

CSR-BC Safety factors for stiffener buckling

In the third draft of the CSR\_BC, the SOLAS safety factor  $S=1.15$  for special members has been added. Only the stiffeners of transverse bulkheads is missing in the list.

BV gives the following explanations by E-mail:

For the following, it is based on the evolution within MSC discussions.

Some extracts are listed to illustrate the process.

Iacs submission to MSC 80: Extract

Quote

***XII/6.5.3 - the structure of cargo areas shall be such that single failure of one stiffening structural member will not lead to immediate consequential failure of other structural items potentially leading to the collapse of the entire stiffened panel.***

a. As written this regulation could be understood to apply to stiffened plate panels of the bottom, side shell, deck, inner bottom, longitudinal bulkheads, upper wing tanks and/or lower wing tanks which are bounded by primary structural elements such as transverse and longitudinal bulkheads, transverse webs, floors or girders (or even more broadly to also include each stiffened plate panel of the transverse webs, floors and girders themselves). IACS considers that **this requirement does not apply to corrugated transverse bulkheads**, which have already been reinforced according to IACS Unified Requirement S18.

Unquote

The IACS proposal of interpretation, document MSC 80/18/2, was not supported during the MSC 80, and the task of proposing an interpretation was allocated to an intersessional working group of the MSC meeting on 12/13 September 2005.

A new IACS proposal has been submitted, document ISR ISWG 1/3/2. The submission deals with SOLAS regulation XII/6.5.3 as follows:

Quote

***XII/6.5.3 - the structure of cargo areas shall be such that single failure of one stiffening structural member will not lead to immediate consequential failure of other structural items potentially leading to the collapse of the entire stiffened panel.***

5.3 IACS understands that the objective of this regulation is to avoid immediate collapse of the stiffened panel after a single, localized mechanical damage (*such as local permanent deformation, cracking or weld failure that might result from accidental damage within the cargo hold from cargo operations*) of one stiffener of the structure bounding the cargo holds (*such as inner bottom, lower hopper tanks, lower half of internal longitudinal bulkhead of double side skin bulk carriers or side shell of single hull bulk carriers and lower stool of transverse corrugated bulkheads*). Then, for the scope of application described in 3. and 4. above, two cases are to be considered:

Unquote

Extract of JBP interpretation sent by JF Segretain on 29/12/2005

Quote

**IACS JOINT BULKER PROJECT – Technical Backgrounds**

**A3(CCS/KR/NK) – UNITAS (BV/GL/RINA) - RS**

**Structural redundancy requirements of SOLAS regulation XII/6.5.1 and 6.5.3 in CSR for Bulk Carriers**

**1 Introduction**

During the 24th assembly, MSC Committee of IMO adopted the unified interpretation of SOLAS regulations XII/6.5.1 and 6.5.3 provided here:

**Regulation XII/6.5.1 . Protection of cargo holds from loading/discharge equipment**

1 The protection of the structure of the cargo holds should be achieved by structural design features such as mandatory application of classification society grab notation.

2 The protection of hatchways and coamings from grab wire damage may be achieved by fitting protection bars (e.g. half-round bar) on the hatch side girder (e.g. upper portion of top side tank plates), hatch-end beams and the upper portion of hatch coamings.

**Regulation XII/6.5.3 . Failure of cargo hold structural members and panels**

1 Stiffening structural member means a stiffener attached to a structural plating panel.

2 For the purpose of this interpretation, cargo area includes hatchway coamings, topside tanks, side shells, longitudinal bulkheads of double-side skin construction, bilge hopper tanks and double bottom, but excludes hatchway covers.

3 Structural members of a cargo hold are the hatchway coamings, transverse bulkheads, panel plates of the top-side tanks and bilge hopper tanks facing the cargo hold, inner bottom, side shell of single-side skin construction or longitudinal bulkhead of double-side skin construction.

Unquote

**Conclusions**

So the factor  $s=1.15$  applied to ordinary stiffeners which could be fitted on stools of transverse Bhds but not in my mind to the corrugation itself.