

GUIDE FOR

SLAMMING LOADS AND STRENGTH ASSESSMENT FOR VESSELS

MARCH 2011

NOTICE NO. 1 – July 2013

The following Rule Changes were approved by the ABS Rules Committee on 31 May 2013 and become **EFFECTIVE AS OF 1 JULY 2013**.

(See <http://www.eagle.org> for the consolidated version of the Guide for Slamming Loads and Strength Assessment for Vessels, 2011, with all Notices and Corrigenda incorporated.)

Notes - The date in the parentheses means the date that the Rule becomes effective for new construction based on the contract date for construction. (See 1-1-4/3.3 of the ABS Rules for Conditions of Classification (Part 1).)

SECTION 8 DIRECT STRENGTH ASSESSMENT

3 Shell Plating

3.1 Bowflare Slamming (1 July 2013)

(Revise definition of f_1 , as follows.)

$$\begin{aligned} f_1 &= 0.90S_m f_y && \text{for side shell plating in the region forward of } 0.125L, \text{ from the forward} \\ & && \text{perpendicular, in N/cm}^2 \text{ (kgf/cm}^2, \text{ lbf/in}^2\text{)} \\ &= 0.75S_m f_y && \text{for side shell plating in the region between } 0.125L \text{ and } 0.25L, \text{ from the} \\ & && \text{forward perpendicular} \end{aligned}$$

5 Shell Longitudinals and Stiffeners

(Revise Paragraph 8/5.1, as follows.)

5.1 Bowflare Slamming (1 July 2013)

The net section modulus of the shell longitudinal (or frame), including the associated effective plating, is not to be less than that obtained from the following equation:

$$SM = M/f_b \quad \text{cm}^3 \text{ (in}^3\text{)}$$

$$M = p_s s \ell^2 10^3 / k \quad \text{N-cm (kgf-cm, lbf-in)}$$

where

$$k = 16 \text{ (16, 111.1)}$$

$$p_s = \text{design slamming pressure as described in Subsection 7/3, in N/cm}^2 \text{ (kgf/cm}^2, \text{ lbf/in}^2\text{)}$$

$$s = \text{spacing of longitudinal or transverse frames, in mm (in.)}$$

$$\begin{aligned}\ell &= \text{unsupported span of the frame, in m (ft)} \\ f_b &= 0.9S_m f_y \quad \text{for transverse and longitudinal frames in the region forward of } 0.125L \\ &\quad \text{from the FP, in N/cm}^2 \text{ (kgf/cm}^2 \text{, lbf/in}^2\text{)} \\ &= 0.8S_m f_y \quad \text{for transverse and longitudinal stiffeners in the region between } 0.125L \\ &\quad \text{and } 0.25L, \text{ measured from the FP, in N/cm}^2 \text{ (kgf/cm}^2 \text{, lbf/in}^2\text{)} \\ &= 0.95S_m f_y \quad \text{for stern slamming, in N/cm}^2 \text{ (kgf/cm}^2 \text{, lbf/in}^2\text{)}\end{aligned}$$

S_m and f_y are defined in Subsection 8/3.

The associated effective breadth of plating is to be taken as spacing of longitudinal or transverse frames or 20% of the unsupported span, whichever is less.

(Revise Paragraph 8/5.3 and add new Figure 1, as follows.)

5.3 Bottom and Stern Slamming (1 July 2013)

In case of bottom or stern slamming, an ultimate strength approach considering plasticity may be employed to estimate section modulus to the corresponding slamming pressure.

The net plastic section modulus, SM_{pl} , of each individual stiffener, is not to be less than:

$$SM_{pl} = \frac{kp_s s \ell^2}{f_{bdg} C_a f_y} \quad \text{cm}^3 \text{ (in}^3\text{)}$$

where

$$\begin{aligned}k &= 1000 \text{ (1000, 144)} \\ p_s &= \text{slamming pressure as described in Subsection 7/3, in N/cm}^2 \text{ (kgf/cm}^2 \text{, lbf/in}^2\text{)} \\ s &= \text{spacing of longitudinal or transverse frames, in mm (in.)} \\ \ell &= \text{unsupported span of the frame, in m (ft)} \\ f_{bdg} &= \text{bending moment factor} \\ &= 8 \left(1 + \frac{n_s}{2} \right) \\ n_s &= 2.0 \text{ for continuous stiffeners or where stiffeners are bracketed at both ends} \\ C_a &= \text{permissible bending stress coefficient} \\ &= 0.9 \\ f_y &= \text{minimum specified yield point of the material, in N/cm}^2 \text{ (kgf/cm}^2 \text{, lbf/in}^2\text{)}\end{aligned}$$

The associated effective breadth of plating may be taken as the spacing of longitudinal or transverse frames.

The net plastic section modulus can be calculated using the following formulae.

When the cross-sectional area of the attached plate exceeds the cross-sectional area of the stiffener to which the plate flange is attached, the actual net plastic section modulus, Z_p , in cm^3 (cm^3 , in^3) is given by:

$$Z_p = A_{pn} t_{pn} / (2 c_4) + \frac{h_w^2 t_{wn} \sin \phi_w}{2 \cdot c_4^3} + A_{fn} (h_{fc} \sin \phi_w - b_w \cos \phi_w) / c_4$$

where

$$\begin{aligned}A_{pn} &= \text{net cross-sectional area of the attached plate, in cm}^2 \text{ (cm}^2 \text{, in}^2\text{)} \\ t_{pn} &= \text{net attached plate thickness, in mm (mm, in.)}\end{aligned}$$