Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1)

Object of Amendment

Rules for the Survey and Construction of Steel Ships Part A and C
Guidance for the Survey and Construction of Steel Ships Part A and C
Rules for High Speed Craft

Reason for Amendment

Part C of the Rules and Guidance for the Survey and Construction of Steel Ships was revised comprehensively in July 2022, and there are plans to continuously review it with the aim of improving its practicality and usability based on various feedback from relevant industry members.

Additionally, insights gained through research and development will be appropriately reflected in Part C to enhance safety and rationality.

Accordingly, relevant requirements are amended to reflect rule review results and research and development outcomes.

Outline of the Amendment

(1) Specifies requirements for ships carrying heavy cargoes on their upper decks, and also provides for the new notation *Heavy Deck Carrier*.
(2) Specifies requirements regarding the installation of attachments to shell plating.
(3) Expands the application of requirements related to side frames to include multiple-deck ships and clarifies said requirements by ship type.
(4) Revises requirements regarding section modulus at the upper parts of corrugated bulkheads.
(5) Revises the coefficients that take into account strength reduction due to buckling.
(6) Revises the reduction factors for double bottom stiffeners considering the effect of struts
(7) Clarifies the loads to be used in buckling strength assessment of pillars
(8) Specifies criteria when opting to assess stress concentration areas
(9) Specifies strength assessment by cargo hold analysis for ships carrying liquefied gases in bulk (independent tanks of type C).
(10) Clarifies some definitions and corrects typographical errors.

Effective Date and application

1. This amendment applies to ships for which the date of contract for construction is on or after 1 July 2026.
2. Notwithstanding the preceding 1, this draft amendment may apply, upon request, to ships for which the date of contract for construction is before the effective date.

An asterisk (*) after the title of a requirement indicates that there is also relevant information in the corresponding Guidance.

ID:DH25-01

Amended-Original Requirements Comparison Table
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended	Original	Remarks
RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS	**RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS**	
Part A GENERAL RULES	**Part A GENERAL RULES**	
Chapter 1 GENERAL	**Chapter 1 GENERAL**	
1.2 Class Notations	**1.2 Class Notations**	
1.2.4 Hull Construction and Equipment, etc.*	**1.2.4 Hull Construction and Equipment, etc.***	
(Omitted) **11** For ships intended for the carriage of heavy cargoes on their upper decks complying with the provisions of **10.6, Part 2-5, Part C** and having no cargo holds below the upper deck, the notation of "*Heavy Deck Carrier*" (abbreviated to *HDCA*) is affixed to the Classification Characters.	(Omitted) **(Newly Added)**	Amendment(1) Specifies requirements for ships carrying heavy cargoes on upper deck, and also provides for a new notation Heavy Deck Carrier. Section numbers are carried forward in the same way below -11.
12 For ships intended for the carriage of unoccupied motor vehicles without cargo, having multiple decks and complying with the provisions of **Part 2-6, Part C**, the notation of "*Vehicles Carrier*" (abbreviated to *VC*) is affixed to the Classification Characters. (Omitted)	**11** For ships intended for the carriage of unoccupied motor vehicles without cargo, having multiple decks and complying with the provisions of **Part 2-6, Part C**, the notation of "*Vehicles Carrier*" (abbreviated to *VC*) is affixed to the Classification Characters. (Omitted)	

Amended	Original	Remarks
RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS **Part C HULL CONSTRUCTION AND EQUIPMENT** **Part 1 GENERAL HULL REQUIREMENTS** **Chapter 3 STRUCTURAL DESIGN PRINCIPLES** **3.4 Structural Detail Principles** **3.4.4 Shell Plating** **3.4.4.1 Local Reinforcement of Shell Plating** All openings in the shell plating are to have well-rounded corners and are to be reinforced as necessary. The reinforcement of openings is to be made in accordance with the following **(1)** to **(3)**: (1) Openings in shell plating of 300 *mm* or more in size are to be reinforced by doubler or thicker plating. (2) In the fore and aft peaks, suitable modifications may be made to the reinforcement of openings. (3) The radius *R* at the corners of openings is to be at least 100 *mm*.	**RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS** **Part C HULL CONSTRUCTION AND EQUIPMENT** **Part 1 GENERAL HULL REQUIREMENTS** **Chapter 3 STRUCTURAL DESIGN PRINCIPLES** **3.4 Structural Detail Principles** **3.4.4 Shell Plating** **3.4.4.1 Local Reinforcement of Shell Plating** All openings in the shell plating are to have well-rounded corners and are to be reinforced as necessary. The reinforcement of openings is to be made in accordance with the following **(1)** to **(3)**: (1) Openings in shell plating of 300 *mm* or more in size are to be reinforced by doubler or thicker plating. (2) In the fore and aft peaks, suitable modifications may be made to the reinforcement of openings. (3) The radius *R* at the corners of openings is to be at least 100 *mm*.	

Amended	Original	Remarks
3.4.2.2 Installation of Attachments to Shell Plating Special consideration is to be given when attachments are welded to shell plating.	**(Newly Added)**	Amendment (2) Specifies requirements regarding installation of attachments on shell plating.
3.5 Minimum Requirements	**3.5 Minimum Requirements**	
3.5.2 Slenderness Requirements	**3.5.2 Slenderness Requirements**	
3.5.2.2 Thickness of Various Structural Members **1** The thickness t (*mm*) of various structural members is to satisfy the following criteria: $t \geq \frac{b}{C}\sqrt{\frac{\sigma_Y}{235}}$ b: For plating, b is to be taken as the plate breadth (*mm*) For webs, b is to be taken as the web depth (*mm*). However, where the stiffener is provided on the web, b may be taken as the maximum breadth taking the stiffener into account. For face plates, b is to be taken as the maximum distance from mid-thickness of the web to its face edge (*mm*) For circular section pillars, b is to be taken as their mid-thickness radius (*mm*) C: Slenderness coefficient as specified in **Table 3.5.2-1** (Omitted)	**3.5.2.2 Thickness of Various Structural Members** **1** The thickness t (*mm*) of various structural members is to satisfy the following criteria: $t \geq \frac{b}{C}\sqrt{\frac{\sigma_Y}{235}}$ b: For plating, b is to be taken as the plate breadth (*mm*) For webs, b is to be taken as the web depth (*mm*). However, where the stiffener is provided on the web, b may be taken as the maximum breadth taking the stiffener into account. For face plates, b is to be taken as the half breadth of the face plate (*mm*) For circular section pillars, b is to be taken as their mid-thickness radius (*mm*) C: Slenderness coefficient as specified in **Table 3.5.2-1** (Omitted)	Amendment (10) Clarifies some definitions and corrects typographical errors. Definition of breadth of face plate is clarified.

Amended-Original Requirements Comparison Table
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended	Original	Remarks
Chapter 5 LONGITUDINAL STRENGTH **5.2 Yield Strength** **5.2.1 Bending Strength**	**Chapter 5 LONGITUDINAL STRENGTH** **5.2 Yield Strength** **5.2.1 Bending Strength**	

Table 5.2.1-1 Wave and Still Water Vertical Bending Moments to be Considered

Condition	M_S	M_w
Maximum load condition	Still water and wave vertical bending moments for the hogging and sagging load cases shown in **4.3.2.5**	
~~Operation in harbor/sheltered water~~ Harbour condition	M_{PT_max} or M_{PT_min}	0

Amendment (10) Clarifies some definitions and corrects typographical errors. Unifies the term “Harbour Condition”.

Table 5.2.1-2 Permissible Vertical Bending Stress σ_{perm}

Condition	Design load	σ_{perm}
Maximum load condition	(*S*+*D*)	175/*K*
~~Operation in harbor/sheltered water~~ Harbour condition	(*S*)	149/*K*

Amended	Original	Remarks
5.2.2 Shear Strength	**5.2.2 Shear Strength**	Change columns.

Table 5.2.2-1 Wave and Still Water Shear Forces to be Considered

Condition	Q_s~~Q_w~~	Q_w~~Q_s~~
Maximum load condition	Still water vertical shear force and wave vertical shear force for the hogging and sagging load cases shown in **4.3.2.5**	
~~Operation in harbor/sheltered water~~ Harbour condition	Q_{PT_max} or Q_{PT_min} ~~0~~	0 ~~Q_{PT_max} or Q_{PT_min}~~

Amended	Original	Remarks

Table 5.2.2-2 Permissible Vertical Shear Stresses

Condition	Design load	Permissible vertical shear stress τ_{i-perm}
Maximum load condition	$(S+D)$	$110/k$
~~Operation in harbor/sheltered water~~ Harbour condition	(S)	$102/k$

Table 5.2.2-3 Shear Force modified Considering Alternate Loading Condition

Condition	Shear force Q_{S_m} modified considering alternate loading condition
Maximum load condition	$Q_{SW\_m} = Q_{SW} + \Delta Q_{mdf}$
~~Operation in harbor/sheltered water~~ Harbour condition	$Q_{SW\_m} = Q_{SW-p} + \Delta Q_{mdf}$

Where:

$$\Delta Q_{mdf} = C_d \alpha \left(\frac{M}{B_H \ell_0} - \rho T_{LC,mh} \right)$$

C_d: Distribution coefficient, to be taken as:

(1) At the aft end of the considered cargo hold except for aftmost cargo hold: $C_d = -1$

(2) At the fore end of the considered cargo hold except for foremost cargo hold: $C_d = 1$

(3) At mid-length of the cargo hold: $C_d = 0$

(4) At the aft bulkhead of the aftmost cargo hold: $C_d = 0$

(5) At the fore bulkhead of the foremost cargo hold: $C_d = 0$

(6) At other locations: To be determined by linear interpolation from **(1)** to **(5)** above.

α: Coefficient taken as:

$$\alpha = g \frac{\ell_0 B_0}{2 + \varphi \frac{\ell_0}{B_0}}$$

φ: Value obtained from the following formula, but not greater than 3.7.

$$\varphi = 1.38 + 1.55 \frac{\ell_0}{B_0}$$

M: Mass (t) in the hold in way of the considered transverse section for the considered loading condition. M is to include the mass of ballast water and fuel oil located directly below the flat portion of the inner bottom, if any, excluding the portion under the bulkhead stool.

B_H: Breadth (m) of the cargo hold, as specified in **4.6**.

ℓ_H: Length (m) of the cargo hold, as specified in **4.6**.

ℓ_0, B_0: Length and breadth (m), respectively, of the flat portion of the double bottom in the way of the hold considered. B_0 is to be measured on the hull transverse section at the middle of the hold.

Amended-Original Requirements Comparison Table
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended	Original	Remarks

$T_{LC,mh}$: Draught (m) measured vertically on the hull transverse section at the middle of the hold considered, from the moulded baseline to the waterline in the loading condition considered.

Amended

Annex 5.1 EXTENT OF HIGH TENSILE STEEL

An1 Extent of High Tensile Steel Use

An1.2 Vertical Extent

Original

Annex 5.1 EXTENT OF HIGH TENSILE STEEL

An1 Extent of High Tensile Steel Use

An1.2 Vertical Extent

Table An1 Stresses at Baseline and Deck

Condition	Baseline	Deck
Seagoing	$\sigma_{bl} = \frac{\lvert M_{SW} + M_{WV} \rvert}{I_{gr}} z_n \times 10^5$	$\sigma_{dk} = \frac{\lvert M_{SW} + M_{WV} \rvert}{I_{gr}} V_D \times 10^5$
~~Operation in harbor/sheltered water~~ Harbour	$\sigma_{bl} = \frac{\lvert M_{SW-p} \rvert}{I_{gr}} z_n \times 10^5$	$\sigma_{dk} = \frac{\lvert M_{SW-p} \rvert}{I_{gr}} V_D \times 10^5$
V_D: Refer to **5.2.1.2**		

Remarks: Unifies the term "Harbour Condition"

Amended-Original Requirements Comparison Table
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended	Original	Remarks
Annex 5.4 HULL GIRDER ULTIMATE STRENGTH **An2. Incremental-iterative Method** **An2.3 Load-end Shortening Curves** **An2.3.8 Plate Buckling** The equation describing the load-end shortening curve $\sigma_{CR5}-\epsilon$ for the buckling of transversely stiffened panels composing the hull girder transverse section is to be obtained from the following formula: $\sigma_{CR5} = \min\left\{\begin{array}{c}\Phi\sigma_{Yp}\\ \Phi\sigma_{Yp}\left[\begin{array}{c}\frac{s}{l}\left(\frac{2.25}{\beta_{E\_1}}-\frac{1.25}{{\beta_{E\_1}}^2}\right)\\ +\left(1-\frac{s}{l}\right)\left(\frac{0.06}{\beta_E}+\frac{0.6}{{\beta_E}^2}\right)\end{array}\right]\end{array}\right.$ Φ: Edge function as specified in **An2.3.3**. $\underline{\beta_{E\_1} = \max(\beta_E, 1.25)}$ $\beta_E = \frac{s}{t}\sqrt{\frac{\epsilon\sigma_{Yp}}{E}}$ s: Plate breadth (*mm*), taken as the spacing between the stiffeners. l: Length (*mm*) of the longer side of the plate.	**Annex 5.4 HULL GIRDER ULTIMATE STRENGTH** **An2. Incremental-iterative Method** **An2.3 Load-end Shortening Curves** **An2.3.8 Plate Buckling** The equation describing the load-end shortening curve $\sigma_{CR5}-\epsilon$ for the buckling of transversely stiffened panels composing the hull girder transverse section is to be obtained from the following formula: $\sigma_{CR5} = \min\left\{\begin{array}{c}\sigma_{Yp}\Phi\\ \Phi\sigma_{Yp}\left[\begin{array}{c}\frac{s}{l}\left(\frac{2.25}{\beta_E}-\frac{1.25}{{\beta_E}^2}\right)\\ +\left(1-\frac{s}{l}\right)\left(\frac{0.06}{\beta_E}+\frac{0.6}{{\beta_E}^2}\right)\end{array}\right]\end{array}\right.$ Φ: Edge function as specified in **An2.3.3**. $\beta_E = \frac{s}{t}\sqrt{\frac{\epsilon\sigma_{Yp}}{E}}$ s: Plate breadth (*mm*), taken as the spacing between the stiffeners. l: Length (*mm*) of the longer side of the plate.	Amendment (5) Revises the coefficients that take into account strength reduction due to buckling. Revises the formula because it could result in unreasonable values such as negative values depending on the values of β_E and s/l.

Amended-Original Requirements Comparison Table
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended	Original	Remarks
Chapter 6 LOCAL STRENGTH	**Chapter 6 LOCAL STRENGTH**	
6.4 Stiffeners	**6.4 Stiffeners**	
6.4.1 General	**6.4.1 General**	
6.4.1.1 Application	**6.4.1.1 Application**	Amendment (3) Clarifies the requirements related to side frames
1 Stiffeners subject to lateral loads are to be in accordance with the requirements in **6.4.2**.	**1** Stiffeners subject to lateral loads are to be in accordance with the requirements in **6.4.2**.	
2 Side frames within the cargo region are to be in accordance with the following **(1)** to **(3)** (*See* **Table 6.4.1-1**).	**2** Side frames within the cargo region are to be in accordance with the following **(1)** to **(3)** (*See* **Table 6.4.1-1**).	
(1) The scantlings of side frames in single-deck ships are to be in accordance with **6.4.3.2** instead of **-1** above. However, for side frames abaft of collision bulkheads, the scantlings are also to be in accordance with **6.4.3.4**.	(1) The scantlings of side frames in single-deck ships are to be in accordance with **6.4.3.2** instead of **-1** above. However, for side frames abaft of collision bulkheads, the scantlings are also to be in accordance with **6.4.3.4**.	Specifies applications for side frames in multiple-deck ships (not only for the lowest tier side frames).
(2) The scantlings of side frames in multiple-deck ships are to be in accordance with **-1** above or **6.4.3.2**.	(Newly Added)	
(3) The scantlings of side frames supporting deck transverses (except cantilever beams) for longitudinal framing systems are to be in accordance with **6.4.3.3** in addition to **(1)** or **(2)** above.	(2) The scantlings of side frames supporting deck transverses (except cantilever beams) for longitudinal framing systems are to be in accordance with **6.4.3.3** in addition to **-1** above.	Specifies that side frames supporting cantilever beams are treated as web frames and to be in accordance with Chapter 7, not with Chapter 6.
(4) The scantlings of side frames supporting cantilever beams are to be in accordance with **7.2.3** to **7.2.6**, notwithstanding **(1)** or **(2)** above. The bending moments and shear forces to be considered in applying **7.2.3** to **7.2.5** are to be in accordance with **7.2.2.2**.	(3) The scantlings of side frames supporting cantilever beams are to be in accordance with **7.2.3** to **7.2.6** in addition to **-1** above. The bending moments and shear forces to be considered in applying **7.2.3** to **7.2.5** are to be in accordance with **7.2.2.1**.	

Amended-Original Requirements Comparison Table
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended	Original	Remarks

Table 6.4.1-1 Side Frames

Side Frames	Applied Requirements
(1) Side frames of single-deck ships	**6.4.3.2** and **6.4.3.4**
(2) Side frames of multiple-deck ships	**6.4.2** or **6.4.3.4**
(3) Side frames supporting deck transverses	**6.4.3.2** and **6.4.3.3** in addition to (1) or (2)
(4) Side frames supporting cantilever beams	**7.2.3** to **7.2.6**

Clarifies Table 6.4.1-1 in accordance with 6.4.1.1.

6.4.2 Stiffeners

6.4.2 Stiffeners

~~Table 6.4.2-7 Correction Factor C_1 for Struts~~

~~Ratio of the moment of inertia of stiffeners $\max(I_B, I_t)/\min(I_B, I_t)$~~			~~≥1.0~~ ~~<1.2~~	~~≥1.2~~ ~~<1.4~~	~~≥1.4~~ ~~<1.6~~	~~≥1.6~~ ~~<1.8~~	~~≥1.8~~
~~C_1~~	~~Bottom longitudinals~~	~~Value for section modulus (6.4.2.1)~~	~~0.625~~	~~0.670~~	~~0.700~~	~~0.725~~	~~0.745~~
		~~Value for web thickness (6.4.2.2)~~	~~0.750~~	~~0.775~~	~~0.800~~	~~0.815~~	~~0.825~~
	~~Inner bottom longitudinals~~	~~Value for section modulus (6.4.2.1)~~	~~0.625~~	~~0.670~~	~~0.690~~	~~0.720~~	~~0.740~~
		~~Value for web thickness (6.4.2.2)~~	~~0.750~~	~~0.780~~	~~0.795~~	~~0.810~~	~~0.825~~

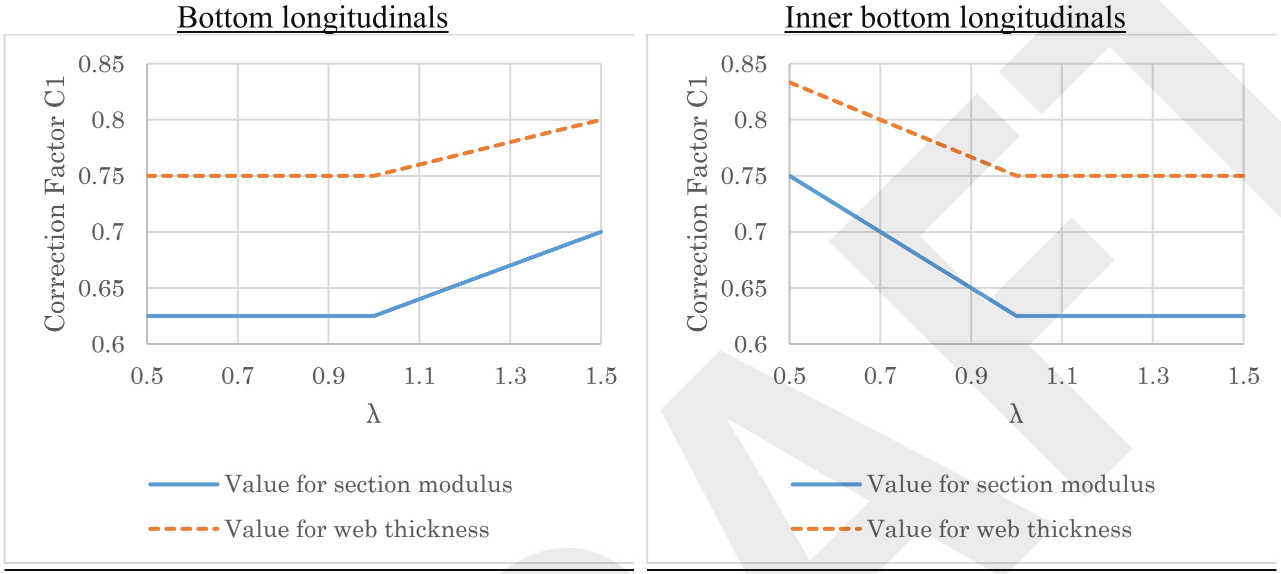
Table 6.4.2-7 Correction Factor C_1 for Struts

C_1	Bottom longitudinals	Inner bottom longitudinals
Value for section modulus (**6.4.2.1**)	$\frac{3}{20}\lambda+\frac{19}{40}$	$-\frac{1}{4}\lambda+\frac{7}{8}$
Value for web thickness (**6.4.2.2**)	$\frac{1}{10}\lambda+\frac{13}{20}$	$-\frac{1}{6}\lambda+\frac{11}{12}$
(Notes) Value for section modulus (**6.4.2.1**) is to be not less than 0.625. Value for web thickness (**6.4.2.2**) is to be not less than 0.75.		

Amendment (6)
Revise the reduction factor for double bottom stiffeners considering the effect of struts.
Change the correction factor so that it is reasonable even when λ is less than 1.0.

<table>
<tr><th>Amended</th><th>Original</th><th>Remarks</th></tr>
<tr><td>

Fig. 6.4.2-2 Correction Factor C_1 for Struts



Bottom longitudinals

Inner bottom longitudinals

</td><td></td><td>Add a simplified diagram of the correction factors derived in the Table 6.4.2-7.</td></tr>
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Amended	Original	Remarks
6.4.3 Side Frames	**6.4.3 Side Frames**	
6.4.3.2 Side Frames	**6.4.3.2 Side Frames in Single-Deck Ships**	
The scantlings of the side frames are to be in accordance with the following **(1)** and **(2)**:	The scantlings of the side frames in single deck ships are to be in accordance with the following **(1)** and **(2)**:	Amendment (3) Clarifies the requirements related to side frames Deletes "in single deck ships"to apply not only to single-deck ships. In the current Rules, the values of each coefficient are specified corresponding to loading conditions and existence of web frames. In this amendment, to clarify the requirements, the values based on full loading condition are only specified in Part 1, and those values are to be incorporated into Part 2 corresponding to type of ship.
(1) Bending strength	(1) Bending strength	
(a) The section modulus is to be not less than the value obtained from the following formula: $Z = C_{Safety} \dfrac{M_1}{\sigma_Y} \times 10^3 (cm^3)$	The section modulus is to be not less than the value obtained from the following formula: $Z = C_{Safety} \dfrac{M_1 + M_2}{\sigma_Y} \times 10^3 (cm^3)$	
C_{safety}: Safety factor taken as 1.0.	C_{safety}: Safety factor taken as 1.0.	
M_1: Bending moment (*kN-m*) due to side loads according to the following formula: $M_1 = f_{load} f_{bc} f_t \left(\dfrac{P_{exsl} + f_p P_{exwl}}{20} + \dfrac{P_{exsu} + f_p P_{exwu}}{30} \right) s \ell_{1bdg}{}^2 \times 10^{-3}$	M_1: Bending moment (*kN-m*) due to side loads according to the following formula: $M_1 = f_{load} f_{bc} f_t \left(\dfrac{P_{exsl} + f_p P_{exwl}}{20} + \dfrac{P_{exsu} + f_p P_{exwu}}{30} \right) s \ell_{1bdg}{}^2 \times 10^{-3}$	
f_{load}: Coefficient corresponding to loading conditions, to be taken as 1.0 f_{bc}: Coefficient corresponding to boundary conditions at ends of side frames, to be taken as the following **i)** or **ii)** i) Side frames in single-deck ships and the lowest tier side frames in multiple-deck ships: $f_{bc} = 0.8$ ii) Side frames other than **i)** above: $f_{bc} = 1.0$	f_{load}, f_{bc}: Coefficient corresponding to loading conditions and boundary conditions at ends of side frames as specified in **Table 6.4.3-1** and **Table 6.4.3-2**. If multiple loading conditions are applicable in loading conditions specified in **Table 6.4.3-1** and **Table 6.4.3-2**, evaluations are to be carried out with all applicable loading condition.	
f_t: Coefficient considering effects of brackets provided between side frames and bilge hopper tanks/top side tanks. If both ends are supported by bilge hopper tanks and top side	f_t: Coefficient considering effects of brackets provided between side frames and bilge hopper tanks/top side tanks. If both ends are supported by bilge hopper tanks and top side	

Amended	Original	Remarks
tanks, 0.8. If either end is supported, 0.9. Otherwise, 1.0. (*See* **Table 6.4.3-1**)	tanks, 0.8. If either end is supported, 0.9. Otherwise, 1.0.	
ℓ: Full length (*m*) of the side frame as specified in **Fig. 6.4.3-2**.	ℓ: Full length (*m*) of the side frame as specified in **Fig. 6.4.3-2**.	
f_p: Coefficient, to be taken 0.9.	f_p: Coefficient, to be taken 0.9.	
ℓ_{1bdg}: Effective bending span (*m*) of the side frame, to be in accordance with the following **i)** or **ii)** i) Where neither bilge hopper tanks nor topside tanks are provided, and brackets are provided at the end of the side frames, the end of the effective bending span is to be taken to the position where the depth of the side frame and the bracket is equal to $1.5h_w$ (*See* **Table 6.4.3-1**). ii) Where side frames and bilge hopper tanks or top side tanks are combined, the end of the effective bending span is to be taken to the end of full length of the side frame ℓ (*See* **Table 6.4.3-1**). However, when the value of f_t is set to 1.0, the end of the effective bending span may be taken to the position where the depth of the side frame and the bracket is equal to $1.5h_w$	ℓ_{1bdg}: Effective bending span (*m*) of the side frame. Where a bracket is provided, the end of the effective bending span is to be taken to the position where the depth of the side frame and the bracket is equal to $2h_w$ (*See* **Fig. 6.4.3-2**).	Aligns the definition of effective bending span to that in Chapter 3. In addition, clarifies the requirements related to span reduction.
h_w: Web depth (*mm*) of side frames		M_2 and F_2 are organised in Table 6.4.3-2.
s: Spacing (*mm*) of side frames	s: Spacing (*mm*) of side frames	
P_{exsl}: Hydro static pressure P_{exs} specified in **4.4.2.2-1**, to be calculated at the lower end of full length ℓ of the side frame	P_{exsl}: Hydro static pressure P_{exs} specified in **4.4.2.2-1**, to be calculated at the lower end of full length ℓ of the side frame	
P_{exsu}: Hydro static pressure P_{exs}	P_{exsu}: Hydro static pressure P_{exs}	

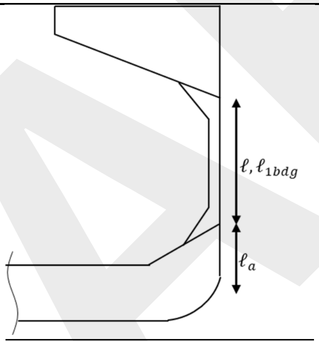
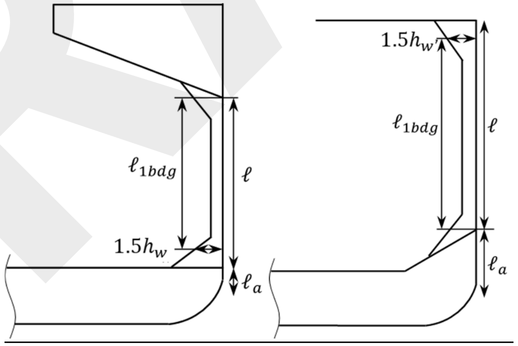
Amended-Original Requirements Comparison Table
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended	Original	Remarks
specified in **4.4.2.2-1**, to be calculated at the upper end of full length ℓ of the side frame P_{exwl}: Dynamic pressure P_{exs} specified in **4.4.2.2-1**, to be calculated at the lower end of full length ℓ of the side frames P_{exwu}: Dynamic pressure P_{exs} specified in **4.4.2.2-1**, to be calculated at the upper end of full length ℓ of the side frames (b) For side frames where the following **i)** to **iii)** are all applicable, M_1 specified in **(a)** above is to be read as $M_1 + M_2$, where M_2 is to be in accordance with **Table 6.4.3-2.** i) Where the cargo holds under consideration are empty due to multiport loading or other reasons. ii) Where the web frames or structures similar to web frames are not provided at the side. iii) Where the side frames under consideration are arranged just above bilge hopper tanks or double bottoms.	specified in **4.4.2.2-1**, to be calculated at the upper end of full length ℓ of the side frame P_{exsl}: Dynamic pressure P_{exs} specified in **4.4.2.2-1**, to be calculated at the lower end of full length ℓ of the side frames P_{exsu}: Dynamic pressure P_{exs} specified in **4.4.2.2-1**, to be calculated at the upper end of full length ℓ of the side frames M_2: Rotation moment (*kN-m*) at the lower end of the side frame due to double bottom bending as specified in the following **(a)** or **(b)**. However, where side frames are divided into spans, this value is to be taken as 0 for those other than the one in the lowest span. (a) $M_2 = 0$ with web frames or structures similar to web frames at the side. (b) $M_2 = \frac{1}{480\ell}(2+3\lambda_1)K(\lambda_1)\alpha_\theta(1-\nu^2)(f_{db}\rho g T_{SC})(s\times 10^{-3}){B_{DB}}^3$ with no structures in (a) above. Where: ν: Poisson's ratio, to be taken as 0.3 f_{db}: Coefficient regarding double bottom bending corresponding to loading conditions, as specified in **Table 6.4.3-1** B_{DB}: Double bottom breadth (*m*) as specified in **7.3.1.6-2.** α_θ: Side rotation angle factor due to double bottom bending according to the following formula: $\alpha_\theta = 0.85 f_1 f_2$ f_1: Coefficient regarding effect of the	

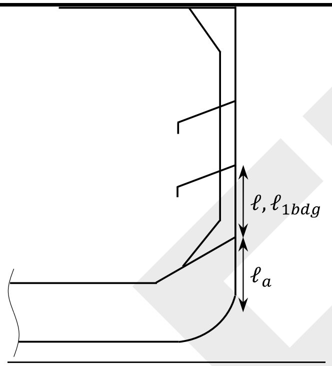
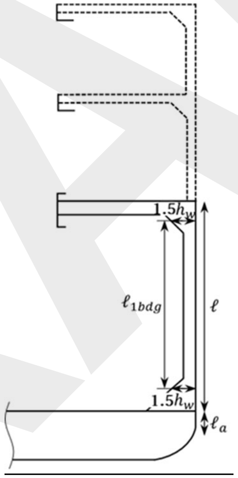
Amended	Original	Remarks
	boundary conditions at fore and aft of the cargo hold, as specified in **Table 6.4.3-3** f_2: Coefficient regarding effect of the boundary conditions at left and right of the cargo hold according to the following formula: $f_2 = 1.0$ with no bilge hopper provided. $f_2 = \frac{k}{k+C_{BH}}$ with a bilge hopper provided. k: Coefficient of stiffness of the bilge hopper as specified in **7.3.3.1**. C_{BH}: Coefficient of torsional stiffness effect of the bilge hopper as specified in **Table 7.3.3-1**. $K(\lambda_1)$: Degree of elastic deformation according to the following formula: $K(\lambda_1) = 0.86 - 0.94\lambda_1$ However, to be taken as 0.4 when less than 0.4. $\lambda_1 = {\ell_\mathrm{a}}/{\ell}$ ℓ_a: Vertical distance (*m*) from the half-height position of the double bottom height to the lower end of the frame as specified in **Fig. 6.4.3-2**. ℓ: Full length of the side frame as specified in **Fig. 6.4.3-2**. However, where side frames are supported by side stringers, ℓ is the distance (*m*) from the top of the inner bottom plating at the side (upper end of hopper tanks, if hopper tanks are	

Amended	Original	Remarks
(2) Shear strength of webs (a) The web thickness is to be not less than the value obtained from the following formula: $t_w = C_{Safety}\frac{F_1}{d_{shr}\tau_Y}\times 10^3 (mm)$ C_{safety}: Safety factor taken as 1.2. τ_Y: Permissible shear stress (N/mm^2) taken as follows: $\sigma_Y/\sqrt{3}$ d_{shr}: Effective shear depth (mm) as specified in **3.6.4.2.** F_1: Shear force due to side loads (kN) according to the following formula: $F_1 = f_{load}f_t\frac{7(P_{exsl}+f_pP_{exwl})+3(P_{exsu}+f_PP_{exwu})}{20}s\ell_{1shr}\times 10^{-3}$ ℓ_{1shr}: Effective shear span (m) of the side frame. Where the side frame is provided with a bracket, the end of the effective shear span is to be taken as the inner end of the bracket. f_{load}, f_t, P_{exsl}, P_{exwl}, P_{exsu}, P_{exwu}, f_p, s : As specified in **(1)** above. (b) For side frames where **i)** to **iii)** in **(1)(a)** above are all applicable, F_1 specified in **(a)** above is to be read as F_1+F_2, where F_2 is to be in accordance with **Table 6.4.3-2.**	provided) to the side stringer. (2) Shear strength of webs The web thickness is to be not less than the value obtained from the following formula: $t_w = C_{Safety}\frac{F_1+F_2}{d_{shr}\tau_Y}\times 10^3 (mm)$ C_{safety}: Safety factor taken as 1.2. τ_Y: Permissible shear stress (N/mm^2) taken as follows: $\sigma_Y/\sqrt{3}$ d_{shr}: Effective shear depth (mm) as specified in **3.6.4.2.** F_1: Shear force due to side loads (kN) according to the following formula: $F_1 = f_{load}f_t\frac{7(P_{exsl}+f_pP_{exwl})+3(P_{exsu}+f_PP_{exwu})}{20}s\ell_{1shr}\times 10^{-3}$ ℓ_{1shr}: Effective shear span (m) of the side frame. Where the side frame is provided with a bracket, the end of the effective shear span is to be taken as the inner end of the bracket. f_{load}, f_t, P_{exsl}, P_{exwl}, P_{exsu}, P_{exwu}, f_p, s : As specified in **(1)** above. F_2: Shear force (kN) at the lower end of the frame due to double bottom bending as specified in the following **(a)** or **(b)**. However, where side frames are divided into spans, this value is to be taken as 0 for those other than the one in the lowest span. (a) $F_2 = 0$ with web frames or structures similar to web frames at the side. (b)	

Amended-Original Requirements Comparison Table
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

<table>
<tr><th>Amended</th><th>Original</th><th>Remarks</th></tr>
<tr><td></td><td>$F_2 = \frac{1}{160\ell^2}(1+\lambda_1)K(\lambda_1)\alpha_\theta(1-\nu^2)(f_{db}\rho g T_{SC})(s\times10^{-3})B_{DB}^{3}$
with no structures in (a) above.
Where:
ℓ, λ_1, $K(\lambda_1)$, α_θ, υ, f_{db}, B_{DB}: As specified in **(1)** above.</td><td></td></tr>
<tr><td colspan="2">Table 6.4.3-1 Measurement of ℓ_{1bdg} and f_t Corresponding to Boundary Conditions at the Ends of Side Frames
<table>
<tr><th colspan="2"></th><th>Measurement of ℓ_{1bdg}</th><th>f_t</th></tr>
<tr><td>Boundary conditions at ends of side frames</td><td>(a) Where both ends are supported by bilge hopper tanks and top side tanks</td><td> </td><td>0.8</td></tr>
<tr><td></td><td>(b) Where either end is supported by bilge hopper tanks and top side tanks</td><td> </td><td>0.9</td></tr>
</table></td><td>(Newly Added)
1. Changes the definition of ℓ_{1bdg} from $2h_w$ to $1.5h_w$ in accordance with that in 3.6.1.2.
2. Adds the values of f_t corresponding to type of structures.</td></tr>
</table>

Amended-Original Requirements Comparison Table
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended				Original		Remarks
						
		(c) Other than **(a)** and **(b)**		1.0		

Amended-Original Requirements Comparison Table
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

<table>
<tr><th>Amended</th><th>Original</th><th>Remarks</th></tr>
<tr>
<td colspan="2">

Table 6.4.3-2 Moment and Shear Force to be Additionally Considered

<table>
<tr><td>Rotation moment at the lower end of the side frame due to double bottom bending M_2 (*kN-m*)</td><td>$M_2 = \frac{1}{480\ell}(2+3\lambda_1)K(\lambda_1)\alpha_\theta(1-\nu^2)(f_{db}\rho g T_{SC})(s\times 10^{-3}){B_{DB}}^3$</td></tr>
<tr><td>Shear force at the lower end of the frame due to double bottom bending F_2 (*kN*)</td><td>$F_2 = \frac{1}{160\ell^2}(1+\lambda_1)K(\lambda_1)\alpha_\theta(1-\nu^2)(f_{db}\rho g T_{SC})(s\times 10^{-3}){B_{DB}}^3$</td></tr>
<tr><td colspan="2">
Where:
ν: Poisson’s ratio, to be taken as 0.3
f_{db}: Coefficient regarding double bottom bending corresponding to loading conditions, to be taken as 0.7
B_{DB}: Double bottom breadth (*m*) as specified in **7.3.1.6-2**.
α_θ: Side rotation angle factor due to double bottom bending according to the following formula:
$\alpha_\theta = 0.85 f_1 f_2$
f_1: Coefficient regarding effect of the boundary conditions at fore and aft of the cargo hold, as specified in **Table 6.4.3-3**
f_2: Coefficient regarding effect of the boundary conditions at left and right of the cargo hold according to the following formula:
$f_2 = 1.0$ with no bilge hopper provided.
$f_2 = \frac{k}{k+C_{BH}}$ with a bilge hopper provided.
k: Coefficient of stiffness of the bilge hopper as specified in **7.3.3.1**.
C_{BH}: Coefficient of torsional stiffness effect of the bilge hopper as specified in **Table 7.3.3-1**.
$K(\lambda_1)$: Degree of elastic deformation according to the following formula:
$K(\lambda_1) = 0.86 - 0.94\lambda_1$
However, to be taken as 0.4 when less than 0.4.
$\lambda_1 = {}^{\ell_a}/_{\ell}$
ℓ_a: Vertical distance (*m*) from the half-height position of the double bottom height to the lower end of the frame as specified in **Table 6.4.3-1**
ℓ: Full length of the side frame as specified in **Table 6.4.3-1**. However, where side frames are supported by side stringers, ℓ is the distance (*m*) from the top of the inner bottom plating at the side (upper end of hopper tanks, if hopper tanks are provided) to the side stringer.
</td></tr>
</table>

</td>
<td>(Newly Added)
Clarifies moment and shear force due to double bottom bending as a table.</td>
</tr>
</table>

Amended-Original Requirements Comparison Table
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended	Original	Remarks

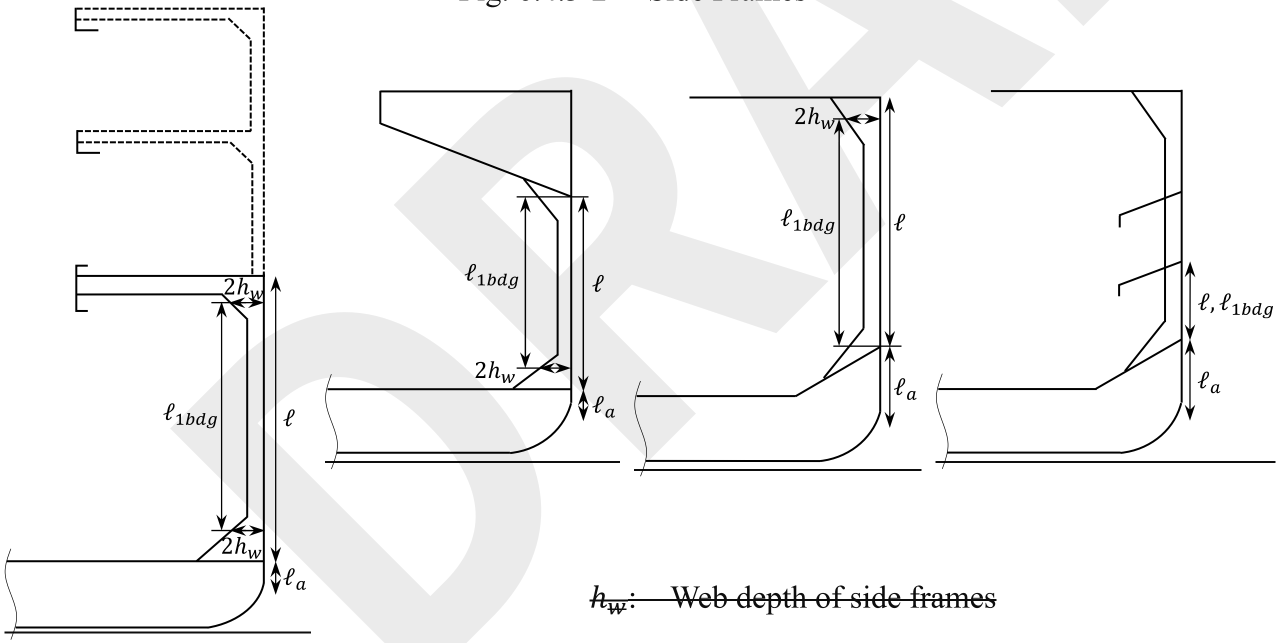
~~Table 6.4.3-1 Coefficient corresponding to loading conditions~~

	~~f_{load}~~	~~f_{dB}~~
~~Full loading~~	~~1.0~~	~~0~~
~~Multiport loading~~	~~0.8~~	~~0.7~~
~~Alternate loading~~	~~1.0~~	~~1.0~~

~~Table 6.4.3-2 Coefficient f_{bc} corresponding to boundary conditions at ends of side frames~~

~~f_{bc}~~	~~Supported by top side tank and bilge hopper tank~~	~~Both ends or either end supported by side stringer~~	~~Otherwise~~
~~Full loading~~	~~0.8~~	~~0.85~~	~~0.8~~
~~Multiport loading, Alternate loading~~	~~1.0~~	~~1.0~~	~~1.0~~

~~Fig. 6.4.3-2 Side Frames~~



~~h_w: Web depth of side frames~~

~~(a) Ship with multiple~~ ~~(b) Single deck ship~~

(Deleted)
This table is deleted in Part 1 but is incorporated into each coefficient in Part 2 corresponding to ship type.

(Deleted)
This table is deleted in Part 1 but is incorporated into each coefficient in Part 2 corresponding to ship type.

(Deleted)
Deleted because of integration into Table 6.4.3-1.

Amended	Original	Remarks
Chapter 7 STRENGTH OF PRIMARY SUPPORTING STRUCTURES **7.2 Simple Girders** **7.2.2 Strength Assessment** **7.2.2.1 General*** **1** Girders are to be assessed in accordance with **7.2.3** to **7.2.5** using the moments and shear forces given in the following **(1)** to **(3)**, depending on the applicable assessment models. (1) Assessment model 1 to 7 shown in **Table 7.2.1-2**: Moments and shear forces are to be in accordance with **Table 7.2.2-1**. (2) Assessment model 8 shown in **Table 7.2.1-2**: Moments and shear forces are to be in accordance with **7.2.2.2**. (3) For cases not corresponding to **(1)** and **(2)** above, applied models are to be deemed appropriate by the Society. **2** Cantilever beams are to comply with the following **(1)** and **(2)**. (1) The section moduli of cantilever beams are to be in accordance with **7.2.3**. The bending moment to be considered in applying **7.2.3** is to be not less than that obtained from the following formula. The moments due to deck cargo and wave loads need not be considered at the same time. $M = M_d + M_h$ M_d: Moment (*kN-m*) due to deck cargo or wave loads	**Chapter 7 STRENGTH OF PRIMARY SUPPORTING STRUCTURES** **7.2 Simple Girders** **7.2.2 Strength Assessment** **7.2.2.1 General*** **1** Girders are to be assessed in accordance with **7.2.3** to **7.2.5** using the moments and shear forces given in the following **(1)** to **(3)**, depending on the applicable assessment models. (1) Assessment model 1 to 7 shown in **Table 7.2.1-2**: Moments and shear forces are to be in accordance with **Table 7.2.2-1**. (2) Assessment model 8 shown in **Table 7.2.1-2**: Moments and shear forces are to be in accordance with **7.2.2.2**. (3) For cases not corresponding to **(1)** and **(2)** above, applied models are to be deemed appropriate by the Society. **2** Corrugated bulkheads are to be assessed in accordance with **7.2.7**.	Amendment (10) Clarifies some definitions and corrects typographical errors. Specifies the requirements related to cantilever beams to clarify the application.

Amended	Original	Remarks
to be obtained from Assessment Model 6 shown in **Table 7.2.2-1**. M_h: Moment (*kN-m*) due to the cargo loaded on the hatch cover or wave loads to be obtained from Assessment Model 7 shown in **Table 7.2.2-1**. (2) Web thicknesses of cantilever beams at any point are to be in accordance with **7.2.4**. The shear force to be considered in applying **7.2.4** is to be not less than that obtained from the following formula. Shear force due to deck cargo and wave loads need not be considered at the same time. $F = F_d + F_h$ F_d: Shear force (*kN*) due to deck cargo or wave loads to be obtained from Assessment Model A shown in **Table 7.2.2-1**. F_h: Moment (*kN*) due to the cargo loaded on the hatch cover or wave loads to be obtained from Assessment Model B shown in **Table 7.2.2-1**. **3** Corrugated bulkheads are to be assessed in accordance with **7.2.7**.		
7.2.6 Bending Stiffness	**7.2.6 Bending Stiffness**	
7.2.6.1 Depth of Girders For the members specified in **Table 7.2.6-1**, depth is not to be less than that specified in the table. However, the depth may be reduced provided that the member has equivalent moment of inertia or deflection to the required members.	**7.2.6.1 Depth of Girders** **1** For the members specified in **Table 7.2.6-1**, depth is not to be less than that specified in the table. However, the depth may be reduced provided that the member has equivalent moment of inertia or deflection to the required members.	
(Deleted)	**2** Cantilever beams are to comply with the following **(1)** and **(2)**: (1) The depths of the cantilever beams may be gradually	Transfers the requirements related to ends of cantilever beams

Amended	Original	Remarks
	tapered down towards their inboard ends from the toes of the end brackets and may be reduced to about $1/2$ of the depth at the toe of the end bracket. (2) The sectional areas of face plates may be gradually tapered down from the toes of the end brackets toward the inboard end of the cantilever beams and may be reduced to 0.60 *times* that at the toe of the end bracket.	to C7.2.2.1 of the Guidance.

Table 7.2.6-1 Depths of Girders

Member	Depths of Girders (m)
Web frame	$0.1\ell_{bdg}$
Web frame supporting cantilever	$0.125\ell_{bdg}$
Web frame supporting side stringer	$0.125\ell_{bdg}$
Side stringer	$0.125\ell_{bdg}$
Side stringer forward of collision bulkhead	$0.2\ell_{bdg}$
Web frame forward of collision bulkhead	$0.2\ell_{bdg}$
Cantilever beam	$0.2\ell_{bdg}$

Note:
ℓ_{bdg}: Effective bending span (m) of the girder as given in **3.6.1.4**

Specifies the position where the requirement regarding the depth of cantilever beams is applied.

Amended	Original	Remarks
7.2.7 Corrugated Bulkheads **7.2.7.2 Strength Assessment** **1** The section modulus per $1/2$ pitch of corrugated bulkheads (*See* **Fig. 7.2.7-1**) is to be in accordance with the following **(a)** and **(b)**: (a) The section modulus per $1/2$ pitch of corrugated bulkheads in the maximum load condition and the testing condition is to be not less than that obtained from the following formula:	**7.2.7 Corrugated Bulkheads** **7.2.7.2 Strength Assessment** **1** The section modulus per $1/2$ pitch of corrugated bulkheads (*See* **Fig. 7.2.7-1**) is to be in accordance with the following **(a)** and **(b)**: (a) The section modulus per $1/2$ pitch of corrugated bulkheads in the maximum load condition and the testing condition is to be not less than that obtained from the following formula:	Amendment (5) Revision of coefficients that take into account strength reduction due to

Amended-Original Requirements Comparison Table
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

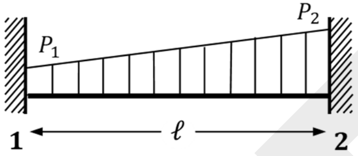
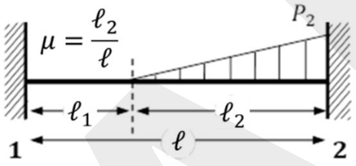
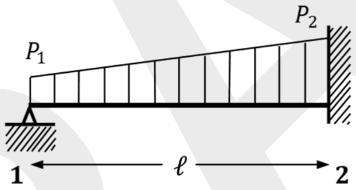
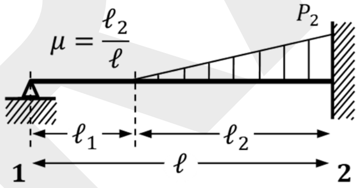
Amended	Original	Remarks
$Z_{n50} = C_{Safety}\frac{C_x+1}{2fC_x}\frac{\lvert M\rvert}{\sigma_{all}}\times 10^3\ (cm^3)$ C_{Safety}: Safety factor to be taken as 1.0 C_x: Coefficient considering buckling of the flange (face plate) to be taken as follows: $C_x = \frac{2.25}{\beta} - \frac{1.25}{\beta^2}$ $\underline{\text{for } \beta > 1.25}$ $\underline{C_x = 1 \text{ for } \beta \leq 1.25}$ For: $\beta = \frac{b_f}{t_{f-n50}}\sqrt{\frac{\sigma_Y}{E}}$ b_f: Flange breadth (mm) t_{f-n50}: Flange thickness (mm) σ_Y: Specified minimum yield stress (N/mm^2) E: Young's modulus to be taken as 206,000 (N/mm^2) f: Shape coefficient to be taken as 1.1 M: Bending moment (kN-m) due to the applied load as specified in **7.2.7.3-1** σ_{all}: Permissible bending stress (N/mm^2) to be taken as follows: $\sigma_{all} = \frac{235}{K}$ K: Material factor as specified in **3.2.1.2** (b) The section modulus per 1/2 pitch of corrugated bulkheads in the flooded condition is to be not less than that obtained from the following formula: $Z_{n50} = C_{Safety}\frac{C_x+1}{2fC_x}\frac{\lvert M_P\rvert}{\sigma_{all}}\times 10^3\ (cm^3)$ C_{Safety}: Safety factor to be taken as 1.0	$Z_{n50} = C_{Safety}\frac{C_x+1}{2fC_x}\frac{\lvert M\rvert}{\sigma_{all}}\times 10^3\ (cm^3)$ C_{Safety}: Safety factor to be taken as 1.0 C_x: Coefficient considering buckling of the flange (face plate) to be taken as follows: $C_x = \frac{2.25}{\beta} - \frac{1.25}{\beta^2}$ For: $\beta = \frac{b_f}{t_{f-n50}}\sqrt{\frac{\sigma_Y}{E}}$ b_f: Flange breadth (mm) t_{f-n50}: Flange thickness (mm) σ_Y: Specified minimum yield stress (N/mm^2) E: Young's modulus to be taken as 206,000 (N/mm^2) f: Shape coefficient to be taken as 1.1 M: Bending moment (kN-m) due to the applied load as specified in **7.2.7.3-1** σ_{all}: Permissible bending stress (N/mm^2) to be taken as follows: $\sigma_{all} = \frac{235}{K}$ K: Material factor as specified in **3.2.1.2** (b) The section modulus per 1/2 pitch of corrugated bulkheads in the flooded condition is to be not less than that obtained from the following formula: $Z_{n50} = C_{Safety}\frac{C_x+1}{2fC_x}\frac{\lvert M_P\rvert}{\sigma_{all}}\times 10^3\ (cm^3)$ C_{Safety}: Safety factor to be taken as 1.0	buckling Revises the calculation formula due to unreasonable values, such as negative values, resulting from the value of β_E.

Amended	Original	Remarks
C_x: As specified in **(a)** above f: Shape coefficient to be taken as 1.1 σ_{all}: Permissible bending stress (*N/mm*^{2}) to be taken as follows: $\sigma_{all} = \frac{235}{K}$ K: Material factor as specified in **3.2.1.2** M_P: Plastic moment as specified in **7.2.7.3-2** (c) The actual section modulus per $1/2$ pitch of corrugated bulkheads is to be obtained from the following: $\frac{b_f t_{f-n50} d_0}{2000} + \frac{b_w t_{w-n50} d_0}{6000}$ (*cm*^{3}) b_f and b_w: Flange and web breadths (*mm*), respectively t_{f-n50} and t_{w-n50}: Flange and web thicknesses (*mm*), respectively d_0: Corrugation depth (*mm*)	C_x: As specified in **(a)** above f: Shape coefficient to be taken as 1.1 σ_{all}: Permissible bending stress (*N/mm*^{2}) to be taken as follows: $\sigma_{all} = \frac{235}{K}$ K: Material factor as specified in **3.2.1.2** M_P: Plastic moment as specified in **7.2.7.3-2** (c) The actual section modulus per $1/2$ pitch of corrugated bulkheads is to be obtained from the following: $\frac{b_f t_{f-n50} d_0}{2000} + \frac{b_w t_{w-n50} d_0}{6000}$ (*cm*^{3}) b_f and b_w: Flange and web breadths (*mm*), respectively t_{f-n50} and t_{w-n50}: Flange and web thicknesses (*mm*), respectively d_0: Corrugation depth (*mm*)	Table 7.2.7-1 and -2 Amendment (4) Revises requirements regarding section modulus at the upper part of corrugated bulkheads. Specifies the reduction requirements for the section modulus at the upper part of corrugated bulkheads.

Amended-Original Requirements Comparison Table
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended	Original	Remarks

Table 7.2.7-1 Moments and Shear Forces (with $d_H \geq 2.5d_0$)

Upper end of bulkhead	Lower end of bulkhead	Load distribution	Assessment model	Lower part of corrugated bulkhead (Point 2 in assessment model)	
				Moment(1)	Shear force F
Supported by girder Connected to stool	Supported by girder Connected to double bottom Connected to stool	Pressure P_1 at the upper end of $\ell \geq 0$		$M_2 = \frac{S\ell^2}{60}(2P_1 + 3P_2)$	$F_2 = \frac{S\ell}{20}(3P_1 + 7P_2)$
		Midspan pressure = 0		$M_2 = \frac{SP_2\ell^2}{60}(3\mu^4 - 10\mu^3 + 10\mu^2)$	$F_2 = \frac{SP_2\ell}{20}(2\mu^4 - 5\mu^3 + 10\mu)$
Connected to deck	Supported by girder Connected to double bottom Connected to stool	Pressure P_1 at the upper end of $\ell \geq 0$		$M_2 = \frac{S\ell^2}{120}(7P_1 + 8P_2)$	$F_2 = \frac{S\ell}{40}(9P_1 + 16P_2)$
		Midspan pressure = 0		$M_2 = \frac{SP_2\ell^2}{120}(3\mu^4 - 15\mu^3 + 20\mu^2)$	$F_2 = \frac{SP_2\ell}{40}(\mu^4 - 5\mu^3 + 20\mu)$

ℓ: Length (*m*) between the supporting points as specified in **Fig. 7.2.7-2** and **-3**

ℓ_1: Length (*m*) from one end of ℓ to the zero pressure point to be taken as $\ell_1 = \ell - \ell_2$

ℓ_2: Length (*m*) from the other end of ℓ to the zero pressure point

P_1 and P_2: Loads (*kN/m*^{2}) corresponding to each assessment condition specified in **Table 7.2.1-1** to be calculated at the upper and lower ends of ℓ of the girder, respectively. However, where an upper stool is provided, P_1 is to be calculated at the deck level.

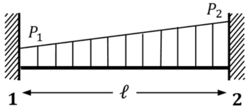
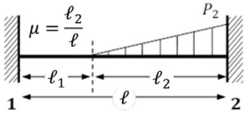
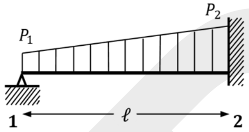
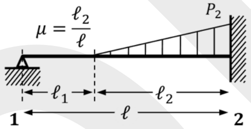
S: Breadth of 1/2 pitch (*m*) of the corrugation

(1) The required section modulus of the corrugated bulkheads within the range from the upper end of l to $l/3$ may be calculated using $0.75M_2$.

Amended-Original Requirements Comparison Table
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended	Original	Remarks

Table 7.2.7-2 Moments and Shear Forces (with $d_H < 2.5d_0$)

Upper end of bulkhead	Lower end of bulkhead	Load distribution	Assessment model	Lower part of corrugated bulkhead		Lower stool at inner bottom plating
				Moment $M^{(1)}$	Shear force F	Moment M
Supported by girder Connected to stool	Supported by girder Connected to deck or double bottom Connected to stool	Pressure P_1 at the upper end of ℓ ≥ 0		$M = \max(\lvert M_1\rvert, \lvert M_a\rvert)$ $M_1 = \frac{S\ell^2}{60}(3P_1 + 2P_2)$ $M_a = \frac{S\ell^2}{60}\begin{bmatrix} 10(P_2 - P_1)\alpha^3 + 30P_1\alpha^2 \\ -3(7P_1 + 3P_2)\alpha + 3P_1 + 2P_2 \end{bmatrix}$	$F = \max(\lvert F_1\rvert, \lvert F_a\rvert)$ $F_1 = -\frac{S\ell}{20}(7P_1 + 3P_2)$ $F_a = \frac{S\ell}{20}\begin{bmatrix} 10(P_2 - P_1)\alpha^2 + 20P_1\alpha \\ -7P_1 - 3P_2 \end{bmatrix}$	$M_2 = \frac{S\ell^2}{60}(2P_1 + 3P_2)$
		Midspan pressure = 0		$M = \max(\lvert M_1\rvert, \lvert M_a\rvert)$ $M_1 = -\frac{SP_2{\ell_2}^2}{60}(3\mu^2 - 5\mu)$ $M_a = \frac{SP_2{\ell_2}^2}{60}[(6\mu^2 - 15\mu + 10)\alpha - 3\mu^2 + 5\mu]$ $-\frac{SP_2{\ell_2}^2}{6}\alpha + \left[\frac{SP_2}{6\ell_2}(\alpha\ell - \ell_1)^3\right]$	$F = \max(\lvert F_1\rvert, \lvert F_a\rvert)$ $F_1 = \frac{SP_2\ell_2}{20}(2\mu^3 - 5\mu^2)$ $F_a = \frac{SP_2\ell_2}{20}(2\mu^3 - 5\mu^2)$ $+\left[\frac{SP_2}{2\ell_2}(\alpha\ell - \ell_1)^2\right]$	$M_2 = \frac{SP_2{\ell_2}^2}{60}$ $(3\mu^2 - 10\mu + 10)$
Connected to deck	Supported by girder Connected to deck or double bottom Connected to stool	Pressure P_1 at the upper end of ℓ ≥ 0		$M = \max(\lvert M_a\rvert, \lvert 0.6M_2\rvert)$ $M_a = \frac{S\ell^2\alpha}{120}\begin{bmatrix} 20(P_2 - P_1)\alpha^2 + 60P_1\alpha \\ -33P_1 - 12P_2 \end{bmatrix}$	$F = \max(\lvert F_1\rvert, \lvert F_a\rvert)$ $F_1 = -\frac{S\ell}{40}(11P_1 + 4P_2)$ $F_a = \frac{S\ell}{40}\begin{bmatrix} 20(P_2 - P_1)\alpha^2 \\ +40P_1\alpha - 11P_1 - 4P_2 \end{bmatrix}$	$M_2 = \frac{S\ell^2}{120}(7P_1 + 8P_2)$
		Midspan pressure = 0		$M = \max(\lvert M_a\rvert, \lvert 0.6M_2\rvert)$ $M_a = \frac{SP_2\ell_2\ell\alpha}{40}(\mu^3 - 5\mu^2) + \left[\frac{SP_2}{6\ell_2}(\alpha\ell - \ell_1)^3\right]$	$F = \max(\lvert F_1\rvert, \lvert F_a\rvert)$ $F_1 = \frac{SP_2\ell_2}{40}(\mu^3 - 5\mu^2)$ $F_a = \frac{SP_2\ell_2}{40}(\mu^3 - 5\mu^2)$ $+\left[\frac{SP_2}{2l_2}(\alpha\ell - \ell_1)^2\right]$	$M_2 = \frac{SP_2{\ell_2}^2}{120}$ $(3\mu^2 - 15\mu + 20)$

ℓ, ℓ_1 and ℓ_2: As given in **Table 7.2.7-1**

P_1 and P_2: Loads (kN/m^2) corresponding to each assessment condition specified in **Table 7.2.1~~2~~-1** to be calculated at the web centre of the upper and lower ends of ℓ of the girder, respectively. However, where an upper stool is provided, P_1 is to be calculated at the deck level.

S: Breadth of 1/2 pitch (m) of the corrugation

α: $\frac{\ell - h_S}{\ell}$

h_S: Height (m) of the lower stool

(1) When calculating the required section modulus of corrugated bulkheads within the range from the upper end of l to $l/3$, the moment M need not be greater than $0.75M_2$.

Table 7.2.7-3 Plastic Moments

Lower end		Upper end	
		Connected to stool Supported by girder	Connected to deck
(1)	Supported by girder Connected to deck or double bottom	$\frac{P_bS\ell^2}{4(2+\frac{{z_1}'}{{z_0}'}+\frac{{z_2}'}{{z_0}'})}$	$\frac{P_bS\ell^2}{4(2+\frac{{z_2}'}{{z_0}'})}$
(2)	Connected to stool	$\frac{P_SS(\ell+h_S)^2}{4(2+\frac{{z_1}'}{{z_0}'}+\frac{d_H}{d_0})}$	$\frac{P_SS(\ell+h_S)^2}{4(2+\frac{d_H}{d_0})}$
		Not to be less than the value in **(1)**.	

P_b: Load (*kN/m*^{2}) acting on the bulkhead to be taken as follows:

$$P_b = \frac{P_1 + P_2}{2}$$

P_S: Load (*kN/m*^{2}) acting on the bulkhead and lower stool to be taken as follows:

$$P_b = \frac{P_1 + P_3}{2}$$

P_1 and P_2: Loads (*kN/m*^{2}) in the flooded condition specified in **Table 7.2.1-1** to be calculated at the upper and lower ends of ℓ, respectively.

However, where an upper stool is provided, P_1 is to be calculated at the deck level.

P_3: Load (*kN/m*^{2}) in the flooded condition specified in **Table 7.2.1~~2~~-1** to be calculated at the lower end of the lower stool

S: 1/2 pitch (*m*) of the corrugation

ℓ: Length (*m*) between the supporting points as specified in **Fig. 7.2.7-2**

d_0: Corrugation depth (*mm*)

d_H: Breadth (*mm*) of the stool on the top of the inner bottom plating

${Z_i}'$: Plastic section modulus considering the effect of buckling to be taken as follows:

$${Z_i}' = \frac{2C_{xi}}{C_{xi}+1} f Z_i \quad (i = 0,1,2)$$

Where:

$$C_{xi} = \frac{2.25}{\beta_i} - \frac{1.25}{\beta_i^2} \quad (i = 0,1,2) \text{ for } \beta_i > 1.25$$

$$C_{xi} = 1 \quad (i = 0,1,2) \text{ for } \beta_i \leq 1.25$$

Amendment (5)
Revises the coefficients that take into account strength reduction due to buckling.

Revises the formula because it could result in unreasonable values

Amended	Original	Remarks
$\beta_i = \frac{b_f}{t_{fi-n50}}\sqrt{\frac{\sigma_Y}{E}}$ $(i = 0, 1, 2)$ Z_0 and t_{f0-n50}: Minimum section modulus (*cm*^{3}) per 1/2 pitch and minimum thickness (*mm*) of the flange of midpart for 0.6ℓ of the corrugated bulkhead, respectively Z_1 and t_{f1-n50}: Minimum section modulus (*cm*^{3}) per 1/2 pitch and the minimum thickness (*mm*) of the flange at the upper end of the bulkhead, respectively Z_2 and t_{f2-n50}: Minimum section modulus (*cm*^{3}) per 1/2 pitch and the minimum thickness (*mm*) of the flange at the lower end of the bulkhead, respectively σ_Y: Specified minimum yield stress (*N/mm*^{2}) E: Young's modulus to be taken as 206,000 (*N/mm*^{2}) f: Shape coefficient to be taken as 1.1		such as negative values depending on the value of β_i.
7.4 Pillars, Struts, Etc. **7.4.2 Scantling Requirements** **7.4.2.1 Buckling Strength Requirements (Euler Buckling)** For members subject to axial compressive loads, such as pillars or struts, their sectional area is to be not less than that obtained from the following formula: $A_{n50} = C_S \frac{F}{\sigma_{cr}} \times 10$ (*cm*^{2}) C_S: Safety factor to be taken as 1.4. However, when struts are placed between longitudinals in double bottom and double side, C_S is to be taken as 2.8. F: Compressive load (*kN*) specified in each requirement. However, the compressive load may be obtained by direct strength analysis. Where pillars are subject to strength assessment, **4.5.2.1-3** is to be applied. In such cases, loads transmitted from upper tween deck pillars to the	**7.4 Pillars, Struts, Etc.** **7.4.2 Scantling Requirements** **7.4.2.1 Buckling Strength Requirements (Euler Buckling)** For members subject to axial compressive loads, such as pillars or struts, their sectional area is to be not less than that obtained from the following formula: $A_{n50} = C_S \frac{F}{\sigma_{cr}} \times 10$ (*cm*^{2}) C_S: Safety factor to be taken as 1.4. However, when struts are placed between longitudinals in double bottom and double side, C_S is to be taken as 2.8. F: Compressive load (*kN*) specified in each requirement. However, the compressive load may be obtained by direct strength analysis. (Newly Added)	Amendment (7) Clarification of loads to be used in buckling strength assessment of pillars The reference to the requirements for calculating compressive loads is to be clearly specified. In addition, it is to be clearly stated that loads transmitted from upper tween deck pillars are also to be taken into account.

Amended	Original	Remarks
pillars under assessment are also to be taken into account. (Omitted)	(Omitted)	
Chapter 8 STRENGTH ASSESSMENT BY CARGO HOLD ANALYSIS	**Chapter 8 STRENGTH ASSESSMENT BY CARGO HOLD ANALYSIS**	
8.3 Structural Model	**8.3 Structural Model**	
8.3.3 Meshing and Related Issues	**8.3.3 Meshing and Related Issues**	
8.3.3.5 Local Models* **1** Where the geometry or structural responses cannot be adequately represented with the typical mesh size specified in 8.3.3.1, or where stress concentration areas are assessed, strength assessment may be carried out using a local structural model with a finer mesh size (hereinafter, “local model”) of the location to be considered. The finer mesh size means a mesh size appropriately determined so as to obtain the intended representation of structural responses. **2** A smooth transition of the mesh size from a location modelled with the finer mesh size to locations modelled with the typical mesh size is to be maintained. **3** Finite element analysis using only a local model may be carried out utilizing the data obtained from finite element analysis using a structural model reproducing cargo holds.	**8.3.3.5 Local Models*** **1** Where the geometry or structural responses cannot be adequately represented with the typical mesh size specified in 8.3.3.1, strength assessment may be carried out using a local structural model with a finer mesh size (hereinafter, “local model”) of the location to be considered. The finer mesh size means a mesh size appropriately determined so as to obtain the intended representation of structural responses. **2** A smooth transition of the mesh size from a location modelled with the finer mesh size to locations modelled with the typical mesh size is to be maintained. **3** Finite element analysis using only a local model may be carried out utilizing the data obtained from finite element analysis using a structural model reproducing cargo holds.	Amendment (8) Specifies criteria when opting to assess stress concentration areas

Amended-Original Requirements Comparison Table
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended	Original	Remarks
8.6 Strength Assessment **8.6.1 Yield Strength Assessment** **8.6.1.2 Criteria** **1** All members to be assessed in the target hold are to comply with the following formula: $\lambda_y \leq \lambda_{yperm}$ λ_y: Yield utilisation factor, taken as follows: For shell elements: $\lambda_y = \frac{\sigma_{eq}}{235/K}$ For rod elements or beam elements: $\lambda_y = \frac{\lvert\sigma_a\rvert}{235/K}$ K: Material factor specified in **3.2.1**. λ_{yperm}: Permissible utilisation factor, taken as specified in **Table 8.6.1-1**: **2** The criteria for the optional assessment of stress concentration areas are to be as deemed appropriate by the Society.	**8.6 Strength Assessment** **8.6.1 Yield Strength Assessment** **8.6.1.2 Criteria** All members to be assessed in the target hold are to comply with the following formula: $\lambda_y \leq \lambda_{yperm}$ λ_y: Yield utilisation factor, taken as follows: For shell elements: $\lambda_y = \frac{\sigma_{eq}}{235/K}$ For rod elements or beam elements: $\lambda_y = \frac{\lvert\sigma_a\rvert}{235/K}$ K: Material factor specified in **3.2.1**. λ_{yperm}: Permissible utilisation factor, taken as specified in **Table 8.6.1-1**: (Newly Added)	Amendment (8) Specifies criteria when opting to assess stress concentration areas

Amended	Original	Remarks
Annex 8.6 BUCKLING STRENGTH ASSESSMENT BASED ON CARGO HOLD ANALYSIS **An2. Buckling Strength Assessment Methods for Different Types of Structures** **An2.4 Corrugated Bulkheads** **An2.4.1 Flange and Web Local Buckling** **2** In the application of **-1** above, for local buckling under compressive loads in longer side direction of the flange of corrugated bulkheads, utilisation factor may be calculated by the following formulae instead of the assessment specified in **An2.2.1**. In this case, local buckling under compressive loads in shorter side direction specified in **An2.2.2** does not need to be assessed. Panel is to be divided in accordance with **-1** above. $\eta_l = \frac{\sigma_x}{\sigma_{cr\_cor}}$ σ_{cr_cor} : Critical buckling stress considering buckling of corrugated bulkhead (N/mm^2) is according to the following formula. $\sigma_{cr\_cor} = \frac{2C_x}{C_x + 1}\sigma_{Yp}$ C_x : According to the following formula. $C_x = \frac{2.25}{\beta} - \frac{1.25}{\beta^2}\ \underline{\text{for } \beta > 1.25}$ $\underline{C_x = 1 \text{ for } \beta \le 1.25}$	**Annex 8.6 BUCKLING STRENGTH ASSESSMENT BASED ON CARGO HOLD ANALYSIS** **An2. Buckling Strength Assessment Methods for Different Types of Structures** **An2.4 Corrugated Bulkheads** **An2.4.1 Flange and Web Local Buckling** **2** In the application of **-1** above, for local buckling under compressive loads in longer side direction of the flange of corrugated bulkheads, utilisation factor may be calculated by the following formulae instead of the assessment specified in **An2.2.1**. In this case, local buckling under compressive loads in shorter side direction specified in **An2.2.2** does not need to be assessed. Panel is to be divided in accordance with **-1** above. $\eta_l = \frac{\sigma_x}{\sigma_{cr\_cor}}$ σ_{cr_cor} : Critical buckling stress considering buckling of corrugated bulkhead (N/mm^2) is according to the following formula. $\sigma_{cr\_cor} = \frac{2C_x}{C_x + 1}\sigma_{Yp}$ C_x : According to the following formula. $C_x = \frac{2.25}{\beta} - \frac{1.25}{\beta^2}$	Amendment (5) Revises the coefficients that take into account strength reduction due to buckling. Revises the formula because it could result in unreasonable values such as negative values depending on the value of β.

Amended	Original	Remarks
Chapter 10 ADDITIONAL STRUCTURAL REQUIREMENTS	**Chapter 10 ADDITIONAL STRUCTURAL REQUIREMENTS**	
10.7 Structural Strength against Bow Impact Pressure	**10.7 Structural Strength against Bow Impact Pressure**	
10.7.2 Blunt Ships	**10.7.2 Blunt Ships**	
10.7.2.6 Primary Supporting Members	**10.7.2.6 Primary Supporting Members**	
7 The web thickness t_w (*mm*) of the primary supporting member that includes the deck and bulkhead in way of side shell is not to be less than that obtained by the following formula:	**7** The web thickness t_w (*mm*) of the primary supporting member that includes the deck and bulkhead in way of side shell is not to be less than that obtained by the following formula:	
$t_w=\frac{P_{FB2}b_{BI}}{\sin\varphi_W\sigma_{cr}}$ φ_W: Angle (*deg*) between the web and shell plating of the primary supporting member (*See* **Fig. 10.7.2-3**) σ_{cr}: Critical buckling stress (*N/mm*^{2}) of the web of the primary supporting member or deck or bulkhead panel obtained by the following formulae:	$t_w=\frac{P_{FB2}b_{BI}}{\sin\varphi_W\sigma_{cr}}$ φ_W: Angle (*deg*) between the web and shell plating of the primary supporting member (*See* **Fig. 10.7.2-3**) σ_{cr}: Critical buckling stress (*N/mm*^{2}) of the web of the primary supporting member or deck or bulkhead panel obtained by the following formulae:	Amendment (5) Revises the coefficients that take into account strength reduction due to buckling.
When $h_w \geq b_w$ $\underline{\sigma_{cr}=\left(\frac{2.25}{\beta}-\frac{1.25}{\beta^2}\right)\sigma_Y \text{ for } \beta > 1.25}$ $\underline{\sigma_{cr}=\sigma_Y \text{ for } \beta \leq 1.25}$ $\beta=\frac{b_w}{t_w}\sqrt{\frac{\sigma_Y}{E}}$	When $h_w \geq b_w$ $\underline{\sigma_{cr}=\min\left(\left(\frac{2.25}{\beta}-\frac{1.25}{\beta^2}\right)\sigma_Y,\sigma_Y\right)}$ $\beta=\frac{b_w}{t_w}\sqrt{\frac{\sigma_Y}{E}}$	Revises the formula because it could result in unreasonable values such as negative values depending on the value of β.
When $h_w < b_w$	When $h_w < b_w$	Revises the formula because it could result in

Amended	Original	Remarks
$\sigma_{cr}=\min\left(\left[\begin{matrix}\frac{h_w}{b_w}\left(\frac{2.25}{\beta_1}-\frac{1.25}{{\beta_1}^2}\right)\\+\left(1-\frac{h_w}{b_w}\right)\left(\frac{0.06}{\beta}+\frac{0.6}{\beta^2}\right)\end{matrix}\right]\sigma_Y,\sigma_Y\right)$ $\underline{\beta_1=\max(\beta,1.25)}$ $\beta=\frac{h_w}{t_w}\sqrt{\frac{\sigma_Y}{E}}$ h_w: Web depth (*mm*) of the primary supporting member b_w: Spacing (*mm*) of the web stiffeners of the primary supporting member σ_Y: Specified minimum yield stress (*N/mm*^{2}) of the web of the primary supporting member	$\sigma_{cr}=\min\left(\left[\begin{matrix}\frac{h_w}{b_w}\left(\frac{2.25}{\beta}-\frac{1.25}{\beta^2}\right)\\+\left(1-\frac{h_w}{b_w}\right)\left(\frac{0.06}{\beta}+\frac{0.6}{\beta^2}\right)\end{matrix}\right]\sigma_Y,\sigma_Y\right)$ $\beta=\frac{h_w}{t_w}\sqrt{\frac{\sigma_Y}{E}}$ h_w: Web depth (*mm*) of the primary supporting member b_w: Spacing (*mm*) of the web stiffeners of the primary supporting member σ_Y: Specified minimum yield stress (*N/mm*^{2}) of the web of the primary supporting member	unreasonable values such as negative values depending on the values of β and h_w/b_w.

Amended	Original	Remarks
Part 2-1 CONTAINER CARRIERS	**Part 2-1 CONTAINER CARRIERS**	
Chapter 5 LONGITUDINAL STRENGTH	**Chapter 5 LONGITUDINAL STRENGTH**	
5.4 Hull Girder Ultimate Strength	**5.4 Hull Girder Ultimate Strength**	
5.4.2 Hull Girder Ultimate Strength Assessment The following formula is to be satisfied. $\gamma_S M_S + \gamma_W M_W \le \frac{M_U}{\gamma_M \gamma_{DB}}$	**5.4.2 Hull Girder Ultimate Strength Assessment** The following formula is to be satisfied. $\gamma_S M_S + \gamma_W M_W \le \frac{M_U}{\gamma_M \gamma_{DB}}$	
γ_S: Partial safety factor for the vertical still water bending moment, to be taken as follows. $\gamma_s = 1.0$	γ_S: Partial safety factor for the vertical still water bending moment, to be taken as follows. $\gamma_s = 1.0$	
γ_W: Partial safety factor for the vertical wave bending moment, to be taken as follows. $\gamma_w = 1.2$	γ_W: Partial safety factor for the vertical wave bending moment, to be taken as follows. $\gamma_w = 1.2$	
M_s, M_w: Vertical still water bending moment and vertical wave bending moment (*kN-m*) for the load cases "hogging" and "sagging" as specified in **4.2.2.5**	M_s, M_w: Vertical still water bending moment and vertical wave bending moment (*kN-m*) for the load cases "hogging" and "sagging" as specified in **4.2.2.5**	
M_U: The hull girder ultimate strength (*kN-m*), which is to be obtained by the method specified in **Annex 5.4, Part 1**. However, instead of the load-end shortening curves formula $\sigma_{CR5} - \epsilon$ specified in **An2.3.8, Annex 5.4, Part 1**, the following is to be used.	M_U: The hull girder ultimate strength (*kN-m*), which is to be obtained by the method specified in **Annex 5.4, Part 1**. However, instead of the load-end shortening curves formula $\sigma_{CR5} - \epsilon$ specified in **An2.3.8, Annex 5.4, Part 1**, the following is to be used.	Amendment (5) Revises the coefficients that take into account strength reduction due to buckling. Revises the formula because it could result in

Amended-Original Requirements Comparison Table
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended	Original	Remarks
$\sigma_{CR5}=\min\left\{\begin{array}{c}\Phi\sigma_{YP}\\ \Phi\sigma_{YP}\left[\begin{array}{c}\frac{s}{l}\left(\frac{2.25}{\beta_{E\_1}}-\frac{1.25}{{\beta_{E\_1}}^2}\right)\\ +0.1\left(1-\frac{s}{l}\right)\left(1+\frac{1}{{\beta_E}^2}\right)^2\end{array}\right]\end{array}\right.$ σ_{YP}:Standard minimum yield stress of plate material (*N/mm*^{2}) Φ, β_E, β_{E_1}, s, l: As prescribed in **An2.3.8, Annex 5.4, Part 1**. γ_M: Partial safety factor for the hull girder ultimate strength, to be taken as follows. $\gamma_M=1.05$ γ_{DB}: Partial safety factor for the hull girder ultimate strength, considering the effect of double bottom bending given by the following formula. However, for cross sections where the double bottom breadth of the inner bottom is less than that at amidships or where the double bottom structure differs from at amidships (e.g. engine rooms), the factor γ_{DB} for hogging condition may be reduced subject to approval by the Society. For hogging condition, $\gamma_{DB}=1.15$ For sagging condition, $\gamma_{DB}=1.0$	$\sigma_{CR5}=\min\left\{\begin{array}{c}\sigma_{YP}\Phi\\ \Phi\sigma_{YP}\left[\begin{array}{c}\frac{s}{l}\left(\frac{2.25}{\beta_E}-\frac{1.25}{{\beta_E}^2}\right)\\ +0.1\left(1-\frac{s}{l}\right)\left(1+\frac{1}{{\beta_E}^2}\right)^2\end{array}\right]\end{array}\right.$ σ_{YP}:Standard minimum yield stress of plate material (*N/mm*^{2}) Φ, β_E, s, l: As prescribed in **An2.3.8, Annex 5.4, Part 1**. γ_M: Partial safety factor for the hull girder ultimate strength, to be taken as follows. $\gamma_M=1.05$ γ_{DB}: Partial safety factor for the hull girder ultimate strength, considering the effect of double bottom bending given by the following formula. However, for cross sections where the double bottom breadth of the inner bottom is less than that at amidships or where the double bottom structure differs from at amidships (e.g. engine rooms), the factor γ_{DB} for hogging condition may be reduced subject to approval by the Society. For hogging condition, $\gamma_{DB}=1.15$ For sagging condition, $\gamma_{DB}=1.0$	unreasonable values such as negative values depending on the values of β_E and s/l.

Amended-Original Requirements Comparison Table
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

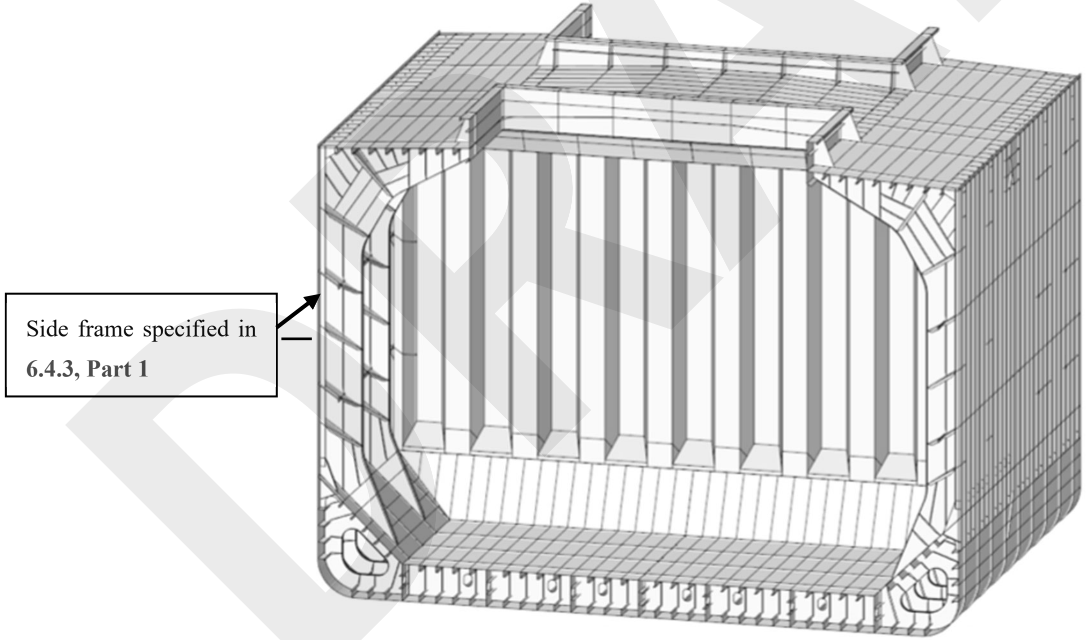
<table>
<tr><th>Amended</th><th>Original</th><th>Remarks</th></tr>
<tr><td>Chapter 9 FATIGUE</td><td>Chapter 9 FATIGUE</td><td></td></tr>
<tr><td>9.4 Torsional Fatigue Strength Assessment</td><td>9.4 Torsional Fatigue Strength Assessment</td><td></td></tr>
<tr><td>9.4.5 Hot Spot Stresses</td><td>9.4.5 Hot Spot Stresses</td><td></td></tr>
<tr><td>9.4.5.3 Loading Conditions and Fractions of Time to be Considered
1 Standard loading conditions and fractions of time are to be as given in Table 9.4.5-1.
2 Notwithstanding -1 above, an appropriate combination is to be considered in cases where considering loading conditions and fractions of time other than those given in Table 9.4.5-1.

Table 9.4.5-1 Standard Loading Conditions and Fractions of Time
<table>
<tr><th>Loading condition</th><th>Fraction of time $\alpha_{(j)}$</th></tr>
<tr><td>Container cargo homogeneously loaded condition</td><td>100 %</td></tr>
</table></td><td>(Newly Added)</td><td>Amendment (10)
Clarifies some definitions and corrects typographical errors.

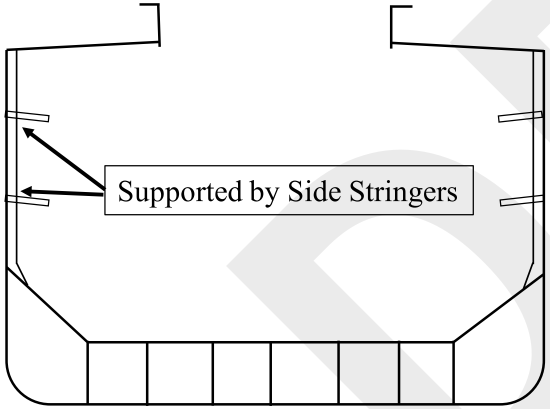
Standard loading conditions and fractions of time are clarified for torsional fatigue strength assessment.</td></tr>
<tr><td>9.4.5.4 Weld Root Fatigue Strength Assessment
Weld root fatigue strength assessment is to be in accordance with 9.7, Part 1.</td><td>9.4.5.3 Weld Root Fatigue Strength Assessment
Weld root fatigue strength assessment is to be in accordance with 9.7, Part 1.</td><td></td></tr>
</table>

Amended	Original	Remarks
Part 2-4 WOOD CHIP CARRIERS	**Part 2-4 WOOD CHIP CARRIERS**	
Chapter 6 LOCAL STRENGTH	**Chapter 6 LOCAL STRENGTH**	
6.1 General	**6.1 General**	
6.1.1 Application	**6.1.1 Application**	
6.1.1.1 Chip Carriers	**6.1.1.1 Chip Carriers**	

Fig. 6.1.1-2 Application Example of Chip Carriers

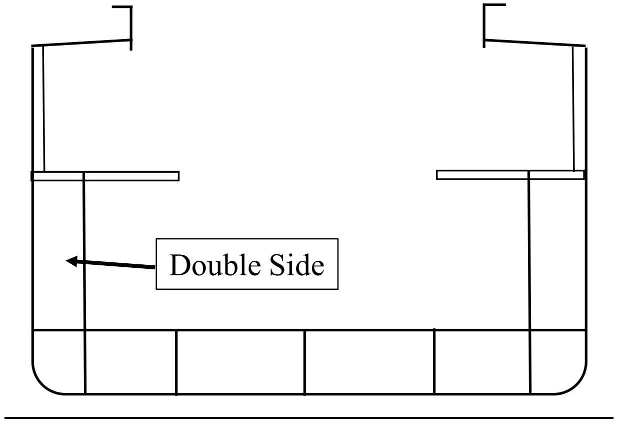


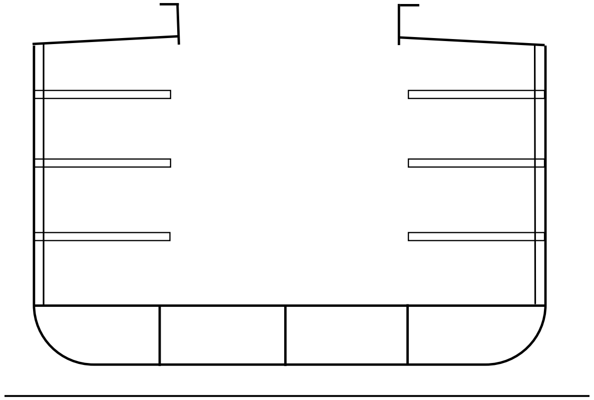
Amended-Original Requirements Comparison Table
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

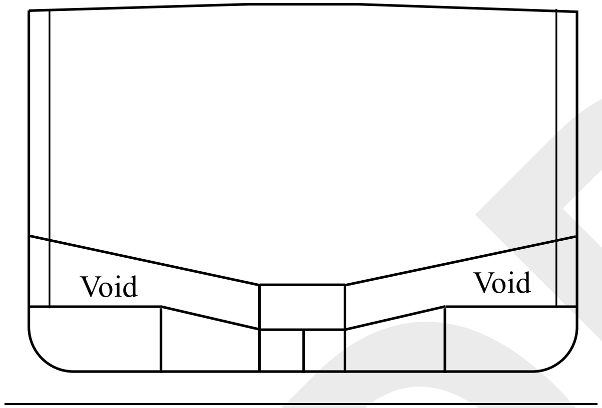
Amended	Original	Remarks
6.2 Stiffeners	**6.2 Ballast Holds**	Rearranges the composition of chapter.
6.2.1 Side Frames	**6.2.1 Side Frames**	
6.2.1.1 In applying **6.4.3.2, Part 1**, the scantlings for side frames in the cargo holds of chip carriers are to be in accordance with the following **(a)** and **(b)**. However, when the type of construction cannot be easily categorised into the type shown in **Fig. 6.2.1-1**, the scantlings are to be as deemed appropriate by the Society. (a) The value of f_{bc} is to be taken as 0.85, not 0.8. (b) Rotation moment M_2 and shear force F_2 at the lower end of the side frame due to double bottom bending need not be considered.	**(Newly Added)**	Amendment (3) Clarifies the requirements related to side frames Specifies the substitution of coefficients for chip carriers. There is no change of requirements compared to the current rules.
Fig.6.2.1-1 Example Cross Section of a Chip Carrier  	(Newly Added)	

Amended	Original	Remarks
6.2.1.2 Ballast Holds The section modulus of the side frame and the thickness of the web in the cargo hold where the ballast is loaded are to satisfy the requirements of **6.4.2** and **6.4.3.2, Part 1**. However, when applying **6.4.2, Part 1**, only assessment based on a liquid cargo in **Table 6.2.2-1, Part 1** is applied, and the effective bending span and effective shear span of the side frame is specified in **6.4.3.2, Part 1**.	**6.2.1.1 Scantlings of Side Frames** The section modulus of the side frame and the thickness of the web in the cargo hold where the ballast is loaded are to satisfy the requirements of **6.4.2** and **6.4.3.2, Part 1**. However, when applying **6.4.2, Part 1**, only assessment based on a liquid cargo in **Table 6.2.2-1, Part 1** is applied, and the effective bending span and effective shear span of the side frame is specified in **6.4.3.2, Part 1**.	Modifies the numbers.
(Deleted)	**6.3 Bilge Hopper Tanks**	Rearranges the composition of chapter.
(Deleted)	**6.3.1 Side Longitudinals and Longitudinals on Bilge Hopper Plating**	
6.2.1.3 Connections of the Bottom of the Side Frame In applying the requirements of **6.4, Part 1**, the section modulus of the side longitudinals and longitudinals on bilge hopper plating that support the support brackets installed inside the bilge hopper tank specified in **10.2.2.2-2** are not to less than the value calculated as the distance (m) between the girders in the formula ℓ regardless of the placement of the support bracket.	**6.3.1.1 Connections of the Bottom of the Side Frame** In applying the requirements of **6.4, Part 1**, the section modulus of the side longitudinals and longitudinals on bilge hopper plating that support the support brackets installed inside the bilge hopper tank specified in **10.2.2.2-2** are not to less than the value calculated as the distance (m) between the girders in the formula ℓ regardless of the placement of the support bracket.	Modifies the numbers.

Amended	Original	Remarks
Part 2-5 GENERAL CARGO SHIPS AND REFRIGERATED CARGO SHIPS	**Part 2-5 GENERAL CARGO SHIPS AND REFRIGERATED CARGO SHIPS**	
Chapter 6 LOCAL STRENGTH	**Chapter 6 LOCAL STRENGTH**	
6.2 Stiffeners	**(Newly Added)**	Amendment (3) Clarifies the requirements related to side frames
6.2.1 Side Frames	**(Newly Added)**	
6.2.1.1 General Cargo Ships In applying **6.4.3.2, Part 1**, the scantlings for side frames in the cargo holds of general cargo ships are to be in accordance with the following **(a)** and **(b)**. However, when the type of construction cannot be easily categorised into the type shown in **Fig. 6.2.1-1**, the scantlings are to be as deemed appropriate by the Society. (a) The value of f_{bc} is to be taken as 1.0, not 0.8. (b) Rotation moment M_2 and shear force F_2 at the lower end of the side frame due to double bottom bending need not be considered.	**(Newly Added)**	Specifies the substitution of coefficients for general cargo ships. As shown in Fig.6.1.1-1, the one provided in the second layer with the first layer being double side structure is assumed to be the side frames of general cargo ships. The coefficient f_{bc} corresponding to boundary conditions is to be taken as 1.0, meaning fixed. Moment and shear force due to double bottom bending need not be considered.

Amended	Original	Remarks
Fig.6.2.1-1 Example Cross Section of a General Cargo Ship 	(Newly Added)	
6.2.1.2 Refrigerated Cargo Ships In applying **6.4.3.2, Part 1** to side frames in the cargo holds of refrigerated cargo ships, rotation moment M_2 and shear force F_2 at the lower end of the side frame due to double bottom bending need not be considered. However, when the type of construction cannot be easily categorised into the type shown in **Fig. 6.2.1-1**, the scantlings are to be as deemed appropriate by the Society.	**(Newly Added)**	Amendment (3) Clarifies the requirements related to side frames Specifies the substitution of coefficients for refigerated cargo ships. Being multiple-deck ships, the coefficient f_{bc} is set to 0.8 for the bottom layer and 1.0 for the other layers, which are considered fixed. (Specified in Part 1) In addition, rotation moment and shear force at the lower end of the side frames due to double bottom bending

Amended	Original	Remarks
Fig.6.2.1-2 Example Cross Section of a Refrigerated Cargo Ship 	(Newly Added)	need not be considered
6.2.1.3 Cement Carriers In applying **6.4.3.2, Part 1**, the scantlings of side frames in the cargo holds of cement carriers are to be in accordance with the following **(a)** and **(b)**. However, when the type of construction cannot be easily categorised into the type shown in **Fig. 6.2.1-1**, the scantlings are to be as deemed appropriate by the Society. (a) The value of f_{load} is to be taken as 0.8, not 1.0, and value of f_{bc} is to be taken as 0.9, not 0.8. (b) Rotation moment M_2 and shear force F_2 at the lower end of the side frame due to double bottom bending need not be considered.	**(Newly Added)**	Specifies the substitution of coefficients for cement carriers. As for cement carriers, it is considered that the empty hold due to multiport loading condition is dominant because the internal cargo load counteracts the external seawater pressure in full loading condition. Therefore, the coefficient f_{load} = 0.8 for multiport loading condition and the coefficient f_{bc}= 0.9 for

Amended	Original	Remarks
Fig.6.2.1-3 Example Cross Section of a Cement Carrier  	(Newly Added)	boundary conditions, taking into account the structure with void under the inner bottom plate, which is unique to cement ships. In addition, rotation moment and shear force at the lower end of the side frames due to double bottom bending need not be considered

Amended	Original	Remarks
6.3 Ships Loaded with Special Cargo	**6.2 Ships Loaded with Special Cargo**	Modifies the numbers.
6.3.1 General	**6.2.1 General**	
6.3.1.1 Where loads of cargoes are not to be regarded as distributed loads, **6.3** is to be followed.	**6.2.1.1** Where loads of cargoes are not to be regarded as distributed loads, **6.2** is to be followed.	
6.3.2 Ships Loaded with Steel Coils	**6.2.2 Ships Loaded with Steel Coils**	
6.3.2.1 Plates and Stiffeners Plates and stiffeners for ships loaded with steel coils are to be in accordance with **10.1**.	**6.2.2.1 Plates and Stiffeners** Plates and stiffeners for ships loaded with steel coils are to be in accordance with **10.1**.	
6.3.3 Ships Loaded with Vehicles (Including Cases Where Vehicles Are Used During Cargo Handling)	**6.2.3 Ships Loaded with Vehicles (Including Cases Where Vehicles Are Used During Cargo Handling)**	
6.3.3.1 Plates and Stiffeners **1** The plates and stiffeners of decks and inner bottom platings on which vehicles are loaded are to be in accordance with **10.1, Part 2-6**. **2** Where plates and stiffeners are subjected to concentrated loads from wheels during cargo handling that vehicles such as forklifts are used, the plates and stiffeners are to be in accordance with **10.1, Part 2-6**.	**6.2.3.1 Plates and Stiffeners** **1** The plates and stiffeners of decks and inner bottom platings on which vehicles are loaded are to be in accordance with **10.1, Part 2-6**. **2** Where plates and stiffeners are subjected to concentrated loads from wheels during cargo handling that vehicles such as forklifts are used, the plates and stiffeners are to be in accordance with **10.1, Part 2-6**.	
6.3.4 Ships Loaded with Other Special Cargo	**6.2.4 Ships Loaded with Other Special Cargo**	
6.3.4.1 Ships loaded with special cargo other than that described in **6.2.2** and **6.2.3** above are to be as deemed	**6.2.4.1** Ships loaded with special cargo other than that described in **6.2.2** and **6.2.3** above are to be as deemed	

Amended	Original	Remarks
appropriate by the Society, taking into consideration the mode of action of the load by each cargo.	appropriate by the Society, taking into consideration the mode of action of the load by each cargo.	
Chapter 10 ADDITIONAL STRUCTURAL REQUIREMENTS	**Chapter 10 ADDITIONAL STRUCTURAL REQUIREMENTS**	
10.1 Ships Carrying Steel Coils	**10.1 Ships Carrying Steel Coils**	
10.1.5 Side Frames (Ships Without Bilge Hoppers and Single-Side Ships)	**10.1.5 Side Frames (Ships Without Bilge Hoppers and Single-Side Ships)**	
10.1.5.1 Side Frames	**10.1.5.1 Side Frames**	
1 In the cases other than three-tiered loading, the section moduli and web thicknesses of side frames are to be greater than or equal to the following values.	**1** In the cases other than three-tiered loading, the section moduli and web thicknesses of side frames are to be greater than or equal to the following values.	
$Z = 1.2\frac{F_{SC}\ell_{1bdg}}{8\sigma_Y} \times 10^3 (cm^3)$,	$Z = 1.2\frac{F_{SC}\ell_{1bdg}}{8\sigma_Y} \times 10^3 (cm^3)$,	
$t_w = 2.0\frac{0.5F_{SC}}{d_{shr}\tau_Y} \times 10^3 (mm)$	$t_w = 2.0\frac{0.5F_{SC}}{d_{shr}\tau_Y} \times 10^3 (mm)$	
σ_Y: Specified minimum yield stress (N/mm^2)	σ_Y: Specified minimum yield stress (N/mm^2)	
τ_Y: Allowable shear stress (N/mm^2) $\sigma_Y/\sqrt{3}$	τ_Y: Allowable shear stress (N/mm^2) $\sigma_Y/\sqrt{3}$	
F_{SC}: Load (kN) acting on the side frame according to **4.4.2.1-2**	F_{SC}: Load (kN) acting on the side frame according to **4.4.2.1-2**	
ℓ_{1bdg}: Effective bending span (m) of the side frame. Where a bracket is provided, the end of the effective bending span is to be taken to the position where the depth of the side frame and the bracket is equal to $\underline{1.5h_w}$ (*See* **Fig. 6.4.3-2, Part**	ℓ_{1bdg}: Effective bending span (m) of the side frame. Where a bracket is provided, the end of the effective bending span is to be taken to the position where the depth of the side frame and the bracket is equal to $\underline{2h_w}$ (*See* **Fig. 6.4.3-2, Part**	Modifies the definition of effective bending span as 6.4.3.2, Part 1.

Amended	Original	Remarks
1). d_{shr}: Effective shear depth (mm) of stiffener according to **3.6.4.2, Part 1**	1). d_{shr}: Effective shear depth (mm) of stiffener according to **3.6.4.2, Part 1**	
10.6 Ships Loaded with Heavy Cargoes on Upper Decks	**(Newly Added)**	
10.6.1 General	**(Newly Added)**	
10.6.1.1 General **1** For ships with $B/D \geq 2.5$, the vertical wave bending moment and the vertical wave shear force specified in **4.3.2.3** and **4.3.2.4, Part 1** respectively are to be determined and are to be approved by the Society after being discussed beforehand. **2** The upper deck plate, stiffener or its transverse web plate is to be suitably reinforced. **3** In cases where heavy cargoes are carried on upper decks, effective means such as steel or wooden dunnage, etc. are to be provided so that weight is uniformly distributed onto the deck structure.	**(Newly Added)**	Amendment(1) Specifies requirements for ships carrying heavy cargoes on upper deck, and also provides for a new notation“Heavy Deck Carrier”.

Amended	Original	Remarks
Part 2-6 VEHICLES CARRIERS AND ROLL-ON/ROLL-OFF SHIPS	**Part 2-6 VEHICLES CARRIERS AND ROLL-ON/ROLL-OFF SHIPS**	
Chapter 6 LOCAL STRENGTH	**Chapter 6 LOCAL STRENGTH**	
6.2 Stiffeners	**(Newly Added)**	Amendment (3) Clarifies the requirements related to side frames
6.2.1 Side Frames	**(Newly Added)**	
6.2.1.1 In applying **6.4.3.2, Part 1** to side frames in the cargo holds of vehicles carriers and ro-ro ships, rotation moment M_2 and shear force F_2 at the lower end of the side frame due to double bottom bending need not be considered.	**(Newly Added)**	Specifies the substitution of coefficients for vehicles carriers and Ro-ro ships. Being multiple-deck ships, the coefficient f_{bc} is set to 0.8 for the side frames on bottom layer and 1.0 for the other layers, which are considered fixed. (Specified in Part 1) In addition, rotation moment and shear force at the lower end of the side frames due to double bottom bending need not be considered

Amended-Original Requirements Comparison Table
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended	Original	Remarks
Chapter 10 ADDITIONAL STRUCTURAL REQUIREMENTS	**Chapter 10 ADDITIONAL STRUCTURAL REQUIREMENTS**	
10.2 Movable Car Deck	**10.2 Movable Car Deck**	
10.2.1 Movable Car Deck Girders	**10.2.1 Movable Car Deck Girders**	
10.2.1.2 Strength Requirement* **2** The effective breadth of compressive plate flange for each girder is to be determined by the following **(1)** and **(2)** corresponding to the stiffening direction of the panel. (1) Effective breadth for girders parallel to the stiffening direction: The value specified in **3.6.3, Part 1**. (2) Effective breadth (b_{eft}) for girders crossing at right angles with the stiffening direction: $b_{eft} = \sum_{n} \left(\frac{C_{et} \cdot a}{2} \right) (mm)$ Where buckling stiffeners for deck plates are fitted properly, these may be taken into account for the determination of effective breadth. However, it is not to exceed the value specified in **3.6.3, Part 1**.	**10.2.1.2 Strength Requirement*** **2** The effective breadth of compressive plate flange for each girder is to be determined by the following **(1)** and **(2)** corresponding to the stiffening direction of the panel. (1) Effective breadth for girders parallel to the stiffening direction: The value specified in **3.6.3, Part 1**. (2) Effective breadth (b_{eft}) for girders crossing at right angles with the stiffening direction: $b_{eft} = \sum_{n} \left(\frac{C_{et} \cdot a}{2} \right) (mm)$ Where buckling stiffeners for deck plates are fitted properly, these may be taken into account for the determination of effective breadth. However, it is not to exceed the value specified in **3.6.3, Part 1**.	
C_{et}: Coefficient as given by the following formula However, where it exceeds 1.0, it is to be taken as 1.0. $\underline{C_{et} = \left(\frac{3}{\beta_1} - \frac{1.75}{{\beta_1}^2} \right) \frac{b}{a} + \left(\frac{0.075}{\beta} + \frac{0.75}{\beta^2} \right) \left(1 - \frac{b}{a} \right)}$	C_{et}: Coefficient as given by the following formula However, where it exceeds 1.0, it is to be taken as 1.0. $\underline{C_{et} = \left(\frac{3}{\beta} - \frac{1.75}{\beta^2} \right) \frac{b}{a} + \left(\frac{0.075}{\beta} + \frac{0.75}{\beta^2} \right) \left(1 - \frac{b}{a} \right)}$	Amendment (5) Revises the coefficients that take into account strength reduction due to buckling.
n: 1 for girders located on the periphery of the car deck, and 2 for the others	n: 1 for girders located on the periphery of the car deck, and 2 for the others	Revises the formula because it could result in

Amended	Original	Remarks
a: Spacing (*mm*) of girders crossing at right angles with the stiffening direction b: Spacing (*mm*) of stiffeners $\underline{\beta_1 = \max(\beta, 2.21)}$ β: Coefficient determined as follows. $\beta = \frac{b}{t}\sqrt{\frac{\sigma_F}{E}}$ t: Thickness (*mm*) of car deck plating σ_F: Minimum upper yield stress or proof stress (*N/mm*^{2}) of the car deck material E: Modulus of elasticity (*N/mm*^{2}) of the material to be assumed equal to 2.06×10^5 for steel	a: Spacing (*mm*) of girders crossing at right angles with the stiffening direction b: Spacing (*mm*) of stiffeners β: Coefficient determined as follows. $\beta = \frac{b}{t}\sqrt{\frac{\sigma_F}{E}}$ t : Thickness (*mm*) of car deck plating σ_F: Minimum upper yield stress or proof stress (*N/mm*^{2}) of the car deck material E: Modulus of elasticity (*N/mm*^{2}) of the material to be assumed equal to 2.06×10^5 for steel	unreasonable values such as negative values depending on the values of β and b/a.

Amended	Original	Remarks
Part 2-9 SHIPS CARRYING LIQUEFIED GASES IN BULK (INDEPENDENT PRISMATIC TANKS TYPE A/B)	**Part 2-9 SHIPS CARRYING LIQUEFIED GASES IN BULK (INDEPENDENT PRISMATIC TANKS TYPE A/B)**	
Chapter 6 LOCAL STRENGTH	**Chapter 6 LOCAL STRENGTH**	
6.2 Stiffeners	**(Newly Added)**	
6.2.1 Side Frames	**(Newly Added)**	Amendment (3) Clarifies the requirements related to side frames Specifies that rotation moment and shear force due to double bottom bending need be considered where cargo holds under consideration can be empty due to multiport loading, etc.
6.2.1.1 In applying **6.4.3.2, Part 1** to side frames in cargo holds which can be empty due to multiport loading or other reasons, rotation moment M_2 and shear force F_2 at the lower end of the side frame due to double bottom bending need be considered.	**(Newly Added)**	

Amended	Original	Remarks
Part 2-10 SHIPS CARRYING LIQUEFIED GASES IN BULK (INDEPENDENT TANKS OF TYPE C)	**Part 2-10 SHIPS CARRYING LIQUEFIED GASES IN BULK (INDEPENDENT TANKS OF TYPE C)**	
Chapter 1 GENERAL	**Chapter 1 GENERAL**	
1.1 General	**1.1 General**	
1.1.1 Application	**1.1.1 Application**	
1.1.1.2 Correspondence with Other Rules of the Society In applying **1.2.2.5, Part 1**, relevant requirements specified in **Part D** and **Part N** are shown for reference.	**(Newly Added)**	

Table 1.1.1-1 Correspondence with Other Parts of the Society's Rules

Structure	Item	Relevant Parts. other than Part C
Hull structures	Applications of steels	**4.19.1, Part N** and **Chapter 6, Part N**
Cargo tanks	General	**4.23, Part N**
	Evaluation of loads due to flooding on ship	**4.15.2, Part N**
	Strength of pressure vessels	**10.5, Part D**
	Sloshing evaluation (within allowable filling levels)	**4.14.3, Part N**
	Thermal stress analysis (considering transient condition for cargo temperature below −55°C)	**4.13.4, Part N**

Amended-Original Requirements Comparison Table
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended	Original	Remarks
Chapter 4 LOADS	**Chapter 4 LOADS**	
4.1 General	**4.1 General**	
4.1.1 Overview	**4.1.1 Overview**	
4.1.1.1 Structure and Overview of this Chapter Each section of this Chapter defines the additional requirements shown in **Table 4.1.1-1** as the loads used for each formula and each strength assessment to determine the scantlings specified in each Chapter of **Part 2-10** and **Part 1**.	**4.1.1.1 Structure and Overview of this Chapter** Each section of this Chapter defines the additional requirements shown in **Table 4.1.1-1** as the loads used for each formula and each strength assessment to determine the scantlings specified in each Chapter of **Part 2-10** and **Part 1**.	

Table 4.1.1-1 Overview of Chapter 4

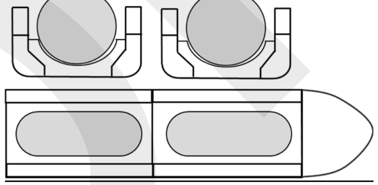
Section	Title	Overview
4.1	General	Requirements for the general principles of **Chapter 4**
4.2	Loads to be Considered in Local Strength	Additional requirements for loads to be considered for the local strength requirements specified in **Chapter 6, Part 1**.
4.3	Loads to be Considered in Strength of Primary Supporting Structures	Additional requirements for loads to be considered for the requirements of strength of primary supporting structures specified in **Chapter 7** and **Chapter 7, Part 1**.
4.4	Loads to be Considered in Strength Assessment by Cargo Hold Analysis	Additional requirements for loads to be considered for the requirements of strength assessment by cargo hold analysis specified in **Chapter 8** and **Chapter 8, Part 1.**

Amended	Original	Remarks
4.1.2 Design Load Scenarios and Loads to be Considered	**(Newly Added)**	
4.1.2.1 **1** In addition to **4.1.2.1, Part 1**, the design load scenarios	**(Newly Added)**	

Amended	Original	Remarks
and loads in the following **(1)** and **(2)** are to be considered in accordance with the requirements of this chapter: (1) 30-degree static heel condition: lateral loads due to seawater and cargo where the ship is heeled at 30 degrees (Relevant requirements: **4.13.9, Part N**) (2) Collision condition: Possible lateral loads due to seawater and cargo in the condition where the ship collides (Relevant requirements: **4.15.1, Part N**) **2** The design load scenarios specified in **14.5.2, Part N**(hereinafter referred to as the "flooded condition(IGC)") may be considered when deemed appropriate by the Society.		
4.4 Loads to be Considered in Strength Assessment by Cargo Hold Analysis	**(Newly Added)**	
4.4.1 General	**(Newly Added)**	
4.4.1.1 General **1** The loads to be considered in the strength assessment by the cargo hold analysis specified in **Chapter 8** and **Chapter 8, Part 1** are to be in accordance with **4.4**. **2** Additional requirements for loads in the maximum load condition are to be in accordance with **4.4.2**. **3** The loads in the harbour condition need not be considered. **4** The loads in the 30-degree static heel condition are to be in accordance with **4.4.3**. **5** The loads in the collision condition are to be in accordance with **4.4.4**. **6** The loads in the flooded condition (IGC) are to be in accordance with **4.4.5**.	**(Newly Added)**	

Amended	Original	Remarks
4.4.2 Maximum Load Condition **4.4.2.1 Loading Conditions** **1** Loading conditions which affect the structural response of each structure to be significantly assessed are to be considered appropriately for all possible loading conditions, except those restricted in the loading manual. **2** On ships with two cargo holds, the loading conditions specified in **Table 4.4.2-1** are to be considered. On ships with three or more holds, the loading conditions specified in **Table 4.4.2-2** are to be considered. However, notwithstanding the number of cargo holds, where restricting the loading conditions on sea-going in the loading manual, the corresponding loading conditions may not be considered.	**(Newly Added)** **(Newly Added)**	

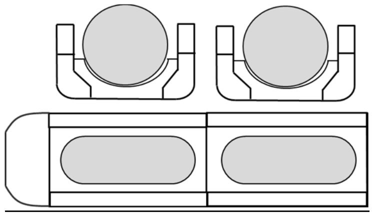
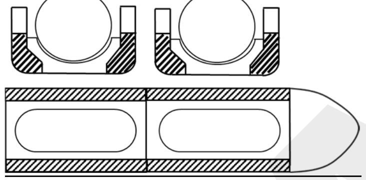
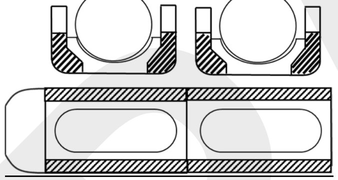
Table 4.4.2-1 Loading Conditions in Maximum Load Condition (Ships with Two Cargo Hold)

Loading condition[(1)(2)]	Loading pattern		Draught	Vertical still water bending moment M_{SV}	Equivalent design wave
Full load condition	*S*1	In the case of the foremost cargo hold  In the case of the aftmost cargo hold	T_{SC}	$0.5M_{SV\_max}$	*HM*-2/*FM*-2 *PCL*-2
				M_{SV_min}	*HM*-1/*FM*-1 *BR*-1*P*/-1*S* *BP*-1*P*/-1*S* *AV*-1*P*/-1*S* *PCL*-1

(Newly Added)

Amended-Original Requirements Comparison Table
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended	Original	Remarks

					
Ballast condition	*S*2	In the case of the foremost cargo hold  In the case of the aftmost cargo hold 	T_{BAL}	M_{SV_max}	*HM*-2/*FM*-2 *PCL*-2
				$0.5M_{SV\_max}$	*HM*-1/*FM*-1 *BR*-1*P*/-1*S* *BP*-1*P*/-1*S* *PCL*-1

▒ : Liquid cargo
▨ : Ballast water

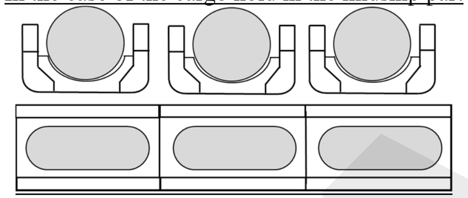
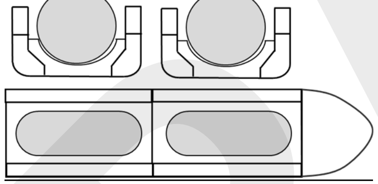
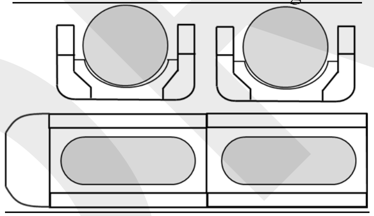
(1) The radius of gyration (*m*) around the *x*-axis, to be taken as 0.35*B* in the full load condition is to be taken as 0.40*B* in the ballast condition. However, the value calculated based on the weight distribution according to the loading condition to be considered may be used instead.

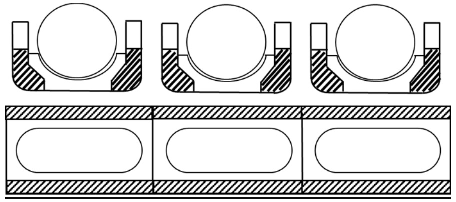
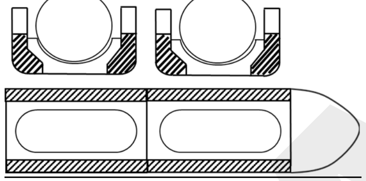
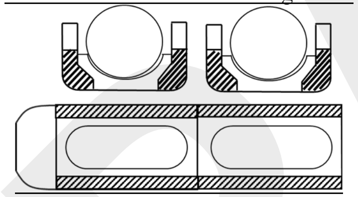
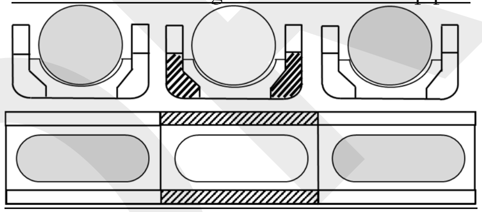
(2) Where the fuel oil tank is located in the cargo region, it is to be considered emptied

Amended-Original Requirements Comparison Table
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended	Original	Remarks
Table 4.4.2-2 Loading Conditions in Maximum Load Condition (Ships with Three or more Cargo Holds)		(Newly Added)

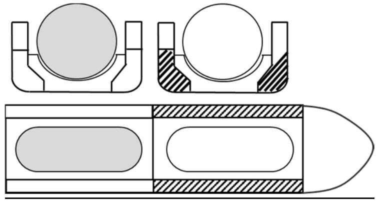
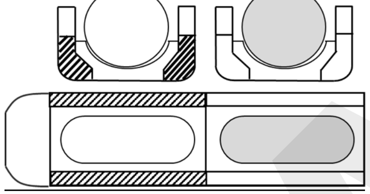
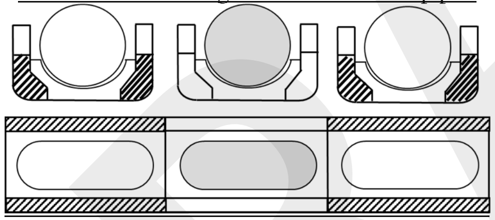
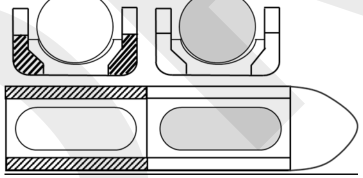
Table 4.4.2-2 Loading Conditions in Maximum Load Condition (Ships with Three or more Cargo Holds)

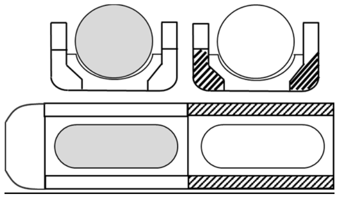
Loading condition(1)(2)	Loading pattern		Draught	Vertical still water bending moment M_{SV} (3)	Equivalent design wave
Full load condition	*S*1	In the case of the cargo hold in the midship part  In the case of the foremost cargo hold  In the case of the aftmost cargo hold 	T_{SC}	$0.5M_{SV\_max}$	*HM*-2/*FM*-2 *PCL*-2
				M_{SV_min}	*HM*-1/*FM*-1 *BR*-1*P*/-1*S* *BP*-1*P*/-1*S* *AV*-1*P*/-1*S* *PCL*-1
Ballast condition	*S*2	In the case of the cargo hold in the midship part	T_{BAL}	M_{SV_max}	*HM*-2/*FM*-2 *PCL*-2
				$0.5M_{SV\_max}$	*HM*-1/*FM*-1 *BR*-1*P*/-1*S* *BP*-1*P*/-1*S*

Amended							Original	Remarks
			 In the case of the foremost cargo hold  In the case of the aftmost cargo hold 			*PCL*-1		
	Condition loaded/unloaded in multiple ports	*S*3	In the case of the cargo hold in the midship part  In the case of the foremost cargo hold	T_{MP-max}	M_{SV_max}	*HM*-2/*FM*-2 *PCL*-2		

Amended-Original Requirements Comparison Table

(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

<table>
<tr><th colspan="4">Amended</th><th colspan="4">Original</th><th>Remarks</th></tr>
<tr><td rowspan="2"></td><td rowspan="2"></td><td></td><td>
In the case of the aftmost cargo hold
</td><td></td><td></td><td></td><td rowspan="2"></td><td rowspan="2"></td></tr>
<tr><td>S4</td><td>In the case of the cargo hold in the midship part

In the case of the foremost cargo hold

In the case of the aftmost cargo hold</td><td>T_{MP-min}</td><td>M_{SV_min}</td><td>HM-1/FM-1
BR-1P/-1S
BP-1P/-1S
PCL-1</td></tr>
</table>

▒ : Liquid cargo
▨ : Ballast water

(Notes)
T_{MP-max} : Maximum draught (m) for loading conditions corresponding to loading condition $S3$ in the loading manual.
T_{MP-min} : Minimum draught (m) for loading conditions corresponding to loading condition $S4$ in the loading manual.

(1) The radius of gyration (m) around the x-axis is to be taken as $0.35B$ in the full load condition, $0.40B$ in the ballast condition and $0.38B$ in the multiport loading/unloading condition. However, the value calculated based on the weight distribution according to the loading condition to be considered may be used instead.
(2) Where the fuel oil tank is located in the cargo region, it is to be considered emptied.
(3) In the multi-port loaded/unloaded condition, instead of the vertical still water bending moment specified in the table, the maximum or minimum vertical still water bending moment that occurs after considering all possible physical combinations (such as a full or empty consumable tank) may be considered.

Amended	Original	Remarks
4.4.2.2 Wave Conditions Loads based on the equivalent design waves specified in **Table 4.4.2-3** are to be additionally considered.	**(Newly Added)**	

<table>
<tr><th>Amended</th><th>Original</th><th>Remarks</th></tr>
<tr><td colspan="2">Table 4.4.2-3 Concept of Equivalent Design Wave
<table>
<tr><th colspan="2">Equivalent design wave</th><th>Heading</th><th colspan="2">Typical features</th></tr>
<tr><td rowspan="4"><i>AV</i>(1)</td><td><i>AV</i>-1<i>P</i></td><td>Oblique sea</td><td>Port side: weather side up</td><td>Vertical acceleration at the centre of gravity of the cargo hold is its maximum value</td></tr>
<tr><td><i>AV</i>-2<i>P</i></td><td>Oblique sea</td><td>Port side: weather side down</td><td>Vertical acceleration at the centre of gravity of the cargo hold is its minimum value</td></tr>
<tr><td><i>AV</i>-1<i>S</i></td><td>Oblique sea</td><td>Starboard: weather side up</td><td>Vertical acceleration at the centre of gravity of the cargo hold is its maximum value</td></tr>
<tr><td><i>AV</i>-2<i>S</i></td><td>Oblique sea</td><td>Starboard : weather side down</td><td>Vertical acceleration at the centre of gravity of the cargo hold is its minimum value</td></tr>
<tr><td rowspan="2"><i>PCL</i></td><td><i>PCL</i>-1</td><td>Head sea</td><td>Sagging condition</td><td>Hydrodynamic pressure at the centreline of the bottom is its minimum value</td></tr>
<tr><td><i>PCL</i>-2</td><td>Head sea</td><td>Hogging condition</td><td>Hydrodynamic pressure at the centreline of the bottom is its maximum value</td></tr>
<tr><td colspan="5">(1) The wave <i>AV</i> is applied where the position of the centre of gravity of the cargo hold to be assessed is $0.6 < x/LC$.</td></tr>
</table>
</td><td>(Newly Added)</td></tr>
<tr><td>4.4.2.3 External Pressure due to Seawater
In applying 4.6.2.4, Part 1, hydrodynamic pressure P_{exw} for the equivalent design wave <i>AV</i> and <i>PCL</i> specified in 4.3.2.4, Part 2-9 is to be additionally considered.

4.4.2.4 Internal Pressure due to Loaded Liquid
In applying 4.6.2.5, Part 1, the acceleration at any position with respect to the equivalent design wave <i>AV</i> and <i>PCL</i> is to be considered. The acceleration is to be in accordance with 4.3.2.5, Part 2-9.

4.4.2.5 Hull Girder Loads
1 In applying 4.6.2.10, Part 1, the vertical still water bending moment for the loading condition to be considered is to be in accordance with 4.3.2.1.</td><td>(Newly Added)

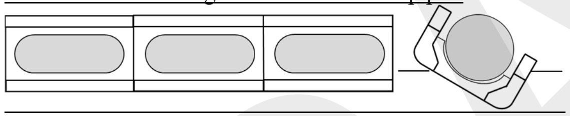
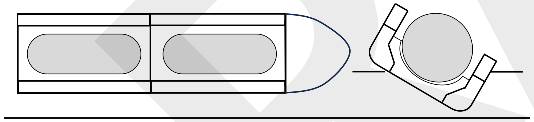
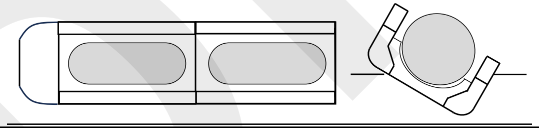
(Newly Added)

(Newly Added)</td><td></td></tr>
</table>

Amended	Original	Remarks
2 In applying **4.6.2.10, Part 1**, the coefficients C_{4v} and C_{4h} for equivalent design waves *AV* and *PCL* are to be in accordance with **4.3.2.6, Part 2-9**.		
4.4.3 30-degree Static Heel Condition	**(Newly Added)**	
4.4.3.1 Loading Conditions The standard loading condition is to be in accordance with **Table 4.4.3-1**.	**(Newly Added)**	

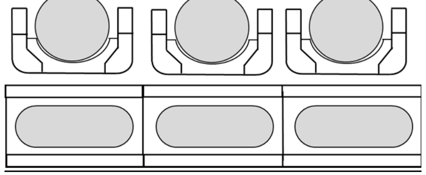
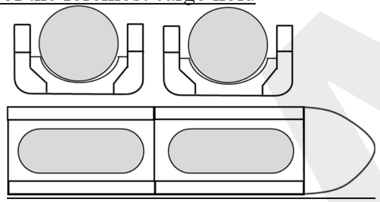
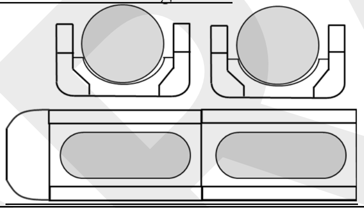
Table 4.4.3-1 Loading Conditions for the 30-degree Static Heel Condition

(Newly Added)

Loading condition	Loading pattern		Draught	Vertical bending moment
-	*H*1	In the case of the cargo hold in the midship part  In the case of the foremost cargo hold  In the case of the aftmost cargo hold 	T_{SC}	0
▨: As specified in **Table 4.4.2-1**.				
Note: As for ships whose hull structure and cargo tank structure are asymmetrical, both the port down heel condition and the starboard down heel condition are to be considered.				

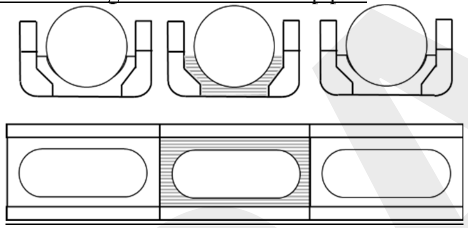
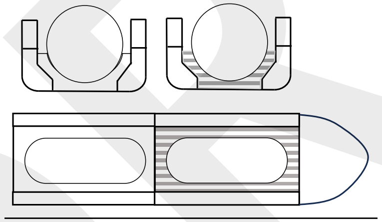
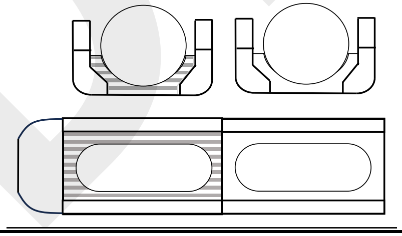
Amended-Original Requirements Comparison Table
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended	Original	Remarks
4.4.3.2 Other Requirements other than those for the loading condition (wave conditions, external pressure, internal pressure and hull girder loads) are to be in accordance with **4.3.4, Part 2-9**. **4.4.4 Collision Condition** **4.4.4.1 Loading Conditions** The standard loading condition is to be in accordance with **Table 4.4.4-1**.	**(Newly Added)** **(Newly Added)** **(Newly Added)**	

<table>
<tr><th>Amended</th><th>Original</th><th>Remarks</th></tr>
<tr><td colspan="2">Table 4.4.4-1 Loading Conditions in Collision Condition
<table>
<tr><th>Loading condition</th><th colspan="2">Loading pattern</th><th>Draught</th><th>Vertical bending moment</th></tr>
<tr><td>Full load condition</td><td>$C1$</td><td>In the case of the cargo hold in the midship part

In the case of the foremost cargo hold

In the case of the aftmost cargo hold
</td><td>T_{SC}</td><td>0</td></tr>
<tr><td colspan="5">▨: As specified in Table 4.4.2-1.</td></tr>
</table></td><td>(Newly Added)</td></tr>
<tr><td>4.4.4.2 Other
Requirements other than those for the loading condition (wave conditions, external pressure, internal pressure and hull girder loads) are to be in accordance with 4.3.5, Part 2-9.</td><td>(Newly Added)</td><td></td></tr>
</table>

Amended	Original	Remarks
4.4.5 Flooded Condition (IGC) **4.4.5.1 Loading Conditions** The standard loading condition is to be in accordance with **Table 4.4.5-1**.	**(Newly Added)** **(Newly Added)**	

Table 4.4.5-1 Loading Conditions in Flooded Conditions (IGC)

Loading condition	Loading pattern		Draught	Vertical bending moment
-	*FLI*1	In the case of the cargo hold in the midship part  In the case of the foremost cargo hold  In the case of the aftmost cargo hold 	T_{sum}	0

(Newly Added)

Amended-Original Requirements Comparison Table
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended	Original	Remarks
T_{sum}: Draught (m), as specified in **4.15.2, Part N.** ▤: Seawater		
4.4.5.2 Others Requirements other than those for the loading condition (wave conditions, external pressure, internal pressure and hull girder loads) are to be in accordance with **4.3.6, Part 2-9**.	**(Newly Added)**	
Chapter 8 STRENGTH ASSESSMENT BY CARGO HOLD ANALYSIS	**Chapter 8 STRENGTH ASSESSMENT BY CARGO HOLD ANALYSIS**	
8.1 General	**8.1 General**	
8.1.1 Overview	**8.1.1 Application**	
8.1.1.1 Structure and Overview of this Chapter **1** This chapter specifies additional requirements related to strength assessment by cargo hold analysis for liquified gas bulk carriers with independent tanks of type C. **2** The structure and overview of this chapter are shown in **Table 8.1.1-1**.	**8.1.1.1** Ships corresponding to **8.1.2.1-1(2), Part 1** are to be ships having a cargo hold with a length of 30 m or more.	

Amended	Original	Remarks
Table 8.1.1-1 Overview of Chapter 8 (table below)		(Newly Added)

Table 8.1.1-1 Overview of Chapter 8

節	表題	概要
8.1	General	Requirements related to the overview and application of this chapter
8.2	Evaluation Areas and Members to be Assessed	Additional requirements related to evaluation area and members to be assessed
8.3	Structural Models	Additional requirements related to structural models
8.4	Boundary Conditions and Loads Conditions	Additional requirements related to the boundary conditions and loads conditions
8.5	Strength Assessment	Additional requirements related to strength criteria

Amended	Original	Remarks
8.1.2 Application	**8.1.2 Members to be Assessed**	
8.1.2.1 Ships to be Assessed Ships corresponding to **8.1.2.1-1(2), Part 1** are those ships having a cargo hold with a length of 30 m or more.	**8.1.2.1** In applying **8.2.2, Part 1**, the members forming the cargo tank structures may not be assessed.	
(Deleted)	**8.1.3 Structural Models**	
(Deleted)	**8.1.3.1 Members to be Modelled** In applying **8.3.1.2, Part 1**, the cargo tank structures and the cargo tank supporting structures are to be modelled appropriately.	
(Deleted)	**8.1.3.2 Properties of Elements** In applying **8.3.2.2, Part 1**, where the equipment such as cargo pumps or pipes and insulation are not modelled, the density of material at locations where the cargo tank structures are modelled is to be adjusted in consideration of their weight.	

Amended	Original	Remarks
8.2 Evaluation Area and Members to be Assessed	**(Newly Added)**	
8.2.1 Members to be Assessed	**(Newly Added)**	
8.2.1.1 Members to be Assessed in Maximum Load Condition and Testing Condition In applying **8.2.2.1, Part 1**, the structures and members to be assessed are as follows: (1) Double bottom structure (bottom shell, inner bottom plating, centre girder, side girder and floor) or single bottom structure (2) Double-side shell structure (side shell, longitudinal bulkhead, side stringer and side transverse) or single side shell structure (3) Deck structure (upper deck, deck transverse, and hatch coaming) (4) Bulkhead structure (5) Supporting structures of cargo tank (cargo tank structure is excluded) (6) Other locations deemed necessary by the Society	**(Newly Added)**	
8.2.1.2 Members to be Assessed in 30-degree Static Heel Condition In the 30-degree static heel condition, supporting structures of cargo tanks (excluding cargo tank structures) and their surrounding hull structures are to be assessed.	**(Newly Added)**	
8.2.1.3 Members to be Assessed in Collision Condition In the collision condition, supporting structures of cargo tanks (excluding cargo tank structures) and their surrounding hull structures are to be assessed. Where, as the standard, the surrounding hull structures include one transverse spacing in	**(Newly Added)**	

Amended	Original	Remarks
the longitudinal direction from the supporting structures.		
8.2.1.4 Members to be Assessed in Flooded Condition (IGC) In strength assessments based on the flooded condition (IGC), the members to be assessed are to be at the discretion of the Society.	**(Newly Added)**	
8.3 Structure Models	**(Newly Added)**	
8.3.1 Extent of Models and Members to be Modelled	**(Newly Added)**	
8.3.1.1 Extent of Models In applying **8.3.1.1, Part 1** to ships with two cargo holds, the extent of models is to be in accordance with **8.3.1.1-4, Part 1**.	**(Newly Added)**	
8.3.1.2 Members to be Modelled **1** In applying **8.3.1.2, Part 1**, cargo tank structures (hull envelope, stiffening rings, swash bulkheads, etc.) and associated supporting structures are to be modelled appropriately. **2** In applying **8.3.3.1**, small members are to be modelled so as to reproduce the actual construction as much as possible.	**(Newly Added)**	
8.3.2 Elements	**(Newly Added)**	
8.3.2.1 Properties of Elements In applying **8.3.2.2, Part 1**, when equipment such as cargo pumps, piping, etc. and insulation are not modelled, the density of the materials is to be adjusted in consideration of	**(Newly Added)**	

Amended	Original	Remarks
their weight in areas where cargo tank structures are modelled.		
8.3.2.2 Element Types **1** In applying **8.3.2.1, Part 1**, webs and coamings of supporting structures of cargo tanks are to be modelled with shell elements. **2** Stiffeners in the range where the mesh size specified in **8.3.3.1** is used are to be modelled with shell elements. Flanges of primary supporting members and flanges of brackets are to be modelled with shell elements. **3** The bearing blocks inserted in the contact surfaces of cargo tanks and any associated supporting structures are to be modelled using the elements in which analysis taking contacts and frictions occurring on the contact surface into account can be carried out appropriately.	**(Newly Added)**	
8.3.3 Meshing and Related Issues	**(Newly Added)**	
8.3.3.1 Supporting Structures of Cargo Tank **1** In applying **8.3.3.1-2, Part 1**, the supporting structures of cargo tanks and the surrounding structures in the holds to be considered are to be reproduced with a mesh size of no larger than 50 *mm* × 50 *mm*. The surrounding structures are, in principle, ten elements from the supporting structures. **2** In applying **1** above, mesh size is to change smoothly between the modelled areas with typical mesh sizes being as specified in **8.3.3.1-1, Part 1**. **3** In applying **1** above, openings in the supporting structures of cargo tanks are to be modelled either by reproducing the shape or by removing elements corresponding to their position and size.	**(Newly Added)**	

Amended	Original	Remarks
8.3.4 Other	**(Newly Added)**	
8.3.4.1 Contacts and Frictions In areas of cargo tanks and their supporting structures, contacts and frictions are to be taken into account in accordance with **8.3.4, Part 2-9**.	**(Newly Added)**	
8.4 Boundary Conditions and Load Conditions	**(Newly Added)**	
8.4.1 Boundary Conditions	**(Newly Added)**	
8.4.1.1 In applying **8.5.1, Part 1**, boundary conditions are to be in accordance with **8.4.1, Part 2-8.**	**(Newly Added)**	
8.4.2 Load Conditions	**(Newly Added)**	
8.4.2.1 Load to be Considered In applying **8.5.2, Part 1**, loads based on the additional requirements specified in **4.4** are to be considered.	**(Newly Added)**	
8.4.2.2 Method of Applying Moments to the Structural Model In applying **8.5.2, Part 1**, the method of applying moments is to be in accordance with **8.4.2, Part 2-8**.	**(Newly Added)**	

Amended	Original	Remarks
8.5 Strength Assessment	**(Newly Added)**	
8.5.1 Yield Strength Assessment	**(Newly Added)**	
8.5.1.1 Criteria for Typical Mesh Size **1** Yield strength assessments in the range of typical mesh sizes specified in **8.3.3.1-1, Part 1** are to be in accordance with **8.6.1, Part 1**. **2** In the 30-degree static heel condition, the permissible utilisation factor λ_{yperm} is to be taken as 1.0. **3** In the collision condition and flooded condition (IGC), the permissible utilisation factor λ_{yperm} is to be in accordance with the following formulae. $\lambda_y \leq \lambda_{perm}$ λ_y: Yield utilisation factor, as given by the following formula. In the case of rod elements or beam elements, σ_{eq} is to be substituted to σ_a. $\lambda_y = \frac{\sigma_{eq}}{\sigma_Y}$ λ_{perm}: Permissible utilisation factor, to be taken as 1.0.	**(Newly Added)**	
8.5.1.2 Criteria for Areas Modelled with Finer Mesh Size **1** Criteria of yield strength assessment for areas where the mesh size specified in **8.3.3.1** is applied are to be in accordance with the following formula, except for stress concentrations. The average value of the stresses of the elements in the range of the typical mesh size specified in **8.3.3.1, Part 1** may be used. However, it is not to be averaged beyond different structures and structural discontinuous parts.	**(Newly Added)**	

Amended-Original Requirements Comparison Table
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended	Original	Remarks
$\lambda_y \le \lambda_{perm}$ λ_y: Yield utilisation factor, as given by the following formula. $\lambda_y = \frac{\sigma_{eq}}{235/K}$ λ_{perm}: Permissible utilisation factor, to be taken as 1.0. **2** In the case of stress concentration, yield strength assessment is to be carried out in accordance with the following criteria $\lambda_y \le \lambda_{perm}$ λ_y : Yield utilisation factor, as given by the following. (1) Hull structures in design load scenarios other than collision condition and flooded condition (IGC) $\lambda_y = \frac{\sigma_{eq}}{C_{fa}C_m \cdot 235/K}$ C_{fa}: Coefficient for fatigue, taken as 1.0. C_m: Coefficient, taken as 1.7 for elements that do not come into contact with welding and 1.5 for elements that come into contact with welding. (2) Supporting structures of cargo tanks in design load scenarios other than the collision condition and flooded condition (IGC) $\lambda_y = \frac{\sigma_{eq}}{C_{fa}C_m\sigma_Y}$ C_{fa}, C_m: As specified in **(1)** above (3) In the collision condition and flooded condition (IGC)		

Amended	Original	Remarks
$\lambda_y = \frac{\sigma_{eq}}{1.87\sigma_Y}$		
8.5.2 Buckling Strength Assessment	**(Newly Added)**	
8.5.2.1 Criteria The permissible buckling usage factor η_{all} for the 30-degree static heel condition and collision condition is to be taken as 1.0.	**(Newly Added)**	

Amended-Original Requirements Comparison Table
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

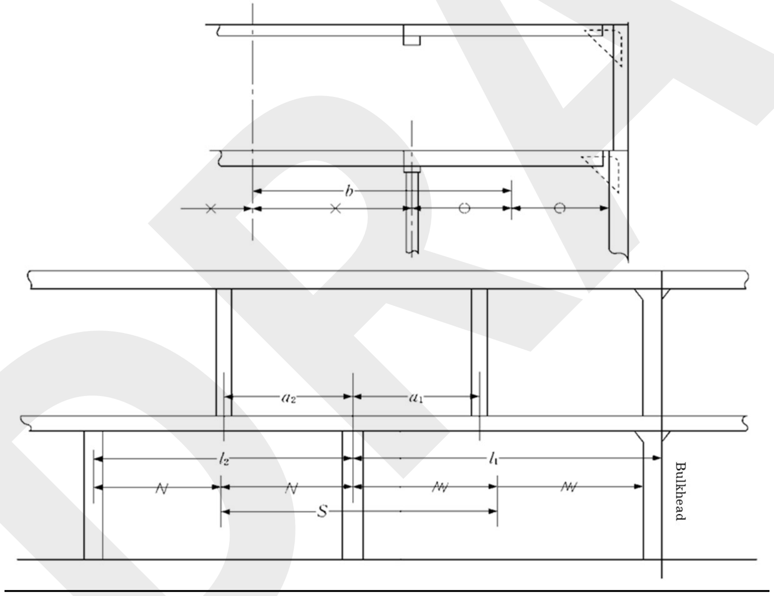
Amended	Original	Remarks
RULES FOR HIGH SPEED CRAFT	**RULES FOR HIGH SPEED CRAFT**	
Part 1 GENERAL RULES	**Part 1 GENERAL RULES**	
Chapter 1 GENERAL	**Chapter 1 GENERAL**	
1.2 Class Notations	**1.2 Class Notations**	
1.2.4 Hull Construction and Equipment, etc.	**1.2.4 Hull Construction and Equipment, etc.**	
7 Craft complying with the requirements of **Part GF of the Rules for the Survey and Construction of Steel Ships** applied in accordance with the requirements of **1.1.8** are to be in accordance with the requirements of **1.2.4-33, Part A of the Rules for the Survey and Construction of Steel Ships**.	**7** Craft complying with the requirements of **Part GF of the Rules for the Survey and Construction of Steel Ships** applied in accordance with the requirements of **1.1.8** are to be in accordance with the requirements of **1.2.4-32, Part A of the Rules for the Survey and Construction of Steel Ships**.	

Amended	Original	Remarks
GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS	**GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS**	
Part A GENERAL RULES	**Part A GENERAL RULES**	
A1 GENERAL	**A1 GENERAL**	
A1.2 Class Notations	**A1.2 Class Notations**	
A1.2.4 Hull Construction and Equipment	**A1.2.4 Hull Construction and Equipment**	
3 For ships complying with the provisions of **1.2.4-1**, **-2**, **-3**, and **-29**, **Part A of the Rules** that are designed for the carriage of specific cargoes, the details are to be entered as descriptive notes in the Classification Register for the ship.	**3** For ships complying with the provisions of **1.2.4-1**, **-2**, **-3**, and **-28**, **Part A of the Rules** that are designed for the carriage of specific cargoes, the details are to be entered as descriptive notes in the Classification Register for the ship.	Modifies the references.
5 With respect to the provisions of **1.2.4-15** and **-16, Part A of the Rules**, design criteria such as water depth and wave height are to be entered into the Classification Register as descriptive notes for the ship.	**5** With respect to the provisions of **1.2.4-14** and **-15, Part A of the Rules**, design criteria such as water depth and wave height are to be entered into the Classification Register as descriptive notes for the ship.	
6 With respect to the provisions of **1.2.4-18, Part A of the Rules**, design conditions such as maximum diving depth are to be entered in the Classification Register as descriptive notes for the ship.	**6** With respect to the provisions of **1.2.4-17, Part A of the Rules**, design conditions such as maximum diving depth are to be entered in the Classification Register as descriptive notes for the ship.	
7 For ships complying with the provisions of **1.2.4-7** and **1.2.4-26, Part A of the Rules**, the notation "*GRAB*" is to be affixed as in the following example: "*BC-XII*, *GRAB*"	**7** For ships complying with the provisions of **1.2.4-7** and **1.2.4-25, Part A of the Rules**, the notation "*GRAB*" is to be affixed as in the following example: "*BC-XII*, *GRAB*"	
8 In applying **1.2.4-33, Part A of the Rules**, the kinds of fuels are listed as follows:	**8** In applying **1.2.4-32, Part A of the Rules**, the kinds of fuels are listed as follows:	
(1) Natural gas used as fuel: "*Gas or Low-flashpoint Fuel*	(1) Natural gas used as fuel: "*Gas or Low-flashpoint Fuel*	

Amended	Original	Remarks
/ Natural Gas" (abbreviated as *GLF/NG*) (2) Others than **(1)** above used as fuel: According to "Guidelines for Ships Using Alternative Fuels" **9** In applying **1.2.4-<u>34</u>, Part A of the Rules**, the kinds of fuels listed as follows: (1) Natural gas used as fuel: "*Cargo as Fuel / Natural Gas*" (abbreviated as *CF/NG*) (2) Others than **(1)** above used as fuel: According to "Guidelines for Ships Using Alternative Fuels"	*/ Natural Gas*" (abbreviated as *GLF/NG*) (2) Others than **(1)** above used as fuel: According to "Guidelines for Ships Using Alternative Fuels" **9** In applying **1.2.4-<u>33</u>, Part A of the Rules**, the kinds of fuels listed as follows: (1) Natural gas used as fuel: "*Cargo as Fuel / Natural Gas*" (abbreviated as *CF/NG*) (2) Others than **(1)** above used as fuel: According to "Guidelines for Ships Using Alternative Fuels"	

Amended	Original	Remarks
GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS	**GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS**	
Part C HULL CONSTRUCTION AND EQUIPMENT	**Part C HULL CONSTRUCTION AND EQUIPMENT**	
Part 1 GENERAL HULL REQUIREMENTS	**Part 1 GENERAL HULL REQUIREMENTS**	
C7 STRENGTH OF PRIMARY SUPPORTING STRUCTURES	**C7 STRENGTH OF PRIMARY SUPPORTING STRUCTURES**	
C7.2 Simple Girders	**C7.2 Simple Girders**	
C7.2.2 Strength Assessment	**C7.2.2 Strength Assessment**	
C7.2.2.1 General **1** In applying **7.2.2.1-1, Part 1, Part C of the Rules** to web frames, moments and shear forces are to be in accordance with **Table C7.2.2-1**.	**C7.2.2.1 General** In applying **7.2.2.1-1, Part 1, Part C of the Rules** to web frames, moments and shear forces are to be in accordance with **Table C7.2.2-1**.	
2 Cantilever beams are to comply with the following (1) and (2): (1) The depths of the cantilever beams may be gradually tapered down towards their inboard ends from the toes of the end brackets and may be reduced to 1/2 of the depth at the toe of the end bracket. (2) The sectional areas of face plates may be gradually		Transferred from 7.2.6.1, Part 1, Part C of the Rules.

Amended	Original	Remarks
tapered down from the toes of the end brackets toward the inboard end of the cantilever beams and may be reduced to 0.60 *times* that at the toe of the end bracket.		
C7.4 Pillars, Struts, Etc.	**(Newly Added)**	
C7.4.2 Scantling Requirements	**(Newly Added)**	
C7.4.2.1 Buckling Strength Requirements (Euler Buckling) In applying **7.4.2.1, Part C of the Rules**, where pillars are subject to strength assessment, the following **(1)** and **(2)** are to be applied as the standard. (1) The area of deck load or green sea load supported by the pillar is to be determined by the following formula: $Sb(m^2)$ S: Distance (*m*) between the mid-points of two adjacent spans of girders supported by pillars, bulkhead stiffeners or bulkhead girders (*See* **Fig. C7.4.2.1**) b: Mean distance (*m*) between the mid-points of two adjacent spans of beams supported by the pillars or the frames (*See* **Fig. C7.4.2.1**) (2) The loads transmitted from upper tween deck pillars to the pillar under assessment are to be calculated by the following formula. However, this is based on the assumption that the arrangement of the pillars in the longitudinal section is continuous and equally spaced in the transverse direction.	**(Newly Added)**	Amendment (8) Clarification of loads to be used in buckling strength assessment of pillars Specify the methods for calculating the area of deck load or green sea load supported by a pillar and the loads transmitted from upper tween deck pillars to the pillar under assessment in the guidance as a reference.

Amended	Original	Remarks
$k_0 w_0 (kN)$ k_0: The value is to be calculated by the following formula, depending on the horizontal distance a_i (m) from the pillar to the tween deck pillar above, and the span l_j (m) of girder supporting the tween deck pillar or bulkhead (*See* **Fig. C7.4.2.1**). $2\left(\frac{a_i}{l_j}\right)^3 - 3\left(\frac{a_i}{l_j}\right)^2 + 1$ w_0: Load (kN) supported by the upper tween deck pillar		
Fig.C7.4.2.1 Measurement of *S, b,* etc.  		(Newly Added)

Amended-Original Requirements Comparison Table
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended	Original	Remarks
C8.3.3 Meshing and Related Issues	**C8.3.3 Meshing and Related Issues**	
C8.3.3.5 Local Models	**C8.3.3.5 Local Models**	Amendment (8) Specifies criteria when opting to assess stress concentration areas
1 In the application of the **8.3.3.5, Part 1, Part C of the Rules**, the region to be modelled by a fine mesh is to be determined so as to obtain the appropriate structural response in the assessment target region of the local model. The boundary of the local model is to coincide with the primary supporting member of the model reproducing the cargo hold.	**1** In the application of the **8.3.3.5, Part C of the Rules**, the region to be modelled by a fine mesh is to be determined so as to obtain the appropriate structural response in the assessment target region of the local model. The boundary of the local model is to coincide with the primary supporting member of the model reproducing the cargo hold.	
2 In applying **8.3.3.5-1, Part 1, Part C of the Rules**, meshing for the assessment of stress concentration areas is to be in accordance with the following **(1)** to **(3)**. (1) The standard mesh size in area to be assesed and its vicinity is to be 50 *mm*× 50 *mm* or less. (2) For at least ten elements in all directions from the locations to be assessed, **(1)** above is to be followed. (3) Members and small openings expected to affect the structural response of the locations to be assessed are to be modelled. Small brackets and face plates attached to the brackets are also to be modelled within the range of the meshing of 50 *mm* size specified in **(1)** above.		
3 In the application of the **8.3.3.5-3, Part 1, Part C of the Rules**, nodal displacements obtained from the analysis results using the structural model reproducing the cargo hold is to be applied to the nodes at the boundary of the local model. Where the nodes the boundary nodal points of the local model are not in agreement with the corresponding nodal points of the model reproducing the cargo hold, it is acceptable to impose prescribed displacement on these nodes using multi-point constraints.	**2** In the application of the **8.3.3.5-3, Part C of the Rules**, nodal displacements obtained from the analysis results using the structural model reproducing the cargo hold is to be applied to the nodes at the boundary of the local model. Where the nodes the boundary nodal points of the local model are not in agreement with the corresponding nodal points of the model reproducing the cargo hold, it is acceptable to impose prescribed displacement on these nodes using multi-point constraints.	

Amended-Original Requirements Comparison Table
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended	Original	Remarks
C8.6 Strength Assessment	**C8.6 Strength Assessment**	
C8.6.1 Yield Strength Assessment	**(Newly Added)**	
C8.6.1.2 General The "deemed appropriate by the Society" referred to in **8.6.1.2-2, Part 1, Part C of the Rules** means the stress obtained through analysis using the mesh specified in **C8.3.3.5-2** is to comply with the following criteria. (1) For meshing for 50 *mm*×50 *mm* size, the criteria are as follows: $\lambda_f \le \lambda_{fperm}$ λ_f: Yield utilisation factor, given as follows. $\lambda_f = \frac{\sigma_{eq}}{C_{fa}C_m \cdot 235/K}$ σ_{eq}: Reference stress, as specified in **8.6.1.1, Part 1, Part C of the Rules.** C_{fa}: Coefficient for fatigue, taken as 1.0. However, taken as 1.2 for structures that satisfy the criteria for fatigue strength assessment specified in **Chapter 9, Part 1, Part C of the Rules.** C_m: As specified in **Table 8.6.1-1**. λ_{fperm}: Permissible yield utilisation factor, taken as 1.0. (2) When using a mesh finer than the mesh of 50 *mm*× 50 *mm*, the value obtained by averaging the stresses of multiple elements may be used as the reference stress within the range corresponding to the mesh of 50 *mm*	**(Newly Added)**	Amendment (8) Specifies criteria when opting to assess stress concentration areas

Amended-Original Requirements Comparison Table
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

<table>
<tr><th>Amended</th><th>Original</th><th>Remarks</th></tr>
<tr><td>× 50 mm.

Table 8.6.1-1 Value of C_m
<table>
<tr><th></th><th>Element not adjacent to weld</th><th>Element adjacent to weld</th></tr>
<tr><td>Maximum load condition</td><td>1.70</td><td>1.50</td></tr>
<tr><td>Other than those mentioned above</td><td>1.36</td><td>1.20</td></tr>
</table>
</td><td></td><td></td></tr>
<tr><td colspan="2">EFFECTIVE DATE AND APPLICATION

1. Effective date of this amendment is 1 July 2026.
2. Notwithstanding the amendments, the current requirements 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 may apply to ships for which the date of contract for construction is before the effective date upon requests.
4. For ships subject to Part C of the Rules for the Survey and Construction of Steel Ships and the Guidance for the Survey and Construction of Steel Ships prior to its comprehensive revision by Rule No.62 on 1 July 2022 and Notice No.47 on 1 July 2022 (herein after referred to as “old Part C of the Rules” and “old Part C of the Guidance”), and which the date of contract for construction* is on and after the effective date, this amendment also applies to following requirements.
12.7.2, old Part C of the Rules
15.4.1, old Part C of the Guidance
2.2.3, Annex C32.2.8-1</td><td></td></tr>
</table>