Common Structural Rules for Bulk Carriers, January 2006

Rule Change Notice 2
February 2008

Notes: (1) This Rule change shall apply to ships contracted for construction on or after 1 July 2008. The Rule change may be adopted before 1 July 2008 at the discretion of the Society.

For technical background for Rule Changes in this present document, reference is made to separate document Technical Background for Rule Change Notice 2.

CHAPTER 3 – STRUCTURAL DESIGN PRINCIPLES

SECTION 6 STRUCTURAL ARRANGEMENT PRINCIPLES

9. Deck structure

9.5 Hatch supporting structure

9.5.2

~~Clear of openings, adequate continuity of strength of longitudinal hatch coamings is to be ensured by under deck girders.~~

The connection of hatch end beams to ~~longitudinal girders and~~ web frames is to be ensured. Hatch end beams are to be aligned with transverse web frames in top side tanks.

9.5.3

Clear of openings, adequate continuity of strength of longitudinal hatch coamings is to be ensured by under deck girders.

At hatchway corners, ~~the face plate of hatch coamings and longitudinal~~ deck girders or their extension parts provided under deck in line with hatch coamings and ~~the face plates of~~ hatch end beams ~~girders on both sides~~ are to be effectively connected so as to maintain the continuity in strength.

9.6 Openings in the strength deck

9.6.3 Corner of hatchways

For hatchways located within the cargo area, insert plates, whose thickness is to be determined according to the formula given after, are generally to be fitted in way of corners where the plating cut-out has a circular profile.

The radius of circular corners is to be not less than 5% of the hatch width, where a continuous longitudinal deck girder is fitted below the hatch coaming.

Corner radius, in the case of the arrangement of two or more hatchways athwartship, is considered by the Society on a case by case basis.

For hatchways located within the cargo area, insert plates are, in general, not required in way of corners where the plating cut-out has an elliptical or parabolic profile and the half axes of elliptical openings, or the half lengths of the parabolic arch, are not less than:

- 1/20 of the hatchway width or 600 mm, whichever is the lesser, in the transverse direction

- twice the transverse dimension, in the fore and aft direction.

Where insert plates are required, their net thickness is to be obtained, in mm, from the following formula:

$$t_{INS} = (0.8 + 0.4\ell / b)\, t$$

without being taken less than t or greater than $1.6t$

where:

ℓ : Width, in m, in way of the corner considered, of the cross deck strip between two consecutive hatchways, measured in the longitudinal direction (see Fig 23)

b : Width, in m, of the hatchway considered, measured in the transverse direction (see Fig 23)

t : Actual net thickness, in mm, of the deck at the side of the hatchways.

For the extreme corners of end hatchways, the thickness of insert plates is to be 60% greater than the actual thickness of the adjacent deck plating. A lower thickness may be accepted by the Society on the basis of calculations showing that stresses at hatch corners are lower than permissible values.

Where insert plates are required, the arrangement is shown in Fig 25, in which d_1, d_2, d_3 and d_4 are to be greater than the ordinary stiffener spacing.

For hatchways located outside the cargo area, a reduction in the thickness of the insert plates in way of corners may be considered by the Society on a case by case basis.

For ships having length L of 150 m or above, the corner radius, the thickness and the extent of insert plate may be determined by the results of a direct strength assessment according to Ch 7, Sec 2 and Sec 3, including buckling check and fatigue strength assessment of hatch corners according to Ch 8, Sec 5.

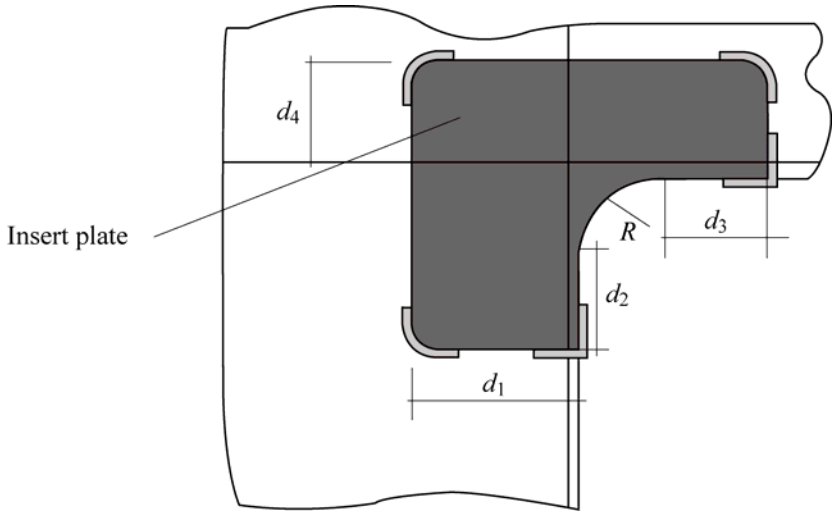

Figure 25: Hatch corner insert plate

CHAPTER 4 – DESIGN LOADS

SECTION 3 HULL GIRDER LOADS

2. Still water loads

2.1 General

2.1.2 Partially filled ballast tanks in ballast loading conditions

Ballast loading conditions involving partially filled peak and/or other ballast tanks at departure, arrival or during intermediate conditions are not permitted to be used as design conditions unless:

- design stress limits are satisfied for all filling levels between empty and full, and
- for **BC-A** and **BC-B** ships, longitudinal strength of hull girder in flooded condition according to Ch 5, Sec 1, [2.1.3] is complied with for all filling levels between empty and full.

~~However, for the purpose of design, it is acceptable if, in each condition at departure, arrival and, where required by [2.1.1], any intermediate condition, the tanks intended to be partially filled are assumed to be empty and full.~~

~~In addition, the specified partly filled level in the intended condition is to be considered.~~

To demonstrate compliance with all filling levels between empty and full, it will be acceptable if, in each condition at departure, arrival, and where required by [2.1.1], any intermediate condition, the tanks intended to be partially filled are assumed to be:

- empty
- full
- partially filled at intended level

Where multiple tanks are intended to be partially filled, all combinations of empty, full or partially filled at intended level for those tanks are to be investigated.

2.1.4 Sequential ballast water exchange

Requirements of [2.1.2] and [2.1.3] are not applicable to ballast water exchange using the sequential method.

CHAPTER 9 – OTHER STRUCTURES

SECTION 2 AFT PART

5. Connection of hull structures with the rudder horn

5.1 Connection of aft peak structures with the rudder horn

5.1.3 Hull structures

~~Between the horn intersection with the shell and the peak tank top, the vertical extension of the hull structures is to be not less than the horn height, defined as the distance from the horn intersection with the shell to the mid-point of the lower horn gudgeon.~~

The vertical extension of hull structure to support the rudder horn between the horn intersection with the shell and the peak tank top is in accordance with the requirements of Ch 10, Sec 1, [9.2.6] and [9.2.7].

The thickness of the structures adjacent to the rudder horn, such as shell plating, floors, platforms and side girders, the centreline bulkhead and any other structures, is to be adequately increased in relation to the horn scantlings.

SECTION 4 SUPERSTRUCTURES AND DECKHOUSES

5. ~~Superstructure end bulkheads and deckhouse walls~~ End bulkheads of superstructure and deckhouse

5.1 Application

5.1.1

The requirements in 5.2 and 5.3 apply to end bulkhead of superstructure and deckhouse ~~superstructure end bulkheads and deckhouse walls~~ forming the only protection for openings, are required by ILLC as amended, and for accommodation.

5.3 Scantling

5.3.1 Stiffeners

The section modulus w, in cm^3~~, and the shear area A_{sh}, in cm^2,~~ of the stiffeners is not to be less than the value obtained from the following formula:

$$w = 0.35kp_A s\ell^2$$

This requirement assume the webs of lowest tier stiffeners to be efficiently welded to the decks. Scantlings for other types of end connections may be specially considered.

The section modulus of deckhouse side stiffeners needs not to be greater than that of side frames on the deck situated directly below; taking account of spacing s and span ℓ.

CHAPTER 13 – SHIPS IN OPERATION, RENEWAL CRITERIA

SECTION 1 MAINTENANCE OF CLASS

1. General

1.2 Definitions

1.2.2 Substantial corrosion

Substantial corrosion is an extent of corrosion such that assessment of the corrosion pattern indicates a ~~wastage in excess of 75% of allowable margins but within acceptable limits~~ gauged (or measured) thickness between $t_{renewal}$ and $t_{renewal} + t_{reserve}$.

~~The allowable margin is the total corrosion addition t_C, as defined in Ch 3, Sec 3.~~

Common Structural Rules for Bulk Carriers, January 2006

Technical Background for Rule Change Notice 2 February 2008

Technical Background for the Changes in:

Chapter 3/Section 6/9.5.2

1. Reason for the Rule Change:

Chapter 3/Section 6/9.5.2

This change is made to clarify the requirement.

In order to clarify the requirement, the first sentence is moved to 9.5.3.

2. Impact on Scantling

There is no change in terms of the steel weight by comparing that before and after the proposed Rule change.

Chapter 3/Section 6/9.5.3

1. Reason for the Rule Change:

Chapter 3/Section 6/9.5.3

The change is made to clarify the requirement.

The word "the face plate of" was deleted, taking into account the current design of BC.

2. Impact on Scantling

There is no change in term**s** of the steel weight by comparing that before and after the proposed Rule change.

Chapter 3/Section 6/9.6.3 Corner of hatchways

1. Reason for the Rule Change:

Chapter 3/Section 6/9.6.3

For ships having length *L* of 150 m and above, FEA including buckling check, hull girder ultimate strength check and fatigue check of hatch corners are required by the CSR for bulk carriers.
Therefore, it is considered that the extent of insert plate can be determined based on such evaluation result in lieu of the requirement of this sub-section.

2. Impact on Scantling

There may be slight change in terms of the steel weight by comparing that before and after the proposed Rule change. In any case, however, there is no influence for on the structural integrity of the ship.

Chapter 4/Section 3/2.1.2 and 2.1.4

1. Reason for the Rule Change:

Chapter 4/Section 3/2.1.2 and 2.1.4

This rule change is made to be in line with the revision 5 (Jan 2005) of IACS UR S11.
The last 2 sentences of [2.1.2] and new paragraph [2.1.4] correspond to the applicable parts of IACS UR S11.2.1.3 and S11.2.1.5 respectively.

2. Impact on Scantling

The rule change proposal has no impact on scantling as the IACS UR S11 should have been applied by designer. No consequence assessment is considered necessary.

Chapter 9/Section 2/5.1.3 Hull structures

1. Reason for the Rule Change:

Chapter 9/Section 2/5.1.3

A significant number of questions and comments have been raised with respect to the vertical extension of the internals in way of the rudder horn (e.g., aft peak floors). When the vertical extension is required not to be less than the horn height, defined as the distance from the horn intersection with the shell to the mid-point of the lower horn gudgeon, it is quite different from the current designs and designers have indicated that this is excessive.

The change is made so that the required vertical extension becomes practical and a cross reference to the floor and girder requirements of Ch.10, Sec.1 [9.2.6] and 9.2.7] is provided.

The requirements of Ch.10, Sec.1 [9.2.6] through [9.2.10] include general prescriptive requirements for the strengthening and alignment of floors and girders in way of the rudder horn. These prescriptive requirements have been shown to provide adequate stiffness in the stern construction area in order to support the rudder forces and to prevent unfavourable hull vibration due to the propeller wake, as they are similar to the existing rules which have resulted in sufficient structure. The aft peak structure in the vicinity of the attachment of horn, peak tank plate and closely spaced floors, can fairly distribute rudder force into hull structures. As is the case with any other part of the structure, unless there is some unusual or novel arrangement, further detailed analytical checks are not considered necessary.

The connection of the rudder horn is handled in CSR for Double Hull Oil Tankers 8/5.2.2.3 and are fairly similar to the above mentioned Ch.10 Sec. 1 [9.2.6] through [9.2.10].

2. Impact on Scantling

There may be slight change in terms of the steel weight by comparing that before and after the proposed Rule change. In any case, however, there is no influence on the structural integrity of the ship.

Chapter 9/Section 4/5 & 5.1.1 Application

Considering the comments from Technical Committee, the editorial correction of the title of Ch 9 Sec 4 [5] and the text of Ch 9 Sec 4 [5.1.1] is made to be in line with IACS UR S 3.

Chapter 9/Section 4/5.3.1 Stiffeners

There is no formula for required shear area for stiffeners of end bulkheads of superstructure and deckhouses. Therefore, the corresponding words are deleted.

There is no formula for required shear area for stiffeners of superstructure end bulkheads and deckhouses wall.
Therefore, the corresponding words are deleted.

2. Impact on Scantling

There is no change in terms of the steel weight by comparing that before and after the proposed Rule change.

Chapter 13/Section 1/1.2.2 Substantial corrosion

1. Reason for the Rule Change:

Chapter 13/Section 1/1.2.2

This change is made to be consistent with Chapter 13/Section 2/3.2.2 and IACS UR Z10.2.1.2.11 (Rev. 22 June 2006).

2. Impact on Scantling

There is no change in terms of the steel weight by comparing that before and after the proposed Rule change.

***** End *****