



MARITIME SAFETY COMMITTEE  
84th session  
Agenda item 8

MSC 84/INF.8  
3 March 2008  
ENGLISH ONLY

## DANGEROUS GOODS, SOLID CARGOES AND CONTAINERS

### Bulk carrier loading rates

#### Submitted by INTERCARGO

#### SUMMARY

<i>Executive summary:</i>	This paper provides information on a recent survey of ships' masters conducted by INTERCARGO as part of an on-going investigation into high loading rates of bulk carriers
<i>Strategic direction:</i>	5.2
<i>High-level action:</i>	5.2.1
<i>Planned output:</i>	-
<i>Action to be taken:</i>	Paragraph 4
<i>Related documents:</i>	Code of Practice for the Safe Loading and Unloading of Bulk Carriers (BLU Code) adopted by resolution A.862(20); MSC/Circ.1160; and SOLAS chapter VI, part B.

1 In recent years INTERCARGO members have experienced increased pressure from terminals to load cargo as quickly as possible, occasionally with little regard to the communication and loading plan requirements in the BLU Code. In order fully to understand the current situation INTERCARGO conducted a confidential survey of ships' masters.

2 Some of the most severe terminal instructions, requiring a 14-hour turn-round and 16,000 t/hr loading rate, were sent to serving masters of cape-size bulk carriers. Of the 54 masters who responded to the survey, 46 indicated that they considered such a rate of loading to be beyond the safe operational limits of their vessel.

3 Although many of the issues raised by the survey are subject to further investigation, it is evident that the BLU Code is not being universally applied. It is to this particular issue that INTERCARGO would like to draw the attention of Member States and international organizations in consultative status. Particular reference is made to operative paragraph 3 of resolution A.862(20), urging Governments in whose territories solid bulk cargo loading and unloading terminals are situated, to introduce port by-laws to bring about effective implementation, and the associated regulation in SOLAS chapter VI, part B.

For reasons of economy, this document is printed in a limited number. Delegates are kindly asked to bring their copies to meetings and not to request additional copies.

**Action requested of the Committee**

4 The Committee is invited to note the information provided in the annex, particularly section 3 – Conclusions.

\*\*\*

## ANNEX

### INTERCARGO LOADING RATES SURVEY

#### INTRODUCTION

1 Recognizing that a number of accidents had occurred as a result of improper loading and unloading of bulk carriers the IMO adopted the *Code of Practice for the Safe Loading and Unloading of Bulk Carriers* (the *BLU Code*) with resolution A.862(20) in 1997; this was followed by MSC/Circ.1160 *Manual on Loading and Unloading of Solid Bulk Cargoes for Terminal Representatives* in 2005. The purpose of the BLU Code is to assist persons responsible for the safe loading or unloading of bulk carriers to carry out their functions and to promote the safety of bulk carriers.

2 In recent years INTERCARGO members have experienced increased pressure from terminals to load cargo as quickly as possible; occasionally with little regard to the communication and loading plan requirements in the BLU Code. In order to fully understand the current situation INTERCARGO conducted a confidential survey of ships' masters. Some of the most severe terminal instructions, requiring a 14-hour turn-round and 16,000 t/hr loading rate, were sent to serving masters of cape-size bulk carriers.

3 This document summarizes the issues raised by the survey.

#### KEY FINDINGS

4 Of the 54 masters who responded to the survey, 46 indicated that they considered such a rate of loading to be beyond the safe operational limits of their vessel, three expressed no concern and five made no clear statement. Two-thirds of respondents stated they had concerns with regard to structural stresses.

5 Two main areas of concern were identified by the survey: the implied arrival condition required to meet such onerous loading conditions and its detrimental effect on manoeuvrability; and the consequences of the instructions for the structural integrity of the ship.

#### MANOEUVRABILITY

6 A parameter that can determine how quickly a ship can safely load is its deballasting rate. In order to meet the terminal instructions a ship must come alongside with "bare minimum" ballast. Typically this results in a condition representing approximately 60% of the "light ballast" condition in the loading manual, with a corresponding large trim, less than 100% propeller immersion, and high windage area. All of these factors serve to reduce the manoeuvrability and, hence, safety of the ship.

#### HULL STRUCTURE

7 Controlling the loading and deballasting operations in accordance with the loading plan is crucial if the ship is to be kept within its permissible operation limits. The loading plan consists of a series of steps – each with a defined volume of cargo, ballast and consumables – for which the stresses in the ship have been calculated and found to be within permissible limits.

However, when loading at high rates, masters are concerned that adequate control cannot be exercised with regard to the amount of cargo loaded or ballast discharged. The feared scenario is that too much cargo is loaded (an overrun of just five minutes on one pour would equate to 1,300 t) and that ballast remains in tanks at the end of the pour (as there is insufficient time fully to empty the tanks); this would impose a greater load on the structure than planned for and calculated. In addition, the dynamic force exerted by the impact of falling cargo is not considered in the calculations and some respondents believe this may be significant. The potential consequences of such a scenario is the overstressing of the ship's structure both in terms of global and local strength; also, the long term effect of such loading may have an impact on the fatigue life of the structure. More detail with regard to other structural issues can be found in IACS Recommendation 46 *Guidance and Information on Bulk Cargo Loading and Discharging to Reduce the Likelihood of Over-stressing the Hull Structure*.

#### **LOADING MANUAL AND LOADING INSTRUMENT**

8 Further concern was expressed with regard to loading manuals and loading instruments, especially those found on older ships. Some masters apply an "age factor" when conducting loading operations – reducing the permissible limits to gain a greater margin of safety. This is because the section modulus assumed in the loading manual for the purpose of calculating hull girder stresses is based on the as-built scantlings. Hence the calculations do not explicitly take into account corrosion of the structure because, even remaining within classification diminution limits, the actual modulus can be less than that used in the calculations. Although the common structural rules have resolved this issue for new ships through the application of the net scantling methodology, it remains an important one for the existing fleet.

#### **CAPABILITIES OF EXISTING FLEET**

9 The survey also asked each master to identify acceptable loading rates and turn-round times for their ships. As one would expect, there was a range of response. Although there are many variables, the majority of respondents said that, arriving in the light ballast condition, it would be reasonable to load with a maximum rate of ~ 10,000 t/hr with a turn-round time of ~ 18-20 hrs.

10 With regard to deballasting rates, a "typical" cape-size bulk carrier will have two ballast pumps of 2,500-3,000 m<sup>3</sup>/hr each, a total capacity of 5-6,000 m<sup>3</sup>/hr. As a general rule, masters indicated that the maximum loading rate should be approximately twice the ballast pump capacity, i.e., typically ~ 10,000 t/hr (however, it should be noted that this is not the only limiting factor).

#### **CONCLUSIONS**

11 The survey clearly indicates widespread unease at the high loading rate being required (requested) at some terminals. Many of the issues raised are well understood and have been raised before, resulting in the development of the BLU Code and IACS Recommendations. However, it is evident that the BLU Code is not being universally applied. It is to this particular issue that INTERCARGO would like to draw the attention of Member States and international organizations in consultative status. Particular reference is made to operative paragraph 3 of resolution A.862(20), urging Governments in whose territories solid bulk cargo loading and unloading terminals are situated, to introduce port by-laws to bring about effective implementation, and the associated regulation in SOLAS chapter VI, part B.

12 Many of the technical issues are well understood and are clearly described in IACS Recommendation 46. However, others are not so clear and there is doubt that all the realities of such operations fall within the design criteria of bulk carriers or have been fully considered within extant regulation. INTERCARGO is working to understand fully these issues and will make its findings public in due course – with a view to developing appropriate risk reduction measures, should the need be proven.

---