Amendments of the Rules / Guidance

(Internal opinion inquiry)

Pt. 10 Hull Structure and Equipment of Small Steel Ships

2023. 9

Hull Rule Development Team

Main Amendments

(1) Background of Amendment

1) MKP4700-2-2023 : requirements of cofferdam
2) UR S3 : thickness of superstructure end bulkhead plating and side wall plating
3) aluminium alloy materials

(2) Effective date : ships contracted for construction on or after 1 July 2024

Present	Amendment	Note
⟨Rules⟩ CHAPTER 15 DEEP TANKS Section 3 Fittings of Deep Tanks 301. ~ 303. ⟨omit⟩ 304. Cofferdam 1. The following dedicated tanks are to be separated from adjacent tanks by cofferdams. However, these cofferdams may be omitted provided that the common boundaries of lubricating oil and fuel oil tank have full penetration welds. (1) Fuel oil (2) Lubricating oil (3) Vegetable oil (4) Fresh water	⟨Rules⟩ CHAPTER 15 DEEP TANKS Section 3 Fittings of Deep Tanks 301. ~ 303. ⟨same as current⟩ 304. Cofferdam 1. A cofferdam means an empty space arranged so that compartments on each side have no common boundary; a cofferdam may be located vertically or horizontally. As a rule, a cofferdam is to be kept gas-tight and is to be properly ventilated, provided with drainage arrangement, and of sufficient size to allow proper inspection, maintenance and safe evacuation. 2. Cofferdams are to be provided between compartments intended for liquid hydrocarbons (including fuel oil, lubricating oil) and those intended for fresh water (water for propelling machinery and boilers) as well as tanks intended for the carriage of liquid foam for fire extinguishing. 3. Furthermore, tanks carrying fresh water for human consumption are to be separated from other tanks containing substances hazardous to human health by cofferdams or other means as approved by the Society. Normally, tanks for fresh water and water ballast are considered non-hazardous. 4. Where a corner to corner situation occurs, tanks are not considered to be adjacent.	-

Present	Amendment	Note
	5. The cofferdams specified in **Par. 1** may be waived when deemed impracticable or unreasonable by the Society in relation to the characteristics and dimensions of the spaces containing such tanks, provided that: (1) The thickness of common boundary plates of adjacent tanks is increased, with respect to the thickness obtained according to **Ch 15, Sec 2**, by 2 mm in the case of tanks carrying fresh water or boiler feed water, and by 1 mm in all other cases, (2) the sum of the throats of the weld fillets at the edges of these plates is not less than the thickness of the plates themselves, (3) the structural test is carried out with a test pressure increased by 1 m.	
2. The cofferdams in **Par. 1** are to be provided with the air pipes to comply with the requirements in **Pt 5, Ch 6, 201** and with the manholes of adequate size which are well accessible.	**6.** The cofferdams in **Par. 1** are to be provided with the air pipes to comply with the requirements in **Pt 5, Ch 6, 201** and with the manholes of adequate size which are well accessible.	
3. Crew spaces and passenger spaces are not to be directly adjacent to the tanks for carriage of fuel oil. Such compartments are to be separated from the fuel oil tanks by cofferdams which are well ventilated and are not less than 600 mm in width for easy access. Where the top of fuel oil tanks has no opening and is coated with incombustible coverings of 38 mm and over in thickness, the cofferdam between such compartments and the top of fuel oil tanks may be omitted.	**7.** Crew spaces and passenger spaces are not to be directly adjacent to the tanks for carriage of fuel oil. Such compartments are to be separated from the fuel oil tanks by cofferdams which are well ventilated and are not less than 600 mm in width for easy access. Where the top of fuel oil tanks has no opening and is coated with incombustible coverings of 38 mm and over in thickness, the cofferdam between such compartments and the top of fuel oil tanks may be omitted.	

Present	Amendment	Note
# CHAPTER 16 SUPERSTRUCTURES AND DECKHOUSES ## Section 2 Construction **202. Thickness of bulkhead and wall platings** **1.** The thickness of superstructure end bulkhead plating and side wall plating is not to be less than that obtained from the following formula. $t = 3S\sqrt{h}$ (mm) where: h = head of water specified in **201.** (m) S = spacing of stiffeners (m) **2.** Regardless of the requirements in **Par** 1, the thickness of bulkhead plating and side wall plating is not to be less than 5 mm.	# CHAPTER 16 SUPERSTRUCTURES AND DECKHOUSES ## Section 2 Construction **202. Thickness of bulkhead and wall platings** **1.** The thickness of superstructure end bulkhead plating and side wall plating is not to be less than that obtained from the following formula or minimum thickness, whichever is the greater, in **Par 2** and **Par 3** $t = 3S\sqrt{h}$ (mm) where: h = head of water specified in **201.** (m) S = spacing of stiffeners (m) **2.** For ships not less than 65 m in length, the minimum thickness of the bulkhead obtained from the following formula. $t_{min} = \frac{L'}{100} + 5.0$ (mm) for lowest tier $t_{min} = 5.0$ (mm) for upper tiers **3.** For ships less than 65 m in length, the minimum thickness of the bulkhead obtained from the following formula. $t_{min} = 5.0$ (mm) for the lowest unprotected tier $t_{min} = 4.0$ (mm) for all other cases	

Present	Amendment	Note
⟨Guidance⟩ CHAPTER 1 GENERAL Section 3 Materials, Welding and Construction 301. Materials 【See Rule】 1. As for ships 60 m and above in length, plating materials for stern frames, rudder horns, rudders and shaft brackets are to be used of higher than Grade I of **Table 10.1.3** of the Rules. 2. Where high tensile steels are used, the formulas for thickness of deck and shell platings, the section modulus of stiffeners, and other scantlings etc., are to be in accordance with the requirements of **Pt 3.** 3. Where the crafts was constructed in aluminium alloy, the material factor is to be in accordance with **Table 10.1.3** to **Table 10.1.6**. But others than the Guidance are to be as following formula; $K = \frac{240}{\sigma_f}$ σ_f : yield stress (N/mm^2, proof load with 0.2 % permanent deformation) is not to be taken greater than 70 % of the ultimate tensile strength. ⟨omit⟩	⟨Guidance⟩ CHAPTER 1 GENERAL Section 3 Materials, Welding and Construction 301. Materials 【See Rule】 1. As for ships 60 m and above in length, plating materials for stern frames, rudder horns, rudders and shaft brackets are to be used of higher than Grade I of **Table 10.1.3** of the Rules. 2. Where high tensile steels are used, the formulas for thickness of deck and shell platings, the section modulus of stiffeners, and other scantlings etc., are to be in accordance with the requirements of **Pt 3.** 3. Where the local structure of crafts was constructed in aluminium alloy, the material factor is to be in accordance with **Table 10.1.3** to **Table 10.1.6**. But others than the Guidance are to be as following formula; $K = \frac{240}{\sigma_f}$ σ_f : yield stress (N/mm^2, proof load with 0.2 % permanent deformation) is not to be taken greater than 70 % of the ultimate tensile strength. ⟨same as current⟩	

Main Amendments

(1) Background of Amendment

1) HUC4100-2572-2023 : HATCHWAYS AND OTHER DECK OPENINGS

(2) Effective date : ships contracted for construction on or after 1 July 2024

Present	Amendment	Note
⟨Rules⟩ **CHAPTER 19 HATCHWAYS AND OTHER DECK OPENINGS** **Section 1 General** **101. Application** ~~**1.** The requirements in this Chapter apply to steel hatch covers and coaming in position I and II on weather decks. The requirements in **Pt 4, Ch 9** apply to steel hatch covers of small hatches fitted on exposed fore deck. Except for those specially provided for in this Chapter, **Pt 4, Ch 2** is to be applied.~~ ~~**2.** Relaxation from the requirements in this Chapter will be specially considered where the ship has an unusually large freeboard.~~ ~~**3.** The construction and means for securing the watertightness of cargo and other hatchways in position 1 and 2 defined in **102.** shall be at least equivalent to the requirements of hatchways closed by weathertight covers of steel or other equivalent materials unless the application of regulation **Sec 3** to such hatchways is granted by the Administration.~~ ~~**102. Position of exposed deck openings**~~ ~~For the purpose of this Chapter, two positions of exposed deck openings are defined as follows:~~ ~~Position I : Upon exposed freeboard and raised quarter decks and upon exposed superstructure decks situated forward of a point 0.25 L_f from the forward perpendicular~~ ~~Position II : Upon exposed superstructure decks situated abaft 0.25 L_f from the forward perpendicular and located at least one standard heights of superstructure above the freeboard deck.~~ ~~Upon exposed superstructure decks situated forward of a point 0.25 L_f from the forward perpendicular and located at least two standard heights of superstructure above the freeboard deck~~	⟨Rules⟩ **CHAPTER 19 HATCHWAYS AND OTHER DECK OPENINGS** **Section 1 General** **101. Application** Hatchways and other deck openings are to comply with **Pt 4, Ch 2**. **102. Openings to cargo spaces** Access and other openings to cargo spaces are to be provided with closing means capable of being operated from outside the spaces in case of a fire. Such closing means for any opening leading to any other space inboard the ship is to be of steel. ⚓	

Present	Amendment	Note

~~103. External pressures on hatch covers~~

1. ~~The wave pressure acting on hatch cover plate is as following~~ **Table 10.19.1**~~. The still water lateral pressure and loads are to be considered when the hatch cover is intended to carry uniform cargoes, wheeled cargoes or containers.~~

~~Table 10.19.1 Wave pressures on hatch covers~~

~~Pressure P_W (kN/m^2)~~		
~~Location~~	~~Position I~~	~~Position II~~
~~$0 \le x/L_f \le 0.75$~~	~~$14.9 + 0.195L_f$~~	~~$11.3 + 0.142L_f$~~
~~$0.75 < x/L_f < 1$~~	~~$12.2 + \frac{L_f}{9}(5\frac{x}{L_f} - 2) + 3.6\frac{x}{L_f}$~~	-
~~(NOTES)~~ ~~L_f : length for freeboard defined in~~ **Ch 1, Sec 1** ~~(m)~~ ~~$x(m)$: distance from the end of astern to the center of hatch cover that should beconsidered.~~		

~~104. Corrosion additions~~

~~The corrosion addition for both sides to be considered for the plating and internal members of hatch covers, hatch coamings and coaming stays is equal to the value specified as follows~~

~~Corrosion addition t_c (mm)~~		
~~Member~~	~~Bulk carriers Ore carriers Combination carriers~~	~~Others except left column~~
~~Plating and stiffeners of single skin hatch cover~~	~~2.0~~	~~2.0 *~~
~~Top and bottom plating of double skin hatch cover~~	~~2.0~~	~~1.5 *~~
~~Internal structures of double skin hatch cover~~	~~1.5~~	~~1.0~~
~~Hatch coamings structures and coaming stays~~	~~1.5~~	~~1.5~~
~~* Corrosion addition t_c=1.0 mm for the hatch covers in may of cellular cargo holds intended for containers.~~		

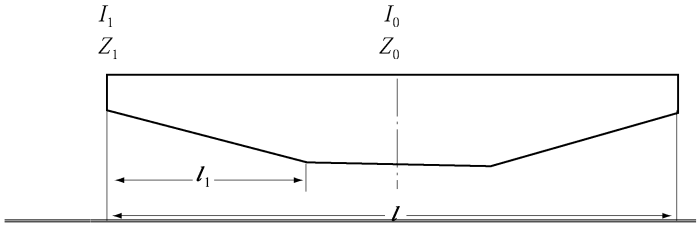
Present	Amendment	Note
~~105. Allowable stresses~~ ~~The allowable stresses σ_a and τ_a, in N/mm^2, are to be obtained as follows.~~ ~~Members of:~~ | ~~σ_a (N/mm^2)~~ | ~~τ_a (N/mm^2)~~ ~~Weathertight hatch cover~~ | ~~$0.80\,\sigma_y$~~ | ~~$0.46\,\sigma_y$~~ ~~Pontoon hatch cover~~ | ~~$0.68\,\sigma_y$~~ | ~~$0.39\,\sigma_y$~~ ~~Hatch coaming~~ | ~~$0.95\,\sigma_y$~~ | ~~$0.50\,\sigma_y$~~ ~~σ_a : normal Stresses~~ ~~τ_a : shear Stresses~~ ~~σ_y : yielding Stresses~~ ~~Section 2 Hatchways~~ ~~201. Application~~ ~~The construction and the closing means of cargo and other hatchways are to comply with the requirements in this Section.~~ ~~202. Height of hatchway coamings~~ ~~1. The height of coamings above the upper surface of deck is to be at least 600 mm in Position I and 450 mm in Position II.~~ ~~2. For hatchways closed by weathertight steel hatch covers as specified in **401.**, the height of coamings may be reduced from those prescribed in **Par 1** or omitted entirely subject to the satisfaction of the Society.~~ ~~3. The height of hatchway coamings other than those provided in exposed portions of the freeboard or superstructure decks is to be to the satisfaction of the Society having regard to the position of hatchways or the degree of protection provided.~~		

Present	Amendment	Note
~~203. Construction of hatchway coamings~~ ~~1. The thickness of hatchway coamings including the corrosion addition is not to be less than that obtained from the following formula:~~ ~~$t = 0.05L + 6$ (mm)~~ ~~2. Coamings for hatchways in Position I or coamings of 760 mm or more in height provided to hatchways in Position II are to be stiffened in a suitable position below the upper edge by a horizontal stiffener: the breadth of horizontal stiffener is not to be less than that obtained from the following formula, but need not exceed 180 mm.~~ ~~$b = 1.7L + 50$ (mm)~~ ~~3. Coamings are to be additionally supported by efficient brackets or stays provided from the horizontal stiffeners specified in **Par 2** to the deck at an interval of approximately 3 m.~~ ~~4. Coamings for all exposed hatchways are to be stiffened on their upper edges by half-round bars or similar section bars and their lower parts are to be constructed efficiently by flanging or other suitable means.~~ ~~5. For the construction and scantlings of coamings of small hatchways, the requirements in **Par 1** to **Par 4** may be suitably modified.~~ ~~6. The construction and scantlings of coamings over 900 mm in height, coamings of hatchways to deep tanks and coamings of hatchways closed by a special type of closing means to which the requirements in **203.** are not applicable, are to be to the satisfaction of the Society.~~ ~~Section 3 Hatch Openings closed by Portable Covers and secured Weathertight by Tarpaulins and Battening Devices~~ ~~301. Hatch rests~~ ~~Hatch rests are to be provided with at least 65 mm bearing surface and are to be bevelled, if required, to suit the slope of the hatchways.~~		

Present	Amendment	Note
302. Wood hatch covers Wood covers are to comply with the following requirements: (1) The finished thickness is not to be less than obtained from the following formula. Covers intended to carry cargoes on them are to be increased in thickness in direct proportion either where the tween deck height exceeds 2.6 m or the weight of cargoes to be carried on the hatchway covers exceeds 17.5 kN/m^2, but in no case is the finished thickness to be less than 60 mm. $t = 40S$ (mm) where: S = spacing of portable beams (m) (2) The wood for hatchway covers is to be of good quality, straight grained and reasonably free from knots, sap and shakes. (3) The ends of all wood covers are to be protected by encircling steel band. (4) Where portable beams for supporting wooden hatch covers are made of steel, the maximum allowable stress and deflection of the member not considering the corrosion margin under the design loads in **103.** are as follows. Maximum allowable stress : in accordance with **105**. in this Chapter Maximum allowable deflection : 0.0044 times the span Where the cross section of portable beams is not constant along the span, article in **304.** may be used to determine required beam scantlings. Thickness is to be added an appropriate corrosion margin in **104**. 303. Steel Hatch Cover **1.** Where steel hatch covers are fitted the maximum allowable stress and deflection of the member not considering the corrosion margin under the design loads in **103.** are as follows. Maximum allowable stress : in accordance with **105.** in this Chapter Maximum allowable deflection : 0.0056 times the span **2.** Top plate thickness is to be 0.01 times the spacing of stiffeners, but not less than 6 mm.		

Present	Amendment	Note
3. Where the cross section of portable beams is not constant along the span, article in **304.** may be used to determine required beam scantlings. **4.** Thickness is to be added an appropriate corrosion margin in **104.** **304. Primary supporting members** **1. Application** The requirements in **Par 3** to **Par 5** apply to primary supporting members which may be analysed through isolated beam models. Primary supporting members whose arrangement is of a grillage type and which cannot be analysed through isolated beam models are to be checked by direct calculations, using the checking criteria in **Par 4.** **2. Normal and shear stress for isolated beam** In case that grillage analysis or finite element analysis are not carried out, according to the requirements in **Par 1**, the maximum normal stress σ and shear stress τ in the primary supporting members are to be obtained from the following formulae: $\sigma = \frac{SP_w l^2 10^3}{8Z}$ (N/mm^2) $\tau = \frac{5SP_w l}{A_{sh}}$ (N/mm^2) l : span of the primary supporting member (m) A_{sh} : shear sectional area (cm^2) S : the spacing of stiffeners (m) **3. Checking criteria** The normal stress σ and the shear stress τ, calculated according to **Par 2** or determined through a grillage analysis or finite element analysis, as the case may be, are to comply with the following formulae: $\sigma \leq \sigma_a$ $\tau \leq \tau_a$		

Present	Amendment	Note
4. Deflection limit Deflection does not exceed the values as follows : - 0.0056 times the span of stiffeners for weathertight hatch covers - 0.0044 times the span of stiffeners for pontoon hatch covers **5. Primary supporting members of variable cross-section** The net section modulus of primary supporting members with a variable cross-section is to be not less than the greater of the value obtained from the following formulae. But the use of these formulae is limited to the determination of the strength of primary supporting members in which abrupt changes in the cross-section do not occur along their length. $Z_V = Z$ (cm^3) $Z_V = (1 + \frac{3.2\alpha - \psi - 0.8}{7\psi + 0.4})Z$ (cm^3) Z : net section modulus for constant cross-section $\alpha = \frac{l_1}{l}$ $\psi = \frac{Z_1}{Z_0}$ l_1 : length of the variable section part l : span measured between end supports Z_1 : net section modulus at end Z_0 : net section modulus at mid-span Moreover, the net moment of inertia of primary supporting members with a variable cross-section is to be not less than the greater of the values obtained from the following formulae : $I_V = I$ (cm^4) $I_V = (1 + 8\alpha^3(\frac{1-\phi}{0.2+3\sqrt{\phi}}))I$ (cm^4)		

Present	Amendment	Note
I : net moment of inertia with a constant cross-section $\phi = \frac{I_1}{I_0}$ I_1 : net moment of inertia at end I_0 : net moment of inertia at mid-span  **305. Pontoon Covers** **1.** Where steel pontoon covers are fitted the maximum allowable stress and deflection of the member not considering the corrosion margin under the design loads in **103.** are as follows : Maximum allowable stress : in accordance with **105.** in this Chapter Maximum allowable deflection : 0.0044 times the span **2.** Top plate thickness is to be 0.01 times the spacing of stiffeners, but not less than 6 mm. **3.** Where the cross section of stiffener is not constant along the span, article in **304.** may be used to determine required scantlings. **4.** Thickness is to be added an appropriate corrosion margin in **104.** **5.** The depth of steel pontoon covers at supports is not to be less than one-third the depth at mid-span or 150 mm, whichever is greater. **6.** The width of bearing surface for steel pontoon covers is to be not less than 75 mm.		

Present	Amendment	Note
~~Section 4 Hatchways Closed by Weathertight Covers Fitted with Gaskets and Clamping Devices~~ ~~401. Steel weathertight covers~~ ~~1. Where steel weathertight covers are fitted the maximum allowable stress and deflection of the member not considering the corrosion margin under the design loads in 103. are as follows :~~ ~~Maximum allowable stress : in accordance with 105. in this Chapter~~ ~~Maximum allowable deflection : 0.0056 times the span~~ ~~2. Top plate thickness is to be 0.01 times the spacing of stiffeners, but not less than 6 mm.~~ ~~3. Where the cross section of stiffener is not constant along the span, article in 304. may be used to determine required scantlings.~~ ~~4. Thickness is to be added an appropriate corrosion margin in 104.~~ ~~5. The depth of steel pontoon covers at supports is not to be less than one third the depth at mid span or 150 mm, whichever is greater.~~ ~~6. The strength and closing arrangements of small or special types of steel weathertight covers to which the requirements in Par 1 through Par 5 above are not applicable and those of covers for hatchways, coaming of which is omitted by Par 2 of 202., will be specially considered.~~ ~~Section 5 Hatchway Covers for Sand Carrier and Dredger~~ ~~501. Hatchway covers for sand carrier and dredger~~ ~~Exemption of hatchway covers of sand carrier and dredger is to be in accordance with the requirements in Pt 4, Ch 2, 104. 3 of the Guidance~~		

Present	Amendment	Note
~~Section 6 Companion ways and Other Deck Openings~~ ~~601. Manholes and flush scuttles~~ ~~Manholes and flush scuttles in exposed positions on the freeboard and superstructure decks or within superstructures other than enclosed superstructures are to be closed by steel covers capable of being made watertight. These covers are to be secured by closely spaced bolts or to be permanently fitted up.~~ ~~602. Companion ways~~ ~~1. Access openings in the freeboard deck are to be protected by enclosed superstructures or by deck-houses or companion ways of equivalent strength and weathertightness.~~ ~~2. Access openings in exposed superstructure decks or in the top of deckhouses on the freeboard deck which give access to a space below the freeboard deck or a space within an enclosed superstructure are to be protected by efficient deckhouses or companion ways.~~ ~~3. Doorways in deckhouses or companion ways such as specified in **Par 1** and **Par 2** are to be provided with doors complying with the requirements in **Ch 16, 301. 1.**~~ ~~4. The sills of doorways specified in **Par 1** to **Par 3** are not to be less than 600 mm in height above the upper surface of the deck in Position I and 380 mm in Position II.~~ 603. **Openings to cargo spaces** Access and other openings to cargo spaces are to be provided with closing means capable of being operated from outside the spaces in case of a fire. Such closing means for any opening leading to any other space inboard the ship is to be of steel. ⚓		

Present	Amendment	Note
⟨Guidance⟩ **CHAPTER 19 HATCHWAYS AND OTHER DECK OPENINGS** **Section 1 General** 101. Application ~~The regulation of **101. 3** of the Rules is not to be applied to the vessel which engaged in domestic service only.~~ ~~**102. Position of exposed deck openings**~~ ~~As specified in **Pt 4, Ch 2, 102.** of the Guidance.~~ ~~**Section 2 Hatchways**~~ ~~**202. Height of hatchway coamings**~~ ~~For the ships classed for restricted service area, as specified in **Ch 1, 201. 1. (4)** of the Guidance.~~ ~~**203. Construction of hatchway coamings**~~ ~~**1.** The thickness of small hatch way coaming (t) provided with weathertight steel hatch covers is to be as following formula;~~ ~~$t = 0.05L + 4$ (mm)~~ ~~**2.** Construction and scantling of hatch way coamings for deep tanks is to be complied with **Pt 3, Ch 15** of the Rules as well as **Pt 4, Ch 2** of the Rules.~~ ~~**3.** In application to **203. 6** of the Rules, the term "satisfaction of the Society" means the acceptance in accordance with **Pt 1, Ch 1, 105.** of the Rules.~~	⟨Guidance⟩ **CHAPTER 19 HATCHWAYS AND OTHER DECK OPENINGS** **Section 1 General** 101. Application 1. Hatchways and other deck openings are to comply with **Pt 4, Ch 2** of the Guidance. 2. For the ships classed for restricted service area, as specified in **Ch 1, 201.** of the Guidance. ⚓	

Present	Amendment	Note
~~Section 4 Hatchways Closed by Weathertight Covers fitted with Gaskets and Clamping Devices~~ ~~401. Steel weathertight covers~~ ~~1. The details of gaskets and clamping devices for steel weathertight covers are to apply the provisions in **Pt 4, Ch 2, Sec 5** of the Rules. However, the standard spacings of securing devices are 0.5 m or less at the corner of the cover, and 1.0 m or less elsewhere.~~ ~~2. In application to **401. 6** of the Rules, the term "specially considered" means the acceptance in accordance with **Pt 1, Ch 1, 105.** of the Rules.~~ ~~Section 6 Companion Ways and Other Deck Openings~~ ~~602. Companion ways~~ ~~For the ships classed for restricted service area, as specified in **Ch 1, 201. 1. (4)** of the Guidance. ㅎ~~		