Common Structural Rules for Bulk Carriers and Oil Tankers

Technical Background for Corrigenda 1 to 01 January 2017 version

Note: The corresponding Corrigenda 1 enters into force on 1st July 2017.

CONTENTS

PART 1 GENERAL HULL REQUIREMENTS

CHAPTER 1
RULE GENERAL PRINCIPLES

SECTION 2 RULE PRINCIPLES

5.3.3

Table 1
"specified in Ch 4, Sec 7" and "specified in Ch 6 and Ch 7" should be deleted from Table 1 since design load scenario and acceptance criteria are not limited to “Ch 4, Sec 7” and “Ch 6 and Ch 7”, respectively.

SECTION 5 LOADING MANUAL AND LOADING INSTRUMENTS

2 LOADING MANUALS

2.3 Requirements specific to bulk carriers

2.3.2

The update is made to clarify the wording.

CHAPTER 3
STRUCTURAL DESIGN PRINCIPLES

SECTION 6 STRUCTURAL DETAIL PRINCIPLES

10 BULKHEAD STRUCTURE

10.4 Corrugated bulkhead

10.4.2 Construction

The figure and variable definitions for the main dimensions of the corrugated bulkhead in Pt 1, Ch 3, Sec 6 and in Pt 2, Ch 2, Sec 3 are different. There is no reason to justify the different figures and variable definitions.

Consequently, the figure and variable definitions for the main dimensions of the corrugated bulkhead in Pt 1, Ch 3, Sec 6 have been updated to be consistent with Pt 2, Ch 2, Sec 3.

10.4.3 Corrugated bulkhead depth

Please see 10.4.2

10.4.4 Actual section modulus of corrugations

Please see 10.4.2

CHAPTER 4
LOADS

SECTION 4 HULL GIRDER LOADS

SYMBOLS

There is no unit for the wave coefficient, C_w, as defined in Pt 1, Ch 1, Sec 4, Table 4. The modification specifies the units.

SECTION 6 INTERNAL LOADS

6 SLOSHING PRESSURES IN TANKS

6.3 Sloshing pressure due to longitudinal liquid motion

6.3.4 Sloshing pressure on internal web frames or transverse stringers adjacent to a transverse bulkhead

Figure13
The requirement is to be corrected in order to indicate the position of stringer 1.

6.4.3 Sloshing pressure in way of longitudinal bulkheads

The requirement is to be corrected in order to clarify the definition of correction f_{slh}.

Figure 14:
The requirement is to be corrected in order to indicate the position of stringer 2.

7 DESIGN PRESSURE FOR TANK TESTING

7.1 Definition

7.1.1

"Cofferdams" in Pt 1, Ch 4, Sec 6, Table 13 should be deleted.

It is considered the "Cofferdams" in Pt 1, Ch 4, Sec 6, Table 13 shall be categorized as "watertight boundaries" in Pt 1, Ch 4, Sec 7, Table 1.

The "watertight boundaries" in Pt 1, Ch 4, Sec 7, Table 1 has no relevance with P_{ST}, but Pt 1, Ch 4, Sec 6, Table 13 is telling "Cofferdams" to be considered P_{ST}. It is a mismatch.

Consequently, it is proposed to delete "Cofferdams" in Pt.1 Ch.4 Sec.6 Table 13.

SECTION 8 LOADING CONDITIONS

3 OIL TANKERS

3.1 Specific design loading conditions

3.1.1 Seagoing conditions

The corrigendum is to correct the definition of ship length used for trim requirement for heavy ballast condition. L is replaced with L_{LL} to be in line with the MARPOL convention.

4 BULK CARRIERS

4.1 Specific design loading condition

4.1.1 Seagoing conditions

The corrigendum is to correct the definition of ship length used for trim requirement for heavy ballast condition. L is replaced with L_{LL} to be in line with the MARPOL convention.

CHAPTER 5
HULL GIRDER STRENGTH

SECTION 1 HULL GIRDER YIELDING STRENGTH

3 HULL GIRDER SHEAR STRENGTH ASSESSMENT

3.4 Effective net thickness for longitudinal bulkheads between cargo tanks of oil tankers

3.4.4 Shear force correction for a ship with two longitudinal bulkheads between the cargo tanks

The corrigendum is to correct a reference. Table 5 is minimum conditions for double bottom and not relevant for this paragraph. Table 7 includes definitions of factor f3 and the areas A1-n50, A2-n50, A3-n50.

3.5 Effective net thickness for longitudinal bulkheads between cargo tanks of oil tankers - Correction due to loads from transverse bulkhead stringers.

3.5.1

In CSR BC & OT application region should be Figure 8 in order to maintain same approach with CSR OT. The update is to correct this typographical error.

The dimension $l_{st\text{-}k}$ that is used to determine $t_{sti\text{-}k}$, employs a 30 degree angle as Figure 7.

For application of 3.5.1, Figure 8 (frame spacing) should be referenced.

APPENDIX 1
DIRECT CALCULATION OF SHEAR FLOW

1 CALCULATION FORMULA

1.2 Determinate shear flow

1.2.2

In Figure 1 the font for “l” should be revised by changing “l” to “ ℓ ”.

APPENDIX 2 HULL GIRDER ULTIMATE CAPACITY

SYMBOLS

A definition of z_i, which is applied in [2.2.1] f), is added to clarify that it is z coordinate of the centre of gravity of the i^{th} element.

CHAPTER 7
DIRECT STRENGTH ANALYSIS

SECTION 2 CARGO HOLD STRUCTURAL STRENGTH ANALYSIS

4 LOAD APPLICATION

4.4 Procedure to adjust hull girder shear forces and bending moments

4.4.8 Procedure to adjust vertical and horizontal bending moments for midship cargo hold region

The vertical load, δw_i, at web frame station *i* is clarified so as to be consistent with Table 7 and the sign convention in Ch 4, Sec 1, Figure2.

4.5 Procedure to adjust hull girder torsional moments

4.5.2 Torsional moment due to local loads

The sign convention of the lumped torsional moment for foremost cargo hold model is changed to be consistent with the sign convention in Pt 1, Ch 4, Sec 1, Figure 2 and Pt 1, Ch 1, Sec 4, [3.6.1].

CHAPTER 8
BUCKLING

SECTION 2 SLENDERNESS REQUIREMENTS

5 BRACKETS

5.3 Edge reinforcement

5.3.1 Edge reinforcements of bracket edges

The formula for the required depth of stiffener web is to be divided by 1000 for consistency with unit, mm.

SECTION 5 BUCKLING CAPACITY

3 BUCKLING CAPACITY OF OTHER STRUCTURES (RCN1 TO 01 JAN 2014)

3.1 Struts, pillars and cross ties

3.1.3 Elastic torsional buckling stress

In Table 7 the variable "$l_{sv\text{-}n50}$" is to be corrected to "l_{sv}"

CHAPTER 9
FATIGUE

SECTION 1 GENERAL CONSIDERATION

6 LOADING CONDITIONS

6.3 Loading conditions for bulk carriers

6.3.1

In Table 3, note (1) the values “30%” and “0%” is to be corrected to “0.30” and “0” respectively.

SECTION 3 FATIGUE EVALUATION

3.2 Mean stress effect

3.2.1 Correction factor for mean stress effect

The mean stress for welded joint is to be calculated according to [3.2.3] or [3.2.4] for the simplified method or FE analysis, not [3.2.2] which is for base material only.

SECTION 6 DETAIL DESIGN STANDARD

4 HOPPER KNUCKLE CONNECTION

4.1 Design standard C to H

4.1.6

Table 5 Design standard E – hopper knuckle connection detail, welded, bulk carrier

The figure is to be corrected in order to remove unused transverse section “B-B” and modified current “C-C” to “B-B”.

CHAPTER 10
OTHER STRUCTURES

SECTION 1 FORE PART

2 STRUCTURAL ARRANGEMENT

2.1 FLOORS AND BOTTOM GIRDERS

2.1.2 Bottom girders

"cargo tank" is replaced with "cargo hold" to be applicable for both tanker and bulker.

3 STRUCTURE SUBJECTED TO IMPACT LOADS

3.2.7 Primary supporting members

The typo is corrected; "affect" should be "effect".

SECTION 2 MACHINERY SPACE

3 MACHINERY FOUNDATIONS

3.1 General

3.1.2

Figure 1 is corrected in order to delete unused symbols, "t" and "A", which are not referred to in the main text of [3.1.2] and to insert the shadow area to right side figure.

SECTION 3 AFT PART

3 STERN FRAMES

3.1 General

3.1.2

The amendment is to clarify that the required thickness for stern frames t1 is as defined in Table 1 for single screw ships or Table 2 for twin screw ships is applied. This requirement is from CSR-OT Sec 8, [5.2.3] and should apply in the harmonized Rules to both bulk carrier and oil tankers.

3.2.1 Gross scantlings of propeller posts

The text in "Fabricated propeller post" in Table 1 is revised to correct a typo; "t" should be "t_1"

3.3 Connections

3.3.4 Connection with centre girder

The previous title "Connection with centre keelson" was changed to "Connection with centre girder".

Centre keelson generally means centre girder located on the centreline of single bottom structure. The concept of this requirement, i.e. to keep adequate structural continuity between the bottom and stern frame, is applicable to double bottom structure which is common for ships designed to these Rules.

SECTION 4 TANKS SUBJECT TO SLOSHING

1 GENERAL

1.3 Application of sloshing pressure

1.3.5 Application of design sloshing pressure due to transverse liquid motion

The text is revised to correct a typo; "$P_{shl\text{-}t}$" should be "$P_{slh\text{-}t}$"

CHAPTER 12
CONSTRUCTION

SECTION 3 DESIGN OF WELD JOINTS

2 TEE OR CROSS JOINT

2.5

2.5.3

The symbol *"l_{weld}"* is to be added in Figure 4 to clarify the definition of *"l_{weld}".*

4 OTHER TYPES OF JOINTS

4.1 Lapped joints

4.1.3 Overlaps for lugs

The update adds the word "need" to be in line with the intention of rule requirement.

CHAPTER 13
SHIP IN OPERATION-RENEWAL CRITERIA

SECTION 1 PRINCIPLES AND SURVEY REQUIREMENTS

1.3 Requirements for documentation

1.3.2 Hull girder sectional properties

The intention of rule is to require the minimum required hull girder sectional properties for the “typical” transverse sections of all cargo hold so “typical” is added for clarification.

PART 2
SHIP TYPES

CHAPTER 1
BULK CARRIERS

SECTION 2 STRUCTURAL DESIGN PRINCIPLES

3 STRUCTURAL DETAIL PRINCIPLES

3.3 Deck structures

3.3.4 Openings in strength deck- Corner of hatchways

According to Pt 1, Ch 1, Sec 4, Table 7, Definition of terms, Hatchways means "Openings, generally rectangular, in a ship's deck affording access into the compartment below".
However, many small hatchways also exist in the strength deck such as access hatch, maintenance hatch for equipment etc. In order to clarify that this requirement does not apply to small hatch openings, "hatchways" is being changed the clarify coverage of this requirement, hence the change to "cargo hatchways".

SECTION 3 TRANSVERSE VERTICALLY CORRUGATED WATERTIGHT BULKHEADS SEPARATING CARGO HOLDS IN FLOODED CONDITION

3 TRANSVERSE VERTICALLY CORRUGATED WATERTIGHT BULKHEADS SEPARATING CARGO HOLDS IN FLOODED CONDITION

3.3.3 Effective shedder plates

“the factor” is removed for clarification.

3.3.4 Effective gusset plates

Please see 3.3.3

SECTION 4 HULL LOCAL SCANTLINGS FOR BULK CARRIERS L<150M

4 PRIMARY SUPPORTING MEMBERS

4.2 Design load sets

4.2.2 Loading conditions

The number of design load set for “BC-9 and BC-10” is replaced with “BC-11 and BC-12” respectively to avoid the duplication with design load sets as defined in Part 2, Ch.1,Sec.3,Table 1

4.7 Primary supporting member in bilge hopper tanks and topside tanks

4.7.2 Net section modulus, net shear sectional area and web thickness

The definition of "f_{bdg}" is to be corrected to reflect the fact that it applies to primary supporting members, not stiffeners.

SECTION 5 CARGO HATCH COVERS

5 STRENGTH CHECK

5.1.1 Application

The number of elements & FE model in Figure 1 are removed since the mesh size is dependent on the size of structural members and the requirements contained in Ch 7.

CHAPTER 2
OIL TANKERS

SECTION 3 HULL LOCAL SCANTLING

1 PRIMARY SUPPORTING MEMBERS IN CARGO HOLD REGION

1.4 Girders in double bottom

1.4.2 Net shear area of centre girders

The amendment is to clarify that the double bottom floor spacing, S, is applied in [1.4.2] and [1.4.3].

1.4.3 Net shear area of side girders

Please see 1.4.2