Rules for the Classification of Steel Ships Revision

(External Inquiry)

Part 4 Hull Equipment

2021. 9.

Hull Rule Development Team

Present	Amendment	Note
CHAPTER 8 EQUIPMENT NUMBER AND EQUIPMENT **Section 1 General** **101. General and application** 【See Guidance】 **1.** All ships, according to their equipment number of provisions in **Sec 2,** are to be provided with anchors, chain cables, ropes, etc. which are not less than given in **Table 4.8.1.** **2.** The anchors, chain cables and ropes (hereinafter referred to as "equipment") which are required to be tested and inspected to be used for ships classed with the Society are to comply with the requirements of this Chapter. **3.** The equipment other than those prescribed in this Chapter may be used where specially approved in connection with the design and use. In such case, the detailed data relating to the process of manufacture of the equipment are to be submitted for approval. **4.** All ships are to be provided with suitable appliances for handling of anchors as follows. (1) General (A) All ships are to be provided with suitable appliances for handling of anchors. (B) The bower anchors given in **Table 4.8.1** are to be connected to their cables and stored on board ready for use. Anchor and chain cable are should be accordance with **Sec 3, 4**. (2) Chain locker (A) Chain locker is to have adequate capacity and be of a suitable from to provide for the proper stowage of the chain cable, allowing an easy direct lead for the cable into the chain pipes when the cable is fully stowed. Port and starboard cables are to have separate spaces. (B) Chain locker boundaries and access opening are to be watertight. (C) Spurling pipes for chain cable leading to chain locker are to be of suitable size and provided with chafing lips.	**CHAPTER 8 EQUIPMENT NUMBER AND EQUIPMENT** **Section 1 General** **101. General and application** 【See Guidance】 **1.** All ships, according to their equipment number of provisions in **Sec 2,** are to be provided with anchors, chain cables, ropes, etc. which are not less than given in **Table 4.8.1.** **2.** The anchors, chain cables and ropes (hereinafter referred to as "equipment") which are required to be tested and inspected to be used for ships classed with the Society are to comply with the requirements of this Chapter. **3.** The equipment other than those prescribed in this Chapter may be used where specially approved in connection with the design and use. In such case, the detailed data relating to the process of manufacture of the equipment are to be submitted for approval. **4.** All ships are to be provided with suitable appliances for handling of anchors as follows. (1) General (A) All ships are to be provided with suitable appliances for handling of anchors. (B) The bower anchors given in **Table 4.8.1** are to be connected to their cables and stored on board ready for use. Anchor and chain cable are should be accordance with **Sec 3, 4**. (2) Chain locker (A) Chain locker is to have adequate capacity and be of a suitable from to provide for the proper stowage of the chain cable, allowing an easy direct lead for the cable into the chain pipes when the cable is fully stowed. Port and starboard cables are to have separate spaces. (B) Chain locker boundaries and access opening are to be watertight. (C) Spurling pipes for chain cable leading to chain locker are to be of suitable size and provided with chafing lips.	

Present	Amendment	Note
(D) Securing of the inboard ends of chain cables. (a) The inboard ends of the chain cables are to be secured to the structures by fastening able to withstand a force not less than 15% BL nor more than 30% BL (BL = breaking load of the chain cable). (b) The fastening is to be provided with a mean suitable to permit, in case of emergency, an easy slipping of the chain cable to sea, operable from an accessible position outside the chain locker. (3) Chain stopper (A) Chain stopper are to be provided to secure each chain cable once it is paid out. (B) Securing arrangements of chain stopper are to be capable of withstanding a load equal to 80% of the breaking load of the chain cable as required by **Table 4.8.8** of **411.**, without undergoing permanent deformation. (4) Windlass Windlass of sufficient power and suitable for the size of chain is to be fitted to the ship. Where an owner requires equipment significantly in excess of Rule requirements, it is the owner's responsibility to specify increased windlass power. (5) Hawse pipes (A) Hawse pipes are to be of a suitable size and configuration to ensure adequate clearance and an easy lead of the chain cable from the chain stopper through the ship's side. Hawse pipes are to be of sufficient strength. (B) Their position and slope are to be so arranged as to create an easy lead for the chain cables and efficient housing for the anchors, where the latter are of the retractable type, avoiding damage to the hull during these operations. For this purpose, charfing lips of suitable form with ample lay-up and radius adequate to the size of the chain cable are to be provided at the shell and deck. The shell plating in way of the hawse pipes is to be reinforced as necessary. (C) Where hawse pipes are not fitted, alternative arrangements will be specially considered. (D) Hawse pipes are to be securely attached to thick, doubling or insert plates, by continuous welds.	(D) Securing of the inboard ends of chain cables. (a) The inboard ends of the chain cables are to be secured to the structures by fastening able to withstand a force not less than 15% BL nor more than 30% BL (BL = breaking load of the chain cable). (b) The fastening is to be provided with a mean suitable to permit, in case of emergency, an easy slipping of the chain cable to sea, operable from an accessible position outside the chain locker. (3) Chain stopper (A) Chain stopper are to be provided to secure each chain cable once it is paid out. (B) Securing arrangements of chain stopper are to be capable of withstanding a load equal to 80% of the breaking load of the chain cable as required by **Table 4.8.8** of **411.**, without undergoing permanent deformation. (4) Windlass Windlass of sufficient power and suitable for the size of chain is to be fitted to the ship. Where an owner requires equipment significantly in excess of Rule requirements, it is the owner's responsibility to specify increased windlass power. (5) Hawse pipes (A) Hawse pipes are to be of a suitable size and configuration to ensure adequate clearance and an easy lead of the chain cable from the chain stopper through the ship's side. Hawse pipes are to be of sufficient strength. (B) Their position and slope are to be so arranged as to create an easy lead for the chain cables and efficient housing for the anchors, where the latter are of the retractable type, avoiding damage to the hull during these operations. For this purpose, charfing lips of suitable form with ample lay-up and radius adequate to the size of the chain cable are to be provided at the shell and deck. The shell plating in way of the hawse pipes is to be reinforced as necessary. (C) Where hawse pipes are not fitted, alternative arrangements will be specially considered. (D) Hawse pipes are to be securely attached to thick, doubling or insert plates, by continuous welds.	

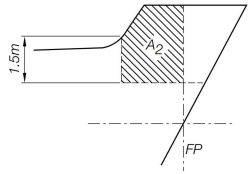
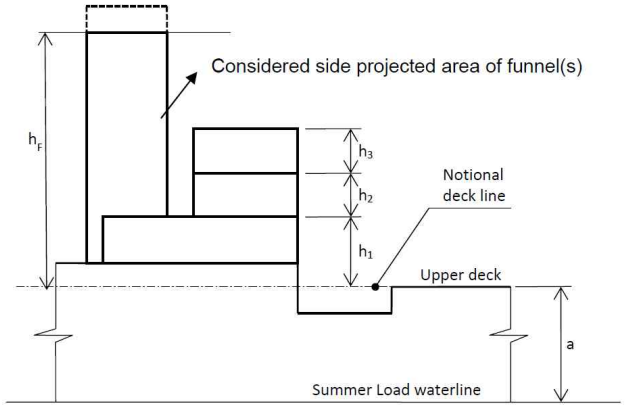
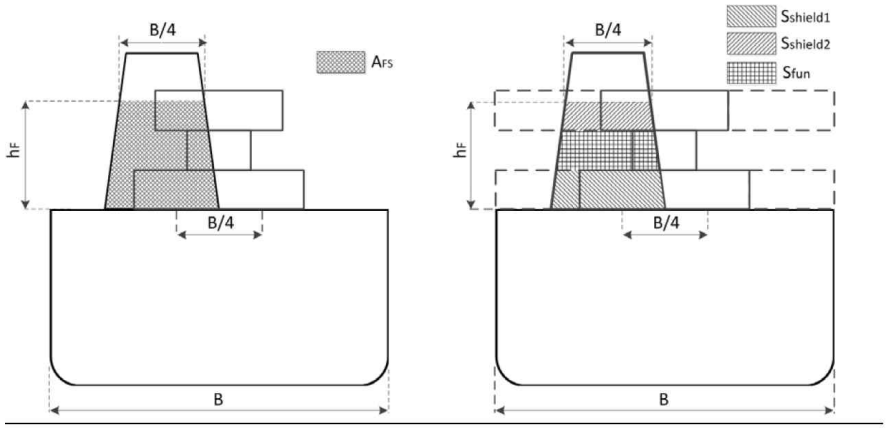
Present	Amendment	Note
(E) Hawse pipes and anchor pockets are to have full rounded flanges or rubbling bars in order to minimize the nip on the cable and to minimize the probability of cable links being subjected to high bending stresses. The radius of curvature is to be such that at least three links of chain will bear simultaneously on the rounded parts of the upper and lower ends of the hawse pipes in those areas where the chain cable is supported during paying out and hoisting and when the ship is at anchor.	(E) Hawse pipes and anchor pockets are to have full rounded flanges or rubbling bars in order to minimize the nip on the cable and to minimize the probability of cable links being subjected to high bending stresses. The radius of curvature is to be such that at least three links of chain will bear simultaneously on the rounded parts of the upper and lower ends of the hawse pipes in those areas where the chain cable is supported during paying out and hoisting and when the ship is at anchor.	
(F) On ships provided with a bulbous bow, where it is not possible to obtain a suitable clearance between shell plating and the anchors during anchor handling, local reinforcements of the bulbous bow are to be provided in the form of increased shell plate thickness.	(F) On ships provided with a bulbous bow, where it is not possible to obtain a suitable clearance between shell plating and the anchors during anchor handling, local reinforcements of the bulbous bow are to be provided in the form of increased shell plate thickness.	
(6) ~~Hull~~ supporting structure of anchor windlass and chain stopper The ~~hull~~ supporting structure of anchor windlass and chain stopper is to be sufficient to accommodate the operating and sea loads.	(6) Supporting hull structures of anchor windlass and chain stopper The supporting hull structures of anchor windlass and chain stopper is to be sufficient to accommodate the operating and sea loads.	
(A) ~~Operating~~ loads The ~~operating~~ loads are to be taken not less than: - for chain stoppers, 80% of the chain cable breaking load - for windlasses, where no chain stopper is fitted or the chain stopper is attached to the windlass, 80% of the chain cable breaking load - for windlasses, where chain stoppers are fitted but not attached to the windlass, 45% of the chain cable breaking load The operating loads are to be applied in the direction of the chain cable.	(A) Design loads The design loads are to be taken not less than: - for chain stoppers, 80% of the chain cable breaking load - for windlasses, where no chain stopper is fitted or the chain stopper is attached to the windlass, 80% of the chain cable breaking load - for windlasses, where chain stoppers are fitted but not attached to the windlass, 45% of the chain cable breaking load The design loads are to be applied in the direction of the chain cable.	
(B) Sea loads The sea loads are to be taken according to **Ch 9, Sec 3.**	(B) Sea loads The sea loads are to be taken according to **Ch 9, Sec 3.**	
(C) Permissible stress The ~~permissible~~ stresses, based on ~~gross~~ thickness, ~~for hull~~ supporting structures of windlass and chain stopper are not to be greater than the following permissible values: ~~- Normal stress: 1.00 × the specified minimum yield stress of the material~~ ~~- Shear stress: 0.60 × the specified minimum yield stress of the material~~	(C) Permissible stresses The stresses acting on the supporting hull structures of windlass and chain stopper, based on net thickness obtained by deducting the corrosion addition, t_c, given in 101.4.(6).(D), are not to be greater than the following permissible values:	

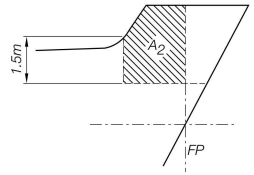
Present	Amendment	Note
	ⓐ For strength assessment by means of beam theory or grillage analysis: – Normal stress: 1.0 R_{eH} – Shear stress: 0.6 R_{eH} The normal stress is the sum of bending stress and axial stress. The shear stress to be considered corresponds to the shear stress acting perpendicular to the normal stress. No stress concentration factors are to be taken into account. ⓑ For strength assessment by means of finite element analysis: – Von Mises stress: 1.0 ReH For strength assessment by means of finite element analysis the mesh is to be fine enough to represent the geometry as realistically as possible. The aspect ratios of elements are not to exceed 3. Girders are to be modelled using shell or plane stress elements. Symmetric girder flanges may be modelled by beam or truss elements. The element height of girder webs must not exceed one-third of the web height. In way of small openings in girder webs, the web thickness is to be reduced to a mean thickness over the web height. Large openings are to be modelled. Stiffeners may be modelled using shell, plane stress, or beam elements. The mesh size of stiffeners is to be fine enough to obtain proper bending stress. If flat bars are modeled using shell or plane stress elements, dummy rod elements are to be modelled at the free edge of the flat bars and the stresses of the dummy elements are to be evaluated. Stresses are to be read from the centre of the individual element. For shell elements the stresses are to be evaluated at the mid plane of the element. R_{eH} is the specified minimum yield stress of the material.	

Present	Amendment	Note
102. ~ 106. 〈same as present〉 ⚓	(D) Corrosion addition The corrosion addition, t_c, is not to be less than the fo lowing values: ⓐ Ships covered by Common Structural Rules for Bulk Carriers and Oil Tankers: Total corrosion additions to be as defined in these rules. ⓑ Other ships: - For the supporting hull structure, according to the Society's Rules for the surrounding structure (e.g. deck structures, bul-wark structures). - For pedestals and foundations on deck which are not part of a fitting according to an accepted industry standard : 2.0 mm. - For shipboard fittings not selected from an accepted industry standard : 2.0 mm. 102. ~ 106. 〈same as present〉 ⚓	

Present	Amendment	Note
Section 2 Equipment Number **201. Equipment number【See Guidance】** Equipment number is the value obtained from the following formula: $E = \Delta^{\frac{2}{3}} + 2.0Bh + 0.1A$ where: Δ = molded displacement in *tonnes* to the summer load waterline. h, A = values specified in the following (1), (2) and (3). (1) h is the value obtained from the following formula: $h = f + h'$ (m) where: f = vertical distance, at the midship, from the load line to the top of uppermost continuous deck beam at side (m). h' = height from the uppermost continuous deck to the top of uppermost superstructures or deckhouses having a breadth greater than $B/4$ (m), In the calculation of h', sheer and trim may be ignored. Where a deckhouse having a breadth greater than $B/4$ is located above a deckhouse with a breadth of $B/4$ or less, the narrow deckhouse may be ignored.	**Section 2 Equipment Number** **201. Equipment number【See Guidance】** Equipment number is the value obtained from the following formula: $E = \Delta^{\frac{2}{3}} + 2.0(hB + S_{fun}) + \frac{A}{10}$ where: Δ = molded displacement in tonnes to the summer load waterline. B = moulded breadth, in m h = effective height, in m, from the Summer Load waterline to the top of the uppermost house $h = a + \sum h_i$ a = distance, in m, from the Summer Load waterline amidships to the upper deck at centreline h_i = height, in m, on the centreline of each tier of houses having a breadth greater than B/4. for the lowest tier h_1 is to be measured at centreline from the upper deck or from a notional deck line where there is local discontinuity in the upper deck, see figure below for an example,	

Present	Amendment	Note
	S_{fun} = effective front projected area of the funnel, in m^2, defined as: $$S_{fun} = A_{FS} - S_{shield}$$ A_{FS} = front projected area of the funnel, in m^2, calculated between the upper deck at centreline, or notional deck line where there is local discontinuity in the upper deck, and the effective height hF. A_{FS} is taken equal to zero if the funnel breadth is less than or equal to B/4 at all elevations along the funnel height. h_F = effective height of the funnel, in m, measured from the upper deck at centreline, or notional deck line where there is local discontinuity in the upper deck, and the top of the funnel. The top of the funnel may be taken at the level where the funnel breadth reaches B/4. S_{shield} = the section of front projected area A_{FS}, in m^2, which is shielded by all deck houses having breadth greater than B/4 . If there are more than one shielded section, the individual shielded sections i.e Sshield1, Sshield 2 etc as shown in figure 2 to be added together. To determine Sshield, the deckhouse breadth is assumed B for all deck houses having breadth greater than B/4 as shown for $S_{shield1}$, $S_{shield2}$ in figure 2.	
(2) A(side projected area) is the value obtained from the following formula: *(2018)* $A = fL + \sum h'' l$ (m2) f = value specified in (1) $\sum h'' l$ = summing up of the products of the height h''(m) and length l (m) of superstructures, deckhouses or trunks which are located above the uppermost continuous deck within the length of ship and also have a breadth greater than $B/4$ and a height greater than 1.5 m.	A = side projected area, in m2, of the hull, superstructures, houses and funnels above the Summer Load waterline which are within the equipment length of the ship and also have a breadth greater than B/4. The side projected area of the funnel is considered in A when AFS is greater than zero. In this case, the side projected area of the funnel should be calculated between the upper deck, or notional deck line where there is local discontinuity in the upper deck, and the effective height h_F.	

Present	Amendment	Note
(3) In the application of (1) and (2), screens and bulwarks more than 1.5 m in height are to be regarded as parts of superstructure or deckhouses. The height of the hatch coamings and that of any deck cargo, such as containers, may be disregarded when determining h and A. With regard to determining A, when a bulwark is more than 1.5 m high, the area shown below as $A2$ is to be included in A. (2018)  	 **Figure 1**  **Figure 2**	

Present	Amendment	Note
	Notes: 1. When calculating h, sheer and trim are to be ignored, i.e. h is the sum of freeboard amidships plus the height (at centreline) of each tier of houses having a breadth greater than B/4. 2. If a house having a breadth greater than B/4 is above a house with a breadth of B/4 or less, then the wide house is to be included but the narrow house ignored. 3. Screens or bulwarks 1.5 m or more in height are to be regarded as parts of houses when determining h and A. The height of the hatch coamings and that of any deck cargo, such as containers, may be disregarded when determining h and A. With regard to determining A, when a bulwark is more than 1.5 m high, the area shown below as A2 is to be included in A.  4. The equipment length of the ship is the length between perpendiculars but is not to be less than 96% nor greater than 97% of the extreme length on the Summer Load waterline (measured from the forward end of the waterline).	

Present	Amendment	Note
	5. When several funnels are fitted on the ship, the above parameters are taken as follows: h_F: effective height of the funnel, in m, measured from the upper deck, or notional deck line where there is local discontinuity in the upper deck, and the top of the highest funnel. The top of the highest funnel may be taken at the level where the sum of each funnel breadth reaches B/4. A_{FS}: sum of the front projected area of each funnel, in m^2, calculated between the upper deck, or notional deck line where there is local discontinuity in the upper deck, and the effective height hF. AFS is to be taken equal to zero if the sum of each funnel breadth is less than or equal to B/4 at all elevations along the funnels height. A: Side projected area, in m2, of the hull, superstructures, houses and funnels above the Summer Loadwaterline which are within the equipment length of the ship. The total side projected area of the funnels is to be considered in the side projected area of the ship, A, when AFS is greater than zero. The shielding effect of funnels in transverse direction may be considered in the total side projected area, i.e., when the side projected areas of two or more funnels fully or partially overlap, the overlapped area needs only to be counted once.	
202. Mass of anchors 〈same as present〉	**202. Mass of anchors** 〈same as present〉	
203. Chain cables and stream lines **1.** Chain cables for bower anchors are to be stud link chains of Grade 1, 2 or 3 specified in **Sec 4.** However, Grade 1 chains made of Class 1 chain bars (*RSBC* 31) are not to be used in association with high holding power anchors. **2.** As for chain cables or wire ropes for stream lines, the breaking test load specified in **Sec 4** or **5** is not to be less than the breaking load given in **Table 4.8.1** respectively. **3.** Steel wire rope instead of stud link chain cable are to be in accordance with the Guidance relating to the Rules specified by the Society for vessels of special design or operation such as crane barges. **【See Guidance】**	**203. Chain cables and stream lines** **1.** Chain cables for bower anchors are to be stud link chains of Grade 1, 2 or 3 specified in **Sec 4.** However, Grade 1 chains made of Class 1 chain bars (*RSBC* 31) are not to be used in association with high holding power anchors. **2.** As for chain cables or wire ropes for stream lines, the breaking test load specified in **Sec 4** or **5** is not to be less than the breaking load given in **Table 4.8.1** respectively. **3.** Steel wire rope instead of stud link chain cable are to be in accordance with the Guidance relating to the Rules specified by the Society for vessels of special design or operation such as crane barges. **【See Guidance】**	

Present	Amendment	Note
4. The total length of chain given in **Table 4.8.1** is to be divided in approximately equal parts between the two bower anchors. *(2018)*	**4.** The total length of chain given in **Table 4.8.1** is to be divided in approximately equal parts between the two bower anchors. *(2018)*	
	5. Wire rope may be used in place of chain cable on ships with less than 40 m in length and subject to the following conditions: *(2018)* (1) The length of the wire rope is to be equal to 1.5 times the corresponding tabular length of chain cable (**Table 4.8.1**) and their strength is to be equal to that of tabular chain cable of Grade 1 (**Table 4.8.8**). (2) A short length of chain cable is to be fitted between the wire rope and anchor having a length of 12.5 m or the distance between anchor in stowed position and winch, whichever is less. (3) All surfaces being in contact with the wire need to be rounded with a radius of not less than 10 times the wire rope diameter (including stem).	
204. ~ 205 〈same as present〉	**204. ~ 205 〈same as present〉**	
Section 3 Anchors 〈same as present〉	**Section 3 Anchors 〈same as present〉**	
Section 4 Chains	**Section 4 Chains**	
401. ~ 403. 〈same as present〉	**401. ~ 403. 〈same as present〉**	
404. Design **1.** Chains and accessaries must be designed according to a standard recognized by the Society, such as ISO 1704. **2.** There is to be an odd number of links in each length of chains, except where swivels are fitted. **3.** Where designs do not comply with this and where accessories are of welded construction, drawings giving full details of the design, the manufacturing process and the heat treatment are to be submitted to the Society for approval.	**404. Design** **1.** Chains and accessaries must be designed according to a standard recognized by the Society, such as ISO 1704. **2.** There is to be an odd number of links in each length of chains, except where swivels are fitted. **3.** Where designs do not comply with this and where accessories are of welded construction, drawings giving full details of the design, the manufacturing process and the heat treatment are to be submitted to the Society for approval. ⚓	
4. ~~Wire rope may be used in place of chain cable on ships with less than 40 m in length and subject to the following conditions: *(2018)*~~		

Present	Amendment	Note
~~(1) The length of the wire rope is to be equal to 1.5 times the corresponding tabular length of chain cable (**Table 4.8.1**) and their strength is to be equal to that of tabular chain cable of Grade 1 (**Table 4.8.8**).~~ ~~(2) A short length of chain cable is to be fitted between the wire rope and anchor having a length of 12.5 m or the distance between anchor in stowed position and winch, whichever is less.~~ ~~(3) All surfaces being in contact with the wire need to be rounded with a radius of not less than 10 times the wire rope diameter (including stem).~~ ⚓		

Present	Amendment	Note
CHAPTER 10 SHIPBOARD .EQUIPMENT, FITTINGS AND SUPPORTING HULL STRUCTURES ASSOCIATED WITH TOWING AND MOORING	**CHAPTER 10 SHIPBOARD .EQUIPMENT, FITTINGS AND SUPPORTING HULL STRUCTURES ASSOCIATED WITH TOWING AND MOORING**	
Section 1 Definitions and Scope of Application	**Section 1 Definitions and Scope of Application**	
101. Application 〈same as present〉	**101. Application 〈same as present〉**	
102. Definitions	**102. Definitions**	
1. ~ 4. 〈same as present〉	1. ~ 4. 〈same as present〉	
	5. The nominal capacity condition is defined as the theoretical condition where the maximum possible deck cargoes are included in the ship arrangement in their respective positions. For container ships the nominal capacity condition represents the theoretical condition where the maximum possible number of containers is included in the ship arrangement in their respective positions.	
	6. Ship Design Minimum Breaking Load (MBL_{SD}) means the minimum breaking load of new, dry mooring lines or tow line for which shipboard fittings and supporting hull structures are designed in order to meet mooring restraint requirements or the towing requirements of other towing service.	
Section 2 Towing and Mooring	**Section 2 Towing and Mooring**	
201. Towing *(2018)*	**201. Towing *(2018)***	
1. Strength	**1. Strength**	
The strength of shipboard fittings used for normal towing operations at bow, sides and stern and their supporting hull structures are to comply with the requirements of this chapter.	The strength of shipboard fittings used for normal towing operations at bow, sides and stern and their supporting hull structures are to comply with the requirements of this chapter.	
Where a ship is equipped with shipboard fittings intended to be used for other towing services, the strength of these fittings and their supporting hull structures are to comply with the requirements of this chapter.	Where a ship is equipped with shipboard fittings intended to be used for other towing services, the strength of these fittings and their supporting hull structures are to comply with the requirements of this chapter.	

Present	Amendment	Note
	For fittings intended to be used for, both, towing and mooring, A2.2 applies to mooring.	
2. Arrangement Shipboard fittings for towing are to be located on stiffeners, and/or girders, which are part of the deck construction so as to facilitate efficient distribution of the towing load. Other equivalent arrangements may be accepted (for chocks in bulwarks, etc.) provided the strength is confirmed adequate for the intended service.	**2. Arrangement** Shipboard fittings for towing are to be located on stiffeners, and/or girders, which are part of the deck construction so as to facilitate efficient distribution of the towing load. Other equivalent arrangements may be accepted (for chocks in bulwarks, etc.) provided the strength is confirmed adequate for the intended service.	
3. Load considerations The minimum design load applied to supporting hull structures for shipboard fittings is to be: (1) For normal towing operations 1.25 times the intended maximum towing load (e.g. static bollard pull) as indicated on the towing and mooring arrangements plan. (2) For other towing service the ~~minimum breaking strength of the tow line~~ according to **Ch 8, Table 4.8.1.** (3) For fittings intended to be used for, both, normal and other towing operations, the greater of the design loads according to (1) and (2). Notes: 1) Side projected area including that of deck cargoes as given by ~~the loading manual~~ is to be taken into account for selection of towing lines and the loads applied to shipboard fittings and supporting hull structure. 2) The increase of the ~~minimum breaking strength~~ for synthetic ropes according to Recommendation No. 10 needs not to be taken into account for the loads applied to shipboard fittings and supporting hull structure.	**3. Load considerations** The minimum design load applied to supporting hull structures for shipboard fittings is to be: (1) For normal towing operations 1.25 times the intended maximum towing load (e.g. static bollard pull) as indicated on the towing and mooring arrangements plan. (2) For other towing service the ship design minimum breaking load according to **Ch 8, Table 4.8.1.** (3) For fittings intended to be used for, both, normal and other towing operations, the greater of the design loads according to (1) and (2). Notes: 1) Side projected area including that of deck cargoes as given by the ship nominal capacity condition is to be taken into account for selection of towing lines and the loads applied to shipboard fittings and supporting hull structure. 2) The increase of the line design break force for synthetic ropes according to Recommendation No. 10 needs not to be taken into account for the loads applied to shipboard fittings and supporting hull structure.	

Present	Amendment	Note
When a safe towing load TOW greater than that determined according to **201. 6** is requested by the applicant, then the design load is to be increased in accordance with the appropriate TOW/design load relationship given by **201. 3** and **201. 6**. The design load is to be applied to fittings in all directions that may occur by taking into account the arrangement shown on the towing and mooring arrangements plan. Where the towing line takes a turn at a fitting the total design load applied to the fitting is equal to the resultant of the design loads acting on the line, see **Fig 4.10.1**. However, in no case does the design load applied to the fitting need to be greater than twice the design load on the line.	When a safe towing load TOW greater than that determined according to **201. 6** is requested by the applicant, then the design load is to be increased in accordance with the appropriate TOW/design load relationship given by **201. 3** and **201. 6**. The design load is to be applied to fittings in all directions that may occur by taking into account the arrangement shown on the towing and mooring arrangements plan. Where the towing line takes a turn at a fitting the total design load applied to the fitting is equal to the resultant of the design loads acting on the line, see **Fig 4.10.1**. However, in no case does the design load applied to the fitting need to be greater than twice the design load on the line.	

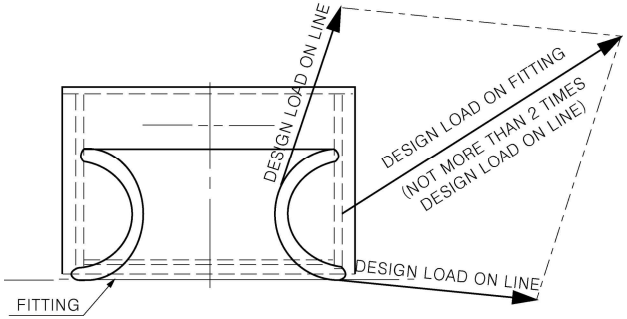
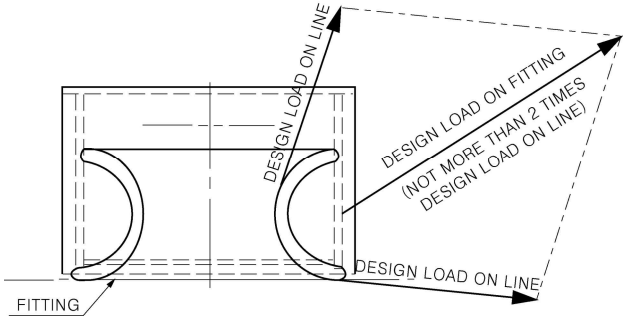
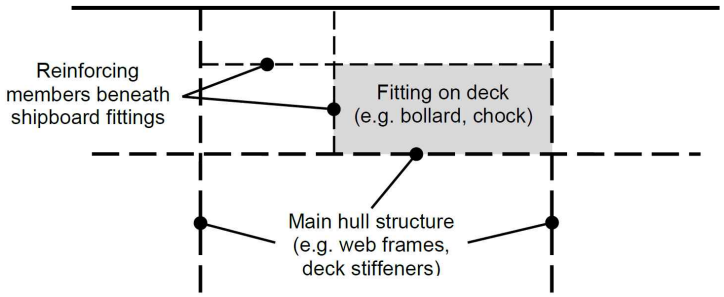
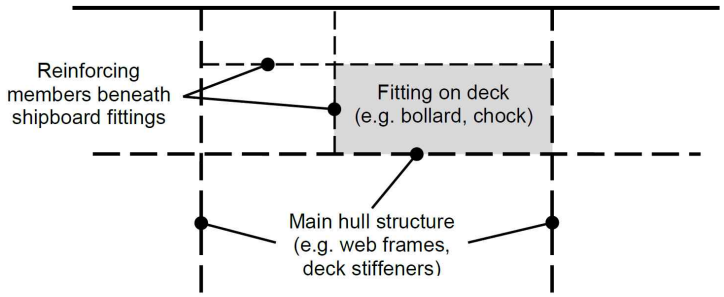
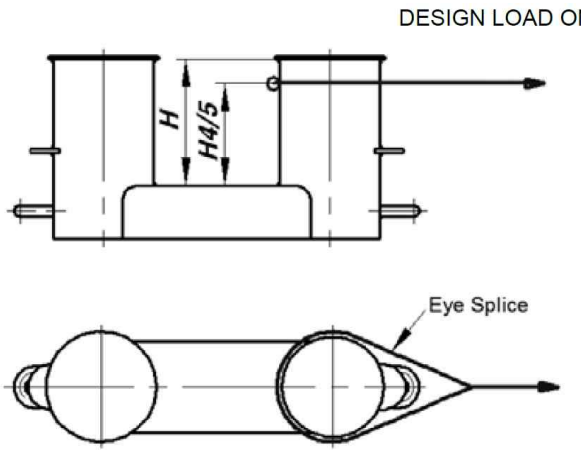
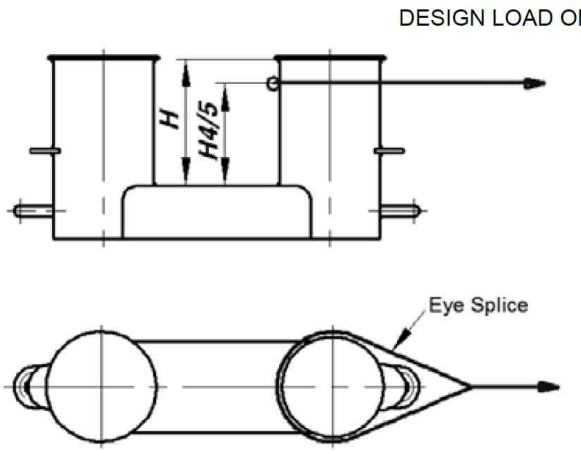

	

Fig 4.10.1 Application of design load	**Fig 4.10.1 Application of design load**	
4. Shipboard fittings Shipboard fittings may be selected from an industry standard accepted by the Society and at least based on the following loads. (1) For normal towing operations the intended maximum towing load (e.g. static bollard pull) as indicated on the towing and mooring arrangements plan, (2) For other towing service the ~~minimum breaking strength~~ of the tow line according to **Ch 8, Table 4.8.1.** (see Notes in **201. 3**)	**4. Shipboard fittings** Shipboard fittings may be selected from an industry standard accepted by the Society and at least based on the following loads. (1) For normal towing operations the intended maximum towing load (e.g. static bollard pull) as indicated on the towing and mooring arrangements plan, (2) For other towing service the ship design minimum breaking load of the tow line according to **Ch 8, Table 4.8.1.** (see Notes in **201. 3**)	

Present	Amendment	Note
(3) For fittings intended to be used for, both, normal and other towing operations, the greater of the loads according to (1) and (2). Towing bitts (double bollards) may be chosen for the towing line attached with eye splice if the industry standard distinguishes between different methods to attach the line, i.e. figure-of-eight or eye splice attachment. When the shipboard fitting is not selected from an accepted industry standard, the strength of the fitting and of its attachment to the ship is to be in accordance with **201. 3** and **201. 5**. Towing bitts (double bollards) are required to resist the loads caused by the towing line attached with eye splice. For strength assessment beam theory or finite element analysis using net scantlings is to be applied, as appropriate. Corrosion additions are to be as defined in **204.** A wear down allowance is to be included as defined in **205.** At the discretion of the Society, load tests may be accepted as alternative to strength assessment by calculations. **5. Supporting hull structure** The design load applied to supporting hull structure is to be in accordance with **201. 3**. (1) The reinforced members beneath shipboard fittings are to be effectively arranged for any variation of direction (horizontally and vertically) of the towing forces acting the shipboard fittings, see **Fig 4.10.2** for a sample arrangement. Proper alignment of fitting and supporting hull structure is to be ensured.  **Fig 4.10.2 Sample arrangement of reinforcing members**	(3) For fittings intended to be used for, both, normal and other towing operations, the greater of the loads according to (1) and (2). Towing bitts (double bollards) may be chosen for the towing line attached with eye splice if the industry standard distinguishes between different methods to attach the line, i.e. figure-of-eight or eye splice attachment. When the shipboard fitting is not selected from an accepted industry standard, the strength of the fitting and of its attachment to the ship is to be in accordance with **201. 3** and **201. 5**. Towing bitts (double bollards) are required to resist the loads caused by the towing line attached with eye splice. For strength assessment beam theory or finite element analysis using net scantlings is to be applied, as appropriate. Corrosion additions are to be as defined in **204.** A wear down allowance is to be included as defined in **205.** At the discretion of the Society, load tests may be accepted as alternative to strength assessment by calculations. **5. Supporting hull structures** The design load applied to supporting hull structure is to be in accordance with **201. 3**. (1) The reinforced members beneath shipboard fittings are to be effectively arranged for any variation of direction (horizontally and vertically) of the towing forces acting the shipboard fittings, see **Fig 4.10.2** for a sample arrangement. Proper alignment of fitting and supporting hull structure is to be ensured.  **Fig 4.10.2 Sample arrangement of reinforcing members**	

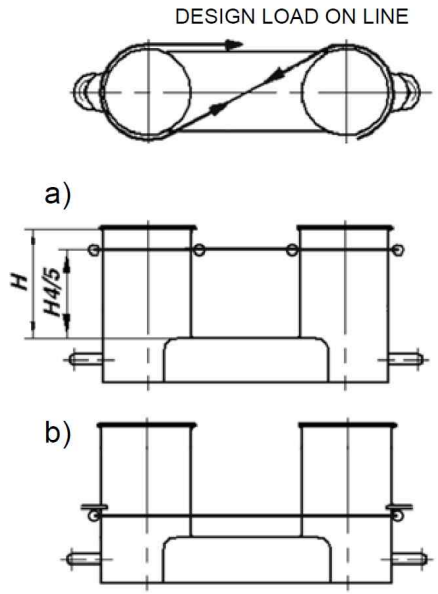
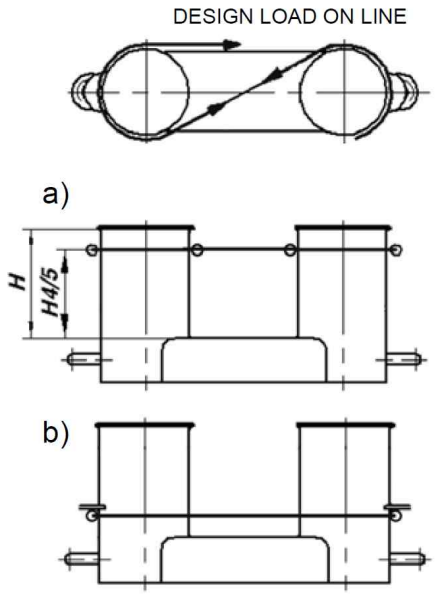
Present	Amendment	Note
(2) The acting point of the towing force on shipboard fittings is to be taken at the attachment point of a towing line or at a change in its direction. For bollards and bitts the attachment point of the towing line is to be taken not less than 4/5 of the tube height above the base, see **Fig 4.10.3**.  **Fig 4.10.3 Acting point of the towing force**	(2) The acting point of the towing force on shipboard fittings is to be taken at the attachment point of a towing line or at a change in its direction. For bollards and bitts the attachment point of the towing line is to be taken not less than 4/5 of the tube height above the base, see **Fig 4.10.3**.  **Fig 4.10.3 Acting point of the towing force**	
(3) Allowable stresses under the design load conditions as specified in **201. 3** are as follows: (A) For strength assessment ~~with~~ beam theory or grillage analysis: Normal stress : ~~100 % of the specified minimum yield point of the material~~ Shearing stress : ~~60 % of the specified minimum yield point of the material~~ Normal stress is the sum of bending stress and axial stress with the corresponding shearing stress acting perpendicular to the normal stress. No stress concentration factors being taken into account. (B) For strength assessment ~~with~~ finite element analysis: ~~Equivalent~~ stress : ~~100 % of the specified minimum yield point of the material.~~	(3) Allowable stresses under the design load conditions as specified in **201. 3** are as follows: (A) For strength assessment by means of beam theory or grillage analysis: Normal stress : 1.0 R_{eH} Shearing stress : 0.6 R_{eH} Normal stress is the sum of bending stress and axial stress with the corresponding shearing stress acting perpendicular to the normal stress. No stress concentration factors being taken into account. (B) For strength assessment by means of finite element analysis: Von Mises stress : 1.0 R_{eH}	

Present	Amendment	Note
~~For strength calculations by means of finite elements, the geometry is to be idealized as realistically as possible. The ratio of element length to width is not to exceed 3. Girders are to be modelled using shell or plane stress elements. Symmetric girder flanges may be modelled by beam or truss elements. The element height of girder webs must not exceed one-third of the web height. In way of small openings in girder webs the web thickness is to be reduced to a mean thickness over the web height. Large openings are to be modelled. Stiffeners may be modelled by using shell, plane stress, or beam elements. Stresses are to be read from the centre of the individual element. For shell elements the stresses are to be evaluated at the mid plane of the element.~~	For strength assessment by means of finite element analysis the mesh is to be fine enough to represent the geometry as realistically as possible. The aspect ratios of elements are not to exceed 3. Girders are to be modelled using shell or plane stress elements. Symmetric girder flanges may be modelled by beam or truss elements. The element height of girder webs must not exceed one-third of the web height. In way of small openings in girder webs the web thickness is to be reduced to a mean thickness over the web height as per individual Class Society rules. Large openings are to be modelled. Stiffeners may be modelled by using shell, plane stress, or beam elements. The mesh size of stiffeners is to be fine enough to obtain proper bending stress. If flat bars are modeled using shell or plane stress elements, dummy rod elements are to be modelled at the free edge of the flat bars and the stresses of the dummy elements are to be evaluated. Stresses are to be read from the centre of the individual element. For shell elements the stresses are to be evaluated at the mid plane of the element. ReH is the specified minimum yield stress of the material.	
6. Safe Towing Load (TOW) (1) The safe towing load (TOW) is the load limit for towing purpose. (2) TOW used for normal towing operations is not to exceed 80% of the design load per **201. 3** (1). (3) TOW used for other towing operations is not to exceed 80% of the design load according to **201. 3** (2). (4) For fittings used for both normal and other towing operations, the greater of the safe towing loads according to (2) and (3) is to be used. ~~(5) For fittings intended to be used for, both, towing and mooring, **202.** applies to mooring.~~ (6) TOW, in t, of each shipboard fitting is to be marked (by weld bead or equivalent) on the deck fittings used for towing. For fittings intended to be used for, both, towing and mooring, SWL, in t, according to **202. 6** is to be marked in addition to TOW.	**6. Safe Towing Load (TOW)** (1) The safe towing load (TOW) is the safe load limit of shipboard fittings used for towing purpose. (2) TOW used for normal towing operations is not to exceed 80% of the design load per **201. 3** (1). (3) TOW used for other towing operations is not to exceed 80% of the design load according to **201. 3** (2). (4) For fittings used for both normal and other towing operations, the greater of the safe towing loads according to (2) and (3) is to be used. (5) TOW, in t, of each shipboard fitting is to be marked (by weld bead or equivalent) on the deck fittings used for towing. For fittings intended to be used for, both, towing and mooring, SWL, in t, according to **202. 6** is to be marked in addition to TOW.	

Present	Amendment	Note
(7) The above requirements on TOW apply for the use with no more than one line. If not otherwise chosen, for towing bitts (double bollards) TOW is the load limit for a towing line attached with eye-splice. (8) The towing and mooring arrangements plan mentioned in **203.** is to define the method of use of towing lines.	(6) The above requirements on TOW apply for the use with no more than one line. If not otherwise chosen, for towing bitts (double bollards) TOW is the load limit for a towing line attached with eye-splice. (7) The towing and mooring arrangements plan mentioned in **203.** is to define the method of use of towing lines.	
202. Mooring *(2018)*	**202. Mooring *(2018)***	
1. Strength The strength of shipboard fittings used for mooring operations and of their supporting hull structures as well as the strength of supporting hull structures of winches and capstans is to comply with the requirements of this Chapter.	**1. Strength** The strength of shipboard fittings used for mooring operations and of their supporting hull structures as well as the strength of supporting hull structures of winches and capstans is to comply with the requirements of this Chapter.	
2. Arrangements Shipboard fittings, winches and capstans for mooring are to be located on stiffeners and/or girders, which are part of the deck construction so as to facilitate efficient distribution of the mooring load. Other equivalent arrangements may be accepted (for chocks in bulwarks, etc.) provided the strength is confirmed adequate for the service.	**2. Arrangements** Shipboard fittings, winches and capstans for mooring are to be located on stiffeners and/or girders, which are part of the deck construction so as to facilitate efficient distribution of the mooring load. Other equivalent arrangements may be accepted (for chocks in bulwarks, etc.) provided the strength is confirmed adequate for the service.	
3. Load considerations (1) The minimum design load applied to supporting hull structures for shipboard fittings is to be 1.15 times the ~~minimum breaking strength of the mooring line~~ according to **Ch 8, Table 4.8.1.** (2) The minimum design load applied to supporting hull structures for winches is to be 1.25 times the intended maximum brake holding load, where the maximum brake holding load is to be assumed not less than 80% of the ~~minimum breaking strength of the mooring line~~ according to **Ch 8, Table 4.8.1**, see Notes. For supporting hull structures of capstans, 1.25 times the maximum hauling-in force is to be taken as the minimum design load.	**3. Load considerations** (1) The minimum design load applied to supporting hull structures for shipboard fittings is to be 1.15 times the ship design minimum breaking load according to **Ch 8, Table 4.8.1.** (2) The minimum design load applied to supporting hull structures for winches is to be 1.25 times the intended maximum brake holding load, where the maximum brake holding load is to be assumed not less than 80% of the ship design minimum breaking load according to **Ch 8, Table 4.8.1**, see Notes. For supporting hull structures of capstans, 1.25 times the maximum hauling-in force is to be taken as the minimum design load.	

Present	Amendment	Note
(3) When a safe working load SWL greater than that determined according to **202. 6** is requested by the applicant, then the design load is to be increased in accordance with the appropriate SWL/design load relationship given by **202. 3** and **202. 6**. (4) The design load is to be applied to fittings in all directions that may occur by taking into account the arrangement shown on the towing and mooring arrangements plan. Where the mooring line takes a turn at a fitting the total design load applied to the fitting is equal to the resultant of the design loads acting on the line, refer to the **Fig 4.10.1** in **201. 3**. However, in no case does the design load applied to the fitting need to be greater than twice the design load on the line. Notes: 1) If not otherwise specified by Recommendation No. 10, side projected area including that of deck cargoes as given by ~~the loading manual~~ is to be taken into account for selection of mooring lines and the loads applied to shipboard fittings and supporting hull structure. 2) The increase of the ~~minimum breaking strength~~ for synthetic ropes according to Recommendation No. 10 needs not to be taken into account for the loads applied to shipboard fittings and supporting hull structure. **4. Shipboard fittings** (1) Shipboard fittings may be selected from an industry standard accepted by the Society and at least based on the ~~minimum breaking strength of the mooring line~~ according to **Ch 8, Table 4.8.1**. (see Notes in **202. 3**) (2) Mooring bitts (double bollards) are to be chosen for the mooring line attached in figure-of-eight fashion if the industry standard distinguishes between different methods to attach the line, i.e. figure-of-eight or eye splice attachment.	(3) When a safe working load SWL greater than that determined according to **202. 6** is requested by the applicant, then the design load is to be increased in accordance with the appropriate SWL/design load relationship given by **202. 3** and **202. 6**. (4) The design load is to be applied to fittings in all directions that may occur by taking into account the arrangement shown on the towing and mooring arrangements plan. Where the mooring line takes a turn at a fitting the total design load applied to the fitting is equal to the resultant of the design loads acting on the line, refer to the **Fig 4.10.1** in **201. 3**. However, in no case does the design load applied to the fitting need to be greater than twice the design load on the line. Notes: 1) If not otherwise specified by Recommendation No. 10, side projected area including that of deck cargoes as given by the ship nominal capacity condition is to be taken into account for selection of mooring lines and the loads applied to shipboard fittings and supporting hull structure. 2) The increase of the line design break force for synthetic ropes according to Recommendation No. 10 needs not to be taken into account for the loads applied to shipboard fittings and supporting hull structures. **4. Shipboard fittings** (1) Shipboard fittings may be selected from an industry standard accepted by the Society and at least based on the ship design minimum breaking load according to **Ch 8, Table 4.8.1**. (see Notes in **202. 3**) (2) Mooring bitts (double bollards) are to be chosen for the mooring line attached in figure-of-eight fashion if the industry standard distinguishes between different methods to attach the line, i.e. figure-of-eight or eye splice attachment.	

Present	Amendment	Note
(3) When the shipboard fitting is not selected from an accepted industry standard, the strength of the fitting and of its attachment to the ship is to be in accordance with **202. 3** and **202. 5**. Mooring bitts (double bollards) are required to resist the loads caused by the mooring line attached in figure-of-eight fashion, see Note. For strength assessment beam theory or finite element analysis using net scantlings is to be applied, as appropriate. Corrosion additions are to be as defined in **204.** A wear down allowance is to be included as defined in **205.** At the discretion of the classification Society, load tests may be accepted as alternative to strength assessment by calculations. Notes: With the line attached to a mooring bitt in the usual way (figure-of-eight fashion), either of the two posts of the mooring bitt can be subjected to a force twice as large as that acting on the mooring line. Disregarding this effect, depending on the applied industry standard and fitting size, overload may occur. **5. Supporting hull structures** The design load applied to supporting hull structure is to be in accordance with **202. 3**. (1) The arrangement of reinforced members beneath shipboard fittings, winches and capstans is to consider any variation of direction (horizontally and vertically) of the mooring forces acting upon the shipboard fittings, see **Fig 4.10.2** in **201. 5** for a sample arrangement. Proper alignment of fitting and supporting hull structure is to be ensured. (2) The acting point of the mooring force on shipboard fittings is to be taken at the attachment point of a mooring line or at a change in its direction. For bollards and bitts the attachment point of the mooring line is to be taken not less than 4/5 of the tube height above the base, see a) in **Fig 4.10.4**. However, if fins are fitted to the bollard tubes to keep the mooring line as low as possible, the attachment point of the mooring line may be taken at the location of the fins, see b) in **Fig 4.10.4**.	(3) When the shipboard fitting is not selected from an accepted industry standard, the strength of the fitting and of its attachment to the ship is to be in accordance with **202. 3** and **202. 5**. Mooring bitts (double bollards) are required to resist the loads caused by the mooring line attached in figure-of-eight fashion, see Note. For strength assessment beam theory or finite element analysis using net scantlings is to be applied, as appropriate. Corrosion additions are to be as defined in **204.** A wear down allowance is to be included as defined in **205.** At the discretion of the classification Society, load tests may be accepted as alternative to strength assessment by calculations. Notes: With the line attached to a mooring bitt in the usual way (figure-of-eight fashion), either of the two posts of the mooring bitt can be subjected to a force twice as large as that acting on the mooring line. Disregarding this effect, depending on the applied industry standard and fitting size, overload may occur. **5. Supporting hull structures** The design load applied to supporting hull structure is to be in accordance with **202. 3**. (1) The arrangement of reinforced members beneath shipboard fittings, winches and capstans is to consider any variation of direction (horizontally and vertically) of the mooring forces acting upon the shipboard fittings, see **Fig 4.10.2** in **201. 5** for a sample arrangement. Proper alignment of fitting and supporting hull structure is to be ensured. (2) The acting point of the mooring force on shipboard fittings is to be taken at the attachment point of a mooring line or at a change in its direction. For bollards and bitts the attachment point of the mooring line is to be taken not less than 4/5 of the tube height above the base, see a) in **Fig 4.10.4**. However, if fins are fitted to the bollard tubes to keep the mooring line as low as possible, the attachment point of the mooring line may be taken at the location of the fins, see b) in **Fig 4.10.4**.	

Present	Amendment	Note
 **Fig 4.10.4 Acting point of the mooring force**	 **Fig 4.10.4 Acting point of the mooring force**	
(3) Allowable stresses under the design load conditions as specified in **202. 3** are as follows: (A) For strength assessment ~~with~~ beam theory or grillage analysis: Normal stress : ~~100 % of the specified minimum yield point of the material~~ Shearing stress : ~~60 % of the specified minimum yield point of the material~~ ~~Normal stress is the sum of bending stress and axial stress with the corresponding shearing stress acting perpendicular to the normal stress. No stress concentration factors being taken into account.~~	(3) Allowable stresses under the design load conditions as specified in **202. 3** are as follows: (A) For strength assessment by means of beam theory or grillage analysis: Normal stress : 1.0 R_{eH} Shearing stress : 0.6 R_{eH} Normal stress is the sum of bending stress and axial stress. No stress concentration factors being taken into account.	

Present	Amendment	Note
(B) For strength assessment ~~with~~ finite element analysis: ~~Equivalent~~ stress : ~~100 % of the specified minimum yield point of the material.~~ ~~For strength calculations by means of finite elements, the geometry is to be idealized as realistically as possible. The ratio of element length to width is not to exceed 3. Girders are to be modelled using shell or plane stress elements. Symmetric girder flanges may be modelled by beam or truss elements. The element height of girder webs must not exceed one-third of the web height. In way of small openings in girder webs the web thickness is to be reduced to a mean thickness over the web height. Large openings are to be modelled. Stiffeners may be modelled by using shell, plane stress, or beam elements. Stresses are to be read from the centre of the individual element. For shell elements the stresses are to be evaluated at the mid plane of the element.~~	(B) For strength assessment by means of finite element analysis: Von Mises stress : 1.0 R_{eH} For strength assessment by means of finite element analysis the mesh is to be fine enough to represent the geometry as realistically as possible. The aspect ratios of elements are not to exceed 3. Girders are to be modelled using shell or plane stress elements. Symmetric girder flanges may be modelled by beam or truss elements. The element height of girder webs must not exceed one-third of the web height. In way of small openings in girder webs the web thickness is to be reduced to a mean thickness over the web height as per individual Class Society rules. Large openings are to be modelled. Stiffeners may be modelled by using shell, plane stress, or beam elements. The mesh size of stiffeners is to be fine enough to obtain proper bending stress. If flat bars are modeled using shell or plane stress elements, dummy rod elements are to be modelled at the free edge of the flat bars and the stresses of the dummy elements are to be evaluated. Stresses are to be read from the centre of the individual element. For shell elements the stresses are to be evaluated at the mid plane of the element. ReH is the specified minimum yield stress of the material.	
6. Safe Working Load (SWL) (1) The Safe Working Load (SWL) is the load limit for mooring purpose. (2) Unless a greater SWL is requested by the applicant according to **202. 3** (3), the SWL is not to exceed the ~~minimum breaking strength of the mooring line~~ according to **Ch 8, Table 4.8.1**, see Notes in **202. 3**. (3) The SWL, in t, of each shipboard fitting is to be marked (by weld bead or equivalent) on the deck fittings used for mooring. For fittings intended to be used for, both, mooring and towing, TOW, in t, according to **201. 6** is to be marked in addition to SWL. (4) The above requirements on SWL apply for the use with no more than one mooring line. (5) The towing and mooring arrangements plan mentioned in **203.** is to define the method of use of mooring lines.	**6. Safe Working Load (SWL)** (1) The Safe Working Load (SWL) is the safe load limit of shipboard fittings used for mooring purpose. (2) Unless a greater SWL is requested by the applicant according to **202. 3** (3), the SWL is not to exceed the ship design minimum breaking load according to **Ch 8, Table 4.8.1**, see Notes in **202. 3**. (3) The SWL, in t, of each shipboard fitting is to be marked (by weld bead or equivalent) on the deck fittings used for mooring. For fittings intended to be used for, both, mooring and towing, TOW, in t, according to **201. 6** is to be marked in addition to SWL. (4) The above requirements on SWL apply for the use with no more than one mooring line. (5) The towing and mooring arrangements plan mentioned in **203.** is to define the method of use of mooring lines.	

Present	Amendment	Note
203. Towing and mooring arrangements plan *(2018)* **1.** The SWL and TOW for the intended use for each shipboard fitting is to be noted in the towing and mooring arrangements plan available on board for the guidance of the Master. It is to be noted that TOW is the load limit for towing purpose and SWL that for mooring purpose. If not otherwise chosen, for towing bitts it is to be noted that TOW is the load limit for a towing line attached with eye-splice. **2.** Information provided on the plan is to include in respect of each shipboard fitting. (1) Location on the ship (2) Fitting type (3) SWL/TOW (4) Purpose (mooring / harbour towing / other towing) (5) Method of applying load of towing or mooring line including limiting fleet angles Item (3) with respect to items (4) and (5), is subject to approval by the Society. Furthermore, information provided on the plan is to include: (1) The arrangement of mooring lines showing number of lines (N) (2) The ~~minimum breaking strength of each mooring line (MBL)~~ (3) The acceptable environmental conditions ~~as given in~~ IACS Recommendation No. 10 "Anchoring, Mooring and Towing Equipment" for the recommended ~~minimum breaking strength of mooring lines~~ for ships with Equipment Number EN 〉 2000: (A) 30 second mean wind speed from any direction. (v_w or v_w^* according to IACS Recommendation No. 10) (B) Maximum current speed acting on bow or stern (±10°). **3.** The information as given in **2.** is to be incorporated into the pilot card in order to provide the pilot proper information on harbour and other towing operations.	**203. Towing and mooring arrangements plan *(2018)*** **1.** The SWL and TOW for the intended use for each shipboard fitting is to be noted in the towing and mooring arrangements plan available on board for the guidance of the Master. It is to be noted that TOW is the load limit for towing purpose and SWL that for mooring purpose. If not otherwise chosen, for towing bitts it is to be noted that TOW is the load limit for a towing line attached with eye-splice. **2.** Information provided on the plan is to include in respect of each shipboard fitting. (1) Location on the ship (2) Fitting type (3) SWL/TOW (4) Purpose (mooring / harbour towing / other towing) (5) Method of applying load of towing or mooring line including limiting fleet angle i.e. angle of change in direction of a line at the fitting. Item (3) with respect to items (4) and (5), is subject to approval by the Society. Furthermore, information provided on the plan is to include: (1) The arrangement of mooring lines showing number of lines (N) (2) The ship design minimum breaking load (MBL_{SD}) (3) The acceptable environmental conditions refer for minimum conditions to IACS Recommendation No. 10 "Anchoring, Mooring and Towing Equipment" for the recommended ship design minimum breaking load for ships with Equipment Number EN 〉 2000: (A) 30 second mean wind speed from any direction. (v_w or v_w^* according to IACS Recommendation No. 10) (B) Maximum current speed acting on bow or stern (±10°). **3.** The information as given in **2.** is to be incorporated into the pilot card in order to provide the pilot proper information on harbour and other towing operations.	

Present	Amendment	Note
204. Corrosion addition ***(2018)***	**204. Corrosion addition** ***(2018)***	
The corrosion addition, t_c, is not to be less than the following values:	The corrosion addition, t_c, is not to be less than the following values:	
1. Ships covered by Common Structural Rules for Bulk Carriers and Oil Tankers: Total corrosion additions to be as defined in these rules.	**1.** Ships covered by Common Structural Rules for Bulk Carriers and Oil Tankers: Total corrosion additions to be as defined in these rules.	
2. Other ships:	**2.** Other ships:	
(1) For the supporting hull structure, according to the Society's Rules for the surrounding structure (e.g. deck structures, bulwark structures).	(1) For the supporting hull structure, according to the Society's Rules for the surrounding structure (e.g. deck structures, bulwark structures).	
(2) For pedestals and foundations on deck which are not part of a fitting according to an accepted industry standard : 2.0 mm.	(2) For pedestals and foundations on deck which are not part of a fitting according to an accepted industry standard : 2.0 mm.	
(3) For shipboard fittings not selected from an accepted industry standard : 2.0 mm.	(3) For shipboard fittings not selected from an accepted industry standard : 2.0 mm.	
205. Wear allowance ***(2018)***	**205. Wear allowance** ***(2018)***	
In addition to the corrosion addition given in **204.** the wear allowance, t_w, for shipboard fittings not selected from an accepted industry standard is not to be less than 1.0 mm, added to surfaces which are intended to regularly contact the line.	In addition to the corrosion addition given in **204.** the wear allowance, t_w, for shipboard fittings not selected from an accepted industry standard is not to be less than 1.0 mm, added to surfaces which are intended to regularly contact the line.	
206. Survey after construction ***(2018)*** **【See Guidance】**	**206. Survey after construction** ***(2018)*** **【See Guidance】**	
The condition of deck fittings, their pedestals or foundations, if any, and the hull structures in the vicinity of the fittings are to be examined in accordance with the Society's Rules. ⚓	The condition of deck fittings, their pedestals or foundations, if any, and the hull structures in the vicinity of the fittings are to be examined in accordance with the Society's Rules. ⚓	

Amendments of the Rules

(Corrigenda)

Pt. 4 Hull Equipment

2022. 01.

Hull Rule Development Team

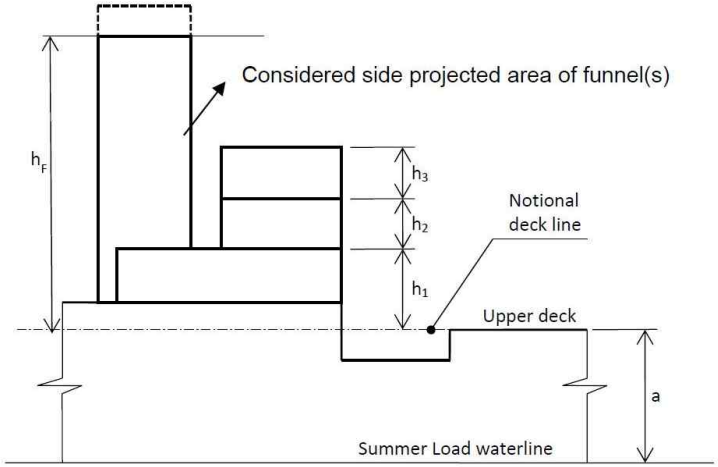
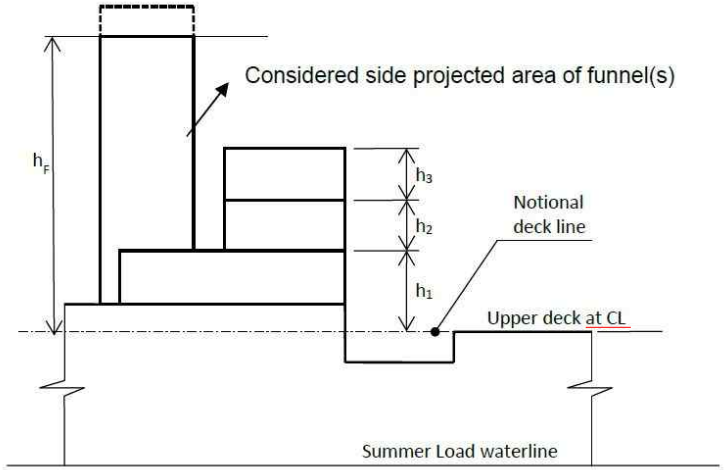
Main Amendments

(1) Background of Amendment

1) Correct errors by reflecting IACS UR A1(Rev.7 Corr.1) and UR A2(Rev.5), TST4700-473-2021

Present	Amendment	Note
CHAPTER 2 HATCHWAYS AND OTHER DECK OPENINGS **Section 1 General〈omitted〉** **Section 2 Design Load** 201. Hatch cover and coaming design load 〈omitted〉 202. Vertical weather design load 〈omitted〉 Table 4.2.3 Vertical weather load P_H of weather deck hatches 〈omitted〉	**CHAPTER 2 HATCHWAYS AND OTHER DECK OPENINGS** **Section 1 General〈same as present〉** **Section 2 Design Load** 201. Hatch cover and coaming design load 〈same as present〉 202. Vertical weather design load 〈same as present〉 Table 4.2.3 Vertical weather load P_v of weather deck hatches 〈same as present〉	- (correction of errors) TST4700-473-2021

Present	Amendment	Note
CHAPTER 8 EQUIPMENT NUMBER AND EQUIPMENT **Section 1 General〈omitted〉** **Section 2 Equipment Number** **201. Equipment number 【See Guidance】** Equipment number is the value obtained from the following formula: $E = \Delta^{\frac{2}{3}} + 2.0(hB + S_{fun}) + \frac{A}{10}$ where: Δ = molded displacement in tonnes to the summer load waterline. B = moulded breadth, in m h = effective height, in m, from the Summer Load waterline to the top of the uppermost house $h = a + \Sigma h_i$ a = distance, in m, from the Summer Load waterline amidships to the upper deck at centreline h_i = height, in m, on the centreline of each tier of houses having a breadth greater than B/4. for the lowest tier h1 is to be measured at centreline from the upper deck or from a notional deck line where there is local discontinuity in the upper deck, see figure below for an example, Sfun = effective front projected area of the funnel, in m², defined as: $S_{fun} = A_{FS} - S_{shield}$ AFS = front projected area of the funnel, in m², calculated between the upper deck at centreline, or notional deck line where there is local discontinuity in the upper deck, and the effective height hF. AFS is taken equal to zero if the funnel breadth is less than or equal to B/4 at all elevations along the funnel height. hF = effective height of the funnel, in m, measured from the upper deck at centreline, or notional deck line where there is local discontinuity in the upper deck, and the top of the funnel. The top of the funnel may be taken at the level where the funnel breadth reaches B/4.	**CHAPTER 8 EQUIPMENT NUMBER AND EQUIPMENT** **Section 1 General〈same as present〉** **Section 2 Equipment Number** **201. Equipment number 【See Guidance】** Equipment number is the value obtained from the following formula: $E = \Delta^{\frac{2}{3}} + 2.0(hB + S_{fun}) + \frac{A}{10}$ where: Δ = molded displacement in tonnes to the summer load waterline. B = moulded breadth, in m h = effective height, in m, from the Summer Load waterline to the top of the uppermost house $h = a + \Sigma h_i$ a = vertical distance at hull side, in m, from the Summer Load waterline amidships to the upper deck h_i = height, in m, on the centreline of each tier of houses having a breadth greater than B/4. for the lowest tier h1 is to be measured at centreline from the upper deck or from a notional deck line where there is local discontinuity in the upper deck, see figure below for an example, Sfun = effective front projected area of the funnel, in m², defined as: $S_{fun} = A_{FS} - S_{shield}$ AFS = front projected area of the funnel, in m², calculated between the upper deck at centreline, or notional deck line where there is local discontinuity in the upper deck, and the effective height hF. AFS is taken equal to zero if the funnel breadth is less than or equal to B/4 at all elevations along the funnel height. hF = effective height of the funnel, in m, measured from the upper deck at centreline, or notional deck line where there is local discontinuity in the upper deck, and the top of the funnel. The top of the funnel may be taken at the level where the funnel breadth reaches B/4.	- (corrections of errors) Reflection of IACS UR A1(Rev. 7 Corr. 1)

Present	Amendment	Note
S_{shield} = the section of front projected area A_{FS}, in m², which is shielded by all deck houses having breadth greater than B/4 . If there are more than one shielded section, the individual shielded sections i.e Sshield1, Sshield 2 etc as shown in figure 2 to be added together. To determine Sshield, the deckhouse breadth is assumed B for all deck houses having breadth greater than B/4 as shown for $S_{shield1}$, $S_{shield2}$ in figure 2. A = side projected area, in m2, of the hull, superstructures, houses and funnels above the Summer Load waterline which are within the equipment length of the ship and also have a breadth greater than B/4. The side projected area of the funnel is considered in A when AFS is greater than zero. In this case, the side projected area of the funnel should be calculated between the upper deck, or notional deck line where there is local discontinuity in the upper deck, and the effective height h_F.  **Figure 1** **Figure 2 <omitted>** Notes: <omitted>	S_{shield} = the section of front projected area A_{FS}, in m², which is shielded by all deck houses having breadth greater than B/4 . If there are more than one shielded section, the individual shielded sections i.e Sshield1, Sshield 2 etc as shown in figure 2 to be added together. To determine Sshield, the deckhouse breadth is assumed B for all deck houses having breadth greater than B/4 as shown for $S_{shield1}$, $S_{shield2}$ in figure 2. A = side projected area, in m2, of the hull, superstructures, houses and funnels above the Summer Load waterline which are within the equipment length of the ship and also have a breadth greater than B/4. The side projected area of the funnel is considered in A when AFS is greater than zero. In this case, the side projected area of the funnel should be calculated between the upper deck, or notional deck line where there is local discontinuity in the upper deck, and the effective height h_F.  **Figure 1** **Figure 2 <same as present>** Notes: <same as present>	- (correction of errors) Reflection of IACS UR A1(Rev. 7 Corr. 1)

Present

202.~ 204. 〈omitted〉

Table 4.8.1 Bower anchors, chain cables and ropes *(2018)*

Equipment letter	Equipment number		Stockless bower anchors		Stud link chain cables for bower anchors				Tow line			Mooring line			
						Diameter (mm)				Breaking load				Breaking load	
	Exceeding	Not exceeding	Number	Mass per anchor (kg)	Total length (m)	Grade 1	Grade 2	Grade 3	Length per line (m)	(kN)	(kg)	Number	Length per line (m)	(kN)	(kg)
A1	-	70	2	180	220	14	12.5		180	98	10000	3	80	37	3750
A2	70	90	2	240	220	16	14		180	98	10000	3	100	40	4100
A3	90	110	2	300	247.5	17.5	16		180	98	10000	3	110	42	4300
A4	110	130	2	360	247.5	19	17.5		180	98	10000	3	110	48	4900
A5	130	150	2	420	275	20.5	17.5		180	98	10000	3	120	53	5400

〈omitted below〉

NOTES :

1. Length of chain cables may be that including shackles for connection
2. Tow line and mooring line are not a condition of Classification, but is listed in this table only for guidance. Side projected area of deck cargo as given by the loading manual is to be taken into account for calculation of equipment number.(For detail, refer to IACS Rec.10 Anchoring, Mooring and Towing Equipment 2.1 and 2.2)
3. The mooring lines for ships with Equipment Number EN ≦ 2000 are taken this table, for ships with an Equipment Number EN 〉 2000 are to be in accordance with the Guidance relating to the Rules specified by the Society.

Amendment

202.~ 204. 〈same as present〉

Table 4.8.1 Bower anchors, chain cables and ropes *(2018)*

Equipment letter	Equipment number		Stockless bower anchors		Stud link chain cables for bower anchors				Tow line			Mooring line			
						Diameter (mm)				Ship design minimum breaking load				Ship design minimum breaking load	
	Exceeding	Not exceeding	Number	Mass per anchor (kg)	Total length (m)	Grade 1	Grade 2	Grade 3	Length per line (m)	(kN)	(kg)	Number	Length per line (m)	(kN)	(kg)
A1	-	70	2	180	220	14	12.5		180	98	10000	3	80	37	3750
A2	70	90	2	240	220	16	14		180	98	10000	3	100	40	4100
A3	90	110	2	300	247.5	17.5	16		180	98	10000	3	110	42	4300
A4	110	130	2	360	247.5	19	17.5		180	98	10000	3	110	48	4900
A5	130	150	2	420	275	20.5	17.5		180	98	10000	3	120	53	5400

〈omitted below〉

NOTES :

1. Length of chain cables may be that including shackles for connection
2. Tow line and mooring line are not a condition of Classification, but is listed in this table only for guidance. Side projected area of deck cargo as given by the nominal capacity condition is to be taken into account for calculation of equipment number.(For detail, refer to IACS Rec.10 Anchoring, Mooring and Towing Equipment 2.1 and 2.2)
3. The mooring lines for ships with Equipment Number EN ≦ 2000 are taken this table, for ships with an Equipment Number EN 〉 2000 are to be in accordance with the Guidance relating to the Rules specified by the Society.

Note

- (correction of errors) Reflection of IACS UR A2(Rev.5), Rec.10(Rev.4)

Amendments of the Guidance

(Corrigenda)

Pt. 4 Hull Equipment

2022. 01.

Hull Rule Development Team

Present	Amendment	Note
CHAPTER 2 HATCHWAYS AND OTHER DECK OPENINGS **Section 1 General** 101. ~102. 〈omitted〉 104. Hatch covers【See Rule】 1.~2. 〈omitted〉 3. In 104. 2 of the Rules, the term "the discretion of the society" means that the hatch cover comply with below requirements. In this article sand carrier and dredger mean that the ships are be engaged in gathering, transporting, dredging or reclamation etc. for sand, soil, gravel etc. (1) 〈omitted〉 (2) For the ship which operates in international service area and is fitted with door or valve in bottom, the requirement for exemption of hatchway cover installation of sand carrier and dredger is as follows. (A) The intact stability is to be met with the requirement of Pt 1, Annex 1-2 of the Guidance. In this case, the calculation is to include the homogeneous full load condition of cargo in each cargo hold loaded up to the top of the hatchway coaming. 〈below omitted〉	**CHAPTER 2 HATCHWAYS AND OTHER DECK OPENINGS** **Section 1 General** 101. ~102. 〈same as present〉 104. Hatch covers【See Rule】 1.~2. 〈same as present〉 3. In 104. 2 of the Rules, the term "the discretion of the society" means that the hatch cover comply with below requirements. In this article sand carrier and dredger mean that the ships are be engaged in gathering, transporting, dredging or reclamation etc. for sand, soil, gravel etc. (1) 〈omitted〉 (2) For the ship which operates in international service area and is fitted with door or valve in bottom, the requirement for exemption of hatchway cover installation of sand carrier and dredger is as follows. (A) The intact stability is to be met with the requirement of IS Code part A. In this case, the calculation is to include the homogeneous full load condition of cargo in each cargo hold loaded up to the top of the hatchway coaming. 〈below omitted〉	- (correction of errors) Reflection of IACS UR A1(Rev. 7 Corr. 1)

Amended Guidance Relating to the Rules for the Classification of Steel Ships

(Part 4 Hull Equipment)

Present	Amendment	Reason
CHAPTER 4 BULWARKS, FREEING PORTS, SIDE SCUTTLES, RECTANGULAR WINDOWS, VENTILATORS AND PERMANENT GANGWAYS **Section 1 ~ 4** **Section 5 Permanent Gangways**	**CHAPTER 4 BULWARKS, FREEING PORTS, SIDE SCUTTLES, RECTANGULAR WINDOWS, VENTILATORS AND PERMANENT GANGWAYS** **Section 1 ~ 4** **Section 5 Permanent Gangways**	
Table 4.4.3 Protection of crew (NOTES) 1. A_f^* and H_s^{**} is to be as following. A_f^* : The minimum summer freeboard calculated as Type A ship regardless of the type freeboard actually assigned. H_s^{**} : the standard height of superstructure as defined in **ICLL Regulation 33.** 2. Protection methods are to be as following (a) to (f) (a) A well lighted and ventilated under-deck passageway (clear opening 0.8 m wide, 2.0 m high) as close as practicable to the freeboard deck, connecting and providing access to the locations in question. (b) A permanent and efficiently constructed gangway fitted at or above the level of the superstructure deck on or as near as practicable to the center line of the ship, providing a continuous platform at least 0.6 m in width and a non-slip surface, with guard rails extending on each side throughout its length. Guard rails shall be at least 1 m high with courses as required in Load Line Regulation 25(3), ~~and supported by stanchions spaced not more than 1.5 m ;~~ a foot-stop shall be provided. (c) A permanent walkway at least 0.6 m in width fitted at freeboard deck level consisting of two rows of guard rails with stanchions spaced not more than 3 m. The number of courses of rails and their spacing are to be as required by Regulation 25(3). On Type B ships, hatchway coamings not less than 0.6 m in height may be regarded as forming one side of the walkway, provided that between the hatchways two rows of guard rails are fitted. (d) ~~A 10 mm minimum diameter~~ wire rope lifeline supported by stanchions ~~about~~ 10 m apart, or ~~A~~ single hand rail or wire rope attached to hatch coamings, continued and ~~adequately~~ supported between hatchways.	**Table 4.4.3 Protection of crew** (NOTES) 1. A_f^* and H_s^{**} is to be as following. A_f^* : The minimum summer freeboard calculated as Type A ship regardless of the type freeboard actually assigned. H_s^{**} : the standard height of superstructure as defined in **ICLL Regulation 33.** 2. Protection methods are to be as following (a) to (f) (a) A well lighted and ventilated under-deck passageway (clear opening 0.8 m wide, 2.0 m high) as close as practicable to the freeboard deck, connecting and providing access to the locations in question. (b) A permanent and efficiently constructed gangway fitted at or above the level of the superstructure deck on or as near as practicable to the center line of the ship, providing a continuous platform at least 0.6 m in width and a non-slip surface, with guard rails extending on each side throughout its length. Guard rails shall be at least 1 m high with courses as required in Load Line Regulation 25(3) ; a foot-stop shall be provided. (c) A permanent walkway at least 0.6 m in width fitted at freeboard deck level consisting of two rows of guard rails with stanchions spaced not more than 3 m. The number of courses of rails and their spacing are to be as required by Regulation 25(3). On Type B ships, hatchway coamings not less than 0.6 m in height may be regarded as forming one side of the walkway, provided that between the hatchways two rows of guard rails are fitted. (d) A wire rope lifeline not less than 10 mm in diameter, supported by stanchions not more than 10 m apart, or a single hand rail or wire rope attached to hatch coamings, continued and supported between hatchways.	

Present	Amendment	Reason
(e) A permanent and efficiently constructed gangway fitted at or above the level of the superstructure deck on or as near as practicable to the center line of the ship: (2017) - located so as not to hinder easy access across the working areas of the deck; - providing a continuous platform at least 1.0 m in width; - constructed of fire resistant and non-slip material; - Fibre Reinforced Plastic(FRP) gratings used in lieu of steel gratings for safe access to tanker bows shall possess: (i) low flame spread characteristics and shall not generate excessive quantities of smoke and toxic products as per the International Code for Application of Fire Test Procedures, 2010 (2010 FTP Code); and (ii) adequate structural fire integrity as per recognized standards(1) after undergoing tests in accordance with the above standards. - fitted with guard rails extending on each side throughout its length; guard rails should be at least high with courses as required by Regulation 25(3) and supported by stanchions spaced not more than 1.5 m; - provided with a foot stop on each side; - having openings, with ladders where appropriate, to and from the deck. Openings should not be more than 40 m apart; - having shelters of substantial construction set in way of the gangway at intervals not exceeding 45 m if the length of the exposed deck to be traversed exceeds 70 m. Every such shelter should be capable of accommodating at least one person and be so constructed as to afford weather protection on the forward, port and starboard sides. (f) A permanent and efficiently constructed walkway fitted at freeboard deck level on or as near as practicable to the center line of the ship having the same specifications as those for a permanent gangway listed in (e) except for foot-stops. On Type *B* ships (certified for the carriage of liquids in bulk), with a combined height of hatch coaming and fitted hatch cover of together not less than 1 m in height the hatchway coamings may be regarded as forming one side of the walkway, provided that between the hatchways two rows of guard rails are fitted. 3. Alternative transverse locations for 2. (c), (d) and (f) above, where appropriate: (1) At or near center line of ship; or Fitted on hatchways at or near center line of ship. (2) Fitted on each side of the ship. (3) Fitted on one side of the ship, provision being made for fitting on either side. (4) Fitted on one side only. (5) Fitted on each side of the hatchways as near to the center line as practicable	(e) A permanent and efficiently constructed gangway fitted at or above the level of the superstructure deck on or as near as practicable to the center line of the ship: (2017) - located so as not to hinder easy access across the working areas of the deck; - providing a continuous platform at least 1.0 m in width; - constructed of fire resistant and non-slip material; - Fibre Reinforced Plastic(FRP) gratings used in lieu of steel gratings for safe access to tanker bows shall possess: (i) low flame spread characteristics and shall not generate excessive quantities of smoke and toxic products as per the International Code for Application of Fire Test Procedures, 2010 (2010 FTP Code); and (ii) adequate structural fire integrity as per recognized standards(1) after undergoing tests in accordance with the above standards. - fitted with guard rails extending on each side throughout its length; guard rails should be at least high with courses as required by Regulation 25(3) and supported by stanchions spaced not more than 1.5 m; - provided with a foot stop on each side; - having openings, with ladders where appropriate, to and from the deck. Openings should not be more than 40 m apart; - having shelters of substantial construction set in way of the gangway at intervals not exceeding 45 m if the length of the exposed deck to be traversed exceeds 70 m. Every such shelter should be capable of accommodating at least one person and be so constructed as to afford weather protection on the forward, port and starboard sides. (f) A permanent and efficiently constructed walkway fitted at freeboard deck level on or as near as practicable to the center line of the ship having the same specifications as those for a permanent gangway listed in (e) except for foot-stops. On Type *B* ships (certified for the carriage of liquids in bulk), with a combined height of hatch coaming and fitted hatch cover of together not less than 1 m in height the hatchway coamings may be regarded as forming one side of the walkway, provided that between the hatchways two rows of guard rails are fitted. 3. Alternative transverse locations for 2. (c), (d) and (f) above, where appropriate: (1) At or near center line of ship; or Fitted on hatchways at or near center line of ship. (2) Fitted on each side of the ship. (3) Fitted on one side of the ship, provision being made for fitting on either side. (4) Fitted on one side only. (5) Fitted on each side of the hatchways as near to the center line as practicable	

Present	Amendment	Reason

nnex 4-1 Anchoring in Deep and Unsheltered Waters

Table 1 Anchoring equipment for ships in unsheltered water with depth up to 120 m

Equipment Number E_1		High holding power stockless bower anchor		Stud link chain cable for bower anchors		
		Number	Mass per anchor (kg)	Length (m)	Min. diameter	
~~Exceeding~~	~~Not exceeding~~				Grade 2 (mm)	Grade 3 (mm)
	1790	2	14150	1017.5	105	84
1790	1930	2	14400	990	105	84
1930	2080	2	14800	990	105	84
2080	2230	2	15200	990	105	84
2230	2380	2	15600	990	105	84
2380	2530	2	16000	990	105	84
2530	2700	2	16300	990	105	84
2700	2870	2	16700	990	105	84
2870	3040	2	17000	990	105	84
3040	3210	2	17600	990	105	84
3210	3400	2	18000	990	105	84
3400	3600	2	18300	990	~~105~~	84
3600	3800	2	19000	990	107	~~87~~
3800	4000	2	19700	962.5	~~107~~	87
4000	4200	2	20300	962.5	111	90
4200	4400	2	21100	962.5	114	92
4400	4600	2	22000	962.5	117	95
4600	4800	2	22900	962.5	~~120~~	97
4800	5000	2	23500	962.5	~~124~~	99
5000	5200	2	24000	935	~~127~~	102
5200	5500	2	24500	907.5	~~132~~	~~107~~
5500	5800	2	25000	907.5	~~132~~	107
5800	6100	2	25500	880	137	111
6100	6500	2	25700	880	~~142~~	~~114~~
6500	6900	2	26000	852.5	~~142~~	~~117~~

nnex 4-1 Anchoring in Deep and Unsheltered Waters

Table 1 Anchoring equipment for ships in unsheltered water with depth up to 120 m

Equipment Number E_1		High holding power stockless bower anchor		Stud link chain cable for bower anchors		
		Number	Mass per anchor (m_A) (kg)	Length (m)	Min. diameter(d)	
Equal to or greater than	Less than				Grade 2 (mm)	Grade 3 (mm)
	1790	2	14150	1017.5	105	84
1790	1930	2	14400	990	105	84
1930	2080	2	14800	990	105	84
2080	2230	2	15200	990	105	84
2230	2380	2	15600	990	105	84
2380	2530	2	16000	990	105	84
2530	2700	2	16300	990	105	84
2700	2870	2	16700	990	105	84
2870	3040	2	17000	990	105	84
3040	3210	2	17600	990	105	84
3210	3400	2	18000	990	105	84
3400	3600	2	18300	990	106	84
3600	3800	2	19000	990	107	85
3800	4000	2	19700	962.5	108	87
4000	4200	2	20300	962.5	111	90
4200	4400	2	21100	962.5	114	92
4400	4600	2	22000	962.5	117	95
4600	4800	2	22900	962.5	119	97
4800	5000	2	23500	962.5	122	99
5000	5200	2	24000	935	125	102
5200	5500	2	24500	907.5	130	105
5500	5800	2	25000	907.5	133	107
5800	6100	2	25500	880	137	111
6100	6500	2	25700	880	140	113
6500	6900	2	26000	852.5	143	115

Present	Amendment	Reason

Table 1 Anchoring equipment for ships in unsheltered water with depth up to 120 m (continued)

Equipment Number E_1		High holding power stockless bower anchor		Stud link chain cable for bower anchors		
					Min. diameter	
~~Exceeding~~	~~Not exceeding~~	Number	Mass per anchor (kg)	Length (m)	Grade 2 (mm)	Grade 3 (mm)
6900	7400	2	26500	852.5	147	~~117~~
7400	7900	2	27000	825	152	~~122~~
7900	8400	2	27500	825	-	~~127~~
8400	8900	2	28000	797.5	-	127
8900	9400	2	28900	770	-	132
9400	10000	2	29400	770	-	137
10000	10700	2	29900	770	-	142
10700	11500	2	30600	770	-	142
11500	12400	2	31500	770	-	147
12400	13400	2	33200	770	-	152
13400	14600	2	35000	770	-	157
14600		2	38000	770	-	162

Table 1 Anchoring equipment for ships in unsheltered water with depth up to 120 m (continued)

Equipment Number E_1		High holding power stockless bower anchor		Stud link chain cable for bower anchors		
					Min. diameter(d)	
Equal to or greater than	Less than	Number	Mass per anchor (m_A) (kg)	Length (m)	Grade 2 (mm)	Grade 3 (mm)
6900	7400	2	26500	852.5	147	118
7400	7900	2	27000	825	152	121
7900	8400	2	27500	825	154	123
8400	8900	2	28000	797.5	158	127
8900	9400	2	28900	770	162	132
9400	10000	2	29400	770	-	135
10000	10700	2	29900	770	-	139
10700	11500	2	30600	770	-	143
11500	12400	2	31500	770	-	147
12400	13400	2	33200	770	-	152
13400	14600	2	35000	770	-	157
14600		2	38000	770	-	162

Amendments of the Guidance relating to the Rules

(External Opinion Inquiry)

Pt. 4 Hull Equipment

2022. 01.

Rule Development Team

Main Amendments

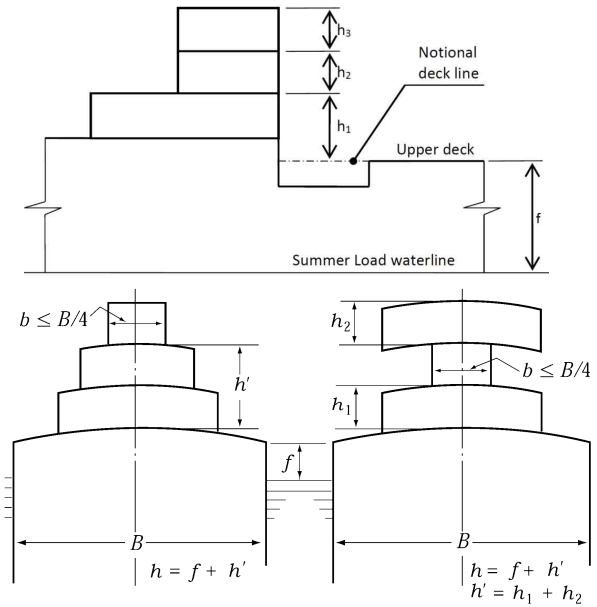
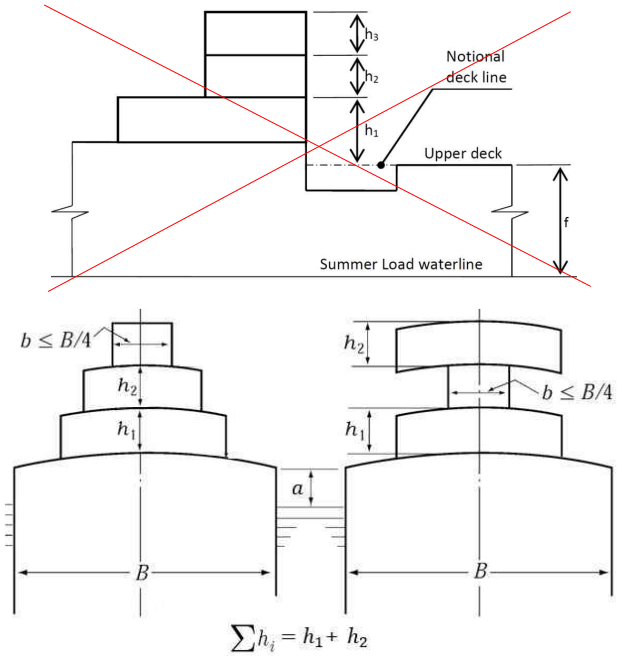
(1) Background of Amendment

1) Reflection of revision IACS UR A1(Rev. 7) and Rec.10(Rev.4)

- Reflect calculation formula of tug boat and correct calculation method for equipment number
- change of mooring line conditions and correct terms for ships with more than 2000 equipment number

Present	Amendment	Note
CHAPTER 8 EQUIPMENT NUMBER AND EQUIPMENT **Section 1 General〈omitted〉** **Section 2 Equipment Number** **201. Equipment number 【See Rule】** **1. The equipment number of tug boat is to be following formula;** $E=\Delta^{\frac{2}{3}}+2(B\times f+\Sigma bh)+0.1A$ b = maximum breadth of superstructure or deck house at each floor(m) h = each height of superstructure having breadth greater than $B/4$ or each deckhouse(m). **2. Significant figures** (1)~(2) 〈omitted〉 (3) Each item of formula ($\Delta^{\frac{2}{3}}$, $2.0Bh$, $0.1A$) has a only positive number with raising to unit from first figure. **3. Δ, f** (1) The values of Δ, f is to be in accordance with designed summer load line. However, ships assigned scantling draft d_s use the value d_s. (2)~(3) 〈omitted〉	**CHAPTER 8 EQUIPMENT NUMBER AND EQUIPMENT** **Section 1 General〈omitted〉** **Section 2 Equipment Number** **201. Equipment number 【See Rule】** **1. The equipment number of tug boat is to be following formula;** $E = \Delta^{\frac{2}{3}} + 2.0(aB+\sum h_i b_i)+\frac{A}{10}$ Δ, a, h_i, A = as specified in 201. of the Rules. b_i = widest breath of superstructure or deckhouse of each tier having a breadth greater than B/4 (m). **2. Significant figures** (1)~(2) 〈same as present〉 (3) Each item of formula ($\Delta^{\frac{2}{3}}$, $2.0(hB+S_{fun})$, $\frac{A}{10}$) has a only positive number with raising to unit from first figure. **3. Δ, f** (1) The values of Δ, a is to be in accordance with designed summer load line. However, ships assigned scantling draft d_s use the value d_s. (2)~(3) 〈same as present〉	- Reflect calculation formula by IACS UR A1(Rev.7) and Rec.10 (Rev.4)

Present	Amendment	Note
4. Extents of structures to be included in the second term ($2.0Bh$) of formula (1)The following items are to be included into the calculation of h'. (A) superstructures (B) deckhouses having a breadth greater than $B/4$ (C) screens or bulwarks higher than 1.5 m and in continuation to deckhouse, the total breadth of which exceeds $B/4$ (See **Fig 4.8.4**) (2)The structures specified in (1) above are to be treated as divided at the intermediate deck into the upper and lower structures, the breadths of which are to be measured as respective tiers.	**4.** ~~Extents of structures to be included in the second term ($2.0Bh$) of formula~~ 〈deleted〉 ~~(1)The following items are to be included into the calculation of h'.~~ ~~(A) superstructures~~ ~~(B) deckhouses having a breadth greater than $B/4$~~ ~~(C) screens or bulwarks higher than 1.5 m and in continuation to deckhouse, the total breadth of which exceeds $B/4$ (See **Fig 4.8.4**)~~ ~~(2)The structures specified in (1) above are to be treated as divided at the intermediate deck into the upper and lower structures, the breadths of which are to be measured as respective tiers.~~	- Deleted because it was already reflected in the Rules.
5. Measurement of breadth of superstructures (1) 〈Newly added〉 A continuous superstructure or deck-house situated on one tier is to be treated as a single structure irrespective of the mode of variation of their breadth and height-continuous or discontinuous, and the breadth is to be the largest one as shown in **Fig 4.8.1.** (2)As for detached independent deck-houses on one tier, breadths of respective deckhouses are to be measured separately to determine whether they should be included or not. (See **Fig 4.8.2**)	**4. Measurement of breadth of superstructures** (1) The structures are to be treated as divided into the upper and lower structures by a deck level. A continuous superstructure or deckhouse situated on one tier is to be treated as a single structure irrespective of the mode of variation of their breadth and height-continuous or discontinuous, and the breadth is to be the largest one as shown in **Fig 4.8.1.** (2)As for detached independent deck-houses on one tier, breadths of respective deckhouses are to be measured separately to determine whether they should be included or not. (See **Fig 4.8.2**)	- IACS UR A1 (Rev. 7) reflected and modified to be calculated on each floor of the structure

Present	Amendment	Note
Fig 4.8.1~ 4.8.2 〈omitted〉  f is to be measured from transverse section of ship **Fig 4.8.3 *(2018)***	Fig 4.8.1~ 4.8.2 〈same as present〉  **Fig 4.8.3**	- Delete part of the Fig. reflected in the Rules and change the factor for the equipment number formula.

Present	Amendment	Note
6. Measurement of heights(h') of structures (1) h' is to be the height at the ship centreline and is to be measured as shown in **Fig 4.8.3.** (2) Where there are detached structures, h' is to be determined for respective structures independently and the maximum value is to be taken as the height. (See **Fig 4.8.4**) (3) Where the between deck height varies longitudinally, h' is to be the maximum value measured from the uppermost continuous deck in the longitudinal section along the ship centreline (See **Fig 4.8.5**)	~~**6. Measurement of heights(h') of structures**~~ 〈deleted〉 ~~(1) h' is to be the height at the ship centreline and is to be measured as shown in **Fig 4.8.3.**~~ ~~(2) Where there are detached structures, h' is to be determined for respective structures independently and the maximum value is to be taken as the height. (See **Fig 4.8.4**)~~ ~~(3) Where the between deck height varies longitudinally, h' is to be the maximum value measured from the uppermost continuous deck in the longitudinal section along the ship centreline (See **Fig 4.8.5**)~~	- Reflected as a rule by reflecting IACS U R A1 (Rev.7)

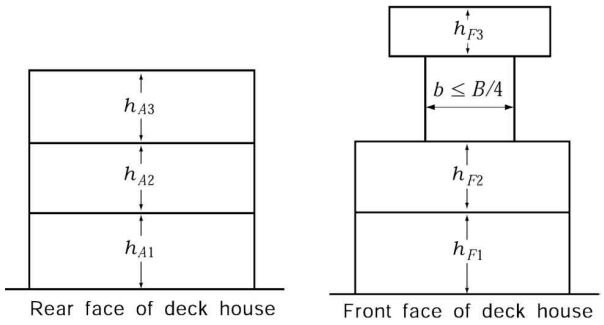


Fig 4.8.4

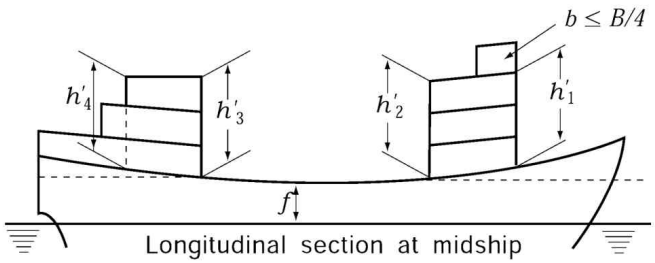


Fig 4.8.5

~~Fig 4.8.4 〈deleted〉~~

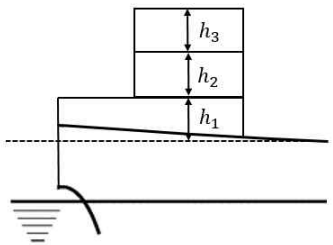
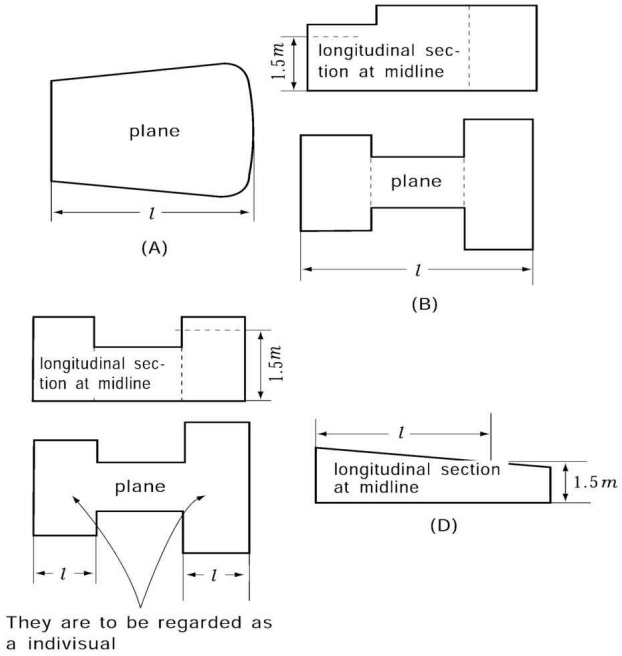
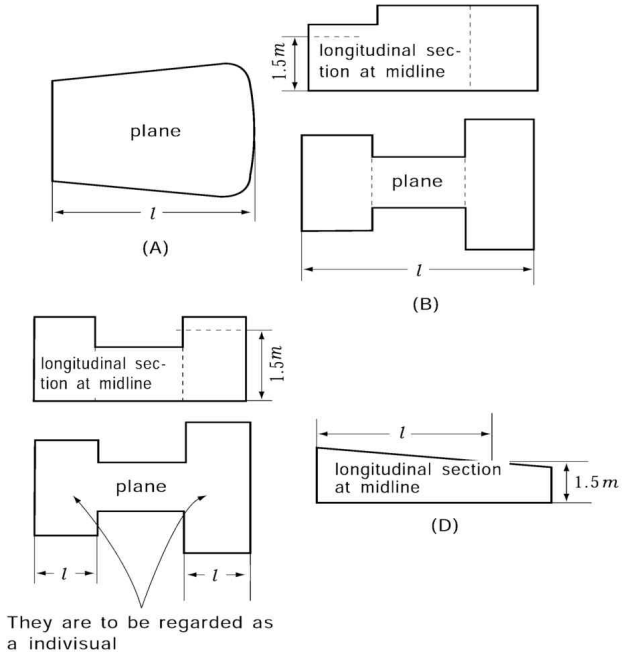
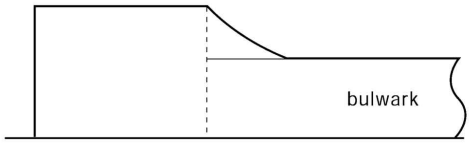
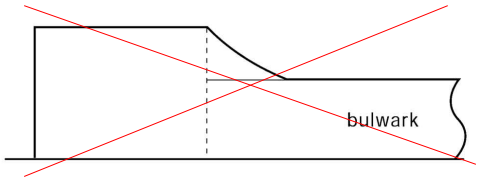


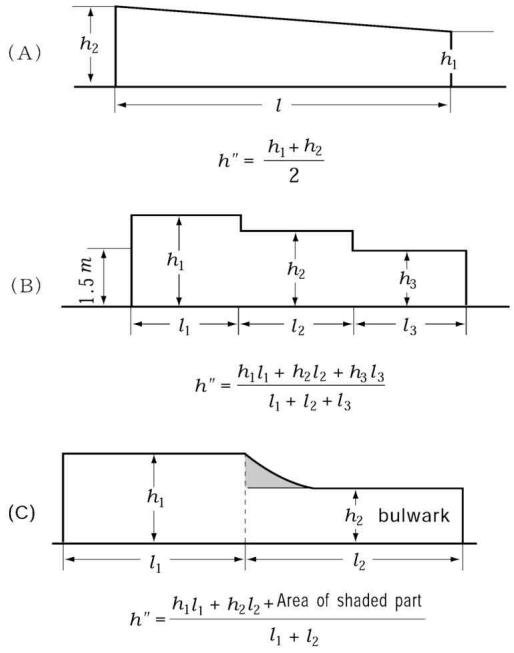
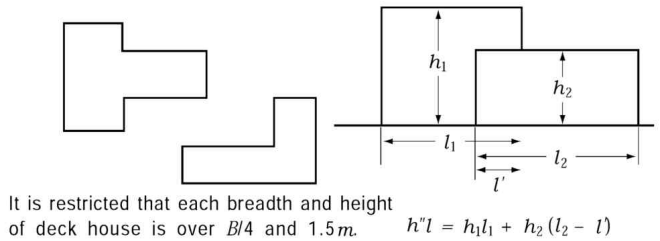
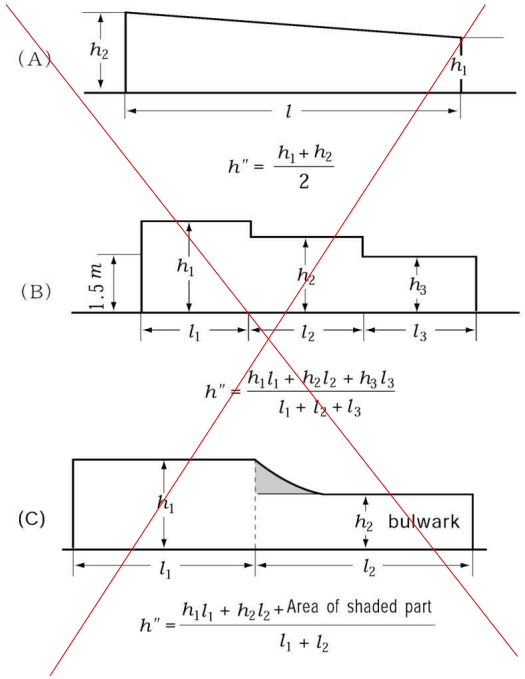
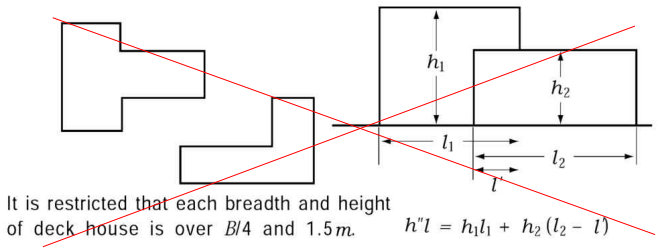
Fig 4.8.4

Present	Amendment	Note
〈Newly added〉	**5. A(side project area)** (1) A(side project area) is to be following formula; $A = aL + \sum h_j l \quad (m^2)$ a : as specified in 201. of the Rules. $\sum h_j l$: summing up of the products of the height h_j(m) and length l (m) of superstructures, deckhouses, trunks or funnels which are located above the uppermost continuous deck within the length of ship and also have a breadth greater than $B/4$ and a height greater than 1.5 m. (2) The area of deck camber may disregarded when determining A(side project area). (3) The structures are to be treated as divided into the upper and lower structures by a deck level. A continuous superstructure or deckhouse situated on one tier is to be treated as a single structure even when its breadth and/or height vary discontinuously. The length is to be the maximum extreme length of the structure. However, if the height is not more than 1.5m, the part of the single structure may be ignored. (4) The height of structure(h_j) having a breadth greater than $B/4$ is the between deck height of respective tiers of structure at the centerline. (5) The following items may be excluded from the A(side project area) (a) portions outside the fore and aft ends of L (b) derrick posts, ventilators, etc. in continuation to superstructures or deckhouses (c) cargoes on decks【See Rule】	- The contents of the existing guidances were integrated and revised by reflecting IACS UR A1(Rev.7) - To reflect [HUT4000-2705-2020] (As reflected in the notes in Figure 4.8.1, a link to the relevant content has been added.)

Present	Amendment	Note
7. Extents of structures to be included in the third term (0.1A) of the formula. (1) The following items are to be included in $\Sigma h''l$. (A) Superstructures (B) Deckhouses and trunks having breadth exceeding $B/4$ and heights exceeding 1.5 m (See the above **Par 5**, as to measurement of breadth) (C) Screens and bulwarks higher than 1.5 m in continuation to superstructure or to deck- houses having breadth exceeding $B/4$ (See **Fig 4.8.7**) (D) The following items may be excluded from the calculation of $\Sigma h''l$ (a) portions outside the fore and aft ends of L (b) derrick posts, ventilators, etc. in continuation to superstructures or deckhouses (c) hatch coamings and hatch covers (d) funnels (e) cargoes on decks (2) The structures specified in (1) above are to be treated as divided into the upper and lower structures at the intermediate deck, and the values of $\Sigma h''l$ are to be calculated for respective tiers. **8. Measurement of length of structures** (1) A continuous superstructure or deck house situated on one tier to be treated as a single superstructure or deckhouse even when its breadth and/or height vary discontinuously. The length is to be the maximum extreme length of the structure. However, where the height is changeable of deckhouse, the end parts or deckhouse having less than 1.5 m height to the middle of deckhouse height may be neglected.(See **Fig 4.8.6**) (2) Bulwarks in continuation to superstructures or deckhouses are to be treated in a the same manner as (1) above. (See **Fig 4.8.7**)	~~**7. Extents of structures to be included in the third term (0.1A) of the formula.**~~ 〈deleted〉 ~~(1) The following items are to be included in $\Sigma h''l$.~~ ~~(A) Superstructures~~ ~~(B) Deckhouses and trunks having breadth exceeding $B/4$ and heights exceeding 1.5 m (See the above **Par 5**, as to measurement of breadth)~~ ~~(C) Screens and bulwarks higher than 1.5 m in continuation to superstructure or to deck- houses having breadth exceeding $B/4$ (See **Fig 4.8.7**)~~ ~~(D) The following items may be excluded from the calculation of $\Sigma h''l$~~ ~~(a) portions outside the fore and aft ends of L~~ ~~(b) derrick posts, ventilators, etc. in continuation to superstructures or deckhouses~~ ~~(c) hatch coamings and hatch covers~~ ~~(d) funnels~~ ~~(e) cargoes on decks~~ ~~(2) The structures specified in (1) above are to be treated as divided into the upper and lower structures at the intermediate deck, and the values of $\Sigma h''l$ are to be calculated for respective tiers.~~ ~~**8. Measurement of length of structures**~~ 〈deleted〉 ~~(1) A continuous superstructure or deck house situated on one tier to be treated as a single superstructure or deckhouse even when its breadth and/or height vary discontinuously. The length is to be the maximum extreme length of the structure. However, where the height is changeable of deckhouse, the end parts or deckhouse having less than 1.5 m height to the middle of deckhouse height may be neglected.(See **Fig 4.8.6**)~~ ~~(2) Bulwarks in continuation to superstructures or deckhouses are to be treated in a the same manner as (1) above. (See **Fig 4.8.7**)~~	- Reflected in clause 5 of this guidance by IACS UR A1(Rev.7)

Present	Amendment	Note
9. Measurement length to height(h'') of structures (1) The height of structures (h'') covering the ship's centreline, such as super structures, deckhouse, etc. is to be the between deck height of respective tiers of structure at the centreline. (2) Where the deck height varies longitudinally, h'' is to be determined as shown in **Fig 4.8.8.** (3)The height of structures not covering the ship's centreline is to be measured at the side facing to the centreline. **10. Where structure stand side by side** (1)Where two or more deckhouse stand side by side transversely, $h''l$ may be the projected plane of longitudinal section. (See **Fig 4.8.9**) (2)Screens and bulwark are to be treated in a same manner as (1) above. **11. Calculation $h''l$ of pressured LPG tanks** The $h''l$ of the upper portions of LPG tanks above the upper deck which is included into $h''l$ according to above **Par 8.** is to be the projected area on the longitudinal section along the ship's centreline.	~~**9. Measurement length to height(h'') of structures**~~ **〈deleted〉** ~~(1) The height of structures (h'') covering the ship's centreline, such as super structures, deckhouse, etc. is to be the between deck height of respective tiers of structure at the centreline.~~ ~~(2) Where the deck height varies longitudinally, h'' is to be determined as shown in **Fig 4.8.8.**~~ ~~(3)The height of structures not covering the ship's centreline is to be measured at the side facing to the centreline.~~ ~~**10. Where structure stand side by side**~~ **〈deleted〉** ~~(1)Where two or more deckhouse stand side by side transversely, $h''l$ may be the projected plane of longitudinal section. (See **Fig 4.8.9**)~~ ~~(2)Screens and bulwark are to be treated in a same manner as (1) above.~~ ~~**11. Calculation $h''l$ of pressured LPG tanks**~~ **〈deleted〉** ~~The $h''l$ of the upper portions of LPG tanks above the upper deck which is included into $h''l$ according to above **Par 8.** is to be the projected area on the longitudinal section along the ship's centreline.~~	- Reflected in clause 5 of this guidance by IACS UR A1(Rev.7)

Present	Amendment	Note
 Fig 4.8.6	 Fig 4.8.5	- Deleted and renumbered a figure by reflecting IACS UR A1 (Rev.7)
 Fig 4.8.7	 ~~Fig 4.8.7~~ 〈deleted〉	

Present	Amendment	Note
 Fig 4.8.8  Fig 4.8.9	 ~~Fig 4.8.8~~ 〈deleted〉  ~~Fig 4.8.9~~ 〈deleted〉	- Deleted and renumbered a figure by reflecting IACS UR A1 (Rev.7)

Present	Amendment	Note
12. Mooring lines for ships with EN 〉 2000 *(2018)*	**6. Mooring lines for ships with EN 〉 2000 *(2018)***	
The minimum recommended strength and number of mooring lines for ships with an Equipment Number EN 〉 2000 are given in (1) and (2), respectively. The length of mooring lines is given by (3).	The minimum recommended strength and number of mooring lines for ships with an Equipment Number EN 〉 2000 are given in (1) and (2), respectively. The length of mooring lines is given by (3).	- Reflection of IACS Rec.10(Rev.4)
The strength of mooring lines and the number of head, stern, and breast lines for ships with an Equipment Number EN 〉 2000 are based on the side-projected area A1. Side projected area A1 should be calculated similar to the side-projected area A according to **201.** of the rules but considering the following conditions:	The strength of mooring lines and the number of head, stern, and breast lines for ships with an Equipment Number EN 〉 2000 are based on the side-projected area A1. Side projected area A1 should be calculated similar to the side-projected area A according to **201.** of the rules but considering the following conditions:	
- For oil tankers, chemical tankers, bulk carriers, and ore carriers the lightest ballast draft should be considered for the calculation of the side-projected area A1. For other ships the lightest draft of usual loading conditions should be considered if the ratio of the freeboard in the lightest draft and the full load condition is equal to or above two. Usual loading conditions mean loading conditions as given by the trim and stability booklet that are to be expected to regularly occur during operation and, in particular, excluding light weight conditions, propeller inspection conditions, etc.	- The ballast draft should be considered for the calculation of the side-projected area A1. For ship types having small variation in the draft, like e.g. passenger and RO/RO vessels, the side projected area A1 may be calculated using the summer load waterline.	
- Wind shielding of the pier can be considered for the calculation of the side-projected area A1 unless the ship is intended to be regularly moored to jetty type piers. A height of the pier surface of 3 m over waterline may be assumed, i.e. the lower part of the side-projected area with a height of 3 m above the waterline for the considered loading condition may be disregarded for the calculation of the side-projected area A1.	- Wind shielding of the pier can be considered for the calculation of the side-projected area A1 unless the ship is intended to be regularly moored to jetty type piers. A height of the pier surface of 3 m over waterline may be assumed, i.e. the lower part of the side-projected area with a height of 3 m above the waterline for the considered loading condition may be disregarded for the calculation of the side-projected area A1.	
- Deck cargo as given by the loading manual should be included for the determination of side-projected area A1. Deck cargo may not need to be considered if a usual light draft condition without cargo on deck generates a larger side-projected area A1 than the full load condition with cargo on deck. The larger of both side-projected areas should be chosen as side-projected area A1.	- Deck cargoes at the ship nominal capacity condition should be included for the determination of side-projected area A1. For the condition with cargo on deck, the summer load waterline may be considered. Deck cargoes may not need to be considered if ballast draft condition generates a larger side-projected area A1 than the full load condition with cargoes on deck. The larger of both side-projected areas should be chosen as side-projected area A1.	
〈omitted below〉	<same as present>	

Present	Amendment	Note
(1)Minimum breaking strength The minimum breaking strength, in kN, of the mooring lines should be taken as: $MBL = 0.1 \cdot A_1 + 350$ The minimum breaking strength may be limited to 1275 kN (130 t). However, in this case the moorings are to be considered as not sufficient for environmental conditions given by this section. For these ships, the acceptable wind speed V_W^*, in m/s, can be estimated as follows: $V_W^* = V_W \cdot \sqrt{\frac{MBL^*}{MBL}}$ where V_W is the wind speed as per this section, MBL^* the breaking strength of the mooring lines intended to be supplied and MBL the breaking strength as recommended according to the above formula. However, the minimum breaking strength should not be taken less than corresponding to an acceptable wind speed of 21 m/s: $MBL^* \geq \left(\frac{21}{V_W}\right)^2 \cdot MBL$ If lines are intended to be supplied for an acceptable wind speed vw* higher than vw as per 2.1.2, the minimum breaking strength should be taken as: $MBL^* \geq \left(\frac{V_W^*}{V_W}\right)^2 \cdot MBL$	(1)Ship design minimum breaking load The ship design minimum breaking load, in kN, of the mooring lines should be taken as: $MBL_{SD} = 0.1 \cdot A_1 + 350$ The ship design minimum breaking load may be limited to 1275 kN (130 t). However, in this case the moorings are to be considered as not sufficient for environmental conditions given by this section. For these ships, the acceptable wind speed V_W^*, in m/s, can be estimated as follows: $V_W^* = V_W \cdot \sqrt{\frac{MBL_{SD}^*}{MBL_{SD}}}$ (m/s) where V_W is the wind speed as per this section, MBL_{SD}^* the ship design minimum breaking load of the mooring lines intended to be supplied and MBL_{SD} the sip design minimum breaking load as recommended according to the above formula. However, the ship design minimum breaking load should not be taken less than corresponding to an acceptable wind speed of 21 m/s: $MBL_{SD}^* \geq \left(\frac{21}{V_W}\right)^2 \cdot MBL_{SD}$ If lines are intended to be supplied for an acceptable wind speed V_W^* higher than V_W as per this section, the ship design minimum breaking load should be taken as: $MBL_{SD}^* \geq \left(\frac{V_W^*}{V_W}\right)^2 \cdot MBL_{SD}$	- Reflection of IACS Rec.10(Rev.4)

Present	Amendment	Note
(2)Number of mooring lines The total number of head, stern and breast lines (see Note in 2.1.2) should be taken as: $n = 8.3 \cdot 10^{-4} \cdot A_1 + 6$ For oil tankers, chemical tankers, bulk carriers, and ore carriers the total number of head, stern and breast lines should be taken as: $n = 8.3 \cdot 10^{-4} \cdot A_1 + 4$ The total number of head, stern and breast lines should be rounded to the nearest whole number. The number of head, stern and breast lines may be increased or decreased in conjunction with an adjustment to the strength of the lines. The adjusted strength, MBL^*, should be taken as: $MBL^* = 1.2 \cdot MBL \cdot n/n^* \leq MBL$ for increased number of lines, $MBL^* = MBL \cdot n/n^*$ for reduced number of lines. where n^* is the increased or decreased total number of head, stern and breast lines and n the number of lines for the considered ship type as calculated by the above formulas without rounding. Vice versa, the strength of head, stern and breast lines may be increased or decreased in conjunction with an adjustment to the number of lines. The total number of spring lines (see Note in this section) should be taken not less than: Two lines where EN 〈 5000, Four lines where EN ≥ 5000.	(2) Number of mooring lines The total number of head, stern and breast lines (see Note in (1)) should be taken as: $n = 8.3 \cdot 10^{-4} \cdot A_1 + 6$ For oil tankers, chemical tankers, bulk carriers, and ore carriers the total number of head, stern and breast lines should be taken as: $n = 8.3 \cdot 10^{-4} \cdot A_1 + 4$ The total number of head, stern and breast lines should be rounded to the nearest whole number. The number of head, stern and breast lines may be increased or decreased in conjunction with an adjustment to the ship design minimum breaking load of the lines. The adjusted ship design minimum breaking load, MBL_{SD}^*, should be taken as: $MBL_{SD}^{**} = 1.2 \cdot MBL_{SD} \cdot n/n^{**} \leq MBL_{SD}$ for increased number of lines, $MBL_{SD}^{**} = MBL_{SD} \cdot n/n^{**}$ for reduced number of lines. where MBL_{SD} is MBL_{SD} or MBL_{SD}^* specified in (1), as appropriate, n^{**} is the increased or decreased total number of head, stern and breast lines and n the number of lines for the considered ship type as calculated by the above formulas without rounding. Vice versa, the ship design minimum breaking load of head, stern and breast lines may be increased or decreased in conjunction with an adjustment to the number of lines. The total number of spring lines (see Note in this section) should be taken not less than: Two lines where EN 〈 5000, Four lines where EN ≥ 5000.	- Reflection of IACS Rec.10(Rev.4)

Present	Amendment	Note
The strength of spring lines should be the same as that of the head, stern and breast lines. If the number of head, stern and breast lines is increased in conjunction with an adjustment to the strength of the lines, the number of spring lines should be likewise increased, but rounded up to the nearest even number. 〈Newly added〉	The ship design minimum breaking load of spring lines should be the same as that of the head, stern and breast lines. If the number of head, stern and breast lines is increased in conjunction with an adjustment to the ship design minimum breaking load of the lines, the number of spring lines should be taken as follows, but rounded up to the nearest even number. $n_s^* = MBL_{SD}/MBL_{SD}^{**} \cdot n_s$ where MBL_{SD} is MBL_{SD} or MBL_{SD}^* specified in (1), as appropriate, n_s is the number of spring lines as given above and n_s^* the increased number of spring lines.	- Reflection of IACS Rec.10(Rev.4)
(3)Length of mooring lines 〈omitted〉	(3)Length of mooring lines 〈same as present〉	
13. Tow line *(2018)* **〈omitted〉**	**7. Tow line *(2018)*** **〈same as present〉**	