RULES FOR FLOATING DOCKS

Rules for Floating Docks 2017 AMENDMENT NO.1

Rule No.96 25 December 2017
Resolved by Technical Committee on 26 July 2017

ClassNK
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Rule No.96 25 December 2017
AMENDMENT TO THE RULES FOR FLOATING DOCKS

"Rules for floating docks" has been partly amended as follows:

Chapter 5 HULL STRUCTURE

5.1 General

Paragraph 5.1.1 has been amended as follows.

5.1.1 Material

1 This chapter applies to the docks mainly constructed with the hull structural rolled steels specified in **Part K of the Rules for the Survey and Construction of Steel Ships** or equivalent. ~~Where the higher tensile steels are used, its structure is to be to the satisfaction of the Society.~~

2 ~~Grade *KA* steels specified in **Part K of the Rules for the Survey and Construction of Steel Ships** may be used for the main structures of the hull.~~ The grades of steels used for the main structures of hulls are to be either of the following **(1)** or **(2)**: ~~Grade *KD* steels will, however, be required for the main structural members such as the deck plates, shell plates and their girders within 0.4*L* amid-length, where the thickness exceeds 30 *mm*.~~

(1) Where mild steel is used, the grade *KA* steels specified in **Part K of the Rules for the Survey and Construction of Steel Ships** may be used for main structures of hulls. Grade *KD* steels, however, is required for primary structural members such as deck plates, shell plates and their associated girders in cases where their respective thickness exceeds 30 *mm* and they are located within 0.4 *L* of amidships.

(2) Grades of high tensile steels used for the main structures of hulls are to be in accordance with **1.1.11, Part C of the Rules for the Survey and Construction of Steel Ships**.

3 (Omitted)

5.2 Longitudinal Strength

Paragraph 5.2.4 has been amended as follows.

5.2.4 Permissible Stresses

For the loading conditions defined in **5.2.1** the longitudinal bending stresses are not to exceed ~~142~~ $\frac{142}{K}$ *N/mm*^{2} and the shear stresses are not to exceed ~~98~~ $\frac{98}{K}$ *N/mm*^{2}, where *K* is coefficient for the kind of steel and is defined as follows:

Mild steels *KA*, *KB*, *KD* or *KE*: 1.00
High tensile steels *KA*32, *KD*32, *KE*32 or *KF*32: 0.78
High tensile steels *KA*36, *KD*36, *KE*36 or *KF*36: 0.72
High tensile steels *KA*40, *KD*40, *KE*40 or *KF*40: 0.68

Paragraph 5.2.6 has been amended as follows.

5.2.6 Approximate Formula of Required Section Modulus

Notwithstanding the requirements of **5.2.1**, **5.2.3** and **5.2.4**, the section modulus required for the hull structure may be generally determined from the formula where the lifting capacity of the dock is not exceeds 40,000 *tons*. Where high tensile steels are used, the extent of use is to be as

deemed appropriate by the Society.

Z = ~~2.35QL~~ 2.35KQL (cm^3)

K: As specified in **5.2.4**.

Q: the maximum lifting capacity in *tons*.

Paragraphs 5.2.7 and 5.2.8 have been renumbered to Paragraphs 5.2.8 and 5.2.9, and Paragraph 5.2.7 has been added as follows.

5.2.7 Buckling

The buckling strength for the longitudinal strength members of docks is to be in accordance with the requirements in **15.4, Part C of the Rules for the Survey and Construction of Steel Ships**.

5.2.~~7~~8 Operation Manual

(Omitted)

Paragraph 5.2.9 has been amended as follows.

5.2.~~8~~9 Deflection Control

The maximum allowable deflection of the dock is to be submitted for approval. ~~This deflection is not to exceed that corresponding to a stress of 142 N/mm^2 when lifting the ship defined in **5.2.1**.~~ This deflection is not to exceed that under the loading conditions defined in **5.2.1**. As for deflection monitoring measures, *see* **6.2**.

5.3 Transverse Strength

Paragraph 5.3.4 has been added as follows.

5.3.4 Buckling

1 The structural panels and members of the hull structures are to be adequately stiffened to prevent buckling.

2 Where the maximum lifting capacity of a dock exceeds 40,000 *tons*, buckling strength is to be assessed using the stresses obtained from direct strength calculations.

Section 5.4 has been amended as follows.

5.4 Structural Detail and Local Strength

5.4.1 Structural Arrangement

(Omitted)

~~**5.4.2 Buckling**~~

~~The structural panels and members of the hull structures are to be adequately stiffened to prevent buckling.~~

5.4.~~3~~2 Tank and Shell Plates

The thickness of the tank and shell plates is not to be less than obtained from the following formula. The minimum thickness is, however, to be 6.5 *mm* for the tank plates and 7 *mm* for the shell plates.

~~$3.6S\sqrt{h}+2.5$~~ $CS\sqrt{h}+2.5$ (mm)

where :

C : To be obtained from the following formulae according to bulkhead type and stiffener system:

For longitudinal tank plates and side shells of longitudinal systems

$$C = 13.4\sqrt{\frac{K}{27.7 - \alpha K}}$$

However, C is not to be less than $3.6\sqrt{K}$.

For longitudinal tank plates and side shells of transverse systems

$$C = 100\sqrt{\frac{K}{767 - \alpha^2 K^2}}$$

For transverse tank plates

$$C = 3.6\sqrt{K}$$

where :

K : As specified in **5.2.4**.

α : Either α_1 or α_2 according to values of z

$$\alpha_1 = 14.5 f_D \frac{z - z_B}{z_0} \quad \text{when } z_B < z$$

$$\alpha_2 = 14.5 f_B \left(1 - \frac{z}{z_B}\right) \quad \text{when } z \le z_B$$

where :

f_D and f_B : Ratios of section moduli of athwartship section on the basis of mild steel in accordance with the requirements of **5.2** to actual section moduli of athwartship section concerning the top deck plating and the bottom plating

z : Vertical distance (m) from the top of the bottom plating to the lower edge of the tank plating under consideration

z_B : Vertical distance (m) from top of the bottom plating amidship to the horizontal neutral axis of the athwartship section of the dock

z_0 : Vertical distance (m) from the neutral axis to the top of the top deck beam

S : Spacing of stiffeners, frames etc., in *metres*

h : 2.5 m or the following, whichever is greater

for tanks;

Vertical distance measured from the lower edge of plate to the mid-point of the distance between the top of tanks and the top of overflow pipes in *metres*. As an alternative the maximum differential head defined in **5.4.~~7~~6** may be used for the ballast tanks.

for cofferdams and void spaces;

Vertical distance measured from lower edge of plate to the maximum immersion water line in *metres*.

5.4.4~~3~~ **Tank Stiffener and Frame**

The section modulus of tank stiffeners and frames is not to be less than obtained from the following formula;

~~$6.65CShl^2$~~ $125C_1C_2Shl^2$ (cm^3)

where :

S : Spacing of stiffeners, frames etc. in *metres*
l : Span of stiffeners, frames etc. in *metres*
h : 2.5 *m* or the following, whichever is greater.
for tanks;
Vertical distance measured from the mid-point of l for vertical stiffeners of S for horizontal stiffeners to the midpoint of the distance between the top of tanks and the top of overflow pipes in *metres*. As an alternative, the maximum differential head defined in **5.4.~~7~~6** may be used for the ballast tanks.
for cofferdams and void spaces;
Vertical distance measured from the midpoint of l for vertical frames etc. or S for longitudinal frames etc. to the maximum immersion water line in *metres*.
C_1 : To be obtained from the following formulae according to the stiffener system:

$C_1 = \frac{K}{24 - \alpha K}$ for longitudinal systems

However, the value of C_1 is not to be less than $\frac{K}{18.8}$.

$C_1 = \frac{K}{18.8}$ for transverse systems or transverse tank plates

K : As specified in **5.2.4.**

α : As specified in **5.4.2.** However, "the lower edge of the tank plating under consideration" is to be construed as "the stiffener or frame under consideration" in applying the requirements for *z*.

~~C~~ C_2 : Coefficient given in **Table 5.1**, according to the type of end connections

Table 5.1 Values of ~~C~~ C_2

The other end of stiffeners	One end of stiffeners		
	Connection by brackets	Lug-connection or supported by girders	End of stiffener unattached
Connection by brackets	0.70	0.85	1.30
Lug-connection or supported by girders	0.85	1.00	1.50
End of stiffener unattached	1.30	1.50	1.50

5.4.~~5~~4 Girders, Web Frames, etc.

1 The section modulus of the girders, web frames etc. supporting the tank stiffeners or frames is not to be less than obtained from the following formula;

$7.13Shl^2$ (cm^3)

where :

S : Breadth of the area supported by the girders, web frames etc. in *metres*
h : 2.5 *m* or the following, whichever is greater.
for tanks;
Vertical distance measured from the mid-point of l for vertical girders etc. or S for horizontal girders etc. to the mid-point of the distance between the top of tanks and the top of overflow pipes in *metres*. As an alternative, the maximum differential head defined, in **5.4.~~7~~6** may be used for ballast tanks.
for void spaces, cofferdams;

Vertical distance measured from the mid-point of *l* for vertical girders etc. or *S* for horizontal girders etc. to the maximum immersion water line in *metres*.

2 (Omitted)

5.4.~~6~~5 Cross Tie

The sectional area of cross ties, where fitted between the stiffeners, frames, girders, web frames etc. is not to be less than obtained from the following formula

$2.2Sbh\ (cm^2)$

where :

S : Space of the stiffeners etc. supported by the cross tie in *metres*.

b : Distance between the mid-point of two adjacent spans of stiffeners etc. supported by the cross tie in *metres*.

h : The maximum head in *metres* to be determined in accordance with the requirements of **5.4.~~5~~3** or **5.4.~~6~~4** as applicable.

5.4.~~7~~6 Maximum Differential Head

(Omitted)

5.4.~~8~~7 Top Deck

(Omitted)

5.4.~~9~~8 Safety Deck

1 Scantlings of the safety deck as constructed as the tanks are to be in accordance with the requirements defined in **5.4.~~3~~2**, **5.4.~~4~~3** and **5.4.~~5~~4**.

2 (Omitted)

5.4.~~10~~9 Non-water Tight Structures

(Omitted)

5.4.~~11~~10 Keel Block and Supporting Structure

(Omitted)

5.4.~~12~~11 Platforms

(Omitted)

5.4.~~13~~12 Swing Bridge

(Omitted)

EFFECTIVE DATE AND APPLICATION

1. The effective date of the amendments is 25 June 2018.

2. Notwithstanding the amendments to the Rules, the current requirements apply to floating docks for which the date of contract for construction is before the effective date.