

The Bahamas
Maritime Authority

Marine Safety Investigation Report

into a crush incident onboard
Dole Chile with the loss of one life
on 19 March 2022



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1. Summary

What happened

On 19 March 2022, the Bahamas registered hatch coverless container vessel, Dole Chile, was alongside, discharging containers at Santa Marta, Columbia. At around 03:30, with discharge continuing in close proximity, a deck fitter began hot work in bay 34, repairing a stopper from the lashing bridge.

With the repair almost completed the fitter was kneeling on a container in the cargo area to gain better access to the work area when he was struck by the container spreader attached to the vessel's gantry crane. He did not survive his injuries.

Why it happened

The deck fitter was working alone and unsupported. His location had been relayed to the person controlling the cargo operations but this information did not alter the cargo discharge plan.

The design of the vessel's gantry crane meant that the operator's view of the casualty location was obstructed. There was no hatchman present to mitigate this hazard.

The officer overseeing the work, expected the repair to be completed from inside the lashing bridge's rails but the task could not be completed in the manner imagined - the victim moved onto the adjacent container in order to complete the repair.

What can we learn

Personnel involved in any potentially hazardous operation should be consulted to identify the hazards associated with completion of the task. If you don't understand the task, you cannot identify the hazards. If you haven't identified the hazards you cannot assess the risk or implement effective controls.

Risk assessments are ineffective if risk control measures are not implemented.

When conducting work in port, clear and effective communication between the ship and terminal is key.

2. Factual Information

Dole Chile

Vessel Type	Hatch coverless container	Flag	Bahamas		
Owner	Ventura Trading Ltd.	Manager	Reefership Marine Services, LLC		
Classification Society	Registro Italiano Navale (RINA)	Gross/Net Tonnage	31,779 / 19,452		
Built	Kiel, Germany, 1999	Propulsion	Single engine driving fixed propeller		
IMO No.	Callsign	Length overall	Breadth	Depth (moulded)	
9185281	C6QX4	206.9 m	32.24 m	20.8 m	
Last BMA Inspection			Last PSC Inspection		
Wilmington, 20 December 2021. No deficiencies.			Wilmington, 11 February 2022. No deficiencies.		



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Rank/Role on board	Deck Fitter (victim)	Master	Chief Officer	Second Officer
Qualification	Welder Performance Qualification	Master (unlimited)	Chief Officer (unlimited)	OOW (unlimited)
Certification Authority	LR	UK	India	India
Nationality	Indian	Indian	Indian	Indian
Age	41	57	29	35
Time in rank	5 years	15 years	2 months	2 years
Time on board	2 months	3 weeks	2 months	3 weeks

Environmental Conditions

Wind Direction	Wind Force	Wave Height	Swell Height	Precipitation / Sky	Light Conditions
East	2 - 3	N/A	N/A	None/Clear	Artificial (night)

Voyage Details

At the time of the casualty the vessel was alongside at Santa Marta, Colombia.

The vessel was engaged in round-trip voyages, of about two weeks in duration, beginning at Wilmington (Delaware), USA, then to Santa Marta, Colombia, Moin, Costa Rica, and Puerto Castilla, Honduras, before returning to Wilmington.

Narrative

All times in this report are UTC -5.

At 01:24 on 19 March 2022, Dole Chile moored, port side to, alongside at Santa Marta, Columbia, in preparation for cargo operations. Approximately thirty minutes later, discharge of empty containers started, which involved using one of the ship's gantry cranes and two shore cranes.

Prior to arrival, the chief officer had identified an opportunity in the cargo stowage plan to facilitate repairs to several damaged container mountings (stoppers). Due to their design, exposure and nature of the trade, the stoppers were regularly damaged and repairs were routinely carried out. To conduct these repairs, along with any other repairs on deck, the vessel carried three deck fitters, reporting to the chief officer.

The repair work to the stoppers (and the pads they landed on) could only be completed when they could be operated to verify alignment i.e., with no container blocking their deployment. In a planning meeting and toolbox talk, conducted the evening before arrival, it was agreed with the deck fitters that they would position their equipment in advance prior to retreating for rest, and complete the repairs once woken when access was available.



Stopper being deployed

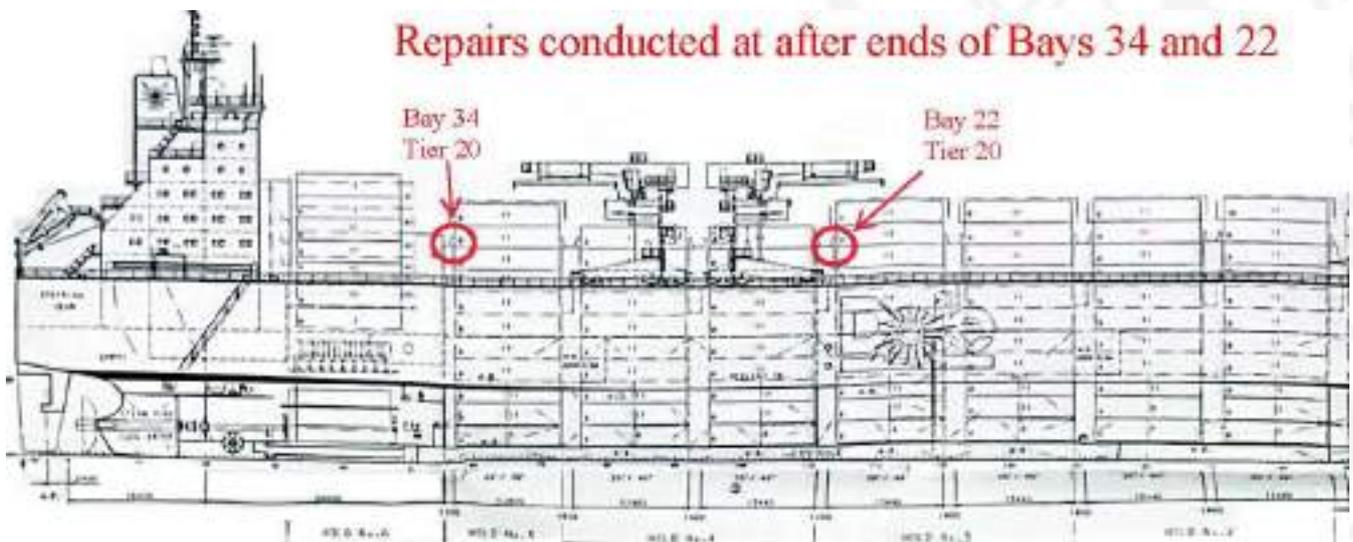


Stoppers deployed



Container resting on stopper

For the call in Santa Marta, it was intended to replace damaged stoppers on the port side (aft) of bay 22 (rows 06, 08 and 10) and on the starboard side (aft) of bay 34 (row 09). The work was considered crucial as full stacks of laden containers were scheduled to be loaded in these locations during the port call - the stoppers would be required to keep weight loading on the tanktop within allowable limits.



General arrangement showing locations of repairs to stoppers

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As there were a total of five stoppers to be replaced at bay 22, two fitters were assigned to work there, with one fitter working alone to replace the single stopper at bay 34. Repairs of this type had previously been carried out by all three of the fitters and it was not unusual for them to work alone with no direct oversight.

On arrival at Santa Marta, bay 34 was fully loaded with empty containers - the plan was to discharge all the containers from tiers 20 and 22, along with several entire stacks (see plan, below). The repair was to be conducted at location 340920¹ (marked red on the plan) and could only be completed in a fixed time period: after the deck level container(s) had been discharged and before work started on the lower tiers.

Shore	Port											Starboard
←												
		22	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES
		20	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES
		18	ES	ES	E	E	ES	ES	ES	E	E	ES
		16	ES	ES	E	E	ES	ES	ES	E	E	ES
		14	ES	ES	E	E	ES	ES	ES	E	E	ES
		12	ES	ES	E	E	ES	ES	ES	E	E	ES
		10	ES	ES	E	E	ES	ES	ES	E	E	ES
		08	ES	ES	E	E	ES	ES	ES	E	E	ES
		06	ES	ES	E	E	ES	ES	ES	E	E	ES
		04	ES	ES	E	E	ES	ES	ES	E	E	ES
		02				E	ES	ES	ES	E		
			10	08	06	04	02	00	01	03	05	07
			Rows									

Bay 34 on arrival. Containers marked ES to be discharged, containers marked E to remain onboard. The continuous black line denotes “deck level” - the lashing bridge

At around 02:30, the chief officer informed the officer of the watch (second officer) of the stopper repair plan. Shortly afterwards, the second officer then relayed the information about the nature and location of the welding to the stevedore foreman.

At approximately 03:30 the ship’s aft gantry crane started discharging containers from bay 34 and the fitter was woken by the chief officer and told the bay would soon be clear. Once tiers 20 & 22 were discharged, he started the repair. Discharge continued from the port side of bay 34 as well as at bays 10 and 22 with the use of shore cranes.

At approximately 04:30 the fitter was seen, lying face down and motionless, on top of the container in position 340918. Cargo operations were immediately stopped, the alarm raised and paramedics called. First responders found him unresponsive with a significant visible head wound. He was declared dead by a medical doctor at 04:45.

An autopsy confirmed the cause of death as head trauma, consistent with being struck by the gantry crane’s container spreader.

¹ Bay 34, row 09, tier 20. See glossary for definitions.

Safety Management

The vessel's safety management system (SMS) comprised of a series of manuals, checklists, permits to work and risk assessments. Guidance on hot work was limited to the section covering works in dry dock but there was a hot work permit and associated checklist.

The SMS system also included an Accident/Incident Library containing lessons to be learned from accidents in the fleet. This included the following, relating to a serious injury that occurred in 2021 when a junior deck officer was struck by a container spreader.

- Details and description of Basic/Root cause: Loss of situational awareness leading to misjudging of ongoing cargo handling equipment movement causing the accident.
- Proposed measures/corrective action: Proper risk assessment and situation awareness while executing a task and keeping check on changes undergoing in the task area as the task progresses to ensure that task is completed safely.

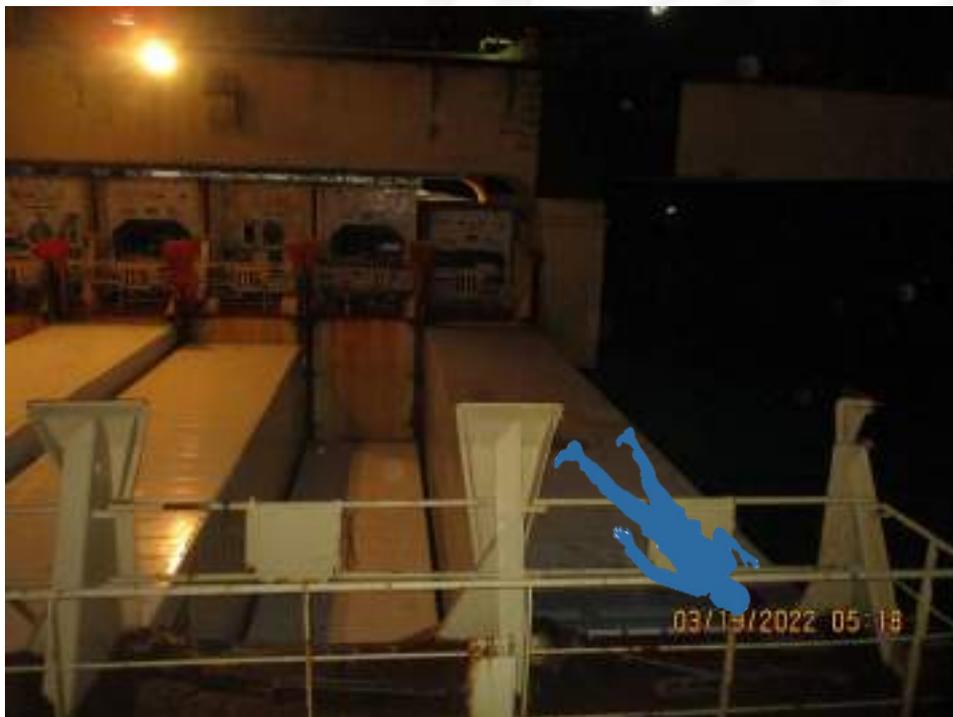
The last external audit of the SMS was conducted on 25 February 2022 showed no non-conformities or observations. Internal audits conducted on 11 July 2021 and 30 July 2020 listed a number of minor observations (unrelated to the casualty) and no non-conformities.

3. Analysis

The purpose of the analysis is to determine the contributory causes and circumstances of the casualty as a basis for making recommendations to prevent similar casualties occurring in the future.

The accident

Scene examination and recreation suggests that the victim was hit by the outboard edge of the container spreader's girder as it was lowered when the victim was kneeling on top of container 340918 and facing aft. The presence of a slag removal hammer and the location of his welding equipment suggests he was inspecting his work or removing slag from welds.



Position of victim, as discovered by first responders (looking forward)

The location of the casualty was illuminated by floodlights on the bridge and accommodation block, facing forward, and on the gantry crossbeam, facing aft.

There were also lights fitted at the mid-point of the gantry boom. However, the victim may have not noticed the change of lighting as the gantry crane moved into position as he was wearing a welding mask (raised) and was facing the brighter lights aft.

Visibility from gantry crane

The vessel was equipped with two gantry cranes. Each consisted of a central carrying crossbeam on two supports with a travelling trolley lifting system (boom and container spreader). At the time of the casualty, the aft crane was being used to discharge Bay 34. This crane was arranged with the driver's cab facing aft and offset to port (of the boom and spreader).



Views of aft gantry crane showing offset cab (looking from starboard)

The offset meant that the crane operator's view of the two rows to starboard of the cab was obscured. At the time of the casualty, the vessel was port side alongside, and the location where the victim was working would have been obscured when the spreader passed an area from Row 05 outboard as the gantry approached Row 09.



View from cab approaching, and at, location of casualty

The location in which the victim was working was not visible from the main deck.

Cargo operations were overseen by a stevedore foreman with hatchmen (spotters) assigned to each bay being worked, usually present on either a lashing bridge or the main deck. These personnel were in communication with each other and the gantry crane operators by radio. There was no direct line of communication between the hatchmen/crane operator and vessel's crew.

At the time of the casualty there was no hatchman at bay 34. The gantry crane operator stated that he saw sparks at the after end of bay 34 and knew that work was being done but, after seeing no sparks for a period of time, assumed that the work had finished.

Risk Controls

Risk control for the repairs consisted of two elements: a toolbox talk held the evening before arrival and a task specific risk assessment. The toolbox talk, held on the bridge during the chief officer’s watch, included discussing the work to be completed, pre-arrival positioning of welding equipment, establishing when personnel would be called and the contents of a task-specific risk assessment that had previously been drafted for similar work.

The task specific risk assessment “HOT WORK – Crop / renewal of stopper bar base plate / bracket in lashing bridge” had been completed on 13 March 2022 (see Appendix). Hazards identified were those associated with hot work – fire hazards in particular- and the need to control risk for falling was also included. There were no hazards identified relating to working cargo.

Enter data in shaded cells – select Likelihood & Severity from drop down options.

ID	Identified Hazard associated with task	Possible consequences of the hazard	Likelihood	Severity	Risk Level	Existing Controls and Safeguards	Additional controls/safeguards required (Action Plan)	After applying Controls		
								Likelihood	Severity	Risk Level
1	Defective tooling equipment like brooms, flash back arrester	Injury & Damage to property	Moderate	Moderate	2	Regular inspection & maintenance to be carried out	Checked prior use	Low	Low	1
2	Defective welding cables	Injury	Moderate	High	4	Proper care & inspection of the cable to correct out frequently	Worn out / frayed cables to be discarded or fixed immediately	Low	Low	1
3	Improper use of PPE	Injury	Moderate	Moderate	2	Proper & appropriate PPE to be used at all times	Crew member should know the importance of PPE & should be trained in its use	Moderate	Low	2
4	Fire Hazards	Injury & Damage to property	Moderate	High	4	All fire preventive measures to be taken, a fire watch should be posted until the completion of hot work	The company policy to be strictly followed & the work permit attached duly filled & complied with	Low	Low	1
5	Fire in adjacent spaces by conduction of Radiations	Injury & Damage to property	Moderate	High	4	Thorough inspection of the adjacent spaces to be carried out prior and during hot work for any fire hazards	Create or reduce the risk of ignition by taking appropriate fire prevention measures	Low	Low	1
6	Hot surface structure	Injury	Moderate	High	4	Hot work to be carried out on well-ventilated structure where there is a possibility of electrification	Flame welding cables should not be used. Proper PPE to be worn during hot work	Low	Low	1
7	Slip trips and fall	Injury or Death	Low	Moderate	2	Work piece adequately lit up and safety barriers put	Personal working dressed safety harness with fall preventer secured to a strong point	Low	Low	1

Notwithstanding the unassessed risk posed by ongoing cargo operations, the risk assessment identified the following control measures:

- completion of hot work permit
- posting a fire watch
- ensuring adequate lighting and erecting safety barriers
- use of fall protection equipment

None of these control measures were in place at the time of the casualty, the fall protection equipment was not mobilised as the work was imagined to be completed from the lashing bridge (meaning the victim was exposed to a 5m fall to the deck when working on 340918). A hot work permit would have required a responsible person in attendance in addition to personnel carrying out the work. This was not done: the victim was working alone and unsupported.

The chief officer considered that the repair could be completed from the relative safety of the lashing bridge. However, to deploy and position the stopper, whoever was completing the task would, at minimum, have to extend their torso through the rails. They would then be left with incredibly limited mobility to complete the weld. Work as imagined did not correspond with work as done.

The chief officer believed that relaying the position of the ongoing hot work to the stevedore foreman was sufficient to control any risk posed by the ongoing cargo operation at Bays 22 and 34.

No-one else, onboard or ashore, flagged that more needed to be done to complete the work safely.

4. Conclusions

- A deck fitter died after being struck by a moving container spreader whilst working in the cargo space next to the lashing bridge of bay 34.
 - In the lead up to the casualty, the victim was working alone, unsupported and in close proximity to ongoing cargo operations.
 - His location had been relayed to the person controlling cargo operations but the information did not alter the execution of the cargo plan. The information was not effectively passed to the gantry crane operator.
 - The design of the vessel's gantry crane meant that the operator's view of the casualty location was obstructed. There was no hatchman present to mitigate this risk.
 - The officer in charge of the work considered that the repair could be completed from the relative safety of the lashing bridge. However, work as imagined did not correspond with the risk this still posed or the restrictions it placed on completing the work.
 - The task specific risk assessment for the work did not identify any hazards associated with working in proximity to ongoing cargo operations. The risk control measures that were identified including supervision, a fire watch, maintaining a boundary and protection from falls, were not implemented.
 - Lessons from an earlier casualty, where a crewmember was seriously injured as a result of being struck with a container spreader, had not been effectively applied to the safety management system.
-

5. Actions taken

Reefership Marine Services LLC has:

- Sent members of the management team to each vessel in the fleet to share the details of this casualty
 - Updated their risk assessments to include hazards posed by cargo operations
 - Re-initiated a risk assessment training program that was on hold during the SARS Cov2 pandemic.
-

6. Recommendations

Reefership Marine Services is recommended to:

- Take action to improve the safety culture onboard Dole Chile and its other managed vessels, including but not limited to:
 - Review the effectiveness of its safety management system's procedures and guidelines
 - Review compliance with safe working practices, to better ensure the safety of its crews

Sociedad Portuaria de Santa Marta is recommended to:

- Ensure that effective oversight is provided at all hatches when cargo is being worked.
 - Establish effective communication procedures between ship and terminal to facilitate repairs or maintenance of vessels moored at their berths. This should include agreement on the precautions to complete the work safely.
-

7. Glossary and Definitions

AB	Able seafarer
ASI	Annual Safety Inspection
Bay	Longitudinal division of container stowage. Bay number indicates the stowage position along the vessel's length. Numbers run from forward to aft.
BMA	The Bahamas Maritime Authority
Company	The Owner of the ship or any other organization or person such as the Manager, or the Bareboat Charterer, who has assumed the responsibility for operation of the ship from the Owner of the ship and who on assuming such responsibility has agreed to take over all the duties and responsibilities imposed by the International Safety Management (ISM) Code
m	Metre. Unit of length. 1m equals 1000mm
No.	Number
PSC	Port State Control
Row	Transverse division of container stowage (stacks). Numbers run from midships increasing outward - odd numbers to starboard, even number to port.
SMS	Safety Management System
Terminal	The operator of the port facility responsible for the loading and discharge of cargo to/from ships and any ancillary operations
Tier	Horizontal division of container stowage. Numbers increase from hold bottom to deck.
USCG	United States Coast Guard
UTC	Universal Time Coordinated

Appendix

Risk Assessment

58. RISK ASSESSMENT & REVIEW FORM

Task has existing checklist, Y/N:
 Use the guide on page 2 for the Risk Assessment
 Complete "Reviewed by" section on page 2 bottom

Vessel: **IMV DOLE CHILE** Date: **13-Mar-22** DK: 012/22
 Project / Task Identification: **HOT WORK - Crisp / renewal of steeper bar base plate / bracket in testing bridge**
 Task Supervisor: **CHIEF OFFICER** Department Head/Assessor: **CHIEF OFFICER**

Enter date in attached calls - select Likelihood & Severity from drop down options.

#	Identified hazard associated with task	Possible consequences of the hazard	Likelihood	Severity	Risk Level	Existing Safeguards	Additional controls/safeguards required (Action Plan)	After applying Controls			
								Likelihood	Severity	Risk Level	
1	Defective cutting equipment like axes, flush lock processor	Injury & Damage to property	Moderate	Moderate	3	Regular inspection & maintenance to be carried out	Checked prior use.	Low	Low	1	
2	Defective walking cables	Injury	Moderate	High	4	Proper care & inspection of the cable to be carried out frequently	When out' checked cables to be discarded or fixed immediately.	Low	Low	1	
3	Improper use of PPE	Injury	Moderate	Moderate	3	Proper & appropriate PPE to be used at all times	Crew member should know the importance of PPE & should be trained in its use	Moderate	Low	2	
4	Fire Hazards	Injury & Damage to property	Moderate	High	4	All fire prevention measures to be taken, a fire watch should be posted until the completion of hot work	The company policy to be strictly followed & the work permit checklist duly filled & completed with.	Low	Low	1	
5	Fire in adjacent spaces by conduction at Redox	Injury & Damage to property	Moderate	High	4	Thorough inspection of the adjacent spaces to be carried out prior and during hot work for any fire hazards	Ensure or reduce the risk of ignition by taking appropriate fire prevention measures	Low	Low	1	
6	Hot surface/ structure	Injury	Moderate	High	4	Hot work to be carried out on well surfaced' structure where there is a possibility of electrification.	Frailty walking cables should not be used. Proper PPE to be worn during hot work	Low	Low	1	
7	Slip trips and fall	Injury at Death	Low	Moderate	2	Work piece adequately fix up and safety barriers put.	Personal working done safety measures with the preventers secured to a strong point.	Low	Low	1	
8											
9											
10											
11											
12											
Average Risk									1.1	Average Risk	1.1

Summary of Action Plan:

Crew briefed about the procedures to be followed and PPE to be worn at all times.

If risks assessment shows a change or refinement of the task, summarize the reasons above.

Original: 16/10
 Revision: 1/20
 Page: 1/2

Subject: Checklist/Standing list.
 Chapter: Risk Assessment & Review Form

Prepared by: **KC**
 Approved by: **MC**

Date: July, 20

RISK ASSESSMENT – GUIDE

Reviewers to Include:
 - Head of Departments, Master, Chief Engineer, Task supervisor
 - Other staff as appropriate whose area of knowledge has been identified as appropriate to the circumstances.
 - If considered, other appropriate members of RMS(SOPEP) team
 e.g.

- Operations
- DVI - Technical
- DP - Risk/Marine/Safety
- Accounting
- Purchasing
- Crewing
- CSO - Security
- Legal
- Others, Outside consultants

Potential hazards & consequences (Ref QSMS 7.11.9)
 - Review must consider all risks & possible consequences.
 - Hazards can vary from the obvious to those listed below
 e.g. of hazards

- Fire, explosion, fumes, smoke, toxic gas, low oxygen
- Electrical shock, mechanical failure.
- Slipping, tripping, low head room, falling objects or tools
- Safety equipment or PPE failure
- Structural weakness, poor tools
- Insufficient manpower or fatigue, lack of skill
- Navigational hazards
- Presence of oil or other pollutants, hazmets
- e.g. of severity and consequences
- Threat to life & limb
- Damage to environment - short or long term
- Damage to machinery, vessel, cargo, other property
- Damage to company reputation, business
- Loss of voyage, financial or commercial loss

Or
 NO RISKS ASSESSED

Potential Controls (Ref QSMS 7.11.14)
 - Controls must be put in place wherever possible to reduce risks to the minimum.
 e.g.

- Safety controls
- Anti-pollution Controls, SOPEP deployment
- Enhanced procedure - at/afloat
- Clear defined responsibilities
- Enhanced procedure — ashore
- Reporting requirements, communication
- Inspection prior commencing
- Reallocating skilled staff
- Familiarisation process
- Enhanced training programme
- Use of technology, additional equipment
- Monitoring for deviations, alerting
- Warning signs, tag out, area isolation, etc.
- PMS status checks

For Control Actions to reduce the risk rating use the ALARP (as low as is reasonably practicable) principle.

Impact of Risk	3	4	5
	Low Likelihood High Impact	Moderate Likelihood High Impact	High Likelihood High Impact
	2	3	4
	Low Likelihood Moderate Impact	Moderate Likelihood Moderate Impact	High Likelihood Moderate Impact
	1	2	3
	Low Likelihood Low Impact	Moderate Likelihood Low Impact	High Likelihood Low Impact
	Likelihood of Risk Occurring		

Overall Risk Rating	1
	2
	3
	4
	5
	Very Low
	Low
	Medium
	High
	Very High
	Acceptable
	Tolerable
	Control action required to reduce to acceptable/tolerable
	Control action required to reduce to acceptable/tolerable
	Unacceptable - Control action required

Crew signatures redacted



Crew signatures redacted

Master: _____ or Chief Engineer: _____ or Chief Officer: _____ Task supervisor: _____

Original: 10/10
 Revision: 1/20
 Page: 2/2

Subject: Checklist/Standby Inst.
 Chapter: Risk Assessment & Review Form

Date: July, 20

Prepared by: KC
 Approved by: MC

