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## **GUIDELINES FOR REVISION OF ISM-MANUALS ON SUPPLY SHIPS AND TUGS USED FOR ANCHOR HANDLING REGARDING THE IMMEDIATE MEASURES ISSUED BY NMD.**

### **1. Introduction**

As a result of the tragic disaster with Bourbon Dolphin and after consultations with the industry as well as shipmasters, the Director General of Shipping and Navigation decided, on 10 May 2007, to introduce immediate measures for planning and safety management on vessels used for anchor handling, pending the report from the appointed special investigating committee.

### **2. Purpose**

Further to the Bourbon Dolphin disaster and the immediate measures issued in English by the NMD on 21 June 2007 with our reference 200711306-9 regarding supply ships and tugs used in anchor-handling operations, the purpose of this circular is to clarify how the implementation of the measures will be followed up during periodical surveys or verification and issuance or endorsement of cargo ship safety certificate.

### **3. Application**

This circular applies to all Norwegian flagged supply vessels and tugs that are designed and equipped to provide anchor handling.

### **4. Definition**

For the purpose of this circular the following definitions are applicable:

None

## 5. Statutory authority

The immediate measures are detailed in section 7 of this circular. Statutory authorities for the implementation follow from:

- Regulations of 15 September 1992 No 695 concerning the construction of Passenger Ships, Cargo Ships and Barges: Chapter 1, 5 and 8.
- Regulations of 15 June 1987 No. 507 concerning safety measures, etc. on passenger ships, cargo ships and lighters: Chapter 1 and 3.
- Regulations of 6 August 1996 No. 822 concerning a Safety Management System for cargo ships.
- Regulation of 1 January 2005 No. 8 concerning the working environment, health and safety of workers on board ship: Chapter 1, 2 and 6

## 6. Background

Anchor handling may implicate a number of special marine operations. A high level of force (tension) in the chain or wire may cause great heeling moment and high astern or transverse speed of motion on the anchor handling vessel. A simultaneous loss of trust force on the vessel's own propellers and or fatal rudder position may result in a rotation which leads to a considerable increase in transverse forces. Environmental conditions as wind, waves and currents will also influence the operations.

High astern or transverse speed of motion may occur as a result of high hauling speed on the anchoring winches or as a result of entire or partial loss of the vessel's own bollard pull. Loss of bollard pull will cause the vessel to be pulled astern with great force by the tension in a heavily strung anchor arrangement.

By using towing hooks, an emergency release of the hook may ensure that the ship is able to quickly relive herself from the applied forces. For towing or hauling by use of winches, there is no equivalent release method.

Please note that the stability requirements for supply- and towing vessels allows for the angle of heeling at witch the maximum righting arm (GZ-max) appears to be under 20 degrees, but not less than 15 degrees. This means that even a slight heeling can be critical.

Please also note that the angle of flooding, which results in water on the aft deck, occurs before the vessel reaches the angle for maximum righting arm (GZmax). Astern trim reduces the angle of flooding further.

## 7 Immediate measures

At periodical survey and or verification and issuance or endorsement of cargo ship safety certificate it shall be controlled that the following measures are implemented:

### 7.1 Stability during anchor handling.

For vessels that are used for anchor handling and which at the same time are utilizing their towing capacity and/or tractive power of the winches, calculations must be made showing the acceptable vertical and horizontal transverse force/tension to which the vessel can be exposed. The calculations must consider the most unfavourable conditions for transverse force/tension and as a minimum include the following:

Calculations must be made for the maximum acceptable tension in wire/chain, including the maximum acceptable transverse force/tension that can be accepted in order for the vessel's maximum heeling to be limited to one of the following angles, whichever occurs first:

- Heeling angle equivalent to a GZ-value equal to 50 % of GZ-max.
- The angle of flooding, which results in water aft on working deck when the deck is calculated as flat.
- 15 degrees.

The heeling moment must be calculated as the total effect of the horizontal and vertical transverse components of force/tension in the wire or the chain. The torque arm of the horizontal components shall be calculated as the distance from the height of the work deck at the guide pins to the centre of main propulsion propeller or to centre of stern side propeller if this projects deeper. The torque arm of the vertical components shall be calculated from the centre of the outer edge of the stern roller and with a vertical straining point on the upper edge of the stern roller.

The other loading conditions for the vessel shall be as stated for anchor handling in approved stability calculations and in accordance with prevailing practice with regards to loads on deck and winch reels. The vertical force from the tension shall be included in the loading conditions, upon which calculations of trim and curve for righting arm (GZ-curve) are based.

Information stating the maximum force/tension in wire or chain, as well as corresponding lateral point of direction according to the calculations, must be communicated to the vessels crew and be displayed next to the control desk or at another location where the navigator on duty easily can see the information from his command post.

The displayed information must be in the form of simple sketches showing the vessels GZ-curve for righting arm in addition to a table stating the relevant combinations of force/tension and point of direction which gives the maximum acceptable heeling moment.

### 7.2 Vertical lifting capacity

The maximum tension in chain or wire during a clean vertical lift without bollard pull, is not permitted to be more than that which is stated for anchor handling (if any) in the approved

stability calculations, nor such that the highest transverse force according to the calculations stated in item 3.1 above, are exceeded.

### **7.3 Horizontal bollard pull**

A vessel specific curve must be prepared and arranged showing the maximum available continuous bollard pull (BP) for anchor handling as a function of the total power balance when required capacity to ensure sufficient operation of the winch pumps and side propellers/azimuth-thrusters has been taken into consideration.

It is not permitted to adjust the original stability calculations for reduced BP, cf. second chapter sub-section a and b of FOR no. 695 of 15 September 1992 on construction of passenger ships, cargo ships and barges §43.

### **7.4 Towing and anchor handling equipment**

The effect of emergency release on winches and equipment according to FOR no. 695 of 15 September 1992 on construction of passenger ships, cargo ships and barges, § 48 second, third and tenths chapter shall be reviewed. Procedures for unintended situations shall be established, which for each type of equipment will describe emergency release methods, time delays and release speed. The procedures shall be communicated to the vessel's crew and vital information shall be displayed next to the control desk or another appropriate location on the bridge where the navigator on duty easily can see the information from his usual command post.

### **7.5 Planning of the anchor handling operations**

Every vessel taking part in anchor handling operation has an obligation to make sure that calculations are carried out and that plans are made clearly showing the loads/forces (tension) that may occur. If necessary, this information must be recovered from the principal. Such calculations must take into consideration the weight of the anchor lines (chain) in question and the anticipated force/tension or forces which may occur in any phase of the operation and/or which will be required in order to obtain sufficient anchor holding power at preset operations.

Based on the results from item 3.1, 3.2, 3.3 and 3.4 above, verifications must be made that the calculated forces are within the capacity of the vessel.

It must be stated in the operation plan, that the anchor handling must be discontinued, the gear and equipment relieved or emergency released if the vessel is exposed to greater load/forces/tension than anticipated in the plans.

### **7.6 Tandem operations or other joint towing operations**

Every vessel taking part in anchor handling operations, in which tandem- or joint tugging operations are planned, is obliged to make sure that calculations are made showing the loads/forces (tension) that may occur during the operation in question. If necessary, this information must be recovered from the principal.

The calculations must be accompanied by procedures describing the method for ensuring that the individual vessel is not exposed to forces exceeding the capacity of the vessel based on results from item 3.1, 3.2, 3.3 and 3.4 above.

During tandem and joint towing operations, the towing gear must be connected in towing hooks with emergency release or in some other way be arranged so that in case of a breakage in towing line or loss of power/bollard pull in one of the vessels, the other vessels may quickly be disconnected. A communication plan for the operation must be established which in particular ensures an effective and coordinated action in case of any unintended incident.

It shall not be allowed to connect the anchor towing gear directly to a winch on one vessel, unless the vessel in question can handle the load/force/tension and the dynamic conditions alone, based on the vessel's permissible capacity calculated according to item 3.1, 3.2, 3.3 and 3.4 above.

The operation plan must state that the towing operation is to be discontinued/relieved or emergency released if one of the vessels is exposed to greater forces than anticipated.

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