13-390

RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

Part C Hull Construction and Equipment

Rules for the Survey and Construction of Steel Ships
Part C 2013 AMENDMENT NO.1
Guidance for the Survey and Construction of Steel Ships
Part C 2013 AMENDMENT NO.1

Rule No.38 / Notice No.28 30th May 2013
Resolved by Technical Committee on 4th February 2013
Approved by Board of Directors on 4th March 2013

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NIPPON KAIJI KYOKAI

RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

RULES

Part C Hull Construction and Equipment

2013 AMENDMENT NO.1

Rule No.38 30th May 2013

Resolved by Technical Committee on 4th February 2013

Approved by Board of Directors on 4th March 2013

Rule No.38 30th May 2013
AMENDMENT TO THE RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

"Rules for the survey and construction of steel ships" has been partly amended as follows:

Part C HULL CONSTRUCTION AND EQUIPMENT

Amendment 1-1

Chapter 13 WATERTIGHT BULKHEADS

13.3 Watertight Doors

Paragraph 13.3.7 has been amended as follows.

13.3.7 Source of Power

1 The remote controls, indications and alarms required in **13.3.4** to **13.3.6** are to be operable in the event of main power failure.

2 Electrical installations for devices specified in **-1** except those of a water-proof type approved by the Society are not to be under the freeboard deck.

3 Cables for devices specified in **-1** are to comply with the requirements of **2.9.11-~~3~~2, Part H**.

EFFECTIVE DATE AND APPLICATION (Amendment 1-1)

1. The effective date of the amendments is 30 May 2013.

Amendment 1-2

Chapter 29 TANKERS

29.7 Structural Details

Paragraph 29.7.4 has been added as follows.

29.7.4 Supporting Structures of Independent Prismatic Tanks

The arrangement and scantlings of the supporting structures of the independent prismatic tanks are to be at the discretion of the Society.

EFFECTIVE DATE AND APPLICATION (Amendment 1-2)

1. The effective date of the amendments is 30 November 2013.

2. Notwithstanding the amendments to the Rules, the current requirements may apply to ships for which the date of contract for construction is before the effective date.

GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

GUIDANCE

Part C Hull Construction and Equipment

2013 AMENDMENT NO.1

Notice No.28 30th May 2013
Resolved by Technical Committee on 4th February 2013

Notice No.28 30th May 2013
AMENDMENT TO THE GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

"Guidance for the survey and construction of steel ships" has been partly amended as follows:

Part C HULL CONSTRUCTION AND EQUIPMENT

Amendment 1-1

C29 TANKERS

C29.7 Structural Details

Paragraph C29.7.4 has been added as follows.

C29.7.4 Supporting Structures of Independent Prismatic Tanks

1 General

With respect to the provisions of **29.7.4, Part C of the Rules,** the arrangement and scantlings of the supporting structures of the independent prismatic tanks are to comply with the requirements of this paragraph. However, other methods approved by the Society may be acceptable.

2 Strength Criteria

Compressive stress σ_a (N/mm^2) acting on each plate which composes the supporting structures, excluding top plate, is to comply with the following criteria:

$\sigma_a < \sigma_{cr}$

σ_a : The compressive stress acting on each plate which composes the supporting structures, excluding top plate, as given by the following:

$$\sigma_a = \frac{F_a}{A_{min}} \ (N/mm^2)$$

F_a : Load acting on the supporting structures as given by the following:

$$F_a = 1000\rho V_t(1+a_z)g \ (N)$$

ρ : Cargo density (ton/m^3)

V_t : Tank volume (m^3) supported by the supporting structure under consideration

a_z : Maximum dimensionless vertical acceleration (i.e. relative to the acceleration of gravity) acting on the centre of the cargo tank under consideration obtained from the following formula. a_z does not include the component due to the static weight.

$$a_z = \pm a_0 \sqrt{1+\left(5.3-\frac{45}{L}\right)^2\left(\frac{x}{L}+0.05\right)^2\left(\frac{0.6}{C_b}\right)^{1.5}}$$

a_0 : As obtained from the following formula:

$$a_0 = 0.2\frac{V}{\sqrt{L}} + \frac{34 - \frac{600}{L}}{L}$$

V : Ship speed (kt) as define in **2.1.8, Part A of the Rules**

x : Longitudinal distance (m) from amidships to the centre of gravity of the cargo tank; x is positive forward of amidships, negative aft of amidships

g : Acceleration due to gravity to be taken as 9.81 (m/s^2)

A_{min} : Minimum horizontal sectional area (mm^2) which is obtained by subtracting 0.5 mm from all side of the plates (*See* **Fig.C29.7.4-1)**

σ_{cr} : Allowable stress obtained by the following value, whichever is the lesser:

$\frac{\sigma_{yd}}{1.33}$ (N/mm^2)

$C_x\sigma_{yd}$ (N/mm^2)

σ_{yd} : Yield stress (N/mm^2) of the material used for the supporting structures

C_x : Reduction factor for each plate which composes the supporting structures, excluding top plate, as obtained by **Table C29.7.4-1**. Assessed plate which is not rectangular may be approximated using **Table C29.7.4-2**.

Fig. C29.7.4-1 Example of supporting structure (excluding top plate) and the relevant minimum horizontal sectional area

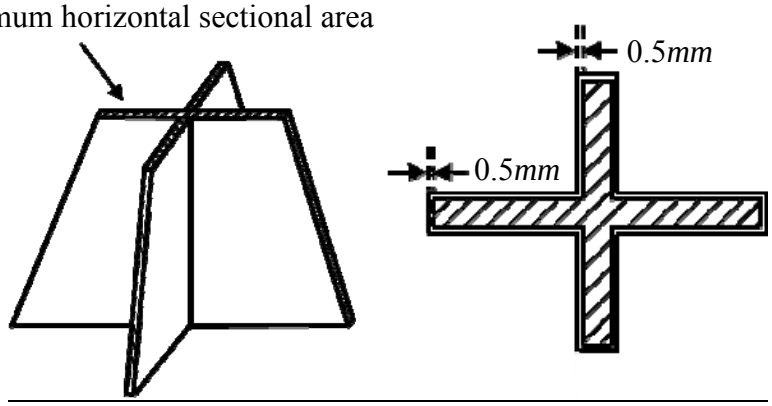
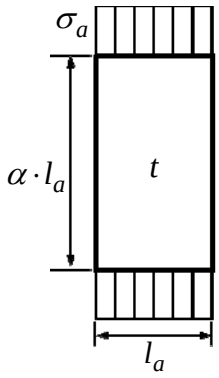
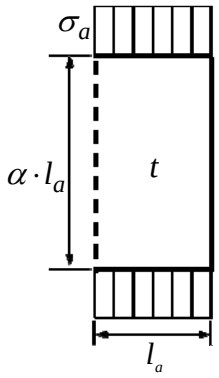


Table C29.7.4-1 Reduction Factor for Plane Plate Panels

	Aspect ratio α	Buckling factor K	Reduction factor C_x
1 	$\alpha \geq 1$	$K = 4$	$C_x = 1$ for $\lambda \leq 0.8$ $C_x = 1.13\left(\frac{1}{\lambda} - \frac{0.22}{\lambda^2}\right)$ for $\lambda > 0.8$
2 	$\alpha > 0$	$K = 0.425 + \frac{1}{\alpha^2}$	$C_x = 1$ for $\lambda \leq 0.7$ $C_x = \frac{1}{\lambda^2 + 0.51}$ for $\lambda > 0.7$

Explanations for boundary conditions:

- - - - - plate edge free

——— plate edge simply supported

λ : Reference degree of slenderness, to be taken as:

$$\lambda = \sqrt{\frac{\sigma_{yd}}{K\sigma_E}}$$

σ_E : Reference stress (N/mm^2), to be taken as:

$$\sigma_E = 0.9E\left(\frac{t}{l_a}\right)^2$$

E: Modulus of elasticity, 206,000 (N/mm^2)

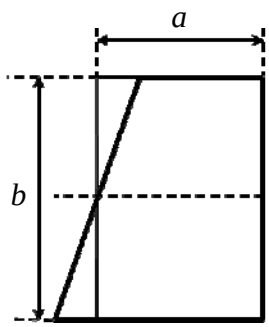
t : As obtained from the following formula

$t = t_{as-built} - 1.0$ (mm)

$t_{as-built}$: As-built thickness (mm)

l_a : Length of the side of the plate panel (mm)

Table C29.7.4-2 Trapezoidal Panel Approximation

Shape	Approximation
	A rectangle is derived with *a* being the mean value of the bases and *b* being the height of the original panel.

EFFECTIVE DATE AND APPLICATION (Amendment 1-1)

1. The effective date of the amendments is 30 November 2013.

2. Notwithstanding the amendments to the Guidance, the current requirements may apply to ships for which the date of contract for construction is before the effective date.

Amendment 1-2

Annex C1.1.7-1 GUIDANCE FOR HULL CONSTRUCTION CONTAINING HIGH TENSILE STEEL MEMBERS

Table 2.2 has been amended as follows.

Table 2.2 Frames

Members	Paragraph No.	Scantlings
Hold frames	**7.3.2** **7.3.3**	Section modulus $Z_H = KZ_M$
Longitudinals on side shell plating	**7.4.1**	Section modulus $100C_H KShl^2 \quad (cm^3)$ $2.9K\sqrt{L'}\,Sl^2 \quad (cm^3)$ C_H is a coefficient equal to $\frac{1}{24-kK}$ k is (a) or (b), whichever is greater: (a) $15.5\,f_{BH}\left(1-2.5\frac{y}{D_s}\right)$ (b) $L \le 230m : \frac{6}{a}$ $L \ge 400m : \frac{10.5}{a}$ Liner interpolation for intermediate L. a is to be $\sqrt{K}$ if at least 80% of side shell is of high tensile steel in the transverse section at amidships. Otherwise, a is to be 1.0. Further, if f_{BH} is less than (0.85/K), f_{BH} is to be taken as equal to (0.85/K).
Web frames	**7.4.2**	Depth Depth as per Rules. Section modulus $Z_H = KZ_M$ Web thickness $t_1 = \frac{C_2 K}{1000}\cdot\frac{Shl}{d_0} + 2.5 \quad (mm)$ $t_2 = 8.6\sqrt[3]{\frac{d_0^2(t_1-2.5)}{kK}} + 2.5 \quad (mm)$
Tween-deck frames	**7.6.2**	Section modulus $Z_H = KZ_M$
Transverse frames below freeboard decks forward of collision bulkhead	**7.7.1**	Section modulus: $Z_H = KZ_M$
Longitudinals below freeboard decks forward of collision bulkhead	**7.7.2**	Section modulus: $Z_H = KZ_M$

EFFECTIVE DATE AND APPLICATION (Amendment 1-2)

1. The effective date of the amendments is 30 November 2013.

2. Notwithstanding the amendments to the Guidance, the current requirements may apply to ships for which the date of contract for construction is before the effective date.

3. Notwithstanding the provision of preceding **2.**, the amendments to the Guidance may apply to ships for which the application is submitted to the Society before the effective date.