

## **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 Parts A and C  
Guidance for the Survey and Construction of Steel Ships Parts A and C  
Rules for High Speed Craft  
Rules for the Survey and Construction of Passenger Ships  
Rules for the Survey and Construction of Inland Waterway Ships

### **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.
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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
<p style="text-align: center;"><b>RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS</b></p> <p style="text-align: center;"><b>Part A GENERAL RULES</b></p> <p style="text-align: center;"><b>Chapter 1      GENERAL</b></p> <p><b>1.2   Class Notations</b></p> <p><b>1.2.4    Hull Construction and Equipment, etc.*</b> (Omitted)</p> <p><b>11</b> For ships intended for the carriage of heavy cargoes on their upper decks complying with the provisions of <b>10.6, Part 2-5, Part C</b> and having no cargo holds below the upper deck, <u>the notation of “<i>Heavy Deck Carrier</i>” (abbreviated to <i>HDCA</i>) is affixed to the Classification Characters.</u></p> <p><b>12</b> For ships intended for the carriage of unoccupied motor vehicles without cargo, having multiple decks and complying with the provisions of <b>Part 2-6, Part C</b>, the notation of “<i>Vehicles Carrier</i>” (abbreviated to <i>VC</i>) is affixed to the Classification Characters. (Omitted)</p>	<p style="text-align: center;"><b>RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS</b></p> <p style="text-align: center;"><b>Part A GENERAL RULES</b></p> <p style="text-align: center;"><b>Chapter 1      GENERAL</b></p> <p><b>1.2   Class Notations</b></p> <p><b>1.2.4    Hull Construction and Equipment, etc.*</b> (Omitted) <b>(Newly Added)</b></p> <p><b>11</b> For ships intended for the carriage of unoccupied motor vehicles without cargo, having multiple decks and complying with the provisions of <b>Part 2-6, Part C</b>, the notation of “<i>Vehicles Carrier</i>” (abbreviated to <i>VC</i>) is affixed to the Classification Characters. (Omitted)</p>	<p>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.</p>

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
<p style="text-align: center;"><b>RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS</b></p> <p style="text-align: center;"><b>Part C HULL CONSTRUCTION AND EQUIPMENT</b></p> <p style="text-align: center;"><b>Part 1 GENERAL HULL REQUIREMENTS</b></p> <p style="text-align: center;"><b>Chapter 3 STRUCTURAL DESIGN PRINCIPLES</b></p> <p><b>3.4 Structural Detail Principles</b></p> <p><b>3.4.4 Shell Plating</b></p> <p><b>3.4.4.1 Local Reinforcement of Shell Plating</b> 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):</p> <ol style="list-style-type: none"> <li>(1) Openings in shell plating of 300 <i>mm</i> or more in size are to be reinforced by doubler or thicker plating.</li> <li>(2) In the fore and aft peaks, suitable modifications may be made to the reinforcement of openings.</li> <li>(3) The radius <i>R</i> at the corners of openings is to be at least 100 <i>mm</i>.</li> </ol>	<p style="text-align: center;"><b>RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS</b></p> <p style="text-align: center;"><b>Part C HULL CONSTRUCTION AND EQUIPMENT</b></p> <p style="text-align: center;"><b>Part 1 GENERAL HULL REQUIREMENTS</b></p> <p style="text-align: center;"><b>Chapter 3 STRUCTURAL DESIGN PRINCIPLES</b></p> <p><b>3.4 Structural Detail Principles</b></p> <p><b>3.4.4 Shell Plating</b></p> <p><b>3.4.4.1 Local Reinforcement of Shell Plating</b> 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):</p> <ol style="list-style-type: none"> <li>(1) Openings in shell plating of 300 <i>mm</i> or more in size are to be reinforced by doubler or thicker plating.</li> <li>(2) In the fore and aft peaks, suitable modifications may be made to the reinforcement of openings.</li> <li>(3) The radius <i>R</i> at the corners of openings is to be at least 100 <i>mm</i>.</li> </ol>	

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

Amended-Original Requirements Comparison Table  
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Amended	Original	Remarks																											
<p><b>Chapter 5      LONGITUDINAL STRENGTH</b></p> <p><b>5.2   Yield Strength</b></p> <p><b>5.2.1   Bending Strength</b></p> <p style="text-align: center;">Table 5.2.1-1   Wave and Still Water Vertical Bending Moments to be Considered</p> <table> <tr> <th>Condition</th><th><math>M_S</math></th><th><math>M_W</math></th></tr> <tr> <td>Maximum load condition</td><td colspan="2">Still water and wave vertical bending moments for the hogging and sagging load cases shown in 4.3.2.5</td></tr> <tr> <td><del>Operation in harbor/sheltered water</del> <u>Harbour condition</u></td><td><math>M_{PT\_max}</math> or <math>M_{PT\_min}</math></td><td>0</td></tr> </table> <p style="text-align: center;">Table 5.2.1-2   Permissible Vertical Bending Stress <math>\sigma_{perm}</math></p> <table> <tr> <th>Condition</th><th>Design load</th><th><math>\sigma_{perm}</math></th></tr> <tr> <td>Maximum load condition</td><td>(S+D)</td><td>175/K</td></tr> <tr> <td><del>Operation in harbor/sheltered water</del> <u>Harbour condition</u></td><td>(S)</td><td>149/K</td></tr> </table> <p><b>5.2.2   Shear Strength</b></p> <p style="text-align: center;">Table 5.2.2-1   Wave and Still Water Shear Forces to be Considered</p> <table> <tr> <th>Condition</th><th><math>Q_S Q_W</math></th><th><math>Q_W Q_S</math></th></tr> <tr> <td>Maximum load condition</td><td colspan="2">Still water vertical shear force and wave vertical shear force for the hogging and sagging load cases shown in 4.3.2.5</td></tr> <tr> <td><del>Operation in harbor/sheltered water</del> <u>Harbour condition</u></td><td><math>Q_{PT\_max}</math> or <math>Q_{PT\_min}</math> <math>\theta</math></td><td>0 <del><math>Q_{PT\_max}</math> or <math>Q_{PT\_min}</math></del></td></tr> </table>	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		<del>Operation in harbor/sheltered water</del> <u>Harbour condition</u>	$M_{PT\_max}$ or $M_{PT\_min}$	0	Condition	Design load	$\sigma_{perm}$	Maximum load condition	(S+D)	175/K	<del>Operation in harbor/sheltered water</del> <u>Harbour condition</u>	(S)	149/K	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		<del>Operation in harbor/sheltered water</del> <u>Harbour condition</u>	$Q_{PT\_max}$ or $Q_{PT\_min}$ $\theta$	0 <del><math>Q_{PT\_max}</math> or <math>Q_{PT\_min}</math></del>	<p><b>Chapter 5      LONGITUDINAL STRENGTH</b></p> <p><b>5.2   Yield Strength</b></p> <p><b>5.2.1   Bending Strength</b></p>	<p>Amendment (10) Clarifies                      some definitions and corrects typographical errors. Unifies   the   term “Harbour Condition”.</p> <p>Change columns.</p>
Condition	$M_S$	$M_W$																											
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<del>Operation in harbor/sheltered water</del> <u>Harbour condition</u>	$M_{PT\_max}$ or $M_{PT\_min}$	0																											
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<del>Operation in harbor/sheltered water</del> <u>Harbour condition</u>	$Q_{PT\_max}$ or $Q_{PT\_min}$ $\theta$	0 <del><math>Q_{PT\_max}</math> or <math>Q_{PT\_min}</math></del>																											

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Amended	Original	Remarks
Table 5.2.2-2 Permissible Vertical Shear Stresses		
Condition	Design load	Permissible vertical shear stress $\tau_{i-perm}$
Maximum load condition	(S+D)	110/k
<del>Operation in harbor/sheltered water</del> <u>Harbour condition</u>	(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	$Q_{SW\_m} = Q_{SW} + \Delta Q_{mdf}$
<del>Operation in harbor/sheltered water</del> <u>Harbour condition</u>	$Q_{SW\_m} = Q_{SW-p} + \Delta Q_{mdf}$
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. $\alpha$ : Coefficient taken as: $\alpha = g \frac{\ell_0 B_0}{2 + \varphi \frac{\ell_0}{B_0}}$ $\varphi$ : 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. $\ell_H$ : Length (m) of the cargo hold, as specified in 4.6. $\ell_0, B_0$ : 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												
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <math>T_{LC,mh}</math>: Draught (<math>m</math>) 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. </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><b>Annex 5.1      EXTENT OF HIGH TENSILE STEEL</b></p> <p><b>An1 Extent of High Tensile Steel Use</b></p> <p><b>An1.2    Vertical Extent</b></p> </div> <div style="width: 45%;"> <p><b>Annex 5.1      EXTENT OF HIGH TENSILE STEEL</b></p> <p><b>An1 Extent of High Tensile Steel Use</b></p> <p><b>An1.2    Vertical Extent</b></p> </div> </div> <div style="text-align: center; margin: 10px 0;"> <b>Table An1 Stresses at Baseline and Deck</b> </div> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Condition</th><th style="width: 35%;">Baseline</th><th style="width: 35%;">Deck</th></tr> </thead> <tbody> <tr> <td style="text-align: center;">Seagoing</td><td style="text-align: center;"><math>\sigma_{bl} = \frac{ M_{SW} + M_{WV} }{I_{gr}} z_n \times 10^5</math></td><td style="text-align: center;"><math>\sigma_{dk} = \frac{ M_{SW} + M_{WV} }{I_{gr}} V_D \times 10^5</math></td></tr> <tr> <td style="text-align: center;"><del>Operation in harbor/sheltered water</del> Harbour</td><td style="text-align: center;"><math>\sigma_{bl} = \frac{ M_{SW-p} }{I_{gr}} z_n \times 10^5</math></td><td style="text-align: center;"><math>\sigma_{dk} = \frac{ M_{SW-p} }{I_{gr}} V_D \times 10^5</math></td></tr> <tr> <td colspan="3"><math>V_D</math>:    Refer to 5.2.1.2</td></tr> </tbody> </table>			Condition	Baseline	Deck	Seagoing	$\sigma_{bl} = \frac{ M_{SW} + M_{WV} }{I_{gr}} z_n \times 10^5$	$\sigma_{dk} = \frac{ M_{SW} + M_{WV} }{I_{gr}} V_D \times 10^5$	<del>Operation in harbor/sheltered water</del> Harbour	$\sigma_{bl} = \frac{ M_{SW-p} }{I_{gr}} z_n \times 10^5$	$\sigma_{dk} = \frac{ M_{SW-p} }{I_{gr}} V_D \times 10^5$	$V_D$ :    Refer to 5.2.1.2		
Condition	Baseline	Deck												
Seagoing	$\sigma_{bl} = \frac{ M_{SW} + M_{WV} }{I_{gr}} z_n \times 10^5$	$\sigma_{dk} = \frac{ M_{SW} + M_{WV} }{I_{gr}} V_D \times 10^5$												
<del>Operation in harbor/sheltered water</del> Harbour	$\sigma_{bl} = \frac{ M_{SW-p} }{I_{gr}} z_n \times 10^5$	$\sigma_{dk} = \frac{ M_{SW-p} }{I_{gr}} V_D \times 10^5$												
$V_D$ :    Refer to 5.2.1.2														
		Unifies    the    term “Harbour Condition”												

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



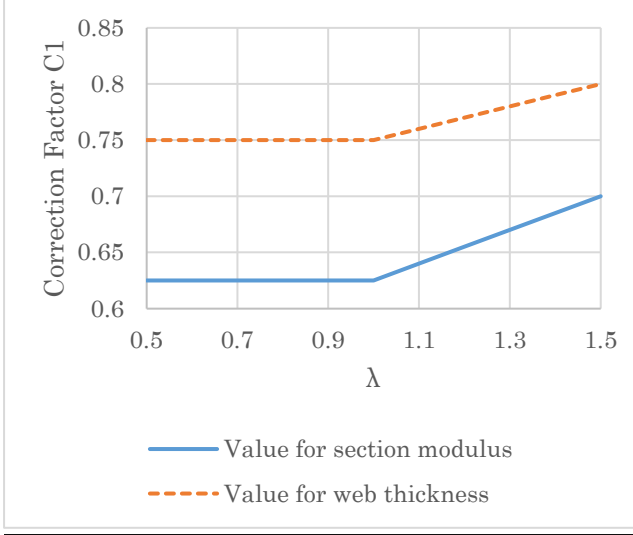
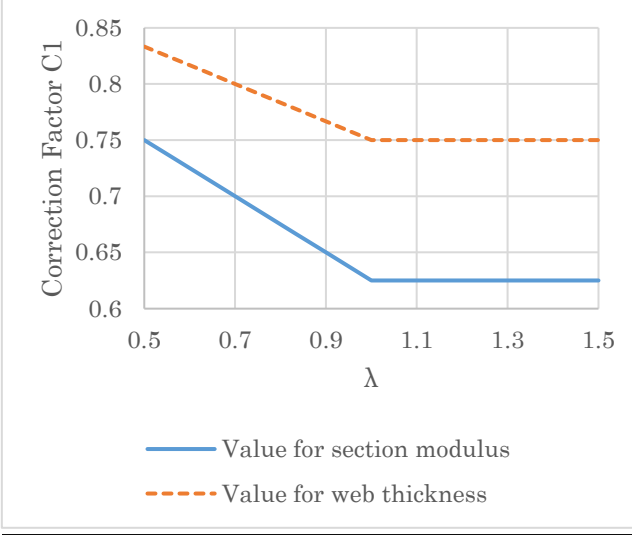
Amended-Original Requirements Comparison Table  
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended	Original	Remarks
<p style="text-align: center;"><b>Chapter 6      LOCAL STRENGTH</b></p> <p><b>6.4 Stiffeners</b></p> <p><b>6.4.1 General</b></p> <p><b>6.4.1.1 Application</b></p> <p>1 Stiffeners subject to lateral loads are to be in accordance with the requirements in 6.4.2.</p> <p>2 Side frames within the cargo region are to be in accordance with the following (1) to (3) (See Table 6.4.1-1).</p> <p>(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.</p> <p>(2) The scantlings of side frames in multiple-deck ships are to be in accordance with -1 above or 6.4.3.2.</p> <p>(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.</p> <p>(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.</p>	<p style="text-align: center;"><b>Chapter 6      LOCAL STRENGTH</b></p> <p><b>6.4 Stiffeners</b></p> <p><b>6.4.1 General</b></p> <p><b>6.4.1.1 Application</b></p> <p>1 Stiffeners subject to lateral loads are to be in accordance with the requirements in 6.4.2.</p> <p>2 Side frames within the cargo region are to be in accordance with the following (1) to (3) (See Table 6.4.1-1).</p> <p>(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.</p> <p>(Newly Added)</p> <p>(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.</p> <p>(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.</p>	<p>Amendment (3)</p> <p>Clarifies the requirements related to side frames</p> <p>Specifies applications for side frames in multiple-deck ships (not only for the lowest tier side frames).</p> <p>Specifies that side frames supporting cantilever beams are treated as web frames and to be in accordance with Chapter 7, not with Chapter 6.</p>

Amended-Original Requirements Comparison Table  
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Amended			Original					Remarks
6.4.2 Stiffeners	Table 6.4.1-1 Side Frames							Clarifies Table 6.4.1-1 in accordance with 6.4.1.1.
	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 6.4.3.2					
	(3) Side frames supporting deck transverses		6.4.3.3 in addition to (1) or (2)					
	(4) Side frames supporting cantilever beams		7.2.3 to 7.2.6					
			6.4.2 Stiffeners					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 6.4.2-7 Correction Factor C <sub>T</sub> for Struts								
Ratio of the moment of inertia of stiffeners max(I <sub>B</sub> , I <sub>T</sub> )/min(I <sub>B</sub> , I <sub>T</sub> )			≥1.0	≥1.2	≥1.4	≥1.6	≥1.8	
			<1.2	<1.4	<1.6	<1.8		
C <sub>T</sub>	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 <sub>1</sub> for Struts								
C <sub>1</sub>		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.								

**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
<p style="text-align: center;"><b>Fig. 6.4.2-2 Correction Factor <math>C_1</math> for Struts</b></p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p><u>Bottom longitudinals</u></p>  <p>— Value for section modulus - - - Value for web thickness</p> </div> <div style="text-align: center;"> <p><u>Inner bottom longitudinals</u></p>  <p>— Value for section modulus - - - Value for web thickness</p> </div> </div>		<p>Add a simplified diagram of the correction factors derived in the Table 6.4.2-7.</p>

**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
<p><b>6.4.3 Side Frames</b></p> <p><b>6.4.3.2 Side Frames</b></p> <p>The scantlings of the side frames are to be in accordance with the following (1) and (2):</p> <p>(1) Bending strength</p> <p>(a) The section modulus is to be not less than the value obtained from the following formula:</p> $Z = C_{safety} \frac{M_1}{\sigma_Y} \times 10^3 (cm^3)$ <p><math>C_{safety}</math>: Safety factor taken as 1.0.</p> <p><math>M_1</math>: Bending moment (kN-m) due to side loads according to the following formula:</p> $M_1 = f_{load} f_{bc} f_t \left( \frac{P_{exsl} + f_p P_{exwl}}{20} + \frac{P_{exsu} + f_p P_{exwu}}{30} \right) s \ell_{1bdg}^2 \times 10^{-3}$ <p><math>f_{load}</math>: Coefficient corresponding to loading conditions, to be taken as 1.0</p> <p><math>f_{bc}</math>: Coefficient corresponding to boundary conditions at ends of side frames, to be taken as the following i) or ii)</p> <p>i) Side frames in single-deck ships and the lowest tier side frames in multiple-deck ships: <math>f_{bc} = 0.8</math></p> <p>ii) Side frames other than i) above: <math>f_{bc} = 1.0</math></p> <p><math>f_t</math>: 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</p>	<p><b>6.4.3 Side Frames</b></p> <p><b>6.4.3.2 Side Frames in Single-Deck Ships</b></p> <p>The scantlings of the side frames in single deck ships are to be in accordance with the following (1) and (2):</p> <p>(1) Bending strength</p> <p>The section modulus is to be not less than the value obtained from the following formula:</p> $Z = C_{safety} \frac{M_1 + M_2}{\sigma_Y} \times 10^3 (cm^3)$ <p><math>C_{safety}</math>: Safety factor taken as 1.0.</p> <p><math>M_1</math>: Bending moment (kN-m) due to side loads according to the following formula:</p> $M_1 = f_{load} f_{bc} f_t \left( \frac{P_{exsl} + f_p P_{exwl}}{20} + \frac{P_{exsu} + f_p P_{exwu}}{30} \right) s \ell_{1bdg}^2 \times 10^{-3}$ <p><math>f_{load}, f_{bc}</math>: 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.</p> <p><math>f_t</math>: 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</p>	<p>Amendment (3)</p> <p>Clarifies the requirements related to side frames</p> <p>Deletes “in single deck ships” to apply not only to single-deck ships.</p> <p>In the current Rules, the values of each coefficient are specified corresponding to loading conditions and existence of web frames.</p> <p>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.</p>

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
<p>tanks, 0.8. If either end is supported, 0.9. Otherwise, 1.0. (<u>See Table 6.4.3-1</u>)</p> <p><math>\ell</math>: Full length (<math>m</math>) of the side frame as specified in <u>Table 6.4.3-1</u>.</p> <p><math>f_p</math>: Coefficient, to be taken 0.9.</p> <p><math>\ell_{1bdg}</math>: Effective bending span (<math>m</math>) of the side frame, to be in accordance with the following i) or ii)</p> <p>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 <u><math>1.5h_w</math> (See Table 6.4.3-1)</u>.</p> <p>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 <math>\ell</math> (See Table 6.4.3-1). However, when the value of <math>f_t</math> 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 <u><math>1.5h_w</math></u>.</p> <p><math>h_w</math>: Web depth of side frames</p> <p><math>s</math>: Spacing (<math>mm</math>) of side frames</p> <p><math>P_{exsl}</math>: Hydro static pressure <math>P_{exs}</math> specified in 4.4.2.2-1, to be calculated at the lower end of full length <math>\ell</math> of the side frame</p> <p><math>P_{exsu}</math>: Hydro static pressure <math>P_{exs}</math></p>	<p>tanks, 0.8. If either end is supported, 0.9. Otherwise, 1.0.</p> <p><math>\ell</math>: Full length (<math>m</math>) of the side frame as specified in <u>Fig. 6.4.3-2</u>.</p> <p><math>f_p</math>: Coefficient, to be taken 0.9.</p> <p><math>\ell_{1bdg}</math>: Effective bending span (<math>m</math>) 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 <u><math>2h_w</math> (See Fig. 6.4.3-2)</u>.</p> <p><math>s</math>: Spacing (<math>mm</math>) of side frames</p> <p><math>P_{exsl}</math>: Hydro static pressure <math>P_{exs}</math> specified in 4.4.2.2-1, to be calculated at the lower end of full length <math>\ell</math> of the side frame</p> <p><math>P_{exsu}</math>: Hydro static pressure <math>P_{exs}</math></p>	<p>Aligns the definition of effective bending span to that in Chapter 3.</p> <p>In addition, clarifies the requirements related to span reduction.</p> <p><math>M_2</math> and <math>F_2</math> are organised in Table 6.4.3-2.</p>

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

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

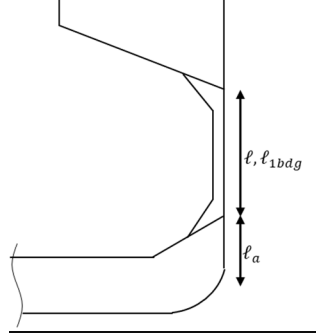
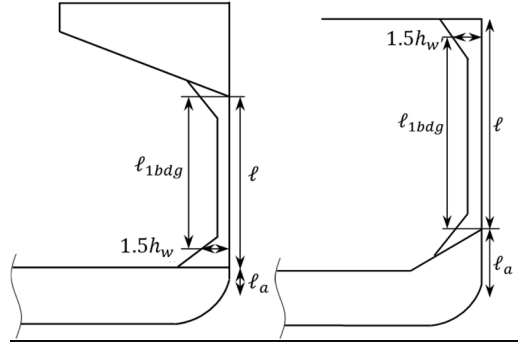
Amended	Original	Remarks
	<p><u>boundary conditions at fore and aft of the cargo hold, as specified in Table 6.4.3-3</u></p> <p><math>f_2</math>: <u>Coefficient regarding effect of the boundary conditions at left and right of the cargo hold according to the following formula:</u></p> <p><math>f_2 = 1.0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

**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
<p>(2) Shear strength of webs</p> <p>(a) The web thickness is to be not less than the value obtained from the following formula:</p> $t_w = C_{safety} \frac{F_1}{d_{shr} \tau_Y} \times 10^3 (mm)$ <p><math>C_{safety}</math>: Safety factor taken as 1.2.  <math>\tau_Y</math>: Permissible shear stress (<math>N/mm^2</math>) taken as follows:  <math>\sigma_Y/\sqrt{3}</math>  <math>d_{shr}</math>: Effective shear depth (<math>mm</math>) as specified in 3.6.4.2.  <math>F_1</math>: Shear force due to side loads (<math>kN</math>) according to the following formula:</p> $F_1 = f_{load} f_t \frac{7(P_{exsl} + f_p P_{exwl}) + 3(P_{exsu} + f_p P_{exwu})}{20} s \ell_{1shr} \times 10^{-3}$ <p><math>\ell_{1shr}</math>: Effective shear span (<math>m</math>) 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.  <math>f_{load}, f_t, P_{exsl}, P_{exwl}, P_{exsu}, P_{exwu}, f_p, s</math>: As specified in (1) above.</p> <p>(b) For side frames where i) to iii) in (1)(a) above are all applicable, <math>F_1</math> specified in (a) above is to be read as <math>F_1 + F_2</math>, where <math>F_2</math> is to be in accordance with <b>Table 6.4.3-2</b>.</p>	<p style="text-align: center;"><u>provided) to the side stringer.</u></p> <p>(2) Shear strength of webs</p> <p>The web thickness is to be not less than the value obtained from the following formula:</p> $t_w = C_{safety} \frac{F_1 + F_2}{d_{shr} \tau_Y} \times 10^3 (mm)$ <p><math>C_{safety}</math>: Safety factor taken as 1.2.  <math>\tau_Y</math>: Permissible shear stress (<math>N/mm^2</math>) taken as follows:  <math>\sigma_Y/\sqrt{3}</math>  <math>d_{shr}</math>: Effective shear depth (<math>mm</math>) as specified in 3.6.4.2.  <math>F_1</math>: Shear force due to side loads (<math>kN</math>) according to the following formula:</p> $F_1 = f_{load} f_t \frac{7(P_{exsl} + f_p P_{exwl}) + 3(P_{exsu} + f_p P_{exwu})}{20} s \ell_{1shr} \times 10^{-3}$ <p><math>\ell_{1shr}</math>: Effective shear span (<math>m</math>) 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.  <math>f_{load}, f_t, P_{exsl}, P_{exwl}, P_{exsu}, P_{exwu}, f_p, s</math>: As specified in (1) above.</p> <p><u><math>F_2</math>: Shear force (<math>kN</math>) 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.</u></p> <p>(a) <u><math>F_2 = 0</math> with web frames or structures similar to web frames at the side.</u></p> <p>(b)</p>	



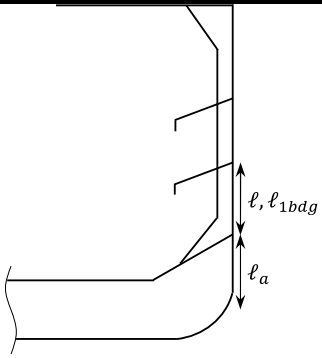
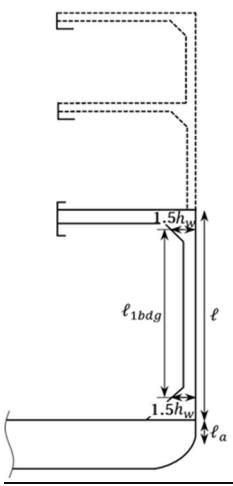
**Amended-Original Requirements Comparison Table**  
**(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))**

Amended		Original	Remarks
		$F_2 = \frac{1}{160\ell^2} (1 + \lambda_1) K(\lambda_1) \alpha_\theta (1 - \nu^2) (f_{db} \rho g T_{SC}) (s \times 10^{-3}) B_{DB}^3$ <p style="text-align: center;">with no structures in (a) above.  Where:  <math>\ell, \lambda_1, K(\lambda_1), \alpha_\theta, \nu, f_{db}, B_{DB}</math>: As specified in (1) above.</p>	
<p><b>Table 6.4.3-1 Measurement of <math>\ell_{1bdg}</math> and <math>f_t</math> Corresponding to Boundary Conditions at the Ends of Side Frames</b></p>			
		Measurement of $\ell_{1bdg}$	$f_t$
<u>Boundary conditions at ends of side frames</u>	<u>(a) Where both ends are supported by bilge hopper tanks and top side tanks</u>		<u>0.8</u>
	<u>(b) Where either end is supported by bilge hopper tanks and top side tanks</u>		<u>0.9</u>

(Newly Added)

1. Changes the definition of  $\ell_{1bdg}$  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.

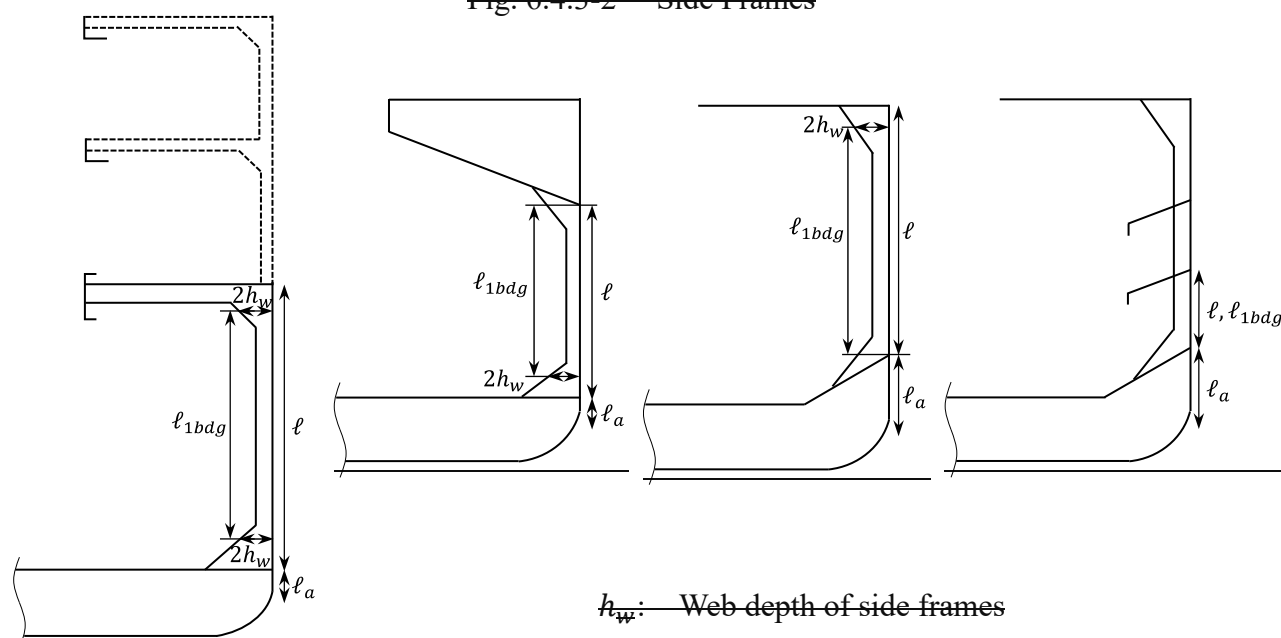
Amended-Original Requirements Comparison Table  
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended			Original		Remarks	
						
		(c) Other than (a) and (b)			<u>1.0</u>	

**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				
<p style="text-align: center;"><b>Table 6.4.3-2 Moment and Shear Force to be Additionally Considered</b></p> <table><tr><td>Rotation moment at the lower end of the side frame due to double bottom bending <math>M_2</math> (kN-m)</td><td><math>M_2 = \frac{1}{480\ell} (2 + 3\lambda_1) K(\lambda_1) \alpha_\theta (1 - \nu^2) (f_{ab} \rho g T_{sc}) (s \times 10^{-3}) B_{DB}^3</math></td></tr><tr><td>Shear force at the lower end of the frame due to double bottom bending <math>E_2</math> (kN)</td><td><math>E_2 = \frac{1}{160\ell^2} (1 + \lambda_1) K(\lambda_1) \alpha_\theta (1 - \nu^2) (f_{ab} \rho g T_{sc}) (s \times 10^{-3}) B_{DB}^3</math></td></tr></table> <p>Where:</p> <p><math>\nu</math>: Poisson's ratio, to be taken as 0.3</p> <p><math>f_{ab}</math>: Coefficient regarding double bottom bending corresponding to loading conditions, to be taken as 0.7</p> <p><math>B_{DB}</math>: Double bottom breadth (m) as specified in 7.3.1.6-2.</p> <p><math>\alpha_\theta</math>: Side rotation angle factor due to double bottom bending according to the following formula:</p> <p><math>\alpha_\theta = 0.85 f_1 f_2</math></p> <p><math>f_1</math>: Coefficient regarding effect of the boundary conditions at fore and aft of the cargo hold, as specified in Table 6.4.3-3</p> <p><math>f_2</math>: Coefficient regarding effect of the boundary conditions at left and right of the cargo hold according to the following formula:</p> <p><math>f_2 = 1.0</math> with no bilge hopper provided.</p> <p><math>f_2 = \frac{k}{k + C_{BH}}</math> with a bilge hopper provided.</p> <p><math>k</math>: Coefficient of stiffness of the bilge hopper as specified in 7.3.3.1.</p> <p><math>C_{BH}</math>: Coefficient of torsional stiffness effect of the bilge hopper as specified in Table 7.3.3-1.</p> <p><math>K(\lambda_1)</math>: Degree of elastic deformation according to the following formula:</p> <p><math>K(\lambda_1) = 0.86 - 0.94 \lambda_1</math></p> <p>However, to be taken as 0.4 when less than 0.4.</p> <p><math>\lambda_1 = \ell_a / \ell</math></p> <p><math>\ell_a</math>: 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</p> <p><math>\ell</math>: Full length of the side frame as specified in Table 6.4.3-1. However, where side frames are supported by side stringers, <math>\ell</math> 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.</p>		Rotation moment at the lower end of the side frame due to double bottom bending $M_2$ (kN-m)	$M_2 = \frac{1}{480\ell} (2 + 3\lambda_1) K(\lambda_1) \alpha_\theta (1 - \nu^2) (f_{ab} \rho g T_{sc}) (s \times 10^{-3}) B_{DB}^3$	Shear force at the lower end of the frame due to double bottom bending $E_2$ (kN)	$E_2 = \frac{1}{160\ell^2} (1 + \lambda_1) K(\lambda_1) \alpha_\theta (1 - \nu^2) (f_{ab} \rho g T_{sc}) (s \times 10^{-3}) B_{DB}^3$	(Newly Added) Clarifies moment and shear force due to double bottom bending as a table.
Rotation moment at the lower end of the side frame due to double bottom bending $M_2$ (kN-m)	$M_2 = \frac{1}{480\ell} (2 + 3\lambda_1) K(\lambda_1) \alpha_\theta (1 - \nu^2) (f_{ab} \rho g T_{sc}) (s \times 10^{-3}) B_{DB}^3$					
Shear force at the lower end of the frame due to double bottom bending $E_2$ (kN)	$E_2 = \frac{1}{160\ell^2} (1 + \lambda_1) K(\lambda_1) \alpha_\theta (1 - \nu^2) (f_{ab} \rho g T_{sc}) (s \times 10^{-3}) B_{DB}^3$					

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												
<div>Table 6.4.3 1 Coefficient corresponding to loading conditions</div> <table><tr><td></td><td><math>f_{load}</math></td><td><math>f_{ax}</math></td></tr><tr><td>Full loading</td><td>1.0</td><td>0</td></tr><tr><td>Multiport loading</td><td>0.8</td><td>0.7</td></tr><tr><td>Alternate loading</td><td>1.0</td><td>1.0</td></tr></table>				$f_{load}$	$f_{ax}$	Full loading	1.0	0	Multiport loading	0.8	0.7	Alternate loading	1.0	1.0	(Deleted) This table is deleted in Part 1 but is incorporated into each coefficient in Part 2 corresponding to ship type.
	$f_{load}$	$f_{ax}$													
Full loading	1.0	0													
Multiport loading	0.8	0.7													
Alternate loading	1.0	1.0													
<div>Table 6.4.3 2 Coefficient <math>f_{be}</math> corresponding to boundary conditions at ends of side frames</div> <table><tr><td><math>f_{be}</math></td><td>Supported by top side tank and bilge hopper tank</td><td>Both ends or either end supported by side stringer</td><td>Otherwise</td></tr><tr><td>Full loading</td><td>0.8</td><td>0.85</td><td>0.8</td></tr><tr><td>Multiport loading, Alternate loading</td><td>1.0</td><td>1.0</td><td>1.0</td></tr></table>			$f_{be}$	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	(Deleted) This table is deleted in Part 1 but is incorporated into each coefficient in Part 2 corresponding to ship type.
$f_{be}$	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												
<div>Fig. 6.4.3 2 Side Frames</div> <div></div> <div><math>h_w</math>: Web depth of side frames</div> <div>(a) Ship with multiple (b) Single deck ship</div>			(Deleted) Deleted because of integration into Table 6.4.3-1.												

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
<p style="text-align: center;"><b>Chapter 7 STRENGTH OF PRIMARY SUPPORTING STRUCTURES</b></p> <p><b>7.2 Simple Girders</b></p> <p><b>7.2.2 Strength Assessment</b></p> <p><b>7.2.2.1 General*</b></p> <p><b>1</b> 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.</p> <p>(1) Assessment model 1 to 7 shown in <b>Table 7.2.1-2</b>: Moments and shear forces are to be in accordance with <b>Table 7.2.2-1</b>.</p> <p>(2) Assessment model 8 shown in <b>Table 7.2.1-2</b>: Moments and shear forces are to be in accordance with 7.2.2.2.</p> <p>(3) For cases not corresponding to (1) and (2) above, applied models are to be deemed appropriate by the Society.</p> <p><b>2</b> <u>Cantilever beams are to comply with the following (1) and (2).</u></p> <p>(1) <u>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.</u></p> <p><u><math>M = M_d + M_h</math></u></p> <p><u><math>M_d</math>: Moment (kN-m) due to deck cargo or wave loads</u></p>	<p style="text-align: center;"><b>Chapter 7 STRENGTH OF PRIMARY SUPPORTING STRUCTURES</b></p> <p><b>7.2 Simple Girders</b></p> <p><b>7.2.2 Strength Assessment</b></p> <p><b>7.2.2.1 General*</b></p> <p><b>1</b> 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.</p> <p>(1) Assessment model 1 to 7 shown in <b>Table 7.2.1-2</b>: Moments and shear forces are to be in accordance with <b>Table 7.2.2-1</b>.</p> <p>(2) Assessment model 8 shown in <b>Table 7.2.1-2</b>: Moments and shear forces are to be in accordance with 7.2.2.2.</p> <p>(3) For cases not corresponding to (1) and (2) above, applied models are to be deemed appropriate by the Society.</p> <p><b>2</b> Corrugated bulkheads are to be assessed in accordance with 7.2.7.</p>	<p>Amendment (10) Clarifies some definitions and corrects typographical errors.</p> <p>Specifies the requirements related to cantilever beams to clarify the application.</p>

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Amended	Original	Remarks
<p>to be obtained from Assessment Model 6 shown in <b>Table 7.2.2-1</b>.</p> <p><math>M_h</math>: Moment (<math>kN\cdot m</math>) due to the cargo loaded on the hatch cover or wave loads to be obtained from Assessment Model 7 shown in <b>Table 7.2.2-1</b>.</p> <p>(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.</p> <p><math>F = F_d + F_h</math></p> <p><math>F_d</math>: Shear force (<math>kN</math>) due to deck cargo or wave loads to be obtained from Assessment Model A shown in <b>Table 7.2.2-1</b>.</p> <p><math>F_h</math>: Moment (<math>kN</math>) due to the cargo loaded on the hatch cover or wave loads to be obtained from Assessment Model B shown in <b>Table 7.2.2-1</b>.</p> <p><b>3</b> Corrugated bulkheads are to be assessed in accordance with 7.2.7.</p> <p><b>7.2.6 Bending Stiffness</b></p> <p><b>7.2.6.1 Depth of Girders</b></p> <p>For the members specified in <b>Table 7.2.6-1</b>, 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.</p> <p>(Deleted)</p>	<p><b>7.2.6 Bending Stiffness</b></p> <p><b>7.2.6.1 Depth of Girders</b></p> <p><b>1</b> For the members specified in <b>Table 7.2.6-1</b>, 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.</p> <p><b>2</b> Cantilever beams are to comply with the following <b>(1)</b> and <b>(2)</b>:</p> <p><b>(1)</b> The depths of the cantilever beams may be gradually</p>	<p>Transfers the requirements related to ends of cantilever beams</p>

**Amended-Original Requirements Comparison Table**  
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Amended	Original	Remarks																		
	<p><u>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.</u></p> <p>(2) <u>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.</u></p>	<p>to C7.2.2.1 of the Guidance.</p>																		
<p>Table 7.2.6-1 Depths of Girders</p> <table><tr><th>Member</th><th>Depths of Girders (<i>m</i>)</th></tr><tr><td>Web frame</td><td><math>0.1\ell_{bdg}</math></td></tr><tr><td>Web frame supporting cantilever</td><td><math>0.125\ell_{bdg}</math></td></tr><tr><td>Web frame supporting side stringer</td><td><math>0.125\ell_{bdg}</math></td></tr><tr><td>Side stringer</td><td><math>0.125\ell_{bdg}</math></td></tr><tr><td>Side stringer forward of collision bulkhead</td><td><math>0.2\ell_{bdg}</math></td></tr><tr><td>Web frame forward of collision bulkhead</td><td><math>0.2\ell_{bdg}</math></td></tr><tr><td>Cantilever beam</td><td><math>0.2\ell_{bdg}</math></td></tr><tr><td colspan="2">Note: <math>\ell_{bdg}</math>: Effective bending span (<i>m</i>) of the girder as given in 3.6.1.4</td></tr></table>			Member	Depths of Girders ( <i>m</i> )	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: $\ell_{bdg}$ : Effective bending span ( <i>m</i> ) of the girder as given in 3.6.1.4	
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Web frame	$0.1\ell_{bdg}$																			
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Note: $\ell_{bdg}$ : Effective bending span ( <i>m</i> ) of the girder as given in 3.6.1.4																				
<p><b>7.2.7 Corrugated Bulkheads</b></p> <p><b>7.2.7.2 Strength Assessment</b></p> <p>1 The section modulus per 1/2 pitch of corrugated bulkheads (<i>See Fig. 7.2.7-1</i>) is to be in accordance with the following (a) and (b):</p> <p>(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:</p>	<p><b>7.2.7 Corrugated Bulkheads</b></p> <p><b>7.2.7.2 Strength Assessment</b></p> <p>1 The section modulus per 1/2 pitch of corrugated bulkheads (<i>See Fig. 7.2.7-1</i>) is to be in accordance with the following (a) and (b):</p> <p>(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:</p>	<p>Specifies the position where the requirement regarding the depth of cantilever beams is applied.</p> <p>Amendment (5) Revision of coefficients that take into account strength reduction due to</p>																		

**Amended-Original Requirements Comparison Table**  
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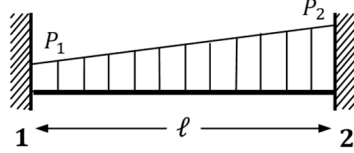
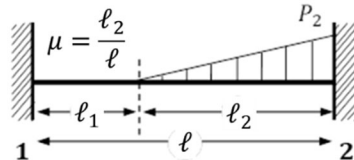
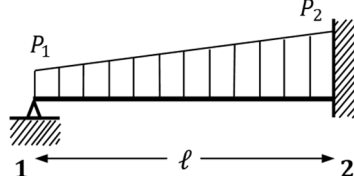
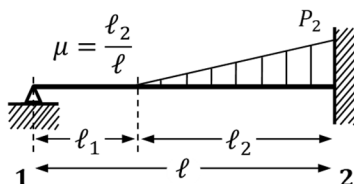
Amended	Original	Remarks
$Z_{n50} = C_{Safety} \frac{C_x + 1}{2f C_x} \frac{ M }{\sigma_{all}} \times 10^3 (cm^3)$ <p><math>C_{Safety}</math>: Safety factor to be taken as 1.0  <math>C_x</math>: Coefficient considering buckling of the flange (face plate) to be taken as follows:  <math display="block">C_x = \frac{2.25}{\beta} - \frac{1.25}{\beta^2} \text{ for } \beta &gt; 1.25</math> <math display="block">C_x = 1 \text{ for } \beta \leq 1.25</math></p> <p>For: <math>\beta = \frac{b_f}{t_{f-n50}} \sqrt{\frac{\sigma_Y}{E}}</math>  <math>b_f</math>: Flange breadth (mm)  <math>t_{f-n50}</math>: Flange thickness (mm)  <math>\sigma_Y</math>: Specified minimum yield stress (N/mm<sup>2</sup>)  <math>E</math>: Young's modulus to be taken as 206,000 (N/mm<sup>2</sup>)  <math>f</math>: Shape coefficient to be taken as 1.1  <math>M</math>: Bending moment (kN-m) due to the applied load as specified in 7.2.7.3-1  <math>\sigma_{all}</math>: Permissible bending stress (N/mm<sup>2</sup>) to be taken as follows:  <math display="block">\sigma_{all} = \frac{235}{K}</math> <math>K</math>: Material factor as specified in 3.2.1.2</p> <p>(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:  <math display="block">Z_{n50} = C_{Safety} \frac{C_x + 1}{2f C_x} \frac{ M_P }{\sigma_{all}} \times 10^3 (cm^3)</math> <math>C_{Safety}</math>: Safety factor to be taken as 1.0</p>	$Z_{n50} = C_{Safety} \frac{C_x + 1}{2f C_x} \frac{ M }{\sigma_{all}} \times 10^3 (cm^3)$ <p><math>C_{Safety}</math>: Safety factor to be taken as 1.0  <math>C_x</math>: Coefficient considering buckling of the flange (face plate) to be taken as follows:  <math display="block">C_x = \frac{2.25}{\beta} - \frac{1.25}{\beta^2}</math></p> <p>For: <math>\beta = \frac{b_f}{t_{f-n50}} \sqrt{\frac{\sigma_Y}{E}}</math>  <math>b_f</math>: Flange breadth (mm)  <math>t_{f-n50}</math>: Flange thickness (mm)  <math>\sigma_Y</math>: Specified minimum yield stress (N/mm<sup>2</sup>)  <math>E</math>: Young's modulus to be taken as 206,000 (N/mm<sup>2</sup>)  <math>f</math>: Shape coefficient to be taken as 1.1  <math>M</math>: Bending moment (kN-m) due to the applied load as specified in 7.2.7.3-1  <math>\sigma_{all}</math>: Permissible bending stress (N/mm<sup>2</sup>) to be taken as follows:  <math display="block">\sigma_{all} = \frac{235}{K}</math> <math>K</math>: Material factor as specified in 3.2.1.2</p> <p>(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:  <math display="block">Z_{n50} = C_{Safety} \frac{C_x + 1}{2f C_x} \frac{ M_P }{\sigma_{all}} \times 10^3 (cm^3)</math> <math>C_{Safety}</math>: Safety factor to be taken as 1.0</p>	<p>buckling</p> <p>Revises the calculation formula due to unreasonable values, such as negative values, resulting from the value of <math>\beta_E</math>.</p>



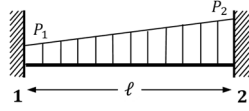
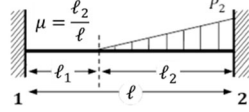
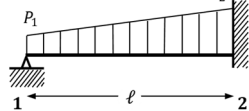
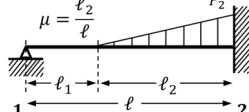
**Amended-Original Requirements Comparison Table**  
**(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))**

Amended	Original	Remarks
<p><math>C_x</math>: As specified in (a) above  <math>f</math>: Shape coefficient to be taken as 1.1  <math>\sigma_{all}</math>: Permissible bending stress (<math>N/mm^2</math>) to be taken as follows:  <math display="block">\sigma_{all} = \frac{235}{K}</math> <math>K</math>: Material factor as specified in 3.2.1.2  <math>M_p</math>: 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:  <math display="block">\frac{b_f t_{f-n50} d_0}{2000} + \frac{b_w t_{w-n50} d_0}{6000} \text{ (cm}^3\text{)}</math> <math>b_f</math> and <math>b_w</math>: Flange and web breadths (mm), respectively  <math>t_{f-n50}</math> and <math>t_{w-n50}</math>: Flange and web thicknesses (mm), respectively  <math>d_0</math>: Corrugation depth (mm)</p>	<p><math>C_x</math>: As specified in (a) above  <math>f</math>: Shape coefficient to be taken as 1.1  <math>\sigma_{all}</math>: Permissible bending stress (<math>N/mm^2</math>) to be taken as follows:  <math display="block">\sigma_{all} = \frac{235}{K}</math> <math>K</math>: Material factor as specified in 3.2.1.2  <math>M_p</math>: 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:  <math display="block">\frac{b_f t_{f-n50} d_0}{2000} + \frac{b_w t_{w-n50} d_0}{6000} \text{ (cm}^3\text{)}</math> <math>b_f</math> and <math>b_w</math>: Flange and web breadths (mm), respectively  <math>t_{f-n50}</math> and <math>t_{w-n50}</math>: Flange and web thicknesses (mm), respectively  <math>d_0</math>: Corrugation depth (mm)</p>	<p>Table 7.2.7-1 and -2  Amendment (4)  Revises requirements regarding section modulus at the upper part of corrugated bulkheads.</p> <p>Specifies the reduction requirements for the section modulus at the upper part of corrugated bulkheads.</p>

**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 <sup>(1)</sup>	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		$M_2 = \frac{SP_2\ell^2}{120}(3\mu^4 - 15\mu^3 + 20\mu^2)$	$F_2 = \frac{SP_2\ell}{40}(\mu^4 - 5\mu^3 + 20\mu)$
$\ell$ : Length (m) between the supporting points as specified in Fig. 7.2.7-2 and -3 $\ell_1$ : Length (m) from one end of $\ell$ to the zero pressure point to be taken as $\ell_1 = \ell - \ell_2$ $\ell_2$ : Length (m) from the other end of $\ell$ to the zero pressure point $P_1$ and $P_2$ : Loads (kN/m <sup>2</sup> ) corresponding to each assessment condition specified in Table 7.2.1-1 to be calculated at the upper and lower ends of $\ell$ 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 $\ell \geq 0$		$M = \max( M_1 ,  M_a )$ $M_1 = \frac{S\ell^2}{60} (3P_1 + 2P_2)$ $M_a = \frac{S\ell^2}{60} \left[ \frac{10(P_2 - P_1)\alpha^3 + 30P_1\alpha^2}{-3(7P_1 + 3P_2)\alpha + 3P_1 + 2P_2} \right]$	$F = \max( F_1 ,  F_a )$ $F_1 = -\frac{S\ell}{20} (7P_1 + 3P_2)$ $F_a = \frac{S\ell}{20} \left[ \frac{10(P_2 - P_1)\alpha^2 + 20P_1\alpha}{-7P_1 - 3P_2} \right]$	$M_2 = \frac{S\ell^2}{60} (2P_1 + 3P_2)$
		Midspan pressure = 0		$M = \max( M_1 ,  M_a )$ $M_1 = -\frac{SP_2\ell_2^2}{60} (3\mu^2 - 5\mu)$ $M_a = \frac{SP_2\ell_2^2}{60} [(6\mu^2 - 15\mu + 10)\alpha - 3\mu^2 + 5\mu]$ $-\frac{SP_2\ell_2^2}{6}\alpha + \left[ \frac{SP_2}{6\ell_2} (\alpha\ell - \ell_1)^3 \right]$	$F = \max( F_1 ,  F_a )$ $F_1 = \frac{SP_2\ell_2}{20} (2\mu^3 - 5\mu^2)$ $F_a = \frac{SP_2\ell_2}{20} (2\mu^3 - 5\mu^2) + \left[ \frac{SP_2}{2\ell_2} (\alpha\ell - \ell_1)^2 \right]$	$M_2 = \frac{SP_2\ell_2^2}{60} (3\mu^2 - 10\mu + 10)$
Connected to deck	Supported by girder Connected to deck or double bottom Connected to stool	Pressure $P_1$ at the upper end of $\ell \geq 0$		$M = \max( M_a ,  0.6M_2 )$ $M_a = \frac{S\ell^2\alpha}{120} \left[ \frac{20(P_2 - P_1)\alpha^2 + 60P_1\alpha}{-33P_1 - 12P_2} \right]$	$F = \max( F_1 ,  F_a )$ $F_1 = -\frac{S\ell}{40} (11P_1 + 4P_2)$ $F_a = \frac{S\ell}{40} \left[ \frac{20(P_2 - P_1)\alpha^2}{+40P_1\alpha - 11P_1 - 4P_2} \right]$	$M_2 = \frac{S\ell^2}{120} (7P_1 + 8P_2)$
		Midspan pressure = 0		$M = \max( M_a ,  0.6M_2 )$ $M_a = \frac{SP_2\ell_2\ell\alpha}{40} (\mu^3 - 5\mu^2) + \left[ \frac{SP_2}{6\ell_2} (\alpha\ell - \ell_1)^3 \right]$	$F = \max( F_1 ,  F_a )$ $F_1 = \frac{SP_2\ell_2}{40} (\mu^3 - 5\mu^2)$ $F_a = \frac{SP_2\ell_2}{40} (\mu^3 - 5\mu^2) + \left[ \frac{SP_2}{2\ell_2} (\alpha\ell - \ell_1)^2 \right]$	$M_2 = \frac{SP_2\ell_2^2}{120} (3\mu^2 - 15\mu + 20)$
$\ell, \ell_1$ and $\ell_2$ : 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 7.2.1-1 to be calculated at the web centre of the upper and lower ends of $\ell$ 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						
$\alpha$ : $\frac{\ell - h_S}{\ell}$						
$h_S$ : Height ( $m$ ) of the lower stool						

**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
(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	$\frac{P_b S \ell^2}{4(2 + \frac{Z_1'}{Z_0'} + \frac{Z_2'}{Z_0'})}$	$\frac{P_b S \ell^2}{4(2 + \frac{Z_2'}{Z_0'})}$	
(2)	Connected to stool	$\frac{P_S S (\ell + h_S)^2}{4(2 + \frac{Z_1'}{Z_0'} + \frac{d_H}{d_0})}$	$\frac{P_S S (\ell + h_S)^2}{4(2 + \frac{d_H}{d_0})}$	
		Not to be less than the value in (1).		
<p><math>P_b</math>: Load (<math>kN/m^2</math>) acting on the bulkhead to be taken as follows:</p> $P_b = \frac{P_1 + P_2}{2}$ <p><math>P_S</math>: Load (<math>kN/m^2</math>) acting on the bulkhead and lower stool to be taken as follows:</p> $P_b = \frac{P_1 + P_3}{2}$ <p><math>P_1</math> and <math>P_2</math>: Loads (<math>kN/m^2</math>) in the flooded condition specified in Table 7.2.1-1 to be calculated at the upper and lower ends of <math>\ell</math>, respectively.</p> <p>However, where an upper stool is provided, <math>P_1</math> is to be calculated at the deck level.</p> <p><math>P_3</math>: Load (<math>kN/m^2</math>) in the flooded condition specified in Table 7.2.1-1 to be calculated at the lower end of the lower stool</p> <p><math>S</math>: 1/2 pitch (<math>m</math>) of the corrugation</p> <p><math>\ell</math>: Length (<math>m</math>) between the supporting points as specified in Fig. 7.2.7-2</p> <p><math>d_0</math>: Corrugation depth (<math>mm</math>)</p> <p><math>d_H</math>: Breadth (<math>mm</math>) of the stool on the top of the inner bottom plating</p> <p><math>Z_i'</math>: Plastic section modulus considering the effect of buckling to be taken as follows:</p> $Z_i' = \frac{2C_{xi}}{C_{xi} + 1} f Z_i \quad (i = 0, 1, 2)$ <p>Where:</p> $C_{xi} = \frac{2.25}{\beta_i} - \frac{1.25}{\beta_i^2} \quad (i = 0, 1, 2) \text{ for } \beta_i > 1.25$ $C_{xi} = 1 \quad (i = 0, 1, 2) \text{ for } \beta_i \leq 1.25$				
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 Requirements Comparison Table**  
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended	Original	Remarks
$\beta_i = \frac{b_f}{t_{fi-n50}} \sqrt{\frac{\sigma_Y}{E}} \quad (i = 0, 1, 2)$ <p> <math>Z_0</math> and <math>t_{f0-n50}</math>: Minimum section modulus (<math>cm^3</math>) per 1/2 pitch and minimum thickness (<math>mm</math>) of the flange of midpart for 0.6<math>\ell</math> of the corrugated bulkhead, respectively  <math>Z_1</math> and <math>t_{f1-n50}</math>: Minimum section modulus (<math>cm^3</math>) per 1/2 pitch and the minimum thickness (<math>mm</math>) of the flange at the upper end of the bulkhead, respectively  <math>Z_2</math> and <math>t_{f2-n50}</math>: Minimum section modulus (<math>cm^3</math>) per 1/2 pitch and the minimum thickness (<math>mm</math>) of the flange at the lower end of the bulkhead, respectively  <math>\sigma_Y</math>: Specified minimum yield stress (<math>N/mm^2</math>)  <math>E</math>: Young's modulus to be taken as 206,000 (<math>N/mm^2</math>)  <math>f</math>: Shape coefficient to be taken as 1.1 </p>		such as negative values depending on the value of $\beta_i$ .
<p><b>7.4 Pillars, Struts, Etc.</b></p> <p><b>7.4.2 Scantling Requirements</b></p> <p><b>7.4.2.1 Buckling Strength Requirements (Euler Buckling)*</b></p> <p>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:</p> $A_{n50} = C_S \frac{F}{\sigma_{cr}} \times 10 \text{ (cm}^2\text{)}$ <p><math>C_S</math>: Safety factor to be taken as 1.4. However, when struts are placed between longitudinals in double bottom and double side, <math>C_S</math> is to be taken as 2.8.</p> <p><math>F</math>: Compressive load (<math>kN</math>) specified in each requirement. However, the compressive load may be obtained by direct strength analysis.</p> <p><u>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</u></p>	<p><b>7.4 Pillars, Struts, Etc.</b></p> <p><b>7.4.2 Scantling Requirements</b></p> <p><b>7.4.2.1 Buckling Strength Requirements (Euler Buckling)</b></p> <p>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:</p> $A_{n50} = C_S \frac{F}{\sigma_{cr}} \times 10 \text{ (cm}^2\text{)}$ <p><math>C_S</math>: Safety factor to be taken as 1.4. However, when struts are placed between longitudinals in double bottom and double side, <math>C_S</math> is to be taken as 2.8.</p> <p><math>F</math>: Compressive load (<math>kN</math>) specified in each requirement. However, the compressive load may be obtained by direct strength analysis.</p> <p>(Newly Added)</p>	<p>Amendment (7)</p> <p>Clarification of loads to be used in buckling strength assessment of pillars</p> <p>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.</p>

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
<p><u>pillars under assessment are also to be taken into account.</u></p> <p>(Omitted)</p> <p><b>Chapter 8      STRENGTH ASSESSMENT BY CARGO HOLD ANALYSIS</b></p> <p><b>8.3   Structural Model</b></p> <p><b>8.3.3   Meshing and Related Issues</b></p> <p><b>8.3.3.5   Local Models*</b></p> <p><b>1</b>   Where the geometry or structural responses cannot be adequately represented with the typical mesh size specified in <u>8.3.3.1</u>, 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.</p> <p><b>2</b>   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.</p> <p><b>3</b>   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.</p>	<p>(Omitted)</p> <p><b>Chapter 8      STRENGTH ASSESSMENT BY CARGO HOLD ANALYSIS</b></p> <p><b>8.3   Structural Model</b></p> <p><b>8.3.3   Meshing and Related Issues</b></p> <p><b>8.3.3.5   Local Models*</b></p> <p><b>1</b>   Where the geometry or structural responses cannot be adequately represented with the typical mesh size specified in <u>8.3.3.1</u>, 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.</p> <p><b>2</b>   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.</p> <p><b>3</b>   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.</p>	<p>Amendment (8) Specifies criteria when opting to assess stress concentration areas</p>

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

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



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
<p><b>Chapter 10 ADDITIONAL STRUCTURAL REQUIREMENTS</b></p> <p><b>10.7 Structural Strength against Bow Impact Pressure</b></p> <p><b>10.7.2 Blunt Ships</b></p> <p><b>10.7.2.6 Primary Supporting Members</b></p> <p>7 The web thickness <math>t_w</math> (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:</p> $t_w = \frac{P_{FB2} b_{BI}}{\sin \varphi_w \sigma_{cr}}$ <p><math>\varphi_w</math>: Angle (deg) between the web and shell plating of the primary supporting member (See Fig. 10.7.2-3)</p> <p><math>\sigma_{cr}</math>: Critical buckling stress (N/mm<sup>2</sup>) of the web of the primary supporting member or deck or bulkhead panel obtained by the following formulae:</p> <p>When <math>h_w \geq b_w</math></p> $\sigma_{cr} = \left( \frac{2.25}{\beta} - \frac{1.25}{\beta^2} \right) \sigma_Y \text{ for } \beta > 1.25$ <hr/> $\sigma_{cr} = \sigma_Y \text{ for } \beta \leq 1.25$ $\beta = \frac{b_w}{t_w} \sqrt{\frac{\sigma_Y}{E}}$ <p>When <math>h_w &lt; b_w</math></p>	<p><b>Chapter 10 ADDITIONAL STRUCTURAL REQUIREMENTS</b></p> <p><b>10.7 Structural Strength against Bow Impact Pressure</b></p> <p><b>10.7.2 Blunt Ships</b></p> <p><b>10.7.2.6 Primary Supporting Members</b></p> <p>7 The web thickness <math>t_w</math> (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:</p> $t_w = \frac{P_{FB2} b_{BI}}{\sin \varphi_w \sigma_{cr}}$ <p><math>\varphi_w</math>: Angle (deg) between the web and shell plating of the primary supporting member (See Fig. 10.7.2-3)</p> <p><math>\sigma_{cr}</math>: Critical buckling stress (N/mm<sup>2</sup>) of the web of the primary supporting member or deck or bulkhead panel obtained by the following formulae:</p> <p>When <math>h_w \geq b_w</math></p> $\sigma_{cr} = \min \left( \left( \frac{2.25}{\beta} - \frac{1.25}{\beta^2} \right) \sigma_Y, \sigma_Y \right)$ <hr/> $\beta = \frac{b_w}{t_w} \sqrt{\frac{\sigma_Y}{E}}$ <p>When <math>h_w &lt; b_w</math></p>	<p>Amendment (5)</p> <p>Revises the coefficients that take into account strength reduction due to buckling.</p> <p>Revises the formula because it could result in unreasonable values such as negative values depending on the value of <math>\beta</math>.</p> <p>Revises the formula because it could result in</p>

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
$\sigma_{cr} = \min \left( \left[ \frac{h_w}{b_w} \left( \frac{2.25}{\beta_1} - \frac{1.25}{\beta_1^2} \right) \right] \sigma_Y, \sigma_Y \right)$ <hr/> $\beta_1 = \max(\beta, 1.25)$ $\beta = \frac{h_w}{t_w} \sqrt{\frac{\sigma_Y}{E}}$ <p> <math>h_w</math>: Web depth (mm) of the primary supporting member  <math>b_w</math>: Spacing (mm) of the web stiffeners of the primary supporting member  <math>\sigma_Y</math>: Specified minimum yield stress (N/mm<sup>2</sup>) of the web of the primary supporting member         </p>	$\sigma_{cr} = \min \left( \left[ \frac{h_w}{b_w} \left( \frac{2.25}{\beta} - \frac{1.25}{\beta^2} \right) \right] \sigma_Y, \sigma_Y \right)$ <hr/> $\beta = \frac{h_w}{t_w} \sqrt{\frac{\sigma_Y}{E}}$ <p> <math>h_w</math>: Web depth (mm) of the primary supporting member  <math>b_w</math>: Spacing (mm) of the web stiffeners of the primary supporting member  <math>\sigma_Y</math>: Specified minimum yield stress (N/mm<sup>2</sup>) of the web of the primary supporting member         </p>	<p>unreasonable values such as negative values depending on the values of <math>\beta</math> and <math>h_w/b_w</math>.</p>

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

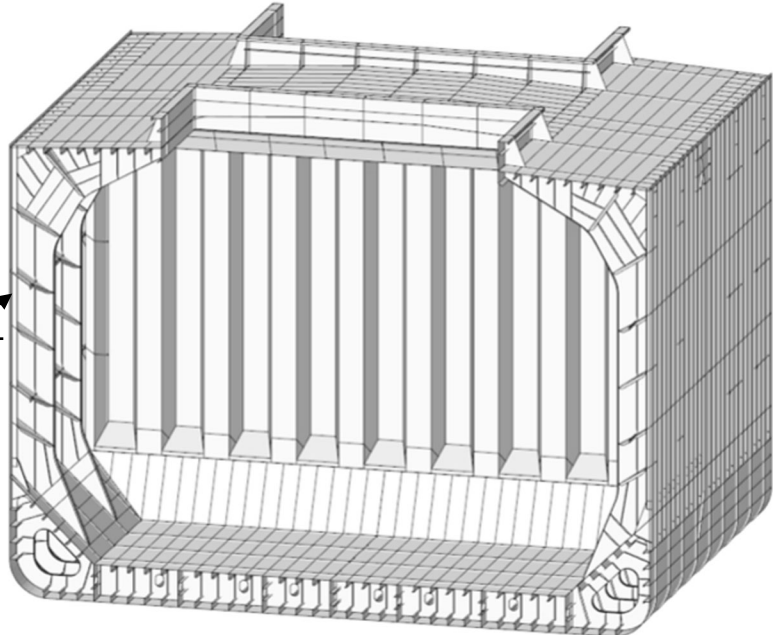
**Amended-Original Requirements Comparison Table**  
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended	Original	Remarks
$\sigma_{CR5} = \min \left\{ \begin{array}{l} \frac{\Phi \sigma_{YP}}{s} \left( \frac{2.25}{\beta_{E-1}} - \frac{1.25}{\beta_{E-1}^2} \right) \\ \Phi \sigma_{YP} \left[ +0.1 \left( 1 - \frac{s}{l} \right) \left( 1 + \frac{1}{\beta_E^2} \right)^2 \right] \end{array} \right]$ <p><math>\sigma_{YP}</math>: Standard minimum yield stress of plate material (N/mm<sup>2</sup>)  <math>\Phi</math>, <math>\beta_E</math>, <math>\beta_{E-1}</math>, <math>s</math>, <math>l</math>: As prescribed in <b>An2.3.8, Annex 5.4, Part 1</b>.</p> <p><math>\gamma_M</math>: Partial safety factor for the hull girder ultimate strength, to be taken as follows.  <math>\gamma_M = 1.05</math></p> <p><math>\gamma_{DB}</math>: 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 <math>\gamma_{DB}</math> for hogging condition may be reduced subject to approval by the Society.</p> <p>For hogging condition, <math>\gamma_{DB} = 1.15</math>  For sagging condition, <math>\gamma_{DB} = 1.0</math></p>	$\sigma_{CR5} = \min \left\{ \begin{array}{l} \frac{\sigma_{YP} \Phi}{s} \left( \frac{2.25}{\beta_E} - \frac{1.25}{\beta_E^2} \right) \\ \Phi \sigma_{YP} \left[ +0.1 \left( 1 - \frac{s}{l} \right) \left( 1 + \frac{1}{\beta_E^2} \right)^2 \right] \end{array} \right]$ <p><math>\sigma_{YP}</math>: Standard minimum yield stress of plate material (N/mm<sup>2</sup>)  <math>\Phi</math>, <math>\beta_E</math>, <math>s</math>, <math>l</math>: As prescribed in <b>An2.3.8, Annex 5.4, Part 1</b>.</p> <p><math>\gamma_M</math>: Partial safety factor for the hull girder ultimate strength, to be taken as follows.  <math>\gamma_M = 1.05</math></p> <p><math>\gamma_{DB}</math>: 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 <math>\gamma_{DB}</math> for hogging condition may be reduced subject to approval by the Society.</p> <p>For hogging condition, <math>\gamma_{DB} = 1.15</math>  For sagging condition, <math>\gamma_{DB} = 1.0</math></p>	<p>unreasonable values such as negative values depending on the values of <math>\beta_E</math> and <math>s/l</math>.</p>

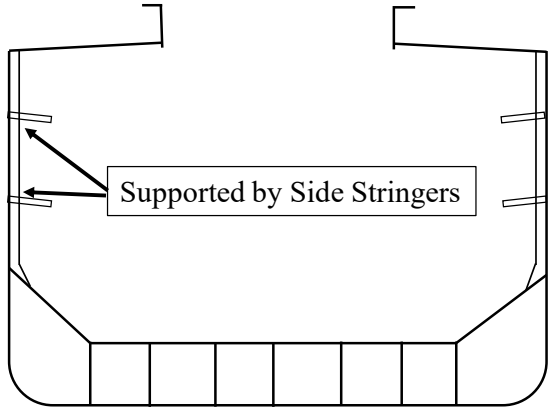
Amended-Original Requirements Comparison Table  
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended	Original	Remarks				
<div>Chapter 9      FATIGUE</div> <div>9.4    Torsional Fatigue Strength Assessment</div> <div>9.4.5    Hot Spot Stresses</div> <div>9.4.5.3    Loading Conditions and Fractions of Time to be Considered</div> <div>1    Standard loading conditions and fractions of time are to be as given in Table 9.4.5-1.</div> <div>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.</div> <div>Table 9.4.5-1    Standard Loading Conditions and Fractions of Time</div> <table><tr><td>Loading condition</td><td>Fraction of time <math>\alpha_{(j)}</math></td></tr><tr><td>Container cargo homogeneously loaded condition</td><td>100 %</td></tr></table> <div>9.4.5.4    Weld Root Fatigue Strength Assessment</div> <div>Weld root fatigue strength assessment is to be in accordance with 9.7, Part 1.</div>	Loading condition	Fraction of time $\alpha_{(j)}$	Container cargo homogeneously loaded condition	100 %	<div>Chapter 9      FATIGUE</div> <div>9.4    Torsional Fatigue Strength Assessment</div> <div>9.4.5    Hot Spot Stresses</div> <div>(Newly Added)</div> <div>9.4.5.3    Weld Root Fatigue Strength Assessment</div> <div>Weld root fatigue strength assessment is to be in accordance with 9.7, Part 1.</div>	<div>Amendment (10)</div> <div>Clarifies some definitions and corrects typographical errors.</div> <div>Standard loading conditions and fractions of time are clarified for torsional fatigue strength assessment.</div>
Loading condition	Fraction of time $\alpha_{(j)}$					
Container cargo homogeneously loaded condition	100 %					

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
<p><b>Part 2-4      WOOD CHIP CARRIERS</b></p> <p><b>Chapter 6      LOCAL STRENGTH</b></p> <p><b>6.1   General</b></p> <p><b>6.1.1   Application</b></p> <p><b>6.1.1.1   Chip Carriers</b></p>	<p><b>Part 2-4      WOOD CHIP CARRIERS</b></p> <p><b>Chapter 6      LOCAL STRENGTH</b></p> <p><b>6.1   General</b></p> <p><b>6.1.1   Application</b></p> <p><b>6.1.1.1   Chip Carriers</b></p>	
<p style="text-align: center;">Fig. 6.1.1-2 Application Example of Chip Carriers</p> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 10px;"> Side frame specified in 6.4.3, Part 1 </div>  </div>		

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
<p><b>6.2 <u>Stiffeners</u></b></p> <p><b>6.2.1 Side Frames</b></p> <p><b><u>6.2.1.1</u></b>  <u>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.</u></p> <p><u>(a) The value of <math>f_{bc}</math> is to be taken as 0.85, not 0.8.</u>  <u>(b) Rotation moment <math>M_2</math> and shear force <math>F_2</math> at the lower end of the side frame due to double bottom bending need not be considered.</u></p> <p><u>Fig. 6.2.1-1 Example Cross Section of a Chip Carrier</u></p> 	<p><b>6.2 <u>Ballast Holds</u></b></p> <p><b>6.2.1 Side Frames</b></p> <p><b>(Newly Added)</b></p> <p style="text-align: center;"><b>(Newly Added)</b></p>	<p>Rearranges the composition of chapter.</p> <p>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.</p>

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

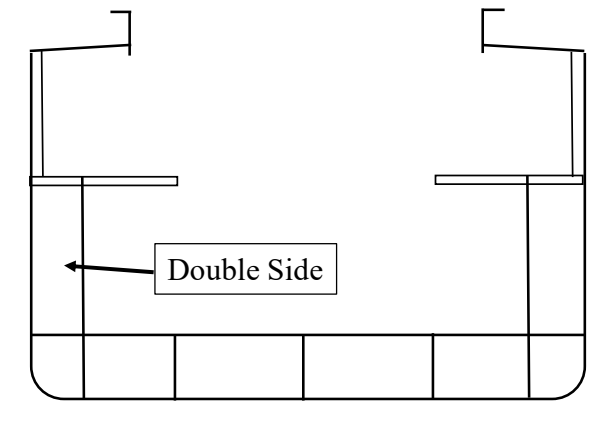
Amended	Original	Remarks
<p><b><u>6.2.1.2 Ballast Holds</u></b></p> <p>The section modulus of the side frame and the thickness of the web in the cargo hold where the ballast is loaded are to satisfy the requirements of 6.4.2 and 6.4.3.2, Part 1. However, when applying 6.4.2, Part 1, only assessment based 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.</p> <p>(Deleted)</p> <p>(Deleted)</p> <p><b><u>6.2.1.3 Connections of the Bottom of the Side Frame</u></b></p> <p>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 (<math>m</math>) between the girders in the formula <math>\ell</math> regardless of the placement of the support bracket.</p>	<p><b><u>6.2.1.1 Scantlings of Side Frames</u></b></p> <p>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.</p> <p><b><u>6.3 Bilge Hopper Tanks</u></b></p> <p><b><u>6.3.1 Side Longitudinals and Longitudinals on Bilge Hopper Plating</u></b></p> <p><b><u>6.3.1.1 Connections of the Bottom of the Side Frame</u></b></p> <p>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 (<math>m</math>) between the girders in the formula <math>\ell</math> regardless of the placement of the support bracket.</p>	<p>Modifies the numbers.</p> <p>Rearranges the composition of chapter.</p> <p>Modifies the numbers.</p>



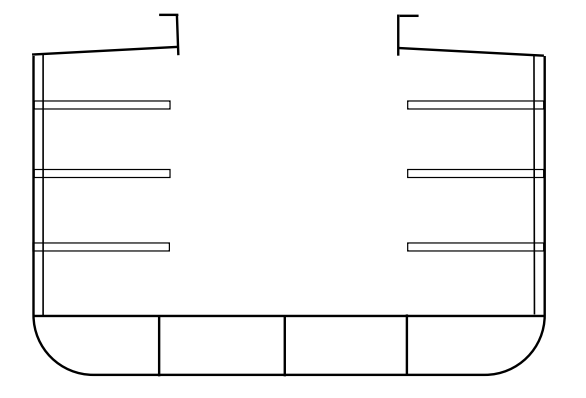
Amended-Original Requirements Comparison Table  
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended	Original	Remarks
<p><b>Part 2-5 GENERAL CARGO SHIPS AND REFRIGERATED CARGO SHIPS</b></p> <p><b>Chapter 6 LOCAL STRENGTH</b></p> <p><b><u>6.2 Stiffeners</u></b></p> <p><b><u>6.2.1 Side Frames</u></b></p> <p><b><u>6.2.1.1 General Cargo Ships</u></b>  <u>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.</u></p> <p><u>(a) The value of <math>f_{bc}</math> is to be taken as 1.0, not 0.8.</u></p> <p><u>(b) Rotation moment <math>M_2</math> and shear force <math>F_2</math> at the lower end of the side frame due to double bottom bending need not be considered.</u></p>	<p><b>Part 2-5 GENERAL CARGO SHIPS AND REFRIGERATED CARGO SHIPS</b></p> <p><b>Chapter 6 LOCAL STRENGTH</b></p> <p>(Newly Added)</p> <p>(Newly Added)</p> <p>(Newly Added)</p>	<p>Amendment (3) Clarifies the requirements related to side frames</p> <p>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 <math>f_{bc}</math> 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.</p>

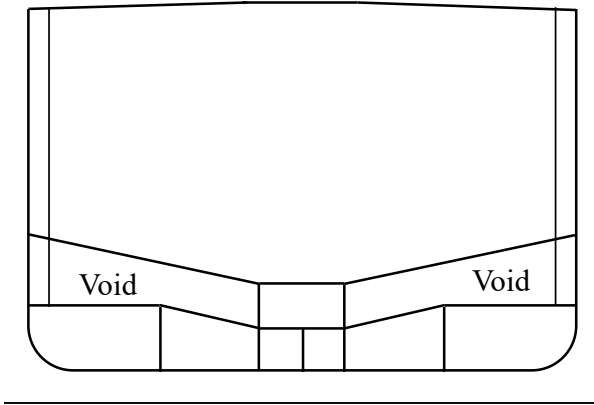
Amended-Original Requirements Comparison Table  
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended	Original	Remarks
<p><u>Fig. 6.2.1-1 Example Cross Section of a General Cargo Ship</u></p>  <p><b><u>6.2.1.2 Refrigerated Cargo Ships</u></b></p> <p><u>In applying 6.4.3.2, Part 1 to side frames in the cargo holds of refrigerated cargo ships, rotation moment <math>M_2</math> and shear force <math>F_2</math> 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.</u></p>	<p>(Newly Added)</p> <p>(Newly Added)</p>	<p>Amendment (3)</p> <p>Clarifies the requirements related to side frames</p> <p>Specifies the substitution of coefficients for refrigerated cargo ships. Being multiple-deck ships, the coefficient <math>f_{bc}</math> is set to 0.8 for the bottom layer and 1.0 for the other layers, which are considered fixed. (Specified in Part 1)</p> <p>In addition, rotation moment and shear force at the lower end of the side frames due to double bottom bending</p>

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
<p><u>Fig. 6.2.1-2 Example Cross Section of a Refrigerated Cargo Ship</u></p>  <p><b>6.2.1.3 Cement Carriers</b> 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.</p> <p>(a) The value of <math>f_{load}</math> is to be taken as 0.8, not 1.0, and value of <math>f_{bc}</math> is to be taken as 0.9, not 0.8.</p> <p>(b) Rotation moment <math>M_2</math> and shear force <math>F_2</math> at the lower end of the side frame due to double bottom bending need not be considered.</p>	<p>(Newly Added)</p> <p>(Newly Added)</p>	<p>need not be considered</p> <p>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 <math>f_{load} = 0.8</math> for multiport loading condition and the coefficient <math>f_{bc} = 0.9</math> for</p>

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

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

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
<p>appropriate by the Society, taking into consideration the mode of action of the load by each cargo.</p> <p style="text-align: center;"><b>Chapter 10    ADDITIONAL STRUCTURAL REQUIREMENTS</b></p> <p><b>10.1 Ships Carrying Steel Coils</b></p> <p><b>10.1.5 Side Frames (Ships Without Bilge Hoppers and Single-Side Ships)</b></p> <p><b>10.1.5.1 Side Frames</b></p> <p><b>1</b> 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.</p> $Z = 1.2 \frac{F_{SC} \ell_{1bdg}}{8\sigma_Y} \times 10^3 (cm^3),$ $t_w = 2.0 \frac{0.5F_{SC}}{d_{shr}\tau_Y} \times 10^3 (mm)$ <p><math>\sigma_Y</math>: Specified minimum yield stress (<math>N/mm^2</math>)  <math>\tau_Y</math>: Allowable shear stress (<math>N/mm^2</math>)  <math>\sigma_Y/\sqrt{3}</math></p> <p><math>F_{SC}</math>: Load (<math>kN</math>) acting on the side frame according to 4.4.2.1-2  <math>\ell_{1bdg}</math>: Effective bending span (<math>m</math>) 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 <u><math>1.5h_w</math></u> (See <b>Table 6.4.3-1</b>,</p>	<p>appropriate by the Society, taking into consideration the mode of action of the load by each cargo.</p> <p style="text-align: center;"><b>Chapter 10    ADDITIONAL STRUCTURAL REQUIREMENTS</b></p> <p><b>10.1 Ships Carrying Steel Coils</b></p> <p><b>10.1.5 Side Frames (Ships Without Bilge Hoppers and Single-Side Ships)</b></p> <p><b>10.1.5.1 Side Frames</b></p> <p><b>1</b> 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.</p> $Z = 1.2 \frac{F_{SC} \ell_{1bdg}}{8\sigma_Y} \times 10^3 (cm^3),$ $t_w = 2.0 \frac{0.5F_{SC}}{d_{shr}\tau_Y} \times 10^3 (mm)$ <p><math>\sigma_Y</math>: Specified minimum yield stress (<math>N/mm^2</math>)  <math>\tau_Y</math>: Allowable shear stress (<math>N/mm^2</math>)  <math>\sigma_Y/\sqrt{3}</math></p> <p><math>F_{SC}</math>: Load (<math>kN</math>) acting on the side frame according to 4.4.2.1-2  <math>\ell_{1bdg}</math>: Effective bending span (<math>m</math>) 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 <u><math>2h_w</math></u> (See <b>Fig. 6.4.3-2, Part</b></p>	<p>Modifies the definition of effective bending span as 6.4.3.2, Part 1.</p>

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
<p><b>Part 1).</b>  <math>d_{shr}</math>: Effective shear depth (<i>mm</i>) of stiffener according to 3.6.4.2, Part 1</p> <p><b><u>10.6 Ships Loaded with Heavy Cargoes on Upper Decks</u></b></p> <p><b><u>10.6.1 General</u></b></p> <p><b><u>10.6.1.1 General</u></b>  <u>1 For ships with <math>B/D \geq 2.5</math>, 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.</u>  <u>2 The upper deck plate, stiffener or its transverse web plate is to be suitably reinforced.</u>  <u>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.</u></p>	<p><b>1).</b>  <math>d_{shr}</math>: Effective shear depth (<i>mm</i>) of stiffener according to 3.6.4.2, Part 1</p> <p><b>(Newly Added)</b></p> <p><b>(Newly Added)</b></p> <p><b>(Newly Added)</b></p>	<p>Amendment (1)  Specifies requirements for ships carrying heavy cargoes on upper deck, and also provides for a new notation“Heavy Deck Carrier”.</p>

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
<p><b>Part 2-6 VEHICLES CARRIERS AND ROLL-ON/ROLL-OFF SHIPS</b></p> <p><b>Chapter 6 LOCAL STRENGTH</b></p> <p><b><u>6.2 Stiffeners</u></b></p> <p><b><u>6.2.1 Side Frames</u></b></p> <p><b><u>6.2.1.1</u></b>  <u>In applying 6.4.3.2, Part 1 to side frames in the cargo holds of vehicles carriers and ro-ro ships, rotation moment <math>M_2</math> and shear force <math>F_2</math> at the lower end of the side frame due to double bottom bending need not be considered.</u></p>	<p><b>Part 2-6 VEHICLES CARRIERS AND ROLL-ON/ROLL-OFF SHIPS</b></p> <p><b>Chapter 6 LOCAL STRENGTH</b></p> <p>(Newly Added)</p> <p>(Newly Added)</p> <p>(Newly Added)</p>	<p>Amendment (3) Clarifies the requirements related to side frames</p> <p>Specifies the substitution of coefficients for vehicles carriers and Ro-ro ships. Being multiple-deck ships, the coefficient <math>f_{bc}</math> 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</p>



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
<p><b>Chapter 10 ADDITIONAL STRUCTURAL REQUIREMENTS</b></p> <p><b>10.2 Movable Car Deck</b></p> <p><b>10.2.1 Movable Car Deck Girders</b></p> <p><b>10.2.1.2 Strength Requirement*</b></p> <p>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.</p> <p>(1) Effective breadth for girders parallel to the stiffening direction: The value specified in <b>3.6.3, Part 1</b>.</p> <p>(2) Effective breadth (<math>b_{eft}</math>) for girders crossing at right angles with the stiffening direction:</p> $b_{eft} = \sum_n \left( \frac{C_{et} \cdot a}{2} \right) (mm)$ <p>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 <b>3.6.3, Part 1</b>.</p> <p><math>C_{et}</math>: Coefficient as given by the following formula However, where it exceeds 1.0, it is to be taken as 1.0.</p> $C_{et} = \left( \frac{3}{\beta_1} - \frac{1.75}{\beta_1^2} \right) \frac{b}{a} + \left( \frac{0.075}{\beta} + \frac{0.75}{\beta^2} \right) \left( 1 - \frac{b}{a} \right)$ <p><math>n</math>: 1 for girders located on the periphery of the car deck, and 2 for the others</p>	<p><b>Chapter 10 ADDITIONAL STRUCTURAL REQUIREMENTS</b></p> <p><b>10.2 Movable Car Deck</b></p> <p><b>10.2.1 Movable Car Deck Girders</b></p> <p><b>10.2.1.2 Strength Requirement*</b></p> <p>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.</p> <p>(1) Effective breadth for girders parallel to the stiffening direction: The value specified in <b>3.6.3, Part 1</b>.</p> <p>(2) Effective breadth (<math>b_{eft}</math>) for girders crossing at right angles with the stiffening direction:</p> $b_{eft} = \sum_n \left( \frac{C_{et} \cdot a}{2} \right) (mm)$ <p>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 <b>3.6.3, Part 1</b>.</p> <p><math>C_{et}</math>: Coefficient as given by the following formula However, where it exceeds 1.0, it is to be taken as 1.0.</p> $C_{et} = \left( \frac{3}{\beta} - \frac{1.75}{\beta^2} \right) \frac{b}{a} + \left( \frac{0.075}{\beta} + \frac{0.75}{\beta^2} \right) \left( 1 - \frac{b}{a} \right)$ <p><math>n</math>: 1 for girders located on the periphery of the car deck, and 2 for the others</p>	<p>Amendment (5) Revises the coefficients that take into account strength reduction due to buckling.</p> <p>Revises the formula because it could result in</p>

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

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
<p><b>Part 2-9 SHIPS CARRYING LIQUEFIED GASES IN BULK (INDEPENDENT PRISMATIC TANKS TYPE A/B)</b></p> <p><b>Chapter 6 LOCAL STRENGTH</b></p> <p><b><u>6.2 Stiffeners</u></b></p> <p><b><u>6.2.1 Side Frames</u></b></p> <p><b><u>6.2.1.1</u></b>  <u>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 <math>M_2</math> and shear force <math>F_2</math> at the lower end of the side frame due to double bottom bending need be considered.</u></p>	<p><b>Part 2-9 SHIPS CARRYING LIQUEFIED GASES IN BULK (INDEPENDENT PRISMATIC TANKS TYPE A/B)</b></p> <p><b>Chapter 6 LOCAL STRENGTH</b></p> <p>(Newly Added)</p> <p>(Newly Added)</p> <p>(Newly Added)</p>	<p>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.</p>

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
<p><b>Part 2-10 SHIPS CARRYING LIQUEFIED GASES IN BULK (INDEPENDENT TANKS OF TYPE C)</b></p> <p><b>Chapter 1 GENERAL</b></p> <p><b>1.1 General</b></p> <p><b>1.1.1 Application</b></p> <p><b><u>1.1.1.2 Correspondence with Other Rules of the Society</u></b>  <u>In applying 1.2.2.5, Part 1, relevant requirements specified in Part D and Part N are shown for reference.</u></p>	<p><b>Part 2-10 SHIPS CARRYING LIQUEFIED GASES IN BULK (INDEPENDENT TANKS OF TYPE C)</b></p> <p><b>Chapter 1 GENERAL</b></p> <p><b>1.1 General</b></p> <p><b>1.1.1 Application</b></p> <p><b>(Newly Added)</b></p>	<p>Amendment (9)</p> <p>Specifies strength assessment by cargo hold analysis for ships carrying liquefied gases in bulk (independent tanks of type C).</p>

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 1.1.1-1 Correspondence with Other Parts of the Society's Rules			
<u>Structure</u>	<u>Item</u>	<u>Relevant Parts, other than Part C</u>	
<u>Hull structures</u>	<u>Applications of steels</u>	<u>4.19.1, Part N and Chapter 6, Part N</u>	
<u>Cargo tanks</u>	<u>General</u>	<u>4.23, Part N</u>	
	<u>Evaluation of loads due to flooding on ship</u>	<u>4.15.2, Part N</u>	
	<u>Strength of pressure vessels</u>	<u>10.5, Part D</u>	
	<u>Sloshing evaluation (within allowable filling levels)</u>	<u>4.14.3, Part N</u>	
	<u>Thermal stress analysis (considering transient condition for cargo temperature below <math>-55^{\circ}\text{C}</math>)</u>	<u>4.13.4, Part N</u>	

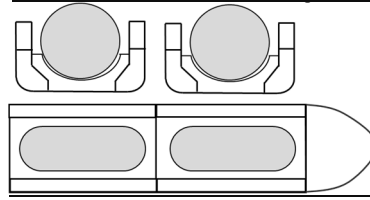
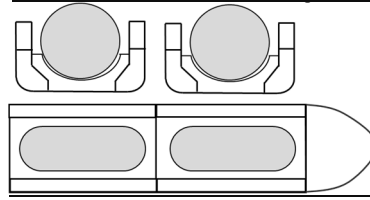
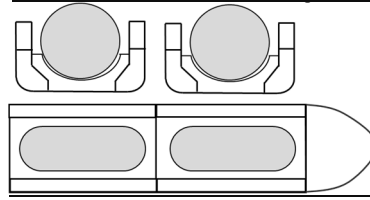
Amended-Original Requirements Comparison Table  
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended	Original	Remarks															
<p style="text-align: center;"><b>Chapter 4      LOADS</b></p> <p><b>4.1    General</b></p> <p><b>4.1.1    Overview</b></p> <p><b>4.1.1.1    Structure and Overview of this Chapter</b> Each section of this Chapter defines the additional requirements shown in <b>Table 4.1.1-1</b> as the loads used for each formula and each strength assessment to determine the scantlings specified in each Chapter of <b>Part 2-10</b> and <b>Part 1</b>.</p> <p style="text-align: center;">Table 4.1.1-1    Overview of Chapter 4</p> <table border="1"> <thead> <tr> <th>Section</th><th>Title</th><th>Overview</th></tr> </thead> <tbody> <tr> <td>4.1</td><td>General</td><td>Requirements for the general principles of <b>Chapter 4</b></td></tr> <tr> <td>4.2</td><td>Loads to be Considered in Local Strength</td><td>Additional requirements for loads to be considered for the local strength requirements specified in <b>Chapter 6, Part 1</b>.</td></tr> <tr> <td>4.3</td><td>Loads to be Considered in Strength of Primary Supporting Structures</td><td>Additional requirements for loads to be considered for the requirements of strength of primary supporting structures specified in <b>Chapter 7</b> and <b>Chapter 7, Part 1</b>.</td></tr> <tr> <td><u>4.4</u></td><td><u>Loads to be Considered in Strength Assessment by Cargo Hold Analysis</u></td><td><u>Additional requirements for loads to be considered for the requirements of strength assessment by cargo hold analysis specified in <b>Chapter 8</b> and <b>Chapter 8, Part 1</b>.</u></td></tr> </tbody> </table> <p><b><u>4.1.2    Design Load Scenarios and Loads to be Considered</u></b></p> <p><b><u>4.1.2.1</u></b> <b><u>1    In addition to 4.1.2.1, Part 1, the design load scenarios</u></b></p>	Section	Title	Overview	4.1	General	Requirements for the general principles of <b>Chapter 4</b>	4.2	Loads to be Considered in Local Strength	Additional requirements for loads to be considered for the local strength requirements specified in <b>Chapter 6, Part 1</b> .	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 <b>Chapter 7</b> and <b>Chapter 7, Part 1</b> .	<u>4.4</u>	<u>Loads to be Considered in Strength Assessment by Cargo Hold Analysis</u>	<u>Additional requirements for loads to be considered for the requirements of strength assessment by cargo hold analysis specified in <b>Chapter 8</b> and <b>Chapter 8, Part 1</b>.</u>	<p style="text-align: center;"><b>Chapter 4      LOADS</b></p> <p><b>4.1    General</b></p> <p><b>4.1.1    Overview</b></p> <p><b>4.1.1.1    Structure and Overview of this Chapter</b> Each section of this Chapter defines the additional requirements shown in <b>Table 4.1.1-1</b> as the loads used for each formula and each strength assessment to determine the scantlings specified in each Chapter of <b>Part 2-10</b> and <b>Part 1</b>.</p> <p><b>(Newly Added)</b></p> <p><b>(Newly Added)</b></p>	
Section	Title	Overview															
4.1	General	Requirements for the general principles of <b>Chapter 4</b>															
4.2	Loads to be Considered in Local Strength	Additional requirements for loads to be considered for the local strength requirements specified in <b>Chapter 6, Part 1</b> .															
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<u>4.4</u>	<u>Loads to be Considered in Strength Assessment by Cargo Hold Analysis</u>	<u>Additional requirements for loads to be considered for the requirements of strength assessment by cargo hold analysis specified in <b>Chapter 8</b> and <b>Chapter 8, Part 1</b>.</u>															

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

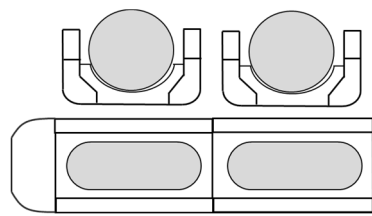
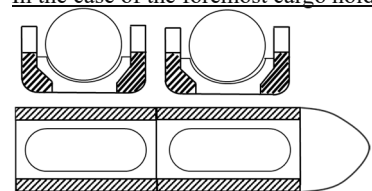
Amended	Original	Remarks
<p><u>and loads in the following (1) and (2) are to be considered in accordance with the requirements of this chapter:</u></p> <p>(1) <u>30-degree static heel condition: lateral loads due to seawater and cargo where the ship is heeled at 30 degrees (Relevant requirements: 4.13.9, Part N)</u></p> <p>(2) <u>Collision condition: Possible lateral loads due to seawater and cargo in the condition where the ship collides (Relevant requirements: 4.15.1, Part N)</u></p> <p><u>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.</u></p> <p><b><u>4.4 Loads to be Considered in Strength Assessment by Cargo Hold Analysis</u></b></p> <p><b><u>4.4.1 General</u></b></p> <p><b><u>4.4.1.1 General</u></b></p> <p><u>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.</u></p> <p><u>2 Additional requirements for loads in the maximum load condition are to be in accordance with 4.4.2.</u></p> <p><u>3 The loads in the harbour condition need not be considered.</u></p> <p><u>4 The loads in the 30-degree static heel condition are to be in accordance with 4.4.3.</u></p> <p><u>5 The loads in the collision condition are to be in accordance with 4.4.4.</u></p> <p><u>6 The loads in the flooded condition (IGC) are to be in accordance with 4.4.5.</u></p>	<p>(Newly Added)</p> <p>(Newly Added)</p> <p>(Newly Added)</p>	

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

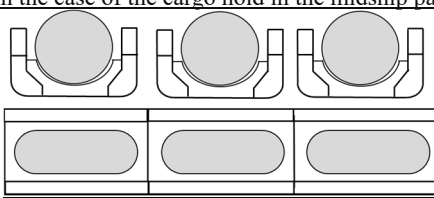
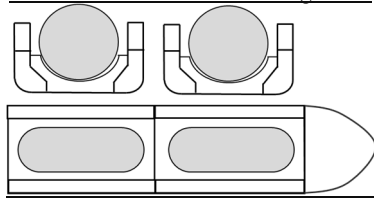
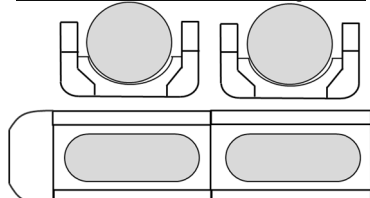
Amended	Original	Remarks															
<p><b><u>4.4.2 Maximum Load Condition</u></b></p> <p><b><u>4.4.2.1 Loading Conditions</u></b></p> <p><u>1 Loading conditions which affect the structural response of each structure to be significantly assessed are to be considered appropriately for all possible loading conditions, except those restricted in the loading manual.</u></p> <p><u>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.</u></p>	<p>(Newly Added)</p> <p>(Newly Added)</p>																
<p>Table 4.4.2-1 Loading Conditions in Maximum Load Condition (Ships with Two Cargo Hold)</p>																	
<table><tr><th><u>Loading condition<sup>(1)(2)</sup></u></th><th colspan="2"><u>Loading pattern</u></th><th><u>Draught</u></th><th><u>Vertical still water bending moment</u> <math>M_{sv}</math></th><th><u>Equivalent design wave</u></th></tr><tr><td rowspan="2"><u>Full load condition</u></td><td rowspan="2"><u>S1</u></td><td><u>In the case of the foremost cargo hold</u> </td><td rowspan="2"><math>T_{sc}</math></td><td><math>0.5M_{sv\_max}</math></td><td><u>HM-2/FM-2</u> <u>PCL-2</u></td></tr><tr><td><u>In the case of the aftmost cargo hold</u></td><td><math>M_{sv\_min}</math></td><td><u>HM-1/FM-1</u> <u>BR-1P/-1S</u> <u>BP-1P/-1S</u> <u>AV-1P/-1S</u> <u>PCL-1</u></td></tr></table>	<u>Loading condition<sup>(1)(2)</sup></u>	<u>Loading pattern</u>		<u>Draught</u>	<u>Vertical still water bending moment</u> $M_{sv}$	<u>Equivalent design wave</u>	<u>Full load condition</u>	<u>S1</u>	<u>In the case of the foremost cargo hold</u> 	$T_{sc}$	$0.5M_{sv\_max}$	<u>HM-2/FM-2</u> <u>PCL-2</u>	<u>In the case of the aftmost cargo hold</u>	$M_{sv\_min}$	<u>HM-1/FM-1</u> <u>BR-1P/-1S</u> <u>BP-1P/-1S</u> <u>AV-1P/-1S</u> <u>PCL-1</u>		(Newly Added)
<u>Loading condition<sup>(1)(2)</sup></u>	<u>Loading pattern</u>		<u>Draught</u>	<u>Vertical still water bending moment</u> $M_{sv}$	<u>Equivalent design wave</u>												
<u>Full load condition</u>	<u>S1</u>	<u>In the case of the foremost cargo hold</u> 	$T_{sc}$	$0.5M_{sv\_max}$	<u>HM-2/FM-2</u> <u>PCL-2</u>												
		<u>In the case of the aftmost cargo hold</u>		$M_{sv\_min}$	<u>HM-1/FM-1</u> <u>BR-1P/-1S</u> <u>BP-1P/-1S</u> <u>AV-1P/-1S</u> <u>PCL-1</u>												



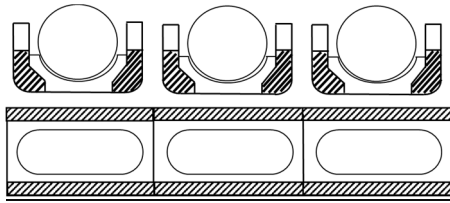
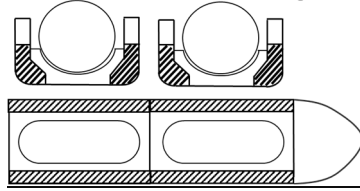
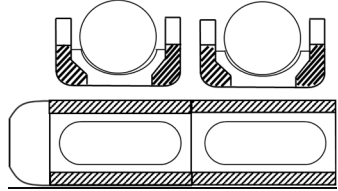
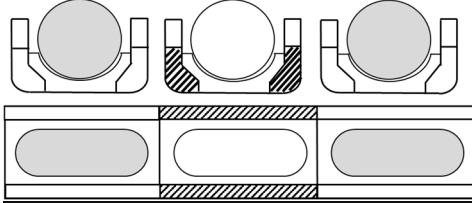
**Amended-Original Requirements Comparison Table**  
**(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))**

Amended			Original			Remarks
						
<u>Ballast condition</u>	<u>S2</u>	<u>In the case of the foremost cargo hold</u> 	<u>T<sub>BAL</sub></u>	<u>M<sub>sv_max</sub></u>	<u>HM-2/FM-2</u> <u>PCL-2</u>	
		<u>0.5M<sub>sv_max</sub></u>		<u>HM-1/FM-1</u> <u>BR-1P/-1S</u> <u>BP-1P/-1S</u> <u>PCL-1</u>		
<div><div></div> : Liquid cargo <div></div> : Ballast water</div>						
<div>(1) The radius of gyration (<i>m</i>) around the <i>x</i>-axis, to be taken as 0.35<i>B</i> in the full load condition is to be taken as 0.40<i>B</i> 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.</div> <div>(2) Where the fuel oil tank is located in the cargo region, it is to be considered emptied</div>						

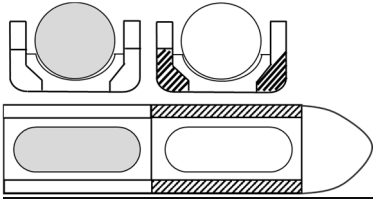
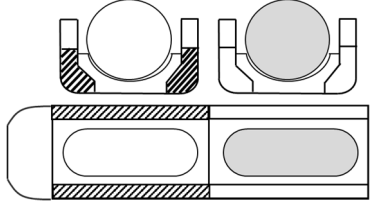
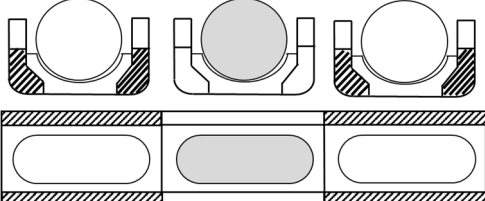
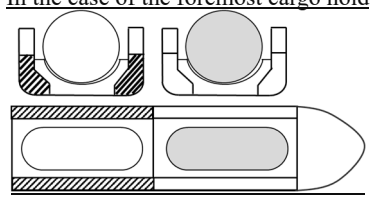
**Amended-Original Requirements Comparison Table**  
**(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))**

Amended		Original			Remarks	
Table 4.4.2-2 Loading Conditions in Maximum Load Condition (Ships with Three or more Cargo Holds)						(Newly Added)
<u>Loading condition<sup>(1)(2)</sup></u>	<u>Loading pattern</u>		<u>Draught</u>	<u>Vertical still water bending moment</u> <u><math>M_{sv}^{(3)}</math></u>	<u>Equivalent design wave</u>	
<u>Full load condition</u>	<u>S1</u>	<u>In the case of the cargo hold in the midship part</u> 	<u>T<sub>SC</sub></u>	<u><math>0.5M_{sv\_max}</math></u>	<u>HM-2/FM-2</u> <u>PCL-2</u>	
		 <u>In the case of the foremost cargo hold</u>  <u>In the case of the aftmost cargo hold</u>		<u><math>M_{sv\_min}</math></u>	<u>HM-1/FM-1</u> <u>BR-1P/-1S</u> <u>BP-1P/-1S</u> <u>AV-1P/-1S</u> <u>PCL-1</u>	
<u>Ballast condition</u>	<u>S2</u>	<u>In the case of the cargo hold in the midship part</u>	<u>T<sub>BAL</sub></u>	<u><math>M_{sv\_max}</math></u>	<u>HM-2/FM-2</u> <u>PCL-2</u>	
				<u><math>0.5M_{sv\_max}</math></u>	<u>HM-1/FM-1</u> <u>BR-1P/-1S</u> <u>BP-1P/-1S</u>	

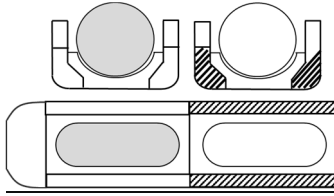


Amended-Original Requirements Comparison Table  
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended			Original			Remarks
		 <p><u>In the case of the foremost cargo hold</u></p>  <p><u>In the case of the aftmost cargo hold</u></p> 			<u>PCL-1</u>	
<u>Condition loaded/unloaded in multiple ports</u>	<u>S3</u>	<p><u>In the case of the cargo hold in the midship part</u></p>  <p><u>In the case of the foremost cargo hold</u></p>	<u>T<sub>MP-max</sub></u>	<u>M<sub>SV-max</sub></u>	<u>HM-2/FM-2</u> <u>PCL-2</u>	

**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
			 <p><u>In the case of the aftmost cargo hold</u></p> 				
		<u>S4</u>	<p><u>In the case of the cargo hold in the midship part</u></p>  <p><u>In the case of the foremost cargo hold</u></p>  <p><u>In the case of the aftmost cargo hold</u></p>	<u><math>T_{MP\_min}</math></u>	<u><math>M_{SV\_min}</math></u>	<u>HM-1/FM-1</u> <u>BR-1P/-1S</u> <u>BP-1P/-1S</u> <u>PCL-1</u>	

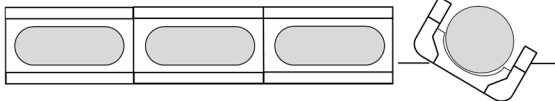
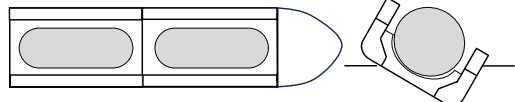
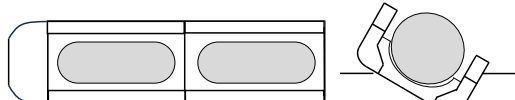

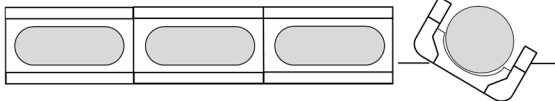
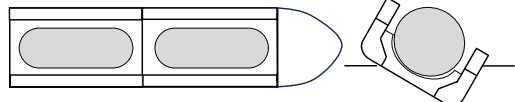
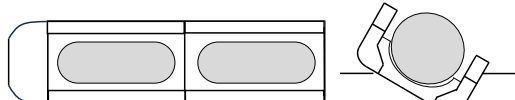
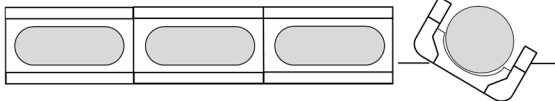
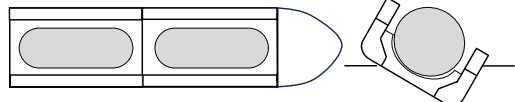
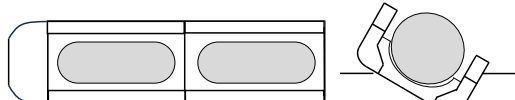
**Amended-Original Requirements Comparison Table**  
 (Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended			Original			Remarks
						
<p>  : Liquid cargo   : Ballast water         </p>						
<p>(Notes)</p> <p> <math>T_{Mp-max}</math> : Maximum draught (<math>m</math>) for loading conditions corresponding to loading condition S3 in the loading manual.  <math>T_{Mp-min}</math> : Minimum draught (<math>m</math>) for loading conditions corresponding to loading condition S4 in the loading manual.         </p>						
<p>           (1) The radius of gyration (<math>m</math>) around the <math>x</math>-axis is to be taken as <math>0.35B</math> in the full load condition, <math>0.40B</math> in the ballast condition and <math>0.38B</math> 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.         </p>						
<p><b>4.4.2.2 Wave Conditions</b>  <u>Loads based on the equivalent design waves specified in Table 4.4.2-3 are to be additionally considered.</u></p>			<p><b>(Newly Added)</b></p>			

**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 4.4.2-3 Concept of Equivalent Design Wave				(Newly Added)
Equivalent design wave		Heading	Typical features	
AV <sup>(1)</sup>	AV-1P	Oblique sea	Port side: weather side up	Vertical acceleration at the centre of gravity of the cargo hold is its maximum value
	AV-2P	Oblique sea	Port side: weather side down	Vertical acceleration at the centre of gravity of the cargo hold is its minimum value
	AV-1S	Oblique sea	Starboard: weather side up	Vertical acceleration at the centre of gravity of the cargo hold is its maximum value
	AV-2S	Oblique sea	Starboard : weather side down	Vertical acceleration at the centre of gravity of the cargo hold is its minimum value
PCL	PCL-1	Head sea	Sagging condition	Hydrodynamic pressure at the centreline of the bottom is its minimum value
	PCL-2	Head sea	Hogging condition	Hydrodynamic pressure at the centreline of the bottom is its maximum value
(1) The wave AV is applied where the position of the centre of gravity of the cargo hold to be assessed is $0.6 < x/LC$ .				
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 waves AV and PCL specified in 4.3.2.4, Part 2-9 is to be additionally considered.		(Newly Added)		
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 waves AV and PCL is to be considered. The acceleration is to be in accordance with 4.3.2.5, Part 2-9.		(Newly Added)		
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.		(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													
<p><u>2</u> In applying 4.6.2.10, Part 1, the coefficients <math>C_{4v}</math> and <math>C_{4h}</math> for equivalent design waves <math>AV</math> and <math>PCL</math> are to be in accordance with 4.3.2.6, Part 2-9.</p> <p><u>4.4.3 30-degree Static Heel Condition</u></p> <p><u>4.4.3.1 Loading Conditions</u></p> <p>The standard loading condition is to be in accordance with <u>Table 4.4.3-1</u>.</p>	<p>(Newly Added)</p> <p>(Newly Added)</p>														
<p>Table 4.4.3-1 Loading Conditions for the 30-degree Static Heel Condition</p> <table><tr><th>Loading condition</th><th colspan="2">Loading pattern</th><th>Draught</th><th>Vertical bending moment</th></tr><tr><td rowspan="3">=</td><td rowspan="3"><u>H1</u></td><td><p><u>In the case of the cargo hold in the midship part</u></p></td><td rowspan="3"><math>T_{sc}</math></td><td rowspan="3"><u>0</u></td></tr><tr><td><p><u>In the case of the foremost cargo hold</u></p></td></tr><tr><td><p><u>In the case of the aftmost cargo hold</u></p></td></tr></table> <p>: As specified in Table 4.4.2-1.</p> <p><u>Note:</u></p> <p><u>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.</u></p>			Loading condition	Loading pattern		Draught	Vertical bending moment	=	<u>H1</u>	<p><u>In the case of the cargo hold in the midship part</u></p> 	$T_{sc}$	<u>0</u>	<p><u>In the case of the foremost cargo hold</u></p> 	<p><u>In the case of the aftmost cargo hold</u></p> 	(Newly Added)
Loading condition	Loading pattern		Draught	Vertical bending moment											
=	<u>H1</u>	<p><u>In the case of the cargo hold in the midship part</u></p> 	$T_{sc}$	<u>0</u>											
		<p><u>In the case of the foremost cargo hold</u></p> 													
		<p><u>In the case of the aftmost cargo hold</u></p> 													

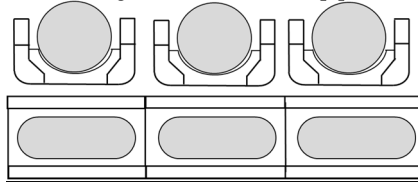
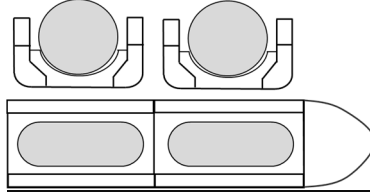
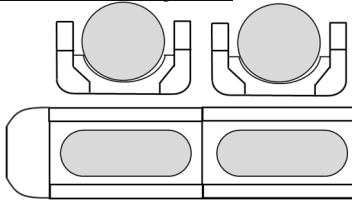

## Amended-Original Requirements Comparison Table

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

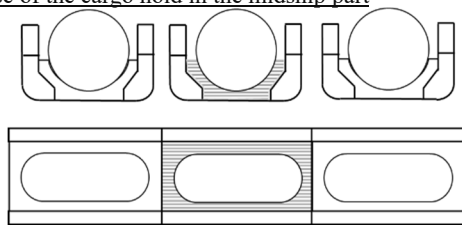
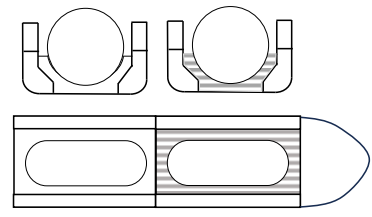
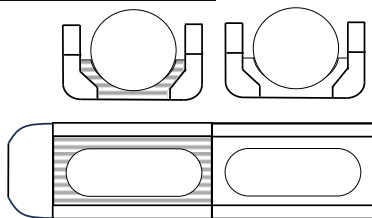
Amended	Original	Remarks
<p><b><u>4.4.3.2 Other</u></b>  <u>Requirements other than those for the loading condition (wave conditions, external pressure, internal pressure and hull girder loads) are to be in accordance with 4.3.4, Part 2-9.</u></p>	(Newly Added)	
<p><b><u>4.4.4 Collision Condition</u></b></p>	(Newly Added)	
<p><b><u>4.4.4.1 Loading Conditions</u></b>  <u>The standard loading condition is to be in accordance with Table 4.4.4-1.</u></p>	(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
Table 4.4.4-1 Loading Conditions in Collision Condition				
<u>Loading condition</u>	<u>Loading pattern</u>	<u>Draught</u>	<u>Vertical bending moment</u>	(Newly Added)
<u>Full load condition</u>	<u>In the case of the cargo hold in the midship part</u> 	$T_{sc}$	$\underline{0}$	
	<u>In the case of the foremost cargo hold</u> 			
	<u>In the case of the aftmost cargo hold</u> 			
 : As specified in Table 4.4.2-1.				
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.		(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
<div>4.4.5 Flooded Condition (IGC)</div> <div>4.4.5.1 Loading Conditions</div> <div>The standard loading condition is to be in accordance with Table 4.4.5-1.</div>	<div>(Newly Added)</div> <div>(Newly Added)</div>			
<div>Table 4.4.5-1 Loading Conditions in Flooded Conditions (IGC)</div>				
<div>Loading condition</div>	<div>Loading pattern</div>		<div>Draught</div>	<div>Vertical bending moment</div>
<div>=</div>	<div>FLI1</div>	<div>In the case of the cargo hold in the midship part</div> <div></div> <div>In the case of the foremost cargo hold</div> <div></div> <div>In the case of the aftmost cargo hold</div> <div></div>	<div>T<sub>sum</sub></div>	<div>0</div>

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
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <math>T_{sum}</math>: Draught (<math>m</math>), as specified in 4.15.2, Part N.  : Seawater         </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><b><u>4.4.5.2 Others</u></b>  <u>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.</u></p> <p style="text-align: center;"><b>Chapter 8      STRENGTH ASSESSMENT BY CARGO HOLD ANALYSIS</b></p> <p><b>8.1 General</b></p> <p><b>8.1.1 Overview</b></p> <p><b>8.1.1.1 Structure and Overview of this Chapter</b>  <u>1 This chapter specifies additional requirements related to strength assessment by cargo hold analysis for liquefied gas bulk carriers with independent tanks of type C.</u>  <u>2 The structure and overview of this chapter are shown in Table 8.1.1-1.</u></p> </div> <div style="width: 45%;"> <p><b>(Newly Added)</b></p> <p style="text-align: center;"><b>Chapter 8      STRENGTH ASSESSMENT BY CARGO HOLD ANALYSIS</b></p> <p><b>8.1 General</b></p> <p><b>8.1.1 Application</b></p> <p><b>8.1.1.1</b>  <u>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.</u></p> </div> </div>		

**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 8.1.1-1 Overview of Chapter 8			(Newly Added)
Section	Titles	Abstracts	
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	
8.1.2 Application		8.1.2 Members to be Assessed	
8.1.2.1 Ships to be Assessed		8.1.2.1	
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.		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 Requirements Comparison Table  
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

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

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
<p><u>the longitudinal direction from the supporting structures.</u></p> <p><b><u>8.2.1.4 Members to be Assessed in Flooded Condition (IGC)</u></b>  <u>In strength assessments based on the flooded condition (IGC), the members to be assessed are to be at the discretion of the Society.</u></p> <p><b><u>8.3 Structure Models</u></b></p> <p><b><u>8.3.1 Extent of Models and Members to be Modelled</u></b></p> <p><b><u>8.3.1.1 Extent of Models</u></b>  <u>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.</u></p> <p><b><u>8.3.1.2 Members to be Modelled</u></b>  <u>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.</u>  <u>2 In applying 8.3.3.1, small members are to be modelled so as to reproduce the actual construction as much as possible.</u></p> <p><b><u>8.3.2 Elements</u></b></p> <p><b><u>8.3.2.1 Properties of Elements</u></b>  <u>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</u></p>	<p>(Newly Added)</p> <p>(Newly Added)</p> <p>(Newly Added)</p> <p>(Newly Added)</p> <p>(Newly Added)</p> <p>(Newly Added)</p> <p>(Newly Added)</p>	

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
<p><u>their weight in areas where cargo tank structures are modelled.</u></p> <p><b><u>8.3.2.2 Element Types</u></b></p> <p><u>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.</u></p> <p><u>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.</u></p> <p><u>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.</u></p> <p><b><u>8.3.3 Meshing and Related Issues</u></b></p> <p><b><u>8.3.3.1 Supporting Structures of Cargo Tank</u></b></p> <p><u>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.</u></p> <p><u>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.</u></p> <p><u>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.</u></p>	<p>(Newly Added)</p>          <p>(Newly Added)</p>          <p>(Newly Added)</p>	

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
<p><b><u>8.3.4 Other</u></b></p> <p><b><u>8.3.4.1 Contacts and Frictions</u></b>  <u>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.</u></p> <p><b><u>8.4 Boundary Conditions and Load Conditions</u></b></p> <p><b><u>8.4.1 Boundary Conditions</u></b></p> <p><b><u>8.4.1.1</u></b>  <u>In applying 8.5.1, Part 1, boundary conditions are to be in accordance with 8.4.1, Part 2-8.</u></p> <p><b><u>8.4.2 Load Conditions</u></b></p> <p><b><u>8.4.2.1 Load to be Considered</u></b>  <u>In applying 8.5.2, Part 1, loads based on the additional requirements specified in 4.4 are to be considered.</u></p> <p><b><u>8.4.2.2 Method of Applying Moments to the Structural Model</u></b>  <u>In applying 8.5.2, Part 1, the method of applying moments is to be in accordance with 8.4.2, Part 2-8.</u></p>	<p>(Newly Added)</p> <p>(Newly Added)</p> <p>(Newly Added)</p> <p>(Newly Added)</p> <p>(Newly Added)</p> <p>(Newly Added)</p> <p>(Newly Added)</p>	



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
<p><b><u>8.5 Strength Assessment</u></b></p> <p><b><u>8.5.1 Yield Strength Assessment</u></b></p> <p><b><u>8.5.1.1 Criteria for Typical Mesh Size</u></b></p> <p><u>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.</u></p> <p><u>2 In the 30-degree static heel condition, the permissible utilisation factor <math>\lambda_{yperm}</math> is to be taken as 1.0.</u></p> <p><u>3 In the collision condition and flooded condition (IGC), the permissible utilisation factor <math>\lambda_{yperm}</math> is to be in accordance with the following formulae.</u></p> $\lambda_y \leq \lambda_{perm}$ <p><u><math>\lambda_y</math>: Yield utilisation factor, as given by the following formula. In the case of rod elements or beam elements, <math>\sigma_{eq}</math> is to be substituted to <math>\sigma_a</math>.</u></p> $\lambda_y = \frac{\sigma_{eq}}{\sigma_Y}$ <p><u><math>\lambda_{perm}</math>: Permissible utilisation factor, to be taken as 1.0.</u></p> <p><b><u>8.5.1.2 Criteria for Areas Modelled with Finer Mesh Size</u></b></p> <p><u>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.</u></p>	<p>(Newly Added)</p> <p>(Newly Added)</p> <p>(Newly Added)</p> <p>(Newly Added)</p>	

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
<p><u><math>\lambda_y \leq \lambda_{perm}</math></u>  <u><math>\lambda_y</math>: Yield utilisation factor, as given by the following formula.</u>  <math display="block">\lambda_y = \frac{\sigma_{eq}}{235/K}</math> <u><math>\lambda_{perm}</math>: Permissible utilisation factor, to be taken as 1.0.</u></p> <p><u>2 In the case of stress concentration, yield strength assessment is to be carried out in accordance with the following criteria</u></p> <p><u><math>\lambda_y \leq \lambda_{perm}</math></u>  <u><math>\lambda_y</math> : Yield utilisation factor, as given by the following.</u></p> <p><u>(1) Hull structures in design load scenarios other than collision condition and flooded condition (IGC)</u>  <math display="block">\lambda_y = \frac{\sigma_{eq}}{C_{fa} C_m \cdot 235/K}</math> <u><math>C_{fa}</math>: Coefficient for fatigue, taken as 1.0.</u>  <u><math>C_m</math>: 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.</u></p> <p><u>(2) Supporting structures of cargo tanks in design load scenarios other than the collision condition and flooded condition (IGC)</u>  <math display="block">\lambda_y = \frac{\sigma_{eq}}{C_{fa} C_m \sigma_Y}</math> <u><math>C_{fa}, C_m</math>: As specified in (1) above</u></p> <p><u>(3) In the collision condition and flooded condition (IGC)</u></p>		

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
$\lambda_y = \frac{\sigma_{eq}}{1.87\sigma_Y}$ <p><b><u>8.5.2 Buckling Strength Assessment</u></b></p> <p><b><u>8.5.2.1 Criteria</u></b></p> <p><u>The permissible buckling usage factor <math>\eta_{all}</math> for the 30-degree static heel condition and collision condition is to be taken as 1.0.</u></p>	<p>(Newly Added)</p> <p>(Newly Added)</p>	

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
<p style="text-align: center;"><b>RULES FOR HIGH SPEED CRAFT</b></p> <p style="text-align: center;"><b>Part 1 GENERAL RULES</b></p> <p style="text-align: center;"><b>Chapter 1 GENERAL</b></p> <p><b>1.2 Class Notations</b></p> <p><b>1.2.4 Hull Construction and Equipment, etc.</b>  7 Craft complying with the requirements of <b>Part GF of the Rules for the Survey and Construction of Steel Ships</b> applied in accordance with the requirements of <b>1.1.8</b> are to be in accordance with the requirements of <b>1.2.4-33, Part A of the Rules for the Survey and Construction of Steel Ships.</b></p>	<p style="text-align: center;"><b>RULES FOR HIGH SPEED CRAFT</b></p> <p style="text-align: center;"><b>Part 1 GENERAL RULES</b></p> <p style="text-align: center;"><b>Chapter 1 GENERAL</b></p> <p><b>1.2 Class Notations</b></p> <p><b>1.2.4 Hull Construction and Equipment, etc.</b>  7 Craft complying with the requirements of <b>Part GF of the Rules for the Survey and Construction of Steel Ships</b> applied in accordance with the requirements of <b>1.1.8</b> are to be in accordance with the requirements of <b>1.2.4-32, Part A of the Rules for the Survey and Construction of Steel Ships.</b></p>	<p>Modifies the reference.</p>

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
<p style="text-align: center;"><b>RULES FOR THE SURVEY AND CONSTRUCTION OF PASSENGER SHIPS</b></p> <p style="text-align: center;"><b>Part 1 GENERAL</b></p> <p style="text-align: center;"><b>Chapter 1 GENERAL</b></p> <p><b>1.2 Class Notations</b></p> <p><b>1.2.4 Hull Construction and Equipment, etc.*</b>  <b>7</b> Ships complying with the requirements of <b>Part GF of the Rules for the Survey and Construction of Steel Ships</b> applied in accordance with the requirements of <b>1.1.6</b> are to be in accordance with the requirements of <b>1.2.4-33, Part A of the Rules for the Survey and Construction of Steel Ships.</b></p>	<p style="text-align: center;"><b>RULES FOR THE SURVEY AND CONSTRUCTION OF PASSENGER SHIPS</b></p> <p style="text-align: center;"><b>Part 1 GENERAL</b></p> <p style="text-align: center;"><b>Chapter 1 GENERAL</b></p> <p><b>1.2 Class Notations</b></p> <p><b>1.2.4 Hull Construction and Equipment, etc.*</b>  <b>7</b> Ships complying with the requirements of <b>Part GF of the Rules for the Survey and Construction of Steel Ships</b> applied in accordance with the requirements of <b>1.1.6</b> are to be in accordance with the requirements of <b>1.2.4-32, Part A of the Rules for the Survey and Construction of Steel Ships.</b></p>	<p>Modifies the reference.</p>

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
<p style="text-align: center;"><b>RULES FOR THE SURVEY AND CONSTRUCTION OF INLAND WATERWAY SHIPS</b></p> <p style="text-align: center;"><b>Part 1 GENERAL RULES</b></p> <p style="text-align: center;"><b>Chapter 1 GENERAL</b></p> <p><b>1.2 Class Notations</b></p> <p><b>1.2.3 Hull Construction and Equipment</b>  <b>5</b> Ships complying with the requirements of <b>Part GF of the Rules for the Survey and Construction of Steel Ships</b> applied in accordance with the requirements of <b>1.1.8</b> are to be in accordance with the requirements of <b>1.2.4-33, Part A of the Rules for the Survey and Construction of Steel Ships.</b></p>	<p style="text-align: center;"><b>RULES FOR THE SURVEY AND CONSTRUCTION OF INLAND WATERWAY SHIPS</b></p> <p style="text-align: center;"><b>Part 1 GENERAL RULES</b></p> <p style="text-align: center;"><b>Chapter 1 GENERAL</b></p> <p><b>1.2 Class Notations</b></p> <p><b>1.2.3 Hull Construction and Equipment</b>  <b>5</b> Ships complying with the requirements of <b>Part GF of the Rules for the Survey and Construction of Steel Ships</b> applied in accordance with the requirements of <b>1.1.8</b> are to be in accordance with the requirements of <b>1.2.4-32, Part A of the Rules for the Survey and Construction of Steel Ships.</b></p>	<p>Modifies the reference.</p>

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

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



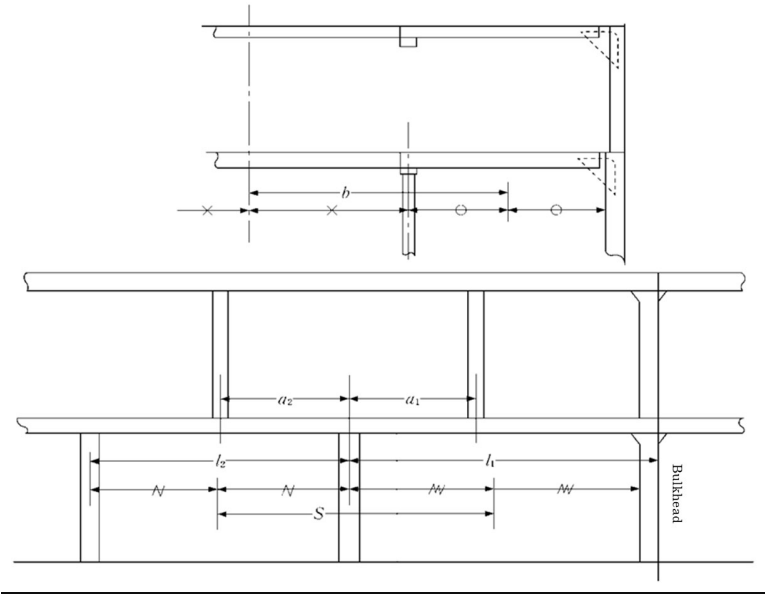
Amended-Original Requirements Comparison Table  
(Amendment related to Part C of the Rules for Survey and Construction of Steel Ships (2025 Amendment 1))

Amended	Original	Remarks
<p><b>GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS</b></p> <p><b>Part C HULL CONSTRUCTION AND EQUIPMENT</b></p> <p><b>Part 1 GENERAL HULL REQUIREMENTS</b></p> <p><b>C7 STRENGTH OF PRIMARY SUPPORTING STRUCTURES</b></p> <p><b>C7.2 Simple Girders</b></p> <p><b>C7.2.2 Strength Assessment</b></p> <p><b>C7.2.2.1 General</b>  <u>1</u> 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.  <u>2</u> 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</p>	<p><b>GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS</b></p> <p><b>Part C HULL CONSTRUCTION AND EQUIPMENT</b></p> <p><b>Part 1 GENERAL HULL REQUIREMENTS</b></p> <p><b>C7 STRENGTH OF PRIMARY SUPPORTING STRUCTURES</b></p> <p><b>C7.2 Simple Girders</b></p> <p><b>C7.2.2 Strength Assessment</b></p> <p><b>C7.2.2.1 General</b>  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.</p>	<p>Transferred from 7.2.6.1, Part 1, Part C of the Rules.</p>

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
<p><u>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.</u></p> <p><b><u>C7.4 Pillars, Struts, Etc.</u></b></p> <p><b><u>C7.4.2 Scantling Requirements</u></b></p> <p><b><u>C7.4.2.1 Buckling Strength Requirements (Euler Buckling)</u></b></p> <p><u>In applying 7.4.2.1, Part 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.</u></p> <p>(1) <u>The area of deck load or green sea load supported by the pillar is to be determined by the following formula:</u>  <math display="block">Sb(m^2)</math> <u>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)</u>  <u>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)</u></p> <p>(2) <u>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.</u></p>	<p>(Newly Added)</p> <p>(Newly Added)</p> <p>(Newly Added)</p>	<p>Amendment (8)</p> <p>Clarification of loads to be used in buckling strength assessment of pillars</p> <p>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.</p>

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
<p><math>k_0 w_0 (kN)</math></p> <p><math>k_0</math>: The value is to be calculated by the following formula, depending on the horizontal distance <math>a_i</math> (m) from the pillar to the tween deck pillar above, and the span <math>l_j</math> (m) of girder supporting the tween deck pillar or bulkhead (See Fig. C7.4.2-1).</p> $\frac{2 \left( \frac{a_i}{l_j} \right)^3 - 3 \left( \frac{a_i}{l_j} \right)^2 + 1}{}$ <p><math>w_0</math>: Load (kN) supported by the upper tween deck pillar</p>		
<p style="text-align: center;">Fig.C7.4.2-1 Measurement of <math>S</math>, <math>b</math>, etc.</p> 		

(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
<p><b>C8.3.3 Meshing and Related Issues</b></p> <p><b>C8.3.3.5 Local Models</b></p> <p><b>1</b> In the application of the <b>8.3.3.5, Part 1, Part C of the Rules</b>, 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.</p> <p><b>2</b> <u>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).</u></p> <p>(1) <u>The standard mesh size in area to be assessed and its vicinity is to be 50 mm× 50 mm or less.</u></p> <p>(2) <u>For at least ten elements in all directions from the locations to be assessed, (1) above is to be followed.</u></p> <p>(3) <u>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.</u></p> <p><b>3</b> In the application of the <b>8.3.3.5-3, Part 1, Part C of the Rules</b>, 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.</p>	<p><b>C8.3.3 Meshing and Related Issues</b></p> <p><b>C8.3.3.5 Local Models</b></p> <p><b>1</b> In the application of the <b>8.3.3.5, Part C of the Rules</b>, 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.</p> <p><b>2</b> In the application of the <b>8.3.3.5-3, Part C of the Rules</b>, 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.</p>	<p>Amendment (8) Specifies criteria when opting to assess stress concentration areas</p>

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
<p><b>C8.6 Strength Assessment</b></p> <p><b><u>C8.6.1 Yield Strength Assessment</u></b></p> <p><b><u>C8.6.1.2 General</u></b></p> <p>The “deemed appropriate by the Society” referred to in <b><u>8.6.1.2-2, Part 1, Part C of the Rules</u></b> means the stress obtained through analysis using the mesh specified in <b><u>C8.3.3.5-2</u></b> is to comply with the following criteria.</p> <p>(1) For meshing for 50 mm×50 mm size, the criteria are as follows:  <math>\lambda_f \leq \lambda_{fperm}</math>  <math>\lambda_f</math>: Yield utilisation factor, given as follows.</p> $\lambda_f = \frac{\sigma_{eq}}{C_{fa} C_m \cdot 235/K}$ <p><math>\sigma_{eq}</math>: Reference stress, as specified in <b><u>8.6.1.1, Part 1, Part C of the Rules</u></b>.  <math>C_{fa}</math>: Coefficient for fatigue, taken as 1.0.  However, taken as 1.2 for structures that satisfy the criteria for fatigue strength assessment specified in <b><u>Chapter 9, Part 1, Part C of the Rules</u></b>.  <math>C_m</math>: As specified in <b><u>Table 8.6.1-1</u></b>.  <math>\lambda_{fperm}</math>: Permissible yield utilisation factor, taken as 1.0.</p> <p>(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</p>	<p><b>C8.6 Strength Assessment</b></p> <p>(Newly Added)</p> <p>(Newly Added)</p>	<p>Amendment (8) Specifies criteria when opting to assess stress concentration areas</p>

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									
<p><u>× 50 mm.</u></p> <p style="text-align: center;">Table 8.6.1-1 Value of <math>C_m</math></p> <table border="1"> <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>		Element not adjacent to weld	Element adjacent to weld	Maximum load condition	1.70	1.50	Other than those mentioned above	1.36	1.20		
	Element not adjacent to weld	Element adjacent to weld									
Maximum load condition	1.70	1.50									
Other than those mentioned above	1.36	1.20									
<p style="text-align: center;">EFFECTIVE DATE AND APPLICATION</p> <ol style="list-style-type: none"> <li>Effective date of this amendment is 1 July 2026.</li> <li>Notwithstanding the amendments, the current requirements apply to ships for which the date of contract for construction is before the effective date.</li> <li>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.</li> <li>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</li> </ol>											