RUSSIAN MARITIME REGISTER OF SHIPPING
HEAD OFFICE

CIRCULAR LETTER **No.** 314-26-797c dated 12.01.2015

Re:

On coming into force of a new revision of IACS Unified Requirement (UR) S20 (Rev. 6, Apr. 2014) "Evaluation of Allowable Hold Loading for Non-CSR Bulk Carriers Considering Hold Flooding"

Item of technical supervision:

Bulk carriers under construction

Implementation	upon receipt
Valid: till	-
Validity period extended till	-
Cancels / Amends/ Supplements Circular Letter No.	- dated -
Number of pages:	1+6
Appendices:	Amendments to Chapter 3.3, Part II "Hull" of the Rules for the Classification and Construction of Sea-Going Ships (hereinafter, the Rules) on 6 pages

Technical Director - Head of Classification Directorate Vladimir I. Evenko

Amends Rules for the Classification and Construction of Sea-Going Ships, 2014 – ND No. 2-020101-077 and 2015 – ND No. 2-020101-085

We hereby inform you that in connection with application in the RS activity of a new revision of IACS UR S20 (Rev. 6, Apr. 2014) "Evaluation of Allowable Hold Loading for Non-CSR Bulk Carriers Considering Hold Flooding" the amendments given in the Appendix to the Circular Letter shall be introduced into Chapter 3.3, Part II "Hull" of the Rules.

The control copy of IACS UR (in English) is posted on the RS internal website in the Section "External Normative Documents/ND No. №1-0212-020-E".

The amendments will be introduced into a new edition of the Rules.

It is necessary to do the following:

1. Apply the amendments to the Rules during review and approval of technical documentation on bulk carriers.
2. Bring the content of the Circular Letter to the notice of the RS surveyors, interested organizations and ahipowners in the area of the RS Branch Offices' activity.

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DMS "THESIS" No.	internal document 276547 of 19.11.2014		

Appendix to Circular Letter

No. 314-26-797c of 12.01.2015

Amendments
to the Rules for the Classification and Construction of Sea-Going Ships, 2014 – ND No. 2-020101-077 and 2015 – ND No. 2-020101-085

PART II. Hull

3.3 BULK CARRIERS AND OIL OR BULK DRY CARGO CARRIERS

Para. 3.3.4.1.1 shall be supplemented with the following text:

"For ships of 150 m in length and more, intended to carry cargoes having bulk density of 1,0 t/m^3 and more of:

single side skin construction; or

double side skin construction in which any part of longitudinal bulkhead is located within *B*/5 or 11,5 m, whichever is less, inboard from the ship's side at right angle to the centreline at the assigned summer load line;

contracted for construction on or after 1 July 2006,

the strength of double-bottom structural components shall be additionally verified in accordance with a special procedure, described in Appendix 4, for the case of each of the holds being flooded.".

1. A new Appendix 4 to Part II "Hull" shall be introduced:

"*APPENDIX 4*

ASSESSMENT OF PERMISSIBLE LOADING OF A CARGO HOLD IN VIEW OF THE POSSIBILITY OF ITS BEING FLOODED FOR NULK CARRIERS NOT COVERED BY COMMON STRUCTURAL RULES

1 APPLICATION AND DEFINITIONS

The loading of each hold determined in Section 4 of this Appendix shall not exceed the permissible hold loading in flooded condition when loads given in Section 2 and the bearing capacity of double bottom by shear given in Section 3 of this Appendix are used.

In no case the permissible hold loading in flooded condition shall exceed the design loading of an intact hold.

2 LOADING MODEL

2.1 General.

The following loads are considered to be applied to the double bottom: external pressure from the sea side and the combination of loads from cargo and water when the hold in which the double bottom is fitted is flooded.

During calculations the most unfavourable combinations of loading and hold flooding

depending on the following loading conditions contained in the Loading Manual shall be used:

uniform loading;

non-uniform loading;

pallet cargo loading (rolled iron, for instance).

The permissible loading for a hold shall be determined for each type of loading condition in case of maximum density of bulk cargo carried.

2.2 Water head acting upon the inner bottom.

Water head h_f (refer to Fig. 2.2 of this Appendix) is the distance, in m, measured vertically, with the ship in the upright position, from the inner bottom to a level re moved to the distance d_f, in m, from the base line and equal to:

in the general case:

D for the first hold;

0,9*D* for other holds;

for ships with type B freeboard which deadweight is below 50000 t:

0,95*D* for the first hold;

0,85*D* for other holds.

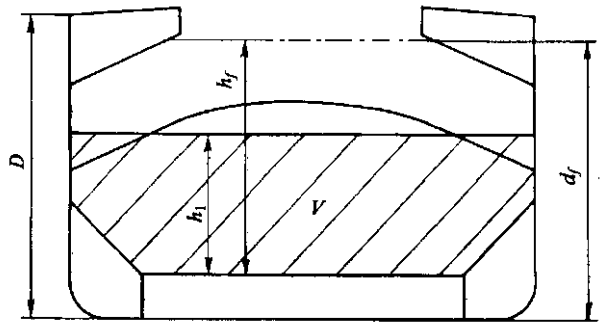

Fig. 2.2:

V = cargo volume;

D = distance, in m, from the base line to the freeboard deck measured along the side

3 BEARING CAPACITY OF DOUBLE BOTTOM BY SHEAR

3.1 The bearing capacity, *C*, of double bottom by shear shall be determined on its contour as the sum of shearing forces in web girder cross sections:

.1 all floors attached to both bilge tanks;

less than half of the shearing forces in two floors adjacent to each lower support for a transverse bulkhead or to a transverse bulkhead where no support is fitted (refer to Fig. 3.1 of this Appendix);

.2 all double-bottom stringers attached to both lower supports for transverse bulkheads or to trans verse bulkheads where no supports are fitted. If stringers or floors terminate between holds and are not directly attached to the lower support of a transverse bulkhead or a bilge tank wall, the relevant shearing forces shall be assessed for a single cross section only. The floors and stringers under consideration are those installed within the hold boundaries and formed by bilge tanks and lower supports for transverse bulkheads (or by transverse bulkheads where no supports are fitted). The bilge tank walls and floors fitted directly below the joints of lower sup ports for transverse bulkheads (or of transverse bulkheads where no supports are fitted) to the inner bottom shall not

be considered during calculation. If the geometry and/or framing system of double bottom is not in compliance with the above provisions, the bearing capacity C of double bottom shall be determined according to the requirements of 3.3, Part II "Hull" or Strength Norms for Sea-Going Ships on a special agreement with the Register. When determining the carrying capacity by shear, net thicknesses of floors and stringers shall be used. The net thickness tnet, in mm, shall be determined by the formula

$$t_{net} = t - 2.5$$

where t = thickness of floors and stringers, in mm.

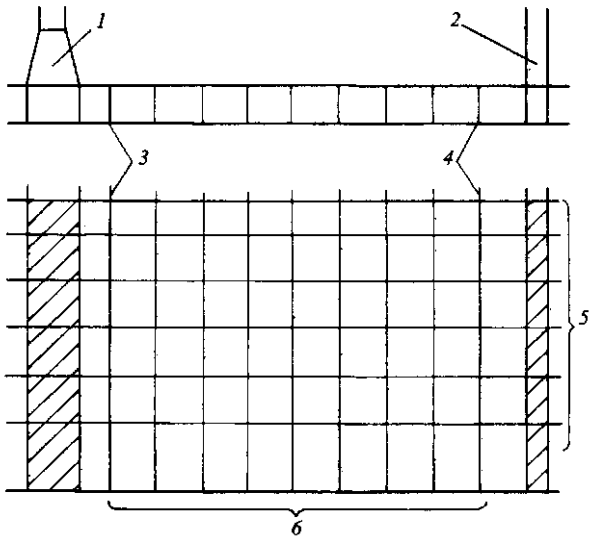

Fig. 3.1:
1 – lower support for transverse bulkhead;
2 – transverse bulkhead;
3 – floor adjacent to lower support for bulkhead;
4 – floor adjacent to transverse bulkhead;
5 – stringers;

6 –floors

3.2 Shearing force in floors.

The shearing force S_{f1}, in kN, in the floor panel cross section adjacent to bilge tanks and the shearing force S_{f2}, in kN, in the cross section of the ultimate panel of a lightened floor (i.e. the lightened panel nearest to the bilge tank) shall be determined by the formulae:

$$S_{f1} = 10^{-3} A_f \frac{\tau_a}{\eta_1},$$

$$S_{f2} = 10^{-3} A_{f,2} \frac{\tau_a}{\eta_2},$$

where A_f = cross-sectional area of a floor panel adjacent to bilge tanks , in mm^2;

$A_{f,h}$ = net cross-sectional area of the ultimate panel of a lightened floor (i.e. the lightened panel adjacent to the bilge tank), in mm^2;

τ_a = permissible tangential stresses, in N/mm2, to be adopted equal to:

$\tau_a = \frac{162\sigma_F^{0.6}}{(\frac{s}{t_{net}})^{0.8}}$ or $R_{eH}/\sqrt{3}$, whichever is less.

For floors attached to the lower supports for transverse bulkheads or to transverse bulkheads, τ_a may be adopted as

$$\tau_a = R_{eH}/\sqrt{3}$$

where R_{eH} = minimal upper yield stress of material, in N/mm^2;

s = spacing of stiffeners on the floor panel in question, in mm;

η_1= 1,10;

η_2= 1,20, whereas may be reduced to 1,10 at the Register discretion, provided the relevant stiffeners comply with the requirements of Instructions for Determination of the Technical Condition, Renovation and Repair of the Hulls of Sea-Going Ships (refer to Annex 2 of the Rules for the Classification Surveys of Ships).

3.3 Shearing force in stringer.

The shearing force S_{g1}, in kN, in the cross section of the stringer panel adjacent to the lower supports for transverse bulkheads (or to transverse bulkheads where no supports are fitted) and the shearing force S_{g2}, in kN, in the cross section of the margin panel of the most lightened stringer (i.e. the lightened panel nearest to the lower support for the transverse bulkhead or to the transverse bulkhead where no support is fitted) shall be determined by the formulae:

$$S_{g1} = 10^{-3} A_g \frac{\tau_a}{\eta_1},$$

$$S_{g2} = 10^{-3} A_{g,h} \frac{\tau_a}{\eta_2},$$

where A_g = cross-sectional area of stringer panel adjacent to the lower supports for bulkheads (or to transverse bulkheads where no support is fitted), in mm^2;

$A_{g,h}$ = net cross-sectional area of margin panel of the most lightened stringer (i.e. the lightened panel nearest to the lower support for the transverse bulkhead or to the transverse bulkhead where no support is fitted), in mm^2;

τ_a = permissible tangential stresses, in N/mm^2, as specified in 3.2 of this Appendix;

$\eta_1 = 1{,}10$;

$\eta_2 = 1{,}15$, whereas η_2 may be reduced to 1,10 1,10 at the Register discretion, provided the relevant stiffeners are fitted to meet the requirements of the Instructions on Assessment of the Hull Technical Condition (refer to Appendix 2 to the Rules for the Classification Surveys of Ships in Service).

4 PERMISSIBLE LOADING OF HOLD

The permissible loading of hold *W*, in t, shall be determined by the formula

$$W = \rho_c V \frac{1}{F}$$

where *F* =1,1 for general loading conditions;

F = 1,05 for rolled iron;

ρ_c = bulk cargo density, in t/m^3 (refer to 2.1 of this Appendix). For steel products ρ_c shall be adopted equal to the steel density;

V =cargo volume, in m^3, corresponding to the hold being filled to the level h_1 by depth;

$$h_1 = \frac{X}{\rho_c g}.$$

For bulk cargoes *X* shall be adopted as the lesser value of X_1 or X_2 determined by the formulae:

$$X_1 = \frac{Z + \rho g(E - h_1)}{1 + \frac{\rho}{\rho_c}(perm - 1)},$$

$$X_2 = Z + \rho g(E - h_f perm),$$

where $X = X_1$ for steel products with *perm* = 0;

ρ = seawater density, in t/m^3;

E $= d_f - 0.1D$ – ship draught with a hold flooded, in m;
for d_f, D, refer to 2.2 of this Appendix;
h_f = water head during flooding , in m (refer to 2.2 of this Appendix);
perm = cargo permeability (i.e. the relationship between the interstitial space and cargo volume), whereas perm shall not be adopted greater than 0,3;
$Z = Z_1$ or Z_2, whichever is the less, whereas:

$Z_1 = \frac{C_h}{A_{DB,h}}$,

$Z_2 = \frac{C_e}{A_{DB,e}}$,

C_h = bearing capacity, in kN, of double bottom by shear in accordance with Section 3 of this Appendix, while the shearing force S_{f1} and S_{f2} for each floor, whichever is the less, shall be determined according to 3.2 of this Appendix, and the shearing force S_{f1} or S_{f2} for each stringer, whichever is the less, shall be determined according to 3.3 of this Appendix;

C_e = bearing capacity, in kN, of double bottom by shear in accordance with Section 3 of this Appendix, while the shearing force S_{f1} for each floor shall be determined according to 3.2 of this Appendix, and the shearing force S_{g1} and S_{g1} for each stringer, whichever is the less, shall be determined according to 3.3 of this Appendix;
$A_{DB,h} = \sum_{i=1}^{i=n} S_i B_{DB,i}$,

$A_{DB,e} = \sum_{i=1}^{i=n} S_i (B_{DB} - s_1)$,

n = number of floors between lower supports for transverse bulkheads (or between transverse bulkheads where no supports are fitted);
S_i = spacing of i-the floor, in m;
$B_{DB,i} = B_{DB} - s_1$ for floors for which shearing forces are determined by S_{f1} determined according to 3.2 of this Appendix;
$B_{DB,i} = B_{DB,h}$ for floors for which the shearing forces are determined by S_{f2} determined according to 3.2 of this Appendix;
B_{DB} = double bottom breadth between bilge tanks, in m (refer to Fig. 4 of this Appendix);
$B_{DB,h}$ = distance between two openings under consideration, in m (refer to Fig. 4 of this Appendix);
s_1 = distance between bilge tank wall and the nearest main framing longitudinal of inner bottom, in m.

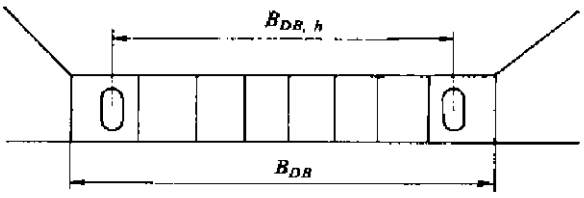

Fig. 4