

Subject :

Discussions in IMO and IACS  
on Bulk Carrier Safety

# NKTECHNICAL INFORMATION

No. : 189

Date : 6 August 1996

To Shipowners and Shipbuilders concerned

Recently, intensive discussions have been held of IMO and IACS regarding Bulk Carrier Safety. A summary of these discussions is presented below for your information.

## 1 Background

Significant numbers of bulk carriers had been lost during the 1980's around turn of the decade. To respond this situation, IACS introduced a new Unified Requirement (UR) requiring thickness measurement of plates and close-up surveys of primary scantlings. IACS implemented this UR on 1 July 1993 voluntarily. Later, this Requirement was incorporated in chapter IX of the SOLAS Convention (Special measures to enhance maritime safety) and made mandatory since 1 January 1996.

After 1992, casualties of bulk carriers decreased momentarily, and less attention was paid to this problem in the IMO. However, in 1994, losses once again began to increase, and more than ten ships were lost, with 140 lives on board. This triggered another round of discussions concerning existing bulk carrier safety in IMO and IACS.

## 2 Response of IMO

At its 19th Assembly held in November 1995, the IMO recommended measures to be taken (primary, operational ones) by port states, terminals, flag state administrations, shipowners and classification societies for improving bulk carrier safety as Assembly resolution A.797(19).

With regard to structural and performance requirements of bulk carriers, being aware of that most of the bulk carrier accident occurred while they were engaging in the transportation of iron ore, a set of amendments to the SOLAS Convention for single hull bulk carriers of 20,000DWT or more (later amended as 150m in length or more) transporting high density cargo was initiated. These considerations include the following aspects:

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.1 being able to sustain flooding in one cargo hold

In any loading condition, the ships should be able to survive against one hold flooding, taking into account both stability and strength of the transverse bulkhead.

.2 early implementation of enhanced survey programme

The enhanced survey programme has been made mandatory since 1 January 1996. IACS has voluntarily implemented this programme since 1 July 1993. However, since close-up surveys of the cargo hold is a requirement for Special Survey (every five years), in principle close-up surveys for the all cargo holds of all ships will not be completed until the end of year the 2000. Noting this circumstance, IACS has decided to implement the close-up surveys in accordance with the enhance survey programme on the earlier stage.

In order to accomplish these tasks, a correspondence group was established to prepare a concrete text of the amendments to the SOLAS convention concerned with the bulk carrier safety.

### 3 Response of IACS

The 32nd session of the IACS council, held in December 1995, agreed on the following matters as responses of IACS regarding the enhanced safety of bulk carriers.

3.1 For new ships

The council decided to develop /amend the following five Unified Requirements for the enhancement of bulk carrier safety:

- UR S12 "Side structures in single side skin bulk carriers"
- UR S17 "Longitudinal strength of hull girders in flooded condition for single side skin bulk carriers" (New)
- UR S18 "Evaluation of scantlings of transverse watertight bulkheads in single side skin bulk carriers"
- UR S20 "Shear strength of double bottom in flooded condition for single side skin bulk carriers"
- UR S21 "Evaluation of scantlings of hatch covers of bulk carriers cargo holds"

### 3.2 For existing ships

The council decided to develop /amend the following five Unified Requirements for the enhancement of bulk carrier safety:

- UR S19 "Retroactive measures for the evaluation of scantlings of corrugated transverse watertight bulkheads in existing bulk carriers"
- UR S22 "Shear strength of double bottom in flooded condition for existing single side skin bulk carriers"
- UR Z10.2 "Hull surveys for bulk carriers"

### 3.3 For all bulk carriers

- The following unified requirements prepared by an Adhoc Group on loading guidance was approved subject to partial modification.
- UR S1 "Requirements for loading condition, loading manuals and loading instruments"

## 4 Response made at 33rd session of the IACS Council

The 33rd session of the IACS council meeting held in May 1996 decided the following matters with regard to the safety of bulk carriers:

### 4.1 Inspection of cargo holds

In addition to the early implementation of the items for special surveys required under the Enhanced Survey Programme, further enhancement of the programme at annual and intermediate surveys was agreed to and finalized with this new scheme to be commenced by 1 January 1997. (Please refer to the attached) NK Rules will be amended accordingly.

### 4.2 Structural requirements

With regard to IACS URs S1/S1A\*, S12, S17, S18, S20, S21), further consideration will be made in order to apply the URs for new ships contracted on or after 1 July 1998\*\*.

With regard to existing ships, remaining technical issues for UR S19 and S22 should be finalized. In particular, "plastic deformation theory" will be taken into consideration as a starting point for the development of UR S19.

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\* S1A: Requirements for loading condition, loading manuals and loading instruments for bulk carriers

\*\* May be amended as date of construction, depending upon the decision of IMO.

4.3 Establishment of a joint working to address the issue of bulk carrier safety

Sharing common recognition that there is a need for cooperation between loading terminals and ship crews for the effective implementation of and compliance with the loading information provided taking into account the procedures and safety of the bulk carriers, a proposal was made to establish a joint working group among IACS, IMO, ICS and INTERCARGO to address this matter.

4.4 Preparation for IMO

IACS is to develop measures, which if complied with, would enable the transverse watertight bulkhead boundaries of cargo holds of existing bulk carriers of 150 m in length and above to withstand flooding of any cargo hold in all permissible conditions of loading, taking into account dynamic effects resulting from the presence of water in the hold.

5 MSC 66

The 66th session of Maritime Safety Committee (MSC) held from 28 May to 6 July 1996 in London, considered the proposed amendments to the SOLAS convention for the safety of bulk carriers based on the result of the Correspondence Group.

The Committee agreed in general on the structural requirements for new bulk carriers as well as damage stability and further enhancement of the enhanced survey programme for existing bulk carriers. However, the Committee could not reach a conclusion on the structural requirements for existing bulk carriers, the Committee could not conclude this issue, therefore, various alternatives were left as possible amendments to the SOLAS convention without appropriate evaluation.

As a result, the proposed amendments were not approved at the session, and proposed SOLAS amendments are scheduled to be approved at MSC 67 (December 1996) and adopted by the SOLAS Conference to be held in conjunction with the MSC 68 session (May-June 1997), with a view to entering them into force on 1 July 1998.

Following points were noted at 66th session:

.1 Definition

.1.1 High density cargo (for existing ships, proposed requirements will apply to ships carrying high density cargo) is the bulk cargo of which SF (Storage Factor) is  $0.56 / \rho \text{ (t/m}^3\text{)} = 1.78$  or heavier.

.1.2 Criteria for the application of those proposed amendments to the SOLAS Convention will be length (refer to ILL Convention) rather than DW.

(For both new and existing ships, ships of 150m or more will be required to comply with the regulations, except regulations for inspections, with which all ships shall comply)

.2 Damage stability (one hold flooding)

Except ships to which damage stability requirements imposed by the SOLAS Convention (ships of constructed before 1 February 1992) or by ILL convention (B-60 and B-100) applies, ships shall be capable of withstanding one cargo hold flooding. Ships unable to fulfill this requirement will not be allowed to carry high density cargo.

.3 Structural requirements for new ships

Single side skin bulk carriers constructed on or after 1 July 1998 which carry bulk cargoes of 1.0t/m<sup>3</sup> or more shall have bulkheads which can withstand flooding in both loaded condition/ballast condition, taking into account the dynamic effect of the water entered into the hold.

.4 Structural requirements for existing ships

After intensive deliberations, the MSC could not reach a consensus regarding the structural requirements for the existing single skin bulk carriers. As a result, the following alternatives were proposed subject to further consideration regarding requirements for ships transporting high density cargo (one or more alternatives to be complied with):

(items given in [ ] are pending)

.4.1 The transverse watertight bulkhead [and double bottoms] of cargo holds of bulk carriers of 150m in length and upwards [and [10][15] years of age and over] shall have sufficient strength to survive flooding of any one cargo hold in all relevant loading conditions, taking into account dynamic effects resulting from the presence of water in the hold;

.4.2 The transverse watertight bulkhead between cargo hold number one and number two of bulk carriers of 150m in length and upward and [10][15] years of age and over shall have sufficient strength to survive flooding of cargo hold number one in all relevant conditions of loading, taking into account dynamic effects resulting from the presence of water in the hold;

- .4.3 The hull envelope as well as bulkheads of cargo holds shall be ascertained to maintain at least the net strength of their original design by means of the enhanced survey programme including prompt and thorough repairs, if necessary;
- .4.4 Bulk carriers designed, constructed and maintained in compliance with the requirements of regulation II-1/1.3 bis (a new regulation adopted by MSC 66 requiring that ships shall be designed, constructed and maintained in compliance with the requirements of a classification society which is recognized by the Administration) to carry high density solid bulk cargoes may be deemed to have sufficient strength;
- .4.5 The ship shall not load cargo in alternate holds in the fully loaded condition;
- .4.6 The maximum permissible cargo loading per hold shall be reduced by [10][20]%; and
- .4.7 The cargo hold shall be protected against corrosion, and the protection shall be applied and maintained in compliance with a standard set by a classification society which is recognized by the Administration in accordance with the provisions of regulation XI/1.
- .5 Survey requirements for existing bulk carriers  
No bulk carriers shall be allowed to carry high density bulk cargoes unless they have completed special survey or completed all items for the cargo hold inspection under enhanced survey programme.
- .6 Endorsement of the certificate  
Compliance with the above mentioned requirements shall be endorsed on the Cargo Ship Safety Construction Certificates
- .7 Loading instruments  
All bulk carriers of 150 m in length or more shall have a loading instrument.
- .8 Others  
Stowage requirements for bulk cargo were adopted at MSC 66 as an amendment to SOLAS regulation VI/7.

## **6 Future schedule for further discussion**

As mentioned above, the proposed amendments to the SOLAS Convention regarding bulk carrier safety is scheduled to be approved at MSC67, December 1996 and to be adopted at the SOLAS Conference to be held in conjunction with MSC 68 from May to June 1997. Due to this circumstance, IACS is requested make every effort to provide information necessary for the consideration of alternatives made for existing bulk carriers (draft SOLAS regulation II-1/23-6) by 1 October 1996, and new/amended Unified Requirements under consideration by the time of the SOLAS conference.

In order to comply with this request, IACS is holding intensive sessions of its Working Party on Hull Strength (WP/S) with the aim of trying to provide some substantial results by 1 October 1996.

Simultaneously, consideration on UR S19 and S22 has been re-scheduled.

Following the results of the scheduled discussions of the IMO and IACS, the NK rules will be amended, in addition to amendments for the further enhanced survey being made of present.

**Early implementation of the items for the Special Survey required under Enhanced Survey Programme**

- 1) Applications
  - Ships meeting all the conditions given hereunder
  - Bulk carriers of 150 m in length or more with class notation "ESP"
  - Ships not yet having undergone a special survey in accordance with Enhanced Survey Programme
  - Age of 10 years old or more on 1 January 1997
- 2) Occasions
  - At periodical survey, in principle
- 3) Survey items
  - a Overall survey of all cargo holds
  - b Close-up survey of all cargo holds
  - c Thickness measurements.



## Further Enhancement of Enhanced Survey Programme

### SPECIAL SURVEY

Additional items regarding cargo hold members have been introduced in the revised for close-up survey under the newly enhanced ESP. However, NK has already extended the range of items to be covered in close-up surveys items based on its own the casualty investigations of large bulk carriers of high age. As a result, here are no additional NK requirements emanating from the amendments to the IACS UR.

(Close-up surveys)

|         | IACS Unified requirements for the enhanced survey programme (implemented since 1 July 1993) | New IACS Unified Requirements (Will be implemented from 1 July 1997)                                                                     | Present NK Rule                                                                                                                         |
|---------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| SS NO.1 | 25% of shell frames in the forward cargo hold at representative positions                   | No amendments                                                                                                                            | All frames in all cargo holds including their attachments                                                                               |
|         | Two selected cargo hold transverse bulkheads                                                | No amendments                                                                                                                            | Two selected cargo hold transverse bulkheads and lower parts of other cargo hold transverse bulkheads (including stiffener and girders) |
| SS NO.2 | 25% of shell frames in the forward cargo hold at representative positions                   | 25% of shell frames in all cargo holds                                                                                                   | All hold frames in all cargo holds including their end attachments                                                                      |
|         | One transverse bulkhead in each cargo hold                                                  | One transverse bulkhead in each cargo hold                                                                                               | One transverse bulkhead and lower parts of another transverse bulkhead in each cargo hold (including stiffeners and girders)            |
| SS NO.3 | 25% of frames in all cargo hold                                                             | All shell frames in the forward cargo hold and 25% of frames in remaining cargo hold, including end attachments and adjacent shell plate | All cargo frames in all cargo holds including their end attachments                                                                     |
|         | All cargo hold transverse bulkheads                                                         | No amendments                                                                                                                            | All cargo hold transverse bulkheads (including stiffeners and girders)                                                                  |
| SS NO.4 | All frames in all and after cargo holds                                                     | No amendments                                                                                                                            | All cargo frames in all cargo holds including their end attachments                                                                     |
|         | All cargo hold transverse bulkheads                                                         | No amendments                                                                                                                            | All cargo hold transverse bulkheads (including stiffeners and girders)                                                                  |

## ANNUAL SURVEY

Amendments to the annual survey items for cargo holds are given hereunder.

|                                | IACS Unified requirements for the enhanced survey programme (implemented since 1 July 1993)                                                                                                                                 | New IACS Unified Requirements (Will be implemented from 1 July 1997)                                                                                                                                                                                | Present NK Rule                                                                                                                                                                                                             |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Age of less than 10 years      | Nil                                                                                                                                                                                                                         | Close-up survey of hatchcover platings, hatch coamings                                                                                                                                                                                              | Nil                                                                                                                                                                                                                         |
| Bulk carriers of over 10 years | Overall survey of two representative holds - one forward and one aft                                                                                                                                                        | Close-up survey of hatchcover plating and hatch coamings.<br>Overall survey of all cargo holds.<br>Close-up survey of lower 1/3 of minimum 25% of shell plating in one forward cargo hold - including lower end attachments                         | Overall survey of two representative holds - one forward and one aft.                                                                                                                                                       |
| over 15 years                  | Close-up survey of hatchcover plating and hatch coamings.<br>Overall survey of all cargo holds.<br>Close-up survey of lower 1/3 of minimum 25% of shell plating in one forward cargo hold - including lower end attachments | Close-up survey of hatchcover plating and hatch coamings.<br>Overall survey of all cargo holds.<br>Close-up survey of lower 1/3 of minimum 25% of shell plating in one forward cargo hold one selected cargo hold - including lower end attachments | Close-up survey of hatchcover plating and hatch coamings.<br>Overall survey of all cargo holds.<br>Close-up survey of lower 1/3 of minimum 25% of shell plating in one forward cargo hold - including lower end attachments |

(The above changes etc. may be summarized as follows)

Close-up surveys for hatch coamings and hatchcover plating will be added. Ships over ten years will be required to carry out a general inspection of all cargo holds and close-up survey of side shell frames as specified above

## INTERMEDIATE SURVEY

Requirements for intermediate surveys of cargo holds are given as follows.

|                     | IACS Unified requirements for the enhanced survey programme (implemented since 1 July 1993)                                                                                                                                                  | New IACS Unified Requirements (will be implemented from 1 July 1997)                                                                                                                                                                                                                                                                                                 | Present NK Rule                                                                                                                                                                                                                              |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| age of over 5 years | Overall inspection of all cargo holds<br>Close-up survey of shell frames and their end attachments and transverse bulkhead in the forward cargo hold and one other selected cargo hold<br>Areas found suspect at the previous special survey | Overall inspection of all cargo holds<br>Close-up survey of min 25% shell frames including their upper and lower end attachments and adjacent shell plating and transverse bulkheads in the forward cargo hold and one other selected cargo hold.<br>Areas found suspected at the previous Special survey<br>Close-up survey of hatchcover plating and hatch coaming | Overall inspection of all cargo holds<br>Close-up survey of shell frames and their end attachments and transverse bulkhead in the forward cargo hold and one other selected cargo hold<br>Areas found suspect at the previous special survey |
| over 1 years        | Same as above                                                                                                                                                                                                                                | Overall inspection of all cargo holds<br>Close-up survey of min 25% of shell frames including their upper and lower end attachments and adjacent shell plating and transverse bulkheads in all cargo holds.<br>Areas found suspected at the previous Special survey<br>Close-up survey of hatchcover plating and hatch coaming                                       | Same as above                                                                                                                                                                                                                                |
| over 1 years        | Same as above                                                                                                                                                                                                                                | Overall inspection of all cargo holds<br>Close-up survey of all shell frames including their upper and lower end attachments and adjacent shell plating and transverse bulkheads in all cargo holds.<br>Areas found suspected at the previous Special survey<br>Close-up survey of hatchcover plating and hatch coaming                                              | Same as above                                                                                                                                                                                                                                |

(The above changes etc. may be summarized as follows)

In general, the survey is further enhanced.

In particular, the content and extent of the Intermediate Survey after Special Survey No.3 will be the same as the special survey.