RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

RULES

Part C Hull Construction and Equipment

2022 AMENDMENT NO.3

Rule No.89 27 December 2022

Resolved by Technical Committee on 27 July 2022

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

Rule No.89 27 December 2022
AMENDMENT TO THE RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

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

Part C HULL CONSTRUCTION AND EQUIPMENT

Amendment 3-1

Part 1 GENERAL HULL REQUIREMENTS

Chapter 3 STRUCTURAL DESIGN PRINCIPLES

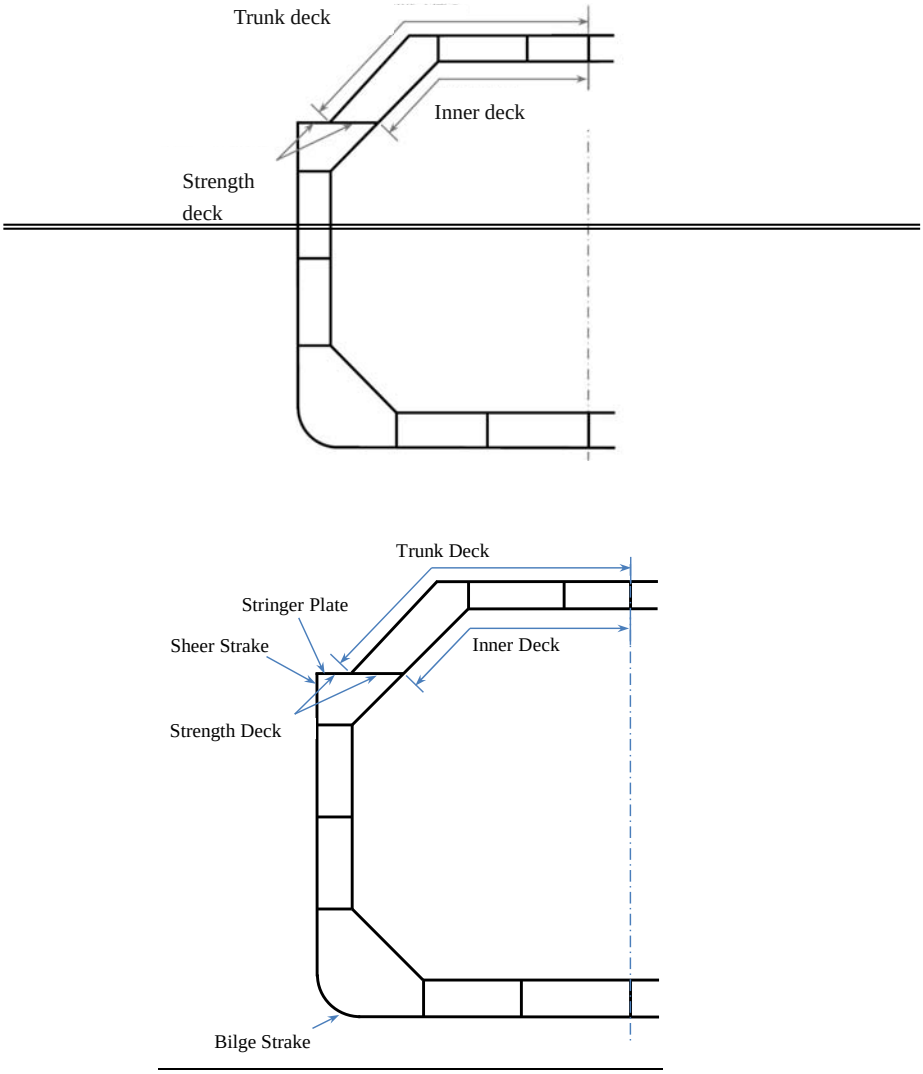
3.2 Materials

3.2.2 Application of Steels

3.2.2.1 General
(-1 to -8 are omitted.)

Fig. 3.2.2-2 has been amended as follows.

Fig. 3.2.2-2 Typical Deck Structure of Ships with Membrane Tank Carrying Liquefied Gases in Bulk



EFFECTIVE DATE AND APPLICATION (Amendment 3-1)

1. The effective date of this amendment is 27 December 2022.

2. For ships subject to Part C of the Rules for the Survey and Construction of Steel Ships prior to its comprehensive revision by Rule No.62 on 1 July 2022 (hereinafter referred to as “old Part C of the Rules”), this amendment also applies to Fig. C1.2, Chapter 1 of old Part C.

Amendment 3-2

Part 1 GENERAL HULL REQUIREMENTS

Chapter 2 GENERAL ARRANGEMENT DESIGN

2.3 Damage Stability

2.3.2 Subdivision Index

2.3.2.3 Probability of Survival (s_i)

Sub-paragraph -12(1) has been amended as follows.

12 Where the ship carries timber deck cargo, the probability of survival (s_i) is to be calculated as follows:

(1) Where the buoyancy of the timber deck cargo is taken into account, the cargo is to be in compliance with the following **(a)** to **(~~e~~d)**:

(a) The timber deck cargo is to be stowed in accordance with the requirements of **Section 2.9**, **Part A** of the *Code of Safe Practice for Ships Carrying Timber Deck Cargoes, 2011* (*IMO* resolution *A*.1048(27)).

(b) The timber deck cargo is to be secured by lashings, uprights or both.

(c) Lashings and Uprights are to comply with the requirements of **Section 2.10**, **Part A** of the *Code of Safe Practice for Ships Carrying Timber Deck Cargoes, 2011* (*IMO* resolution *A*.1048(27)).

~~(d) Uprights are to be as follows:~~

~~i) be made of steel or other suitable material of adequate strength, taking into account the breadth of the deck cargo;~~

~~ii) be spaced at intervals not exceeding 3 *m*;~~

~~iii) be fixed to the deck by angles, metal sockets or equally efficient means; and~~

~~iv) if deemed necessary, be further secured by a metal bracket to a strengthened point (e.g. bulwark, hatch coaming).~~

(~~e~~d) The height and extent of the timber deck cargo is to be in accordance with **Section 3.3.2** of **Chapter 3**, **Part A** of the *International Code on Intact Stability, 2008 (2008 IS Code)* and is to be at least stowed to the standard height of one superstructure.

((2) and (3) are omitted.)

Part 2-5 GENERAL CARGO SHIPS AND REFRIGERATED CARGO SHIPS

Chapter 10 ADDITIONAL STRUCTURAL REQUIREMENTS

10.4 Ships Loaded with Lumber

10.4.1 Ships Loaded with Lumber

10.4.1.1 Protection of Hull Structure Against Lumber Cargo

The hull structures of ships loaded with lumber in their cargo holds and/or on their decks are to be protected in accordance with the following **(1)** to **(10),** notwithstanding being marked with the load lines corresponding to timber freeboard assigned in accordance with the provisions of **Part V**. However, where it is obvious from the specifications or other similar documents that the ship is not intended to carry log cargoes, the following requirements except **(8)** and **(10)** may be modified.

Sub-paragraph (10) has been amended as follows.

(10) Timber deck cargo arrangement
Timber deck cargo stowage heights, lashing arrangements and securing arrangements are to be in accordance with the "International Convention on Load Lines, 1996 and Protocol of 1988 relating to the International Convention on Load Lines, 1966". Where the buoyancy of the timber deck cargo is taken into account with regard to damage stability, uprights are to be in accordance with **2.3.2.3-12(1)(c), Part 1**.

EFFECTIVE DATE AND APPLICATION (Amendment 3-2)

1. The effective date of the amendments is 1 January 2023.

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

3. For ships subject to Part C of the Guidance for the Survey and Construction of Steel Ships prior to its comprehensive revision by Notice No.47 on 1 July 2022 (herein after referred to as "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.

C4.2.3-3, old Part C of the Guidance

C1.1.3-1.(3)(j), old Part C of the Guidance

* "contract for construction" is defined in the latest version of IACS Procedural Requirement (PR) No.29.

IACS PR No.29 (Rev.0, July 2009)

1. The date of "contract for construction" of a vessel is the date on which the contract to build the vessel is signed between the prospective owner and the shipbuilder. This date and the construction numbers (i.e. hull numbers) of all the vessels included in the contract are to be declared to the classification society by the party applying for the assignment of class to a newbuilding.

2. The date of "contract for construction" of a series of vessels, including specified optional vessels for which the option is ultimately exercised, is the date on which the contract to build the series is signed between the prospective owner and the shipbuilder.

For the purpose of this Procedural Requirement, vessels built under a single contract for construction are considered a "series of vessels" if they are built to the same approved plans for classification purposes. However, vessels within a series may have design alterations from the original design provided:

(1) such alterations do not affect matters related to classification, or

(2) If the alterations are subject to classification requirements, these alterations are to comply with the classification requirements in effect on the date on which the alterations are contracted between the prospective owner and the shipbuilder or, in the absence of the alteration contract, comply with the classification requirements in effect on the date on which the alterations are submitted to the Society for approval.

The optional vessels will be considered part of the same series of vessels if the option is exercised not later than 1 year after the contract to build the series was signed.

3. If a contract for construction is later amended to include additional vessels or additional options, the date of "contract for construction" for such vessels is the date on which the amendment to the contract, is signed between the prospective owner and the shipbuilder. The amendment to the contract is to be considered as a "new contract" to which **1.** and **2.** above apply.

4. If a contract for construction is amended to change the ship type, the date of "contract for construction" of this modified vessel, or vessels, is the date on which revised contract or new contract is signed between the Owner, or Owners, and the shipbuilder.

Note:
This Procedural Requirement applies from 1 July 2009.

Amendment 3-3

Part 1 GENERAL HULL REQUIREMENTS

Chapter 4 LOADS

4.6 Loads to be Considered in Strength Assessment by Cargo Hold Analysis

4.6.5 Flooded Condition

4.6.5.2 External Pressure

Table 4.6.5-1 has been amended as follows.

Table 4.6.5-1 External Pressure P_{FD-ex} in Flooded Condition

~~External pressure P_{FD-ex} (kN/m^2)~~
~~$P_{FD-ex} = \rho g h_{FD}$~~
~~Notes:~~ ~~h_{FD}: Assumed draught height (m) in the flooded condition from the position under consideration, as given by the following formula (1):~~ ~~$h_{FD} = \max(z_{FB} - z, \lvert y \rvert \sin\theta_{FD} + (z_{FD} - z)\cos\theta_{FD})$~~ ~~$z_{FB}$: Z coordinate ($m$) of the freeboard deck at side in way of the transverse section under consideration~~ ~~z_{FD}: Z coordinate (m) of the greatest value among deepest equilibrium waterline at the centreline amidships, excluding flooded conditions where the probability of survival in damage stability calculations is 0.~~ ~~θ_{FD}: Greatest value among the deepest equilibrium heel angle (rad), excluding flooded conditions where the probability of survival in damage stability calculations is 0.~~
~~(1) When the maximum draught was obtained based on the combination of z_{FD} and z_{FB} in each case to be considered in damage stability calculations, the said draught may be regarded as the assumed draught height.~~

External pressure P_{FD-ex} (kN/m^2)	
$FD1$(1)(2)	$P_{FD-ex} = \rho g h_{FD1}$
$FD2$(1)(2)	$P_{FD-ex} = \rho g h_{FD2}$
$FD3$(1)	$P_{FD-ex} = \rho g (z_{FB} - z)$
Notes: h_{FD1}, h_{FD2}: Assumed draught height (m) in the flooded condition from the position under consideration, as given by the following formulae (3): $h_{FD1} = y \sin\theta_{FD} + (z_{FD} - z)\cos\theta_{FD}$ $h_{FD2} = -y \sin\theta_{FD} + (z_{FD} - z)\cos\theta_{FD}$ z_{FD}: Z coordinate (m) of the greatest value among deepest equilibrium waterline at the centreline amidships, excluding flooded conditions where the probability of survival in damage stability calculations is 0. θ_{FD}: Greatest value among the deepest equilibrium heel angle (rad), excluding flooded conditions where the probability of survival in damage stability calculations is 0. z_{FB}: Z coordinate (m) of the freeboard deck at side in way of the transverse section under consideration	
(1) In case of $z_{FD} \geq z_{FB}$, $FD3$ may not be considered. (2) For ships with structure symmetrical about centreline, either $FD1$ or $FD2$ may be considered. (3) When the maximum draught was obtained based on the combination of z_{FD} and θ_{FD} in each case to be considered in damage stability calculations, the said draught may be regarded as the assumed draught height.	

4.6.5.3 Internal Pressure

Table 4.6.5-2 has been amended as follows.

Table 4.6.5-2 Internal Pressure P_{FD-in} in Flooded Condition

~~Internal pressure P_{FD-in} (kN/m^2)~~
~~$P_{FD-in} = \rho g h_{FD}$~~
~~Notes:~~ ~~h_{FD}: Assumed draught height (m) in the flooded condition from the position under consideration, as given by the following formula (1):~~ ~~$h_{FD} = \max(z_{FD} - z, \lvert y \rvert \sin\theta_{FD} + (z_{FD} - z)\cos\theta_{FD})$~~ ~~$z$: Z coordinate of the freeboard deck (m) at side in way of the transverse section of the hull under consideration~~ ~~z_{FD}: Z coordinate of the greatest value (m) among deepest equilibrium waterline at the centreline amidships, excluding flooded conditions where the probability of survival in damage stability calculations is 0.~~ ~~θ_{FD}: Greatest value among deepest equilibrium heel angle (rad), excluding flooded conditions where the probability of survival in damage stability calculations is 0.~~
~~(1) When the maximum draught was obtained based on the combination of z_{FD} and z_{FD} in each case to be considered in damage stability calculations, the said draught may be regarded as the assumed draught height.~~

Internal pressure P_{FD-in} (kN/m^2)	
$FD1$(1)(2)	$P_{FD-in} = \rho g h_{FD1}$
$FD2$(1)(2)	$P_{FD-in} = \rho g h_{FD2}$
$FD3$(1)	$P_{FD-in} = \rho g (z_{FB} - z)$
Notes: h_{FD1}, h_{FD2}: As specified in **Table 4.6.5-1** (3) z_{FB} : As specified in **Table 4.6.5-1**	
(1) In case of $z_{FD} \geq z_{FB}$, $FD3$ may not be considered. (2) For ships with structure symmetrical about centreline, either $FD1$ or $FD2$ may be considered. (3) When the maximum draught was obtained based on the combination of z_{FD} and θ_{FD} in each case to be considered in damage stability calculations, the said draught may be regarded as the assumed draught height.	

Paragraph 4.6.5.4 has been amended as follows.

4.6.5.4 Weight of Hull Structure

The effect of gravitational acceleration acting on the hull structure ~~in still water~~ is to be considered. In case of $FD1$ and $FD2$, the effect of heel angle is to be considered.

Chapter 8 STRENGTH ASSESSMENT BY CARGO HOLD ANALYSIS

8.6 Strength Assessment

8.6.2 Buckling Strength Assessment*

8.6.2.1 Criteria

Sub-paragraph -2 has been amended as follows.

1 In principle, all members in the target hold are to satisfy the buckling assessment criteria specified in **Annex 8.6 "BUCKLING STRENGTH ASSESSMENT BASED ON CARGO HOLD ANALYSIS"**. The permissible utilisation factor in this assessment is to be in accordance with **Table 8.6.2-1**.

2 Notwithstanding **-1** above, strength assessment considering the characteristics of a member to be assessed and surrounding structures of the member may be carried out where the surrounding structures are able to withstand compressive loads instead of the member due to load redistribution after the elastic buckling of the member occurs and where the strength deemed as sufficient by the Society. In this case, the strength assessment specified in **Annex 8.6A "STRENGTH ASSESSMENT CONSIDERING EFFECT OF SURROUNDING STRUCTURES"** may be applied. Where **Annex 8.6A** is applied, the permissible utilisation factor is to be 0.8 for the utilisation factor specified in **An2.6.1**. As for the yield strength assessment and buckling assessment specified in **An2.7.1** in the said Annex, **8.6.1** and **8.6.2.1-1** are to be satisfied.

3 Notwithstanding **-1** above, where compliance with **Annex 8.6** is recognised as difficult due to the stress distribution or deformation characteristics assumed for the buckling strength assessment method specified in **Annex 8.6**, requirements deemed appropriate by the Society are to be followed.

Annex 8.6A STRENGTH ASSESSMENT CONSIDERING EFFECT OF SURROUNDING STRUCTURES

An2 Strength Assessment Method Considering the Effect of the Surrounding Structures

An2.7 Strength Assessments of Surrounding Structures After Rigidity Reduction

Paragraph An2.7.1 has been amended as follows.

An2.7.1

1 The yield strength and buckling strength assessments ~~specified in **Annex 8.6 "BUCKLING STRENGTH ASSESSMENT BASED ON CARGO HOLD ANALYSIS"**~~ are to be performed for the region other than the region of rigidity reduction determined in **An2.2.1**, based upon stress obtained from finite element analysis in consideration of the rigidity reduction specified in **An2.3.2**. The buckling strength assessment is to be accordance with **Annex 8.6 "BUCKLING STRENGTH ASSESSMENT BASED ON CARGO HOLD ANALYSIS"**.

2 ~~Buckling~~ In application of **-1** above, the strength assessments may be omitted for ~~stiffened panels and plate~~ elements and panels to which the appropriate ~~buckling~~ strength assessment is not applicable ~~because of applying the rigidity reduction. As for the region, strength assessments based on this Annex are not to be performed for the stress obtained in accordance with **An2.3.2**.~~

3 In application of **-1** above, the strength assessment based upon the requirements of **An2.2** to **An2.6** is not to be carried out for the region other than the region of rigidity reduction.

Part 2-1 CONTAINER CARRIERS

Chapter 8 STRENGTH ASSESSMENT BY CARGO HOLD ANALYSIS

8.6 Strength Assessment

Paragraph 8.6.1 has been amended as follows.

8.6.1 Yield Strength Assessment and Buckling Strength Assessment

8.6.1.1 Buckling Strength Assessment of Girders Attached to Partial Bulkheads

1 In the buckling strength assessment of the girders attached to the partial bulkheads, the buckling strength of a plate panel or an opening panel is to be assessed as well as the bucking strength of the struts in **An2.5** of **Annex 8.6, Chapter 8, Part 1** (*See* **Table 8.6.1-1**). Where the buckling strength assessment of the struts is carried out, the struts may be taken as the members without openings.

2 In applying the requirements of **-1** above, the following **(1)** and **(2)** are to be followed.

(1) For the plate panel adjacent to the inner bottom plating and longitudinal bulkheads, the boundary conditions of **An2.5.1-2(1)(ii)** of **Annex 8.6, Part 1 "Buckling Strength Assessment Based on Cargo Hold Analysis"** are to be used.

(2) For other plate panels, the boundary conditions of **An2.5.1-2(1)(iii)** of **Annex 8.6, Part 1** are to be used.

3 Notwithstanding the requirements in **-1** above, where the primary supporting members attached to the partial bulkheads are sandwiched between plate members on both sides, the boundary conditions of **An2.5.1-2(1)(i)** of **Annex 8.6, Part 1** are to be used where deemed appropriate by the Society.

8.6.1.2 Strength Assessment of Side Shell in Beam Sea

1 When a strength assessment is performed considering the load based on the equivalent design waves *BR* and *BP* in maximum load condition, **8.6.2.1-2, Part 1** may be applied for stiffened panels of side shell instead of **8.6.2.1-1, Part 1** where the stress in the direction parallel to the shorter edge of the panels, which is due to bending deformation of side transverse and side shell, is dominant component (*See* **Table 8.6.1-1**).

2 In application of **-1** above, yield strength assessment of side shell may not be carried out.

3 ~~Further, in applying~~ In application of **-1** above, where the yield strength assessment and buckling strength assessment specified in **An2.7 in Annex 8.6A, Part 1 "STRENGTH ASSESSMENT CONSIDERING THE EFFECT OF SURROUNDING STRUCTURES**" are carried out, ~~a~~ the yield strength and buckling strength assessments may not be required for the following stiffened panels, ~~and~~ plate panels and elements including these panels.

(1) Stiffened panels within the rigidity reduction range

(2) Plate panels which include elements of the side transverse sharing nodes included in elements forming **(1)** above

Table 8.6.1-1 Relationship between the Application of Part 1 and Part 2

<table>
<tr><td rowspan="2">Member to be assessed</td><td colspan="2">Maximum load condition</td></tr>
<tr><td>Equivalent design waves HM and FM</td><td>Equivalent design waves BR and BP</td></tr>
<tr><td>Side shell
(Annex 8.6A, Part 1 is applied for equivalent design waves BR and BP)</td><td rowspan="2">・Yield strength assessment:
As specified in 8.6.1, Part 1
・Buckling strength assessment:
As specified in 8.6.2.1-1, Part 1</td><td>・An2.2 to An2.6 of Annex 8.6A, Part 1 are applied.
・Permissible utilization factor (buckling): 0.8
・Yield strength assessment: NA</td></tr>
<tr><td>Members other than side shell
(Annex 8.6A, Part 1 is applied for equivalent design waves BR and BP)</td><td>・An2.7 of Annex 8.6A, Part 1 is applied.
・Yield strength assessment: As specified in 8.6.1, Part 1.
・Buckling strength assessment: As specified in 8.6.2.1-1, Part 1.</td></tr>
<tr><td>Girders attached to partial bulkhead(1)</td><td colspan="2">・Yield strength assessment: As specified in 8.6.1, Part 1.
・Buckling strength assessment: As specified in 8.6.2.1-1, Part 1. In addition, as specified in 8.6.1.1.</td></tr>
<tr><td colspan="3">Note:
(1) The same requirements apply to harbour condition, testing condition and flooded condition.</td></tr>
</table>

Part 2-2 BOX-SHAPED BULK CARRIERS

Chapter 8 STRENGTH ASSESSMENT BY CARGO HOLD ANALYSIS

8.5 Strength Assessment

Paragraph 8.5.1 has been amended as follows.

8.5.1 Yield Strength Assessment and Buckling Strength Assessment

8.5.1.1 Strength Assessment of Side Shell in Beam Sea

1 Where strength assessment is performed considering the load based on the equivalent design waves *BR* and *BP* in the maximum load condition, **8.6.2.1-2, Part 1** may be applied for stiffened panels of side shell instead of **8.6.2.1-1, Part 1** where the compressive stress in the shorter side direction of the panels, which is due to bending deformation of side transverse and side shell, is a dominant component (*See* **Table 8.5.1-1**).

2 In application of **-1** above, yield strength assessment of side shell may not be carried out.

3 ~~Further, in applying~~ In application of **-1** above, where the yield strength assessment and buckling strength assessment specified in **An2.7, Annex 8.6A, Part 1 "STRENGTH ASSESSMENT CONSIDERING THE EFFECT OF SURROUNDING STRUCTURES**" are carried out, ~~a~~ the yield strength and buckling strength assessments may not be required for the following stiffened panels, ~~and~~ plate panels and elements including these panels.

(1) Stiffened panels within the rigidity reduction range

(2) Plate panels which include elements of the side transverse sharing nodes included in elements forming **(1)** above

8.5.1.2 Buckling Strength Assessment of Cross Deck in Head ~~s~~Sea and Following ~~s~~Sea

Where strength assessment is performed considering the load based on the equivalent design waves *HM*-1 and *FM*-1 in the maximum load condition, assessment of **8.6.2.1-1, Part 1** may not be carried out for plate panel on cross deck stiffened in transverse direction when the following is satisfied (*See* **Table 8.5.1-1**).

(1) The stress in longitudinal direction on cross deck due to vertical bending moment is act on the narrow area enough compared to the length of cross deck in transverse direction.

(2) Thickness of cross deck adjacent to upper deck longitudinally stiffened is greater than 50 % of thickness of the upper deck.

Table 8.5.1-1 Relationship between the Application of Part 1 and Part 2

Member to be assessed	Maximum load condition	
	Equivalent design waves *HM* and *FM*	Equivalent design waves *BR* and *BP*
Side shell (**Annex 8.6A, Part 1** is applied for equivalent design waves *BR* and *BP*)	・Yield strength assessment: As specified in **8.6.1, Part 1** ・Buckling strength assessment: As specified in **8.6.2.1-1, Part 1**	・**An2.2** to **An2.6** of **Annex 8.6A, Part 1** are applied. ・Permissible utilization factor (buckling): 0.8 ・Yield strength assessment: *NA*
Members other than side shell (**Annex 8.6A, Part 1** is applied for equivalent design waves *BR* and *BP*)		・**An2.7** of **Annex 8.6A, Part 1** is applied. ・Yield strength assessment: As specified in **8.6.1, Part 1**. ・Buckling strength assessment: As specified in **8.6.2.1-1, Part 1**.
Cross deck	・Yield strength assessment: As specified in **8.6.1, Part 1**. ・Buckling strength assessment: As specified in **8.5.1.2**.	・Yield strength assessment: As specified in **8.6.1, Part 1**. ・Buckling strength assessment: As specified in **8.6.2.1-1, Part 1**.

Part 2-3 ORE CARRIERS

Chapter 8 STRENGTH ASSESSMENT BY CARGO HOLD ANALYSIS

8.5 Strength Assessment

Paragraph 8.5.1 has been amended as follows.

8.5.1 Yield Strength Assessment and Buckling Strength Assessment

8.5.1.1 Strength Assessment of Side Shell in Beam Sea

1 Where strength assessment is performed considering the load based on the equivalent design waves *BR* and *BP* in the maximum load condition, **8.6.2.1-2, Part 1** may be applied for stiffened panels of side shell instead of **8.6.2.1-1, Part 1** where the compressive stress in the shorter side direction of the panels, which is due to bending deformation of side transverse and side shell, is dominant component (*See* **Table 8.5.1-1**).

2 In application of **-1** above, yield strength assessment of side shell may not be carried out.

3 ~~Further, in applying~~ In application of **-1** above, where the yield strength assessment and buckling strength assessment specified in **An2.7, Annex 8.6A, Part 1 "STRENGTH ASSESSMENT CONSIDERING THE EFFECT OF SURROUNDING STRUCTURES**" are carried out, the yield strength and buckling strength assessments may not be required for the following stiffened panels, ~~and~~ plate panels and elements including these panels.

(1) Stiffened panels within the rigidity reduction range

(2) Plate panels which include elements of the side transverse sharing nodes included in elements forming **(1)** above

(3) Plate panels on lower stool plating

8.5.1.2 Strength Assessment of Lower Stool Plating in Beam Sea

1 Where strength assessment is performed considering the load based on the equivalent design waves *BR* and *BP* in the maximum load condition, **8.6.2.1-2, Part 1** may be applied for plate panels of lower stool plating instead of **8.6.2.1-1, Part 1** (*See* **Table 8.5.1-1**).

2 In application of **-1** above, yield strength assessment of lower stool plating may not be carried out.

3 ~~Further, in applying~~ In application of **-1** above, where the yield strength assessment and buckling strength assessment specified in **An2.7, Annex 8.6A, Part 1 "STRENGTH ASSESSMENT CONSIDERING THE EFFECT OF SURROUNDING STRUCTURES**" are carried out, the yield strength and buckling strength assessments may not be required for the following plate panels and elements including the panels.

(1) Plate panels within the region of rigidity reduction

8.5.1.3 Buckling Strength Assessment of Cross Ties in Wing Tanks

In applying **8.6.2, Part 1**, when assessing the column buckling of cross ties in ore carrier's wing tanks based upon the requirements specified in **An2.5, Annex 8.6, Part 1 "Buckling Strength Assessment Based on Cargo Hold Analysis"**, the cross tie span l is to be the distance from the flange of the side stringer attached to the longitudinal bulkhead where the horizontal girder for the cross tie is mounted, to the flange of the side stringer attached to the side shell (*See* **Table 8.5.1-1**). However, if this is difficult to determine based on this definition, the cross tie span l may be determined upon prior consultation with the Society.

8.5.1.4 Buckling Strength Assessment of Cross Deck in Head ~~s~~Sea and Following ~~s~~Sea

Where strength assessment is performed considering the loads based on the equivalent design waves *HM*-1 and *FM*-1 in the maximum load condition, the assessment specified in **8.6.2.1-1, Part 1** may not be carried out for plate panels on cross deck stiffened in transverse direction where the following is satisfied~~:~~ (*See* **Table 8.5.1-1**).

(1) The stress in longitudinal direction on cross deck due to vertical bending moment is act on the narrow area enough compared to the length of cross deck in transverse direction.

(2) Thickness of cross deck adjacent to upper deck longitudinally stiffened is greater than 50% of thickness of the upper deck.

Table 8.5.1-1 Relationship between the Application of Part 1 and Part 2

<table>
<tr><td rowspan="2">Member to be assessed</td><td colspan="2">Maximum load condition</td></tr>
<tr><td>Equivalent design waves HM and FM</td><td>Equivalent design waves BR and BP</td></tr>
<tr><td>Side shell and lower stool plating (Annex 8.6A, Part 1 is applied for equivalent design waves BR and BP)</td><td rowspan="2">・Yield strength assessment:
As specified in 8.6.1, Part 1
・Buckling strength assessment:
As specified in 8.6.2.1-1, Part 1</td><td>・An2.2 to An2.6 of Annex 8.6A, Part 1 are applied.
・Permissible utilization factor (buckling): 0.8
・Yield strength assessment: NA</td></tr>
<tr><td>Members other than side shell and lower stool plating (Annex 8.6A, Part 1 is applied for equivalent design waves BR and BP)</td><td>・An2.7 of Annex 8.6A, Part 1 is applied.
・Yield strength assessment:
As specified in 8.6.1, Part 1.
・Buckling strength assessment:
As specified in 8.6.2.1-1, Part 1.</td></tr>
<tr><td>Cross deck</td><td>・Yield strength assessment:
As specified in 8.6.1, Part 1.
・Buckling strength assessment:
As specified in 8.5.1.4.</td><td>・Yield strength assessment:
As specified in 8.6.1, Part 1.
・Buckling strength assessment:
As specified in 8.6.2.1-1, Part 1.</td></tr>
<tr><td>Cross ties in wing tanks(1)</td><td colspan="2">・Yield strength assessment: As specified in 8.6.1, Part 1.
・Buckling strength assessment: As specified in 8.6.2.1-1, Part 1. In addition, as specified in 8.5.1.3.</td></tr>
<tr><td colspan="3">Note:
(1) The same requirements apply to harbour condition, testing condition and flooded condition.</td></tr>
</table>

Part 2-9 SHIPS CARRYING LIQUEFIED GASES IN BULK (INDEPENDENT PRISMATIC TANKS TYPE A/B)

Chapter 4 Loads

4.3 Loads to be Considered in Strength Assessment by Cargo Hold Analysis

4.3.4 30-Degree Static Heel Condition

Paragraph 4.3.4.5 has been renumbered to Paragraph 4.3.4.6, and Paragraph 4.3.4.5 has been added as follows.

4.3.4.5 Weight of Hull Structure

Self-weight of hull structure and cargo tank structure depending on 30-degree heel is to be considered.

4.3.4.~~5~~6 Hull Girder Loads

(Omitted)

4.3.5 Collision Condition

4.3.5.4 has been amended as follows.

4.3.5.4 Internal Pressure

The internal pressure P_{in-COL} due to cargo (kN/m^2) acting on the cargo tank is to be in accordance with the following formula. Dynamic pressure in two conditions that acceleration of $0.5g$ in aft direction and $0.25g$ in forward direction is to be considered. ~~However~~ In addition, ~~it~~P_{in-COL} is not to be less than 0.

$P_{in-COL} = P_{LS-COL} + P_{LD-COL}$

P_{LS-COL}: Static pressure (kN/m^2), as specified in **Table 4.3.5-2**.

P_{LD-COL}: Dynamic pressure due to cargo (kN/m^2), as specified in **Table 4.3.5-3**.

EFFECTIVE DATE AND APPLICATION (Amendment 3-3)

1. The effective date of the amendments is 1 July 2023.

2. Notwithstanding the amendments to the Rules, the current requirements apply to the following ships:

(1) ships for which the date of contract for construction is before the effective date; or

(2) sister ships of ships subject to the current requirements for which the date of contract for construction is before 1 January 2025.

RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

RULES

Part C Hull Construction and Equipment

AMENDMENT TO "AMENDMENT TO THE RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS (Rule No. 61 dated 27 December 2021)"

Rule No.89 27 December 2022

Resolved by Technical Committee on 27 July 2022

Rule No.89 27 December 2022

AMENDMENT TO "AMENDMENT TO THE RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS (Rule No.61 dated 27 December 2021)"

In the "AMENDMENT TO THE RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS (Rule No.61 dated 27 December 2021)", the EFFECTIVE DATE AND APPLICATION has been partly amended as follows:

Part C HULL CONSTRUCTION AND EQUIPMENT

EFFECTIVE DATE AND APPLICATION (Amendment 2-3) has been amended as follows.

EFFECTIVE DATE AND APPLICATION (Amendment 2-3)

1. The effective date of the amendments is 1 ~~July~~January 202~~2~~3.

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

* "contract for construction" is defined in the latest version of IACS Procedural Requirement (PR) No.29.

IACS PR No.29 (Rev.0, July 2009)

1. The date of "contract for construction" of a vessel is the date on which the contract to build the vessel is signed between the prospective owner and the shipbuilder. This date and the construction numbers (i.e. hull numbers) of all the vessels included in the contract are to be declared to the classification society by the party applying for the assignment of class to a newbuilding.

2. The date of "contract for construction" of a series of vessels, including specified optional vessels for which the option is ultimately exercised, is the date on which the contract to build the series is signed between the prospective owner and the shipbuilder.
For the purpose of this Procedural Requirement, vessels built under a single contract for construction are considered a "series of vessels" if they are built to the same approved plans for classification purposes. However, vessels within a series may have design alterations from the original design provided:
(1) such alterations do not affect matters related to classification, or
(2) If the alterations are subject to classification requirements, these alterations are to comply with the classification requirements in effect on the date on which the alterations are contracted between the prospective owner and the shipbuilder or, in the absence of the alteration contract, comply with the classification requirements in effect on the date on which the alterations are submitted to the Society for approval.
The optional vessels will be considered part of the same series of vessels if the option is exercised not later than 1 year after the contract to build the series was signed.

3. If a contract for construction is later amended to include additional vessels or additional options, the date of "contract for construction" for such vessels is the date on which the amendment to the contract, is signed between the prospective owner and the shipbuilder. The amendment to the contract is to be considered as a "new contract" to which **1.** and **2.** above apply.

4. If a contract for construction is amended to change the ship type, the date of "contract for construction" of this modified vessel, or vessels, is the date on which revised contract or new contract is signed between the Owner, or Owners, and the shipbuilder.

Note:
This Procedural Requirement applies from 1 July 2009.

GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

GUIDANCE

Part C Hull Construction and Equipment

AMENDMENT TO "AMENDMENT TO THE GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS (Notice No.58 dated 27 December 2021)"

Notice No.64 27 December 2022

Resolved by Technical Committee on 27 July 2022

Notice No.64 27 December 2022
AMENDMENT TO "AMENDMENT TO THE GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS (Notice No.58 dated 27 December 2021)"

In the "AMENDMENT TO THE GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS (Notice No.58 dated 27 December 2021)", the EFFECTIVE DATE AND APPLICATION has been partly amended as follows:

Part C HULL CONSTRUCTION AND EQUIPMENT

EFFECTIVE DATE AND APPLICATION (Amendment 2-3) has been amended as follows.

EFFECTIVE DATE AND APPLICATION (Amendment 2-3)

1. The effective date of the amendments is 1 ~~July~~January 202~~2~~3.

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

* "contract for construction" is defined in the latest version of IACS Procedural Requirement (PR) No.29.

IACS PR No.29 (Rev.0, July 2009)

1. The date of "contract for construction" of a vessel is the date on which the contract to build the vessel is signed between the prospective owner and the shipbuilder. This date and the construction numbers (i.e. hull numbers) of all the vessels included in the contract are to be declared to the classification society by the party applying for the assignment of class to a newbuilding.

2. The date of "contract for construction" of a series of vessels, including specified optional vessels for which the option is ultimately exercised, is the date on which the contract to build the series is signed between the prospective owner and the shipbuilder.
For the purpose of this Procedural Requirement, vessels built under a single contract for construction are considered a "series of vessels" if they are built to the same approved plans for classification purposes. However, vessels within a series may have design alterations from the original design provided:
(1) such alterations do not affect matters related to classification, or
(2) If the alterations are subject to classification requirements, these alterations are to comply with the classification requirements in effect on the date on which the alterations are contracted between the prospective owner and the shipbuilder or, in the absence of the alteration contract, comply with the classification requirements in effect on the date on which the alterations are submitted to the Society for approval.
The optional vessels will be considered part of the same series of vessels if the option is exercised not later than 1 year after the contract to build the series was signed.

3. If a contract for construction is later amended to include additional vessels or additional options, the date of "contract for construction" for such vessels is the date on which the amendment to the contract, is signed between the prospective owner and the shipbuilder. The amendment to the contract is to be considered as a "new contract" to which **1.** and **2.** above apply.

4. If a contract for construction is amended to change the ship type, the date of "contract for construction" of this modified vessel, or vessels, is the date on which revised contract or new contract is signed between the Owner, or Owners, and the shipbuilder.

Note:
This Procedural Requirement applies from 1 July 2009.