ships.

IMO: ISM Code

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: IBC Code

ICS: Tanker Safety Guide (Chemicals) - Fifth Edition

IMO: Resolution MEPC.96(47) Guidelines for the sampling of fuel oil for determination of compliance with Annex VI of MARPOL 73/78

### Objective

**To ensure cargo and bunker samples are safely stored on board and properly disposed of in a timely manner.**

### **Industry Guidance**

#### **OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals**

##### 13.3 Cargo and bunker samples

The operator's SMS should include guidance on managing and storing cargo and bunker samples. The quantity of samples kept on board should be carefully managed and reduced to a minimum number required. When they are no longer required, they should be disposed of in an appropriate cargo or slop tank on board or landed ashore.

##### 13.3.1 Sample disposal

After the cargo has been discharged, unless the company or charterer says otherwise, it is suggested that cargo samples are kept for no longer than three months. MARPOL requires that bunker samples are kept on board for at least 12 months from the time of delivery.

##### 13.3.2 Sample storage

All cargo and bunker samples should be stored securely in lockers that cannot be accessed from the accommodation. Consider storing samples in an area protected by a fire detection and fixed firefighting system, such as a paint locker or midship storeroom. If no fixed firefighting system is fitted, portable firefighting equipment should be provided nearby. Keep samples away from high temperatures and do not expose them to direct sunlight. Before entering any storage space, make sure it is properly ventilated.

In some cases, oil tankers may be equipped to carry certain MARPOL Annex II cargoes and have a relevant certificate of fitness. In such cases, follow the guidance in the IBC Code section 16.5, Stowage of Cargo Samples. (*see below*)

## ICS: Tanker Safety Guide (Chemicals) - Fifth Edition

### 6.7.12 Sample Management

After completion of loading or before discharge starts, samples of the cargo should be obtained under supervision of the duty officer, the shipper's surveyor and a representative from the shore installation. The sample should be stored in the sample locker (see Section 6.7.14).

#### Marking of samples

Sample bottles should be clearly marked with;

- Date and time of sampling;
- Port;
- Type of sample e.g. manifold, final from tank after loading, tank before discharge;
- Grade;
- Tank number;
- Manifold number;
- Name/rank of person taking the sample;
- USCG Compatibility Number (if appropriate); and
- MARPOL Category (X, Y, Z or OS).

A log should be kept with the seal reference number and date of all samples, as well as the date of final disposal.

#### Retention of samples

All samples should be kept in the sample locker for a time to be determined by the company

#### Disposal of samples

Cargo samples should be disposed of as required by the SMS. When cargo samples are disposed of ashore, a record should be kept. This record should include: date, place, number of samples, quantity per bottle and a reference to the delivery receipt.

#### Inhibited samples

Inhibited samples should be checked regularly for signs of polymerisation. These samples should only be retained for as long as the inhibitor remains active, as stated on the inhibitor certificate.

### 6.7.14 Sample Storage

Chemical tankers are required to store a wide range of cargo samples. The IBC Code requires that the storage of samples must be within a purpose built storage.

The sample locker must be designed and built to ensure that sample bottles are securely stored and protected from damage and excessive vibration, and that the space is adequately ventilated and fitted with flame arresters. Fire-fighting equipment should be readily available. The sample store should be a dedicated locker, resistant to the different liquids that will be stowed in it and sited within the cargo area.

The sample locker should separate chemicals that react dangerously with each other and should only be used for the storage of cargo samples.

**IMO: Resolution MEPC.96(47) Guidelines for the sampling of fuel oil for determination of compliance with Annex VI of MARPOL 73/78**

## 8 Sealing of the retained sample

8.1 Immediately following collection of the retained sample, a tamper proof security seal with a unique means of identification should be installed by the supplier's representative in the presence of the ship's representative. A label containing the following information should be secured to the retained sample container:

\* The phrase "be drawn continuously throughout the bunker delivery period" in paragraph 6 of the Guidelines should be taken to mean continuous collection of drip sample throughout the delivery of bunker fuel covering each bunker delivery note. In case of receiving an amount of bunker fuel necessitating two or more delivery notes, the sampling work may be temporarily stopped to change sample bags and bottles and then resumed as necessary.

1. location at which, and the method by which, the sample was drawn;
2. date of commencement of delivery;
3. name of bunker tanker/bunker installation;
4. name and IMO number of the receiving ship;
5. signatures and names of the supplier's representative and the ship's representative;
6. details of seal identification; and
7. bunker grade.

8.2 To facilitate cross-reference details of the seal, identification may also be recorded on the bunker delivery note.

## 9 Retained sample storage

9.1 The retained sample should be kept in a safe storage location, outside the ship's accommodation, where personnel would not be exposed to vapours which may be released from the sample. Care should be exercised when entering a sample storage location.

9.2 The retained sample should be stored in a sheltered location where it will not be subject to elevated temperatures, preferably at a cool/ambient temperature, and where it will not be exposed to direct sunlight.

9.3 Pursuant to regulation 18(6) of Annex VI of MARPOL 73/78, the retained sample should be retained under the ship's control until the fuel oil is substantially consumed, but in any case, for a period of not less than 12 months from the time of delivery.

9.4 The ship's master should develop and maintain a system to keep track of the retained samples

**IMO: MEPC/Circ.864/Rev.1 2019 Guidelines for on board sampling for the verification of the sulphur content of the fuel used on board ships.**

## Annex

### 3 Sample handling

...The ship should be given the option of retaining a sample. The label should include the following information:

1. sampling point location where the sample was drawn;
2. date and port of sampling;
3. name and IMO number of the ship;
4. details of seal identification; and
5. signatures and names of the inspector and the ship's representative.

**TMSA KPI 6.1.1** requires that procedures for cargo, ballast, tank cleaning and bunkering operations are in place for all vessel types within the fleet.

**IMO: ISM Code**

7 The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks involved should be defined and assigned to qualified personnel.

## **IMO: IBC Code**

### **16.5 Stowage of cargo samples**

16.5.1 Samples which have to be kept on board should be stowed in a designated space situated in the cargo area or, exceptionally, elsewhere, subject to the approval of the Administration.

16.5.2 The stowage space should be:

- cell-divided in order to avoid shifting of the bottles at sea;
- made of material fully resistant to the different liquids intended to be stowed; and
- equipped with adequate ventilation arrangements.

16.5.3 Samples which react with each other dangerously should not be stowed close to each other.

16.5.4 Samples should not be retained on board longer than necessary.

### **Inspection Guidance**

The operator should have developed procedures addressing the management of samples of bunker fuel oil and Annex I and/or Annex II cargoes as applicable, including:

- Marking/labelling of samples.
- Storage arrangements.
- Records to be kept.

A sample locker should be equipped with adequate ventilation arrangements but does not have to be mechanically ventilated.

### **Suggested Inspector Actions**

- Sight, and where necessary review, company procedures addressing the management of samples of bunker fuel oil and Annex I and/or Annex II cargoes as applicable.
- Review the records of bunker fuel oil and cargo samples and Oil Record Book Part II or Cargo Record Book as applicable.
- Inspect the designated space(s) for storing samples.
- During the course of the inspection, note any samples stored outside the designated space(s) for storing samples.
  
- Interview the responsible officer to verify their familiarity with company procedures addressing the management of samples of bunker fuel oil and Annex I and/or Annex II cargoes as applicable.

The responsible officer can be any officer nominated by the Master to review the onboard sample management during an inspection.

### **Expected Evidence**

- Company procedures addressing the management of samples of bunker fuel oil and Annex I and/or Annex II cargoes as applicable.
- Records of bunker fuel oil and cargo samples.
- Oil Record Book Part II or Cargo Record Book as applicable.

#### **Potential Grounds for a Negative Observation**

- There were no company procedures addressing the management of bunker fuel oil and Annex I and/or Annex II cargo samples as applicable, including:
  - Marking/labelling of samples.
  - Storage arrangements.
  - Records to be kept.
- The responsible officer was not familiar with the company procedures addressing the management of bunker fuel oil or Annex I and/or Annex II cargo samples, as appropriate.
- The designated storage space(s) for samples was:
  - Insufficient for the quantity of samples being retained.
  - Accessible from the accommodation.
  - Not within the cargo area for MARPOL Annex II samples.
  - Subject to high temperatures.
  - Inadequately ventilated.
  - Not protected by a fixed firefighting system or readily available portable firefighting equipment.
- Samples were:
  - Stored outside the designated storage space(s).
  - Retained beyond the period indicated in the company procedures.
  - Not disposed of as required by the company procedures.
- Bunker fuel oil samples were not marked as required by MEPC.96(47) or MEPC.1/Circ.864/rev.1 as appropriate.
- Annex I cargo samples were not marked as required by company procedures.
- Annex II cargo samples were not marked as recommended in the ICS Tanker Safety Guide.
- A log was not kept of all:
  - bunker fuel oil samples.
  - cargo samples.
- The disposal of cargo samples had not been recorded in the Oil Record Book Part II or Cargo Record Book as applicable.
- The disposal of bunker samples had not been recorded in the Oil Record Book Part 1.
- The design of a sample locker did not ensure that sample bottles were securely stored and protected from damage.
- Annex II cargo samples that might react dangerously with one another were not separated in the sample locker.
- Inhibited Annex II cargo samples had been retained on board beyond the period that the inhibitor remained active, as stated on the inhibitor certificate.

## 5.12. Safety Equipment

**5.12.1. Were the Master, officers and ratings familiar with the company procedures that addressed the use of respiratory protective equipment during cargo operations, and did the procedures prohibit the use of filter type respirators for this purpose?**

### Short Question Text

Respiratory protective equipment

### Vessel Types

Oil, Chemical, LPG, LNG

### ROV/Q Sequence

Cargo Control Room, Main Deck

### Publications

ICS: Tanker Safety Guide (Chemicals) - Fifth Edition

IMO: ISM Code

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

### Objective

**To ensure the correct respiratory protective equipment is worn during cargo operations.**

### **Industry Guidance**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition**

10.13 Respiratory Protective Equipment

Cartridge or canister face masks will not protect the user against concentrations of hydrocarbon or toxic vapours or against oxygen deficiency. They should never be used in place of breathing apparatus.

**ICS: Tanker Safety Guide (Chemicals) - Fifth Edition**

3.11.11 Respiratory Protection

Respiratory protection in the form of breathing apparatus (self-contained or air-line) is designed to provide the user with an adequate supply of fresh air when working in an area where toxic vapours could be present. It usually consists of a sealed facepiece connected to either a self-contained air source or to a fresh air line.

3.11.15 Canister or filter type respirators

Canister or filter type respirators/filter masks are designed to absorb specific toxic or poisonous elements, dust and debris but do not protect the wearer from an oxygen deficient atmosphere.

Filter masks may be ineffective in protecting the wearer from cargo vapours and do not protect the wearer from an oxygen deficient atmosphere. They should not be used during cargo or tank cleaning operations.

Filter masks should never be used in enclosed spaces or areas on board where the oxygen content of the atmosphere may be insufficient to sustain life.

Filter masks should only be used to protect wearers from dust and other debris in the air when carrying out maintenance tasks such as chipping paintwork or when using grinding tools.

**TMSA KPI 6.1.4** requires that the company has procedures that address cargo specific hazards for all vessel types within the fleet. Cargoes with specific hazards may include:

- Aromatic hydrocarbons.
- Toxic cargoes.
- Incompatible cargoes.
- High vapour pressure cargoes.
- Cargoes containing mercaptans and/or H<sub>2</sub>S.

#### **IMO: ISM Code**

7 The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks involved should be defined and assigned to qualified personnel.

#### **Inspection Guidance**

The vessel operator should have developed procedures that addressed the use of respiratory protective equipment during cargo operations including prohibiting the use of filter type respirators for this purpose.

Filter masks should not be used during cargo operations.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures for the use of respiratory protective equipment during cargo operations.
- During the course of the inspection, observe any respiratory protective equipment in use during cargo operations.
- Interview the accompanying officer to verify their familiarity with company procedures for the use of respiratory protective equipment during cargo operations.

#### **Expected Evidence**

- Company procedures for the use of respiratory protective equipment during cargo operations.

#### **Potential Grounds for a Negative Observation**

- There were no company procedures for the use of respiratory protective equipment during cargo operations.
- The company procedures for the use of respiratory protective equipment during cargo operations did not prohibit the use of filter type respirators during cargo operations.
- The accompanying officer was not familiar with the company procedures for the use of respiratory protective equipment during cargo operations.
- Filter type respirators were observed being used by crew members involved in cargo operations.



**5.12.2. Were the Master, officers and ratings familiar with the location and operation of the decontamination showers and eyewash stations on deck, and were these facilities suitably marked, easily accessible and ready for use?**

**Short Question Text**

Decontamination showers and eyewash stations.

**Vessel Types**

Chemical, LPG

**ROVIQ Sequence**

Main Deck

**Publications**

IMO: ISM Code

IMO: IGC Code

IMO: IBC Code

ICS: Tanker Safety Guide (Chemicals) - Fifth Edition

**Objective**

**To ensure the decontamination showers and eyewash stations provided on deck are always ready to use in an emergency.**

**Industry Guidance**

**ICS: Tanker Safety Guide (Chemicals) - Fifth Edition**

2.7.3 Cold Weather

Special attention should be paid to emergency showers and eye wash stations to ensure they continue to function. Water pipes supplying these should be insulated and provided with heat tracing to prevent freezing.

8.3.4 Preparations

Before commencing tank cleaning or gas freeing operations, the responsible officer should confirm that all the necessary equipment is available and in working condition.

Checks, including the following, should be made before operations start:

- Decontamination showers and eye-wash arrangements are ready for use.

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors. The documented procedures may include familiarisation with:

- Vessel specific operations and equipment.

**IMO: ISM Code**

10.1 The Company should establish procedures to ensure that the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

**IMO: IBC Code**

14.3.4 Suitably marked decontamination showers and an eyewash shall be available on deck in convenient locations. The showers and eyewash shall be operable in all ambient conditions.

#### **IMO: IGC Code**

14.4.1 Requirements of this section shall apply to ships carrying products for which those paragraphs are listed on column "I" in the table of Chapter 19.

14.4.3 One or more suitably marked decontamination showers and eyewash stations shall be available on deck, taking into account the size and layout of the ship. The showers and eyewashes shall be operable in all ambient conditions.

#### **Inspection Guidance**

The operator should have developed a procedure to ensure that decontamination showers and eye wash stations on deck are ready for use, and:

- Suitably marked.
- Easily accessible.
- Regularly inspected and tested.

This procedure may form part of the planned maintenance system.

To be operable in any ambient condition, a recirculation system, or fully heat-traced line must be provided.

Uninsulated sections of freshwater supply lines may lead to water being heated by direct sunlight such that a person would not be able to use a shower or eyewash station for the intended purpose.

#### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure which ensures that decontamination showers and eye wash stations on deck are ready for use.
- Inspect the decontamination showers and eye wash stations, select one and,
  - If the temperature is at or below freezing, verify that the selected shower or eye wash was not frozen.
  - If the temperature was high with strong sunlight, verify that the selected shower or eye wash was not scalding hot.
- Where necessary, review the records of inspection and testing of the decontamination showers and eye wash stations.
  
- Interview a rating to verify their familiarity with the location and operation of the decontamination showers and eyewash stations.

#### **Expected Evidence**

- Company procedure which ensures that decontamination showers and eye wash stations on deck were ready for use.
- Records of inspection and testing of the decontamination showers and eye wash stations on deck.

#### **Potential Grounds for a Negative Observation**

- There was no company procedure which ensures that decontamination showers and eye wash stations on deck were ready for use.

- An interviewed rating was not familiar with the location and operation of the decontamination showers and eyewash stations on deck.
- The decontamination showers and eye wash stations on deck were not
  - Ready for use.
  - Suitably marked.
  - Easily accessible.
  - Regularly inspected and tested as required by company procedures.
  - Provided with insulation and a recirculation system or a fully heat-traced line.
- Sections of freshwater piping supplying the showers or eye wash stations required to be heat traced and/or insulated were found with the insulation and/or heat tracing removed.
- The fresh water supply to a shower or eyewash station was found to be either frozen or scalding hot.

## 6. Pollution Prevention

### 6.1. Pollution Prevention - Record Books

**6.1.1. Were the Master and officers familiar with the company procedure for maintaining the Cargo Record Book, and did the entries contained in the Cargo Record Book accurately record the cargo related operations required to be documented by MARPOL Annex II?**

**Short Question Text**

Cargo Record Book

**Vessel Types**

Chemical, LPG

**ROVIQ Sequence**

Cargo Control Room, Documentation

**Publications**

IMO: ISM Code

IMO: MARPOL

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: MEPC.312(74) Guidelines for the Use of Electronic Record Books under MARPOL

ICS: Tanker Safety Guide (Chemicals) - Fifth Edition

**Objective**

**To ensure that all cargo operations are conducted in compliance with the Procedures and Arrangements Manual and recorded in accordance with MARPOL Annex II.**

**Industry Guidance**

**ICS: Tanker Safety Guide (Chemicals) Fifth edition**

4.3.2 MARPOL Annex II Prevention of Pollution by Noxious Liquid Substances.

All liquid cargoes carried in bulk are defined by MARPOL as either oil (Annex I) or as NLS (Annex II)

The MARPOL Annex II regulations assign pollution criteria for all regulated NLS...

Cargo record book

All operations involving the loading, discharging and cleaning of cargo tanks after the carriage of NLS products should be recorded in the ship's cargo record book.

**IMO: MEPC.312(74) Guidelines for the Use of Electronic Record Books under MARPOL**

2.1 These Guidelines are only applicable to the use of electronic record books on board to meet the requirements of the following record books and recording requirements under the MARPOL Annexes and the Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines (NOX Technical Code):

.2 Cargo Record Book (MARPOL Annex II, regulation 15.1);

2.2 The use of an electronic record book to record operational logs is an alternative method to a hard copy record book. The electronic record book may allow ships to utilize their technology to reduce administrative burdens and contribute to on board environmental initiatives, e.g. reduction of paper use.

4.4.2 The electronic record book should have the capability to allow automatic backup of data in the system to offline storage. Backups should ensure the offline record is updated automatically every time changes are made to entries to ensure the backing up process is not forgotten by the user.

## 5 Declaration

5.1 Any electronic system deemed to meet the above criteria should be provided with written confirmation by the Administration and carried on board the ship for the purpose of regulatory surveys or inspections. An example of a declaration can be seen in the appendix.

5.2 Delegating the assessment of the electronic record book against these Guidelines and the issuing of a declaration on behalf of the Administration by recognized organizations (ROs) is at the discretion of the Administration.

**TMSA KPI 10.1.3** requires that procedures minimise marine and atmospheric emissions and ensure that they are always within permitted levels.

Procedures may include:

- Methods of minimising emissions.
- Identification of applicable regulations.
- Environmentally responsible disposal methods.
- Emissions monitoring.
- Fuel analysis.
- VOC management.

## IMO: ISM Code

1.2.3 The safety management system should ensure:

1. compliance with mandatory rules and regulations, and
2. that applicable codes, guidelines and standards recommended by the Organization, Administrations, classification societies and maritime industry organizations are taken into account.

## IMO: MARPOL

### Annex II

#### Regulation 15 Cargo Record Book

1 Every ship to which this Annex applies shall be provided with a Cargo Record Book, whether as part of the ship's official logbook or otherwise, in the form specified in the appendix II to this Annex.

2 After completion of any operation specified in appendix II to this Annex, the operation shall be promptly recorded in the Cargo Record Book.

3 In the event of an accidental discharge of a noxious liquid substance or a mixture containing such a substance or a discharge under the provision of regulation 3 of this Annex, an entry shall be made in the Cargo Record Book stating the circumstances of, and reason for, the discharge.

4 Each entry shall be signed by the officer or officers in charge of the operation concerned and each page shall be signed by the master of the ship. The entries in the Cargo Record Book, for ships holding an International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk or a certificate referred to in regulation 7 of this Annex, shall be at least in English, French or Spanish. Where entries in an official national language of the State whose flag the ship is entitled to fly are also used, this shall prevail in the case of dispute or discrepancy.

5 The Cargo Record Book shall be kept in such a place as to be readily available for inspection and, except in the case of unmanned ships under tow, shall be kept onboard the ship. It shall be retained for three years after the last entry has been made.

Appendix II Form of Cargo Record Book for ships carrying noxious liquid substances in bulk.

List of Items to be recorded

- *Loading of cargo*
- *Internal transfer of cargo*
- *Unloading of cargo*
- *Mandatory prewash in accordance with the ship's Procedures and Arrangements Manual*
- *Cleaning of cargo tanks except mandatory prewash (other prewash operations, final wash, ventilation, etc.)*
- *Discharge into the sea of tank washings*
- *Ballasting of cargo tanks*
- *Discharge of ballast water from cargo tanks*
- *Accidental or other exceptional discharge*
- *Control by authorized surveyors*
- *Additional operational procedures and remarks*

### **Inspection Guidance**

The vessel operator should have developed procedures for maintaining the Cargo Record Book, either in paper or electronic format, in accordance with MARPOL Annex II and any Flag Administration guidance. The procedures should include:

- What cargo related operations are required to be entered in the Cargo Record Book.
- Who is required to enter the details of a cargo related operation into the Cargo Record Book.
- When entries are required to be entered in the Cargo Record Book.
- The use of the correct official name in accordance with the Certificate of Fitness for each entry requiring the cargo to be identified. The entries may also include the popular trading name or abbreviation.
- When the Master is required to verify the accuracy of the Cargo Record Book entries and sign each page.
- The procedure for correcting entries made in error.
- The procedure for entering cargo related operations which had been overlooked and not entered in the Cargo Record Book in the correct chronological order.
- Instructions for operations required to be entered under Section K, Additional operational procedures and remarks.
- Instructions for retention of completed Cargo Record Books.

Where the vessel is using an electronic record book for recording the entries required in the Cargo Record Book, instructions for the use of the electronic record book should be provided, including automatic backing up of data to offline storage and an appropriate method of data recovery if the system were to fail or not be available from the ship's network. The use of the electronic record book should be authorised by a Declaration from flag/class.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures that for maintaining the Cargo Record Book (CRB) in accordance with MARPOL Annex II and any Flag Administration instructions.
- Review the entries in the CRB for a recent series of cargo operations relating to a single cargo and verify that:
  - Each operation had been entered in the CRB in the correct chronological sequence from the time the cargo was initially loaded until the completion of cargo tank cleaning and disposal of any generated tank washings.
  - Each entry included the information required by the instructions in the CRB.
  - Each entry was signed by the officer in charge of the operation.
  - Each page was counter-signed by the Master.

- Each reference to a named cargo used the correct official name in accordance with the Certificate of Fitness.
- Where prewash operations had been carried out in accordance with MARPOL requirements, the CRB entry was endorsed by the local port authority inspector or equivalent.
- Discharge of tank washings was in accordance with the company procedure and MARPOL Annex II.
- Where wash water had been discharged to a reception facility, a receipt or certificate specifying the quantity of tank washings transferred, together with the time and date of the transfer, was kept together with the CRB.
- Where tank washings had been transferred to the sea, the entries in the CRB were consistent with the vessel's operations at the time of the operation by comparison with the deck logbook.
- Where an error or omission had been made, the method of correcting or inserting an updated entry had been made in accordance with the company procedure.
- Where the vessel is using an electronic record book for recording the entries required in the Cargo Record Book, verify that data is being automatically backed up to offline storage and that there is an appropriate method of data recovery if the system were to fail or not be available from the ship's network. Sight the Declaration from flag/class.

The review of CRB entries should be limited to the previous six months.

#### **Expected Evidence**

- The company procedures for maintaining the Cargo Record Book, either in paper or electronic format, in accordance with MARPOL Annex II and any Flag Administration instructions.
- Cargo Record Books for the previous six months.
- Cargo records for the previous six months.
- The Bridge Log Book for the previous six months.
- Where an electronic record book is in use, the Declaration from flag/class.

#### **Potential Grounds for a Negative Observation**

- There was no company procedure for maintaining the Cargo Record Book in accordance with MARPOL Annex II and any Flag Administration instructions.
- The accompanying officer was not familiar with company procedures for maintaining the CRB in accordance with MARPOL Annex II and any Flag Administration instructions.
- Where the vessel was using an electronic record book, there were no instructions available for the use of the electronic record book system.
- Where the vessel was using an electronic record book, there was no Declaration from flag/class authorising its use.
- There was no facility for automatic backup and recovery of data if the electronic record book system were to fail or not be available from the ship's network.
- The accompanying officer was not familiar with the entries required to be made in the CRB
- The entries in the CRB:
  - Were not an accurate record of cargo operations.
  - Did not correctly identify cargoes by their correct technical name according to the Certificate of Fitness.
  - Recorded operations that were in violation of MARPOL Annex II.
  - Did not record all cargo related operations required to be recorded by MARPOL Annex II.
  - Were not signed by the officer in charge of each operation.
  - Were not verified and signed by the Master on completion of each page.
  - Were not supported by a receipt or certificate when tank washings were disposed to a reception facility.
- Where a prewash operation had been carried out in accordance with MARPOL Annex II requirements, the required entry in the CRB had not been endorsed by the local port authority inspector or equivalent.
- Tank washings disposal to the sea had not been made in compliance with MARPOL Annex II.
- A pollution incident (accidental or other exceptional discharge) was recorded in the CRB.
- Where a vessel was an oil/chemical carrier MARPOL Annex I cargo operations had been entered in the Cargo Record Book rather than the Oil Record Book Part II.

**6.1.2. Were the Master and officers familiar with the company procedure for maintaining the Oil Record Book Part II, and did the entries contained in the Oil Record Book Part II accurately record the cargo related operations required to be documented by MARPOL Annex I?**

**Short Question Text**

Oil Record Book Part II

**Vessel Types**

Oil, Chemical

**ROVIQ Sequence**

Cargo Control Room, Documentation

**Publications**

IMO: ISM Code

IMO: MARPOL

INTERTANKO: A Guide for Correct Entries in the Oil Record Book (Part II – Cargo/Ballast Operations). Second Edition.

IMO: MEPC.312(74) Guidelines for the Use of Electronic Record Books under MARPOL

IMO: MEPC.1/Circ.872 Unified Interpretations of Regulations 1.23 and 36.2.10 of MARPOL Annex I

**Objective**

**To ensure that all cargo operations are conducted and recorded in compliance with MARPOL Annex I.**

**Industry Guidance**

**INTERTANKO: A Guide for Correct Entries in the Oil Record Book (Part II – Cargo/Ballast Operations). Second Edition.**

**2.2 Objective of the Guide**

The objective of this Guide is to provide simple and clear advice and guidance for making entries in the ORB Part II with the aim of:

- Ensuring compliance with the relevant MARPOL Annex I requirements;
- Facilitating and simplifying the onboard work of the responsible officers and the Master; and,
- Ensuring uniform and consistent ORB Part II record-keeping that is aligned with and compatible with, other shipboard log books and records.

**IMO: MEPC.1/Circ.872 Unified Interpretations of Regulations 1.23 and 36.2.10 of MARPOL Annex I**

Terminal hose flush water

Interpretation of regulation 36.2.10

When the master of an oil tanker agrees to accept terminal hose flush water from a Single Point Mooring (SPM) or a Conventional Buoy Mooring (CBM), that flush water should be categorized as the disposal of residues under regulation 36.2.10...

**IMO: MEPC.312(74) Guidelines for the Use of Electronic Record Books under MARPOL**

2.1 These Guidelines are only applicable to the use of electronic record books on board to meet the requirements of the following record books and recording requirements under the MARPOL Annexes and the Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines (NOX Technical Code):



.1 Oil Record Book, parts I and II (MARPOL Annex I, regulations 17.1 and 36.1);

2.2 The use of an electronic record book to record operational logs is an alternative method to a hard copy record book. The electronic record book may allow ships to utilize their technology to reduce administrative burdens and contribute to on board environmental initiatives, e.g. reduction of paper use.

4.4.2 The electronic record book should have the capability to allow automatic backup of data in the system to offline storage. Backups should ensure the offline record is updated automatically every time changes are made to entries to ensure the backing up process is not forgotten by the user.

## 5 Declaration

5.1 Any electronic system deemed to meet the above criteria should be provided with written confirmation by the Administration and carried on board the ship for the purpose of regulatory surveys or inspections. An example of a declaration can be seen in the appendix.

5.2 Delegating the assessment of the electronic record book against these Guidelines and the issuing of a declaration on behalf of the Administration by recognized organizations (ROs) is at the discretion of the Administration.

**TMSA KPI 10.1.3** requires that procedures minimise marine and atmospheric emissions and ensure that they are always within permitted levels.

Procedures may include:

- Methods of minimising emissions.
- Identification of applicable regulations.
- Environmentally responsible disposal methods.
- Emissions monitoring.
- Fuel analysis.
- VOC management.

## IMO: ISM Code

1.2.3 The safety management system should ensure:

1. compliance with mandatory rules and regulations, and
2. that applicable codes, guidelines and standards recommended by the Organization, Administrations, classification societies and maritime industry organizations are taken into account.

## IMO: MARPOL

### Annex I

#### Regulation 36 Oil Record Book Part II – Cargo/ballast operations

1 Every oil tanker of 150 gross tonnage and above shall be provided with an Oil Record Book Part II (Cargo/Ballast Operations). The Oil Record Book Part II, whether as part of the ship's official logbook or otherwise, shall be in the form specified in the appendix III to this Annex.

2 The Oil Record Book Part II shall be completed on each occasion, on a tank-to-tank basis if appropriate, whenever any of the following cargo/ballast operations take place on the ship:

1. loading of oil cargo
2. internal transfer of oil cargo during voyage;
3. unloading of oil cargo;

4. ballasting of cargo tanks and dedicated clean ballast tanks;
5. cleaning of cargo tanks including crude oil washing;
6. discharge of ballast except from segregated ballast tanks;
7. discharge of water from slop tanks;
8. closing of all applicable valves or similar devices after slop tank discharge operations;
9. closing of valves necessary for isolation of dedicated clean ballast tanks from cargo and stripping lines after slop tank discharge operations; and,
10. disposal of residues.

4 In the event of such discharge of oil or oily mixture as referred to in regulation 4 of this Annex or in the event of accidental or other exceptional discharge of oil not excepted by that regulation, a statement shall be made in the Oil Record Book Part II of the circumstances of, and reasons for, the discharge.

5 Each operation described in paragraph 2 of this regulation shall be fully recorded without delay in the Oil Record Book Part II so that all entries in the book appropriate to that operation are completed. Each completed operation shall be signed by the officer or officers in charge of the operation concerned and each completed page shall be signed by the master of the ship. The entries in the Oil Record Book Part II shall be at least in English, French or Spanish. Where entries in an official language of the State whose flag the ship is entitled to fly are also used, this shall prevail in the case of dispute or discrepancy.

6 Any failure of the oil discharge monitoring and control system shall be noted in the Oil Record Book Part II.

7 The Oil Record Book shall be kept in such a place as to be readily available for inspection at all reasonable times and, except in the case of unmanned ships under tow, shall be kept onboard the ship. It shall be preserved for a period of three years after the last entry has been made.

### **Inspection Guidance**

The vessel operator should have developed procedures for maintaining the Oil Record Book Part II (ORB II), either in paper or electronic format, in accordance with MARPOL Annex I and any Flag Administration guidance. The procedure should include:

- What cargo related operations are required to be entered in the ORB II.
- Who is required to enter the details of a cargo related operation into the ORB II.
- When entries are required to be entered in the ORB II.
- When the Master is required to verify the accuracy of the ORB II entries and sign each page.
- The procedure for correcting entries made in error.
- The procedure for entering cargo related operations which had been overlooked and not entered in the ORB II in the correct chronological order.
- Instructions for operations required to be entered under Section O, Additional operational procedures and general remarks.
- Instructions for retention of completed ORB II.

Where the vessel is using an electronic record book for recording the entries required in ORB II, instructions for the use of the electronic record book system should be provided, including automatic backing up of data to offline storage and an appropriate method of data recovery if the system were to fail or not be available from the ship's network. The use of the electronic record book should be authorised by a Declaration from flag/class.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures for maintaining the Oil Record Book Part II in accordance with MARPOL Annex I and any Flag Administration instructions.
- Review the entries in the ORB II for a recent series of cargo operations relating to a single cargo and verify that:
  - Each operation had been entered in the ORB II in the correct chronological sequence from the time the cargo was initially loaded until the completion of cargo tank cleaning and disposal of any generated tank washing water.

- Each entry included the information required by the instructions in the ORB II.
- Each entry was signed by the officer in charge of the operation.
- Each page was counter-signed by the Master.
- Discharge of tank washings was in accordance with the company procedure and MARPOL Annex I.
- Where wash water had been discharged to a reception facility, a receipt or certificate specifying the quantity of tank washings transferred, together with the time and date of the transfer, was kept together with ORB II.
- Where water from a slop tank had been discharged into the sea, the entries in the ORB II were consistent with the vessel's operations at the time of the operation by comparison with the deck logbook.
- Where an error or omission had been made, the method of correcting or inserting an updated entry had been made in accordance with the company procedure.
- Where a transfer of bilge water or sludge from the machinery space had taken place that a corresponding entry was recorded in ORB I.
- Where an error or omission had been made verify that the method of correcting or inserting an updated entry had been made in accordance with the company procedure.
- Where the vessel is using an electronic record book for recording the entries required in the ORB II, verify that data is being automatically backed up to offline storage and that there is an appropriate method of data recovery if the system were to fail or not be available from the ship's network. Sight the Declaration from flag/class.

The review of ORB II entries should be limited to the previous six months of records.

#### **Expected Evidence**

- The company procedures for maintaining the Oil Record Book Part II in accordance with MARPOL Annex I and any Flag Administration instructions.
- Oil Record Book Part II for the previous six months.
- Cargo records for the previous six months.
- The Bridge Log Book for the previous six months.
- Where an electronic record book is in use, the Declaration from flag/class.

#### **Potential Grounds for a Negative Observation**

- There was no company procedure for maintaining the Oil Record Book Part II (ORB II) in accordance with MARPOL Annex I and any Flag Administration instructions.
- The accompanying officer was not familiar with company procedure for maintaining the ORB II in accordance with MARPOL Annex I and any Flag Administration instructions.
- Where the vessel was using an electronic record book, there were no instructions available for the use of the electronic record book system.
- Where the vessel was using an electronic record book, there was no Declaration from flag/class authorising its use.
- There was no facility for automatic backup and recovery of data if the electronic record book system were to fail or not be available from the ship's network.
- The accompanying officer was not familiar with the entries required to be made in the ORB II.
- The entries in ORB II:
  - Were not an accurate record of cargo operations.
  - Recorded operations that were in violation of MARPOL Annex I.
  - Did not record all cargo related operations required to be recorded by MARPOL Annex I.
  - Were not signed by the officer in charge of each operation.
  - Were not verified and signed by the Master on completion of each page.
  - Were not supported by a receipt or certificate when wash water was disposed to a reception facility.
  - Were corrected in a manner which was not in compliance with the company procedure.
- Discharge of water from the slop tanks into the sea had not been made in compliance with MARPOL Annex I.
- Ballast water had been loaded into a cargo tank or cargo tanks after the carriage of crude oil, but the cargo tank(s) had not been crude oil washed.

- The oil discharge monitoring equipment was, or had been, out of service but there was no entry in ORB II for when the equipment was taken out of service and, if applicable, returned to service.
- A pollution incident (accidental or other exceptional discharge) was recorded in the ORB II.
- Where a vessel was an oil/chemical carrier, MARPOL Annex II cargo operations had been entered in the ORB II rather than the Cargo Record Book.

**6.1.3. Were the Master and engineer officers familiar with the company procedure for maintaining the Oil Record Book Part I, and did the entries contained in the Oil Record Book Part I accurately record the machinery space operations required to be documented by MARPOL Annex I?**

**Short Question Text**

Oil Record Book Part I

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Engine Control Room, Chief Engineer's Office, Documentation

**Publications**

IMO: ISM Code

IMO: MARPOL

INTERTANKO: A Guide for Correct Entries in the Oil Record Book (Part I – Machinery Space Operations). Fourth Edition.

IMO: MEPC.1/Circ.736/Rev.2 Guidance for the Recording of Operations in the Oil Record Book Part I – Machinery Space Operations (All Ships)

IMO: MEPC.312(74) Guidelines for the Use of Electronic Record Books under MARPOL

**Objective**

**To ensure that all machinery space operations are conducted and recorded in compliance with MARPOL Annex I.**

**Industry Guidance**

**INTERTANKO: A Guide for Correct Entries in the Oil Record Book (Part I – Machinery Space Operations). Fourth Edition.**

**2.2 Objectives of the Guide**

Assist ship operators in defining the controls and activities necessary to ensure that:

- All operations referred to in regulation 17 of Annex I of MARPOL 73/78 consolidated edition as amended, are recorded in the ORB.
- All records are in accordance with the format stipulated by Appendix III of Annex I of MARPOL 73/78 consolidated edition 2011 as amended.
- The records in the ORB are compatible with the records in the other log books.

**IMO: MEPC.1/Circ.736/Rev.2 Guidance for the Recording of Operations in the Oil Record Book Part I – Machinery Space Operations (All Ships)**

2 This Guidance is intended to facilitate compliance with MARPOL requirements on board ships by providing advice to crews on how to record the various operations in the Oil Record Book by using the correct codes and item numbers in order to ensure a more uniform port State control procedure.

**IMO: MEPC.312(74) Guidelines for the Use of Electronic Record Books under MARPOL**

2.1 These Guidelines are only applicable to the use of electronic record books on board to meet the requirements of the following record books and recording requirements under the MARPOL Annexes and the Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines (NOX Technical Code):

.1 Oil Record Book, parts I and II (MARPOL Annex I, regulations 17.1 and 36.1);

2.2 The use of an electronic record book to record operational logs is an alternative method to a hard copy record book. The electronic record book may allow ships to utilize their technology to reduce administrative burdens and contribute to on board environmental initiatives, e.g. reduction of paper use.

4.4.2 The electronic record book should have the capability to allow automatic backup of data in the system to offline storage. Backups should ensure the offline record is updated automatically every time changes are made to entries to ensure the backing up process is not forgotten by the user.

## 5 Declaration

5.1 Any electronic system deemed to meet the above criteria should be provided with written confirmation by the Administration and carried on board the ship for the purpose of regulatory surveys or inspections. An example of a declaration can be seen in the appendix.

5.2 Delegating the assessment of the electronic record book against these Guidelines and the issuing of a declaration on behalf of the Administration by recognized organizations (ROs) is at the discretion of the Administration.

**TMSA KPI 10.1.3** requires that procedures minimise marine and atmospheric emissions and ensure that they are always within permitted levels.

Procedures may include:

- Methods of minimising emissions.
- Identification of applicable regulations.
- Environmentally responsible disposal methods.
- Emissions monitoring.
- Fuel analysis.
- VOC management.

## IMO: ISM Code

1.2.3 The safety management system should ensure:

1. compliance with mandatory rules and regulations, and
2. that applicable codes, guidelines and standards recommended by the Organization, Administrations, classification societies and maritime industry organizations are taken into account.

## IMO: MARPOL

### Annex I

#### Regulation 17 Oil Record Book Part I – Machinery space operations

1 Every oil tanker of 150 gross tonnage and above and every ship of 400 gross tonnage and above other than an oil tanker shall be provided with an Oil Record Book Part I (Machinery space operations). The Oil Record Book, whether as part of the ship's official logbook or otherwise, shall be in the form specified in appendix III to this Annex.

2 The Oil Record Book Part I shall be completed on each occasion, on a tank-to-tank basis if appropriate, whenever any of the following machinery space operations takes place in the ship:

1. ballasting or cleaning of fuel tanks;
2. discharge of dirty ballast or cleaning water from oil fuel tanks;
3. collection and disposal of oil residues (sludge);

4. discharge overboard or disposal otherwise of bilge water which has accumulated in machinery spaces; and
5. bunkering of fuel or bulk lubricating oil.

3 In the event of such discharge of oil or oily mixture as referred to in regulation 4 of this Annex or in the event of accidental or other exceptional discharge of oil not excepted by that regulation, a statement shall be made in the Oil Record Book Part I of the circumstances of, and reasons for, the discharge.

4 Each operation described in paragraph 2 of this regulation shall be fully recorded without delay in the Oil Record Book Part I so that all entries in the book appropriate to that operation are completed. Each completed operation shall be signed by the officer or officers in charge of the operation concerned and each completed page shall be signed by the master of the ship. The entries in the Oil Record Book Part I, for ships holding an International Oil Pollution Prevention Certificate, shall be at least in English, French or Spanish. Where entries in an official language of the State whose flag the ship is entitled to fly are also used, this shall prevail in the case of dispute or discrepancy.

5 Any failure of the oil filtering equipment shall be recorded in the Oil Record Book Part I.

6 The Oil Record Book Part I shall be kept in such a place as to be readily available for inspection at all reasonable times and, except in the case of unmanned ships under tow, shall be kept onboard the ship. It shall be preserved for a period of three years after the last entry has been made.

### **Inspection Guidance**

The vessel operator should have developed procedures for maintaining the Oil Record Book Part I (ORB I), either in paper or electronic format, in accordance with MARPOL Annex I and any Flag Administration guidance. The procedures should include:

- What machinery space operations are required to be entered in the ORB I.
- Who is required to enter the details of a machinery space operation into the ORB I.
- When entries are required to be made in the ORB I.
- When the Master is required to verify the accuracy of the ORB I entries and sign each page.
- The procedure for correcting entries made in error.
- The procedure for entering machinery space operations which had been overlooked and not entered in the ORB I in the correct chronological order.
- Instructions for operations required to be entered under Section I, Additional operational procedures and general remarks.
- Instructions for retention of completed Oil Record Book Part I.

Where the vessel is using an electronic record book for recording the entries required in ORB I, instructions for the use of the electronic record book system should be provided, including automatic backing up of data to offline storage and an appropriate method of data recovery if the system were to fail or not be available from the ship's network. The use of the electronic record book should be authorised by a Declaration from flag/class.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedure for maintaining the Oil Record Book Part I (ORB I) in accordance with MARPOL Annex I and any Flag Administration instructions.
- Review the entries in the ORB I for a randomly selected period of approximately 10 uninterrupted days and verify that:
  - The collection and transfer or disposal of oil residues (sludge) were consistent with the weekly inventory of oil residues retained on board. (Code C)
  - The disposal of sludge using the incinerator was consistent with the capacity of the incinerator when in sludge burning mode. (Code 12.3)
  - The disposal of bilge water through the 15 ppm equipment was consistent with the capacity of the 15 ppm equipment. (Code D15.1).
  - The voluntary declaration of quantities retained on board in oily bilge water holding tanks (Code I) was consistent with the disposals made (Code D15.1)

- The capacities of the oil residue tanks corresponded with the capacities listed in the IOPP supplement.
- Review the entries in ORB I more generally, and verify that:
  - Each operation had been entered in the ORB I in the correct chronological sequence.
  - Each entry included the information required by the instructions in the ORB I.
  - Each entry was signed by the officer in charge of the operation.
  - Each page was counter-signed by the Master.
  - Where an error or omission had been made verify that the method of correcting or inserting an updated entry had been made in accordance with the company procedure.
- Where sludge (C12.2) or bilge water (D15.3) had been transferred to a cargo area slop tank verify that there was a reciprocal entry in Oil Record Book Part II.
- Where sludge (C12.1) or bilge water (D15.2) had been disposed of to a reception facility, verify that a receipt or certificate detailing the quantity of residues or oily mixture transferred along with the date and time of the transfer was available with the ORB I.
- Where bunkering of fuel oil (H26.3) had taken place verify that the entries in the ORB I were consistent with the bunker delivery note (BDN) provided by the bunker supplier
- Where the vessel is using an electronic record book for recording the entries required in the ORB I, verify that data is being automatically backed up to offline storage and that there is an appropriate method of data recovery if the system were to fail or not be available from the ship's network. Sight the Declaration from flag/class.

The review of ORB I entries should be limited to the previous six months.

#### **Expected Evidence**

- The company procedures for maintaining the Oil Record Book Part I in accordance with MARPOL Annex I and any Flag Administration instructions.
- Oil Record Book Part I for the previous six months.
- The Engine Room Log Book for the previous six months.
- A copy of the supplement to the IOPP certificate (Form B)
- Where an electronic record book is in use, the Declaration from flag/class.

#### **Potential Grounds for a Negative Observation**

- There was no company procedure for maintaining the Oil Record Book Part I in accordance with MARPOL Annex I and any Flag Administration instructions.
- Where the vessel was using an electronic record book, there were no instructions available for the use of the electronic record book system.
- Where the vessel was using an electronic record book, there was no Declaration from flag/class authorising its use.
- There was no facility for automatic backup and recovery of data if the electronic record book system were to fail or not be available from the ship's network.
- The accompanying officer was not familiar with company procedure for maintaining the Oil Record Book Part I in accordance with MARPOL Annex I and any Flag Administration instructions.
- The accompanying officer was not familiar with the entries required to be made in the Oil Record Book Part I.
- The entries in the Oil Record Book Part I:
  - Were not an accurate record of machinery space operations.
  - Recorded operations that were in violation of MARPOL Annex I.
  - Did not record all machinery space operations required by MARPOL Annex I.
  - Were not signed by the officer in charge of each operation.
  - Were not verified and signed by the Master upon completion of each page.
  - Were not supported by a receipt or certificate when sludge or bilge water was disposed to a reception facility.
  - Were corrected in a manner which was not in compliance with the company procedure.
- The oil filtering equipment, its alarm or automatic stopping device was, or had been, out of service but there was no entry in the ORB I for when the equipment failed and, if applicable, was returned to service.



- Bilge water had been discharged in a Special Area, but the oil filtering equipment was not fitted with an alarm and an automatic stopping device (IOPP Certificate Supplement 2.2.1) or this equipment was out of service.
- A pollution incident (accidental or other exceptional discharge) was recorded in the ORB I.
- Where sludge or bilge water had been transferred to a cargo area slop tank there was no reciprocal entry in Oil Record Book Part II.
- Where sludge or bilge water had been disposed of to a reception facility, there was no receipt or certificate detailing the quantity of residues or oily mixture transferred, available with the ORB I.
- Where sludge had been incinerated, the volume of sludge disposed of was inconsistent with the capacity of the incinerator in sludge burning mode.
- Where bilge water had been discharged through the oil filtering equipment, the volume of bilge water disposed of was inconsistent with the capacity of the oil filtering equipment.
- The disposal of accumulated sludge or bilge water could not be accounted for through the entries provided in the ORB I
- The capacity of one or more oil residue tanks referred to in an ORB I entry did not correspond with the capacities listed on the supplement to the IOPP certificate.

If the oil filtering equipment was defective in any respect enter a **negative observation** in the Hardware response tool of question 6.6.1.

**6.1.4. Were the Master and officers familiar with the company procedures for maintaining the Garbage Record Book in accordance with the Garbage Management Plan, and did the entries contained in the Garbage Record Book accurately record the garbage management activities required to be documented by MARPOL Annex V?**

**Short Question Text**

Garbage Record Book

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation, Engine Room, Interview - Rating

**Publications**

IMO: MARPOL

IMO: Guidelines for the Implementation of MARPOL Annex V. 2017 Edition.

IMO: MEPC.1/Circ.834/Rev.1 Consolidated Guidance for Port Reception Facility Providers and Users.

**Objective**

**To ensure that all garbage management activities are conducted and recorded in compliance with MARPOL Annex V.**

**Industry Guidance**

**IMO: Guidelines for the Implementation of MARPOL Annex V. 2017 Edition.**

Preface

The main objectives of these Guidelines are to assist:

.2 shipowners, ship operators, ship's crew, cargo owners and equipment manufacturers in complying with the requirements set forth in MARPOL Annex V and relevant domestic laws;

**IMO: MEPC.1/Circ.834/Rev.1 Consolidated Guidance for Port Reception Facility Providers and Users.**

Considerations during MARPOL waste/residues delivery

37 Following delivery, the master should request a Waste Delivery Receipt to document the type and quantity of MARPOL wastes/residues actually received by the facility. IMO has standardized the format of this document to facilitate its use and application and in order to provide uniformity of records throughout the world...

**IMO: MEPC.312(74) Guidelines for the Use of Electronic Record Books under MARPOL**

2.1 These Guidelines are only applicable to the use of electronic record books on board to meet the requirements of the following record books and recording requirements under the MARPOL Annexes and the Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines (NOX Technical Code):

.3 Garbage Record Book, parts I and II (MARPOL Annex V, regulation 10.3);

2.2 The use of an electronic record book to record operational logs is an alternative method to a hard copy record book. The electronic record book may allow ships to utilize their technology to reduce administrative burdens and contribute to on board environmental initiatives, e.g. reduction of paper use.

4.4.2 The electronic record book should have the capability to allow automatic backup of data in the system to offline storage. Backups should ensure the offline record is updated automatically every time changes are made to entries to ensure the backing up process is not forgotten by the user.

## 5 Declaration

5.1 Any electronic system deemed to meet the above criteria should be provided with written confirmation by the Administration and carried on board the ship for the purpose of regulatory surveys or inspections. An example of a declaration can be seen in the appendix.

5.2 Delegating the assessment of the electronic record book against these Guidelines and the issuing of a declaration on behalf of the Administration by recognized organizations (ROs) is at the discretion of the Administration.

**TMSA KPI 10.1.3** requires that procedures minimise marine and atmospheric emissions and ensure that they are always within permitted levels.

Procedures may include:

- Methods of minimising emissions.
- Identification of applicable regulations.
- Environmentally responsible disposal methods.
- Emissions monitoring.
- Fuel analysis.
- VOC management.

## IMO: ISM Code

1.2.3 The safety management system should ensure:

1. compliance with mandatory rules and regulations, and
2. that applicable codes, guidelines and standards recommended by the Organization, Administrations, classification societies and maritime industry organizations are taken into account.

## IMO: MARPOL

### Annex V

Regulation 10 Placards, garbage management plans and garbage record-keeping

1.1 Every ship of 12m or more in length overall and fixed or floating platforms shall display placards which notify the crew and passengers of the discharge requirements of regulations 3, 4, 5 and 6 of this Annex and section 5.2 of part II-A of the Polar Code, as applicable.

1.2 The placards shall be written in the working language of the ship's crew and, for ships engaged in voyages to ports or offshore terminals under the jurisdiction of other Parties to the Convention, shall also be in English, French or Spanish.

2 Every ship of 100 gross tonnage and above, and every ship which is certified to carry 15 or more persons and fixed or floating platforms shall carry a garbage management plan which the crew shall follow. This plan shall provide written procedures for minimizing, collecting, storing, processing and disposing of garbage, including the use of equipment onboard. It shall also designate the person or persons in charge of carrying out the plan. Such a plan shall be based on the guidelines developed by the Organization and written in the working language of the crew.

3 Every ship of 400 gross tonnage and above and every ship which is certified to carry 15 or more persons engaged in voyages to ports or offshore terminals under the jurisdiction of another Party to the Convention and every fixed or floating platform shall be provided with a Garbage Record Book. The Garbage Record Book, whether as part of the

ship's official logbook, or as an electronic record book which shall be approved by the Administration taking into account the Guidelines developed by the Organization, or otherwise, shall be in the form specified in appendix II to this Annex:

1. Each discharge into the sea or to a reception facility, or a completed incineration, shall be promptly recorded in the Garbage Record Book and signed for on the date of discharge or incineration by the officer in charge. Each completed page of the Garbage Record Book shall be signed by the master of the ship. The entries in the Garbage Record Book shall be at least in English, French or Spanish. Where the entries are also made in an official language of the State whose flag the ship is entitled to fly, the entries in that language shall prevail in case of a dispute or discrepancy.
2. The entry for each discharge into the sea under regulations 4, 5, 6 or section 5.2 of chapter 5 of part II-A of the Polar Code shall include date and time, position of the ship (latitude and longitude), category of the garbage and the estimated amount (in cubic metres) discharged. For discharge of cargo residues the discharge start and stop positions shall be recorded in addition to the foregoing;
3. The entry for each completed incineration shall include date and time and position of the ship (latitude and longitude) at the start and stop of incineration, categories of garbage incinerated, and the estimated amount incinerated for each category in cubic metres;
4. The entry for each discharge to a port reception facility or another ship shall include date and time of discharge, port or facility or name of ship, categories of garbage discharged, and the estimated amount discharged for each category in cubic metres;
5. The Garbage Record Book along with receipts obtained from reception facilities shall be kept on board the ship or the fixed or floating platform, and in such a place as to be readily available for inspection at all reasonable times. This document shall be preserved for a period of at least two years from the date of the last entry made in it.
6. In the event of any discharge or accidental loss referred to in regulation 7 of this Annex an entry shall be made in the Garbage Record Book, or in the case of any ship of less than 400 gross tonnage, an entry shall be made in the ship's official log-book of the date and time of occurrence, port or position of the ship at time of occurrence (latitude, longitude and water depth if known), the reason for the discharge or loss, details of the items discharged or lost, categories of garbage discharged or lost, estimated amount for each category in cubic metres, reasonable precautions taken to prevent or minimize such discharge or accidental loss and general remarks.

#### Appendix II to Annex V

#### Form of Garbage Record Book

#### 3 Description of the Garbage

Garbage is to be grouped into categories for the purposes of recording in parts I and II of the Garbage Record Book (or ship's official logbook) as follows:

##### Part I

- A Plastics
- B Food Wastes
- C Domestic Wastes
- D Cooking Oil
- E Incinerator Ashes
- F Operational Wastes
- G Animal carcasses
- H Fishing gear
- I E-waste

##### Part II

- J Cargo residues (non-HME)
- K Cargo residues (HME)

## 4.2 Amount of garbage

The amount of garbage on board should be estimated in cubic metres, if possible separately according to category. The Garbage Record Book contains many references to estimated amount of garbage. It is recognized that the accuracy of estimating amounts of garbage is left to interpretation. Volume estimates will differ before and after processing. Some processing procedures may not allow for a usable estimate of volume, e.g. the continuous processing of food waste. Such factors should be taken into consideration when making and interpreting entries made in a record.

### Inspection Guidance

The vessel operator should have developed procedures for developing a Garbage Management Plan and maintaining the Garbage Record Book (GRB), either in paper or electronic format, in accordance with MARPOL Annex V and any Flag Administration guidance. The procedure and/or Garbage Management Plan should include:

- What garbage related activities are required to be entered in the GRB.
- Who is required to enter the details of garbage related activities into the GRB.
- When entries are required to be made in the GRB.
- When the Master is required to verify the accuracy of the GRB entries and sign each page.
- The procedure for correcting entries made in error.
- The procedure for entering garbage related activities which had been overlooked and not entered in the GRB in the correct chronological order.
- Instructions for retention of completed GRB.

Where the vessel is using an electronic record book for recording the entries required in the Garbage Record Book, instructions for the use of the electronic record book should be provided, including automatic backing up of data to offline storage and an appropriate method of data recovery if the system were to fail or not be available from the ship's network. The use of the electronic record book should be authorised by a Declaration from flag/class.

### Suggested Inspector Actions

- Sight, and where necessary review, the company procedures for maintaining the Garbage Record Book (GRB) in accordance with MARPOL Annex V and any Flag Administration instructions.
- Review the entries in the GRB for a selected period of 10 consecutive days which included a port visit and verify that:
  - Special areas.
  - Distance from coastline.
  - Whether the waste had been comminuted or ground.
  - Food wastes had been disposed of overboard in accordance with restrictions based on:
  - Each operation had been entered in the GRB in the correct chronological sequence
  - Each entry included the information required by the instructions in the GRB.
  - Each entry was signed by the officer in charge of the operation.
  - Each page was counter-signed by the Master.
  - Where an error or omission had been made, the method of correcting or inserting an updated entry had been made in accordance with the company procedure.
- Where garbage had been disposed of to a reception facility, verify that a receipt or certificate detailing the quantity of garbage by category transferred along with the date and time of the transfer was available with the GRB.
- Where an error or omission had been made verify that the method of correcting or inserting an updated entry had been made in accordance with the company procedure.
- Where the vessel is using an electronic record book for recording the entries required in the Garbage Record Book, verify that data is being automatically backed up to offline storage and that there is an appropriate method of data recovery if the system were to fail or not be available from the ship's network. Sight the Declaration from flag/class.
- Where necessary review the Garbage Management Plan.

The review of GRB entries should be limited to the previous six months.

- Inspect the garbage collection areas, including the incinerator space and verify:
  - Garbage was being stored and segregated in a safe and hygienic manner in accordance with the garbage management plan.
  - Dangerous or toxic waste items, such as aerosols and batteries, were being properly collected and segregated to prevent them from being incinerated or disposed of ashore with general waste.
  
- Interview a rating to verify their understanding of onboard garbage management including:
  - Garbage segregation onboard.
  - Disposal of aerosols and batteries.
  - Permitted disposals of garbage to the sea.
  - Garbage management practices within their operational department.

#### **Expected Evidence**

- The company procedures for developing a Garbage Management Plan and maintaining the Garbage Record Book (GRB), either in paper or electronic format, in accordance with MARPOL Annex V and any Flag Administration guidance.
- The Garbage Management Plan.
- Garbage Record Book for the previous six months.
- The Bridge Log Book for the previous six months.
- Where an electronic record book is in use, the Declaration from flag/class.

#### **Potential Grounds for a Negative Observation**

- There was no company procedure for maintaining the Garbage Record Book, either in paper or electronic format, in accordance with MARPOL Annex V and any Flag Administration instructions.
- Where the vessel was using an electronic record book, there were no instructions available for the use of the electronic record book system.
- Where the vessel was using an electronic record book, there was no Declaration from flag/class authorising its use.
- There was no facility for automatic backup and recovery of data if the electronic record book system were to fail or not be available from the ship's network.
- There was no Garbage Management Plan available onboard.
- The accompanying officer was not familiar with company procedure for maintaining the Garbage Record Book in accordance with MARPOL Annex V and any Flag Administration instructions.
- The accompanying officer was not familiar with the Garbage Management Plan.
- The accompanying officer was not familiar with the entries required to be made in the Garbage Record Book.
- The entries in the Garbage Record Book:
  - Where garbage had been disposed of to a reception facility, there was no receipt or certificate detailing the quantity and categories of garbage disposed of.
  - There was no evidence that food waste disposed of overboard through a waste disposal unit (comminuter or grinder) had been recorded on the GRB.
  - Garbage was stored onboard in an unhygienic manner.
  - Garbage was not being segregated into the required categories in preparation for final disposal either by incineration or to a reception facility.
  - Dangerous or toxic garbage was found to be mixed with general garbage.
  - An interviewed rating was not familiar with the garbage management practices onboard.

**6.1.5. Were the Master and engineer officers familiar with the company procedure for maintaining the Ozone-depleting Substances Record Book, and did the entries contained in the Ozone-depleting Substances Record Book accurately record the operations and emissions required to be documented by MARPOL Annex VI?**

**Short Question Text**

Ozone Depleting Substances Record Book

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation, Engine Control Room, Chief Engineer's Office

**Publications**

IMO: ISM Code

IMO: MARPOL

IMO: MEPC.312(74) Guidelines for the Use of Electronic Record Books under MARPOL

**Objective**

**To ensure all operations involving ozone-depleting substances, including any deliberate and non-deliberate emissions, are recorded in compliance with MARPOL Annex VI.**

**Industry Guidance**

**IMO: MEPC.312(74) Guidelines for the Use of Electronic Record Books under MARPOL**

2.1 These Guidelines are only applicable to the use of electronic record books on board to meet the requirements of the following record books and recording requirements under the MARPOL Annexes and the Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines (NOX Technical Code):

.4 Ozone-depleting Substances Record Book (MARPOL Annex VI, regulation 12.6)

2.2 The use of an electronic record book to record operational logs is an alternative method to a hard copy record book. The electronic record book may allow ships to utilize their technology to reduce administrative burdens and contribute to on board environmental initiatives, e.g. reduction of paper use.

4.4.2 The electronic record book should have the capability to allow automatic backup of data in the system to offline storage. Backups should ensure the offline record is updated automatically every time changes are made to entries to ensure the backing up process is not forgotten by the user.

**5 Declaration**

5.1 Any electronic system deemed to meet the above criteria should be provided with written confirmation by the Administration and carried on board the ship for the purpose of regulatory surveys or inspections. An example of a declaration can be seen in the appendix.

5.2 Delegating the assessment of the electronic record book against these Guidelines and the issuing of a declaration on behalf of the Administration by recognized organizations (ROs) is at the discretion of the Administration.

**TMSA KPI 10.1.3** requires that procedures minimise marine and atmospheric emissions and ensure that they are always within permitted levels.

Procedures may include:

- Methods of minimising emissions.
- Identification of applicable regulations.
- Environmentally responsible disposal methods.
- Emissions monitoring.
- Fuel analysis.
- VOC management.

#### **IMO: ISM Code**

1.2.3 The safety management system should ensure:

1. compliance with mandatory rules and regulations, and
2. that applicable codes, guidelines and standards recommended by the Organization, Administrations, classification societies and maritime industry organizations are taken into account.

#### **IMO: MARPOL**

Annex VI

Regulation 6

Issue or endorsement of Certificates

International Air Pollution Prevention Certificate

1 An International Air Pollution Certificate shall be issued, after an initial or renewal survey in accordance with the provisions of Regulation 5 of this annex to:

.1 any ship of 400 gross tonnage and above engaged in voyages to ports or offshore terminals under the jurisdiction of other Parties;

Regulation 12

Ozone depleting substances

5 Each ship subject to regulation 6.1 shall maintain a list of equipment containing ozone-depleting substances\*

\*See appendix 1, Supplement to International Air Pollution Prevention Certificate (IAPP Certificate), section 2.1

6 Each ship subject to regulation 6.1 that has rechargeable systems that contain ozone depleting substances shall maintain an ozone-depleting substances record book. This record book may form part of an existing logbook or electronic record book as approved by the Administration.

7 Entries in the ozone-depleting substances record book shall be recorded in terms of mass(kg) of substance and shall be completed without delay on each occasion, in respect of the following:

- .1 recharge, full or partial, of equipment containing ozone-depleting substances;
- .2 repair or maintenance of equipment containing ozone-depleting substances;
- .3 discharge of ozone-depleting substances to the atmosphere:



- .3.1 deliberate, and
  - .3.2 non-deliberate;
- .4 discharge of ozone-depleting substances to land-based reception facilities; and
- .5 supply of ozone-depleting substances to the ship.

### **Inspection Guidance**

The vessel operator should have developed procedures for maintaining the Ozone-depleting Substances Record Book, either in paper or electronic format, in accordance with MARPOL Annex VI and any Flag Administration guidance. The procedures should include:

- The operations and emissions required to be entered in the Ozone-depleting Substances Record Book, i.e.:
  - recharge, full or partial, of equipment containing ozone-depleting substances.
  - repair or maintenance of equipment containing ozone-depleting substances.
  - discharge of ozone-depleting substances to the atmosphere, both deliberate and non-deliberate.
  - discharge of ozone-depleting substances to land-based reception facilities.
  - supply of ozone-depleting substances to the ship.
- Who is required to enter the details of an operation or emission into the Ozone-depleting Substances Record Book.
- When entries are required to be made in the Ozone-depleting Substances Record Book.
- When the Master is required to verify the accuracy of the Ozone-depleting Substances Record Book entries and sign each page.
- The procedure for correcting entries made in error.
- The procedure for entering operations or emissions which had been overlooked and not entered in the Ozone-depleting Substances Record Book in the correct chronological order.
- Instructions for retention of completed Ozone-depleting Substances Record Books.

Where the vessel is using an electronic record book for recording the entries required in the Ozone-depleting Substances Record Book, instructions for the use of the electronic record book should be provided, including automatic backing up of data to offline storage and an appropriate method of data recovery if the system were to fail or not be available from the ship's network. The use of the electronic record book should be authorised by a Declaration from flag/class.

The Ozone-depleting Substances Record Book may form part of an existing logbook or electronic record book.

A list of equipment on board containing ozone-depleting substances is included in the Supplement to the International Air Pollution Prevention Certificate (IAPP Certificate), section 2.1

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures that described the requirements for maintaining the Ozone-depleting Substances Record Book, either in paper or electronic format, in accordance with MARPOL Annex VI and any Flag Administration guidance.
- Review the list of equipment on board containing ozone-depleting substances included in the Supplement to the IAPP Certificate, section 2.1.
- Select an item of equipment listed and review the relevant maintenance records.
- Review the Ozone-depleting Substances Record Book and verify that:
  - Any equipment recharge, repair or maintenance noted had been correctly recorded in the Ozone-depleting Substances Record Book.
  - The supply of ozone-depleting substances to the ship, or discharge of ozone-depleting substances to land-based reception facilities, had been recorded in the Ozone-depleting Substances Record Book, as appropriate.
- Review the entries in the Ozone-depleting Substances Record Book more generally, and verify that:
  - Each operation had been entered in the Ozone-depleting Substances Record Book in the correct chronological sequence.
  - Each entry included the information required by the company procedures.
  - Each entry was signed by the officer in charge of the operation.

- Each page was counter-signed by the Master.
  - Where an error or omission had been made verify that the method of correcting or inserting an updated entry was in accordance with the company procedures.
- Where the vessel is using an electronic record book for recording the entries required in the Ozone-depleting Substances Record Book, verify that data is being automatically backed up to offline storage and that there is an appropriate method of data recovery if the system were to fail or not be available from the ship's network. Sight the Declaration from flag/class.

#### **Expected Evidence**

- The company procedures that described the requirements for maintaining the Ozone-depleting Substances Record Book, either in paper or electronic format, in accordance with MARPOL Annex VI and any Flag Administration guidance.
- The Ozone-depleting Substances Record Book for the previous six months.
- The maintenance records for the equipment on board containing ozone-depleting substances for the previous six months.
- A copy of the Supplement to the IAPP Certificate.
- Where an electronic record book is in use, the Declaration from flag/class.

#### **Potential Grounds for a Negative Observation**

- There was no company procedure that described the requirements for maintaining the Ozone-depleting Substances Record Book, either in paper or electronic format, in accordance with MARPOL Annex VI and any Flag Administration guidance.
- The accompanying officer was not familiar with the company procedures that described the requirements for maintaining the Ozone-depleting Substances Record Book, either in paper or electronic format, in accordance with MARPOL Annex VI and any Flag Administration guidance.
- Where the vessel was using an electronic record book, there were no instructions available for the use of the electronic record book system.
- Where the vessel was using an electronic record book, there was no Declaration from flag/class authorising its use.
- There was no facility for automatic backup and recovery of data if the electronic record book system were to fail or not be available from the ship's network.
- An item of equipment on board containing ozone-depleting substances was not included in the Supplement to the International Air Pollution Prevention Certificate (IAPP Certificate), section 2.1.
- The entries in the Ozone-depleting Substances Record Book:
  - Were not an accurate record of operations and/or emissions involving ozone-depleting substances.
  - Recorded operations that were in violation of MARPOL Annex VI.
  - Did not record all operations and/or emissions required by MARPOL Annex VI.
  - Were not signed by the officer in charge of each operation.
  - Were not verified and signed by the Master upon completion of each page.
  - Were not supported by a receipt or certificate for the discharge of ozone-depleting substances to land-based reception facilities.
  - Were corrected in a manner which was not in compliance with the company procedures.

### **6.1.6. Were the documents and records required by MARPOL Annex VI Regulation 13 for the control of NO<sub>x</sub> and associated emissions in good order?**

#### **Short Question Text**

MARPOL Annex VI NO<sub>x</sub> Compliance and Record Keeping.

#### **Vessel Types**

Oil, Chemical, LPG, LNG

#### **ROVIQ Sequence**

Chief Engineer's Office, Documentation, Engine Control Room

#### **Publications**

IMO: ISM Code

IMO: MARPOL

IMO: MEPC.312(74) Guidelines for the Use of Electronic Record Books under MARPOL

IMO: NO<sub>x</sub> Technical Code (2008)

Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines

IMO: Resolution MEPC 307(73) 2018 Guidelines for the discharge of exhaust gas recirculation (EGR) bleed-off water

#### **Objective**

**To ensure the documents and records required by MARPOL Annex VI for the control of NO<sub>x</sub> and associated emissions are maintained as required.**

#### **Industry Guidance**

#### **IMO: NO<sub>x</sub> Technical Code (2008) Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines**

1.3.15 A Technical File is a record containing all details of parameters, including components and settings of an engine, which may influence the NO<sub>x</sub> emission of the engine, in accordance with 2.4 of this Code.

1.3.16 A Record Book of Engine Parameters is the document used in connection with the Engine Parameter Check method for recording all parameter changes, including components and engine settings, which may influence NO<sub>x</sub> emission of the engine.

2.3.4 Every marine diesel engine installed on board a ship shall be provided with a Technical File. The Technical File shall be prepared by the applicant for engine certification and approved by the Administration and is required to accompany an engine throughout its life on board ships. The Technical File shall contain the information as specified in 2.4.1.

2.4.1 To enable an Administration to perform the engine surveys described in 2.1, the Technical File required by 2.3.4 shall, at a minimum, contain the following information:

1. identification of those components, settings and operating values of the engine which influences its NO<sub>x</sub> emissions including any NO<sub>x</sub> reducing device or system;
2. identification of the full range of allowable adjustments or alternatives for the components of the engine;
3. full record of the relevant engine's performance, including the engine's rated speed and rated power;
4. a system of onboard NO<sub>x</sub> verification procedures to verify compliance with the NO<sub>x</sub> emission limits during onboard verification surveys in accordance with chapter 6;
5. a copy of the relevant Parent Engine test data, as given in section 2 of appendix 5 of this Code;
6. if applicable, the designation and restrictions for an engine which is an engine within an Engine Family or Engine Group;
7. specifications of those spare parts/components which, when used in the engine, according to those specifications, will result in continued compliance of the engine with the applicable NO<sub>x</sub> emission limit; and
8. the EIAPP Certificate, as applicable

2.3.7 Where the Engine Parameter Check method in accordance with 6.2 is used to verify compliance, if any adjustments or modifications are made to an engine after its pre-certification, a full record of such adjustments or modifications shall be recorded in the engine's Record Book of Engine Parameters.

6.2.2.7 The shipowner or person responsible for a ship equipped with a marine diesel engine required to undergo an Engine Parameter Check method shall maintain on board the following documentation in relation to the onboard NO<sub>x</sub> verification procedures:

1. a Record Book of Engine Parameters for recording all changes, including like for like replacements, and adjustments within the approved ranges made relative to an engine's components and settings;
2. an engine parameter list of an engine's designated components and settings and/or the documentation of an engine's load-dependent operating values submitted by an applicant for engine certification and approved by the Administration; and
3. technical documentation of an engine component modification when such a modification is made to any of the engine's designated engine components.

6.2.2.8 Descriptions of any changes affecting the designated engine parameters, including adjustments, parts replacements and modifications to engine parts, shall be recorded chronologically in the Record Book of Engine Parameters. These descriptions shall be supplemented with any other applicable data used for the assessment of the engine's NO<sub>x</sub> emissions.

**IMO: Resolution MEPC 307(73) 2018 Guidelines for the discharge of exhaust gas recirculation (EGR) bleed-off water**

2.3.1 "Bleed-off water" means water to be discharged directly, or via a holding tank, to the sea from an EGR water treatment system.

4.1 Residues from EGR water treatment systems should be delivered ashore to adequate reception facilities. Such residues should not be discharged to the sea or incinerated on board.

4.2 Each ship fitted with an EGR unit should record the storage and disposal of bleed-off water residues in an EGR record book, including the date, time and location of such storage and disposal.

**IMO: MEPC.312(74) Guidelines for the Use of Electronic Record Books under MARPOL**

2.1 These Guidelines are only applicable to the use of electronic record books on board to meet the requirements of the following record books and recording requirements under the MARPOL Annexes and the Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines (NO<sub>x</sub> Technical Code):

.5 recording of the tier and on/off status of marine diesel engines (MARPOL Annex VI, regulation 13.5.3);

.7 Record Book of Engine Parameters (NO<sub>x</sub> Technical Code, paragraph 6.2.2.7).

2.2 The use of an electronic record book to record operational logs is an alternative method to a hard copy record book. The electronic record book may allow ships to utilize their technology to reduce administrative burdens and contribute to on board environmental initiatives, e.g. reduction of paper use.

4.4.2 The electronic record book should have the capability to allow automatic backup of data in the system to offline storage. Backups should ensure the offline record is updated automatically every time changes are made to entries to ensure the backing up process is not forgotten by the user.

**5 Declaration**

5.1 Any electronic system deemed to meet the above criteria should be provided with written confirmation by the Administration and carried on board the ship for the purpose of regulatory surveys or inspections. An example of a declaration can be seen in the appendix.

5.2 Delegating the assessment of the electronic record book against these Guidelines and the issuing of a declaration on behalf of the Administration by recognized organizations (ROs) is at the discretion of the Administration.

**TMSA KPI 10.1.3** requires that procedures minimise marine and atmospheric emissions and ensure that they are always within permitted levels.

Procedures may include:

- Methods of minimising emissions.
- Identification of applicable regulations.
- Environmentally responsible disposal methods.
- Emissions monitoring.
- Fuel analysis.
- VOC management.

#### **IMO: ISM Code**

1.2.3 The safety management system should ensure:

1. compliance with mandatory rules and regulations, and
2. that applicable codes, guidelines and standards recommended by the Organization, Administrations, classification societies and maritime industry organizations are taken into account.

#### **IMO: MARPOL**

Annex VI

Regulation 13

Nitrogen oxides (NO<sub>x</sub>)

Application

1.1 This regulation shall apply to:

.1 each marine diesel engine with a power output of more than 130 kW installed on a ship; and

.2 each marine diesel engine with a power output of more than 130 kW that undergoes a major conversion on or after 1 January 2000 except when demonstrated to the satisfaction of the administration that such engine is an identical replacement to the engine that is replacing and is otherwise not covered under paragraph 1.1.1. of this regulation.

1.2 This regulation does not apply to

.1 a marine diesel engine intended to be used solely in emergencies, or solely to power any device or equipment intended to be used solely for emergencies on the ship on which it is installed, or a marine diesel engine installed in lifeboats intended to be used solely for emergencies; ...

5.3 The tier and on/off status of marine diesel engines installed on board a ship to which paragraph 5.1 of this regulation applies which are certified to both Tier II and Tier III or which are certified to Tier II only shall be recorded in such a logbook as prescribed by the Administration at entry into and exit from an emission control area designated under paragraph 6 of this regulation, or when the on/off status changes within such an area, together with the date, time and position of the ship.

#### **Inspection Guidance**

The details of each marine diesel engine installed on board to which MARPOL Annex VI regulation 13 applies can be found in paragraph 2.2.1 of the vessel's International Air Pollution Prevention (IAPP) Certificate.

The level of NO<sub>x</sub> emissions for each engine is described by Tier designation. Tier I and Tier II status is usually achieved via engine design. Tier III status is achieved by the use of additional equipment such as Selective Catalytic Reduction (SCR) or Exhaust Gas Recirculation (EGR) systems. Such equipment is not run continuously and must be operating to achieve Tier III status. Thus engines may be run at Tier II or Tier III depending upon local requirements. Engines must be operating in Tier III mode in a NO<sub>x</sub> Emission Control Area that applies to the vessel.

NO<sub>x</sub> Emission Control Areas apply as follows:

- Baltic Sea for vessels constructed after 1 Jan 2021.
- North Sea for vessels constructed after 1 Jan 2021.
- North American for vessels constructed after 1 Jan 2016.
- United States Caribbean Sea for vessels constructed after 1 Jan 2016.

MARPOL Annex VI and the NO<sub>x</sub> Technical Code require Technical Files for each of these diesel engines to be maintained on board, together with the following records in relation to NO<sub>x</sub> emissions:

- A Record Book of Engine Parameters for those engines required to undergo Engine Parameter Checks at initial and subsequent surveys.
- A record that shows only engines operating at Tier III are in use in a NO<sub>x</sub> Tier III emission control area (NECA)
- Ships fitted with Exhaust Gas Recirculation (EGR) are required to record the discharge of solid residues and bleed-off water in an EGR Record Book.

Where diesel engines are fitted with a Selective Catalytic Reduction (SCR) System there should be a strategy for monitoring the catalyst condition/degradation set out in the engine's technical file. This may involve continuous monitoring of NO<sub>x</sub> levels or a prediction of the life of the catalyst under operating conditions together with annual spot checks of NO<sub>x</sub> levels. Vessel staff should be familiar with the strategy, its implementation and associated equipment. Records should be available on board of measured NO<sub>x</sub> levels.

The vessel operator should have developed procedures for maintaining these Records Books, either in paper or electronic format, in accordance with MARPOL Annex VI Regulation 13, the NO<sub>x</sub> Technical Code and any Flag Administration guidance. The procedure should include:

- The information required to be entered in the Record Books.
- Who is required to enter the details in the Record Books.
- When entries are required to be made in the Record Books.
- Guidance on any additional record keeping requirements of local or national legislation such as the U.S. Vessel General Permit (VGP).
- When the Master is required to verify the accuracy of the Record Book entries and sign each page.
- The procedure for correcting entries made in error.
- The procedure for entering operations or emissions which had been overlooked and not entered in a Record Book in the correct chronological order.
- Instructions for retention of completed Record Books.
- The actions to take if any NO<sub>x</sub> abatement system fitted suffers a failure that cannot be rectified within one hour.

Where the vessel is using an electronic record book for recording the entries required in the Record Books, instructions for the use of the electronic record book should be provided, including automatic backing up of data to offline storage and an appropriate method of data recovery if the system were to fail or not be available from the ship's network. . The use of the electronic record book should be authorised by a Declaration from flag/class.

The Record Books may form part of an existing logbook or electronic record book.

### **Suggested Inspector Actions**

- Sight and where necessary, review, the company procedures for maintaining the documents and records required by MARPOL Annex VI Regulation 13 and the NO<sub>x</sub> Technical Code.
- Review the IAPP Certificate.
- Sight the Technical Files for diesel engines listed in paragraph 2.2.1 of the vessel's International Air Pollution Prevention (IAPP) Certificate.
- Review the Record Books of Engine Parameters where applicable.
- Review the records of diesel engine Tier and on/off status on entering/leaving an NECA where applicable.
- Review the EGR Record Book where applicable.
- Where the vessel is using an electronic record book for recording the entries required in the Record Books, verify that data is being automatically backed up to offline storage and that there is an appropriate method of data recovery if the system were to fail or not be available from the ship's network. Sight the Declaration from flag/class.

### **Expected Evidence**

- Company procedures for maintaining the documents and records required by MARPOL Annex VI Regulation 13 and the NO<sub>x</sub> Technical Code.
- International Air Pollution Prevention (IAPP) Certificate.
- Technical Files for diesel engines listed in paragraph 2.2.1 of the vessel's International Air Pollution Prevention (IAPP) Certificate.
- Record Books of Engine Parameters for those engines required to undergo Engine Parameter Checks at initial and subsequent surveys.
- Records of diesel engine Tier and on/off status on entering/leaving an NECA where applicable.
- Records of the discharge of solid residues and bleed-off water from the EGR equipment where fitted.
- Where an electronic record book is in use, the Declaration from flag/class.

### **Potential Grounds for a Negative Observation**

- There were no company procedures for maintaining the documents and records required by MARPOL Annex VI Regulation 13 and the NO<sub>x</sub> Technical Code.
- The accompanying officer was not familiar with the company procedures for maintaining the documents and records required by MARPOL Annex VI Regulation 13 and the NO<sub>x</sub> Technical Code.
- The accompanying officer was not familiar with the NO<sub>x</sub> abatement system installed on board, or its operation.
- The accompanying officer was not familiar with the actions to be taken in the event that a NO<sub>x</sub> abatement system fitted suffered a failure that could not be rectified within one hour.
- Technical Files were not available for all diesel engines listed in paragraph 2.2.1 of the vessel's International Air Pollution Prevention (IAPP) Certificate.
- Record Books of Engine Parameters were not available for all those engines required to undergo Engine Parameter Checks at initial and subsequent surveys.
- Record Books of Engine Parameters had not been maintained in accordance with company procedures.
- On a vessel constructed after the applicable date, there were no records of diesel engine Tier and on/off status on entering/leaving an NECA.
- There was evidence that Tier II engines had been operated in an applicable NECA.
- On a vessel with Exhaust Gas Recirculation equipment, records of the discharge of solid residues and bleed-off water had not been maintained in accordance with company procedures.
- The accompanying engineer officer was not familiar with the strategy for monitoring the catalyst condition/degradation in an SCR system installed on board, and/or its implementation and associated equipment.
- There were no records available, paper or electronic, of continuous or spot-checked NO<sub>x</sub> levels associated with an SCR system fitted on board.
- Where the vessel was using an electronic record book, there were no instructions available for the use of the electronic record book system.

- Where the vessel was using an electronic record book, there was no Declaration from flag/class authorising its use.
- There was no facility for automatic backup and recovery of data if the electronic record book system were to fail or not be available from the ship's network.



## 6.2. Cargo and Bunker Operations

### 6.2.1. Were the Master and officers familiar with the arrangements to drain the cargo pumproom bilges in the event of flooding or accidental leakage, and were these arrangements in good order?

#### Short Question Text

Flooding or accidental leakage of cargo pumproom bilges

#### Vessel Types

Oil, Chemical

#### ROV IQ Sequence

Cargo Control Room, Pumproom

#### Publications

IMO: ISM Code

IMO: MARPOL

USCG: Code of Federal Regulations. Title 46.

#### Objective

To ensure that the cargo pumproom bilge pump could be operated when the pumproom was flooded.

#### **Industry Guidance**

#### **USCG: Code of Federal Regulations. Title 46.**

- 32.52-5 Bilge piping for pump rooms and adjacent cofferdams on tank vessels constructed or converted on or after November 19, 1952—TB/ALL.

(a) Provisions shall be made for removing drainage from the pumproom bilges and adjacent cofferdams. A separate bilge pump, ejector, or bilge suction from a cargo pump or cargo stripping pump may be provided for this purpose. The bilge pump shall not be located in nor shall the piping pass through spaces containing machinery where sources of vapor ignition are normally present.

(b) Where a bilge suction is provided from a cargo or stripping pump, a stop check valve shall be fitted in the suction branch, and an additional stop valve shall be fitted also if the bilge suction branch can be subjected to a head of oil from the filling line.

(c) Means shall be provided for controlling the cargo or pump room bilge pumps and their suctions or discharges in order that a flooded pump room may be pumped out. Suitable portable or manually operated pumps may be accepted as complying with this provision, or alternatively, the pump controls shall be arranged so that they are operable from inside the pump room and either from an accessible position outside the pump room, or from the pump room casing above the freeboard deck.

**TMSA 10.1.3** requires that procedures minimise marine and atmospheric emissions and ensure that they are always within permitted levels. These sources could include:

- Environmentally responsible disposal methods.

#### **IMO: ISM Code**

6.3 The Company should establish procedures to ensure that new personnel and personnel transferred to new assignments related to safety and protection of the environment are given proper familiarisation with their duties. Instructions which are essential to be provided prior to sailing should be identified, documented and given.

## **IMO: MARPOL**

### **Annex I**

#### **Regulation 15**

1. Subject to the provisions of regulation 4 of this Annex and paragraphs 2, 3 and 6 of this regulation, any discharge into the sea of oil or oily mixtures shall be prohibited.

#### **Regulation 34**

1. Subject to the provisions of regulation 4 of this Annex and paragraph 2 of this regulation, any discharge of oil or oily mixtures from the cargo area of an oil tanker shall be prohibited except when all the following conditions are met:...

### **Inspection Guidance**

The vessel operator should have developed procedures for draining the pumproom bilges. These procedures should include:

- Transferring bilge contents to cargo/slop tanks or other containment tanks without risk of pollution.
- Pumping out the pumproom in the event of flooding, including controlling the bilge pump and suction and discharge valves remotely from the upper deck.
- Periodic testing of the arrangements for draining the pumproom bilges.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures for draining the pumproom bilges.
- Inspect the arrangements for draining the pumproom bilges, including the controls on platforms above the freeboard deck or the upper deck and verify that:
  - Valves required to remain open were correctly set.
  - Valves or controls were marked with their purpose.
- Where necessary, review Oil Record Book Part II for records of the disposal of pumproom bilge accumulations.
- Where necessary, review records of tests of the arrangements for draining the pumproom bilges.

Interview the accompanying officer to verify that they were familiar with the pipeline set up to pump the pumproom bilges to a slop or cargo tank when the pumproom was flooded.

### **Expected Evidence**

- The company procedures for draining the pumproom bilges.
- The shipboard emergency response plan for pumproom flooding.
- The Oil Record Book Part II.
- Records of tests of the arrangements for draining the pumproom bilges.

### **Potential Grounds for a Negative Observation**

- There was no company procedure for draining the pumproom bilges.
- There was no shipboard emergency response plan for pumproom flooding.
- The company procedures did not provide guidance on:
  - Transferring bilge contents to cargo/slop tanks or other containment tanks without risk of pollution.

- Pumping out the pumproom in the event of flooding, including controlling the bilge pump and suction and discharge valves remotely from the upper deck.
  - Periodic testing of the arrangements for draining the pumproom bilges
- The accompanying officer was unfamiliar with the company procedure for draining the pumproom bilges.
- There was evidence that the disposal of the content of the pumproom bilges or bilge wells had not been documented within the Oil Record Book part II.
- The accompanying officer was unfamiliar with the location and purpose of the remote controls for the bilge pump and suction and discharge valves.
- There were no means available to operate the bilge pump and suction and discharge valves remotely.
- Valves, including steam delivery and condensate return valves, required to remain in the open position to permit emergency bilge pumping were shut with no means to open them remotely.
- The means available to operate the bilge pump and suction and discharge valves remotely were defective in any respect.
- There was no evidence of periodic testing of the arrangements for draining the pumproom bilges.
- The bilge pump was defective in any respect.

**6.2.2. Were cargo system overboard and sea suction valves checked and verified as closed and secured prior to commencement of cargo transfer, and where provided, were sea valve-testing arrangements in order and regularly monitored for leakage?**

**Short Question Text**

Cargo system overboard and sea suction valves

**Vessel Types**

Oil, Chemical

**ROVIQ Sequence**

Cargo Control Room, Pumproom, Main Deck

**Publications**

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: ISM Code

OCIMF/ICS: Prevention of Oil Spillages through Cargo Pumproom Sea Valves. Second Edition

**Objective**

**To ensure all precautions are taken to prevent cargo spillages through cargo system overboard and sea suction valves.**

**Industry Guidance**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition**

12.1.14.2 Line displacement with water

On ships with a segregated ballast system, avoid the practice of using cargo pumps on a sea suction. However, at the end of cargo operations, some terminals require ships to displace the contents of the hoses or MLAs, and perhaps the shorelines, with water. This practice risks pollution, so it should be done only if essential and should be carefully planned and executed. Before starting the displacement, the ship and terminal should agree the procedures to be used, particularly the amount to be pumped and the pumping rate.

Pay particular attention to venting the cargo pumps and ensuring there is no outflow of oil when opening the sea valve.

Refer to OCIMF/ICS: Prevention of Oil Spillages through Cargo Pumproom Sea Valves.

12.6.2 Loading cargo tank ballast

12.6.2.1 Operation of cargo pumps

When starting to ballast, operate the cargo pumps so that no oil is allowed to escape overboard when the sea suction valve is opened (see OCIMF/ICS: Prevention of Oil Spillages through Cargo Pumproom Sea Valves).

23.7.3 Sea and overboard discharge valves

During cargo, tank cleaning/de-ballasting operations, keep a watch to ensure that no oil is escaping through sea valves.

Sea and overboard discharge valves connected to the cargo and ballast systems should be closed and secured using a Lock-out/Tag-out system (LO/TO) and may be sealed when not in use. In-line blanks should be inserted where provided. When a LO/TO system is not practical as with hydraulic valves, use some suitable marking to indicate clearly that the valves are to remain closed.

## **OCIMF/ICS: Prevention of Oil Spillages through Cargo Pumproom Sea Valves. Second Edition**

### **4. Sea valve monitoring**

It is recommended that a device be installed to monitor pressure build-up and determine liquid make-up in the section of the pipeline which lies between the inboard and the out-board valves. Such a device would both provide an early indication of leakage through either valve during cargo handling operations, and enable the leaking valve to be identified.

Devices should be positioned so that both readings and samples can be taken from a point far enough above the pumproom lower platform level that there is no possibility of human exposure to gas concentrations which may accumulate below the floor plates.

The use of a pressure/vacuum gauge rather than a pressure only gauge, is preferable in that it will provide a reliable indication of a vacuum in the line prior to opening the sea-valve for ballasting.

### **5.2 Display of notice**

A notice reading "START PUMP BEFORE OPENING SEA SUCTION" should be prominently displayed next to each cargo system suction valve in the pumproom(s). A similar notice should be displayed in the cargo control room or pump operating location.

### **5.3 Testing of Sea Valves**

Note: Care must be taken that the pipe system is not over-pressurised during the test. This can be done by utilising a pressure limiting device on the air inlet set for no more than 3.5 kg/cm<sup>2</sup>.

**TMSA KPI 6.1.2** requires procedures for pre-operational tests and checks of cargo and bunkering equipment are in place for all vessel types within the fleet.

## **IMO: ISM Code**

7 The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks involved should be defined and assigned to qualified personnel.

### **Inspection Guidance**

The vessel operator should have developed procedures to prevent cargo spillages through cargo system overboard and sea suction valves that included detailed guidance on:

- Taking ballast into cargo tanks via sea-valves.
- Line displacement with sea water.

And precautionary measures including:

- Checking cargo system overboard and sea suction valves are closed and secured prior to commencement of cargo transfer.
- Checking cargo system overboard valves and sea suction valves for leakage, where arrangements are fitted.
- Testing cargo system overboard and sea suction valves for integrity between dry-docks, where arrangements are fitted.
- The maximum test pressure to which sea valve arrangements should be subjected.
- Recording these checks and tests.

- Posting suitable anti-pollution notices next to overboard valves and cargo system sea valves and at the pump operating position.

The HVPQ responses to questions 6.1.6, 6.1.10, 6.1.11 and 6.1.12 will be inserted in the inspection editor and the final inspection report.

### **Suggested Inspector Actions**

- Sight, and where necessary review the company procedures to prevent cargo spillages through cargo system overboard and sea suction valves.
- Review records of:
  - Checks that cargo system overboard and sea suction valves are closed and secured prior to commencement of cargo transfer in the bridge or cargo logbook.
  - Checks of cargo system overboard and sea suction valves for leakage.
  - Tests of cargo system overboard and sea suction valves for integrity between dry-docks.
- Inspect cargo system overboard valves, cargo system sea valves and testing arrangements where fitted.

### **Expected Evidence**

- Company procedures to prevent cargo spillages through cargo system overboard and sea suction valves.
- Records of
  - Checks that cargo system overboard and sea suction valves are closed and secured prior to commencement of cargo transfer in the bridge or cargo logbook.
  - Checks of cargo system overboard and sea suction valves for leakage.
  - Tests of cargo system overboard and sea suction valves for integrity between dry-docks.

### **Potential Grounds for a Negative Observation**

- There were no company procedures to prevent cargo spillages through cargo system overboard and sea suction valves that included detailed guidance on:
  - Taking ballast into cargo tanks via sea-valves.
  - Line displacement with sea water.
- And precautionary measures including:
  - Checking cargo system overboard and sea suction valves are closed and secured prior to commencement of cargo transfer.
  - Checking cargo system overboard and sea suction valves for leakage, where arrangements are fitted.
  - Testing cargo system overboard and sea suction valves for integrity between dry-docks, where arrangements are fitted.
  - The maximum test pressure to which sea valve arrangements should be submitted.
  - Recording these checks and tests.
  - Posting suitable anti-pollution notices next to cargo system overboard and sea suction valves and at the pump operating position.
- The accompanying officer was not familiar with the company procedures to prevent cargo spillages through cargo system overboard and sea suction valves.
- Cargo system overboard valves and/or cargo system sea suction valves had not been fully closed prior to commencement of cargo transfer.
- Cargo system overboard valves and/or cargo system sea valves had not been secured using a Lock-out/Tag-out system prior to commencement of cargo transfer.
- Where provided, in-line blanks had not been inserted.
- Where a Lock-out/Tag-out system was not practical as with hydraulic valves, suitable marking to indicate clearly that the valves were to remain closed had not been used.
- There were no records of cargo system overboard and sea suction valves being checked as closed and secured prior to commencement of cargo transfer.
- Where arrangements for monitoring and testing cargo system overboard and sea suction valves were fitted:
  - There were no records of checking cargo system overboard and sea suction valves for leakage.

- The pressure/vacuum gauge indicated that there was leakage past one of the cargo system overboard and/or sea suction valves.
- There were no records of testing cargo system overboard and sea suction valves for integrity between dry-docks.
- The leak detecting arrangement for the direct sea suction valves was not fitted with a pressure/vacuum gauge.
- The pressure/vacuum gauge fitted was damaged/defective.
- The arrangements were not positioned so that both readings and samples could be taken from a point far enough above the pumproom lower platform level that there was no possibility of human exposure to gas concentrations which may accumulate below the floor plates.
- Suitable anti-pollution notices were not posted next to overboard valves and/or cargo system sea valves and/or at the pump operating position.

**6.2.3. Were the Master and officers familiar with the company procedures for inspections and pressure tests of the bunker oil (HFO and MDO) pipeline system, and had the tests been performed and the results suitably recorded?**

**Short Question Text**

Bunker pipeline system pressure testing

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Documentation, Main Deck, Chief Engineer's Office

**Publications**

IMO: ISM Code

USCG: Code of Federal Regulations. Title 33.

USCG: Marine Safety Manual

Vol. II: Materiel Inspection

**Objective**

**To ensure the bunker pipeline system is regularly inspected and tested.**

**Industry Guidance**

**USCG: Code of Federal Regulations. Title 33.**

156.170 Equipment tests and inspections.

(a) Except as provided in paragraph (d) of this section, no person may use any equipment listed in paragraph (c) of this section for transfer operations unless the vessel or facility operator, as appropriate, tests and inspects the equipment in accordance with paragraphs (b), (c) and (f) of this section and the equipment is in the condition specified in paragraph (c) of this section.

(c) For the purpose of paragraph (a) of this section:

- (2) Each transfer system relief valve must open at or below the pressure at which it is set to open;
- (3) Each pressure gauge must show pressure within 10 percent of the actual pressure;
- (4) Each loading arm and each transfer pipe system, including each metallic hose, must not leak under static liquid pressure at least 1 1/2 times the maximum allowable working pressure; and
- (5) Each item of remote operating or indicating equipment, such as a remotely operated valve, tank level alarm, or emergency shutdown device, must perform its intended function.

(e) The test fluid used for the testing required by this section is limited to liquids that are compatible with the hose tube as recommended by the hose manufacturer.

(f) The frequency of the tests and inspections required by this section must be:

- (3) For vessels, annually or as part of the biennial and mid-period inspections.

**USCG: Marine Safety Manual, Vol. II: Materiel Inspection**

**SECTION B: DOMESTIC INSPECTION PROGRAMS**

**CHAPTER 6: POLLUTION PREVENTION**



## 8. Equipment Tests and Inspections

a. Introduction. The high pressure test required by 33 CFR 156.170 is intended to expose a weakness or leak under controlled conditions, so that corrective action can be taken before a spill.

- (1) Testing to 1.5 MAWP is standard engineering practice and does not damage or destroy a hose in good working condition.
- (2) On the other hand, testing only to MAWP is not a conclusive indicator of hose condition and is not suitable to determine that a hose is safe for transfer operations.

b. Transfer piping systems.

- (1) A vessel's oil transfer pipe system includes the discharge pump and piping or hose between the pump and the vessel's deck manifold (which connects to the facility or other vessel's transfer system). The portions of the vessel's oil transfer pipe system, not including non-metallic hose(s), must be tested annually to a minimum of 1.5 times the MAWP of the pipe system.
  - (a) In this instance, the MAWP can be assumed to be either the pressure at which the transfer piping relief valve is set or, where no relief valve(s) are fitted, the maximum discharge pressure including hydraulic shock that can be developed by the vessel's pump.
  - (b) For centrifugal pumps, this is the pressure developed by the pump at zero flow conditions, i.e., pump shutoff head.
  - (c) All non-metallic cargo hose(s) used on a vessel as part of its oil transfer system must also be tested to 1.5 times its MAWP, which will be a minimum of 1,552 kPa per 33 CFR 155.800 and 156.170(c)(1).

c. Acceptance of alternative cargo piping test pressures for vessels. Achieving test pressures of 150% MAWP for annual cargo piping tests on tank vessels is often impractical while vessels are in service, where transfers are conducted by vacuum or suction method, or outside the shipyard where special equipment is not available. Therefore, as provided by 33 CFR 156.107, alternative test pressures of not less than 100% MAWP may be used for in-service annual cargo piping tests, provided that a 150% MAWP test of the cargo piping is conducted at least twice in any 5-year period.

- (1) The Coast Guard envisions that the 150% MAWP tests will be conducted during drydock periods at the discretion of the vessel owners or operators. Those vessels with longer drydock intervals must make arrangements to conduct the 150% MAWP tests at least twice in any 5-year period.
- (2) All alternative test pressures must provide an equivalent level of safety and protection from pollution. Accurate records of the required tests must be maintained aboard the vessel. These records must be made available to the OCMI or COTP upon request.
- (3) An alternative to the 150% MAWP test of hoses should not normally be granted. Sections of piping that cannot be tested without pressurizing cargo tanks, must not be pressure tested due to the possibility of causing structural damage aboard the vessel. These sections of piping must be visually examined during periods of availability.

**TMSA KPI 6.1.2** requires that procedures for pre-operational tests and checks of cargo and bunkering equipment are in place for all vessel types within the fleet.

Tests and checks of equipment may include:

- Cargo/bunker line pressure testing

### IMO: ISM Code

7. The company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks should be defined and assigned to qualified personnel.

### Inspection Guidance

The vessel operator should have developed procedures for the inspection and pressure testing of the bunker pipeline system, including guidance on the:

- Equipment to be inspected/tested.
- Inspection and test frequency.
- Testing method(s).
- Test pressure.
- Disposal of the liquid used to test the pipeline system.
- Records to be kept.

Bunker pipelines are defined as any pipeline used for taking on, discharging, or internally transferring any fuel for consumption on board. Inspections should include any pressure relief valves, pressure gauges, valves, ullage gauges, level alarms and emergency shutdown arrangements that form part of the system.

Where ship's drawings do not define the MAWP for the bunker pipeline system, the MAWP may be assumed to be either:

- The pressure at which the transfer piping relief valve is set; or,
- Where no relief valve(s) are fitted, the maximum discharge pressure including hydraulic shock that can be developed by the vessel's pump.

Pipelines should be marked with the date of test and the test pressure.

Records should include the date of test, the test pressure and the method and testing medium used. Pressure testing should be a hydrostatic test, pressure testing using compressed air or inert gas is not acceptable.

Procedures and records may form part of the vessel's maintenance plan.

The responses to HVPQ questions 6.1.14.1 and 6.1.14.2 will be inserted in the inspection editor and the final report.

### **Suggested Inspector Actions**

- Sight, and where necessary, review the company procedures for the inspection and pressure testing of the bunker pipeline system.
- Review the records of inspection and testing of the bunker pipeline system.
- Review records of the disposal of the liquid used to test the pipeline system.
- During the inspection, observe the condition of the bunker pipeline system and associated equipment.
- Verify pipelines had been marked with the date and pressure of the last test.

### **Expected Evidence**

- Company procedures for the inspection and pressure testing of the bunker pipeline system.
- Records of inspection and testing of the bunker pipeline system.
- Records of testing the bunker system relief valve, where fitted.
- Records of testing tank level alarms, where fitted.
- Records of the disposal of the liquid used to test the pipeline system.

### **Potential Grounds for a Negative Observation**

- There were no company procedures for the inspection and pressure testing of the bunker pipeline system including guidance on the:
  - Equipment to be inspected/tested.
  - Inspection and test frequency.
  - Testing method(s).

- The test pressure.
  - Disposal of the liquid used to test the pipeline system.
  - Records to be kept.
- The accompanying officer was not familiar with the company procedures for the inspection and pressure testing of the bunker pipeline system including the testing method.
- There were no records of inspection and testing of the bunker pipeline system.
- There were no records of the disposal of the liquid used to test the pipeline system.
- There were no records of the testing of the bunker system relief valve, where fitted.
- The bunker pipeline system was not marked with the date of the last test and the test pressure.
- The bunker pipeline system had not been tested:
  - To 100% of MAWP within the last 12 months.
  - To 150% of MAWP twice in the last 5 years.
  - With a suitable liquid but tested with air or inert gas instead.
- A section of pipeline, pressure gauge, valve, remotely operated valve, tank level alarm or emergency shutdown device that formed part of the bunker pipeline system was defective in any respect.

## 6.3. Ballast Operations

**6.3.1. Were the Master and officers familiar with the company procedures for the safe operation of the ballast water management system (BWMS), and was the equipment in satisfactory condition and used in accordance with the company procedures and manufacturer's instructions?**

### Short Question Text

Ballast water management system (BWMS)

### Vessel Types

Oil, Chemical, LPG, LNG

### ROVIQ Sequence

Engine Room, Pumproom, Main Deck

### Publications

IMO: ISM Code

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: Ballast Water Management Convention and BWMS Code

### Objective

**To ensure that ballast is always handled safely in accordance with company procedures and manufacturer's instructions.**

### **Industry Guidance**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.**

#### 10.3 Identifying enclosed spaces

Some spaces that do not meet the criteria for an enclosed space may have an unsafe atmosphere and should be subject to the enclosed space procedures. A list should identify these spaces on every tanker. Examples include: Ballast water treatment room.

#### 10.4 The hazards of enclosed space atmospheres

##### 10.4.2 Presence of toxic and/or flammable gases

When preparing to enter a ballast tank or void space, the space should be tested for hydrocarbon vapour and H<sub>2</sub>S.

Technologies such as ballast water treatment systems introduce an additional risk of gases to enclosed spaces that would not normally be expected on tankers. For this reason, where ballast water treatment systems are fitted, the precautions noted in section 10.3 should be followed.

Some examples of ballast water treatment systems are:

- Electrolysis based systems that may generate hydrogen gas.
- Chemical injection systems that inject different chemicals.
- Ozone based systems.

##### 12.4.7 Ventilating double hull ballast tanks

The use of a ballast water treatment system may call for extra measures to ensure that the space is properly ventilated. Toxic gases in the tank atmosphere, or chemicals in the remaining ballast water, may mean precautions need to be taken before entering a tank.

**TMSA KPI 6.2.3** requires that comprehensive procedures cover all aspects of ballast handling operations which includes ballast water exchange and ballast water treatment.

#### **IMO: ISM Code**

7 The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks involved should be defined and assigned to qualified personnel.

#### **IMO: Ballast Water Management Convention and BWMS Code**

Regulation D-3 Approval requirements for ballast management systems

2. Ballast water management systems which make use of Active Substances or preparations containing one or more Active Substances to comply with this Convention shall be approved by the Organisation. This procedure shall describe the approval and withdrawal of approval of Active Substances and their proposed manner of application. At withdrawal of approval, the use of the relevant Active Substance or Substances shall be prohibited within one year after the date of such withdrawal.

3. Ballast water management systems used to comply with this Convention must be safe in terms of the ship, its equipment and the crew.

#### **Inspection Guidance**

The vessel operator should have developed procedures for the operation, inspection and maintenance of the ballast water management system (BWMS), including guidance on:

- Who is responsible for supervising the use of the BWMS.
- Who is permitted to use the BWMS.
- Identification of hazards to the crew presented by the operation of the BWMS.
- Mitigation measures for hazards presented by the operation of the BWMS.
- Use, handling and storage of any active substances, such as chemicals, used by the system for disinfection or neutralisation.
- Safe disposal of any by-products of the process.
- The possible effect of water density, water temperature and suspended solids on the operation of the BWMS.
- Actions in the event of a failure of the BWMS.
- Records to be kept of the operation of the BWMS.

These procedures may refer to the manufacturer's operation and safety manual for the BWMS and the vessel's maintenance plan.

#### **Suggested Inspector Actions**

- Sight and where necessary, review the company procedures for the operation, inspection and maintenance of the ballast water management system (BWMS).
- Inspect the BWMS control panel and verify that the system is operational with no apparent faults or alarms.
- Review available self-monitoring data to verify satisfactory operation.
- Inspect the visible parts of the BWMS and verify that it is intact and not modified in any respect.
- Where necessary, review the maintenance and inspection records of the BWMS.
- Where necessary, review the records of the operation of the BWMS.

- Interview the accompanying officer and verify their familiarity with:
  - Company procedures for the operation, inspection and maintenance of the BWMS.
  - The hazards from the operation of the equipment and the handling and storage of any chemicals used.
  - The actions in the event of the failure of the BWMS.

#### **Expected Evidence**

- Company procedures for the operation, inspection and maintenance of the ballast water management system (BWMS).
- The operation and safety manual for the BWMS.
- Inspection and maintenance records of the BWMS.
- Records of the operation of the BWMS.

#### **Potential Grounds for a Negative Observation**

- There were no company procedures for the operation, inspection and maintenance of the ballast water management system (BWMS), including guidance on:
  - Who is responsible for supervising the use of the BWMS.
  - Who is permitted to use the BWMS.
  - Identification of hazards to the crew presented by the operation of the BWMS.
  - Mitigation measures for hazards presented by the operation of the BWMS.
  - Use, handling and storage of any active substances, such as chemicals, used by the system for disinfection or neutralisation.
  - Safe disposal of any by-products of the process.
  - The possible effect of water density, water temperature and suspended solids on the operation of the BWMS.
  - Actions in the event of the failure of the BWMS.
  - Records to be kept of the operation of the BWMS.
- The accompanying officer was not familiar with the company procedures for the operation, inspection and maintenance of the BWMS, particularly the hazards from the operation of the equipment and the handling and storage of any chemicals used.
- There were no records of the required inspection and maintenance of the BWMS in the vessel's maintenance plan.
- There were no records of the operation of the BWMS.
- The BWMS was not fully operational, including pumps, filters and back-flush arrangements.
- BWMS self-monitoring data indicated that the equipment had not operated correctly at the last ballast/de-ballast operation.
- The BWMS had been modified and/or by-passed.
- The BWMS was defective in any respect.
- There was insufficient stock of the required chemicals for injection.
- Storage and/or handling arrangements for the required chemicals were not satisfactory.

Where the entry procedures for the space containing the BWMS posted at the entrance were not in alignment with the enclosed space entry procedure contained in the SMS for such a space or, entry into the space containing the BWMS was authorised during the inspection without full compliance with the enclosed space entry procedure, make a **negative observation** in the Process response tool of question 5.5.1.

## 6.4. Deck Area Pollution Prevention

**6.4.1. Were the Master, officers and ratings familiar with the company procedures for the removal of small quantities of oil or chemical spilled and contained on deck, and was suitable response equipment available, in satisfactory condition and effectively deployed?**

### Short Question Text

Main deck oil or chemical spill clean up equipment.

### Vessel Types

Oil, Chemical, LPG, LNG

### ROVIQ Sequence

Cargo Control Room, Main Deck, Interview - Rating

### Publications

IMO: MARPOL

USCG: Code of Federal Regulations. Title 33.

IMO: Guidelines for the development of Shipboard Marine Pollution Emergency Plans. 2010 edition.

IMO: ISM Code

IMO SOLAS

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

### Objective

**To ensure any oil or chemical spills contained on deck are promptly and safely cleaned up.**

### **Industry Guidance**

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.**

#### 23.7.5 Spill containment

A permanently fitted spill tank, with suitable means of draining, should be fitted under all tanker/terminal manifold connections. If no permanent spill tank is fitted, portable drip trays should be placed under each connection to catch any leaks. Avoid plastic and other non-metallic containers unless bonding is possible.

SSSCL. Part 5A Tanker and terminal: Pre-transfer conference.

Item 42: Oil spill clean-up material is available (20.4)

Bunker Checklist. Part F: Ship technical checks before bunkering.

Item 32: Oil spill clean-up material is available (20.4, 24.2)

**IMO: Guidelines for the development of Shipboard Marine Pollution Emergency Plans. 2010 edition.**

2.5.2.1 Operational spills: The Plan should outline the procedures for safe removal of oil or NLS spilled and contained on deck. This may be through the use of on-board resources or by hiring a clean-up company. In either case the Plan should provide guidance to ensure proper disposal of removed oil, NLS and clean-up materials.

3.3 Response equipment: Some ships may carry on board equipment to assist in pollution response. The type and quantity of this equipment may vary widely. The Plan should indicate an inventory of such equipment, if carried. It should also provide directions for safe use and guidelines to assist the master in determining when such use is warranted. Care should be exercised to ensure that the use of such equipment by the crew is practical and consistent

with safety considerations. When such equipment is carried, the Plan should establish personnel responsibilities for its deployment, oversight, and maintenance. In order to ensure safe and effective use of such equipment, the Plan should also provide for crew training in the use of it. The Plan should include a provision that no chemical agent should be used for response to pollution on the sea without authorization of the appropriate coastal State and that such authorization should also be requested, when required, for use of containment or recovery equipment.

**USCG: Code of Federal Regulations. Title 33.**

155.205 Discharge removal equipment for vessels 400 feet or greater in length.

(a) Oil tankers and offshore oil barges with an overall length of 400 feet or more must carry appropriate equipment and supplies for the containment and removal of on-deck oil cargo spills of at least 12 barrels.

155.210 Discharge removal equipment for vessels less than 400 feet in length.

(a) Oil tankers and offshore oil barges with an overall length of less than 400 feet must carry appropriate equipment and supplies for the containment and removal of on-deck oil spills of at least 7 barrels.

*In both cases*

(b) The equipment and supplies must include—

1. Sorbents.
2. Non-sparking hand scoops, shovels, and buckets.
3. Containers suitable for holding recovered waste.
4. Emulsifiers for deck cleaning.
5. Protective clothing.
6. A minimum of one non-sparking portable pump with hoses; and
7. Scupper plugs.

(c) During cargo transfer operations, the equipment and supplies must remain ready for immediate use.

**TMSA KPI 11.1.1** requires that detailed vessel emergency response plans include initial notification procedures and cover all credible emergency scenarios.

- Vessel emergency response plans are reviewed at least annually, to reflect changes in legislation, contact details, vessel equipment and changes in company procedures.
- They are additionally reviewed following any incident or drill where the emergency response plans have been used.

**IMO: ISM Code**

8.1 The Company should establish procedures to identify, describe and respond to potential emergency shipboard situations.

**IMO: MARPOL**

Annex II

Regulation 17

Shipboard marine pollution emergency plan for noxious liquid substances



1. Every ship of 150 gross tonnage and above certified to carry noxious liquid substances in bulk shall carry on board a shipboard marine pollution emergency plan for noxious liquid substances approved by the Administration.
2. Such a plan shall be based on the Guidelines\* developed by the Organization and written in a working language or languages understood by the master and officers. The plan shall consist at least of:

.3 a detailed description of the action to be taken immediately by persons on board to reduce or control the discharge of noxious liquid substances following the incident; and

1. In the case of ships to which regulation 37 of Annex I of the Convention also applies, such a plan may be combined with the shipboard oil pollution emergency plan required under regulation 37 of Annex I of the Convention. In this case, the title of such a plan shall be "Shipboard marine pollution emergency plan".

\* Refer to "Guidelines for the development of shipboard marine pollution emergency plans for oil and/or noxious liquid substances" adopted by the Marine Environment Protection Committee of the Organization by resolution MEPC.85(44), as amended by resolution MEPC.137(53).

(See also IMO: MARPOL Annex I Regulation 37 Shipboard oil pollution emergency plan)

### **Inspection Guidance**

The vessel operator should have developed procedures for the removal of oil or chemical spilled and contained on deck. These procedures may be partly or wholly contained in the SOPEP or SMPEP and should ensure that:

- Suitable equipment is readily available at the manifold and there is an adequate method (non-sparking portable pumps, dump valves to a cargo/slop tank or other equally effective means) for the rapid disposal of spills at the aft end of the main deck on both sides of the vessel.
- If transferring to a cargo/slop tank is not a viable option, an enclosed container with a capacity of at least 2 m<sup>3</sup> is available for the disposal of spills and water from the deck.
- Portable pumps are:
  - Bonded to the vessel's structure to prevent electrical discharge to earth. Bonding may be made by external means, or by the discharge hose, if this is attached by means of a flanged connection to the vessel's structure.
  - Mounted to prevent movement and subsequent damage during operation.
- If portable pumps are arranged to discharge to a cargo/slop tank, this is via a suitable fixed connection, not via the insertion of the spill pump discharge hose through a tank opening such as a sighting port.
- If effective draining of a spill cannot be achieved or if pressure release is required, an alternative method of immediately disposing of a spill should be provided.
- The arrangement and positioning of the equipment take into account the following:
  - The effectiveness of dump-valves to a cargo/slop tank will be impacted by:
    - Cargo/slop tank pressure.
    - The liquid level in any U-bends fitted in the drain pipework.
    - The ullage in the receiving tank and the vessel's trim, particularly when the tank is full, and the vessel is trimmed by the stern.
  - The location on deck where any spill will accumulate will be impacted by
    - Trim
    - Hogging/sagging
- An inventory of the spill clean-up equipment is maintained by a designated officer and periodic inspections carried out.
- Crew members receive suitable training in the use of the spill clean-up equipment.
- Instructions are available for the safe use of the spill clean-up equipment, including PPE requirements.
- No chemical agent is used in response to pollution on the sea without authorization of the appropriate coastal State
- Removed spilled oil or chemical and clean-up materials are properly disposed of.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the SOPEP or SMPEP.
- Sight, and where necessary review, the company procedures for the removal of oil or chemical spilled and contained on deck.
- Review the inventory of spill clean-up equipment provided on board and the records of periodic inspections.
- During the main deck inspection:
  - Review the arrangement, positioning and condition of the spill clean-up equipment.
  - Inspect the stored spill clean-up equipment and confirm actual quantities broadly agree with the inventory.
  - Review the means for the rapid disposal of oil or chemical at the aft end of the main deck on both sides of the vessel.
  - Where dump valves were installed at the after end of the main deck verify that:
    - The valve operating controls would remain above the surface of an accumulation of spilled liquid.
    - The valve operating controls could be accessed without the need to wade into an accumulation of spilled liquid.
    - The opening of the dump valves would result in the draining of accumulated liquid at any state of list and trim or vapour pressure within the tank and, if not, the limitations that applied were clearly posted.
- Where safe to do so, request that at least one portable pump is demonstrated and that it could create and maintain suction.
- Interview a rating to verify they were familiar with the location, purpose and safe use of the spill clean-up equipment and PPE provided for dealing with small spills.

#### **Expected Evidence**

- The SOPEP or SMPEP
- Company procedures for the removal of oil or chemical spilled and contained on deck.
- The inventory of spill clean-up equipment and records of periodic inspections.

#### **Potential Grounds for a Negative Observation**

- There were no company procedures for the removal of oil or chemical spilled and contained on deck.
- There was no inventory of spill clean-up equipment on board.
- The records of periodic inspections of the inventory of spill clean-up equipment were missing or incomplete.
- There were no instructions available for the safe use of the spill clean-up equipment, including PPE requirements.
- Company procedures did not contain:
  - A provision that no chemical agent should be used in response to pollution on the sea without authorization of the appropriate coastal State and that such authorization should also be requested, when required, for use of containment or recovery equipment.
  - Guidance on the proper disposal of removed oil or chemical and clean-up materials.
- The accompanying officer was unfamiliar with the:
  - Company procedures for the removal of oil or chemical spilled and contained on deck.
  - Location, purpose or safe use of the spill clean-up equipment on board, including PPE requirements.
- Actual quantities of spill clean-up equipment on board were significantly different to the latest inventory.
- There were inadequate quantities of spill clean-up equipment on board.
- Suitable spill clean-up equipment was not available at the manifold.
- There was no adequate means for the rapid disposal of oil or chemical at the aft end of the main deck on both sides of the vessel.

- Where the transfer of spilled oil or chemical to a cargo/slop tank was not an option, there was no alternative means to collect spills and water from the deck into an enclosed container with a capacity of at least 2 m3.
- Hand scoops, shovels, or buckets provided were not of the non-sparking type.
- Portable pumps were:
  - Not bonded(earthed) to the vessel's structure.
  - Not mounted to prevent movement and subsequent damage during operation.
  - Not ready for immediate use e.g. no air available.
  - Arranged to discharge to a cargo/slop tank via the insertion of the spill pump discharge hose through a tank opening such as a sighting port.
- For non inerted vessels, the portable pumps were not provided with a connection to a full depth sounding pipe or other connection which avoided the free fall of liquid in the receiving tank.
- For any reason, it appeared that the dump valves would not be effective in draining spilled oil or chemical from the deck.
- Where there were restrictions for the use of dump valves, these were not clearly posted at or near the location of the dump valves.
- Spill clean-up equipment was defective or deficient in any respect.
- There was no permanently fitted spill tank, with suitable means of draining, or a portable drip tray, fitted under each tanker/terminal manifold connection.
- A plastic or other non-metallic portable drip tray had been placed under a tanker/terminal manifold connection without bonding.
- An interviewed rating was unfamiliar with the location and use of the oil/chemical spill clean-up material and PPE provided, including the specific PPE required for the cargoes being carried.

#### **6.4.2. Were the Master and officers familiar with the company procedures for the disposal of accumulations of water contaminated with oil and/or marine pollutants in the forecastle and other internal spaces, and had the procedures been implemented?**

##### **Short Question Text**

Disposal of oily water in the forecastle and other internal spaces

##### **Vessel Types**

Oil, Chemical, LPG, LNG

##### **ROVIQ Sequence**

Pumproom, Forecastle, Steering Gear

##### **Publications**

IMO: ISM Code

IMO: MEPC.1/Circ.759 Guidelines for a shipboard oily waste pollution prevention plan

##### **Objective**

**To ensure any water contaminated with oil or marine pollutants generated in the forecastle and other internal spaces is disposed of properly.**

##### **Industry Guidance**

##### **IMO: MEPC.1/Circ.759 Guidelines for a shipboard oily waste pollution prevention plan**

1.2 Key elements of the shipboard oily waste pollution prevention plan should include documented ship-specific company procedures as laid out in these guidelines.

##### **3 Shipboard oily waste pollution prevention plan**

The shipboard oily waste pollution prevention plan should contain measures, including as provided for in paragraphs 4 to 14, in order to ensure proper oily waste disposal in accordance with relevant Flag State and Port State regulations. The measures could be directly incorporated in a shipboard oily waste pollution prevention plan or in the Safety Management System (SMS).

##### **7 Identification of waste streams**

Procedures for determining and documenting waste streams, by volume and types.

##### **8 Minimizing wastes**

Procedures to minimize oily waste generation, bilge contaminants and segregation of clean water, including:

.1 maintenance, procedures and operational controls; and

.2 minimizing waste and contaminant generation directly associated with the maintenance, cleaning, and operation of equipment and systems within a machinery space.

**TMSA KPI 10.1.3** requires that procedures minimise marine and atmospheric emissions and ensure that they are always within permitted levels.

Procedures may include:

- Methods of minimising emissions.

- Identification of applicable regulations.
- Environmentally responsible disposal methods.
- Emissions monitoring.

## **IMO: ISM Code**

1.2.3 The safety management system should ensure:

1. compliance with mandatory rules and regulations; and
2. that applicable codes, guidelines and standards recommended by the Organization, Administration, classification societies and maritime industry organizations are taken into account.

## **Inspection Guidance**

The vessel operator should have developed procedures to ensure proper disposal of oily waste or other marine pollutants accumulating in internal space bilge wells, including:

- Identification of relevant spaces.
- Measures to minimise oily waste generation.
- Monitoring of bilge levels, by inspection or sensor/alarm.
- Arrangements for proper disposal of any liquid oily waste and marine pollutant waste generated.
- Record keeping.

Where pumps or ejectors are fitted, pollution prevention notices should be posted and the overboard valves should be secured against accidental opening. Testing and maintenance of such equipment should be included in the vessel's maintenance plan.

## **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures to ensure proper disposal of oily waste or other marine pollutants accumulating in internal space bilge wells.
- Review the records of the disposal of oily waste or other marine pollutants accumulated in internal space bilge wells.
- Inspect bilge-wells in the forecastle and other internal spaces and note the arrangements for monitoring and disposal of the contents and arrangements to prevent unauthorised discharge.

## **Expected Evidence**

- Company procedures to ensure proper disposal of oily waste or other marine pollutants accumulated in internal space bilge wells.
- Records of the disposal of oily waste or other marine pollutants accumulated in internal space bilge wells.

## **Potential Grounds for a Negative Observation**

- There were no company procedures to ensure proper disposal of oily waste or other marine pollutants accumulated in internal space bilge wells including:
  - Identification of relevant spaces.
  - Measures to minimise oily waste generation.
  - Monitoring of bilge levels, by inspection or sensor/alarm.
  - Arrangements for proper disposal of any oily and/or marine pollutant waste generated.
  - Record keeping.
- The accompanying officer was not familiar with the company procedures to ensure proper disposal of oily waste or other marine pollutants accumulated in internal space bilge wells.

- There was evidence that a disposal of oily waste or other marine pollutant had taken place, for example after a hydraulic leak in the forecastle, but there was no record of how the oily waste or marine pollutant had been disposed of.
- Arrangements for the proper disposal of oily waste or other marine pollutants accumulated in internal space bilge wells were inadequate.
- Arrangements to prevent unauthorised discharge of oily waste and/or marine pollutant were inadequate.
- The bilge well of an internal space contained a significant quantity of oily waste or marine pollutant.

## 6.5. Machinery Space Pollution Prevention

**6.5.1. Were the Master and officers familiar with the emergency arrangements to pump out the machinery space bilges in the event of flooding, and were these arrangements prominently marked and in good order?**

### Short Question Text

Emergency arrangements to pump out the machinery space bilges

### Vessel Types

Oil, Chemical, LPG, LNG

### ROVIQ Sequence

Engine Room

### Publications

IMO: ISM Code

IMO SOLAS

IMO: MARPOL

IMO: MSC.1/Circ.1424 Unified interpretation of SOLAS regulation II-1/48.3 Controls of emergency bilge suction valve in periodically unattended machinery spaces

### Objective

**To ensure that the machinery space bilges could be pumped out promptly in the event of a flooding situation.**

### **Industry Guidance**

**ICS: Engine Room Procedures Guide. First Edition.**

5.4 Flooding

5.4.2 Prevention, Preparedness and Response

Though the engineering team cannot predict or prevent flooding caused by allision, collision and grounding, it can avoid flooding caused by inefficient bilge management. Best practices to follow include: (*abbreviated*)

- Maintain and operate bilge and ballast systems properly. Repair any corrosion or leaks in the lines or pumps straight away.
- Test and verify the emergency bilge suction valve regularly, and any other valves for emergency bilge operation.
- Take extra care when working on sea chests and seawater mainlines...
- Never wedge sounding pipes open.

**IMO: MSC.1/Circ.1424 Unified interpretation of SOLAS regulation II-1/48.3 Controls of emergency bilge suction valve in periodically unattended machinery spaces**

SOLAS Regulation II-1/48.3 reads:

Regulation 48 Protection against flooding

3 The location of the controls of any valve serving a sea inlet, a discharge below the waterline or a bilge injection system shall be so sited as to allow adequate time for operation in case of influx of water to the space, having regard to the time likely to be required in order to reach and operate such controls. If the level to which the space could

become flooded with the ship in the fully loaded condition so requires, arrangements shall be made to operate the controls from a position above such level.

#### Interpretation

(A) 'Bilge injection system' is same as 'direct suction' referred in SOLAS Reg.II-1/35-1 3.7.1 and 3.7.2 and is understood to mean 'Emergency bilge suction', which is used to discharge overboard large quantities of sea water accumulated in engine room bilges using the main circulating pump or another suitable pump as permitted by 35-1 3.7.2.

(B) The requirements for the controls of the "valves serving a sea inlet, a discharge below the waterline or a bilge injection system" are not applicable to valves serving an emergency bilge system provided:

(1) The emergency bilge valve is normally maintained in a closed position,

(2) A non-return device is installed in the emergency bilge piping, and

(Note: A normally closed non-return valve with positive means of closing is considered to satisfy both (1) and (2) above.)

(3) The emergency bilge suction piping is located inboard of a shell valve that is fitted with the control arrangements required by SOLAS Reg. II-1/48.3.

#### Note:

1. This UI is to be uniformly implemented by IACS Societies on ships contracted for construction on or after 1 January 2013.

**TMSA KPI 3.1.4** requires that formal familiarisation procedures are in place for vessel personnel, including contractors. The documented procedures may include familiarisation with:

- Vessel specific operations and equipment.

#### IMO: ISM Code

6.3 The Company should establish procedures to ensure that new personnel and personnel transferred to new assignments related to safety and protection of the environment are given proper familiarisation with their duties. Instructions which are essential to be provided prior to sailing should be identified, documented and given.

#### IMO: SOLAS

##### Chapter II-1 Regulation 35-1

##### Bilge pumping arrangements

1 This regulation applies to ships constructed on or after 1 January 2009.

##### 2 Passenger ships and cargo ships

2.1 An efficient bilge pumping system shall be provided, capable of pumping from and draining any watertight compartment other than a space permanently appropriated for the carriage of fresh water, water ballast, oil fuel or liquid cargo and for which other efficient means of pumping are provided, under all practical conditions. Efficient means shall be provided for draining water from insulated holds.



2.2 Sanitary, ballast and general service pumps may be accepted as independent power bilge pumps if fitted with the necessary connections to the bilge pumping system.

### 3 Passenger ships

3.7.1 In addition to the direct bilge suction or suctions required by paragraph 3.6, a direct suction from the main circulating pump leading to the drainage level of the machinery space and fitted with a non-return valve shall be provided in the machinery space. The diameter of this direct suction pipe shall be at least two thirds of the diameter of the pump inlet in the case of steamships, and of the same diameter as the pump inlet in the case of motorships.

3.7.2 Where in the opinion of the Administration the main circulating pump is not suitable for this purpose, a direct emergency bilge suction shall be led from the largest available independent power driven pump to the drainage level of the machinery space; the suction shall be of the same diameter as the main inlet of the pump used. The capacity of the pump so connected shall exceed that of a required bilge pump by an amount deemed satisfactory by the Administration.

3.7.3 The spindles of the sea inlet and direct suction valves shall extend well above the engine room platform.

### 4 Cargo ships

At least two power pumps connected to the main bilge system shall be provided, one of which may be driven by the propulsion machinery.

## IMO: MARPOL

### Annex 1

#### Regulation 4

#### Exceptions

Regulations 15 and 34 of this Annex and paragraph 1.1.1. of part II-A of the Polar Code shall not apply to:

1. The discharge into the sea of oil or oily mixture necessary for the purpose of securing the safety of a ship or saving life at sea; or
2. The discharge into the sea of oil or oily mixture resulting from damage to a ship or its equipment:
  1. provided that all reasonable precautions have been taken after the occurrence of the damage or discovery of the discharge for the purpose of preventing or minimising the discharge; and
  2. except if the owner or the Master acted either with intent to cause damage, or recklessly and with knowledge that damage would probably result; or

The discharge into the sea of substances containing oil, approved by the Administration, when being used for the purpose of combating specific pollution incidents in order to minimise the damage from pollution. Any such discharges shall be subject to the approval of any government in whose jurisdiction it is contemplated the discharge will occur

### Inspection Guidance

Although paragraph 3 of SOLAS II-1/reg 35-1 applies to passenger ships, arrangements such as described may be required in tankers by flag and/or class rules.

The purpose of the “bilge injection system”, “direct suction” or “emergency bilge suction” is to discharge overboard large quantities of sea water from engine room bilges in an emergency using the main circulating pump or another suitable large pump.

The vessel operator should have developed procedures for the use of the emergency bilge pumping arrangements in the machinery spaces. These should include guidance on:

- The use of the various pumps connected to the bilge system, their direct suctions and overboard valves.
- The use of the emergency bilge suction. The emergency bilge suction valve should be readily accessible and clearly marked as to its purpose.
- MARPOL requirements concerning the discharge into the sea of oil or oily mixtures necessary for the purpose of securing the safety of the ship or saving life at sea or resulting from damage to a ship or its equipment. The emergency bilge discharge arrangements must not be used for the disposal of daily machinery space bilge accumulations.
- Ship specific requirements to seal emergency bilge suction and/or overboard valves, depending on the ship's equipment and design, to prevent unauthorised discharge of oil or oily mixtures.
- The marking of system valves and controls to ensure correct operation and avoid accidental opening.

Positive evidence that a valve has not been opened can be provided by use of a numbered seal, the number of which should be recorded in an official document such as the Engine Room Log Book or the Oil Record Book Part I. Such a method of sealing must be easily breakable to allow the valve to be opened in an emergency.

The vessel-specific instructions for pumping of the machinery space bilges in an emergency may be included as part of the vessel emergency response plan for machinery space flooding.

Emergency overboard discharge valve(s) should be provided with a notice warning against accidental opening.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures for the use of the emergency bilge pumping arrangements in the machinery spaces.
- Inspect the emergency bilge pumping arrangements in the machinery spaces, including the associated bilge direct suction valves, overboard valves and the emergency bilge suction valve and verify that:
  - Each suction and/or discharge valve required to be opened and/or closed to permit the emergency pumping of the engine room bilges was marked.
  - Where an emergency bilge suction could be served by multiple pumps there was a clear indication of which pump should be started to take suction.
  - Warning signs to prevent accidental opening of the emergency overboard discharge valve(s) were posted at appropriate locations.
- Consider reviewing the records of numbered seals in the relevant logbook.
- Interview the accompanying officer or any other available engineer officer to verify their understanding of how the machinery space bilges would be pumped out in an emergency utilising the various systems provided onboard. This should include the sequence of opening and closing valves and starting the appropriate pump based on the scenarios where:
  - There had been a failure of the main seawater circulating system pipework.
  - There had been flooding from any source other than a failure in the main seawater circulating system pipework.

### **Expected Evidence**

- The company procedure for the use of the emergency bilge pumping arrangements in the machinery spaces.
- The shipboard emergency response plan for machinery space flooding.
- The Oil Record Book Part I.
- The Engine Room Log Book.

### **Potential Grounds for a Negative Observation**

- There was no company procedure for the use of the emergency bilge pumping arrangements in the machinery spaces.
- There was no shipboard emergency response plan for machinery space flooding.
- The company procedures did not include guidance on:
  - The use of the various pumps connected to the bilge system, their direct suctions and overboard valves.
  - The use of the emergency bilge suction.
  - MARPOL requirements concerning the discharge into the sea of oil or oily mixtures necessary for the purpose of securing the safety of the ship or saving life at sea or resulting from damage to a ship or its equipment.
  - Ship specific requirements to seal suction and/or overboard valves, depending on the ship's equipment and design, to prevent unauthorised discharge of oil or oily mixtures.
- The accompanying or interviewed engineer officer was unfamiliar with
  - The location and purpose of the various pumps connected to the bilge system, their direct suctions and overboard valves.
  - The location and purpose of the emergency bilge suction.
  - The sequence of opening and closing valves and starting the appropriate pump to effectively commence pumping out the bilges in an emergency.
  - MARPOL requirements concerning the discharge into the sea of oil or oily mixtures in an emergency flooding situation.
  - Company requirements to seal suction and/or overboard valves to prevent unauthorised discharge of oil or oily mixtures.
- The emergency bilge suction valve was not readily accessible.
- The emergency bilge suction valve was not clearly marked as to its purpose.
- The emergency overboard discharge valve(s) were not provided with a notice warning against accidental opening.
- Emergency bilge suction and/or overboard valves had not been sealed in accordance with company procedures.
- Seals on emergency bilge suction and/or overboard valves were not easily breakable.
- The condition of the emergency bilge suction and/or overboard valves was unsatisfactory in any respect which may make the operation of the valve difficult or impossible in an emergency.
- The emergency bilge pumping system or lines were defective in any respect.
- There was evidence that the emergency bilge discharge arrangements had been used for the disposal of daily machinery space bilge accumulations.

**6.5.2. Were the engineer officers familiar with the company procedure for the safe use of the incinerator, and was the incinerator in satisfactory condition and used in accordance with the company procedure and in compliance with MARPOL?**

**Short Question Text**

Incinerator operation.

**Vessel Types**

Oil, Chemical, LPG, LNG

**ROVIQ Sequence**

Engine Room, Interview - Engineer Officer

**Publications**

ICS: Engine Room Procedures Guide. First Edition.

IMO: ISM Code

IMO: MARPOL

IMO: MEPC.244(66) 2014 Standard specification for shipboard incinerators.

**Objective**

**To ensure that the disposal of garbage and sludge using the incinerator is always carried out safely and in accordance with the requirements of MARPOL.**

**Industry Guidance**

**ICS: Engine Room Procedures Guide. First Edition.**

9.3.2 Incinerators

- Incinerators are a potential fire hazard, therefore it is essential that their operation is closely monitored, including what is being incinerated.
- Waste should not be allowed to accumulate around incinerator spaces other than in the correct storage facilities. Accumulated waste around incinerator spaces is a fire and occupational health hazard;
- Waste oil or sludge should not be incinerated when in ports, harbours or estuaries;
- Sludge from EGCS should not be incinerated; and
- Plastics and PVC should only be incinerated in IMO-approved incinerators.

**UK MCA: Code of Safe Working Practices for Merchant Seafarer's. 2015 Edition.**

2.6.4 Incinerators and compactors should always be operated by competent personnel, and operating instructions should be strictly followed.

**IMO: MEPC.244(66) 2014 Standard specification for shipboard incinerators.**

3. Materials and manufacture

3.10 The incinerator furnace may be charged with solid waste either by hand or automatically. In every case, fire dangers should be avoided, and charging should be possible without danger to the operating personnel.

For instance, where charging is carried out by hand, a charging lock may be provided which ensures that the charging space is isolated from the fire box as long as the filling hatch is open.

Where charging is not effected through a charging lock, an interlock should be installed to prevent the charging door from opening while the incinerator is in operation with burning of garbage is in progress or while the furnace temperature is above 220C.

3.12 Interlocks should be installed to prevent ash removal doors from opening while burning is in progress or while the furnace temperature is above 220C

#### 4. Operating requirements

4.5 The incinerator should have warning plates attached in a prominent location on the unit, warning against the unauthorized opening of doors to combustion chamber(s) during operation and against overloading the incinerator with garbage.

4.6 The incinerator should have instruction plate(s) attached in a prominent location of the unit that clearly addresses the following:

4.6.1 Cleaning ashes and slag from the combustion chamber(s) and cleaning of combustion air openings before starting the incinerator (where applicable).

4.6.2 Operating procedures and instructions. These should include proper start up procedures, normal shut-down procedures, emergency shut-down procedures, and procedures for loading garbage (where applicable).

**TMSA KPI 10.1.3** requires that procedures minimise marine and atmospheric emissions and ensure that they are always within permitted levels.

Procedures may include:

- Methods of minimising emissions.
- Identification of applicable regulations.
- Environmentally responsible disposal methods.
- Emissions monitoring.
- Fuel analysis.
- VOC management.

#### **IMO: ISM Code**

1.2.3 The safety management system should ensure:

1. compliance with mandatory rules and regulations, and
2. that applicable codes, guidelines and standards recommended by the Organization, Administrations, classification societies and maritime industry organizations are taken into account.

#### **IMO: MARPOL**

##### Annex VI

##### Regulation 16 Shipboard Incineration

1 Except as provided on paragraph 4 of this regulation, shipboard incineration shall be allowed only in a shipboard incinerator.

2 Shipboard incineration of the following substances shall be prohibited:

1. residues of cargoes subject to Annex I, II or III or related contaminated packing materials;
2. polychlorinated biphenyls (PCBs);
3. garbage, as defined by Annex V, containing more than traces of heavy metals;
4. refined petroleum products containing halogen compounds;

5. sewage sludge and sludge oil either of which is not generated on board the ship; and
6. exhaust gas system cleaning system residues.

3 Shipboard incineration of polyvinyl chlorides (PVCs) shall be prohibited, except in shipboard incinerators for which IMO Type Approval Certificates have been issued.

4 Shipboard incineration of sewage sludge and sludge oil generated during normal operation of a ship may also take place in the main or auxiliary power plant of boilers, but in those cases, shall not take place inside ports, harbours and estuaries.

6.1 Except as provided in paragraph 6.2 of this regulation, each incinerator on a ship constructed on or after 1 January 2000 or incinerator that is installed on board a ship on or after 1 January 2000 shall meet the requirements contained in appendix IV to this Annex...

6.2 The Administration may allow exclusion from the application of paragraph 6.1 of this regulation to any incinerator installed on board a ship before 19 May 2005, provided that the ship is solely engaged in voyages within waters subject to the sovereignty or jurisdiction of the State of which the ship is entitled to fly.

7 Incinerators installed in accordance with the requirements of paragraph 6.1 of this regulation shall be provided with a manufacturer's operating manual, which is to be retained with the unit and which shall specify how to operate the incinerator within the limits described in paragraph 2 of the appendix IV of this Annex.

### **Inspection Guidance**

The vessel operator should have developed procedures which described the safe use of the shipboard incinerator.

The procedure should include:

- Who is responsible for supervising the use of the incinerator.
- Who is permitted to use the incinerator.
- When and where incinerator use is prohibited for either garbage or sludge disposal considering:
  - The geographical position of the ship and proximity to land.
  - Any local regulations relating to the use of the incinerator.
  - Onboard operations.
  - The status of the machinery space.
- What is permitted to be incinerated onboard considering the design of the incinerator and the restrictions imposed by MARPOL Annex VI.
- The checks that must be conducted before the incinerator is used on each occasion.
- The PPE that must be used when loading garbage into the incinerator.
- The actions that must be taken if the incinerator fails or develops a fault.
- The requirement to review a risk assessment for the safe use of the incinerator paying attention to the effectiveness of the safety interlocks fitted to garbage loading chutes.
- The requirement to post clear and simple operating instructions at the incinerator controls.
- The requirement to post a list of items that are not to be incinerated from a safety and/or regulatory perspective in the incinerator space.
- How to dispose of incinerator ashes.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures which described the safe use of the incinerator.
- Sight, and where necessary review, the risk assessment for the safe operation of the incinerator.
- Inspect the incinerator and the garbage sorting area and verify that:
  - The incinerator appeared fully functional and operational.
  - Clear and simple operating instructions were posted at the incinerator controls.
  - A list of items that were prohibited from being incinerated was posted in the incinerator space.

- There was evidence that prohibited items were being separated and stored for disposal ashore.
  - The safety interlocks on the garbage loading chutes were properly connected and functioning. (as far as possible with the incinerator stopped)
  - There was no evidence of localised overheating or leaking of exhaust fumes on the exterior of either the combustion chambers or the exhaust trunk.
  - There was no evidence of oil dripping around the incinerator casing and/or cooling space.
- Interview an engineer officer who was responsible for the supervision of the incinerator to verify their understanding and knowledge of:
    - Who is permitted to use the incinerator for garbage disposal and what level of supervision must be maintained
    - The safe operating procedure for the incinerator.
    - The PPE that must be used when loading the incinerator with garbage.
    - The correct garbage loading process.
    - The safety interlocks that prevent the garbage loading chutes from being opened in the incorrect sequence or while the furnace is in operation.
    - The location of the incinerator emergency stop controls.
    - The items that were prohibited from being incinerated.

#### **Expected Evidence**

- The company procedures which described the safe use of the incinerator.
- The risk assessment for the safe operation of the incinerator.
- The incinerator operation and maintenance manual.

#### **Potential Grounds for a Negative Observation**

- There was no company procedure which described the safe use of the incinerator.
- There was no risk assessment available for the safe operation of the incinerator.
- The accompanying officer was unfamiliar with the company procedure or risk assessment for the safe operation of the incinerator.
- An interviewed engineer officer was unfamiliar with:
  - The company procedures or risk assessment for the safe operation of the incinerator.
  - The PPE that must be worn when loading garbage into the incinerator.
  - The process to safely load garbage into the incinerator.
  - The items that were prohibited from being incinerated.
  - The actions to take if the incinerator fails or develops a fault.
- The incinerator was out of service or defective in any respect.
- A list of items prohibited from being incinerated was not posted in the incinerator space.
- Operating instructions were not posted by the incinerator controls.
- There was evidence of localised overheating or exhaust gas leakage from the combustion chamber or exhaust trunk.
- There was evidence that the safety interlocks on the garbage loading chutes were defective or being bypassed.
- There was evidence of oil dripping around the incinerator casing and/or cooling space.
- There was evidence that prohibited items were being incinerated.
- There was evidence that the incinerator had been used to incinerate garbage or sludge at times or places where MARPOL, local regulations or company procedure prohibited the use of the incinerator.
- There was evidence that the main or auxiliary power plant of boilers had been used to incinerate sewage sludge and/or sludge oil at times or places where MARPOL, local regulations or company procedure prohibited this practice.
- Waste had been allowed to accumulate around incinerator spaces other than in the correct storage facilities.

## 6.6. Oil Discharge Monitors

**6.6.1. Were the Master and engineer officers familiar with the company procedures for the use of the oil filtering equipment, and was the oil filtering equipment in satisfactory condition and used in accordance with the company procedure, manufacturer's instructions and MARPOL Annex I?**

### Short Question Text

Oil filtering equipment.

### Vessel Types

Oil, Chemical, LPG, LNG

### ROVIQ Sequence

Engine Control Room, Engine Room, Interview - Engineer Officer

### Publications

ICS: Engine Room Procedures Guide. First Edition.

IMO: ISM Code

IMO: MARPOL

IMO: Polar Code

### Objective

**To ensure that bilge discharges from machinery spaces are always within the limits permitted by MARPOL Annex I.**

### **Industry Guidance**

**ICS: Engine Room Procedures Guide. First Edition.**

Chapter 9- Pollution Control

9.3 Equipment Operational Guidelines

9.3.1 Oily Water Separators (OWS)

- Keep the OWS overboard discharge manual valve lock closed when not in use. The Chief Engineer and Master should hold the keys;
- Post a sign next to the OWS overboard discharge valve to identify the function of the valve and warn that it must be locked at all times when not in use. Some legal jurisdictions require notices to inform crews of the consequences (such as fines) should they illegally discharge anything to sea.

**IMO: MEPC.107(49) Revised Guidelines and Specifications for Pollution Prevention Equipment for Machinery Space Bilges of Ships.**

3.1 Pollution prevention equipment

For the purpose of these Guidelines and Specifications pollution prevention equipment installed in a ship in compliance with regulation 16 (*amended by MEPC.285(70) to 14.7*) comprises:

1. 15 ppm Bilge Separator;
2. 15 ppm Bilge Alarm; and
3. automatic stopping device

3.2 15 ppm Bilge Separator



“15 ppm Bilge Separator” may include any combinations of a separator, filter, coalescer or other means, and also a single unit designed to produce an effluent with oil content not exceeding 15 ppm.

### 3.3 15 ppm Bilge Alarm

The alarm arrangements specified in regulation 16(5) (*amended by MEPC.285(70) to 14.7*) are referred to in these Guidelines and Specifications as a “15 ppm Bilge Alarm”.

### 3.6 Automatic Stopping Device

The automatic stopping device is a device used, where applicable, to automatically stop any discharge overboard of oily mixture when the oil content of the effluent exceeds 15 ppm. The automatic stopping device should consist of a valve arrangement installed in the effluent outlet line of the 15 ppm Bilge Separator which automatically diverts the effluent mixture from being discharged overboard back to the ships bilges or bilge tank when the oil content of the effluent exceeds 15 ppm.

4.2.9 The 15 ppm Bilge Alarm should record date, time and alarm status, and operating status of the 15 ppm Bilge Separator. The recording device should also store data for at least eighteen months and should be able to display or print a protocol for official inspections as required. In the event the 15 ppm Bilge Alarm is replaced, means should be provided to ensure the data recorded remains available on board for 18 months.

4.2.11 (*amended by MEPC.285(70) as follows*) The validity of calibration certificates should be checked at IOPP annual/intermediate/renewal surveys. The accuracy of 15 ppm bilge alarms is to be checked by calibration and testing of the equipment conducted by a manufacturer or persons authorized by the manufacturer and should be done at intervals not exceeding five years after its commissioning, or within the term specified in the manufacturer's instructions, whichever is shorter. Alternatively the unit may be replaced by a calibrated 15 ppm bilge alarm. The calibration certificate for the 15 ppm bilge alarm, certifying the date of the last calibration check, should be retained on board for inspection purposes.

## 6 Installation Requirements

### 6.1 15 ppm Bilge Separator

6.1.1 For future inspection purposes on board ship, a sampling point should be provided in a vertical section of the water effluent piping as close as is practicable to the 15 ppm Bilge Separator outlet. Re-circulating facilities should be provided, after and adjacent to the overboard outlet of the stopping device to enable the 15 ppm Bilge Separator system, including the 15 ppm Bilge Alarm and the automatic stopping device, to be tested with the overboard discharge closed (see figure 1).

**TMSA KPI 10.1.3** requires that procedures minimise marine and atmospheric emissions and ensure that they are always within permitted levels.

Procedures may include:

- Methods of minimising emissions.
- Identification of applicable regulations.
- Environmentally responsible disposal methods.
- Emissions monitoring.
- Fuel analysis.
- VOC management.

## IMO: ISM Code

1.2.3 The safety management system should ensure:

1. compliance with mandatory rules and regulations, and

2. that applicable codes, guidelines and standards recommended by the Organization, Administrations, classification societies and maritime industry organizations are taken into account.

## **IMO: Polar Code**

### Part II-A – Pollution prevention measures

#### 1.1 Operational requirements

- 1.1.1 In Arctic waters any discharge into the sea of oily mixtures from any ship shall be prohibited.

## **IMO: MARPOL**

### Annex I

#### Regulation 14. Oil filtering equipment

1. Except as specified in paragraph 3 of this regulation, any ship of 400 gross tonnage and above but less than 10,000 gross tonnage shall be fitted with oil filtering equipment complying with paragraph 6 of this regulation. Any such ship which may discharge into the sea ballast water retained in oil fuel tanks in accordance with regulation 16.2 shall comply with paragraph 2 of this regulation.
2. Except as specified in paragraph 3 of this regulation, any ship of 10,000 gross tonnage and above shall be fitted with oil filtering equipment complying with paragraph 7 of this regulation.
5. The Administration may waive the requirements of paragraphs 1 and 2 of this regulation for:
  - .1 any ship engaged exclusively on voyages within special areas or Arctic waters.
6. Oil filtering equipment referred to in paragraph 1 of this regulation shall be of a design approved by the Administration and shall be such as will ensure that any oily mixture discharged into the sea after passing through the system has an oil content not exceeding 15 parts per million. In considering the design of such equipment, the Administration shall have regard to the specification recommended by the Organization.
7. Oil filtering equipment referred to in paragraph 2 of this regulation shall comply with paragraph 6 of this regulation. In addition, it shall be provided with alarm arrangements to indicate when this level cannot be maintained. The system shall also be provided with arrangements to ensure that any discharge of oily mixtures is automatically stopped when the oil content of the effluent exceeds 15 parts per million. In considering the design of such equipment and approvals, the Administration shall have regard to the specification recommended by the Organization.

## **Inspection Guidance**

The terms “oily water separator”, “15ppm bilge separator” and “oil filtering equipment” are considered to interchangeable for the purpose of this question.

The vessel operator should have developed procedures which described the use of the oil filtering equipment provided.

The procedure should include:

- Who is responsible for supervising the use of the oil filtering equipment.
- Who is permitted to use of the oil filtering equipment.
- When the oil filtering equipment may be used for overboard discharge of bilge water, considering amongst other things:

- Whether the equipment was fitted with an automatic stopping device or not. (*IOPP Form B section 2.2.2*)
  - Operation in a special area, Arctic waters or any other area with potential restrictions and/or prohibitions.
  - The company environmental protection policy.
- The authorisation that must be obtained before the overboard discharge of bilge water may be conducted.
- The required checks to be conducted on the oil filtering equipment and system pipework before an overboard discharge of bilge water may take place.
- The required checks to be conducted on the oil filtering equipment and system pipework upon completion of an overboard discharge of bilge water.
- The actions that must be taken if the oil filtering equipment fails or develops a fault.
- The document retention instructions for the 15 ppm bilge alarm data.

The required frequency of the 15 ppm bilge alarm sensor calibration.

- The control measures to prevent the unauthorised opening of the oil filtering equipment overboard valve.
- The control of anti-tampering devices or seals on flanges or pipe connection on the oil filtering equipment and the connected pipework.
- The actions to take if the oil filtering equipment, its associated system pipework or machinery space pipework in general was suspected as having been used for the illegal discharge of bilge water or sludge.

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures which described the use of the oil filtering equipment provided.
- Where necessary, review the manufacturer's instructions for the 15 ppm bilge alarm.
- Sight the calibration certificate for the 15 ppm bilge alarm sensor fitted to the oil filtering equipment.
- Inspect the oil filtering equipment and its associated pipework and verify that:
  - The overboard valve was secured and sealed against accidental opening.
  - A warning sign had been posted at the overboard valve indicating that opening the valve was prohibited without the authority of the Chief Engineer or the Master.
  - There were no signs or indicators that the flanges and pipe connections on the oil filtering equipment and associated piping had been tampered with.
  - That each flange or connection that could permit inappropriate use of the oil filtering system or its overboard had been sealed to prevent tampering.
- Where the oil filtering equipment was, or had recently been, defective verify that an entry had been made in the Oil Record Book Part I to record the time the equipment was taken out of service and, where applicable, returned to service.
- Request that an engineer officer demonstrates the operation the oil filtering equipment using the mandatory testing facility (MEPC 107(49) 6.1.1) to verify the proper functioning of:
  - The 15 ppm bilge alarm.
  - The automatic stopping device.
  - The 15 ppm bilge alarm recorder.
- Interview the accompanying engineer officer and verify their familiarity with:
  - The restrictions on the use of the oil filtering equipment for overboard discharge of bilge water, particularly as it related to a vessel without an automatic stopping device.
  - The actions to take if the oil filtering equipment became defective.
  - The actions to take if any part of the oil filtering equipment or its associated pipework was found to have been tampered with.
  - The actions to take if any piping system in the machinery space was suspected as being used to illegally dispose of bilge water or sludge overboard.

- Where the vessel was exempt from being fitted with an oil filtering device verify that:
  - The vessel was trading within the limitations identified by MARPOL Annex I 14.5.1.
  - The IOPP Certificate was endorsed appropriately (14.5.3.4).
  - There was no evidence that the machinery space piping was being used inappropriately for bilge water or sludge disposal
  - The engineer officers were familiar with the machinery space bilge water and sludge management procedures.

#### **Expected Evidence**

- The company procedures which described the use of the oil filtering equipment provided.
- The calibration certificate for the 15 ppm bilge alarm fitted to the oil filtering equipment.
- The manufacturer's maintenance and operation manuals for the oil filtering equipment.
- Records of inspection and maintenance of the oil filtering equipment in the vessel's maintenance plan.
- The Oil Record Book Part I.

#### **Potential Grounds for a Negative Observation**

- There was no company procedure which described the use of the oil filtering equipment provided.
- The 15 ppm bilge alarm sensor had not been calibrated within the previous five years or within the time frame specified by the manufacturer's operation and maintenance manual, where this was less than five years.
- The oil filtering equipment overboard valve was not closed and/or was not secured and sealed to prevent accidental opening.
- There was no warning sign posted at the overboard valve indicating that the valve was only to be operated with the authority of the Chief Engineer or the Master.
- There was evidence that the oil filtering equipment or its system pipework had been tampered with.
- The oil filtering equipment or its system pipework flanges and connections were not sealed as per the manufacturer's or shipowner's approved drawing and/or instructions to prevent tampering.
- The oil filtering equipment was defective in any respect.
- There were no records of inspection and maintenance of the oil filtering equipment in the vessel's maintenance plan.
- The accompanying engineer officer was unfamiliar with the company procedure which described the use of the oil filtering equipment provided.
- An engineer officer was unable to demonstrate the operation and proper functioning of the oil filtering equipment, automatic stopping device, 15 ppm bilge alarm and/or 15 ppm bilge alarm recorder.
- The accompanying engineer officer was unfamiliar with:
  - The restrictions on use of the oil filtering equipment in accordance with the company procedure and the design of the equipment.
  - The actions to take if the oil filtering equipment was defective.
  - The actions to take if the oil filtering equipment or its associated pipework was found to have been tampered with.
  - The actions to take if any piping system in the machinery space was suspected as being used to illegally pump bilge water or sludge overboard.

Where the oil filtering equipment was, or had been, out of service but where no entry had been made in the Oil Record Book part I, make a **negative observation** under question 6.1.3 in addition to the observations that may be relevant under this question relating to Hardware, Process and Human element as appropriate.

**6.6.2. Were the Master and officers familiar with the company procedures for the use of the oil discharge monitoring and control system, and was the oil discharge monitoring and control system in satisfactory condition and used in accordance with the company procedures, manufacturer's instructions and MARPOL Annex I?**

**Short Question Text**

Oil discharge monitoring and control system (ODME)

**Vessel Types**

Oil, Chemical

**ROVIQ Sequence**

Pumproom, Main Deck, Cargo Control Room

**Publications**

IMO: MARPOL

IMO: ISM Code

IMO: Resolution MEPC.108(49). Revised Guidelines and Specifications for Oil Discharge Monitoring and Control System for Oil Tankers.

**Objective**

**To ensure that discharges from cargo and ballast spaces are always within the limits permitted by MARPOL Annex I.**

**Industry Guidance**

**IMO: Resolution MEPC.108(49). Revised Guidelines and Specifications for Oil Discharge Monitoring and Control System for Oil Tankers.**

*(Amended by resolution MEPC.240(65) but no text below affected)*

**3.1 Oil discharge monitoring and control system**

An oil discharge monitoring and control system, referred to in these Guidelines and Specifications as a monitoring system, is a system which monitors the discharge into the sea of oily ballast or other oil-contaminated water from the cargo tank areas and comprises the items specified in paragraph 6.1.4.

**3.2 Control section**

A control section of a monitoring system is a unit composed of the items specified in paragraph 6.1.4.8.

**3.3 Overboard discharge control**

An overboard discharge control is a device which automatically initiates the sequence to stop the overboard discharge of the effluent in alarm conditions and prevents the discharge throughout the period the alarm condition prevails. The device may be arranged to close the overboard valves or to stop the relevant pumps, as appropriate.

**3.4 Starting interlock**

A starting interlock is a facility which prevents the initiation of the opening of the discharge valve or the operation of other equivalent arrangements before the monitoring system is fully operational when use of the monitoring system is required by the Convention.

**3.5 Control unit**

3.5.1 A control unit is a device which receives automatic signals of:

1. oil content of the effluent ppm;
2. flow rate of discharge m<sup>3</sup>/hour;
3. ships speed in knots;
4. ship's position - latitude and longitude;
5. date and time (GMT); and
6. status of the overboard discharge control.

3.5.2 The unit shall make automatic recordings of data as specified in paragraph 6.9.2.

## 6.2 Oil content meter

6.2.4 It is desirable that the reading should not be affected by the type of oil. If it is, it should not be necessary to calibrate the meter on board ship, but pre-set alterations in the calibration may be made in accordance with the manufacturer's instructions. In the latter case, means should be available to check that the correct calibration has been selected for the oil in question. The accuracy of the readings should at all times remain within the limit specified in 6.2.2.

6.2.7 The meter should have simple means to enable the ship's crew to check the functioning of the electrical and electronic circuitry of the meter by introduction of a simulated signal corresponding approximately to half the full-scale reading of the meter. It should also be possible for qualified personnel to recalibrate the meter on board the oil tanker.

## 6.5 Ships speed indicating system

6.5.1 The automatic speed signal required for a monitoring system should be obtained from the ships speed indicating device by means of a repeater signal. The speed information used may be either speed over the ground or speed through the water, depending upon the speed measuring equipment installed on board.

## 6.6 Ship position indicating device

6.6.1 The ship position indicating device shall consist of a receiver for a global navigation satellite system or a terrestrial radio navigation system, or other means, suitable for use at all times throughout the intended voyage to establish and update the ships position by automatic means.

**TMSA KPI 10.1.3** requires that procedures minimise marine and atmospheric emissions and ensure that they are always within permitted levels.

Procedures may include:

- Methods of minimising emissions.
- Identification of applicable regulations.
- Environmentally responsible disposal methods.
- Emissions monitoring.
- Fuel analysis.
- VOC management.

## IMO: ISM Code

1.2.3 The safety management system should ensure:

1. compliance with mandatory rules and regulations, and
2. that applicable codes, guidelines and standards recommended by the Organization, Administrations, classification societies and maritime industry organizations are taken into account.

## IMO: MARPOL

## Annex I

### Regulation 31 Oil discharge monitoring and control system

1 Subject to the provisions of paragraphs 4 and 5 of regulation 3 of this Annex, oil tankers of 150 gross tonnage and above shall be equipped with an oil discharge monitoring and control system approved by the Administration.

1. In considering the design of the oil content meter to be incorporated into the system the Administration shall have regard to the specification recommended by the organization. The system shall be fitted with a recording device to provide a continuous record of the discharge in litres per nautical mile and total quantity discharged, or the oil content and rate of discharge, this record shall be identifiable as to time and date and shall be kept for at least three years. The oil discharge monitoring and control system shall come into operation when there is any of effluent into the sea and shall be such as will ensure that any discharge of oily mixture is automatically stopped when the instantaneous rate of discharge of oil exceeds that permitted by regulation 34 of this Annex. Any failure of this monitoring and control system shall stop the discharge. In the event of failure of the oil discharge monitoring and control system a manually operated alternative method may be used, but the defective unit shall be made operable as soon as possible. Subject to allowance by the port State authority, a tanker with a defective oil discharge monitoring and control system may undertake one ballast voyage before proceeding to a repair port.
2. The oil discharge monitoring and control system shall be designed and installed in compliance with the guidelines and specifications for oil discharge monitoring and control systems for oil tankers developed by the Organization. Administrations may accept such specific arrangements as detailed in the Guidelines and Specifications.
3. Instructions as to the operation of the system shall be in accordance with an operation manual approved by the Administration. They shall cover manual as well as automatic operations and shall be intended to ensure that at no time shall oil be discharged except in compliance with the conditions specified in regulation 34 of this Annex.

### Inspection Guidance

The vessel operator should have developed a procedure which described the use of the oil discharge monitoring and control system provided. The procedure should include:

- Who is responsible for supervising the use of the oil discharge monitoring and control system.
- Who is permitted to use the oil discharge monitoring and control system.
- When the oil discharge monitoring and control system may be used for overboard discharge of oily mixtures, considering amongst other things:
  - Whether the vessel was in a special area.
  - The proximity to land.
  - The vessel's route.
  - The operational status of the oil discharge monitoring and control system.
  - The company environmental protection policy.
- The authorisation that must be obtained before the overboard discharge of oily mixtures may be conducted.
- The required checks to be conducted on the oil discharge monitoring and control system before an overboard discharge of oily mixtures may take place.
- The level of supervision and lookout required during an overboard discharge of an oily mixture:
  - In the cargo control room.
  - On deck.
  - On the bridge.
- The additional permissions that must be obtained before using the oil discharge monitoring and control system with any of the automatic inputs and control functions in manual mode.
- The required checks to be conducted on the oil discharge monitoring and control system upon completion of an overboard discharge of oily mixtures.
- The actions that must be taken if the oil discharge monitoring and control system fails or develops a fault.
- The print-out or electronic data retention instructions for the oil discharge monitoring and control system recorder data.
- The required frequency of the oil content meter sensor calibration.
- The required frequency of the oil discharge monitoring and control system test functions.

- The control measures to prevent the unauthorised opening of the oil discharge monitoring and control system overboard valve(s).

### **Suggested Inspector Actions**

- Sight, and where necessary review, the company procedures which described the use of the oil discharge monitoring and control system provided.
- Inspect the oil discharge monitoring and control system control panel and verify that:
  - The system is operational with no apparent faults or alarms.
  - The recording device was printing the data legibly, or
  - it is possible to store and subsequently download the data from memory.
  - The sensor input for speed and position is accurate.
  - The time and date is synchronised to GMT.
- During the deck inspection inspect the visible parts of the oil discharge monitoring and control system and verify that it is intact and not modified in any respect.
- Where the vessel had conducted an overboard discharge of oily mixtures during the previous six months, inspect the recorder print out/memory and verify that a selected discharge had been undertaken with the system in automatic mode with all sensors providing an automatic input.
- Where a discharge of oily mixtures had taken place with the oil discharge monitoring and control system or any of its required data feeds in manual mode:
  - Inspect the Oil Record Book Part II and verify that an entry had been made to record that the oil discharge monitoring and control system was defective.
  - Request documented confirmation that shore-based management had been advised of the failure of the system and that approval for continuing the discharge in manual mode had been provided.
  - Request evidence that the oil discharge monitoring and control system had been repaired and demonstrated as fully operational as soon as possible after failure.
- Where the oil discharge monitoring and control system was, or had recently been, defective verify that an entry had been made in the Oil Record Book Part II to record the time the equipment was taken out of service and, where applicable, returned to service.
- Where necessary, review the maintenance and inspection records.
- Interview the accompanying officer and verify their familiarity with:
  - The test run and calibration function of the oil discharge monitoring and control system.
  - The actions to take if the oil discharge monitoring and control system became defective.
  - The company procedure for using the oil discharge monitoring and control system in manual mode.
  - The actions to take if during overboard discharge the dedicated overboard lookout reported sighting an excessive discharge of oil or an oil slick astern of the vessel.

### **Expected Evidence**

- The company procedures which described the use of the oil discharge monitoring and control system provided.
- The manufacturer's maintenance and operation manuals for the oil discharge monitoring and control system.
- The maintenance and inspection records for the oil discharge monitoring and control system.
- Print-outs of ODME data or data displayed from memory.
- The Oil Record Book Part II.
- The Bridge Log Book.

### **Potential Grounds for a Negative Observation**

- There was no company procedure which described the use of the oil discharge monitoring and control system provided.
- The oil discharge monitoring and control system was defective in any respect.



- The oil discharge monitoring and control system was apparently modified or fitted with connections which were not part of the original design.
  - Maintenance and testing of the oil discharge monitoring and control system had not been conducted in accordance with the company procedures and the manufacturer's operation and maintenance manual.
  - The accompanying officer was unfamiliar with the company procedure which described the use of the oil discharge monitoring and control system provided.
  - The accompanying officer was unfamiliar with:
    - The restrictions on use of the oil discharge monitoring and control system in accordance with the company procedure and the design of the equipment, if any.
    - The actions to take if the oil discharge monitoring and control system was defective.
    - The test run and calibration function of the oil discharge monitoring and control system.
  - The oil discharge monitoring and control system had been used to discharge oil mixtures overboard while in manual mode or with any of the data feeds in manual mode, without authorisation from shore based management.
  - The oil discharge monitoring and control system had been used to discharge oil mixtures overboard which were not compatible with the sensors fitted.
  - The printed data from the recording device was illegible.
  - The stored data from the recording device was unavailable for review or download.
- 
- Where the oil discharge monitoring and control system was, or had been, out of service but where no entry had been made in the Oil Record Book part II, make a **negative observation** under question 6.1.2 in addition to the observations that will be relevant under this question relating to Hardware, Process and Human element as appropriate.

## 7. Maritime Security

### 7.1. Ship Routing

#### 7.1.1. Was security threat and risk assessment an integral part of voyage planning, and did the passage plan contain security related information for each leg of the voyage?

##### Short Question Text

Security threat and risk assessment during passage planning.

##### Vessel Types

Oil, Chemical, LPG, LNG

##### ROVIQ Sequence

Bridge

##### Publications

Industry: Global Counter Piracy Guidance for Companies

Masters and Seafarers

Industry : BMP5 Best Management Practices to Deter Piracy and Enhance Maritime Security in the Red Sea Gulf of Aden

Indian Ocean and Arabian Sea

Industry: BMP West Africa. Best Management Practices to Deter Piracy and Enhance Maritime Security off the Coast of West Africa including the Gulf of Guinea. 1st Edition.

ReCAAP: Regional Guide to Counter Piracy & Armed Robbery against Ships in Asia (2021).

##### Objective

**To ensure voyage planning always addresses security considerations.**

##### **Industry Guidance**

**Industry: Global Counter Piracy Guidance for Companies, Masters and Seafarers**

Fundamentals

The fundamental requirements of best practices to avoid attack by pirates and armed robbers are:

1. Conduct thorough, ship-specific pre-voyage threat and risk assessments to identify appropriate Ship Protection Measures (SPMs).
2. Implement SPMs as identified in the pre-voyage risk assessment.

Section 4 Company Threat and Risk Assessment

Risk Assessment

Risk assessment is an integral part of voyage planning within a safety management system. All voyages require thorough advanced planning and risk assessment using all available information. The risk being evaluated should include likelihood of harm to the crew or ship from attack by pirates and armed robbers. The risk assessment must reflect the prevailing characteristics of the specific voyage, ship and operations and not just be a repetition of advice e.g. relating to different geographical regions and different pirate modus operandi. Detailed guidance on preparing risk assessments can be found from a variety of sources including the ISPS code.

Section 5 Company planning

5.1 Company planning prior to entering an area of increased risk

This section details the procedures that should be undertaken by the company prior to a ship entering an area of increased risk identified through the risk assessment in order to mitigate against the risk of attack. It should be noted that pirate and armed robbery risk will vary across regions.

#### 5.1.6 Offer guidance to the Master as to recommended route

Offer the Master guidance regarding recommended routeing through areas of increased risk identified through the risk assessment. Guidance should be provided on using recommended transit corridors or other supported routes (e.g. a Group Transit or National Convoys where these exist). If anchoring, consideration should be given to the use of protected anchorages where available recognising that standards of protection vary widely. The company should appreciate that the voyage routeing may need to be reviewed and amended at short notice in light of updated information.

**Industry: BMP5 Best Management Practices to Deter Piracy and Enhance Maritime Security in the Red Sea, Gulf of Aden, Indian Ocean and Arabian Sea**

and

**Industry: BMP West Africa. Best Management Practices to Deter Piracy and Enhance Maritime Security off the Coast of West Africa including the Gulf of Guinea. 1<sup>st</sup> Edition.**

Annex B - Maritime security charts (*similar advice and guidance is provided in both publications*)

Maritime security charts contain safety-critical information to assist bridge crews in the planning of safe passages through high risk areas. All information has been gathered by the UKHO through work with NATO and other government organisations, ensuring each chart has the most accurate, up-to-date and verified information available.

Each maritime security chart includes:

- Information about dangers to the security of navigation including piracy, terrorism, embargoes, mine warfare, exclusion zones, blockades and illegal fishing. This information, when used alongside official navigational charts, can help to ensure the safety of ships, crew and cargo.
- General security advice, self-protective measures, security procedures and regional contacts, as well as routeing and reporting requirements implemented by military or security forces.

**ReCAAP: Regional Guide to Counter Piracy & Armed Robbery against Ships in Asia (2021).**

**TMSA KPI 13.2.1** requires that formal risk assessments of company activities are undertaken to identify and mitigate potential security threats.

Ship specific security risk assessments are reviewed prior to entry into areas identified as having increased risk.

#### **IMO: ISM Code**

7. The company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and the protection of the environment. The various tasks should be defined and assigned to qualified personnel.

#### **Inspection Guidance**

The passage plan and voyage charts should contain security related information for each leg of the voyage.

In order to plan a voyage or transit through a security risk area, the Master should have available current threat information and a security risk assessment based on that information. The information available should include:

- Relevant UKHO or equivalent security charts.
- Industry best management practice guidance (BMP) publications.
- Regional guidance where available.
- Company specific guidance regarding recommended routeing, speed, waiting areas and anchorages.

A detailed threat and risk assessment should be completed for each voyage and activity within a security risk area. This should be reviewed and updated prior to entering an area which requires an increased state of readiness and vigilance and the passage plan amended if necessary.

The passage plan should identify points where there will be, for example:

- Changes to security levels.
- Points at which maritime reports should be made (e.g., entering a VRA/VCR)
- Enhanced bridge manning levels (e.g., extra lookouts).
- Vessel speed requirements.
- Restricted access controls.
- Voyage day/night transit considerations.
- Hardening of the vessel.
- No planned maintenance on voyage critical equipment.

The vessel operator should have provided bridge security cards and/or checklists to ensure that all security related considerations were included within the passage plan.

*The ships security plan is confidential and approved by flag state. Where the master advises that the ship security plan and any other plans relating to security are confidential, the inspector should only confirm their existence by inspection of the front cover.*

*The inspector should address the question based on those documents and records that are not considered confidential in conjunction with the explanations of the accompanying officer.*

*Where a comment is required to support an observation, it must not provide any detail relating to the content of plans or risk assessments that are reported as confidential.*

*Inspectors should note that a company may instruct its vessel not to participate in a VRA based on their own internal security assessment. In these circumstances the voyage planning records should identify the VRA reporting points and indicate that reports must not be made to comply with company instructions.*

### **Suggested Inspector Actions**

- Sight UKHO or equivalent security charts and industry best management practice guidance (BMP) publications and/or regional guidance.
- Review the passage plan for a recently completed voyage including security related notations on voyage charts.
- Review the security risk assessment for the same voyage.
- Review if necessary, the records of the same voyage in the Bridge Log Book.

### **Expected Evidence**

- UKHO or equivalent security charts.
- Industry best management practice guidance (BMP) publications.
- Regional Security Guidance (e.g., ReCAAP Guidance)
- Company passage plan appraisal form checklist for a recently completed voyage.
- Passage plan for the same recently completed voyage.
- Security risk assessment for the same recently completed voyage.

- Bridge Log Book.
- Bridge security cards and/or checklists.

**Potential Grounds for a Negative Observation**

- The vessel did not have the appropriate security information available such as:
  - Relevant security charts.
  - Industry best management practice guidance (BMP) publications.
  - Regional Security Guidance (e.g., ReCAAP Guidance)
  - Company specific guidance.
- No security risk assessment had been performed for a recent voyage.
- Completed voyage security risk assessments did not identify ship protection measures where required.
- No company specific guidance regarding recommended routeing had been provided for a recent voyage through a high-risk area.
- There was no evidence that the voyage security risk assessment had been reviewed and updated prior to entering an area which required an increased state of readiness and vigilance, and the passage plan amended if necessary.
- The passage plan did not contain appropriate security related information for each leg of the voyage.
- Bridge security cards or checklists were not available.

## 7.2. Ship Hardening and access control

### 7.2.1. Were the Master and officers familiar with the company procedures for hardening the vessel when entering areas of increased security risk, and was there a Vessel Hardening Plan (VHP) available?

#### Short Question Text

Vessel hardening.

#### Vessel Types

Oil, Chemical, LPG, LNG

#### ROVIQ Sequence

Documentation, Exterior Decks, Main Deck, Interview - Security Officer

#### Publications

IMO: ISM Code

OCIMF: Guidelines to Harden Vessels. First Edition.

#### Objective

**To ensure the vessel can be hardened effectively if scheduled to enter an area of increased security risk.**

#### **Industry Guidance**

**OCIMF: Guidelines to Harden Vessels. First Edition.**

##### 1.1 Assessing risks, detecting threats and defending the vessel

Vessel hardening is the physical measures taken to improve a vessel's security integrity. Any vessel hardening measures adopted should not compromise the vessel's compliance with the International Convention for the Safety of Life at Sea (SOLAS) regulations. Escape routes should be kept clear and nothing should interfere with the crew's ability to respond to non-security related emergencies.

##### 2 Risk assessment

It is recommended a Vessel Hardening Plan (VHP) is created, based on the company risk assessment. The VHP should outline what mitigation measures are needed to reduce the risk to As Low as Reasonably Practicable (ALARP). It could be a stand-alone document, be incorporated into company procedures or be contained within the Ship Security Plan (SSP). An example of a VHP is given in appendix C.

#### Appendix C

##### Vessel Hardening Plan

A Vessel Hardening Plan (VHP) can ensure vessels are prepared for operations in areas of increased security. A VHP ought to be considered as part of any voyage preparation and more so when the vessel will cross known areas of maritime crime or piracy. The requirement for a VHP should be defined within the company management procedures for security. The Company Security Officer should be responsible for the VHP ensuring process is in place for hardening the vessel. The Master and the Ship's Security Officer are responsible for reviewing the VHP before transit or operation within known security risk areas. It is recommended that vessel owners and managers should develop and use a VHP.

**TMSA KPI 13.1.3** requires that measures have been developed to mitigate and respond to all identified threats to vessels and shore-based locations.

Mitigating measures may include:

- Physical security measures.

## **IMO: ISM Code**

7 The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks involved should be defined and assigned to qualified personnel.

## **Inspection Guidance**

The vessel operator should have developed procedures for hardening the vessel when entering areas of increased security risk that included:

- A ship-specific Vessel Hardening Plan (VHP), including a list of materials needed to implement the VHP and the required quantities.
- Guidance on when the required quantities of hardening material should be available on board, i.e. always or only as needed.
- A requirement to maintain an inventory of the materials needed to implement the VHP currently on board.
- Inspection and maintenance requirements for security equipment such as water cannons, CCTV etc.
- Safety guidance to crew when rigging security equipment, e.g., working with razor wire or near the ships side.

The VHP should not conflict with lifesaving appliance operation, e.g., life rafts should not be obstructed.

*The ships security plan is confidential and approved by flag state. Where the master advises that the ship security plan and any other plans relating to security are confidential, the inspector should only confirm their existence by inspection of the front cover.*

*The inspector should address the question based on those documents and records that are not considered confidential in conjunction with the explanations of the accompanying officer.*

*Where a comment is required to support an observation, it must not provide any detail relating to the content of plans or risk assessments that are reported as confidential.*

This question will only be allocated to vessels where the vessel operator had declared through the pre-inspection questionnaire that:

- The vessel's usual trading area included entering or transiting areas of increased security risk.

In which case, the vessel operator will have declared whether the vessel always carried materials to implement its hardening plan. The response will be inserted in the inspection editor and the final report.

## **Suggested Inspector Actions**

- Sight and where necessary, review the company procedures for hardening the vessel when entering areas of increased security risk.
- Review:
  - Vessel Hardening Plan (VHP).
  - Records of implementation of the VHP such as logbooks, work planning records, reports, photographs etc.
  - Inventory of hardening materials.
  - Inspection and maintenance records for security equipment such as water cannons, CCTV, infrared detection cameras, etc.

- During the inspection, inspect the hardening materials currently stored on board.
  - If the vessel is hardened in accordance with the VHP at the time of the inspection, verify that LSA and FFA is accessible and unobstructed.
- 
- Interview the Ship Security Officer to verify their familiarity with the company procedures for hardening the vessel when entering areas of increased security risk, particularly the VHP.

Where the VHP was reported to be an integral part of the ship security plan and confidential, the date of the last review/major changes to the plan should be sighted to verify that a VHP plan existed.

#### **Expected Evidence**

- Company procedures for hardening the vessel.
- Vessel Hardening plan (VHP).
- Inventory of hardening materials.
- Inspection and maintenance records for security equipment such as water cannons, CCTV, infrared detection cameras, etc.
- Bridge Log Book.
- Work planning records.
- Any other records of hardening being implemented, e.g., reports, photographs.

#### **Potential Grounds for a Negative Observation**

- There were no company procedures for hardening the vessel when entering areas of increased security risk.
- The Ship Security Officer was not familiar with the company procedures for hardening the vessel when entering areas of increased security risk.
- There was no Vessel Hardening Plan (VHP) available.
- The Vessel Hardening Plan was not ship-specific.
- The VHP did not include a list of materials needed to implement the VHP and the required quantities.
- There was no inventory of the hardening materials currently on board.
- There were no records of inspection and maintenance of security equipment such as water cannons, CCTV, infrared cameras, etc.
- The inventory of hardening materials clearly did not reflect actual quantities on board.
- There was no record of the VHP being properly implemented prior to sailing into or through an area of increased security risk.



### **7.2.2. Were the Master, officers and ratings familiar with the company procedures to control access to the vessel in port and to ensure the safety of visitors, and were these procedures effectively implemented?**

#### **Short Question Text**

Controlling access to the vessel

#### **Vessel Types**

Oil, Chemical, LPG, LNG

#### **ROVIQ Sequence**

Approaching Vessel, Forecastle, Main Deck, Mooring Decks

#### **Publications**

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

ICS: Tanker Safety Guide (Chemicals) - Fifth Edition

IMO: ISM Code

ICS: Tanker Safety Guide (Gas) - Third Edition

#### **Objective**

**To ensure access to the vessel is controlled at all times, and that all visitors are provided with an overview of the hazards present and the safety precautions to observe while they are on board.**

#### **Industry Guidance**

##### **OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition**

###### **21.2.1 Security information**

In addition to International Ship and Port Facility (ISPS) requirements, the tanker should provide the terminal with a list of approved visitors, including Agents, Surveyors and Loading Masters.

##### **ICS: Tanker Safety Guide (Gas) - Third Edition**

###### **2.5.3 Unauthorised access**

All access to the ship and the control and monitoring of visitors should be in accordance with the ship's own Ship Security Plan (SSP) which is required by the International Ship and Port Facility Security (ISPS) Code.

##### **ICS: Tanker Safety Guide (Chemicals) - Fifth Edition**

2.5.2 On arrival at a terminal, a notice board displaying appropriate warnings should be posted at the access point to the ship. The warnings can be translated into other languages as appropriate.

- WARNING
- No Naked Lights
- No Smoking
- No Unauthorised Persons
- No Use of Mobile Phones without Master's Permission.

Figure 2.1: Sample visitor warning notice

When toxic or hazardous cargoes are being handled, further notices in appropriate languages should be prominently displayed stating the particular risks of the operations being conducted.

Local, national or port regulations may require additional notices to be posted.

## Appendix A

### Visitor Information Card

#### Purpose

It is essential that every person, including contractors and sub-contractors, who boards the ship, is provided with an overview of the hazards present and the safety precautions to observe while on board.

It is also recommended that similar advice is provided to people who are working close to the ship, e.g. the crews of barges (bunkers, stores). This is especially relevant if cargo operations or gas freeing operations are taking place, which can spread cargo vapours over a large area.

The visitor information card is an example of the information that should be provided to visitors. Information cards should be designed to account for the plans, procedures and operations specific of the company and ship. Information cards should always be assessed and may be modified for each port arrival, taking into account operations, cargoes, anticipated visitors and any other special arrangements.

**TMSA KPI 13.1.3** requires that measures have been developed to mitigate and respond to all identified threats to vessels and shore-based locations.

Mitigating measures may include:

- Access control.
- Security patrols.

### IMO: ISM Code

7 The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks involved should be defined and assigned to qualified personnel.

### Inspection Guidance

The vessel operator should have developed procedures, in accordance with the Ship Security Plan (SSP), to control access to the vessel in port and to ensure the safety of visitors. These procedures should include:

#### Access control

- Pre-approval of visitors for terminal security purposes.
- A continuous gangway watch.
- Regular patrols of the deck to monitor potential unauthorised access points e.g. hawse pipes, mooring ropes etc.
- Remote monitoring by CCTV where available.
- Visitor photo identification, visitor passes and record keeping.
- Baggage searches.
- Escorting visitors.

#### Visitor induction and familiarisation.

- Warning notices.
- Visitor information cards.

- PPE requirements.
- Smoking regulations.
- Restrictions on movement around the vessel.
- Restrictions on mobile phones and portable electronic equipment.
- Briefing on the hazards of the cargo and any operations taking place e.g. loading, tank-cleaning or gas-freeing.
- Emergency signals and actions in the case of an emergency.
- Drug and alcohol policy.

Provision of basic PPE for the period of a visit for those visitors who do not have it.

### **Suggested Inspector Actions**

- When boarding the vessel, observe the security arrangements and induction and familiarisation procedures for visitors.
- During the course of the inspection, observe the arrangements for regular patrols of the deck to monitor potential unauthorised access points.

### **Expected Evidence**

- Company procedures to control access to the vessel in port, and to ensure the safety of visitors, if available outside of the Ship Security Plan.
- Visitor Log.
- Visitor Information Card, if provided.

### **Potential Grounds for a Negative Observation**

- There were no company procedures to control access to the vessel in port and to ensure the safety of visitors.
- The gangway watchman was unfamiliar with the company procedures to control access to the vessel in port and to ensure the safety of visitors.
- The Master had not provided the terminal with a list of approved visitors, including Agents, Surveyors, Loading Masters and the SIRE inspector.
- A continuous gangway watch was not maintained.
- There were no regular patrols of the deck to monitor potential unauthorised access points e.g. hawse pipes, mooring ropes etc.
- CCTV coverage of the vessel access points was not monitored, where CCTV systems were provided.
- Visitors to the vessel were not required to provide photo identification.
- Visitors were not provided with visitor passes.
- No records were maintained of visitors boarding and leaving the vessel.
- Visitor baggage was not searched in accordance with the company procedures for the appropriate security level.
- Visitors were not escorted from the gangway to the accommodation.
- There was no notice board at the access point to the vessel displaying the appropriate warnings to visitors, including the particular risks from toxic or hazardous cargoes being handled and the operations taking place.
- Visitors to the vessel were not provided with an overview of the hazards present and the safety precautions to observe while they are on board, (which may be via a Visitor Information Card), including:
  - Smoking regulations.
  - Restrictions on movement around the vessel.
  - Restrictions on mobile phones and portable electronic equipment.
  - Briefing on the hazards of the cargo and any operations taking place e.g. loading, tank-cleaning or gas-freeing.
  - The use of appropriate PPE while onboard.
  - Emergency signals and actions in the case of an emergency.
  - Drug and alcohol policy.

## 7.3. Communications and Monitoring

### 7.3.1. Were the Master and officers familiar with regional maritime security reporting requirements and operation of the ship security alert system (SSAS) and had this equipment been regularly tested?

#### Short Question Text

Ship security reporting and communications

#### Vessel Types

Oil, Chemical, LPG, LNG

#### ROV/Q Sequence

Bridge, Internal Accommodation

#### Publications

IMO: ISM Code

IMO: Guide to Maritime Security and the ISPS Code 2012 edition

Industry: Global Counter Piracy Guidance for Companies

Masters and Seafarers

Industry : BMP5 Best Management Practices to Deter Piracy and Enhance Maritime Security in the Red Sea Gulf of Aden

Indian Ocean and Arabian Sea

Industry: BMP West Africa. Best Management Practices to Deter Piracy and Enhance Maritime Security off the Coast of West Africa including the Gulf of Guinea. 1st Edition.

ReCAAP: Regional Guide to Counter Piracy & Armed Robbery against Ships in Asia (2021).

#### Objective

**To ensure that the vessel staff have knowledge of regional maritime security reporting and that the SSAS works.**

#### **Industry Guidance**

**Industry: Global Counter Piracy Guidance for Companies, Masters and Seafarers**

Section 3 Voluntary Reporting

A major lesson learnt from operations against piracy and armed robbery to date is the importance of liaison with the military and law enforcement. This is an essential part of self-protection that applies to all ships. To ensure these forces are aware of the intended sea passage and to understand the ships' vulnerability to an attack, ships are encouraged to report to the centres overseeing the Voluntary Reporting Areas (VRAs). This information is essential to enable the centres to best use any assets available to them and to assist in an emergency. Once ships have entered a VRA it is important that they continue to report while transiting within the area. This will allow the reporting centres to update the ship of any maritime security related incidents or threats in that region.

Ships are strongly encouraged to register and report with the respective reporting centres as appropriate and, then send regular reports.

#### **See also**

**Industry: BMP5 Best Management Practices to Deter Piracy and Enhance Maritime Security in the Red Sea, Gulf of Aden, Indian Ocean and Arabian Sea**

**Industry: BMP West Africa. Best Management Practices to Deter Piracy and Enhance Maritime Security off the Coast of West Africa including the Gulf of Guinea. 1<sup>st</sup> Edition.**

## **ReCAAP: Regional Guide to Counter Piracy & Armed Robbery against Ships in Asia (2021).**

**TMSA KPI 13.1.5** requires that procedures include the reporting of potential security threats and actual security incidents. The reporting procedures may include:

- Vessel to the company.
- Vessel to external authorities.

### **IMO: ISM Code**

8.3 The SMS should provide for measures ensuring that the Company's organization can respond at any time to hazards, accidents and emergency situations involving its ships.

### **IMO: Guide to Maritime Security and the ISPS Code 2012 edition**

#### Part A

#### 9. Ship Security Plan

9.4 The plan should address at least the following:

.14 identification of the company security officer, including 24-hour contact details

#### 10 Records

10.1 Records of the following activities addressed in the ship security plan shall be kept on board for at least the minimum period specified by the Administration, bearing in mind the provisions of regulation XI-2/9.2.3

.10 maintenance, calibration and testing of any security equipment provided on board, including testing the ship security alert system.

#### 2.12 Ship security communications

##### Requirement for alert and identification systems

2.12.1 Under the Maritime Security Measures, all SOLAS ships have to have a ship security alert system (SSAS).

2.12.3 Also under provision elsewhere in the SOLAS Convention, the following SOLAS ships engaged on international voyages have to be fitted with a long-range identification and tracking (LRIT) system:

2 cargo ships, including high-speed craft, of 300 gross tonnage and upwards.

### **Inspection Guidance**

The Master and officers should be aware of the name and 24-hour contact details of the Company Security Officer (CSO), and these details should be posted appropriately.

The Master and Ship Security Officer (SSO) should be familiar with the company procedures for voluntary security reporting in VRAs.

Security communication equipment provided on board, including the ship security alert system (SSAS), long-range identification and tracking (LRIT) equipment and dedicated standalone security communications equipment, if fitted, should be regularly tested and in satisfactory condition.

The Master and officers should be familiar with the procedures for the use of this equipment, including the location of the SSAS activation buttons.

*The ship's security plan is confidential and approved by flag state. Where the master advises that the ship security plan and any other plans relating to security are confidential, the inspector should only confirm their existence by inspection of the front cover.*

*The inspector should address the question based on those documents and records that are not considered confidential in conjunction with the explanations of the accompanying officer.*

*Where a comment is required to support an observation, it must not provide any detail relating to the content of plans or risk assessments that are reported as confidential.*

*Inspectors should note that a company may instruct its vessel not to participate in a VRA based on their own internal security assessment. In these circumstances the voyage planning records should identify the VRA reporting points and indicate that reports must not be made to comply with company instructions.*

### **Suggested Inspector Actions**

- Sight the 24-hour contact details for the CSO.
- Verify with the Master or SSO that:
  - They were familiar with the company procedures for voluntary security reporting in VRAs.
  - SSAS, LRIT and dedicated standalone security communications equipment, if fitted, is in satisfactory condition, regularly tested and records maintained.
- Verify that participation in operational VRAs had been considered during each passage planning phase, and;
  - Where security reporting to VRAs was required by company procedures, there was evidence that reports had been made as required, or
  - Where security reporting to VRAs was not to be made in accordance with company procedures the passage plan was annotated with the actions to take, if any, when passing reporting points.
  
- Interview the accompanying officer to verify their awareness of the:
  - - Purpose and operation of the SSAS, LRIT and dedicated standalone security communications equipment, if fitted.
    - 24-hour contact details of the CSO.

*(Inspectors should not request details of communications equipment or to sight test and maintenance records.)*

### **Expected Evidence**

- Contact details of the CSO.
- Records of participation in voluntary security reporting.

### **Potential Grounds for a Negative Observation**

- The accompanying officer was not familiar with the 24-hour contact details of the company security officer (CSO).
- The 24-hour contact details of the CSO were not posted appropriately.
- The Master and/or SSO were not familiar with the company procedures for voluntary security reporting in VRAs.

- There was no evidence that participation in an operational VRA had been considered during the passage planning phase.
- Where the company procedure required participation in a VRA, there was no evidence that reporting to a VRA had been undertaken in accordance with the scheme
- It was reported that there were no records of the regular testing of:
  - The SSAS and/or the LRIT.
  - Dedicated standalone security communications equipment.
- The accompanying officer was not aware of the purpose and operation of the SSAS, LRIT and/or dedicated standalone security communications equipment.
- It was reported that an item of security communication equipment was defective in any respect.

## 7.4. Ship Security Officer

### 7.4.1. Did the Ship Security Officer (SSO) have a valid Certificate of Proficiency and a full understanding of their role, and were ship security records of port calls being maintained as required by SOLAS?

#### Short Question Text

Ship Security Officer (SSO).

#### Vessel Types

Oil, Chemical, LPG, LNG

#### ROVIQ Sequence

Documentation, Interview - Security Officer, Interview - Rating

#### Publications

IMO: ISM Code

IMO SOLAS

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: Guide to Maritime Security and the ISPS Code 2012 edition

#### Objective

To ensure the SSO is trained and qualified and required security records are maintained.

#### Industry Guidance

**OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.**

6.6 Responsibilities under the International Ship and Port Facility Security Code

For tankers at a terminal, while the PFSO is responsible for the port security plan, the Master has overriding authority to make decisions about the safety and security of the tanker. A Ship Security Officer (SSO) should be appointed who is trained and capable of implementing the ship security plan and security measures on board. The SSO could be the Master but is often one of the senior officers.

**IMO: Guide to Maritime Security and the ISPS Code 2012 edition**

#### 1.8 Definitions

Ship security officer means the person on board the ship, accountable to the master, designated by the company as responsible for the security of the ship including implementation and maintenance of the ship security plan and liaison with the company security officer and port facility security officers.

#### 4.5.16

An SSO must be designated for every SOLAS ship. To allow for crew changes, a number of SSOs may be designated to serve on each ship. The duties of an SSO include:

1. Undertaking regular security inspections of the ship to ensure that appropriate security measures are maintained;
2. Maintaining and supervising the implementation of the SSP, including any amendments;
3. Co-ordinating the security aspects of the handling of cargo and ship's stores with other shipboard personnel and relevant PFSOs;
4. Proposing modifications to the SSP;
5. Reporting any deficiencies and non-conformities identified during internal audits, periodic reviews, security inspections and verifications of compliance to the CSO;



6. Implementing any corrective actions;
7. Enhancing security awareness and vigilance on board the ship;
8. Ensuring that adequate training has been provided to shipboard personnel, including security-related familiarization training;
9. Reporting all security incidents;
10. Co-ordinating implementation of the SSP with the CSO and relevant PFSOs;
11. Ensuring that security equipment is properly operated, tested, calibrated and maintained; and
12. Ensuring the effective implementation of the SSP by organizing drills at appropriate intervals.

4.5.17 Effective 1 January 2012, SSOs are required to hold a certificate of proficiency confirming they:

1. have approved seagoing service of not less than 12 months (or appropriate seagoing service and knowledge of ship operations) and;
2. meet the minimum standards of competency specified in the STCW Code, which are listed in appendix 4.3 – Competency matrix for ship security officers.

**TMSA KPI 13.2.2** requires that the personnel responsible for security receive training appropriate to their role and the company's activities.

#### **IMO: ISM Code**

6.2 The Company should ensure that each ship is:

1. manned with qualified, certificated and medically fit seafarers in accordance with national and international requirements; and
2. appropriately manned in order to encompass all aspects of maintaining safe operations on board.

#### **IMO: SOLAS**

Chapter XI-2 Regulation 9

2.1 For the purpose of this chapter, a Contracting Government may require that ships intending to enter its ports provide the following information to officers duly authorized by that Government to ensure compliance with this chapter prior to entry into port with the aim of avoiding the need to impose control measures or steps:

1. That the ship possesses a valid Certificate and the name of the issuing authority;
2. The security level at which the ship is currently operating;
3. The security level at which the ship operated in any previous port where it has conducted a ship/port interface within the time frame specified in paragraph 2.3;
4. Any special or additional security measures that were taken by the ship in any previous port where it has conducted a ship/port interface within the time frame specified in paragraph 2.3;
5. That the appropriate ship security procedures were maintained during any ship-to-ship activity within the time frame specified in paragraph 2.3;
6. Other practical security-related information (but not the details of the ship security plan), taking into account the guidance given in part B of the ISPS Code.

If requested by the Contracting Government, the ship or the Company shall provide confirmation, acceptable to that Contracting Government, of the information required above.

2.2 Every ship to which this chapter applies intending to enter the port of another Contracting Government shall provide the information described in paragraph 2.1 on the request of the officers duly authorized by that Government. The master may decline to provide such information on the understanding that failure to do so may result in denial of entry into port.

2.3 The ship shall keep records of the information referred to in paragraph 2.1 for the last 10 calls at port facilities.

#### **Inspection Guidance**

- A Ship Security Officer (SSO) must be appointed on each ship, and they must be in possession of a Certificate of Proficiency acceptable to the flag administration.
- The SMS should clearly designate who is the SSO and should contain a description of the role and a list of their duties.
- The SSO must be a member of the crew and cannot be an external security consultant, for example.
- Ship security records as required by SOLAS must be maintained for the last 10 port calls.

*The ships security plan is confidential and approved by flag state. Where the master advises that the ship security plan and any other plans relating to security are confidential, the inspector should only confirm their existence by inspection of the front cover.*

*The inspector should address the question based on those documents and records that are not considered confidential in conjunction with the explanations of the accompanying officer.*

*Where a comment is required to support an observation, it must not provide any detail relating to the content of plans or risk assessments that are reported as confidential.*

### **Suggested Inspector Actions**

- Sight and verify the SSO's Certificate of Proficiency.
  - Sight and where necessary review, the sections of the SMS relating to ship security.
  - Sight evidence of regular security inspections of the vessel by the SSO.
  - Sight the ship security records for the last 10 port calls.
- 
- Interview the SSO to verify their familiarity with their role, responsibilities, and duties.
  - Interview a rating to verify their knowledge of vessel specific security procedures.

*(Inspectors do not need to review the details of the information maintained in the records but should note whether records are maintained or not.)*

### **Expected Evidence**

- SSO's Certificate of Proficiency.
- Sections of the SMS relating to ship security.
- Evidence of regular security inspections of the vessel by the SSO.
- Ship security records as required by SOLAS.

### **Potential Grounds for a Negative Observation**

- The SMS did not clearly designate who should be SSO.
- The SMS did not contain a description of the role of the SSO, and a list of their duties.
- The SSO did not have a valid Certificate of Proficiency.
- The designated SSO was not a member of the crew.
- The SSO did not have a full understanding of their role, responsibilities, and duties. For example, they were not familiar with one or more of the following:
  - Purpose of the Ship Security Plan (SSP).
  - Operation, testing and maintenance of security equipment on board
  - Vessel Hardening Plan (VHP).
  - Identity, role and contact details of the CSO
  - Role of a Port Facility Security Officer (PFSO)

- An interviewed rating had no knowledge of security procedures or response to security alarms
- There was no evidence of regular security inspections of the vessel by the SSO.
- Ship security records were not being maintained as required by SOLAS.

## 7.5. Cyber Security

### 7.5.1. Were the Master and officers familiar with the company procedures for cyber security risk management, and had these procedures been fully implemented?

#### Short Question Text

Cyber security risk management.

#### Vessel Types

Oil, Chemical, LPG, LNG

#### ROVIQ Sequence

Documentation, Bridge, Cargo Control Room, Engine Control Room

#### Publications

OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition.

IMO: ISM Code

IMO: MSC-FAL.1/Circ.3 Guidelines on maritime cyber risk management

Industry: The Guidelines on Cyber Security Onboard Ships Version 4

IMO: Resolution MSC.428(98) Maritime cyber risk management in safety management systems

#### Objective

**To ensure the vessel has in place effective technical and procedural measures to protect against a cyber incident and ensure continuity of operations.**

#### **Industry Guidance**

##### **OCIMF/ICS: International Safety Guide for Oil Tankers and Terminals. Sixth Edition**

##### 6.4 Cyber safety and security

Cyber security is concerned with the protection of Information Technology (IT), Operational Technology (OT), information and data from unauthorised access, manipulation and disruption. Cyber safety covers the risks from the loss of availability or integrity of safety critical data and OT.

##### **IMO: MSC-FAL.1/Circ.3 Guidelines on maritime cyber risk management**

2.1.2 The distinction between information technology and operational technology systems should be considered. Information technology systems may be thought of as focusing on the use of data as information. Operational technology systems may be thought of as focusing on the use of data to control or monitor physical processes. Furthermore, the protection of information and data exchange within these systems should also be considered.

##### **Industry: The Guidelines on Cyber Security Onboard Ships Version 4**

##### 1.1 Cyber security characteristics of the maritime industry

...Cyber risk management should:

- Identify the roles and responsibilities of users, key personnel, and management both ashore and on board.
- Identify the systems, assets, data and capabilities, that if disrupted, could pose risks to the ship's operations and safety.
- Implement technical and procedural measures to protect against a cyber incident, timely detection of incidents and ensure continuity of operations.
- A contingency plan which is regularly exercised.

**TMSA KPI 13.1.2** requires that the company has documented procedures in place to identify security threats applicable to vessels trading areas and shore-based locations. Security threats may include:

- Cyber threat

The identified threats are reviewed as required by changes in circumstance.

#### **IMO: ISM Code**

8.1 The Company should establish procedures to identify describe and respond to potential emergency shipboard situations.

#### **IMO: Resolution MSC.428(98) Maritime cyber risk management in safety management systems**

The Maritime Safety Committee,

1 Affirms that an approved safety management system should take into account cyber risk management in accordance with the objectives and functional requirements of the ISM Code;

2 Encourages Administrations to ensure that cyber risks are appropriately addressed in safety management systems no later than the first annual verification of the company's Document of Compliance after 1 January 2021;

#### **Inspection Guidance**

The vessel operator should have developed procedures for cyber risk management that:

- Identified the roles and responsibilities of users, key personnel, and management both ashore and on board, including:
  - The officer with responsibility for cyber risk management on board.
  - The person responsible for managing user profiles and passwords in the vessel network.
- Identified the IT(information technology) and OT(operational technology) systems at risk on board such as:
  - Cargo management systems.
  - Bridge systems.
  - Propulsion and machinery management and power control systems.
  - Access control systems.
  - Administrative and crew welfare systems.
  - Communication systems.
- Described technical protection measures to protect against a cyber incident such as
  - Physical security of network components.
  - Anti-virus software.
  - Application software management.
  - Back-up facilities.
  - Control of crew internet access.
  - Control of administrator profiles, user profiles and passwords.
- Described procedural protection measures to protect against a cyber incident such as:
  - Cyber security training and awareness raising for crew members.
  - Control of local and remote access to the IT and OT systems.
  - Control of the use of personal devices on board.
  - Equipment disposal including data destruction.
  - Contingency plans for possible cyber incidents.

Spaces containing sensitive IT or OT control equipment should be securely locked.

Physical access to sensitive user equipment (such as exposed USB ports on bridge systems and wi-fi hub ports) should be secured or disabled.

All on-board computers should be protected by anti-virus software, and this should be kept updated.

Only senior officers should have administrator profiles and the responsibility for maintaining user profiles should be clearly set out. User profiles should only allow workstations etc. to be used for their intended purpose. User profiles should be carefully managed, and redundant profiles deleted.

Generic user profiles and passwords should not be passed on as part of crew changes. Passwords should be changed regularly.

Back-up facilities should be available and used to assist recovery following a cyber incident.

OT systems critical to navigation and propulsion should have backup systems enabling quick and safe recovery after a cyber incident.

Application software should be regularly updated with security patches and upgrades.

Crew members should receive cyber security training as appropriate to their responsibilities and duties.

Cyber security awareness should be actively promoted on board using for example, posters, CBT or online courses.

Computer access for visitors such as surveyors, technicians etc. should be restricted. Unauthorised access to sensitive OT computers should be prohibited. There should be procedures for the approval of access to sensitive networks, including remote access.

Procedures should strictly restrict the use of portable media. Where use is unavoidable, such media should be checked for malware etc. in a computer not connected to the ship's control network.

The following is a sample non-exhaustive list of cyber incidents, which should be addressed in plans for onboard contingencies. These incidents may be addressed in the company's procedures for dealing with shipboard emergencies as required by the ISM Code's Chapter 8 (Emergency preparedness).

- Loss of availability of electronic navigational equipment or loss of integrity of navigation related data.
- Loss of availability or integrity of external data sources, including but not limited to GNSS.
- Loss of essential connectivity with the shore, including but not limited to the availability of Global Maritime Distress and Safety System (GMDSS) communications.
- Loss of availability of industrial control systems, including propulsion, auxiliary systems, and other critical systems, as well as loss of integrity of data management and control.
- The event of a ransomware or denial of service incident.

Contingency plans and related information should include communications and escalation management to ensure that the correct shore based support can be accessed and should be available in a non-electronic form as some types of cyber incidents can include the deletion of data and shutdown of communication links.

Contact details should be readily available for technical support from the operator's IT department or external IT contractors as appropriate.

*The ships security plan is confidential and approved by flag state. Where the master advises that the ship security plan and any other plans relating to security are confidential, the inspector should only confirm their existence by inspection of the front cover.*

*The inspector should address the question based on those documents and records that are not considered confidential in conjunction with the explanations of the accompanying officer.*

*Where a comment is required to support an observation, it must not provide any detail relating to the content of plans or risk assessments that are reported as confidential.*

### **Suggested Inspector Actions**

- Interview the officer with responsibility for cyber risk management on board to confirm the existence of
  - The company procedures for cyber risk management.
  - The inventory/register of sensitive IT/OT systems fitted on board.
  - Records of approval for external local or remote access to sensitive IT/OT systems.
  - Contact details for technical support from the operator's IT department or external IT contractors.
  - Records of cyber security training.
  - Cyber contingency plans in hard copy.
  
- During the tour of the vessel, inspect equipment to verify physical cyber security measures were in place.

### **Expected Evidence**

- Company procedures for cyber risk management.
- The inventory/register of sensitive IT/OT systems fitted onboard.
- Records of approval for external local or remote access to sensitive IT/OT systems.
- Cyber contingency plans in hard copy.
- Contact details for technical support from the operator's IT department or external IT contractors.
- Records of cyber security training.

*The inspector should not request to review any of the documents and records above considered to be confidential.*

### **Potential Grounds for a Negative Observation**

- There were no company procedures for cyber risk management that:
  - Identified the roles and responsibilities of users, key personnel, and management both ashore and on board.
  - Identified the IT and OT systems at risk on board.
  - Described technical protection measures to protect against a cyber incident.
  - Described procedural protection measures to protect against a cyber incident.
- The accompanying officer was not familiar with the company procedures for cyber risk management.
- A space containing sensitive IT or OT control equipment was not securely locked.
- There was no inventory/register of sensitive IT/OT systems fitted on board.
- Physical access to sensitive user equipment (such as exposed USB ports on bridge systems) was not secured or disabled.
- Company procedures did not designate who on board should have an administrator profile and/or who should manage user profiles.
- Back-up facilities were not available or not used.
- Officers were not familiar with the back-up arrangements for OT systems critical to navigation and propulsion.
- There was no evidence of formal approval for a technician observed on board to access sensitive equipment such as ECDIS etc.
- There was no evidence that portable media observed in use had been checked for malware etc. in a computer not connected to the ship's control network.
- It was reported that:
  - On-board computers were not protected by anti-virus software.

- Anti-virus software had not been regularly updated.
- Application software had not been regularly updated with upgrades and security patches.
- A crew member other than a senior officer had an administrator profile.
- User profiles allowed computer workstations to be used for other than their intended purpose.
- User profiles were not actively managed.
- Generic user profiles and passwords were passed on at crew changes.
- The accompanying officer had not received cyber security training as appropriate to their responsibilities and duties.
- User names and passwords were posted at workstations.
- It was observed that passwords were not required to access workstations.
- There was no evidence that cyber security awareness was actively promoted on board.
- There were no cyber contingency plans addressing the loss of:
  - Function or reliability of navigational equipment e.g., ECDIS.
  - Availability or integrity of external data sources such as GNSS.
  - Connectivity with the shore including GMDSS communications.
  - Control systems for critical systems such as propulsion, steering etc.
- There were no hard copies of cyber contingency plans.
- Contact details were not readily available for technical support from the operator's IT department or external IT contractors as appropriate.





**Our vision**

A global marine industry that causes no harm to people or the environment

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