RULES CHANGE NOTICE No.1 April 2022

Part 1 Seagoing Ships

Volume II

RULES FOR HULL

Consolidated Edition 2022

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Foreword

This Rules Change Notice (RCN) No.1 gives new additions and amandments to the "Rules for Hull (Pt.1, Vol.II), 2022 Consolidated Edition" along with the effective dates from which these changes are applicable.

Amendments to the preceding Edition are marked by strikethrough, red color, and expanded text. These new additions and amendments are to be read in conjunction with the requirements given in the 2022 Consolidated Edition of the Rules.

The summary of current amendments for each section including the implementation date are indicated in *Table 1 - Amendments Incorporates in This Notice.*

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Further queries or comments concerning this Rules are welcomed through communication to BKI Head Office.

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Rules Changes Notice No. 1 – April 2022

Table 1 – Amendments Incorporates in This Notice

These amendments come into force for ships contracted for construction on or after 1 July 2022

Paragraph	Title/Subject	Status/Remark
Section 1 General, Definitions		
1.	General	To confirm that the associated references provide the design and construction requirements as required by SOLAS II-1/Part A1, Reg. 3-10.2
Section 2 Materials		
A.	General	Update reference requirements
B.	Hull Structural Steel for Plates and Sections	
Table 2.5	Minimum material grades for ships with length exceeding 250 m	A misspelling of 'sheer strake' and the footnote has been corrected so as to reflect the use of the correct grade for various strakes/plates (IACS UR S6 Corr. 2 Nov. 2021)
Fig. 2.1	Typical deck arrangement for membrane type Liquefied Natural Gas Carriers	adding structural member information as detailed in Table 2.5 (IACS UR S6 Corr. 2 Nov. 2021)
Section 17 Cargo Hatchways		
F.	Cargo Hatch Cover Securing Arrangements for Bulk Carriers not Built in accordance with UR S21 (Rev.3)	
1.1	-	Corrigenda
Section 18 Equipment		
A.7	References	Adding new reference IACS UR L4 Rev.3 Corr.2
C.9	Securing of stowed anchors	Corrigenda
D.13	Securing of stowed anchors	Deleted (move to C.9)
E.1	-	Add new requirement accordance to IACS Rec. 10.1.3.1 (a)
E.3	Special requirements to minimize the ingress of water	Renumbering
E.3.1	-	Renumbering and adding new requirement according to IACS UR L4.1
E.3.2	-	Renumbering
E.3.3	-	Adding new requirement form IACS UR L4.3
E.3.4	-	Renumbering and adding new notes from IACS UR L4.4
E.4	-	Renumbering
E.5	-	Renumbering
E.6	-	Renumbering
F.2.3.4)	-	Renumbering reference figure
F.2.4	Acting point of mooring force	Renumbering reference figure
F.4.2	*Note:* -	Renumbering reference figure

Paragraph	Title/Subject	Status/Remark
G.1.1.1	-	Renumbering reference figure
G.1.1.2	-	Renumbering reference figure
H.3.2	-	Renumbering reference figure
Section 21 Hull Outfit		
A.1	References	Update reference
O.4	-	Renumbering
O.4.2	-	deleted number
O.4.3	-	deleted number
Section 22 Structural Fire Protection		
A.1.1 -1.2	-	Corrected the application of the rules to aligned with SOLAS provision
Section 23 Bulk Carriers, Ore Carriers and Ships with Strengthenings for Bulk Cargo and Heavy Cargo		
B.10.2	Conditions of approval of loading manuals	Corrigenda
B.10.3	Approval of the loading instrument	Corrigenda
E.2.3	Pressure in the non-flooded bulk cargo loaded holds	Corrigenda
F	Design Loading Conditions for BC-A, BC-B and BC-C Notations	Corrigenda
J.6	Corrosion addition and steel renewal	Corrigenda
L	Renewal Criteria for Side Shell Frames and Brackets in Single Side Skin Bulk Carriers and Single Side Skin OBO Carriers not Built in accordance with UR S12 Rev.1 or subsequent revisions	Corrigenda
Section 27 Tugs		
A.1.4	-	Update reference
A.3.3	-	Update reference
C.2.1	-	Update reference
C.4.2	-	Update reference
C.6.2.2	-	Update reference
Section 32 Dredgers		
A	General	Update reference
N.1	-	deleted number
N.2	-	Renumbering
N.3	-	Renumbering

Section 1 General, Definitions

A. Validity, Equivalence

1. The Rules apply to seagoing steel ships classed **A100** whose breadth to depth ratio is within the range common for seagoing ships and the depth **H** of which is not less than:

- **L**/16 for Unlimited Range of Service and **P** (Restricted Ocean Service)
- **L**/18 for **L** (Coasting Service)
- **L**/19 for **T** (Sheltered Water Service).

Smaller depths may be accepted if proof is submitted of equal strength, rigidity and safety of the ship.

Hull structural design and construction of Bulk Carriers with **L** ≥ 90 m and Double Hull Oil Tankers with **L** ≥ 150 m and operated in unlimited service range, which is contracted for construction on or after 1st July 2015 to be carried out on the basis Rules for Bulk Carriers and Oil Tankers (Pt.1, Vol. XVII). Those ships refers as CSR ships

For Bulk Carriers and Double Hull Oil Tanker not covered in above paragraph the requirements in Section 23 and 24 are applicable respectively.

Hull structural design and construction of container ships or ships dedicated primary to carry their load in containers with **L** ≥ 90 m and operated in unlimited service range, which is contracted for construction on or after 1st July 2016, is to be carried out on the basis of Rules for Container Ships (Pt.1, Vol.XVIII).

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Section 2 Materials

A. General

All materials to be used for the structural members indicated in the Construction Rules are to be in accordance with the Rules for Materials (Pt.1, Vol.V). Materials the properties of which deviate from these Rules requirements may only be used upon special approval.

Paragraphs of this section are based on the following international convention(s) and/or code(s):

IACS UR S4 Rev.~~3~~4

IACS UR S6 Rev.9.Corr.~~1~~2

At the end of each relevant paragraph of this section, the corresponding paragraphs of the international convention(s) and/or code(s) are given in brackets.

B. Hull Structural Steel for Plates and Sections

Table 2.5 Minimum material grades for ships with length exceeding 250 m

Structural member category	Material grade
~~Shear~~ Sheer strake at strength deck [1)]	Grade E/EH within 0,4**L** amidships
Stringer plate in strength deck [1)]	Grade E/EH within 0,4**L** amidships
Bilge strake [1)]	Grade D/DH within 0,4**L** amidships
[1)] Single strakes required to be of Grade D/DH or Grade E/EH as shown in the above table and within 0,4**L** amidships are to have breadths not less than 800 + 5**L** [mm], need not be greater than 1800 mm, unless limited by the geometry of the ship's design.	

(IACS UR S6 Table 4)

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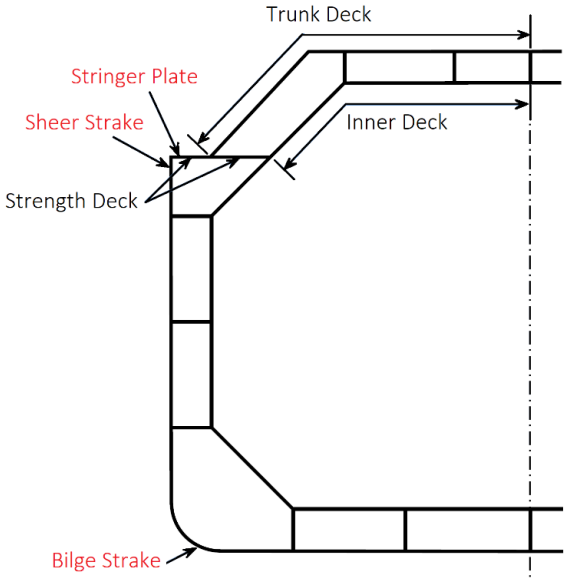

Fig. 2.1 Typical deck arrangement for membrane type Liquefied Natural Gas Carriers

(IACS UR S6 Fig. 1)

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Section 17 Cargo Hatchways

F. Cargo Hatch Cover Securing Arrangements for Bulk Carriers not Built in accordance with UR S21 (Rev.3)

1. Application and Implementation

1.1 These requirements apply to all bulk carriers, as defined in Rules for Classification and Survey (Pt.1, Vol.I) Annex A.~~5~~7, which were not built in accordance with UR S21(Rev.3) and are for steel hatch cover securing devices and stoppers for cargo hold hatchways No.1 and No.2 which are wholly or partially within 0,25**L** of the fore perpendicular, except pontoon type hatch cover

----------*end*----------

Section 18 Equipment

A. General

7. References

7.1 Paragraphs of this section are based on the following international convention(s) and/or code(s):

IACS UR A1 Rev.7 Corr.1

IACS UR A2 Rev.5

IACS UR L4 Rev.3 Corr.2

IACS Rec. 10 Rev.4

At the end of each relevant paragraph, the corresponding paragraphs of the international convention(s) and / or code(s) are given in brackets.

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C. Anchors

9. Securing of stowed anchors

To hold the anchor tight in against the hull or the anchor pocket, respectively, it is recommended to fit anchor lashings, e.g., a 'devil's claw'.

Anchor lashings should be designed to resist a load at least corresponding to twice the anchor mass plus 10 m of cable without exceeding 40% of the yield strength of the material.

(IACS Rec. 10 1.3.2)

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D. Chain Cables

~~13. Securing of stowed anchors~~

~~To hold the anchor tight in against the hull or the anchor pocket, respectively, it is recommended to fit anchor lashings, e.g., a 'devil's claw'.~~

~~Anchor lashings should be designed to resist a load at least corresponding to twice the anchor mass plus 10 m of cable without exceeding 40% of the yield strength of the material.~~

~~(IACS Rec. 10 1.3.2)~~

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E. Chain Locker

1. The chain locker is to be of capacity and depth adequate to provide an easy direct lead of the cables through the chain pipes (spurling pipe) and self-stowing of the cables. The chain locker should be provided with an internal division so that the port and starboard chain cables may be fully and separately stowed.

(IACS Rec. 10 1.3.1 (a))

The minimum required stowage capacity without mud box for the two bow anchor chains is as follows:

$$S = 1{,}1 \cdot d^2 \cdot \frac{\ell}{10^5} \qquad [m^3]$$

d = chain diameter [mm] according to Table 18.2

ℓ = total length of stud link chain cable according to Table 18.2

The total stowage capacity is to be distributed on two chain lockers of equal size for the port and starboard chain cables. The shape of the base areas shall as far as possible be quadratic with a maximum edge length of 33 · d. As an alternative, circular base areas may be selected, the diameter of which shall not exceed (30 to 35) · d.

Above the stowage of each chain locker sufficient free depth is to be provided, which is to be determined by the following formula:

h = 1500 [mm]

2. The chain locker boundaries and their access openings should be watertight as necessary to prevent accidental flooding of the chain locker and damaging essential auxiliaries or equipment or affecting the proper operation of the ship.

(IACS Rec. 10 1.3.1 (b))

~~2.1~~3 Special requirements to minimize the ingress of water

~~2.1.1~~3.1 Spurling pipes and cable lockers are to be watertight up to the weather deck. Bulkheads between separate cable lockers (see arrangement 1 in Fig. 18.3), or which form a common boundary of cable lockers (see arrangement 2 in Fig. 18.3), need not however be watertight.

(IACS UR L4.1)

Arrangement 1 Arrangement 2

Figure 18.3 Chain locker arrangement

~~2.1.2~~3.2 Where means of access is provided, it is to be closed by a substantial cover and secured by closely spaced bolts.

(IACS UR L4.2)

3.3 Where a means of access to spurling pipes or cable lockers is located below the weather deck, the access cover and its securing arrangements are to be in accordance with recognized standards (see Notes) or equivalent for watertight manhole covers. Butterfly nuts and/or hinged bolts are prohibited as the securing mechanism for the access cover.

(IACS UR L4.3)

Notes:

Examples of the recognized standards are such as:

a) ISO 5894:2018
b) China: CB/T4392-2014 "Marine manhole cover"
c) India: IS 15876-2009 "Ships and Marine Technology manholes with bolted covers"

d) Japan: JIS F2304:2015, "Ship's Manholes" and JIS F2329:1975, "Marine Small Size Manhole"
e) Korea: KS V ISO 5894:2012
f) Norway: NS 6260:1985 "Manhole cover – overview"
g) Russia: GOST 2021-90 "Ship's steel manholes. Specifications"

~~2.1.3~~3.4 Spurling pipes through which anchor cables are led are to be provided with permanently attached closing appliances to minimize water ingress. Examples of acceptable arrangements are such as:

1) Steel plates with cutouts to accommodate chain links or
2) Canvas hoods with a lashing arrangement that maintains the cover in the secured position.

(IACS UR L4.4)

~~3.~~4. Adequate drainage facilities of the chain locker are to be provided.

(IACS Rec. 10 1.3.1 (c))

~~4~~5. Where the chain locker boundaries are also tank boundaries their scantlings of stiffeners and plating are to be determined as for tanks in accordance with Section 12.

Where this is not the case the plate thickness is to be determined as for t_2 and the section modulus as for W_2 in accordance with Section 12, B.2 and B.3 respectively. The distance from the load centre to the top of the chain locker pipe is to be taken for calculating the load.

~~5~~6. For the location of chain lockers on tankers Section 24, A.9 is to be observed

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F. Mooring Equipment

2. Supporting hull structure

2.3 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 Table 18.2 for the equipment numeral Z (see Notes)
2) The minimum design load applied to supporting hull structures for winches, etc. is to be 1,25 times the intended maximum brake holding where the maximum brake holding load is to be assumed not less than 80% of the ship design minimum breaking load according Table 18.2, see Notes. For supporting hull structures of capstans, the design load is to be 1,25 times the maximum hauling-in force.
3) When a safe working load SWL greater than that determined according to 1.2 is requested by the applicant, then the design load is to be increased in accordance with the appropriate SWL/design load relationship given by 2.3 and 1.2.
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.18.~~3~~4. 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 B.1 and F.4, 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 structures. The nominal capacity condition is defined in A.8.

2. The increase of the line design break force for synthetic ropes according to F.6.2 needs not to be taken into account for the loads applied to shipboard fittings and supporting hull structures.

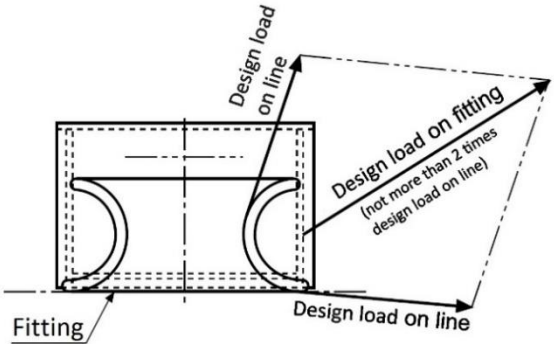

Fig. 18.~~3~~4 Application of design loads

(IACS UR A2.2.3)

2.4 Acting point of mooring force

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.18.~~4~~ 5. 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.18.~~4~~ 5.

(IACS UR A2.2.5)

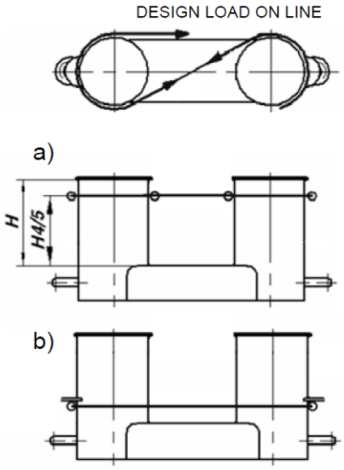

Fig. 18.~~4~~5 Attachment point of mooring line

(IACS UR A2.2.5)

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4. Mooring lines

4.2 Mooring lines for ships with Z > 2000

The minimum recommended strength and number of mooring lines for ships with an Equipment Numeral Z > 2000 are given in 4.2.1 and 4.2.2, respectively. The length of mooring lines is given by 4.2.3.

The strength of mooring lines and the number of head, stern, and breast lines (see Note) for ships with an Equipment Numeral Z > 2000 are based on the side-projected area A_2. Side projected area A_2 should be calculated similar to the side-projected area A according to B.1 but considering the following conditions:

1) The ballast draft should be considered for the calculation of the side-projected area A_1. For ship types having small variation in the draft, like e.g. passenger and RO-RO ship, the side projected area A_1 may be calculated using the summer load waterline.
2) Wind shielding of the pier can be considered for the calculation of the side-projected area A_2 unless the ship is intended to be regularly moored to jetty type piers. A height of the pier surface of 3,0 m over waterline may be assumed, i.e. the lower part of the side-projected area with a height of 3,0 m above the waterline for the considered loading condition may be disregarded for the calculation of the side-projected area A_1.
3) Deck cargoes at the ship nominal capacity condition should be included for the determination of side-projected area A_1. For the condition with cargo on deck, the summer load waterline may be considered. Deck cargo may not need to be considered if ballast draft condition generates a larger side-projected area A_1 than the full load condition with cargoes on deck. The larger of both side-projected areas should be chosen as side-projected area A_1. The nominal capacity condition is defined in A.8.

The mooring lines as given here under are based on a maximum current speed of 1,0 m/s and the following maximum wind speed v_w [m/s]:

$v_w = 25 - 0{,}002 \cdot (A_1 - 2000)$ for passenger ships, ferries and car carriers with $2000\ m^2 < A_1 \leq 4000\ m^2$

$= 21$ for passenger ships, ferries, and car carriers with $A_1 > 4000\ m^2$

$= 25$ for other ships

The wind speed is considered representative of a 30 second mean speed from any direction and at a height of 10 m above the ground. The current speed is considered representative of the maximum current speed acting on bow or stern ($\pm 10°$) and at a depth of one-half of the mean draft. Furthermore, it is considered that ships are moored to solid piers that provide shielding against cross current.

Additional loads caused by, e.g., higher wind or current speeds, cross currents, additional wave loads, or reduced shielding from non-solid piers may need to be particularly considered. Furthermore, it should be observed that unbeneficial mooring layouts can considerably increase the loads on single mooring lines.

Note:

The following is defined with respect to the purpose of mooring lines, see also Fig. 18.5~~6~~:

Breast line: *A mooring line that is deployed perpendicular to the ship, restraining the ship in the off-berth direction.*

Spring line: *A mooring line that is deployed almost parallel to the ship, restraining the ship in fore or aft direction.*

Head/Stern line: *A mooring line that is oriented between longitudinal and transverse direction, restraining the ship in the off-berth and in fore or aft direction. The amount of restraint in fore or aft and off-berth direction depends on the line angle relative to these directions.*

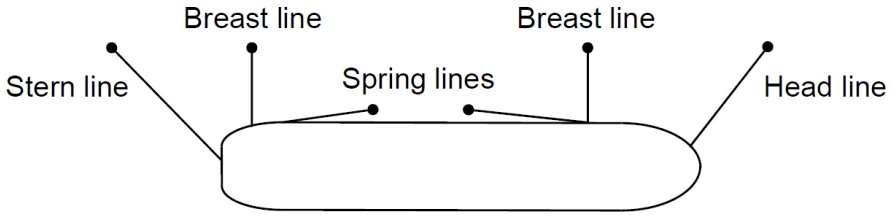

Fig. 18.~~5~~6 mooring line

(IACS Rec. 10, 2.1.2)

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G. Towing Equipment

1. Shipboard fittings and supporting hull structures

1.1 Arrangement and strength

1.1.1 Load consideration

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 Table 18.2. (see Notes),
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 structures. The nominal capacity condition is defined in A.8.

2. The increase of the line design break force for synthetic ropes according to F.1.2 needs not to be taken into account for the loads applied to shipboard fittings and supporting hull structures.

When a safe towing load TOW greater than that determined according to 1.2 is requested by the applicant, then the design load is to be increased in accordance with the appropriate TOW/design load relationship given by 1.1.1 and 1.2.

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. 18.~~6~~7. However, in no case does the design load applied to the fitting need to be greater than twice the design load on the line.

(IACS UR A2.1.3)

1.1.2 Acting point of towing force

The design load applied to supporting hull structure is to be in accordance with 1.1.1.

The reinforced members beneath shipboard fittings are to be effectively arranged for any variation of direction (horizontally and vertically) of the towing forces acting upon the shipboard fittings, see Fig. 18.~~6~~7 for a sample arrangement. Proper alignment of fitting and supporting hull structure is to be ensured.

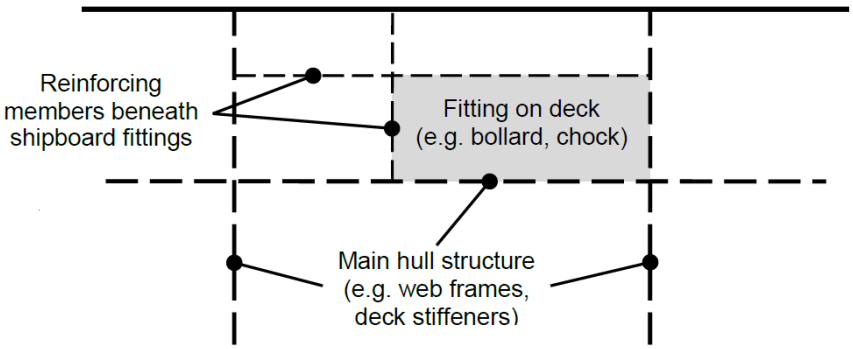

Fig. 18.67 Sample arrangement of reinforced members beneath shipboard fittings

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.18.78 below.

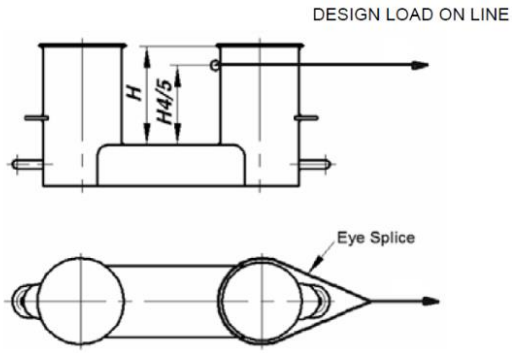

Fig. 18.78 Attachment point of towing line

(IACS UR A2.1.5)

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H. Mooring and Towing Arrangements3. Mooring and towing arrangement

3.2 Towing arrangement

Towing lines should be led through a closed chock. The use of open fairleads with rollers or closed roller fairleads should be avoided.

For towing purpose it is recommended to provide at least one chock close to centreline of the ship forward and aft. It is also beneficial to provide additional chocks on port and starboard side at the transom and at the bow.

Towing lines should have a straight lead from the towing bitt or bollard to the chock.

For the purpose of towing, bitts or bollards serving a chock should be located slightly offset and in a distance of at least 2 m away from the chock, see Fig. 18.89:

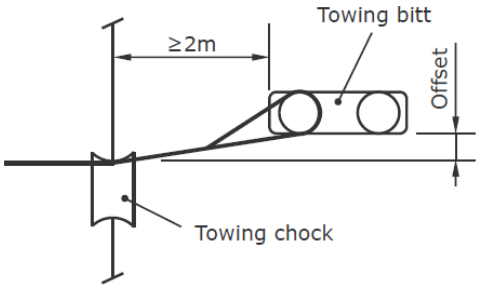

Fig. 18.89 Typical towing arrangement

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Section 21 Hull Outfit

A. General

1. References

Paragraphs of this section are based on the following international convention(s) and/or code(s):

IACS UR S26 Rev.4

IACS UR S27 Rev.~~5~~6

ICLL containing all amendments up to 1st July 2010

At the end of each relevant paragraph, the corresponding paragraphs of the international convention(s) and/ or code(s) are given in brackets

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O. Access to Cargo Area of Oil Tankers and Bulk Carriers

1. Application

1.1 Ships with the class notation OIL TANKER of less than 500 gross tonnage are to comply with the requirements of 2, 4.1, 5 to 11. Ships with the class notation OIL TANKER of 500 gross tonnage and over are to comply with the requirements of SOLAS, 1974 as amended, Ch. II-1, Reg. 3-6 for detail and arrangements of opening and attachments to the hull structure.

1.2 Ships with the class notation **BULK CARRIER** of less than 20000 gross tonnage are to comply with the requirements of 3, 4.1, 4.2, 4.3 and 11. Ships with the class notation **BULK CARRIER** of 20000 gross tonnage and over are to comply with the requirements of SOLAS, 1974 as amended, Ch. II-1, Reg. 3-6.

2. Safe access[1] to cargo holds, cofferdams, ballast tanks, cargo tanks and other spaces in the cargo area is to be direct from the open deck and such as to ensure their complete inspection. Safe access to double bottom spaces or to forward ballast tanks may be from a pump-room, deep cofferdam, pipe tunnel, cargo hold, double hull space or similar compartment not intended for the carriage of oil or hazardous cargoes.

3. Each cargo hold is to be provided with at least two means of access as far apart as practicable. In general, these accesses should be arranged diagonally, for example one access near the forward bulkhead on the port side, the other one near the aft bulkhead on the starboard side.

Ladders are to be so designed and arranged that the risk of damage from the cargo handling gear is minimised.

Vertical ladders may be permitted provided they are arranged above each other in line with other ladders to which they form access and resting positions are provided at not more than 9,0 m apart.

Tunnel passing through cargo holds are to be equipped with ladders or steps at each end of the hold so that personnel may get across such tunnels.

[1] Refer to the Recommendations for entering enclosed spaces aboard ships, adopted by the Organization by resolution A.1050(27) or Petunjuk Masuk Ruang Tertutup (Pt.0, Vol.A).

Where it may be necessary for work to be carried out within a cargo hold preparatory to loading, consideration is to be given to suitable arrangements for the safe handling of portable staging or movable platform

4 ~~.1~~ For access through horizontal openings, hatches or manholes, the dimensions is to be sufficient to allow a person wearing a self-contained air-breathing apparatus and protective equipment to ascend or descend any ladder without obstruction and also provide a clear opening to facilitate the hoisting of an injured person from the bottom of the space. The minimum clear opening is to be not less than 600 mm x 600 mm.

~~4.2~~ When access to a cargo hold is arranged through the cargo hatch, the top of the ladder is to be placed as close as possible to the hatch coaming.

~~4.3~~ Access hatch coamings having a height greater than 900 mm shall also have steps on the outside in conjunction with the ladder.

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Section 22 Structural Fire Protection

A. General

1. Application, Submission of Plans

1.1 The requirements of this Section apply to ~~ships~~ ~~for~~ ~~unrestricted service~~ passenger ships and cargo ships (including tankers) of 500 gross tonnage and upwards, engaged in international voyages. Ships other than those specified above ~~intended for restricted service or ships not subject to SOLAS~~ may diverge from the requirements provided that an adequate level of safety is ensured[2].

1.2 As a minimum this Section incorporates the structural fire protection requirements of Chapter II-2 of SOLAS 74 as amended, including any relevant IMO guidelines and interpretations.

The terms used in this Section ~~correspond~~ is same with ~~to~~ the definitions as per Chapter II-2, Regulation 3 of SOLAS 74.

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[2] Reference is made to the "No. 99 Recommendation for the Safety of Cargo Vessels of less than Convention Size (IACS Rec. 2013)" or equivalent

Section 23 Bulk Carriers, Ore Carriers and Ships with Strengthenings for Bulk Cargo and Heavy Cargo

B. Bulk Carriers

10. Loading information for Bulk Carriers, Ore Carriers and Combination Carriers

10.2 Conditions of approval of loading manuals

In addition to the requirements given in Section 5, A.4.2 the following loading conditions, subdivided into departure and arrival conditions as appropriate, are to be included in the Loading Manual:

- alternate light- and heavy cargo loading conditions at maximum draught, where applicable.
- homogeneous light and heavy cargo loading conditions at maximum draught.
- ballast conditions including those conditions, where ballast holds are filled when the adjacent topwing-, hopper- and double bottom tanks are empty.
- short voyage conditions where the vessel is to be loaded to maximum draught but with limited amount of bunkers.
- multiple port loading/unloading conditions.
- deck cargo conditions, where applicable.
- typical loading sequences where the vessel is loaded from commencement of cargo loading to reaching full dead weight capacity, for homogeneous conditions, the relevant part load conditions and alternate conditions, where applicable. Typical unloading sequences for these conditions shall also be included. The typical loading/unloading sequences shall also be developed to not exceed applicable strength limitations. The typical loading sequences shall also be developed paying due attention to loading rate and the deballasting capability[2] .
- typical sequences for change of ballast at sea, where applicable.

10.3 Approval of the loading instrument

For approval of the loading instrument see Guidelines for Certification of Loading Computer Systems (Pt.4, Vol.1).

----------*end*----------

E. Evaluation of Scantlings of Corrugated Transverse Watertight Bulkheads in Bulk Carriers Considering Hold Flooding

2. Load model

2.3 Pressure in the non-flooded bulk cargo loaded holds

At each point of the bulkhead, in way of length ℓ~~R~~ according to Fig. 23.8 and Fig. 23.9 the pressure p_c [kN/m^2], is given by:

$$p_c = \rho_c \cdot g \cdot h_1 \cdot n$$

[2] Reference is made to IACS recommendation no. 83 (August 2003), "Note to Annexes to IACS unified Requirements S1A on Guidance for Loading/ Unloading Sequence for Bulk Carriers.

ρ_c = bulk cargo density [t/m^3]

g = 9,81 [m/s^2], gravitational acceleration

h_1 = vertical distance [m], from the calculation point to the horizontal plane corresponding to the level height of the cargo (see Fig. 23.7), located at a distance d_1 [m], from the baseline

n = $\tan^2\left(45^\circ - \frac{\gamma}{2}\right)$

γ = angle of repose of the cargo, that may generally be taken as 35° for iron ore and 25° for cement.

F_c = force [kN], acting on a corrugation is given by :

$$F_c = \rho_c \cdot g \cdot e_1 \cdot \frac{(d_1 - h_{DB} - h_{LS})^2}{2} \cdot n$$

e_1 = spacing of corrugations [m], see Fig. 23.8

h_{LS} = mean height of t he lower stool [m], from the inner bottom

h_{DB} = height of the double bottom [m]

----------*end*----------

F. Design Loading Conditions for BC-A, BC-B and BC-C Notations

(IACS UR S25 deleted)

BC-A, **BC-B** and **BC-C** are mandatory additional notations for bulk carriers having **CSR** notation and length **L** ≥ 150 m, therefore the ~~IACS General Structure Rules for Bulk Operators and Oil Tankers~~ Rules for Bulk Carrier and Oil Tankers (Pt.1, Vol.XVII) must be applied.

As request by Owner, the notation of **BC-A**, **BC-B** and **BC-C** may be assigned for other bulk carriers excluded as mentioned above and only design loading condition requirements in the the ~~IACS Common Structural Rules for Bulk Carriers and Oil Tankers (Pt. 1, Ch. 1) Sec. 1.3.1~~ Rules for Bulk Carriers and Oil Tankers (Pt. 1, Vol.XVII.B) Sec. 1.3.1 are to be applied and included in the longitudinal strength calculation according to Section 5.

----------*end*----------

J. Evaluation of Scantlings of the Transverse Watertight Corrugated Bulkhead between Cargo Holds Nos. 1 and 2, with Cargo Hold No. 1 Flooded, for Existing

6. Corrosion addition and steel renewal

~~Section 23, J.6 was deleted on August 2020. Requirements relocated into~~ See Rules for Classification and Surveys (Pt.1, Vol.I) Annex B.6.5.

----------*end*----------

L. Renewal Criteria for Side Shell Frames and Brackets in Single Side Skin Bulk Carriers and Single Side Skin OBO Carriers not Built in accordance with UR S12 Rev.1 or subsequent revisions

~~Section 23, L was deleted on August 2020. Requirements relocated into~~ See Rules for Classification and Surveys (Pt.1, Vol.I) Annex B.11.

----------*end*----------

Section 27 Tugs

A. General

Paragraphs of this section are based on the following international convention(s) and/or code(s):

IACS UR A1 Rev.6

IACS UR M79 Rev.1[1]

At the end of each relevant paragraph, the corresponding paragraphs of the international convention(s) and/or code(s) are given in brackets.

1. Scope, application

1.1 The following requirements apply to vessels primarily designed for towing and/or pushing operations or assisting other vessels or floating objects in manoeuvring. Combination with other purposes is possible and will be noted accordingly in the Class Certificate, see 2.2.

1.2 Unless specially mentioned in this Section, the requirements of Sections 1 – 22 apply.

1.3 Special designs not covered by the following rules will be considered from case to case.

1.4 For instructions regarding towing operations in general, see Guidelines for Safe Ocean Towageing (Pt.1, Vol.12).

2. Classification, Notations

2.1 Ships built in accordance with the requirements of this Section will have the Notation **TUG** affixed to their Character of Classification.

2.2 Where towing services are to be combined with other duties such as offshore supply or ice breaking, corresponding additional Class Notations may be assigned if the relevant requirements are met.

3. Approval documents, documentation

3.1 In addition to the documents listed in the rules mentioned under 1.2 above, the following design documentation shall be submitted in form of soft copy (electronic), for approval and/or information:

- general arrangement of the towing gear including winch(es), if provided,
- design drawings and material specifications of towing hook and accessory towing gear, towrope guide and/or of the towing winch including winch drives, brakes and fastening elements, for examination of towing gear with towing winch, the direction of the towrope has to be indicated on the drawings,
- slip device(s) including hydraulic/pneumatic systems and electric circuits, and/or "weak link" for towrope on winch drum,
- required bollard pull (design value),
- towrope specification,
- in special cases, intended tow configuration(s).

[1] IACS UR M79 has been implemented by IACS Class societies for ships contracted for construction on or after 1 January 2020. In the case of BKI, this requirement together with the amendment of UR M79 Rev.1 was included in the RCN No. 1 July 2021, Rules for Hull (Pt.1, Vol. II).

3.2 The reliable function of the towing gear has to be proven during the initial tests on board.

3.3 If a bollard pull test has to be carried out and will be certified by BKI, it shall correspond to the procedure given in Guidelines for Safe Ocean Towageing (Pt.1, Vol.12). The test results shall be documented and kept on board together with the Certificate of bollard pull testing and the Classification documents.

3.4 Materials

BKI material certificates will generally be required for:

- towing hook and attached load transmitting elements, including slip device,
- towing winch: frame, drum shaft(s), couplings, brakes, and gear(s),
- towrope(s), including certification of breaking force.

Material Certificates according to DIN 50049-3.1B or equivalent standard may be accepted for standard items, if the manufacturer is recognized by BKI.

----------*end*----------

C. Towing Gear/Towing Arrangement

2. Definition of loads

2.1 The design force T corresponds to the towrope pull (or the bollard pull, if the towrope pull is not defined) stipulated by the owner. The design force may be verified by a bollard pull test, see A.3.3 and Guidelines for Safe Ocean Towageing (Pt.1, Vol.12).

----------*end*----------

4. Towropes

4.2 The length of the towrope shall be chosen according to the tow formation (masses of tug and towed object), the water depth and the nautical conditions. Regulations of Flag State authorities have to be observed. For length of towrope for bollard pull test, see Guidelines for Safe Ocean Towageing (Pt.1, Vol.12).

----------*end*----------

6. Testing

6.2 Initial testing

6.2.2 Bollard pull test

In general a bollard pull test will be carried out before entering into service of the vessel. The test can be witnessed and certified by BKI, see Guidelines for Safe Ocean Towageing (Pt.1, Vol.12).

----------*end*----------

Section 32 Dredgers

A. General

Paragraphs of this section are based on the following international convention(s) and/or code(s):

IACS UR A1 Rev.~~3~~7 Corr.1

At the end of each relevant paragraph, the corresponding paragraphs of the international convention(s) and/or code(s) are given in brackets.

----------*end*----------

N. Equipment

1. The equipment of anchors, chain cables, wires and recommended ropes for dredgers for unrestricted service range having normal ship shape of the underwater part of the hull is to be determined in accordance with Section 18.

When calculating the Equipment Number according to Section 18, B bucket ladders and gallows need not to be included. For dredgers of unusual design of the underwater part of the hull, the determination of the equipment requires special consideration.

The equipment for dredgers for restricted range of service is to be determined as for vessels with the Notations L (Coasting Service).

~~2.~~ For dredgers with Notation "T", see Section 30, E.

(IACS UR A1.3.2)

~~3~~2. The equipment of non-self propelled dredgers is to be determined as for barges, in accordance with Section 31, G.

~~4~~3. Considering rapid wear and tear, it is recommended to strengthen the anchor chain cables which are also employed for positioning of the vessel during dredging operations.

----------*end*----------