RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

Part C Hull Construction and Equipment

Rules for the Survey and Construction of Steel Ships
Part C 2023 AMENDMENT NO.2
Guidance for the Survey and Construction of Steel Ships
Part C 2023 AMENDMENT NO.2

Rule No.67 / Notice No.63 22 December 2023
Resolved by Technical Committee on 27 July 2023

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NIPPON KAIJI KYOKAI

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

RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

RULES

Part C Hull Construction and Equipment

2023 AMENDMENT NO.2

Rule No.67 22 December 2023

Resolved by Technical Committee on 27 July 2023

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

Rule No.67 22 December 2023
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 2-1

Part 1 GENERAL HULL REQUIREMENTS

Chapter 2 GENERAL ARRANGEMENT DESIGN

2.3 Damage Stability

2.3.2 Subdivision Index

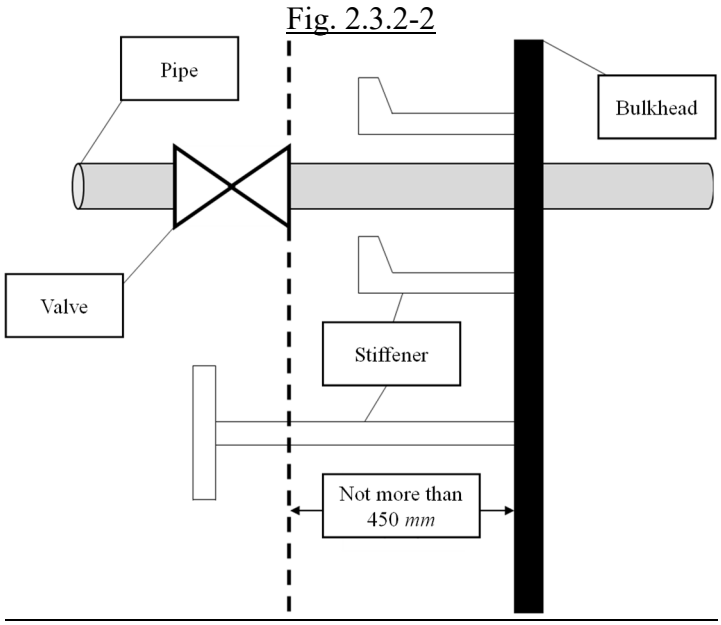
2.3.2.1 Subdivision Index

Sub-paragraph -11 has been amended as follows.

11 Pipes and valves directly adjacent or situated as close as practicable to a bulkhead or to a deck can be considered to be part of the bulkhead or deck, provided the separation distance on either side of the bulkhead or deck is of the same order as the bulkhead or deck stiffening structure. The same applies for small recesses, drain wells, etc. In no case is the separation distance on either side of the bulkhead or deck to be more than 450 *mm* measured from the valve's near end to the bulkhead or deck. An example is shown in **Fig. 2.3.2-2**.

Fig.2.3.2-2 has been added as follows.

Fig. 2.3.2-2



Chapter 14 EQUIPMENT

14.10 Doors

14.10.2 Side Shell Doors and Stern Doors

14.10.2.2 Arrangement of Doors

Sub-paragraph -2 has been amended as follows.

1 Doors are to be made weathertight.
2 Where the lower edges of any openings of the doors are situated below the freeboard deck, the doors are to be so designed as to ensure the same watertightness and structural integrity as the surrounding shell plating.
3 Notwithstanding the requirements in **-2**, the lower edges of the doors are not to be below a line drawn parallel to the freeboard deck at side, which has at its lowest point at least 230 *mm* above the upper edge of the uppermost load line, unless additional measures for ensuring watertightness such as the following **(1)** to **(4)** are implemented. However, notwithstanding the additional measures in **(1)** to **(4)**, in no case are such doors to be fitted so as to have their lowest point below the deepest subdivision draught specified in **2.3.1.2(3)**.
(1) A second door of equivalent strength and watertightness is fitted inside the watertight door
(2) A leakage detection device is provided in the compartment between the two doors
(3) Drainage of this compartment to the bilges is controlled by a readily accessible screw-down valve
(4) The outer door opens outwards
4 The number of door openings is to be kept to the minimum compatible with design and proper operation of the ship.
5 Doors are generally to open outwards.
6 Shipside doors used for pilot transfer are to be in accordance with Regulation 23.5, Chapter V, *SOLAS* Convention.

EFFECTIVE DATE AND APPLICATION (Amendment 2-1)

1. The effective date of the amendments is 1 January 2024.

2. Notwithstanding the amendments to the Rules, the current requirements apply to ships other than ships that fall under the following:

(1) for which the contract for construction is placed on or after the effective date; or

(2) in the absence of a contract for construction, the keels of which are laid or which are at *a similar stage of construction* on or after 1 July 2024; or

(3) the delivery of which is on or after 1 January 2028.

(Note) The term "*a similar stage of construction*" means the stage at which the construction identifiable with a specific ship begins and the assembly of that ship has commenced comprising at least 50 *tonnes* or 1% of the estimated mass of all structural material, whichever is the less.

3. For ships subject to Part C of the Rule and Guidance for the Survey and Construction of Steel Ships prior to its comprehensive revision by Rule No.62 and Notice No.47 on 1 July 2022 (hereinafter referred to as "old Part C of the Rules" and "old Part C of the Guidance"), and for which into -2 above is either on after the effective date, this amendment also applies to following requirements.

23.4.2-2, old Part C of the Rules
C4.2.1-6 and -8, old Part C of the Guidance
Fig. C4.2.1, old Part C of the Guidance
Fig. C4.2.1-2, old Part C of the Guidance (new)

Amendment 2-2

Part 1 GENERAL HULL REQUIREMENTS

Chapter 2 GENERAL ARRANGEMENT DESIGN

2.3 Damage Stability

2.3.2 Subdivision Index

2.3.2.2 Compartment Flooding Probability (p_i)

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

1 The Compartment Flooding Probability (p_i) for a compartment or group of compartments is to be determined by the following **(1)**, **(2)** or **(3)** according to the number of damaged compartments:

(1) Where the damage involves a single zone only:

$$p_i = p(x1_j, x2_j) \cdot [r(x1_j, x2_j, b_k) - r(x1_j, x2_j, b_{k-1})]$$

Where:

(Omitted)

b: The mean transverse distance (m) measured at right angles to the centreline at the deepest subdivision draught between the shell and an assumed vertical plane extended between the longitudinal limits used in calculating the factor p_i and which is a tangent to, or common with, all or part of the outermost portion of the longitudinal bulkhead under consideration. (*See* **Fig. 2.3.2-~~2~~3**) This vertical plane is to be so orientated that the mean transverse distance to the shell is a maximum, but not more than twice the least distance between the plane and the shell. In any case, b is not to be taken as greater than $B'/2$.

(Omitted)

Fig.2.3.2-2 has been renumbered to Fig. 2.3.2-3.

Fig. 2.3.2-~~2~~3 Examples of Assumed Vertical Plane (In Case of Single Damage Zone)

(Omitted)

Part 2-2 BOX-SHAPED BULK CARRIERS

Annex 1.1 ADDITIONAL REQUIREMENTS FOR BULK CARRIERS IN CHAPTER XII OF THE SOLAS CONVENTION

An2 Damage Stability

An2.1 Survivability

An2.1.1

Sub-paragraph -2(1) has been amended as follows.

2 The condition of equilibrium after flooding is to be in accordance with the following:

(1) The final water line after flooding, taking into account sinking, heel, and trim, is to be below the lower edge of any opening through which progressive flooding may take place. Such openings are to include air pipes, ventilators and openings which are closed by means of weathertight doors or hatch covers. The openings closed by means of manhole hatch covers and flush scuttles, watertight hatch covers, remotely operated sliding watertight doors, hinged watertight access doors with open/closed indication locally and at the navigation bridge of the quick-acting or single-action type that are normally closed at sea, hinged watertight doors that are permanently closed at sea, and side scuttles of the non-opening type, may be excluded.

((2) to (4) are omitted.)

EFFECTIVE DATE AND APPLICATION (Amendment 2-2)

1. The effective date of this amendment is 1 January 2024.

Amendment 2-3

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 -6 has been amended as follows.

6 Probability of survival (s_i) is to be taken as 0 in ~~those~~ cases where~~, taking into account~~ the final waterline (in consideration of sinkage, heel and trim~~, the openings in accordance with the following **(1)** and **(2)** immerse at the final waterline:~~) immerses the lower edge of openings through which progressive flooding may take place and such flooding is not accounted for in the calculation of the probability of survival (s_i). Such openings are to include air pipes, ventilators and openings which to be closed by means of weathertight doors or hatch covers.

~~(1) The openings through which progressive flooding may take place and such flooding is not accounted for in the calculation of the probability of survival (s_i)~~

~~(2) Air pipes, ventilators and the openings which are closed by means of weathertight doors or hatch covers~~

EFFECTIVE DATE AND APPLICATION (Amendment 2-3)

1. The effective date of this amendment is 1 January 2024.

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 4.2.3-6, old Part C of the Rules.

Amendment 2-4

Part 1 GENERAL HULL REQUIREMENTS

Chapter 4 LOADS

4.4 Loads to be Considered in Local Strength

4.4.3 Testing Condition

4.4.3.2 Internal Pressure

Table 4.4.3-2 has been amended as follows.

Table 4.4.3-2 Design Testing Water Head Height z_{ST}

Compartment	z_{ST}
Double bottom tanks(1)	$z_{ST} = \max(z_{top} + h_{air}, z_{top} + 2.4, z_{bd})$(3)
Double side tanks	$z_{ST} = \max(z_{top} + h_{air}, z_{top} + 2.4, z_{bd})$(3)
Deep tanks not described in this Table	$z_{ST} = \max(z_{top} + h_{air}, z_{top} + 2.4)$(3)
Cargo oil tanks	$z_{ST} = \max(z_{top} + h_{air}, z_{top} + 2.4, z_{top} + z_{PV})$(3)
Ballast holds of bulk carriers	$z_{ST} = z_{hc}$
Peak tanks (fore and aft peak tanks)	$z_{ST} = \max(z_{top} + h_{air}, z_{top} + 2.4)$(3)
Chain lockers	$z_{ST} = z_c$
Ballast ducts	$z_{ST} = \max(z_{bp}, z_{PV})$
Fuel oil tanks	$z_{ST} = \max(z_{top} + h_{air}, z_{top} + 2.4, z_{top} + z_{PV}, z_{bd})$(3)
Cargo tanks of ships carrying dangerous chemicals in bulk(2)	$z_{ST} = \max(z_{top} + 2.4, z_{top} + z_{PV})$(3)
Cargo tanks of ships carrying liquefied gas in bulk	According to **Part N**
Low-flashpoint fuel tanks for storing natural gas	According to **Part GF**
Edible liquid tanks (independent tanks)	$z_{ST} = \max(z_{top} + h_{air}, z_{top} + 0.9)$
Fuel oil overflow tanks not intended to hold fuel	$z_{ST} = \max(z_{top} + h_{air}, z_{top} + 2.4, z_{bd})$(3)

Notes:
z_{top}: Z coordinate of the top of tank (m) (the highest point of the tank excluding small hatchways)
z_{bd}: Z coordinate of the bulkhead deck (m)
z_{PV}: Z coordinate of the test water head (m) corresponding to ~~set~~ the design vapour pressure ~~of pressure relief valve~~
z_{hc}: Z coordinate of the top of hatch coaming (m)
z_c: Z coordinate of the top of chain pipe (m)
z_{bp}: Z coordinate of the test water head (m) corresponding to maximum pressure of ballast pump
h_{air}: Height of the air pipe or overflow pipe (m) above the top of the tank

(1) For double bottom tanks connected with hopper side tanks, topside tanks or double side tanks, z_{ST} corresponding to "hopper side tanks, topside tanks, double side tanks, fore and aft peaks used as tanks, and cofferdams" is applicable.

(2) For tanks loaded with cargoes having specific gravity exceeding 1.0, an additional water head in accordance with *Note*3, Table An1.4-2, Annex 2.1.5 Part B* is to be considered.

(3) For ships not subject to *SOLAS Convention*, "0.3D + 0.76, but not greater than 2.4" can be used instead of "2.4", where D is the depth of the ship (m).

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

4.6.4 Testing Condition

4.6.4.3 Internal Pressure

Table 4.6.4-2 has been amended as follows.

Table 4.6.4-2 Design Testing Water Head Height z_{ST}

Compartment	z_{ST}
Double bottom tanks(1)	$z_{ST} = \max(z_{top} + h_{air}, z_{top} + 2.4, z_{bd})$(3)
Double side tanks	$z_{ST} = \max(z_{top} + h_{air}, z_{top} + 2.4, z_{bd})$(3)
Deep tanks not described in this Table	$z_{ST} = \max(z_{top} + h_{air}, z_{top} + 2.4)$(3)
Cargo oil tanks	$z_{ST} = \max(z_{top} + h_{air}, z_{top} + 2.4, z_{top} + z_{PV})$(3)
Ballast holds of bulk carriers	$z_{ST} = z_{hc}$
Peak tanks (fore and aft peak tanks)	$z_{ST} = \max(z_{top} + h_{air}, z_{top} + 2.4)$(3)
Chain lockers	$z_{ST} = z_c$
Ballast ducts	$z_{ST} = \max(z_{bp}, z_{PV})$
Fuel oil tanks	$z_{ST} = \max(z_{top} + h_{air}, z_{top} + 2.4, z_{top} + z_{PV}, z_{bd})$(3)
Cargo tanks of ships carrying dangerous chemicals in bulk(2)	$z_{ST} = \max(z_{top} + 2.4, z_{top} + z_{PV})$(3)
Cargo tanks of ships carrying liquefied gas in bulk	According to **Part N**
Low-flashpoint fuel tanks storing natural gas	According to **Part GF**
Edible liquid tanks (independent tanks)	$z_{ST} = \max(z_{top} + h_{air}, z_{top} + 0.9)$
Fuel oil overflow tanks not intended to hold fuel	~~$z_{ST} = \max(z_{top} + h_{air}, z_{top} + 2.4, z_{bd})$~~(3)

Notes:
z_{top}: Z coordinate of the top of tank (m) (highest point of tank excluding small hatchways)
z_{bd}: Z coordinate of the bulkhead deck (m)
z_{PV}: Z coordinate of the test water head (m) corresponding to ~~set~~ the design vapour pressure ~~of pressure relief valve~~
z_{hc}: Z coordinate (m) at the top of the hatch coaming
z_c: Z coordinate (m) at the top of chain pipe
z_{bp}: Z coordinate of the test water head (m) corresponding to maximum pressure of ballast pump
h_{air}: Height of the air pipe or overflow pipe (m) above the top of the tank

(1) For double bottom tanks connected with "hopper side tanks, topside tanks or double side tanks, z_{ST} corresponding to hopper side tanks, topside tanks, double side tanks, fore and aft peaks used as tanks, and cofferdams" is applicable.

(2) For tanks to be loaded with cargoes having specific gravity exceeding 1.0, an additional water head in accordance with *Note*3, Table An1.4-2, Annex 2.1.5 Part B* is to be considered.

(3) For ships not subject to *SOLAS Convention*, "0.3D + 0.76, but not greater than 2.4" can be used instead of "2.4", where D is the depth of the ship (m).

EFFECTIVE DATE AND APPLICATION (Amendment 2-4)

1. The effective date of the amendments is 1 January 2024.

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.

Amendment 2-5

Part 1 GENERAL HULL REQUIREMENTS

Chapter 14 EQUIPMENT

14.4 Towing and Mooring Arrangement

14.4.1 General

14.4.1.1 Applications and Definitions*

7 The definitions of terms which appear in **14.4** are as follows.
((1) to (13) are omitted.)

Sub-paragraphs (14) to (16) have been added as follows.

(14) Mooring area
"Mooring area" refers to the dedicated area on a ship where mooring equipment is installed and line-handling takes place. It also includes areas where there is a risk of personnel injury in event of snap-back or other failure of mooring equipment.
(15) Working Load Limit (*WLL*)
"Working Load Limit (*WLL*)" means the maximum load that a mooring line should be subjected to in operational service, calculated from the relevant environmental mooring restraint requirement.
(16) Bend radius (*D*/*d* ratio)
"Bend radius (*D*/*d* ratio)" means the diameter (*D*) of a mooring fitting divided by the diameter (*d*) of a mooring line that is led around or through the fitting.

14.4.1.4 Towing and Mooring Fitting Arrangements Plan

(-1 is omitted.)
2 Information provided on the plan is to include the following.
((1) to (6) are omitted.)

Sub-paragraph (7) has been renumbered to Sub-paragraph (9), and Sub-paragraphs (7) and (8) have been added as follows.

(7) Winch brake holding capacities
(8) For ships of 3,000 gross tonnage and above, documentation confirming that *MSC*.1/*Circ*.1619 has been considered.
(~~7~~9) Other information or notes related to the design of shipboard fittings or lines.

14.4.3.2 Mooring Lines*

Sub-paragraph -1(3) has been amended as follows.

1 Mooring lines are to be in accordance with the following **(1)** to **(5)**.
((1) and (2) are omitted.)
(3) Fibre ropes used for mooring lines are to be not less than 20 *mm* in diameter. ~~For considering~~

~~rope age degradation and wear, the line design break force for such ropes is to be in accordance with the following **(a)** or **(b)**. However, neither **(a)** nor **(b)** need to be complied with in cases where consideration of rope age degradation and wear is included in the method specified in **14.4.3.1.**~~

~~(a) Polyamide ropes: $LDBF \geq 120$ % of MBL_{sa}~~

~~(b) Other synthetic ropes: $LDBF \geq 110$ % of MBL_{sa}~~

((4) and (5) are omitted.)

14.4.3.3 Mooring Fittings

Sub-paragraph -2(3) has been amended as follows.

2 The arrangement of mooring fittings is to be in accordance with the following **(1)** and **(3)**.

(1) Mooring fittings, mooring winches and capstans are to be located on stiffeners, girders, or both which are parts of the deck construction so as to facilitate efficient distribution of the mooring load.

(2) When mooring fittings, mooring winches and capstans cannot be located as specified in **(1),** appropriate reinforced members are to be provided directly underneath the towing fittings.

(3) ~~Mooring arrangements are recommended as follows.~~

~~(a) As far as possible, a sufficient number of mooring winches is to be fitted to allow for all mooring lines to be belayed on winches. If the mooring arrangement is designed such that mooring lines are partly belayed on bitts or bollards, it is to be considered that these lines may not be as effective as the mooring lines belayed on winches. Mooring lines are to have as straight a lead as is practicable from the mooring drum to the fairlead.~~

~~(b) At points of changes in direction, sufficiently large radii of the contact surface of a rope on a fitting is to be provided to minimize the wear experienced by mooring lines and as recommended by the rope manufacturer for the rope type intended to be used.~~

~~(c)~~ Attention is to be given to the arrangement of the equipment for mooring operations in order to prevent interference of the mooring lines as far as practicable.

Paragraph 14.4.4 has been added as follows.

14.4.4 Arrangement and selection of mooring line, mooring equipment, capstan, and winch

14.4.4.1 Application

1 The requirements in this **14.4.4** apply to ships of 3,000 gross tonnage and above.

2 Ships of less than 3,000 gross tonnage are to comply with the requirements in this **14.4.4** as far as reasonably practicable, or are to comply with applicable the national standards of their respective Administration.

14.4.4.2 Arrangement of mooring line, mooring equipment, capstan, and winch

1 The arrangement of mooring lines, mooring equipment, capstans and winches is to be in accordance with the following **(1)** through **(11)**.

(1) To minimise the need for complex mooring line configurations during the normal operation of the ship, mooring winches and fairleads are to be positioned to allow the use of direct, unobstructed leads from mooring winches to the fairleads for each mooring line described in the towing and mooring arrangements plan.

(2) Where the arrangement in **(1)** above is not possible, the following **(a)** to **(c)** measures are to be considered.

(a) The deviation from straight leads sre to be by means of pedestal fairleads, rolling

fairleads or similar means that will reduce the friction between line/fitting and will reduce bend losses. Steel fittings such as horns or bollards without chafe protection are to be avoided.

(b) Lines are to traverse mooring areas from winches to fairleads by the shortest route.

(c) Changes of direction of mooring line are to be minimised to prevent reductions in mooring line strength due to bend loss and introduction of complex snap-back areas.

(3) To provide for the oversight and supervision of mooring operations, mooring areas are to be designed to give supervising personnel unobstructed views of installed mooring lines, mooring equipment, capstans and winches. This is to also include the provision of platform or other appropriate means by which supervising personnel can obtain unobstructed views of mooring areas and the berth arrangements planned to be used from positions clear of hazards.

(4) Mooring arrangements are to be designed to provide unobstructed views between shipboard personnel and the lines being worked within mooring areas.

(5) Winch operators are to be provided with mooring winch controls that are positioned so as to allow operators direct views of the lines being worked in mooring areas worked without needing to step away from the winch controls. Winch controls are to be positioned clear of hazards.

(6) Deck illumination is to provide clear views of mooring areas as well as the equipment and lines being worked during hours of darkness or in conditions of limited visibility.

(7) Designs of mooring arrangements and mooring areas are to consider the following **(a)** to **(c)** constraints.

(a) Anticipated variations in shore-based mooring arrangements and the need to preserve flexibility in mooring line configurations to achieve an appropriate restraining capacity.

(b) Ship structural element (including accommodation, ventilation exhausts, cargo equipment or similar obstacles) impact on access.

(c) Special requirements for the location and selection of mooring lines, mooring equipment, capstans and winches; for example, special requirements for canal transits.

(8) Unless not permitted by ship size or special features, mooring lines, mooring equipment, capstans and winches in mooring areas are to be positioned so as to provide shipboard personnel with unobstructed access to the following during mooring operations.

(a) Mooring winches and winch controls.

(b) Mooring fittings.

(c) Mooring lines and mooring line stowage.

(d) Spaces between shipside fairleads and winches to permit mooring personnel to safely apply stoppers to mooring lines when necessary.

(9) Mooring arrangements are to be designed to avoid exposing shipboard personnel to lines under tension through snap-back or sudden movements of mooring lines. In this respect, the following measures are to be considered.

(a) Winches are to be located close to shipside fairleads. The position of winches is to not result in inappropriate mooring line orientations that block or otherwise interfere with the use of shipside fairleads for additional mooring lines, the connecting up of tugs for towage during mooring operations or the ability to safely moor the ship.

(b) Enclosing mooring lines behind barriers provided that such enclosures do not adversely affect mooring system performance and do not prevent the effective inspection and maintenance of equipment, fittings and mooring lines.

(c) Alternative designs where ship personnel do not need to work close to or have to pass mooring lines that are under tension or are potentially under tension.

(d) Use of appropriate, alternative means to moor the ship, including but not limited to automated mooring systems.

(e) Permanently fix mooring lines to mooring winches.

(10) Mooring areas should be considered as potential snap-back zones and signage should be provided to indicate that this is the case.

(11) To minimise the need for manual handling of towing and mooring lines, the following **(a)** to **(f)** measures are to be considered.

(a) Equipment and fitting arrangements should minimise the distance over which mooring lines may need to be handled.

(b) The use of fixed or dedicated mooring lines, considering the need to avoid inappropriate mooring line orientations that block or otherwise interfere with the use of shipside fairleads for additional mooring lines, the connecting up of tugs for towage during mooring operations or the ability to safely moor the ship.

(c) Layouts are to be designed to prevent manual intervention in transfers of mooring lines from storage drums to mooring winch drums and vice versa.

(d) Use of spooling equipment.

(e) Additional mooring lines are to be available for immediate use, provided that their stowage does not interfere with the safe operation of the mooring equipment.

(f) A sufficient number of mooring winches so that manual use of warping ends, stoppers, capstans and bitts is minimized, as far as possible, during mooring operations.

2 Being unable to comply with **(2)**, **(4)**, **(5)**, **(8)**, **(9)** and **(11)** above is to be recorded as supplementary information in towing and mooring fitting arrangements plan. The reasons for not being able to fulfill the requirements and appropriate safety measures taken instead are to also be included in this supplementary information.

3 Compliance with items **(2)**, **(4)**, **(5)**, **(8)**, **(9)** and **(11)** above is to be indicated on towing and mooring fitting arrangements plan.

14.4.4.3 Selection of mooring line, mooring equipment, capstan, and winch

1 Selection of mooring winches is to be in accordance with the following **(1)** to **(5)**.

(1) Consideration is to be given to the availability of winches with alternative drum arrangements, including split drum arrangements, which can reduce the need for manual handling of mooring lines during mooring operations.

(2) Consideration is to be given to the positioning of winch controls, including the availability of remote controls for winches, to improve the lines of sight and reduce operator exposure to snap-backs.

(3) Consideration is to be given to the availability of constant tension winches and their appropriateness for normal ship operations.

(4) Consideration is to be given to limiting noise levels to ensure proper communication during mooring operations.

(5) To avoid overloads on mooring winches, mooring winch brake holding capacities are to be less than 100 % of the Ship Design Minimum Breaking Load (MBL_{sd}). Alternatively, winches are to be fitted with brakes that allow for reliable settings of brake rendering loads.

2 Selections of mooring equipment and capstans are to be in accordance with the following **(1)** to **(3)**.

(1) Consideration is to be given to the diameter (*D)* of surfaces of mooring fittings that are in contact with mooring lines in relation to mooring line diameter (*d)* (i.e. the *D*/*d* ratio) to reduce or mitigate bend loss of strength.

(2) Consideration is to be given to use mooring equipment and capstans with load-bearing surfaces to minimize damage from chafing and abrasion.

(3) Mooring equipment and capstans are to be compatible in design, diameter, strength, suitability, etc. and maintained with the original purpose and concept of the mooring arrangement.

3 The selection of mooring line is to be in accordance with the following **(1)** to **(7)**.

(1) Consideration is to be given to the diameter (*D*) of surfaces of mooring fittings that are in contact with mooring lines in relation to mooring line diameter (*d*) (i.e. the *D*/*d* ratio) to reduce or mitigate bend loss of strength.

(2) Consideration is to be given to the compatibility of the MBL_{sd} of mooring lines and the brake capacities of mooring winches installed on board.

(3) Line Design Break Force (*LDBF*) is to be 100 % to 105 % of the MBL_{sd}. When lines made of nylon are used as mooring lines, the *LDBF* of the lines is to be the tested under wet and spliced conditions.

(4) Consideration is to be given to the characteristics and limitations of mooring lines (including the material properties and environmental operating conditions anticipated during normal ship operations).

(5) Consideration is to be given to the anticipated behaviours of mooring lines in the event of failure.

(6) Consideration is to be given to the influence on stored energy and the potential for snap-back of high stiffness mooring lines caused by the use of tails.

(7) As far as possible, but at least for lines in the same service (e.g. headlines, breast lines or springs), Mooring lines of the same diameter and type (i.e. material) are to be used.

14.4.4.4 Technical specification documents for mooring lines

The technical specification documents of the mooring lines provided on board are to include the manufacturer recommended minimum diameters (*D*) for fittings in contact with mooring lines and the Line Design Break Forces (*LDBF*) for mooring lines. The properties of mooring lines related to *LDBF* and bend radius (i.e. the *D*/*d* ratio) are to also be included for confirmation of appropriate mooring line selection.

14.4.4.5 Working Load Limit (*WLL*)

The *WLL* of mooring lines is to be used as user operating limiting values and is not to be exceeded. *WLL* is expressed as a percentage of MBL_{sd} and is to be used as a limiting value in operational mooring analyses. Steel wires have a *WLL* of 55 % of MBL_{sd} and all other cordage (synthetic) have a *WLL* of 50 % of the MBL_{sd}.

EFFECTIVE DATE AND APPLICATION (Amendment 2-5)

1. The effective date of the amendments is 1 January 2024.

2. Notwithstanding the amendments to the Rules, the current requirements apply to ships other than ships that fall under the following:

(1) for which the contract for construction is placed on or after the effective date; or

(2) in the absence of a contract for construction, the keels of which are laid or which are at *a similar stage of construction* on or after 1 July 2024; or

(3) the delivery of which is on or after 1 January 2027.

(Note) The term "*a similar stage of construction*" means the stage at which the construction identifiable with a specific ship begins and the assembly of that ship has commenced comprising at least 50 *tonnes* or 1% of the estimated mass of all structural material, whichever is the less.

3. For ships subject to Part C of the Rule and Guidance for the Survey and Construction of Steel Ships prior to its comprehensive revision by Rule No.62 and Notice No.47 on 1 July 2022 (hereinafter referred to as "old Part C of the Rules" and "old Part C of the Guidance"), and for which into -2 above is either on after the effective date, this amendment also applies to following requirements.

27.2.1-3, old Part C of the Rules
27.2.5, old Part C of the Rules
27.2.9-2(7), old Part C of the Rules
27.2.9-2(8), old Part C of the Rules
27.2.9-2(9), old Part C of the Rules
27.2.9-3, old Part C of the Rules
27.2.10, old Part C of the Rules (new)

Amendment 2-6

Part 1 GENERAL HULL REQUIREMENTS

Chapter 14 EQUIPMENT

14.4 Towing and Mooring Arrangement

14.4.1 General

14.4.1.4 Towing and Mooring Fitting Arrangements Plan

(-1 is omitted.)

2 Information provided on the plan is to include the following.

((1) to (6) are omitted.)

Sub-paragraph (7) has been renumbered to Sub-paragraph (8), and Sub-paragraph (7) has been added as follows.

(7) The length of each mooring line

(~~7~~8) Other information or notes related to the design of shipboard fittings or lines.

EFFECTIVE DATE AND APPLICATION (Amendment 2-6)

1. The effective date of the amendments is 1 January 2024.

2. Notwithstanding the amendments to the Rules, the current requirements apply to ships other than ships that fall under the following:
(1) for which the contract for construction is placed on or after the effective date; or
(2) in the absence of a contract for construction, the keels of which are laid or which are at *a similar stage of construction* on or after 1 July 2024; or
(3) the delivery of which is on or after 1 January 2028.
(Note) The term "*a similar stage of construction*" means the stage at which the construction identifiable with a specific ship begins and the assembly of that ship has commenced comprising at least 50 *tonnes* or 1% of the estimated mass of all structural material, whichever is the less.

3. For ships subject to Part C of the Rule and Guidance for the Survey and Construction of Steel Ships prior to its comprehensive revision by Rule No.62 and Notice No.47 on 1 July 2022 (hereinafter referred to as "old Part C of the Rules" and "old Part C of the Guidance"), and for which into -2 above is either on after the effective date, this amendment also applies to following requirements.
27.2.9-2(7), old Part C of the Rules
27.2.9-2(8), old Part C of the Rules

Amendment 2-7

Part 1 GENERAL HULL REQUIREMENTS

Chapter 1 GENERAL

1.4 Symbols and Definitions

1.4.2 Primary Symbols and Units

1.4.2.3 Materials

Unless otherwise specified, the symbols of the materials and their units used in **Part C** are those defined in **Table 1.4.2-3**.

Table 1.4.2-3 has been amended as follows.

Table 1.4.2-3 Materials

Symbol	Meaning	Unit
E	Young's modulus, to be taken as 206,000 *N/mm*^{2}	*N/mm*^{2}
G	Shear modulus, to be obtained from the following formula: $G = \frac{E}{2(1+\nu)}$	*N/mm*^{2}
σ_Y	Specified minimum yield stress (*See* **3.2**)	*N/mm*^{2}
τ_Y	Specified shear yield stress $\tau_Y = \frac{\sigma_Y}{\sqrt{3}}$	*N/mm*^{2}
ν	Poisson's ratio, to be taken as 0.3	-
K	Material factor (*See* **3.2~~.1.2~~**)	-
σ_m	Specified minimum tensile strength	*N/mm*^{2}

Chapter 3 STRUCTURAL DESIGN PRINCIPLES

3.2 Materials

3.2.1 General

3.2.1.4 Rolled Stainless Steel Members or Stainless Clad Steel Plates

Sub-paragraph -1 has been amended as follows.

1 The material factor *K* for stainless steels or stainless clad steels specified in **Chapter 3, Part K** is to be the value obtained from the following formulae. However, the factor (*K*) is to be rounded to three decimal places and not less than 0.63.

$K = f_T \left\{ 8.81 \left(\sigma_{\underline{Y\_SUS}} / 1000 \right)^2 - 7.56 \left(\sigma_{\underline{Y\_SUS}} / 1000 \right) + 2.29 \right\}$ (for $\sigma_{\underline{Y\_SUS}} \leq 355$ (N/mm^2))

$K = f_T f_C (235 / \sigma_{\underline{Y\_SUS}})$ (for rolled stainless steel with $\sigma_{\underline{Y\_SUS}} > 355$ (N/mm^2))

f_C: Determined as follows:

$f_C = 3.04 (\sigma_{\underline{Y\_SUS}} / 1000)^2 - 1.09 (\sigma_{\underline{Y\_SUS}} / 1000) + 1.09$

$\sigma_{\underline{Y\_SUS}}$: The minimum value of yield strength or proof stress of stainless steel or stainless clad steel specified in **Chapter 3, Part K** (N/mm^2)

f_T: Determined as follows:

$f_T = 0.0025(T - 60) + 1.00$

If *T* is more than 100 °C, the value of f_T is at the discretion of the Society.

T: The maximum temperature in (°C) of cargo in contact with the materials. If the temperature is less than 60 °C, *T* is to be taken as 60 °C.

2 In the application of **-1** above, where deemed necessary by the Society, data corresponding to the standard of steels used (e.g. extent of use, location of structural members, section rigidity, buckling strength, minimum thickness, etc.) is to be submitted to the Society and approved.

Sub-paragraph -3 has been added as follows.

3 The specified minimum yield stress of stainless steel or stainless clad steel is specified as follows.

$\sigma_Y = \sigma_{Y\_SUS} / f_T$

σ_{Y_SUS} and f_T: As specified in **-1** above.

3.5 Minimum Requirements

3.5.2 Slenderness Requirements

3.5.2.1 Application

Sub-paragraph -3 has been amended as follows.

1 All structural members are to meet the slenderness requirements specified in **3.5.2**, except for those listed below:

- Bilge plates within the cylindrical part of the ship and the radius gunwale

- Structure members in superstructures and deck houses in cases where such members do not contribute to longitudinal strength.

Pillars in superstructures and deckhouses are to comply with the applicable slenderness and proportion requirements specified in **3.5.2**.

2 Where structural members are deemed by the Society as having an effectiveness equivalent to those compliant with **3**.**5**.**2**, such members are to be deemed compliant with **3.5.2**.

3 Notwithstanding **-1** above, thickness of shell plating, deck, bulkhead and web of girder and stiffness of stiffener need not to comply with **3.5.2**, provided that buckling strength requirements specified in **5.3** and **8.6.2**, if applicable, are satisfied.

Chapter 6 LOCAL STRENGTH

6.2 Design Load Scenarios and Loads of the Ship to Be Assessed

6.2.2 Assessment Design Load Scenarios and Loads for Members to Be Assessed

6.2.2.1

Table 6.2.2-1 has been amended as follows.

Table 6.2.2-1 Assessment Design load scenarios and Loads for Members/Compartments to Be Assessed

<table>
<tr><th rowspan="3">Compartments or members to be assessed</th><th rowspan="3">Design load scenario</th><th colspan="5">Load</th></tr>
<tr><th rowspan="2">Lateral load</th><th rowspan="2">Load type</th><th rowspan="2">Load component</th><th colspan="2">Refer to the following:</th></tr>
<tr><th>Lateral load (P)</th><th>Hull girder load (M_{V-HG}, M_{H-HG})</th></tr>
<tr><td>Outer shell (including stiffeners)</td><td rowspan="7">Maximum load condition</td><td>External pressure</td><td>Seawater</td><td>Static + dynamic loads</td><td>4.4.2.2-1</td><td rowspan="7">4.4.2.9</td></tr>
<tr><td>Cargo tanks, ballast tanks, ballast holds and other tanks</td><td rowspan="3">Internal pressure</td><td>Liquid loaded</td><td>Static + dynamic loads</td><td rowspan="3">4.4.2.2-2</td></tr>
<tr><td>Cargo holds(1)</td><td>Dry bulk cargoes</td><td>Static + dynamic loads</td></tr>
<tr><td>Cargo holds(2)</td><td>Others</td><td>Static + dynamic loads</td></tr>
<tr><td>Weather decks (including stiffeners)</td><td rowspan="2">Others</td><td>Green sea, unspecified loads</td><td>Green sea load, static + dynamic loads</td><td>Greater of the pressures specified in 4.4.2.2-3 and -4</td></tr>
<tr><td>Internal decks(2) (including stiffeners)</td><td>Cargoes</td><td>Static + dynamic loads</td><td>4.4.2.2-3</td></tr>
<tr><td>Members constituting compartments subject to hydrostatic testing</td><td>Testing condition</td><td>Internal pressure</td><td>Seawater</td><td>Static loads</td><td>4.4.3.2</td><td>4.4.3.3</td></tr>
<tr><td>Compartments not carrying liquids(3) ~~Transverse and longitudinal bulkheads~~</td><td>Flooded condition</td><td>Internal pressure</td><td>Seawater</td><td>-</td><td>4.4.4.1</td><td>4.4.4.2</td></tr>
<tr><td colspan="7">(Notes)
(1) For ships of single-side skin construction for carrying cargoes other than liquids, the outer shell (including stiffeners) may be excluded from the assessment.
(2) For ships carrying cargoes other than bulk and liquid cargoes with the cargoes properly fastened or otherwise held in position so that the cargo loads can be deemed as acting only on the inner bottom plating and internal deck, the assessment may be performed only for the inner bottom plating and the internal deck.
(3) Not required to be applied to shell plating, stiffeners attached to shell plating, weather deck plating and stiffeners attached to weather deck plating.</td></tr>
</table>

Chapter 7 STRENGTH OF PRIMARY SUPPORTING STRUCTURES

7.2 Simple Girders

7.2.2 Assessment Conditions and Loads

7.2.2.2 Assessment Conditions and Loads for Members to Be Assessed

Table 7.2.2-1 has been amended as follows.

Table 7.2.2-1 Assessment Conditions and Loads for Members/Compartments to Be Assessed

Compartments/members to be assessed	Typical members	Assessment condition	Loads				
			Lateral load	Load type	Load components	Refer to:	
						Load (P)	Hull girder load (M_{V-HG}, M_{H-HG})
Girders on shell plating	Web frames, side stringers (single side skin structure)	Maximum load condition	External pressure	Seawater	Static + dynamic loads	**4.4.2.2-1**	**4.4.2.9**
Cargo oil tanks, ballast tanks, ballast holds and other tanks	Stiffening girders, corrugated bulkheads		Internal pressure	Liquid loaded	Static + dynamic loads	**4.4.2.2-2**	
Cargo holds[(1)]	Stiffening girders, corrugated bulkheads			Dry bulk cargoes and others	Static + dynamic loads		
Single-bottomed cargo holds	Girders, floors			Unspecified cargoes	Static + dynamic loads		
Girders on deck	Deck girders, deck transverses		Others	Green sea (weather decks only), unspecified cargoes	Green sea load, static + dynamic loads	Greater of the pressures specified in **4.4.2.2-3** and **-4**	
Internal decks[(2)]	Deck girders, deck transverses			Unspecified cargoes	Static + dynamic loads	**4.4.2.2-3**	
Members constituting compartments subject to hydraulic testing	Stiffening girders, corrugated bulkheads	Testing condition	Internal pressure	Seawater	Static loads	P_{ST-in1} as specified in **4.4.3.2**	**4.4.4.3**
Compartments not carrying liquids[(3)] ~~Transverse and longitudinal bulkheads~~	Stiffening girders, corrugated bulkheads	Flooded condition	Internal pressure	Seawater	-	**4.4.4.1**	**4.4.4.2**

(Notes)

(1) For ships of a single side skin structure for carrying cargoes other than liquids, girders on the shell plating may be excluded from the assessment.

(2) For ships carrying cargoes other than bulk and liquid cargoes with the cargoes properly fastened or otherwise held in position so that the cargo loads can be deemed as acting only on the inner bottom plating and internal deck, the assessment may be performed only for the inner bottom plating and the internal deck.

(3) Not required for girders on shell plating and weather deck.

Chapter 8 STRENGTH ASSESSMENT BY CARGO HOLD ANALYSIS

8.2 Evaluation Area and Members to be Assessed

8.2.2 Members to be Assessed

Paragraph 8.2.2.2 has been amended as follows.

8.2.2.2 Members to be Assessed in Flooded Condition**

Where strength assessment is carried out in the flooded condition, the following members and locations are to satisfy the assessment criteria specified in this Chapter:

(1) Watertight bulkhead structures at the boundaries of compartments not carrying liquids

(2) Other members and locations as deemed necessary by the Society

Chapter 11 STRUCTURES OUTSIDE CARGO REGION

11.5 Stern Construction

11.5.2 Arrangements to Resist Panting Abaft of After Peak Bulkhead

Paragraph 11.5.2.5 has been added as follows.

11.5.2.5 Shell Plating connected with Stern Frame*

The structural continuity of connections between stern frame and shell plating is to be maintained.

Part 2-6 VEHICLES CARRIERS AND ROLL-ON/ROLL-OFF SHIPS

Chapter 3 STRUCTURAL DESIGN PRINCIPLES

3.1 Minimum Requirements

3.1.2 Car Deck

Paragraph 3.1.2.1 has been amended as follows.

3.1.2.1 Application

The car deck solely loaded with wheeled vehicles is to comply with the requirements of **3.1.2.2**.

Paragraph 3.1.2.2 has been amended as follows.

3.1.2.2 Minimum Thickness of the Car Deck

1 The gross thickness of the car deck is not to be less than 5 *mm*.

2 The gross thickness of web and flange of stiffeners attached to the car deck is not to be less than 5 *mm*.

EFFECTIVE DATE AND APPLICATION (Amendment 2-7)

1. The effective date of the amendments is 22 June 2024.

2. Notwithstanding the provision of preceding **1.**, the version of Part C of the Rules in effect prior to its comprehensive revision (hereinafter referred to as “old Part C”) may still be applied to the sister ships of those ships constructed under old Part C in cases where the date of the contract for construction of the sister ships is before 1 January 2025.

Amendment 2-8

Part 1 GENERAL HULL REQUIREMENTS

Chapter 11 STRUCTURES OUTSIDE CARGO REGION

11.5 Stern Construction

11.5.1 Stern Frames

11.5.1.8 Rudder Trunk

Sub-paragraph -2(3) has been amended as follows.

2 The material, welding, and connection to the hull are to be in accordance with the following **(1)** to **(4)**.

(1) The steel used for the rudder trunk is to be of weldable quality, with a carbon content not exceeding 0.23 % or carbon equivalent (*CEQ*) not exceeding 0.41 %.

(2) The weld at the connection between the rudder trunk and the shell or the bottom of the skeg is to be full penetration.

(3) For rudder trunks extending below shell or skeg, ~~T~~the fillet shoulder radius r (*mm*) (*See* **Fig. 11.5.1-5**) is to be as large as practicable and to comply with the following formula:

$r = 0.1d_l/K_T$

However, this value is not to be less than:

When $\sigma \geq 40/K_{\underline{ST}}$ *N/mm*^{2} $r = 60$ *mm*

When $\sigma < 40/K_{\underline{ST}}$ *N/mm*^{2} $r = 30$ *mm*

d_l: Diameter of the rudder stock defined in **13.2.5.2**.

σ: Bending stress (*N/mm*^{2}) of the rudder trunk

$K_{\underline{ST}}$: Material factor ~~of the rudder stock determined~~ for the rudder trunk as given in **13.2.1.2**.

The fillet radius may be obtained by grinding. If disk grinding is carried out, score marks are to be avoided in the direction of welding. The fillet radius is to be checked with a template for accuracy. At least four profiles are to be checked. A report is to be submitted to the Surveyor.

(4) Rudder trunks comprising materials other than steel are to be specially considered by the Society.

Sub-paragraph -3(2) has been amended as follows.

3 The scantlings of the rudder trunk are to be in accordance with the following:

(1) The equivalent stress due to bending and shearing is not to exceed $0.35\sigma_Y$ of the material used.

(2) The bending stress on the welded rudder trunk is to comply with the following formula:

$\sigma \leq 80/K_{\underline{ST}}$

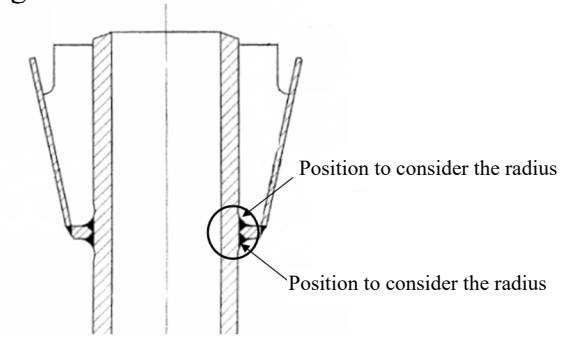
σ: As specified in **-2** above.

$K_{\underline{ST}}$: Material factor ~~of~~for the rudder ~~stock~~ trunk determined as given by **13.2.1.2**, not to be taken less than 0.7.

σ_Y: Specified minimum yield stress (*N/mm*^{2}) of the material used.

For calculation of bending stress, the span to be considered is the distance between the mid-height of the lower rudder stock bearing and the point where the trunk is clamped into the shell or the bottom of the skeg.

Fig. 11.5.1-5 Fillet Radius of Fillet Weld



Chapter 13 RUDDERS

13.2 Rudders

13.2.1 General

13.2.1.3 Welding and Design Details

Sub-paragraph -3 has been amended as follows.

3 Welds in the rudder side plating subjected to significant stresses from rudder bending, and welds between plates and heavy pieces (solid parts in forged or cast steel or very thick plating) are to comply with the following **(1)** to **(3)**:

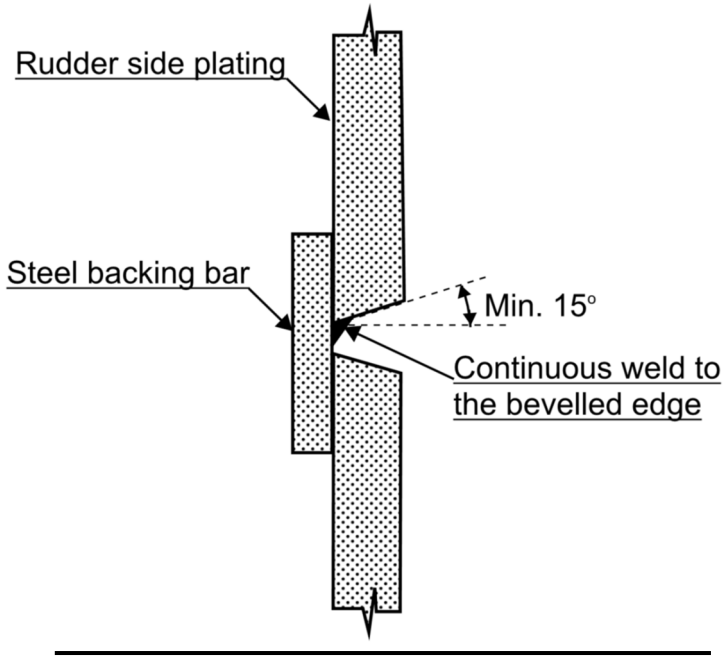
(1) ~~Welds between plates and heavy pieces (solid parts in forged or cast steel or very thick plating)~~ These are to be made as full penetration welds.

(2) In way of highly stressed areas e.g. cut-out of Type *A*, *D* and *E* rudders and upper part of Type *C* rudders, cast or welding on ribs is to be arranged.

(3) Two sided full penetration welding is normally to be arranged. Where back welding is impossible, one side welding using steel backing bars is, in principle, to be performed. In such cases, one~~-~~ sided continuous welding is to be used to weld the steel backing bars to ~~heavy pieces~~ bevelled edge (*See* **Fig. 13.2.1-3**). The bevel angle is to be at least 15 *degrees* for one sided welding. Other welding procedures, however, may be approved when deemed appropriate by the Society.

Fig. 13.2.1-3 has been added as follows.

Fig.13.2.1-3 Use of Steel Backing Bar in way of Full Penetration Welding of Rudder Side Plating



13.2.2 Rudder Force

Paragraph 13.2.2.1 has been amended as follows.

13.2.2.1

The rudder force FR is used to determine the rudder scantlings and is obtained from the following formula, for ahead and astern conditions. However, when the rudder is arranged behind the propeller that produces an especially great thrust, the rudder force is to be appropriately increased.

$$F_R = 132K_1K_2K_3AV^2 \ (N)$$

Where:

A: Area of rudder plate (m^2)

V: Speed of ship (kt)

When the speed is less than 10 *knots*, V is to be replaced by $V_{\min}$ obtained from the following formula:

$$V_{\min} = \frac{V + 20}{3} \ (kt)$$

For the astern condition, the astern speed V_a as defined in **2.1.30, Part A** is to be obtained from the following formula. However, when the maximum astern speed is designed to exceed V_a, the design maximum astern speed is to be used.

$$V_a = 0.5V \ (kt)$$

Where:

K_1: Factor depending on the aspect ratio Λ of the rudder area obtained by the following formula.

$$K_1 = \frac{\Lambda + 2}{3}$$

Λ: As obtained from the following formula, however, Λ is not required to be greater than 2

$$\Lambda = \frac{h^2}{A_t}$$

h: Mean height of rudder (m), which is determined according to the coordinate system in **Fig. 13.2.2-1**.

A_t: Sum of rudder plate area A (m^2) and area of rudder post or rudder horn, if any, within the mean height of Rudder h

K_2: Factor depending on the rudder profile (*See* **Table 13.2.2-1**)

K_3: Factor depending on the location of rudder, as specified below:
For rudders outside the propeller jet: 0.8
For rudders behind a fixed propeller nozzle: 1.15
Otherwise: 1.0

13.2.5 Rudder Stocks

Paragraph 13.2.5.2 has been amended as follows.

13.2.5.2 Lower Stocks

The diameter d_l of the lower stock, which is the stock below the bearing centre of the rudder carrier subject to the combined forces of torque and bending moment, is to be determined such that the equivalent stress in the rudder stock does not exceed $118/K_S$ (N/mm^2)

The equivalent stress σ_e is to be obtained from the following formula.

$\sigma_e = \sqrt{{\sigma_b}^2 + 3{\tau_t}^2}$ (N/mm^2)

σ_b and τ_t: The bending stress and torsional stress acting on the lower stock are to be determined as follows:

Bending stress: $\sigma_b = \frac{10.2M}{{d_l}^3} \times 10^3$ (N/mm^2)

Torsional stress: $\tau_t = \frac{5.1T_R}{{d_l}^3} \times 10^3$ (N/mm^2)

Where:

M:Bending moment (N-m) at the section of rudder stock considered

T_R: As specified in **13.2.3**

When the horizontal section of the lower stock forms a circle, the lower stock diameter d_l may be determined by the following formula:

$$d_l = d_u \cdot \sqrt[6]{1 + \frac{4}{3}\left(\frac{M}{T_R}\right)^2} \quad (mm)$$

d_u: Diameter of upper stock (mm) as given in **13.2.5.1**

For a spade rudder with trunk extending inside the rudder, the rudder stock scantlings are to be checked for the following two cases:

(1) pressure applied on the entire rudder area; and

(2) pressure applied only on rudder area below the middle of the neck bearing.

13.2.6 Rudder Plates, Rudder Frames and Rudder Main Pieces

Paragraph 13.2.6.1 has been amended as follows.

13.2.6.1 Rudder Plate

The rudder plate thickness t_{gr} is not to be less than that obtained from the following formula. The thickness of rudder plating in way of the solid part is to be increased in accordance with **13.2.7.4**.

$$t_{gr} = 5.5S\beta\sqrt{\left(\cancel{d}\underline{T_{SC}} + \frac{F_R \times 10^{-4}}{A}\right)K_{pl}} + 2.5\ (mm)$$

$\underline{T_{SC}}$: Scantling draught (m) (*See* **1.4.3.1-5**)

A and F_R: As specified in **13.2.2.1**

K_{pl}: Material factor for the rudder plate as given in **13.2.1.2**

β: To be obtained from the following formula:

$$\beta = \sqrt{1.1 - 0.5\left(\frac{S}{a}\right)^2},$$

but need not exceed $1.0\left(\frac{a}{S} \geq 2.5\right)$

Where:

S: Spacing (m) of horizontal or vertical rudder frames, whichever is smaller

a: Spacing (m) of horizontal or vertical rudder frames, whichever is greater

13.2.8 Couplings between Rudder Stocks and Main Pieces

13.2.8.4 Cone Couplings with Special Arrangements for Mounting and Dismounting the Couplings

Sub-paragraph -2(1) has been amended as follows.

2 Push-up pressure is to comply with the following requirements.

(1) The push-up pressure is not to be less than the greater of the two following values:

$$p_{req1} = \frac{2M_Y}{{d_m}^2 l\pi\mu_0} \times 10^3\ (N/mm^2)$$

$$p_{req2} = \frac{6\cancel{M_b}\underline{M_{bc}}}{l^2 d_m} \times 10^3\ (N/mm^2)$$

Where:

M_Y: Design yield moment of rudder stock, as defined in **13.2.8.3-2**. (N-m)

d_m: Mean cone diameter (mm) (*See* **Fig. 13.2.8-2**)

l: Coupling length (mm)

μ_0: Frictional coefficient, equal to 0.15

$\cancel{M_b}\underline{M_{bc}}$: Bending moment in <u>rudder stock at the top of</u> the cone coupling (e.g. in case of spade rudders) (N-m)

<u>For spade rudder with trunk extending inside the rudder, the coupling is to be checked for the following two cases:</u>

<u>(1) pressure applied on the entire rudder area; and</u>

<u>(2) pressure applied only on rudder area below the middle of the neck bearing.</u>

(2) It has to be proved by the designer that the push-up pressure does not exceed the permissible

surface pressure in the cone. The permissible surface pressure is to be determined by the following formula:

$$p_{perm} = \frac{0.95\sigma_Y(1-\alpha^2)}{\sqrt{3+\alpha^4}} - p_b$$

$$p_b = \frac{3.5M_{b\underline{c}}}{d_m l^2} \times 10^3$$

σ_Y: Specified minimum yield stress (N/mm^2) of the material of the gudgeon

$$\alpha = \frac{d_m}{d_a}$$

d_m: Mean cone diameter (mm) (*See* **Fig. 13.2.8-2**)

d_a: Outer diameter of the gudgeon (mm) (*See* **Fig. 13.2.8-2** and **Fig. 13.2.8-3**. The least diameter is to be considered.) The outer diameter of gudgeon d_a is recommended to be taken at the same plane in which the mean cone diameter d_m.

(3) The outer diameter of the gudgeon is not to be less than 1.25 d_0 (mm), with d_0 defined in **Fig. 13.2.8-2**

3 The push-up length is to comply with the following requirements.

(1) The push-up length Δl (mm) is to comply with the following formula:

$$\Delta l_1 \leq \Delta l \leq \Delta l_2$$

$$\Delta l_1 = \frac{p_{req} d_m}{E\left(\frac{1-\alpha^2}{2}\right)c} + \frac{0.8R_{tm}}{c} \ (mm)$$

$$\Delta l_2 = \frac{p_{perm} d_m}{E\left(\frac{1-\alpha^2}{2}\right)c} + \frac{0.8R_{tm}}{c} \ (mm)$$

R_{tm}: Mean roughness (mm) taken equal to about 0.01 mm

c: Taper on diameter according to **13.2.8.3-1**

E: Young's modulus (N/mm^2) , to be taken as 2.06×10^5

(2) In case of hydraulic pressure connections the required push-up force P_e for the cone (N) may be determined by the following formula:

$$P_e = p_{req} d_m \pi l \left(\frac{c}{2} + 0.02\right)$$

The value 0.02 is a reference for the friction coefficient using oil pressure. It varies and depends on the mechanical treatment and roughness of the details to be fixed. Where due to the fitting procedure a partial push-up effect caused by the rudder weight is given, this may be taken into account when fixing the required push-up length, subject to approval by the Society.

13.2.9 Pintles

13.2.9.2 Construction of Pintles*

Sub-paragraph -2 has been amended as follows.

2 The required push-up pressure for pintle in case of dry fitting (N/mm^2) is to be determined by p_{req1} as given below. The required push-up pressure for pintle in case of oil injection fitting (N/mm^2) is to be determined by the ~~following formula~~ maximum pressures of p_{req1} and p_{req2} as given below. The required push up length Δl_1 is to be calculated similarly as in **13.2.8.4-3**, using the required push-up pressure (as defined below) and properties for the pintle.

$p_{req1} = 0.4\frac{Bd_0}{{d_m}^2 l}$ (N/mm^2)

$p_{req2} = \frac{6M_{bp}}{l^2 d_m} \times 10^3$ (N/mm^2)

B: As defined in **13.2.9.1**

d_m, l: As defined in **13.2.8.4-2**

d_0: Pintle diameter (*mm*) (*See* **Fig. 13.2.8-2**)

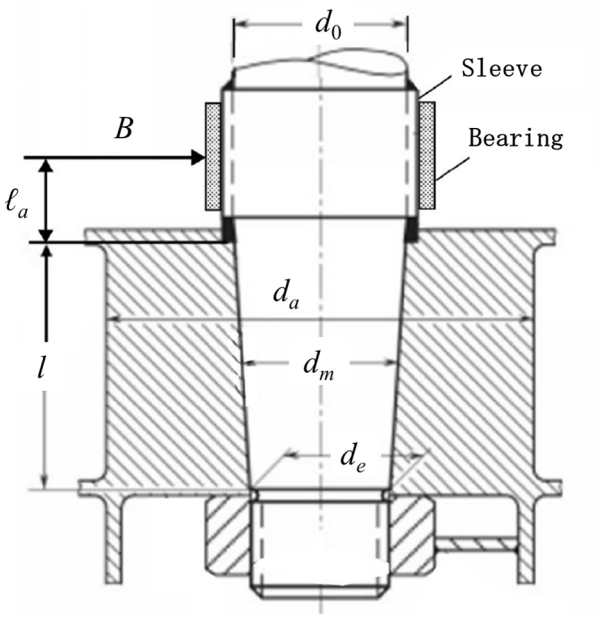
M_{bp}:bending moment in the pintle cone coupling (*N-m*) to be determined as follows

$M_{bp} = B\ell_a$

ℓ_a: length between middle of pintle-bearing and top of contact surface between cone coupling and pintle (*m*) (*See* **Fig. 13.2.9-1**)

Fig. 13.2.9-1 has been added as follows.

Fig. 13.2.9-1 Pintle Cone Coupling Indicating ℓ_a



13.2.10 Bearings of Rudder Stocks and Pintles

Sub-paragraphs -1 and -2 have been amended as follows.

13.2.10.1 Sleeves and Bushes

1 Sleeves and bushes are to be fitted in way of rudder stock bearing. For rudder stocks and pintles having diameter less than 200 *mm*, sleeves in way of bushes may be provided optionally. The minimum thickness of sleeves and bushes is to be equal to:

(1) $t_{\min} = 8$ *mm* for metallic materials and synthetic material

(2) $t_{\min} = 22$ *mm* for lignum material

2 Sleeves and bushes are to be fitted in way of pintle bearings. The minimum thickness of sleeves and bushes is to be equal to:

$t = 0.01\sqrt{B}$ (mm)

B: As specified in **13.2.9.1**

13.2.11 Rudder Accessories

13.2.11.1 Rudder Carriers*

Sub-paragraph -2 has been amended as follows.

2 In rudder trunks which are open to the sea, a seal or stuffing box is to be fitted above the deepest load waterline to prevent water from entering the steering gear compartment and the lubricant from being washed away from the rudder carrier. If the top of the rudder trunk is below the ~~deepest~~ waterline at scantling draught (without trim), two separate watertight seals or stuffing boxes are to be provided.

EFFECTIVE DATE AND APPLICATION (Amendment 2-8)

1. The effective date of the amendments is 1 July 2024.

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 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.

2.2.8-2 and -3, old Part C of the Rules
3.1.3-3, old Part C of the Rules
Fig.C3.3, old Part C of the Rules (new)
3.2, old Part C of the Rules
3.3.1, old Part C of the Rules
3.3.2, old Part C of the Rules
3.5.2, old Part C of the Rules
3.6.1, old Part C of the Rules
3.7.3, old Part C of the Rules
3.8.1, old Part C of the Rules
3.8.3, old Part C of the Rules
3.8.4-2, old Part C of the Rules
3.9.2-2, old Part C of the Rules
Fig.C3.12, old Part C of the Rules (new)
3.10.1-1, old Part C of the Rules
C3.4.1-3, old Part C of the Guidance
Fig.C3.4.1-3, Fig.C3.4.1-6 and Fig.C3.4.1-7 (new), old Part C of the Guidance
C3.9.2-4, old Part C of the Guidance
C3.11.1-3, 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.

GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

GUIDANCE

Part C Hull Construction and Equipment

2023 AMENDMENT NO.2

Notice No.63 22 December 2023
Resolved by Technical Committee on 27 July 2023

Notice No.63 22 December 2023
AMENDMENT TO THE GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

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

Part C HULL CONSTRUCTION AND EQUIPMENT

Amendment 2-1

Part 1 GENERAL HULL REQUIREMENTS

C14 EQUIPMENT

C14.4 Towing and Mooring Arrangement

C14.4.1 General

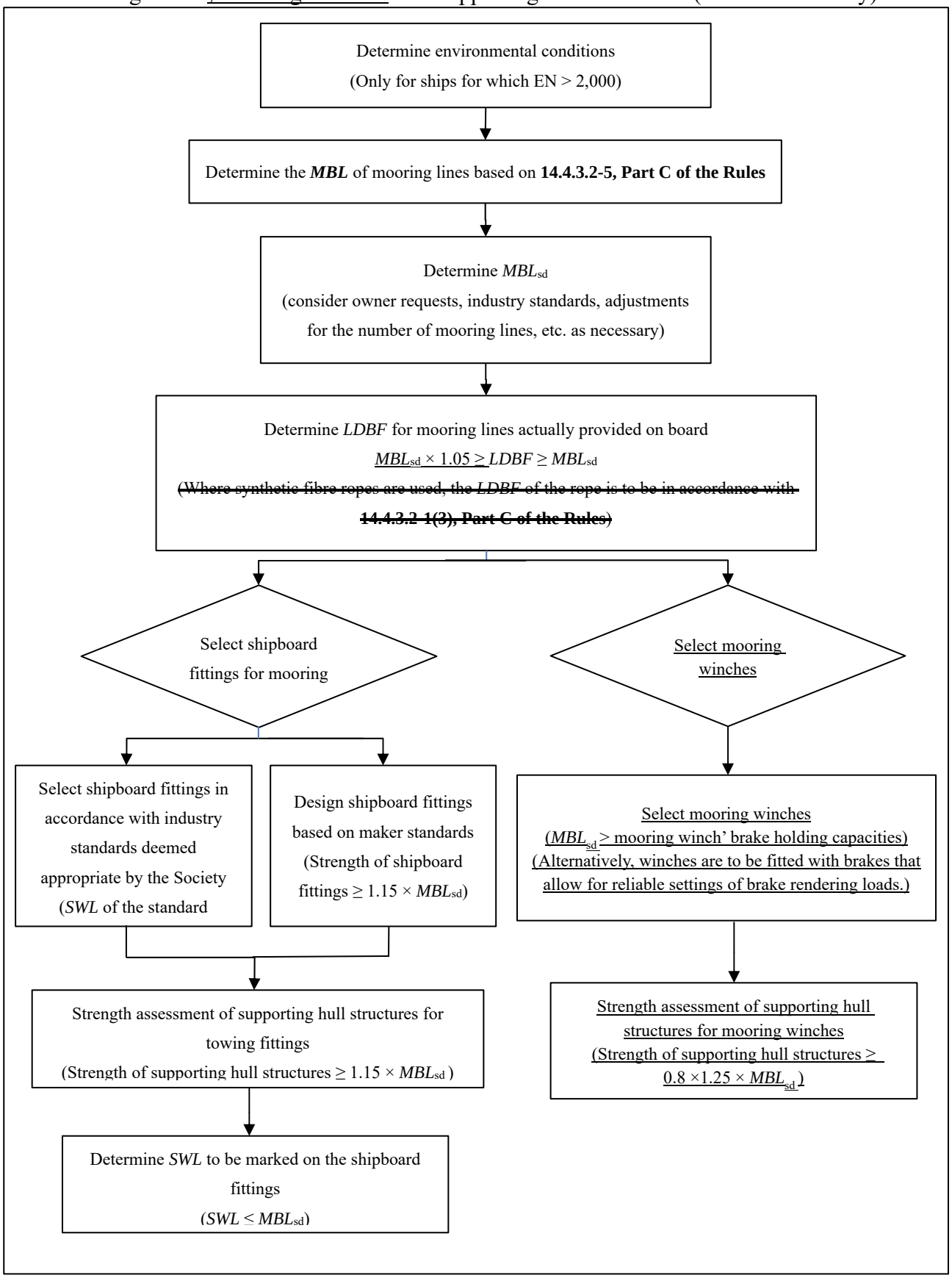
C14.4.1.1 Applications and Definitions

1 (Omitted)

2 The design process for the mooring fittings including the mooring lines is shown in **Fig. C14.4.1-2**. This flow chart is a standard method for the selection of the mooring line and mooring fittings, and for the design of the mooring fittings and their supporting hull structures, and is not intended to cover everything that may be expected at the time of newbuilding or in service of ships.

Fig. C14.4.1-2 has been amended as follows.

Fig. C14.4.1-2 Standard Design and Selection Process for Mooring Lines, Mooring Arrangements, Mooring Winches and Supporting Hull Structures (for reference only)



EFFECTIVE DATE AND APPLICATION (Amendment 2-1)

1. The effective date of the amendments is 1 January 2024.

2. Notwithstanding the amendments to the Rules, the current requirements apply to ships other than ships that fall under the following:

(1) for which the contract for construction is placed on or after the effective date; or

(2) in the absence of a contract for construction, the keels of which are laid or which are at *a similar stage of construction* on or after 1 July 2024; or

(3) the delivery of which is on or after 1 January 2027.

(Note) The term "*a similar stage of construction*" means the stage at which the construction identifiable with a specific ship begins and the assembly of that ship has commenced comprising at least 50 *tonnes* or 1% of the estimated mass of all structural material, whichever is the less.

Fig. C14.4.1-2, old Part C of the Guidance

Amendment 2-2

Part 1 GENERAL HULL REQUIREMENTS

Chapter C1 has been added as follows.

C1 GENERAL

C1.2 Application

C1.2.2 Requirements

C1.2.2.4 Application of Strength Assessment Criteria to Primary Supporting Structures

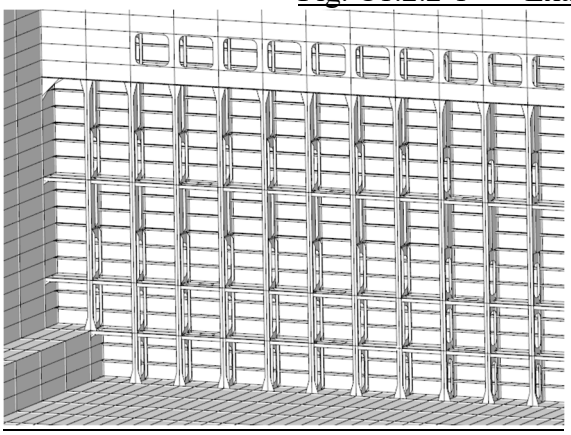
Where strength assessments are carried out in the flooded condition, the following **(1)** to **(3)** evaluation methods are considered to be standard:

(1) For reciprocal-type bulkhead structures, **Chapter 8, Part C of the Rules** is to be applied.

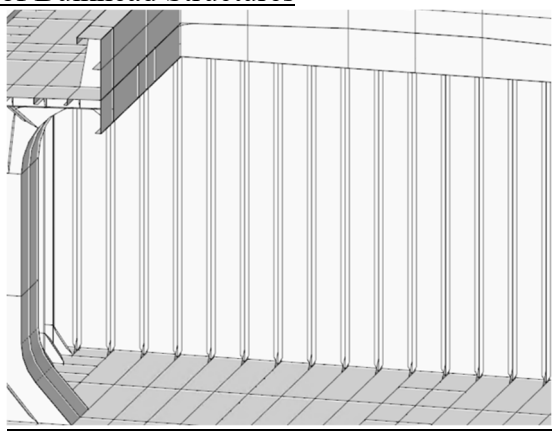
(2) For bulkhead structures supported solely by stiffeners, neither **Chapter 7** nor **Chapter 8, Part C of the Rules** need be applied.

(3) For bulkhead structures excluding **(1)** and **(2)** above (e.g. corrugated bulkheads) and where **Chapter 8, Part C of the Rules** is not applied, relevant requirements in **Chapter 7, Part C of the Rules** are to be applied.

Fig. C1.2.2-1 Example of Bulkhead Structures



(a) Reciprocal-type bulkhead structure



(b) Bulkhead structure supported solely by stiffeners

C8 STRENGTH ASSESSMENT BY CARGO HOLD ANALYSIS

C8.2 Evaluation Area and Members to be Assessed

Paragraph C8.2.2 has been added as follows.

C8.2.2 Members to be Assessed

C8.2.2.2 Members to be Assessed in Flooded Condition

Watertight bulkhead structures for which the differences between internal and external pressures are small (e.g. longitudinal bulkheads and girder members that constitute double side structures) need not be assessed.

C11 STRUCTURES OUTSIDE CARGO REGION

C11.5 Stern Structure

Paragraph C11.5.2 has been added as follows.

C11.5.2 Arrangements to Resist Panting Abaft of After Peak Bulkhead

C11.5.2.5 Shell Plating connected with Stern Frame

1 The thicknesses of shell plating connected with stern frames are not to be less than those obtained from the following formula:

$t = 0.094(L_{C300} - 43) + 0.009b$

b: Length (mm) of the shorter side of the plate panel

2 Notwithstanding **-1** above, the thicknesses of shell plating in way of bosses and heel plates are not to be less than those obtained from the following formula:

$t = 0.105(L_{C300} - 47) + 0.011b$

b: As specified in **-1** above

EFFECTIVE DATE AND APPLICATION (Amendment 2-2)

1. The effective date of the amendments is 22 June 2024.

2. Notwithstanding the provision of preceding **1.**, the version of Part C of the Rules in effect prior to its comprehensive revision (hereinafter referred to as “old Part C”) may still be applied to the sister ships of those ships constructed under old Part C in cases where the date of the contract for construction of the sister ships is before 1 January 2025.

Amendment 2-3

Part 1 GENERAL HULL REQUIREMENTS

C13 RUDDERS

C13.2 Rudders

C13.2.4 Rudder Strength Calculation

C13.2.4.1 Rudder Strength Calculation

Sub-paragraph -3(3) has been amended as follows.

3 The method of evaluating moments and forces is to be as in the following **(1)** to **(3)** below. Notwithstanding the above, for Type *D* rudders with 2-conjugate elastic supports by rudder horns, the method of evaluating moments and forces is to be as in **4**.

((1) and (2) are omitted.)

(3) Simplified method

The moments and forces for rudders of each type may be obtained from the following formulae.

(a) Type *A* rudders

$$M_R = \frac{{B_1}^2(\ell_{10} + \ell_{30})}{2F_R} \ (N\text{-}m)$$

$$M_b = \frac{B_3(\ell_{30} + \ell_{40})(\ell_{10} + \ell_{30})^2}{{\ell_{10}}^2} \ (N\text{-}m)$$

$$M_s = B_3\ell_{40} \ (N\text{-}m)$$

$$B_1 = \frac{F_R h_c}{\ell_{10}} \ (N)$$

$$B_2 = F_R - 0.8B_1 + B_3 \ (N)$$

$$B_3 = \frac{F_R {\ell_{10}}^2}{8\ell_{40}(\ell_{10} + \ell_{30} + \ell_{40})} \ (N)$$

(b) Type *B* rudders

$$M_R = \frac{{B_1}^2\ell_{10}}{2F_R} \ (N\text{-}m)$$

$$M_b = B_3\ell_{40} \ (N\text{-}m)$$

$$M_s = \frac{3M_R\ell_{30}}{\ell_{10} + \ell_{30}} \ (N\text{-}m)$$

$$B_1 = \frac{F_R h_c}{\ell_{10} + \ell_{30}} \ (N)$$

$$B_2 = F_R - 0.8B_1 + B_3 \ (N)$$

$$B_3 = \frac{F_R(\ell_{10} + \ell_{30})^2}{8\ell_{40}(\ell_{10} + \ell_{30} + \ell_{40})} \ (N)$$

(c) Type *C* rudders

$M_b = F_R h_c$ (*N-m*)

$B_2 = F_R + B_3$ (*N*)

$$B_3 = \frac{M_b}{\ell_{40}} \ (N)$$

The maximum moment M_c in top of the cone coupling (as shown in **Fig.C13.2.4-3**) is applicable for the connection between the rudder and the rudder stock.

Notwithstanding the above, ~~the value is as follow,~~ the strength is to be checked against the following two cases for rudders with rudder trunks supporting rudder stocks.

i) pressure applied on the entire rudder area; and

ii) pressure applied only on rudder area below the middle of neck bearing.

The moments and forces for the two cases defined above may be determined according to **Fig. C13.2.4-6** and **Fig. C13.2.4-7**, respectively.

~~M_R is the greatest of the following values:~~

$M_{FR1} = F_{R1}(CG_{1Z} - \ell_{10})$

$M_{FR2} = F_{R2}(\ell_{10} - CG_{2Z})$

where A_1 and A_2 are the rudder blade area which are above the lower bearing and below respectively and symbols are as follows (*See* **Fig. C13.2.4-6** and **Fig. C13.2.4-7**)

F_{R1} : Rudder force over the rudder blade area A_1

F_{R2} : Rudder force over the rudder blade area A_2

CG_{1Z} : Vertical position of the centre of gravity of the rudder blade area A_1 from base

CG_{2Z} : Vertical position of the centre of gravity of the rudder blade area A_2 from base

$F_R = F_{R1} + F_{R2}$

$B_2 = F_R + B_3$

$$B_3 = \frac{M_{FR2} - M_{FR1}}{\ell_{20} + \ell_{40}}$$

(d) Type *D* rudders

$$M_R = \frac{F_{R2}\ell_{10}}{2} \ (N\text{-}m)$$

$$M_b = \frac{F_R {\ell_{10}}^2}{10(\ell_{20} + \ell_{30})} \ (N\text{-}m)$$

$$M_s = \frac{2M_R \ell_{10} \ell_{30}}{(\ell_{20} + \ell_{30})^2} \ (N\text{-}m)$$

$$B_1 = \frac{F_R h_c}{\ell_{20} + \ell_{30}} \ (N)$$

$$B_2 = F_R - B_1, \ \ \min B_2 = F_R/4 \ (N)$$

$$B_3 = \frac{M_b}{\ell_{40}} \ (N)$$

$$Q_1 = F_{R2} \ (N)$$

(e) Type *E* rudders

$$M_R = \frac{F_{R2} \ell_{10}}{2} \ (N\text{-}m)$$

$$M_b = \frac{F_R {\ell_{10}}^2}{10 \ell_{20}} \ (N\text{-}m)$$

$$B_1 = \frac{F_R h_c}{\ell_{20}} \ (N)$$

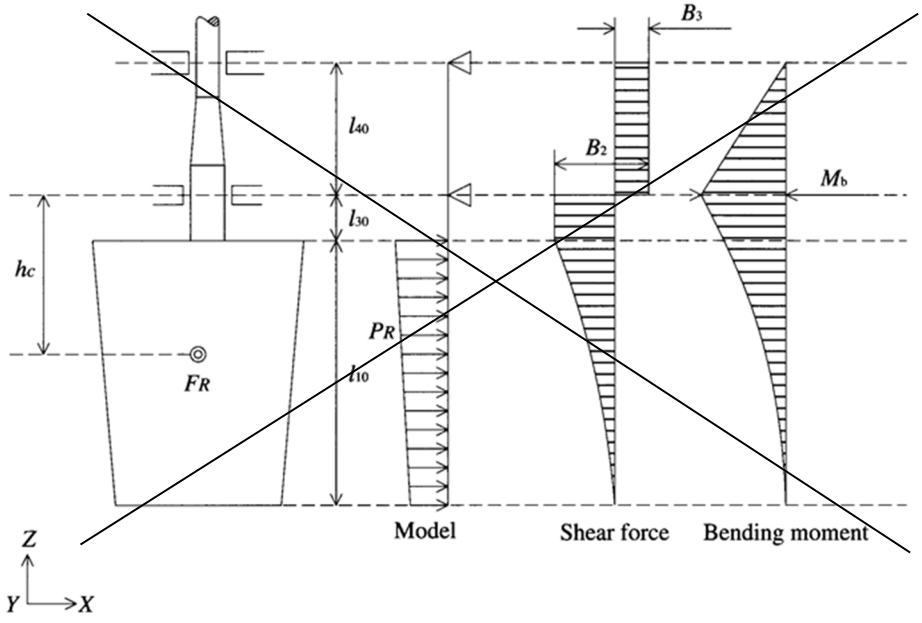
$$B_2 = F_R - B_1, \ \ \min B_2 = F_R/4 \ (N)$$

$$B_3 = \frac{M_b}{\ell_{40}} \ (N)$$

$$Q_1 = F_{R2} \ (N)$$

Fig. C13.2.4-3 has been amended as follows.

Fig. C13.2.4-3 Type *C* Rudder



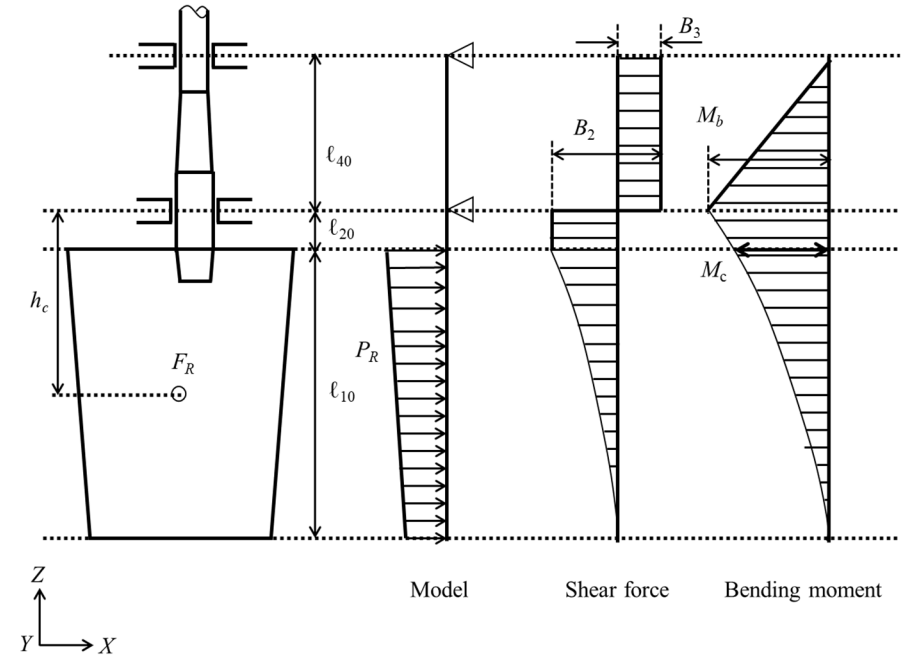


Fig. C13.2.4-4 Type *D* Rudder

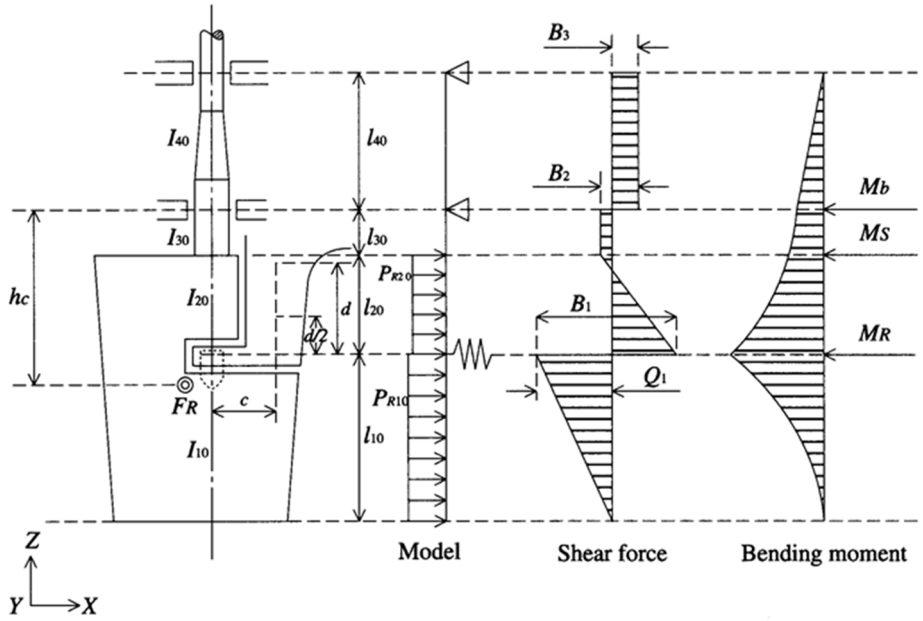
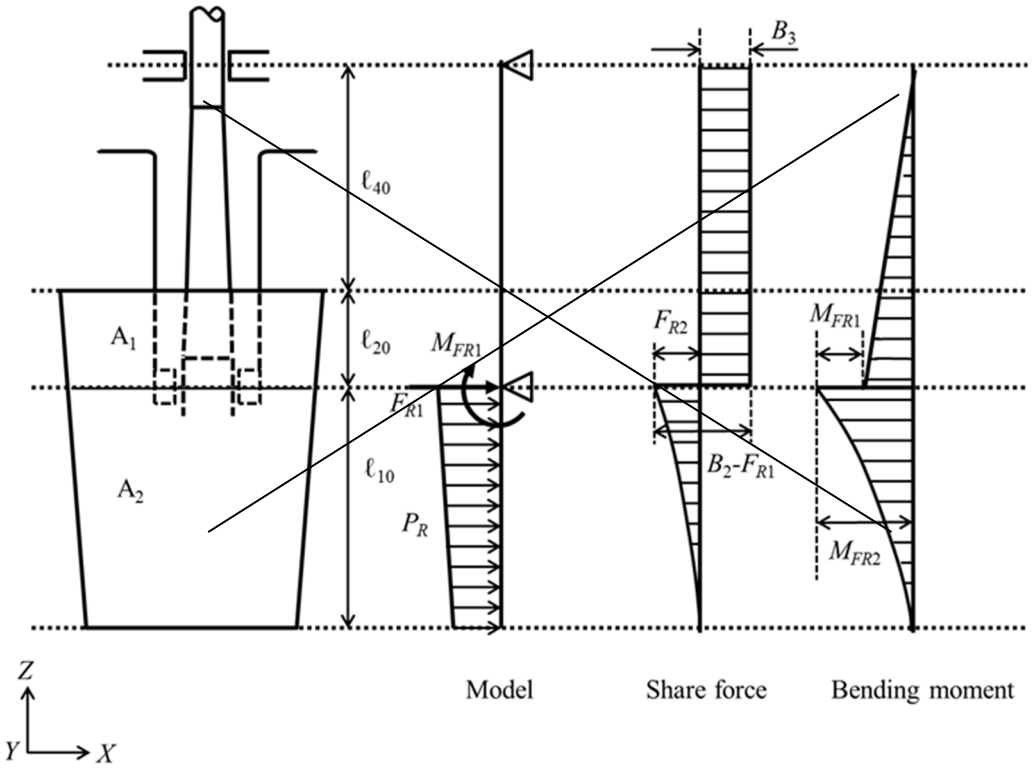


Fig. C13.2.4-6 has been amended as follows.

Fig. C13.2.4-6 Type *C* Rudder with Rudder Trunk Supporting Rudder Stock
(Pressure Applied on the Entire Rudder Area)



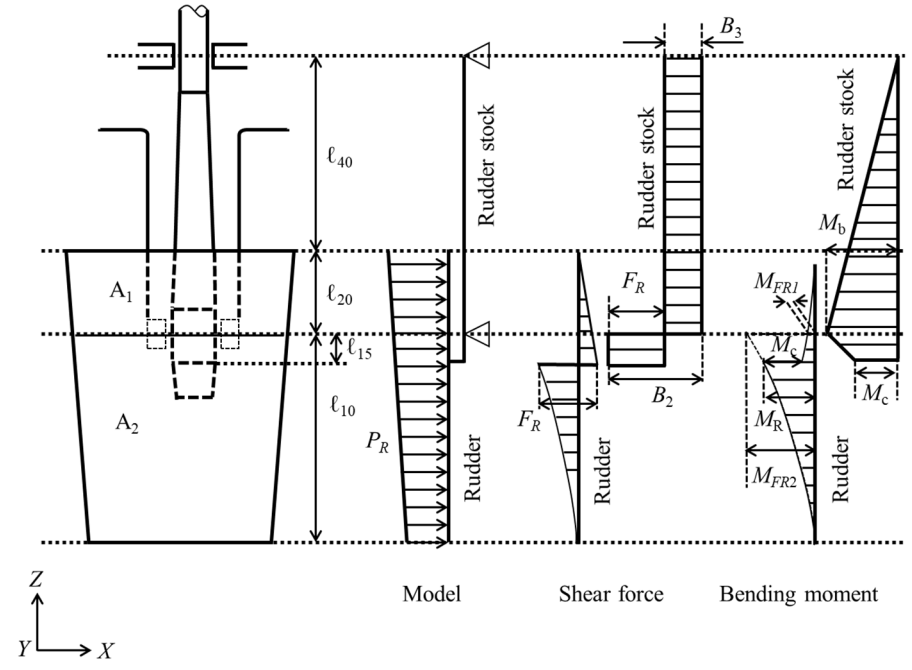


Fig. C13.2.4-7 has been renumbered to Fig. C13.2.4-8, and Fig. C13.2.4-7 has been added as follows.

Fig. C13.2.4-7 Type *C* Rudder with Rudder Trunk Supporting Rudder Stock (Pressure Applied only on Rudder Area below the Middle of Neck Bearing)

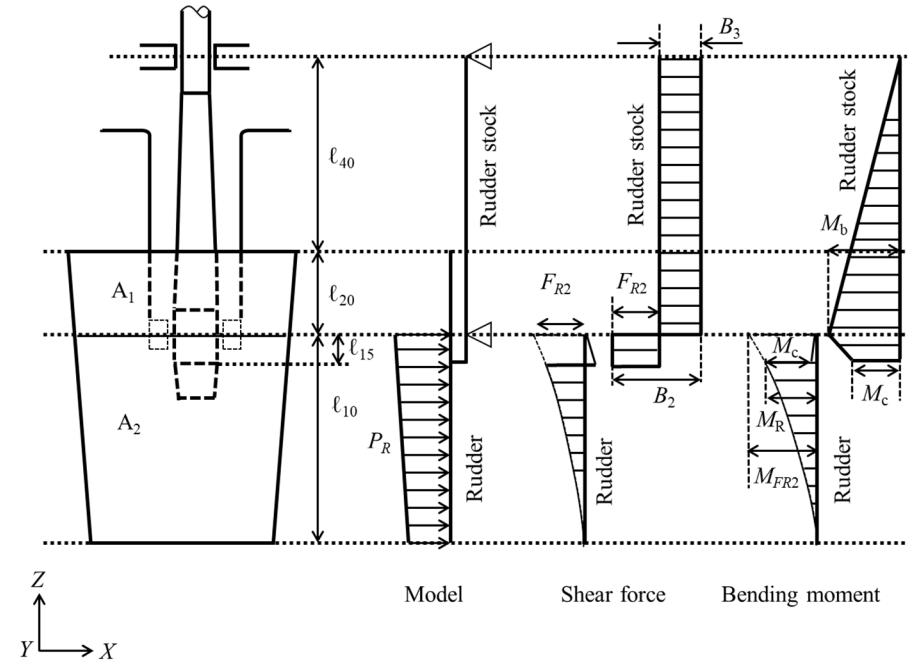


Fig. C13.2.4-~~7~~8 Type *D* Rudder with 2-conjugate Elastic Supports

（Omitted）

C13.2.9 Pintles

Paragraph C13.2.9.2 has been amended as follows.

C13.2.9.2 Construction of Pintles

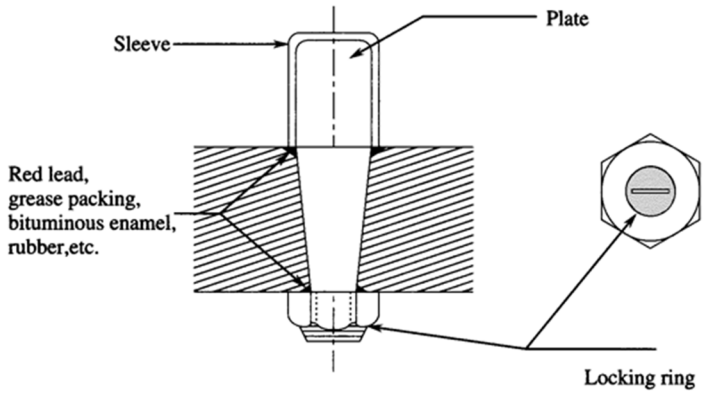
1 Split pins are not recommendable as the locking device for pintle nuts. Locking rings or other equivalent devices are to be used, as shown in **Fig. C13.2.9~~.2~~-1**.

2 To prevent corrosion of pintles, the end of the sleeve is to be filled with red lead, grease packing, bituminous enamel, rubber, etc. as shown in **Fig. C13.2.9~~.2~~-1**.

3 Combining pintle and rudder frame into a monoblock is not recommended.

4 For the reaction force in bearing *B* specified in **13.2.9.2-2, Part 1**, for example, B_1 defined in **Fig. C13.2.4-4** is used for Type *D* rudders.

Fig. C13.2.9-1 Locking Ring



EFFECTIVE DATE AND APPLICATION (Amendment 2-3)

1. The effective date of the amendments is 1 July 2024.

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.

3. 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.

2.2.8-2 and -3, old Part C of the Rules
3.1.3-3, old Part C of the Rules
Fig.C3.3, old Part C of the Rules (new)
3.2, old Part C of the Rules
3.3.1, old Part C of the Rules
3.3.2, old Part C of the Rules
3.5.2, old Part C of the Rules
3.6.1, old Part C of the Rules
3.7.3, old Part C of the Rules
3.8.1, old Part C of the Rules
3.8.3, old Part C of the Rules
3.8.4-2, old Part C of the Rules
3.9.2-2, old Part C of the Rules
Fig.C3.12, old Part C of the Rules (new)
3.10.1-1, old Part C of the Rules
C3.4.1-3, old Part C of the Guidance
Fig.C3.4.1-3, Fig.C3.4.1-6 and Fig.C3.4.1-7 (new), old Part C of the Guidance
C3.9.2-4, old Part C of the Guidance
C3.11.1-3, 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.