TECHNICAL AND REGULATORY NEWS No. 07/2016 – Technical

# DECK CARGO ON BULK CARRIERS – WHAT YOU NEED TO KNOW

Relevant for design offices, shipyards and owners/managers of bulk carriers.

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DNV GL is receiving an increasing number of requests regarding the carriage of cargo on deck and hatch covers of traditional bulk carriers. This Technical and Regulatory News provides you with the information you need when preparing a vessel for deck cargoes.

## Structural strength

The deck and hatch covers on modern bulk carriers usually have a structural capacity of around 2.0 to 2.5 t/m2 of uniformly distributed load (UDL), without any reinforcements. This load corresponds to the green sea pressure used in the approval of the vessel. With a few minor reinforcements, it may be possible to increase the UDL, especially for the deck area.

## Stability documentation

Compliance with applicable stability and longitudinal strength criteria in deck cargo loading conditions shall be shown in updated/amended stability manuals.

In general, intact GM limit curves shall be recalculated taking into account an additional wind profile area from deck cargo.

Probabilistic damage stability calculations may also be required for ships with reduced freeboard (B-60/B-100), ref. IACS UI LL65.

For ships with B freeboard (without reduction), it may be necessary to re-address the damage stability calculations of SOLAS Chapter XII (flooding of single holds), depending on how compliance was documented originally.

The Loading Computer System (LCS) will have to be updated as necessary with new GM limits, profile curves or other stored data. In cases where the ship does not need any new limits or data, a test condition with deck cargo shall be provided to verify that the loading computer can correctly handle deck cargo as input.

## Cargo securing

The securing of cargo is very important when it comes to deck cargo. The vessel should be equipped with the relevant securing equipment, such as lashing eyes, container sockets, timber uprights and sockets, chains and wires. The stowage and securing of cargo other than bulk cargo is to be described in an approved Cargo Securing Manual (CSM).

### Containers

It is strongly recommended for ships designed to carry containers to apply for the class notation Container, which provides a design standard enabling the safe and reliable transport of containers on ships.

It is also strongly recommended for ships designed to carry containers on deck to ensure compliance with the Code of Safe Practice for Cargo Stowage and Securing (CSS Code), Annex 14. The class notation Safelash may be assigned to ships with the class notation Container, ensuring compliance with the afore-mentioned regulations.

It should be noted that the side projected area of containers is to be taken into account for the selection of mooring and towing lines and for the loads applied to shipboard fittings and supporting hull structure.

### Project cargoes

Project cargoes are large or bulky cargo which cannot be considered uniformly distributed cargo. Typical examples are windmill blades or towers and parts of cranes. For such cargo, a stowage plan including the footprint load should be used as input for structural strength calculations and the cargo securing arrangement. Ship-specific accelerations and calculation examples to securing are to be provided in the CSM.

### Timber

Timber in the form of logs or packaged sawn timber is frequently carried on deck of bulk carriers. It is recommended that the 2011 Timber Deck Cargo Code (TDC Code) be complied with, even if this is not a mandatory code.

When carrying logs, the vessel should be equipped with uprights featuring hog wires in between. Sawn timber may be secured with lashing only, in such a way that every package is secured by at least two lashings. For both logs and sawn timber, a compact stowage is essential.

For timber cargo conditions, buoyancy of timber may be utilized in damage stability calculations for a more favourable GM limit curve, ref. IACS UI SC161.

The vessel may be assigned a timber load line to allow the vessel to load to a deeper draught, thereby increasing cargo capacity. Load line regulations 41 to 45 and parts of the TDC Code have to be complied with. For vessels in service, it may be difficult to satisfy the load line requirements for compact stowage due to obstructions such as ventilation ducts, deck houses, guard rails and bulwark stays. In cases where a timber load line is intended, the corresponding draught is to be included in the midship drawing. The local hull strength for bottom and side shell plating and stiffeners is to be ensured under the sea pressure based on this draught.

### Recommendations

The above-mentioned recommendations summarize key relevant issues for bulk carriers carrying deck cargo. We recommend reviewing these items related to your ships and existing procedures.

### Appendix

"Typical documentation requirements for deck cargo" on the following page.

**CONTACT**

Contact your local DNV GL office.

For customers:
DATE – Direct Access to Technical Experts via My DNV GL

## Appendix

**Typical documentation requirements for deck cargo:**

| Document | Additional description | Application |
|---|---|---|
| Addendum to the stability booklet / loading manual | Including deck cargo loading conditions | All ships |
| Addendum to the loading/unloading sequences | Including deck cargo loading conditions | All ships |
| Probabilistic damage stability analysis | Calculation of GM limit curve, applicable to deck cargo | Ships with reduced freeboard or with timber cargo |
| Damage stability calculations, SOLAS Chapter XII | Flooding of single holds | Ships with B freeboard |
| Updated loading computer documentation | Test conditions with deck cargo and stored data considering new GM limits, profile curves, etc., as applicable | All ships |
| Documentation of ship wind profile curve with deck cargo and calculation of new intact GM limits | Calculation according to weather criteria of IMO 2008 IS Code, Part A, Ch. 2 | All ships |
| Cargo Securing Manual | Revised CSM, including carriage of deck cargo or an addendum to the CSM ship-specific document | All ships |
| Cargo securing arrangement plan | Showing fixed cargo securing devices, including MSL | All ships |
| Supporting structure for fixed-cargo securing devices | | All ships |
| Strength calculation report | Covering strength of hatch cover, strength deck and cross deck, as applicable; may be waived if the cargo loads (including dynamic accelerations) are less than the green sea pressure for which the vessel is designed | All ships |
| Mooring and towing equipment | Including the revised equipment number calculation for mooring and towing only | Container cargo |
| Stowage plan | Including the weight and footprint loads of each unit | Project cargo |