RUSSIAN MARITIME REGISTER OF SHIPPING

CIRCULAR LETTER **No. 314-26-1829c** dated 28.09.2022

Re:

amendments to the Load Line Rules for Sea-Going Ships, 2022, ND No. 2-020101-155-E, Rules for the Classification and Construction of Sea-Going Ships, 2022, ND No. 2-020101-152-E

Item(s) of supervision:

vessels of dredging fleet under construction and in service

Entry-into-force date:
01.10.2022

~~Cancels / amends / adds Circular Letter No.~~ ~~dated~~

Number of pages: 1 + 12

Appendices:

Appendix 1: information on amendments introduced by the Circular Letter

Appendix 2: text of amendments to the Load Line Rules for Sea-Going Ships and Parts IV "Stability", V "Subdivision", VIII "Systems and Piping", XI "Electrical Equipment" of the Rules for the Classification and Construction of Sea-Going Ships

Director General Konstantin G. Palnikov

Text of CL:

We hereby inform that the Load Line Rules for Sea-Going Ships and the Rules for the Classification and Construction of Sea-Going Ships shall be amended as specified in the Appendices to the Circular Letter.

It is necessary to do the following:

1. Bring the content of the Circular Letter to the notice of the RS surveyors, interested organizations and persons in the area of the RS Branch Offices' activity.
2. Apply the provisions of the Circular Letter during review and approval of the technical documentation on the vessels of dredging fleet contracted for construction of conversion on or after 01.10.2022, in the absence of a contract, during review and approval of the technical documentation on the vessels of dredging fleet requested for review on or after 01.10.2022.

List of the amended and/or introduced paras/chapters/sections:

Load Line Rules for Sea-Going Ships:

Sections 3 and 8;

Rules for the Classification and Construction of Sea-Going Ships:

Part IV: C 3.8

Part V: paras 1.1.1.18 — 1.1.1.20, 1.2.1 and 3.4.14;

Part VIII: paras 4.3.2.15 and 5.3.10;

Part XI: Chapter 19.12

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Appendix 1 to Circular Letter
No. 314-26-1829c dated 28.09.2022

Information on amendments introduced by the Circular Letter
(for inclusion in the Revision History to the RS Publication)

Nos.	Amended paras/chapters/ sections	Information on amendments	Number and date of the Circular Letter	Entry-into-force date
1	Load Line Rules for Sea-Going Ships, Section 3, para 3.2.4.1	Requirements for the coamings heights for fishing vessels have been specified	314-26-1829c of 28.09.2022	01.10.2022
2	Load Line Rules for Sea-Going Ships, Section 3, para 3.2.5.1	Requirements for conditions of the coamings of hatchways have been specified	314-26-1829c of 28.09.2022	01.10.2022
3	Load Line Rules for Sea-Going Ships, Section 8	Conditions for assignment of reduced freeboard for vessels of dredging fleet have been introduced considering the Guidelines for the Assessment of Reduced Freeboards for Dredgers, DR-68 rev.1, distributed by IMO circular LL.3/Circ.236	314-26-1829c of 28.09.2022	01.10.2022
4	Rules for the Classification and Construction of Sea-Going Ships, Part IV, Chapter 3.8	Chapter has been completely revised considering the Guidelines for the Assessment of Reduced Freeboards for Dredgers, DR-68 rev.1, distributed by IMO circular LL.3/Circ.236	314-26-1829c of 28.09.2022	01.10.2022
5	Rules for the Classification and Construction of Sea-Going Ships, Part V, para 1.1.1.20	New para containing requirements for vessels of dredging fleet has been introduced considering the Guidelines for the Assessment of Reduced Freeboards for Dredgers, DR-68 rev.1, distributed by IMO circular LL.3/Circ.236	314-26-1829c of 28.09.2022	01.10.2022
6	Rules for the Classification and Construction of Sea-Going Ships, Part V, para 1.2.1	New definition "Dredging draught d_d" has been introduced	314-26-1829c of 28.09.2022	01.10.2022
7	Rules for the Classification and Construction of Sea-Going Ships, Part V, para 3.4.14	New para containing requirements for vessels of dredging fleet has been introduced considering the Guidelines for the Assessment of Reduced Freeboards for Dredgers, DR-68 rev.1, distributed by IMO circular LL.3/Circ.236	314-26-1829c of 28.09.2022	01.10.2022

Nos.	Amended paras/chapters/ sections	Information on amendments	Number and date of the Circular Letter	Entry-into-force date
8	Rules for the Classification and Construction of Sea-Going Ships, Part VIII, para 4.3.2.15	New para has been introduced considering the Guidelines for the Assessment of Reduced Freeboards for Dredgers, DR-68 rev.1, distributed by IMO circular LL.3/Circ.236	314-26-1829c of 28.09.2022	01.10.2022
9	Rules for the Classification and Construction of Sea-Going Ships, Part VIII, para 5.3.10	New para has been introduced considering the Guidelines for the Assessment of Reduced Freeboards for Dredgers, DR-68 rev.1, distributed by IMO circular LL.3/Circ.236	314-26-1829c of 28.09.2022	01.10.2022
10	Rules for the Classification and Construction of Sea-Going Ships, Part XI, Chapter 19.12	New Chapter has been introduced considering the Guidelines for the Assessment of Reduced Freeboards for Dredgers, DR-68 rev.1, distributed by IMO circular LL.3/Circ.236	314-26-1829c of 28.09.2022	01.10.2022

LOAD LINE RULES FOR SEA-GOING SHIPS, 2022,

ND No. 2-020101-155-E

3 CONDITIONS OF ASSIGNMENT OF FREEBOARDS

1 **Para 3.2.4.1** is replaced by the following text:

"**3.2.4.1** The coamings of hatchways shall be of substantial construction, and their height above the deck shall be at least as follows:

600 mm if in position 1;

450 mm if in position 2.

In fishing vessels, the height of cargo hatchway coamings in position 2 may be reduced down to 300 mm.".

2 **Para 3.2.5.1** is replaced by the following text:

"**3.2.5.1** All hatchways in position 1 or 2 shall be fitted with covers made of steel or other equivalent material. Covers shall be weathertight and fitted with gaskets and clamping devices. The means for strengthening and maintaining weathertightness shall comply with the requirements of 7.10.6, Part III "Equipment, Arrangements and Outfit" of the Rules for the Classification and Construction of Sea-Going Ships[1]. The arrangements shall ensure that the tightness can be maintained in any sea conditions. For this purpose, tests for tightness shall be required at the initial surveys, and may be required at annual and renewal surveys or at more frequent intervals.

The coamings of hatchways shall, generally, comply with the requirements of 3.2.4.1.

Height of the coamings of hatchways, complying with the requirements of 3.2.5.2 – 3.2.5.3, may be reduced as compared to that required by 3.2.4.1 and the coamings may be omitted entirely provided that the cover tightness and securing means are found efficient and the following is submitted:

for hatches that are closed at sea — technical background containing operational limitations considering designation and nature of hatch application;

for hatches that may be open at sea — technical background containing assessment of seaworthiness and deck flooding as well as confirmation that the safety of the ship is provided at any sea condition in accordance with the designated area of navigation.".

3 New **Section 8** is introduced reading as follows:

"8 ASSIGNMENT OF REDUCED FREEBOARD FOR VESSELS OF DREDGING FLEET

8.1 GENERAL

8.1.1 Application.

8.1.1.1 These requirements apply to vessels of dredging fleet (refer to 8.1.2) of 500 gross tons (GT) as measured under the 1969 International Tonnage Convention (ITC) and above, the keels of which are laid after 1 January 2010.

Vessels of dredging fleet (refer to 8.1.2) of 500 gross tons (GT) and above, the keels of which are laid prior to 1 January 2010, may be assigned a reduced freeboard provided that the

[1] Hereinafter referred to as the RS Rules/C

ship complies with the requirements of 3.8, Part IV "Stability", 3.4.14, Part V "Subdivision", 19.12, Part XI "Electrical Equipment", 4.3.2.15 and 5.3.10 and Part VIII "Systems and Piping" of the RS Rules/C.

8.1.1.2 Similar ships such as (non-self-propelled) hopper barges which are capable of discharging their cargo as required under 4.3.2.15, Part VIII "Systems and Piping" of the RS Rules/C, may be treated as dredgers. The requirements for unmanned or non-self-propelled ships are given in 8.4, 4.3.2.15 and 5.3.10, Part VIII "Systems and Piping" of RS Rules/C.

8.1.2 Definitions.

Vessels of dredging fleet (dredger, hopper dredger, hopper barge) is a self-propelled or non-self-propelled manned vessel capable of loading dredgings at sea and fitted with bottom doors or of split type.

Cargo means dredgings and entrained water.

Dredgings (spoil) are materials consisting of soil, sand, gravel, or rock.

8.2 LOAD LINE MARKING ON VESSELS OF DREDGING FLEET

8.2.1 Deck line and load line marks.

8.2.1.1 The dimensions of the deck line shall be determined in compliance with 2.1.1.

8.2.1.2 The dimensions and configuration of the load line mark shall be in compliance with 2.1.2.

8.2.2 Lines to be used with load line mark.

8.2.2.1 The lines which indicate the position of the load waterlines of vessels of dredging fleet (refer to 8.1.2) for loading in different zones, areas and during different seasonal periods of navigation shall be horizontal lines 230 mm in length and 25 mm in breadth which extend forward of and at right angles to, a vertical line 25 mm in breadth marked at a distance 540 mm forward of the centre of the load line mark ring, as well as lines in operation condition: summer load line *S* and fresh water load line in summer *F* marked abaft and at right angles to a vertical line 25 mm in breadth marked at a distance 540 mm abaft the center of the load line mark ring (refer to Fig. 8.2.2.1).

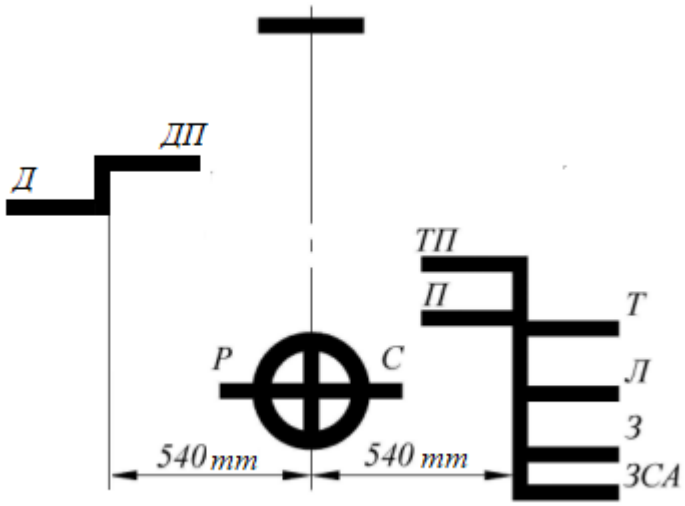

Fig. 8.2.2.1

8.2.3 Mark of assigning authority. Details of marking. Marking of draughts.

The mark of the authority by whom the load lines are assigned and details of marking shall be in compliance with 2.1.3.8.

8.3 REDUCED FREEBOARD FOR VESSELS OF DREDGING FLEET AND CONDITIONS OF ITS ASSIGNMENT

8.3.1 Freeboard.

8.3.1.1 The vessels of dredging fleet (refer to 8.1.2) may be assigned a reduced freeboard for loading, carrying or discharging cargo. The reduced freeboard is a minimum summer freeboard calculated for a type B ship reduced by 2/3 of the minimum summer freeboard to be calculated without requirements of 4.4.8 taken into account.

8.3.1.2 The minimum bow height is calculated in accordance with 4.4.8 and reduced by the reduction as calculated in 8.3.1.1.

8.3.1.3 The reserve buoyancy according to 4.4.8.8 for the vessels of dredging fleet (refer to 8.1.2) shall not be verified.

8.3.1.4 The minimum freeboard for the vessels of dredging fleet (refer to 8.1.2) in fresh water shall be specified similar to 4.5.5.

8.3.2 Condition of assignment of freeboards.

8.3.2.1 No bulwarks shall be fitted along the ships' sides abreast of any hopper which is an open hopper.

8.3.2.2 A safe access from the fore end to the aft end of the dredger shall be provided for the protection of the crew. The safe access shall comply with the applicable requirements according to 3.3.

Where the access is located above the freeboard deck it shall be at least as high above the freeboard deck as the difference between the summer freeboard and the vessels of dredging fleet (refer to 8.1.2) load line freeboard.

8.3.2.3 A suitable hopper geometry shall consist of:

.1 the height above the vessels of dredging fleet (refer to 8.1.2) load line of the spill-out edge of the hopper, exceeding at all points the minimum bow height value calculated according to 8.3.1.2; or

.2 freeing ports of sufficient area to ensure rapid outflow of sea water, the area of such ports being at least equivalent to the area required by 3.2.13.1, when hopper length and height above overflow ducts or spillways are substituted for bulwark length and height above deck; or

.3 closed hopper.

8.3.2.4 For openings addressed by 3.2.10, 3.2.11 and 3.2.12, the terms "uppermost load line" and "summer load line" shall be replaced by the term " the vessels of dredging fleet (refer to 8.1.2) load line".

The minimum coaming height of air pipes and ventilators located on the freeboard deck shall be increased by the difference between the summer freeboard and the freeboard at the the vessels of dredging fleet (refer to 8.1.2) load line.

The coaming of ventilators and air pipes on board of the ship shall not be lower above the waterline than calculated for the coaming height of air pipes and ventilator of the freeboard deck.

8.4 SPECIAL CONSIDERATIONS FOR UNMANNED OR NON-SELF-PROPELLED SHIPS SIMILAR TO DREDGERS

8.4.1 Freeboard.

8.4.1.1 An unmanned ship similar to a vessel of dredging fleet (refer to 8.1.2) is not required to meet the minimum bow height requirement as set forth in 8.3.1.2. In these cases, the spill-out edge shall exceed the required bow height as specified in 8.3.2.4.

8.4.2 Specific load line provisions.

Unmanned ships similar to the vessels of dredging fleet (refer to 8.1.2) shall comply with the requirements of 8.3.2.2 except for the height of safe access requirement.".

RULES FOR THE CLASSIFICATION AND CONSTRUCTION OF SEA-GOING SHIPS, 2022,

ND No. 2-020101-152-E

PART IV. STABILITY

3 ADDITIONAL REQUIREMENTS FOR STABILITY

4 **Chapter 3.8** is replaced by the following text:

"3.8 VESSELS OF DREDGING FLEET

3.8.1 This Chapter applies to vessels of dredging fleet (refer to 8.1.2 of the Load Line Rules for Sea-Going Ships) with descriptive notations **Dredger** or **Hopper barge**, or **Hoper dredger** in the class notation.

3.8.2 Working conditions.

Working conditions is an operation of a vessel of dredging fleet according to its purpose within the prescribed operation zones:

.1 Zone 1 — coastal zone up to 20 miles from the coast;

.2 Zone 2 — zone including the prescribed area of navigation of a vessel.

3.8.3 Loading conditions.

Stability of a vessel of dredging fleet shall be checked for the loading conditions stated below depending on the type of a vessel, its dredging gear and assigned freeboard.

3.8.3.1 For vessels of dredging fleet of all types during voyages under following loading conditions:

.1 vessel with full stores, without spoil (dredgings) (refer to in 8.1.2 of the Load Line Rules for Sea-Going Ships), dredging gear being secured for sea;

.2 vessel in the same loading condition as in 3.8.3.1.1, but with 10 % of stores.

3.8.3.2 In working conditions for hopper dredgers and hopper barges under following loading conditions:

.1 vessel with full stores, with spoil in the hopper, dredging gear being secured for sea;

.2 vessel in the same loading condition as in 3.8.3.2.1, but with 10 % of stores;

.3 for hopper dredgers equipped with grab cranes, additional loading conditions, such as with grab cranes operating from one side and crane boom being in the athwartship plane, with spoil in the grab, with maximum heeling moment and also with the highest position of the boom with due regard to initial heel shall be considered. These conditions shall be considered for a vessel with 10 % of stores and full stores, both with spoil and without it.

Notes: 1. The mass of spoil in the grab is taken to be $1{,}6V$ t where V is the volume of the grab, in m^3.

2. The quantity of spoil in the hopper and the position of the centre of gravity shall be determined assuming that the hopper is filled with homogeneous spoil up to the level of the upper discharge holes or the upper coaming edge, if the discharge holes are not provided, with the vessel having a dredging draught (refer to in 1.2.1 of Part V "Subdivision").

3.8.3.3 In working conditions for dredgers equipped with bucket ladder, under following loading conditions:

.1 vessel with full stores, with spoil in buckets, ladder being secured for sea;

.2 vessel in the same loading condition as in 3.8.3.3.1, but with 10 % of stores.

Note. Spoil is taken into the buckets of the upper part of the ladder (from upper to lower drum). The mass of spoil in each bucket is taken to be $2V$ t where V is the full volume of the bucket, in m^3.

3.8.3.4 In working conditions for dredgers, other than those equipped with bucket ladder, under following loading conditions:

.1 vessel with full stores, with dredging gear in the highest position possible in normal operation;

.2 vessel in the same loading condition as in 3.8.3.4.1, but with 10 % of stores.

For dredgers equipped with grab cranes the additional loading conditions shall be considered in compliance with 3.8.3.2.

N o t e s : 1. Spoil pipeline within the vessel is assumed to be filled with spoil having density equal to 1,3 t/m^3.

2. The mass of spoil in the grab (bucket) is assumed to be 1,6V t where V is the volume of the grab (bucket), in m^3.

3.8.3.5 In working conditions for vessels of dredging fleet assigned with a freeboard in accordance with Section 8 of the Load Line Rules for Sea-Going Ships, under following loading conditions:

.1 vessel in the same loading conditions as in 3.8.3.2, loaded to the dredging draught with a liquid cargo having density up to the spill-out edge of the hopper coaming;

.2 vessel in the same loading conditions as in 3.8.3.2, loaded to the dredging draught with the hopper fully or partly filled with a liquid cargo having densities equal to 1,0, 1,2, 1,4, 1,6, 1,8, 2,0 t/m^3.

When the dredger load line cannot be reached due to the density of the cargo, the vessel is permitted to be considered as loaded to the maximum possible draught;

.3 vessel in the same loading conditions as in 3.8.3.2, loaded to the dredging draught with a solid cargo having density up to the spill-out edge of the hopper coaming;

.4 vessel the same in loading conditions as in 3.8.3.2, loaded to the dredging draught with the hopper fully or partly filled with a solid cargo having densities equal to 1,4, 1,6, 1,8, 2,0, 2,2 t/m^3.

When the dredger load line cannot be reached due to the density of the cargo, the vessel is permitted to be considered as loaded to the maximum possible draught;

.5 vessel loaded to the draught with a liquid cargo having density equal to 1,0 t/m^3 or more ensuring the draught to the summer load line, with 10 % of stores;

.6 for vessels of dredging fleet whose construction of bottom doors and their drive does not prevent the possibility of spoil discharge from one side shall be checked with due regard to such discharge according to 3.8.4.5. These loading conditions shall be considered for a vessel loaded to the dredging draught with a solid cargo having density equal to 1,9 t/m^3.

Note. In case of partly filled hopper, the cargo shall be assumed to consist of two layers: cargo and a layer of sea water on top of the cargo up to the lower edge of the overflow arrangement. Where no overflow arrangement is provided the layer of seawater on top of the cargo shall be assumed to extent to the spill-out edge of the hopper coaming.

3.8.4 Checking of stability in working conditions and during voyages.

3.8.4.1 Stability of vessels of dredging fleet during voyages shall be calculated having regard to the area of navigation prescribed for the vessel concerned.

To be stated in the Stability Booklet are the conditions of voyages, if any (ballast water available, extent to which the dredging gear is dismantled, the position of the ladder, the possibility of spoil transportation in the hopper beyond the limits of 20-mile coastal zone etc.).

The dredgers equipped with a ladder may undertake voyages in the unrestricted area of navigation only with the bucket chain dismantled.

3.8.4.2 When calculating stability of vessels of dredging fleet under working conditions, the following is assumed:

.1 in Zone 1 wind pressure shall be taken as 270 Pa;

amplitude of roll, as for restricted areas of navigation;

.2 in Zone 2 wind pressure and amplitude of roll shall be taken in accordance with area of navigation prescribed for the vessel concerned.

3.8.4.3 Amplitude of roll of the vessels of dredging fleet shall be determined in accordance with 2.1.5.

For restricted areas of navigation **R1** and **R2**, the amplitude of roll determined by Formula (2.1.5.1) shall be multiplied by factor X_3, the value of which is obtained from Table 3.8.4.3.

For hopper dredges and hopper barges having recesses in bottom doors, factor X_1 is obtained from Table 2.1.5.1-1 for the ratio B/d, multiplied by coefficient $(\nabla + \nabla_v)/\nabla$, where ∇ is the volume displacement of the vessel with no regard to bottom recess, in m^3; ∇_v is the volume of bottom recess, in m^3.

Table 3.8.4.3

Factor X_3

$\sqrt{h_0/B}$	0,04 and less	0,05	0,06	0,07	0,08	0,09	0,1	0,11	0,12	0,13	0,14	0,15	0,16	0,17	0,18	0,19	0,2 and more
X_3	1,27	1,23	1,16	1,08	1,05	1,04	1,03	1,02	1,01	1,0	1,0	1,01	1,03	1,05	1,07	1,10	1,13

3.8.4.4 Stability of dredgers and hopper dredgers equipped with grab cranes at additional loading conditions specified in 3.8.3.2.3 shall meet the requirements of 4.1.

3.8.4.5 Stability of hopper dredgers and hopper barges whose construction of bottom doors and their drive does not prevent the possibility of spoil discharge from one side shall be checked with due regard to such discharge in accordance with 3.8.7.2 taking into account 3.8.4.6 and 3.8.4.7 for the most unfavourable loading condition out of the conditions specified in 3.8.3.2.1 and 3.8.3.2.2.

3.8.4.6 Transverse centre of gravity y_g, in m, when discharging the spoil from one side out of fully loaded hopper, is determined by the formula

$$y_g = 0{,}2y \qquad (3.8.4.6)$$

where y = transverse centre of gravity of spoil in that part of the hopper from which the discharge is performed, in m.

3.8.4.7 When spoil is discharged by long chute or conveyor methods, stability of a dredger shall be checked taking into account static heeling moment due to the long chute or the conveyor (in the athwartship plane) filled with spoil (with no regard to the waves and wind effects).

3.8.5 Effect of liquid cargo outflow and sea water inflow into the hopper.

When calculating stability for hopper dredgers and hopper barges, it shall be assumed that:

.1 for a vessel with spoil having density over 1,3 t/m^3, the spoil is regarded as solid non-overflowing cargo, unless otherwise stated.

The calculation of vessel's trim, righting lever and dynamic stability curve lever is carried out for the constant displacement and position of the spoil centre of gravity in the hopper until the sea water enters into the hopper from overboard or through overflow arrangement.

After sea water inflow into the hopper, the calculation of trim, righting lever and dynamic stability curve lever is carried out for variable displacement and position of the spoil centre of gravity;

.2 for a vessel with spoil having density equal to or less than 1,3 t/m^3, the spoil is considered as a liquid cargo, unless otherwise stated.

The calculation of vessel's trim, righting lever and dynamic stability curve lever is carried out for variable displacement and position of the spoil centre of gravity, taking account of the liquid cargo outflow and sea water inflow into the hopper from overboard or through overflow arrangement;

.3 for a vessel without spoil, the hopper is in direct communication with sea water, i.e. bottom doors or valves are open.

The calculation of vessel's trim, righting lever and dynamic stability curve lever is carried out for the constant displacement.

3.8.6 Effect of dredging gear icing.

When estimating the effect of icing of vessels of dredging fleet, the horizontal projection of dredging gear is added to the area of horizontal projection of decks (the centreline projection being included in the windage area).

The vertical moment due to this additional ice load is determined by the centre of gravity elevation of the projection of the dredging gear in its working or secured for sea position to the centreline.

3.8.7 Stability criteria.

3.8.7.1 In the loading condition specified in 3.8.3.5.5, stability of a vessel of dredging fleet shall comply with the requirements of 2.1 at assumed wind pressure corresponding to the area of navigation of the vessel.

3.8.7.2 In case of spoil discharge from one side of the hopper specified in 3.8.4.5, stability of a vessel of dredging fleet shall comply with the following criteria:

.1 the angle of static heel shall not exceed 25°;

.2 the righting lever shall be not less than 0,1 m within 30° after the angle of static heel;

.3 the length of positive righting lever curve shall be not less than 30°.

3.8.7.3 The angle of static heel of a dredger where spoil is discharged by long chute or conveyor methods specified in 3.8.4.7, shall not exceed the angle of down-flooding or the angle at which the freeboard becomes equal to 0,3 mm, whichever is less.

3.8.7.4 For dredgers equipped with bucket ladder in all loading conditions specified in 3.8.3, as well as when taking account of icing, the maximum righting lever at an angle of heel greater than 25° shall be:

when operating in Zone 1 — not less than 0,25 m;

during voyages and when operating in Zone 2 — not less than 0,4 m.".

PART V. SUBDIVISION

1 GENERAL

5 **Para 1.1.1.20** is introduced reading as follows:

"**.20** vessels of dredging fleet.".

6 **Para 1.2.1.** After definition "The ship length L_1", new definition "Dredging draught d_d" is introduced reading as follows:

"Dredging draught d_d is a draught to the dredger load line.".

3 DAMAGE TRIM AND STABILITY

7 **New para 3.4.14** is introduced reading as follows:

"**3.4.14 Vessels of dredging fleet.**

3.4.14.1 Requirements of Section 2 supplemented by 3.4.14.2, 3.4.14.3 and 3.4.14.4 shall be fulfilled for vessels of dredging fleet with descriptive notations **Dredger** or **Hopper barge**, or **Hopper dredger** in the class notation, which are assigned a freeboard in accordance with Section 8 of the Load Line Rules for Sea-Going Ships. For such vessels with length $L_s < 80$ m, the required subdivision index shall be calculated assuming $L_s = 80$ m.

3.4.14.2 The calculation of the righting lever curves shall take into account:

the change of trim due to heel;

in the case of an open hopper the inflow of sea water or outflow of liquid cargo and sea water over the spill-out edge of the hopper coaming;

the inflow of sea water through any overflow arrangement, spillways, scuppers or freeing ports, either at the lower edge of the opening or at the cargo/sea water interface, whichever is the lower. Adjustable overflows operated from the navigation bridge, may be considered to be located at the highest position;

outflow of the cargo only occurs over the spill-out edge of the hopper coaming where this edge has a length of at least 50 % of the maximum hopper length at a constant height above the freeboard deck on both sides of the hopper;

the sliding of the cargo surface in the hopper, in transverse and longitudinal direction according to the following formula:

$$\begin{aligned} &\theta_r = \theta_g && \text{for } \rho \leq 1400 \text{ kg/m}^3 \text{ (liquid cargo)} \\ &\theta_r = \theta_g\,(2000 - \rho)/600 && \text{for } 1400 < \rho < 2000 \text{ kg/m}^3 \text{ (sliding cargo)} \\ &\theta_r = 0 && \text{for } \rho \geq 2000 \text{ kg/m}^3 \text{ (solid cargo)} \end{aligned} \qquad (3.4.14.2)$$

where ρ = cargo density, in kg/m^3;
θ_r = shifting angle of the cargo surface, in deg.;
θ_g = angle of heel or angle of trim, in deg.

3.4.14.2.1 The damage stability calculations shall take into account all the possible progressive floodings. Progressive flooding is an additional flooding of spaces interconnected with those assumed to be damaged.

Such additional flooding may occur through openings or pipes as indicated in conditions stated below.

Internal progressive flooding via:

pipes and connected valves which are located within the assumed damage, where no valves are fitted outside the damage zone;

pipes, even if located outside the damage zone, where all the following conditions apply:

.1 the pipe connects a damaged space to one or more intact spaces;

.2 the pipe is below a damage waterline at all points between the connected spaces;

.3 the pipe has no valves between the connected spaces;

all internal doors other than:

remotely operated sliding watertight doors;

watertight access doors required to be normally closed at sea.

External progressive flooding via:

external openings where a damage waterline immerses the lower edge of the sill or coaming and where the openings are not fitted with watertight means of closure. Such non-watertight openings include air pipes whether or not fitted with automatic weathertight closure, ventilators, hatch covers whether or not fitted with weathertight means of closure. Openings which may be assumed watertight include manhole covers, flush scuttles and small watertight hatch covers which maintain the high integrity of the deck, side scuttles of the non-opening type.

3.4.14.2.2 When calculating the damaged stability, only the dredging draught d_d and the light service draft d_l need to be taken into account.

3.4.14.3 The attained subdivision index for the light service draught A_l shall be calculated and corresponding trim, assuming the vessel of a dredging fleet is loaded with 50 % stores and fuel, no cargo in the hopper(s), and the hopper(s) in direct communication with the sea.

3.4.14.4 The attained subdivision index for the dredging draught A_d shall be calculated for each cargo density defined in 3.4.14.4.1 and 3.4.14.4.2 assuming the vessel of a dredging fleet is loaded with 50 % stores and fuel.

The damage stability calculations shall be performed taking into account the initial trim of the dredger load line and an assumed permeability of the cargo filled hopper space of 0 % and a permeability of the space above the cargo equal to 100 %.

In performing these calculations, the spoils are considered not to be porous and that any sea water that enters a partially full hopper due to damage ingresses only to the space above the upper surface of the spoils.

3.4.14.4.1 The design density ρ_d corresponding to the dredger load line is determined by the formula

$$\rho_d = M_2/V_2$$

where M_2 = mass of cargo in the hopper when loaded at dredger load line with stores and fuel at 50 %, in kg;
V_2 = volume of the hopper at the highest overflow position, in m^3.

3.4.14.4.2 Each density ρ_i greater than ρ_d is determined by the formula

$$\rho_i = 2200 - 200(i)$$

where $i = [0, 1, 2, 3 \ldots 6]$.

3.4.14.5 The required subdivision index R and the attained subdivision index A are calculated according to Section 2 except that instead of Formula (2.3.1-1), the following shall be taken into account:

$A \geq R$ for each cargo density defined in 3.4.14.4.1 and 3.4.14.4.2;
$A_l \geq 0{,}7R$
$A_d \geq 0{,}7R$ for each cargo density defined in 3.4.14.4.1 and 3.4.14.4.2

where $A = 0{,}5(A_l + A_d)$;
A_l = attained subdivision index at light service draught d_l, no cargo, considering 3.4.14.3;
A_d = attained subdivision index at dredging draught d_d and cargo densities defined in 3.4.14.4.1 and 3.4.14.4.2.".

PART VIII. SYSTEMS AND PIPING

4 ELEMENTS OF THE SYSTEMS AND PIPING

8 **New para 4.3.2.15** is introduced reading as follows:

"**4.3.2.15** Emergency closing devices shall be provided for the vessel of dredging fleet (refer to 8.1.2 of the Load Line Rules for Sea-Going Ships) valves in piping systems penetrating the shell below the freeboard deck and which are normally open when loading cargo by dredging. The emergency closing devices shall be operable from the navigation bridge. They shall be capable of manual operation in case of failure of the main electric power supply, the main hydraulic unit or single failure of the remote control system.".

5 PIPING LAYING

9 **New para 5.3.10** is introduced reading as follows:

"**5.3.10** Means for overflow of process water shall be arranged over the spill-out edge of the hopper coaming or through overflow ducts or spillways in the hopper walls or through adjustable overflows. In this case, the overflow ducts or spillways and overflows shall have an area of at least

$0{,}7(L_h)^2$/1000 m^2

where L_h = the maximum length of the hopper, in m;

or

Q/3 m^2

where Q = the total maximum water capacity of the suction dredge pumps, in m^3/s,

whichever is greater.".

PART XI. ELECTRICAL EQUIPMENT

19 REQUIREMENTS FOR ELECTRICAL EQUIPMENT PROCEEDING FROM SHIP PURPOSE[1]

10 **New Chapter 19.12** is introduced reading as follows:

"19.12 VESSELS OF DREDGING FLEET

19.12.1 General.

Requirements of this Chapter cover electrical equipment of vessel of dredging fleet (refer to 8.1.2 of the Load Line Rules for Sea-Going Ships). with descriptive notation **Dredger,** or **Hopper barge,** or **Hopper dredger** in addition to the applicable requirements of Sections 1 — 18 of this Part.

19.12.2 Survey of electrical equipment.

19.12.2.1 In addition to the requirements of 1.3.2.1 of this Part, the following equipment, systems and devices are subject to survey on board the vessel of dredging fleet (refer to 8.1.2 of the Load Line Rules for Sea-Going Ships):

.1 electric drives of cargo discharge system and their control system;

.2 electric drives and their systems of the emergency control systems for closing the dredging valves.

19.12.3 Draught gauges.

An accurate draught indicator of the vessel of dredging fleet (refer to 8.1.2 of the Load Line Rules for Sea-Going Ships), capable of showing the corresponding position of the draught, shall be fitted at the navigation bridge. This draught indicator shall also be capable of providing a record of draught as a function of time.".