Common Structural Rules for Bulk Carriers and Oil Tankers

Technical Background for Rule Change Notice 1 to 01 JAN 2014 version

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Pt. 1, Ch. 1, Sec. 1, [3.2.1] Class notation for bulk carriers

1. Reason for the Rule Change
Clarification of service feature notation.

2. Background
For improvement and transparency, the additional service feature {Block loading} is included when the ship is intended to operate in alternate block load condition.

The proposed amendment is in line with the answer provided to KC ID: 640.

3. Impact in Scantlings
This amendment is for clarification of rule application. No impact on scantlings is expected.

Pt. 1, Ch. 1, Sec. 3, [2.2.3, a]

1. Reason for the Rule Change
It is to clarify the Rule requirement.

2. Background
The renewal thickness plan is not required for the casing, superstructure and deckhouses since the required scantlings are based on gross scantling.

3. Impact in Scantlings
There is no impact on scantlings due to this change.

Pt. 1, Ch. 1, Sec. 3, [2.2.3] Submission of plans and supporting calculations

1. Reason for the Rule Change
According to Pt. 1, Ch. 9, Sec. 3, [6], post-weld fatigue strength improvement methods may be taken into consideration to achieve, the calculated fatigue life of 25 years in certain locations. In order to have a better follow-up of the coating during the ship life, the location of structural details where the benefit of post-weld treatment is applied is to be informed to the owner and class so that the structural details will be noticed during operation and maintenance.

2. Background
The ship owners require that the critical fatigue details, which fatigue life are achieved by means of the benefit of post-weld treatment, should be submitted to owners to notice during operation and maintenance. It is relative to KC ID 807.

3. Impact in Scantlings
No impact in scantling is expected by the Rule change proposal.

Pt. 1, Ch. 2, Sec. 3, [1.1.1] Definition

1. Reason for the Rule Change
It is to clarify the cofferdams need to be arranged for drainage.

2. Background
Based on comment from the industry, the proposed amendment is in line with the answer provided to KC ID: 761.

3. Impact in Scantlings
There is no impact on scantlings due to this change.

Pt. 1, Ch. 2, Sec. 3, [1.2.1] Arrangement of cofferdams

1. Reason for the Rule Change
"Drinking water" is removed from the text in 1.2.1 as the requirement in 1.2.2 refer to water for human consumption and is more stringent.

2. Background
"Drinking water" is as "fresh water for human consumption" which is considered in 1.2.2, the requirement about "drinking water" in 1.2.1 is unnecessary. It is relative to KC ID 552.

3. Impact in Scantlings
No impact in scantling is expected by the Rule change proposal.

Pt. 1, Ch. 2, Sec. 3, [1.2.4]

1. Reason for the Rule Change
Implementation of the requirement from CSR BC Ch2 Section 2, [2.1.2] is still valid.

2. Background
Rule change proposal is in line with CSR BC Ch2 Section 2, [2.1.2]. It is relative to KC ID 552.

3. Impact in Scantlings
No impact in scantling is expected by the Rule change proposal.

Pt. 1, Ch. 3, Sec. 1, [2.3.1] and Table 7

1. Reason for the Rule Change
It is to clarify the Rule requirement.

2. Background
The steel grades for ships with ice strengthening is removed since Pt1, Ch1, Sec2, [3.4.3] prescribes that the effects of ice are not covered by the Rules.
Furthermore, the required material grade in Table 7 does not fully cover various ice-class requirements dependent on the area of operation.

3. Impact in Scantlings
There is no impact on scantlings due to this change.

Pt. 1, Ch. 3, Sec. 2, [3.2.1] Figure 2, Figure 3

1. Reason for the Rule Change
Clarification of how to measure the depth hw of stiffener web.

2. Background
The formula, "hw= hstr – tf-net", in Ch3, Sec7, [1.4.6] is only applicable when corrosion additions of attached plate and stiffener are same. Hence propose to delete the formula in [1.4.6] and update Figure 2 and 3 to include definitions of "hw" for FB type and L3 profile.

Pt. 1, Ch. 3, Sec. 3, [Table 1]

1. Reason for the Rule Change
In note (7) of Ch 3, Sec 3, Table 1, it is specified that "In the case where a stool is not fitted on the opposing bulkhead, the vertical extent of this zone is to be from the inner bottom to a height level with the top of the adjacent hopper sloping plate.". In general, however, the height level with the top of the hopper sloping plate is much higher that a height level with top of lower stool, if fitted considering the same size of ships, at aftmost cargo hold (i.e. at engine bulkhead).
This increased corrosion addition was originally determined by the data of excessive corrosion due to mechanical damage, such as grab and bulldozer, therefore the extent of applicable zone should be considered appropriately. Then the extent of this zone is to change so as to align with the strengthen requirement for grab, i.e. not be taken as more than 3m.

2. Background
See 1. above.

3. Impact in Scantlings
No impact in scantling is expected by the Rule change proposal.

Pt. 1, Ch. 3, Sec. 6, Structural detail principles [4.4.2], [5.1.6], [6.1.3], [7.1.2], [7.5.2], [11.2.1]

1. Reason for the Rule Change
Delete the words "general" and "generally" where it is not relevant.

2. Background
The words "general" and "generally" are not appropriate in all locations in the Rules. The word "in general" or "generally" is deleted from the paragraphs where it is not relevant.

The proposed amendment is in line with the answer provided to KC ID: 767 and 1113.

3. Impact in Scantlings
This amendment is for clarification of rule application. No impact on scantlings is expected.

Pt. 1, Ch. 3, Sec. 6, [10.4.1]

1. Reason for the Rule Change
It is clarified that the required moulded depth for stools with respect to loads.

2. Background
The limitation of D=16 m for tank bulkheads and ballast hold bulkheads for both tankers and bulk carriers, since the depth is the most important parameter with respect to strength of corrugated bulkheads. For corrugated watertight bulkheads of BC (dry cargo) a limitation of 18 m corresponds to a length on 190 m.

3. Impact in Scantlings
This amendment is for clarification of rule application. No impact on scantlings is expected.

Pt. 1, Ch. 3, Sec. 6, [10.5.1]

1. Reason for the Rule Change
Clarification of the area of non-tight bulkhead.

2. Background
Feedback indicated that the area of non-tight bulkhead was not clear and various interpretations were indicated. The proposal clarifies for common application of the Rules.

3. Impact in Scantlings
This amendment is for clarification of rule application. No impact on scantlings is expected.

Pt. 1, Ch. 3, Sec. 7, [1.1.3], [1.1.8]

1. Reason for the Rule Change
Clarification of how the imaginary triangular bracket should be taken. Although the figure shows a right angled triangle the text should also be clarified for improved clarity.

2. Background
During software implementation some confusion arose as to how the triangle should be shaped. The Rules currently only stipulates that a length to height ratio of 1.5 and this lead to different triangle shapes.

Pt. 1, Ch. 3, Sec. 7, [1.4.3] and [1.4.4]

1. Reason for the Rule Change
Where the inclination angle between stiffener web and attached plate is less than 75 degrees, this angle is to be also considered in the calculations.

2. Background
Amendment proposed in order to be consistent with the current practice in the CSR OT and the CSR BC.

3. Impact in Scantlings
There is no impact on scantlings due to this change.

Pt. 1, Ch. 3, Sec. 7, [1.4.6]

1. Reason for the Rule Change
See the reason of Pt1, Ch3, Sec2, [3.2.1] Figure 2 & Figure 3

2. Background
See the background of Pt1, Ch3, Sec2, [3.2.1] Figure 2 & Figure 3

3. Impact in Scantlings
There is no impact on scantlings due to this change.

Pt. 1, Ch. 3, Sec. 7, Table 5

1. Reason for the Rule Change
Clarification for curved plate panel. See also separate TB Report.

Pt. 1, Ch. 4, Sec. 4, 2.3.4

1. Reason for the Rule Change
Editorial corrections.

2. Background
Qwv-pos and Qwv-neg, as defined in [3.2.1] not [2.3.1].

3. Impact in Scantlings
There is no impact on scantlings due to this change.

Pt. 1, Ch. 4, Sec. 5, Table 22 and Table 29

1. Reason for the Rule Change
Editorial corrections.

2. Background
Table 22: kp values are for FSM load cases, not HSM.

Table 29: y = 0 already defined in table, it is assumed y < 0.

3. Impact in Scantlings
There is no impact on scantlings due to this change.

Pt. 1, Ch. 4, Sec. 6, Symbols

1. Reason for the Rule Change
It is to clarify that when the loading condition includes a short voyage condition with 50% bunker for maximum cargo weight determination, the ballast water tanks should be empty. Clarify the application of perm=0 for packed cargo.

2. Background
In the past, we used to encounter an argument from designer, they used a short voyage condition (50% Bunker) for maximum cargo weight determination. However, in the short voyage condition, the ballast water tanks are not empty. We believe this should not be acceptable. The proposed amendment is in line with the answer provided to KC ID: 560

The proposed amendment for perm=0 is in line with the answer provided to KC ID: 729.

3. Impact in Scantlings
No significant impact on scantlings is expected as the proposal is to clarify the original intent.

Pt. 1, Ch. 4, Sec. 6, [1.1.2]

1. Reason for the Rule Change
Editorial change.

2. Background
The current statement is not clear because [1.1.2] stipulates for flooding conditions however there is no flooding case described in [4]

3. Impact in Scantlings

There is no impact on scantlings due to this change.

Pt. 1, Ch. 4, Sec. 6, Table 4

1. Reason for the Rule Change
It is clarified that the flooded level is corresponding to loading condition and cargo density.

2. Background
Rule change proposal is in line with CSR BC Ch4 Section 6, [3.3.3]. It is relative to KC ID 859.

3. Impact in Scantlings
No impact in scantling is expected by the Rule change proposal.

Pt. 1, Ch. 4, Sec. 8, [2.2.1]

1. Reason for the Rule Change
It is clarified that "hull girder strength specified in Pt 1, Ch 5, Sec 1 and Pt 1, Ch 8, Sec 3" regarding loading conditions with the considered tanks full, empty and partially filled at intended level in any departure, arrival or intermediate condition is to be confirmed in cases where vessels have partially filled ballast tanks in ballast loading conditions. Those loading conditions with the considered tanks full or empty are assumed conditions only for confirmation of hull girder strength as specified in UR S11 and are not required to be included in Loading Manual.

2. Background
The proposed amendment is in line with CSR-OT (Sec.8 [1.1.2.5] and [1.1.2.5]) and CSR-BC (Ch.4 Sec.3 [2.1.2] and Ch.4 Sec.7 [2.2.1]).

3. Impact in Scantlings
No impact in scantling is expected by the Rule change proposal.

Pt. 1, Ch. 4, Sec. 8, [2.4.1]

1. Reason for the Rule Change
Clarification of the propeller inspection afloat condition loading condition for podded propulsion units.

2. Background
The propeller inspection afloat condition loading condition is intended for conventional propeller arrangements. Some vessels are fitted with podded propulsion units. For these cases this particular loading condition should be individual considered.

3. Impact in Scantlings
No impact in scantling is expected by the Rule change proposal.

Pt. 1, Ch. 4, Sec. 8, Table 2, 4, 6, and 7

Tables Table 2, 4, 6, and 7 for load combinations for FE analysis has been amended based on further testing and calibration.

Pt. 1, Ch. 4, Sec. 8, [4.2.4] and Table 12, 13, and 14

1. Reason for the Rule Change
This rule change aligns the requirement with what is already specified in IACS UR S25.

2. Background
Design heavy ballast condition of bulk carriers for strength assessment is specified in Pt 1, Ch 4, Sec 8, [4] based on IACS UR S25. However, IACS received the comment from industry that newly added sentence "except if this loading condition is explicitly prohibited in the loading manual" is not in line with IACS UR S25 and should be deleted. After consideration, it was concluded that the sentence can be deleted.

3. Impact in Scantlings
This amendment is for clarification of rule application. No impact on scantlings is expected.

Pt. 1, Ch. 5, Sec. 1, [3.4.5]

1. Reason for the Rule Change
Editorial change. For tankers with two longitudinal bulkheads between the cargo tanks, it is the length of centre tank which are to be used, i.e. the cargo tank length corresponding to the breadth b2 shown in Figure 6, i.e. the strikethrough text is misleading/wrong.

3. Impact in Scantlings
This amendment is for clarification of rule application. No impact on scantlings is expected.

Pt. 1, Ch. 5, Sec. 1, [3.5.1]

1. Reason for the Rule Change
The proposal is to correct an error in the Rules. The permissible shear stress used in stringer correction shall be the same as for the shear force correction, see [3.4.2] and CSR-OT Section 8 [1.3.4.1].

3. Impact in Scantlings
This amendment is for clarification of rule application. No impact on scantlings is expected.

Pt. 1, Ch. 5, Sec. 2, [2.1.2] Hull girder ultimate strength

1. Reason for the Rule Change
Clarify the application of the partial safety factor for the effect of the double bottom bending, γ_{DB}.

2. Background
The γ_{DB} value for flooded condition for Bulk Carrier cases is found to be not clear. The intention is to apply the γ_{DB} value in the calculations for both hogging and sagging conditions of Bulk Carriers in flooded condition are using 1.0. (Ref. "4.2. Scantling impact" in the TB report "Hull Girder Longitudinal Strength").
The proposed amendment is in line with the answer provided to KC ID: 1005.

3. Impact in Scantlings
This amendment is for clarification of rule application. No impact on scantlings is expected.

Pt. 1, Ch. 5, Sec. 3, [2.2.1] Hull girder Residual strength

1. Reason for the Rule Change

The 2nd paragraph is included in the 4th one and redundant, it is to be deleted.

2. Background

This is an editorial modification.

3. Impact in Scantlings

No impact on scantlings is expected.

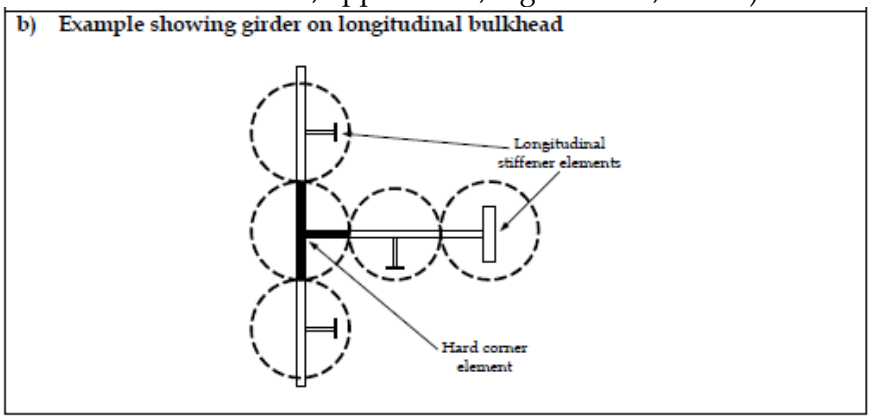
Pt. 1, Ch. 5, Appendix 2, [2.2.2]

1. Reason for the Rule Change

Clarification of the how enlarged stiffeners used for Permanent Means of Access (PMA) should be treated in the modelling of the hull girder cross section. Figure 3 is amended to clarify this aspect. For PMA made from enlarged stiffeners, only the attached plate/web connections are considered as hard corners and the face plate-web connects are not.

2. Background

Proposal is to be in line with CSR OT, appendix A, Figure A.2.3, item b) shown below.



3. Impact in Scantlings

This amendment is for clarification of rule application. No impact on scantlings is expected.

Pt. 1, Ch. 6, Sec. 2, Table 1

1. Reason for the Rule Change

Editorial change.

2. Background

It is to clarify the intent of the Rule requirement.

3. Impact in Scantlings

Scantlings impact is not expected due to this change.

Pt. 1, Ch. 6, Sec. 4, [1.2.1] Cold hot formed corrugation

1. Reason for the Rule Change

It is clarified that both [1.2.1] and [1.2.2] are to be applied to built-up corrugations in the same way as in CSR-OT.

2. Background

Rule change proposal is in line with original intention of the requirement to avoid confusion. For built-up corrugations both [1.2.1] and [1.2.2] shall apply and the thinner plate will be determined by [1.2.1] in the same way as in CSR-OT. The proposed amendment is in line with the answer provided to KC ID: 411 and 837

3. Impact in Scantlings

No impact in scantling is expected by the Rule change proposal.

Pt. 1, Ch. 6, Sec. 4, [2.2.2]

1. Reason for the Rule Change
It is clarified that the requirement is the less of the value obtained by [1.1.1] and [2.2.2].

2. Background
Rule change proposal is in line with original intention of the requirement to avoid confusion.

3. Impact in Scantlings
No impact in scantling is expected by the Rule change proposal.

Pt. 1, Ch. 6, Sec. 4, [2.2.3]

1. Reason for the Rule Change
The proposed amendment is to clarify the Rules and in line with the answer provided to KC ID: 834.

Pt. 1, Ch. 6, Sec. 4, [2.6.2]

1. Reason for the Rule Change
This rule change aligns the requirement with what is already specified in CSR-BC and CSR-OT.

2. Background
In harmonised CSR, strength continuity between corrugate bulkhead and lower stool top plate should be maintained as specified in Ch 3, Sec 6, [10.4.7]. In addition, requirement of (structural) continuity at same area is specified in Ch 6, Sec 4, [2.6.2 c)] based on CSR-T. However, bulk carriers tend to have vertical stiffening in the lower stool and the spacing of the stiffeners follows the inner bottom longitudinals spacing. Since this spacing is different from the corrugation size, it is not practical (or impossible) to fit brackets at every web position or knuckle of the corrugation. Then bulk carriers are clearly excluded from the application of Ch 6, Sec 4, [2.6.2 c)]. It should be noted that strength continuity of subject area on both oil tankers and bulk carriers still should be considered according to Ch 6, Sec 4, [2.6.1] and Ch 3, Sec 6, [10.4.7] even though the application of Pt 1, Ch 6, Sec 4, [2.6.2] is limited to oil tankers based on this rule change.

3. Impact in Scantlings
No consequence assessment is considered necessary.

Pt. 1, Ch. 7, Sec 1, [2.1.1]
The proposed amendment is to clarify the Rules.

Pt. 1, Ch. 7, Sec 3, [5.2.1]
The proposed amendment is to clarify the Rules.

Pt. 1, Ch. 7, Sec 3, [6.2.1]

1. Reason for the Rule Change

The requirement is amended to be able to use fatigue factor 1.2 for not only the design details fully compliant with the mandatory requirements of very fine mesh analysis specified in Ch 9, Sec 2, Table 1 but also the ALL design details which is verified by very fine mesh analysis.

2. Background

In the Rules, the mandatory requirements of very fine mesh analyses for structural details are specified, ref. Ch 9, Sec2, Tables 1, 2 and 3. In addition, there are some possibility to carry out voluntary very fine mesh analyses for structural details other than Tables 1, 2 and 3. Technically the same fatigue factor 1.2 can be applied to ALL structural details (not limited to Ch 9, Sec2, Tables 1) verified by very fine mesh analysis. Hence the definition of fatigue factor specified in Pt 1, Ch 7, Sec 3, [6.2.1] is amended.

3. Impact in Scantlings

This amendment is just for clarification of rule application. No impact on scantlings is expected.

Pt. 1, Ch. 8, Sec. 1, [2.1.1]

1. Reason for the Rule Change

Editorial change.

2. Background

It is to clarify the intent of the Rule requirement.

3. Impact in Scantlings

There is no impact on scantlings due to this change.

Pt. 1, Ch. 8, Sec. 1, [3.2.2] General

1. Reason for the Rule Change

Editorial change.

2. Background

Duplication of reference

3. Impact in Scantlings

There is no impact on scantlings due to this change.

Pt. 1, Ch. 8, Sec. 2, Symbols

1. Reason for the Rule Change

Clarification of the length of stiffener.

2. Background

The definition of l is the same as the one in Ch 4, Sec 1, referring to Ch 3, Sec 7, [1]. Hence the definition in the Symbols should be deleted.

3. Impact in Scantlings

There is no impact on scantlings due to this change.

Pt. 1, Ch. 8, Sec. 2, [2.1.1]

1. Reason for the Rule Change
Current rule text permits only the case that the grade of assumed steel plate is mild steel. However, there is a possible case that actually HT36 is applied and requirements specified in Sec 3 and Sec 4 are satisfied for the strake assumed in HT32. Therefore, to enable to treat the above situation, current rule test should be modified.

In KC ID 82 during CSR-H development phase it was clarified that "We confirm that the slenderness requirements in Pt 1, Ch 8, Sec 2 are not applicable to bilge plate". However, in Pt 1, Ch 8, Sec 2, [2.1.1] of CSR-H 01 Jan 2014, the slenderness requirement "does not apply to transversely stiffened bilge plates and …". As per the technical background, this slenderness requirement is applicable to flat plate only, not the curved bilge plate regardless longitudinally or transversely stiffened panels. Hence, a rule change proposal in line with technical background is prepared to avoid any misapplication.

2. Background
In a practical design situation, a higher yielding stress material could be used where a lower yielding stress material is acceptable. The proposed amendment is in line with the answer provided to KC ID: 446

3. Impact in Scantlings
There is no impact on scantlings due to this change.

Pt. 1, Ch. 8, Sec. 2, [3.1.3]

1. Reason for the Rule Change
Editorial change.

2. Background
It is to clarify the intent of the Rule requirement.

3. Impact in Scantlings
There is no impact on scantlings due to this change.

Pt. 1, Ch. 8, Sec. 2, Figure 2

1. Reason for the Rule Change
Editorial change; "*lstf*" is to be replaced by "*l*".

2. Background
It is to clarify the intent of the Rule requirement.

3. Impact in Scantlings
There is no impact on scantlings due to this change.

Pt. 1, Ch. 8, Sec. 3, [1.1.1] and Sec. 4, [1.1.2]

1. Reason for the Rule Change
Clarification of application to curved plating.

Pt. 1, Ch. 8, Sec. 3, [1.1.2]

1. Reason for the Rule Change
Editorial change.

Pt. 1, Ch. 8, Sec. 4, [1.1.2]

1. Reason for the Rule Change
Amendment proposed to clarify that curved panels are also within the scope of calculations.

Pt. 1, Ch. 8, Sec. 4, Figure 5

1. Reason for the Rule Change
The proposal clarifies how certain parts of a typical bulk carrier structure is to be modelled; stiffened or unstiffened panel, Method A or Method B.

3. Impact in Scantlings
This amendment is for clarification of rule application. No impact on scantlings is expected.

Pt. 1, Ch. 8, Sec. 4, [4.1.1]

1. Reason for the Rule Change
There is a comment from industry that the scope of application in Pt 1, Ch 8, Sec 4, [4.1.1] is not clear and should be modified and it is concluded that the requirement can be amended.

2. Background
This amendment is made to correct the scope of application in Pt 1, Ch 8, Sec 4, [4.1.1] to describe clearly the original intention of the requirement.

3. Impact in Scantlings
This amendment is for clarification of rule application. No impact on scantlings is expected.

Pt. 1, Ch. 8, Sec. 5, [2.2.1], [2.4.1]

1. Reason for the Rule Change
Please see the TB report "Buckling assessment of hatch cover with U type stiffeners".

Pt. 1, Ch. 8, Sec. 5, Table 2

1. Reason for the Rule Change
Please see the TB report "Buckling assessment of hatch cover with U type stiffeners".

Pt. 1, Ch. 8, Sec. 5, [2.2.3]

1. Reason for the Rule Change
It is clarified that the formulae of κ_{x3}, κ_{x4}, κ_{y3}, κ_{y4} are not the function of γc which equal to the minimum of γ_{c1}, γ_{c2}, γ_{c3} and γ_{c4}, but are relative to γ_{c1}, γ_{c2}, γ_{c3} and γ_{c4} respectively according to the limit state formula.

2. Background

Rule change proposal is in line with original intention of the requirement to avoid confusion.

3. Impact in Scantlings

No impact in scantling is expected by the Rule change proposal.

Pt. 1, Ch. 8, Sec. 5, Table 3
Buckling factor and reduction factor for plane plate panels

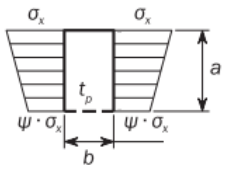
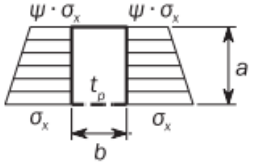
1. Reason for the Rule Change/Describe the reason and motivation for the Rule change proposal.

In both CSR-BC and CSR-H, the longer side of plating is assigned the symbol *a* and the shorter side is assigned the symbol *b*, where the aspect ratio $\alpha = a/b$. Accordingly, the aspect ratio α is always greater than 1. However, in Table 3 of the CSR-BC buckling rules, equations for calculating the buckling factor *K* are provided for aspect ratios α < 1. For the sake of consistency, the four (4) relevant equations are reformulated in CSR-H. The procedure is to invert all instances of α and to divide the result by α^2 (to correct the elastic buckling reference stress σ_E).

In addition, for the buckling assessment of plates in way of openings/manholes without edge stiffening, i.e. geometries where the opening ratio exceeds 70%, cases covering the shear strength were missing. Accordingly, two (2) new load cases have been developed for calculating the buckling factor *K* of plates with one free edge (including validation of the existing equation for the reduction factor C_τ).

The six (6) new load cases are summarised in Tables 1 and 2.

Table 1: The New Load Cases 6, 7, 8 and 10 in Table 3 of CSR-H

• New Load Case 6 (based on existing Load Case 3) 	$0 \le \psi \le 1$	$K_y = \frac{4(0.425+\alpha^2)}{(3\psi+1)\alpha^2}$	$C_y = 1 \; for \; \lambda \le 0.7$ $C_y = \frac{1}{\lambda^2 + 0.51} \; for \; \lambda > 0.7$
	$-1 \le \psi < 0$	$K_y = 4(0.425+\alpha^2)(1+\psi)\frac{1}{\alpha^2} - 5\psi(1-3.42\psi)\frac{1}{\alpha^2}$	
• New Load Case 7 (based on existing Load Case 4) 	$-1 \le \psi \le 1$	$K_y = (0.425+\alpha^2)\frac{(3-\psi)}{2\alpha^2}$	

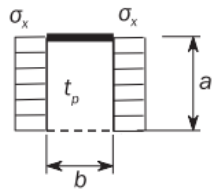
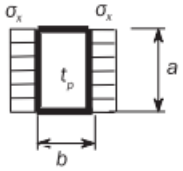
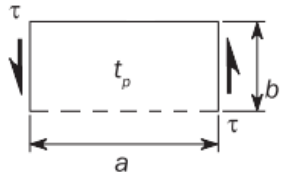
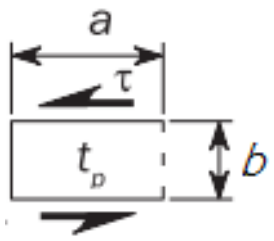
● New Load Case 8 (based on existing Load Case 5) 	-	$K_y = 1 + \frac{0.56}{\alpha^2} + \frac{0.13}{\alpha^4}$	
● New Load Case 14 (based on existing Load case 10) 		$K_y = 4\left(1 + \frac{1}{\alpha^4}\right) + \frac{2.07}{\alpha^2}$	$C_y = 1 \; for \; \lambda \leq 0.83$ $C_y = 1.13\left(\frac{1}{\lambda} - \frac{0.22}{\lambda^2}\right)$ $for \; \lambda > 0.83$

Table 2: The New Load Cases 18 and 19 in Table 3 of CSR-H

18 	-	$K_\tau = \sqrt{3}\,(0.6 + \frac{4}{\alpha^2})$	$C_\tau = 1$ for $\lambda \leq 0.84$ $C_\tau = \frac{0.84}{\lambda}$ for $\lambda > 0.84$
19 	-	$K_\tau = 8$	

2. Background/Describe the background and provide information on Rule change proposal.

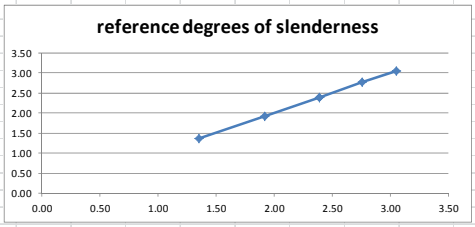
1) New load cases 6,7,8 and 14:

The following comparisons of reference degrees of slenderness λ validate the procedure for reformulating the equations used to calculate the elastic buckling factor K, where:

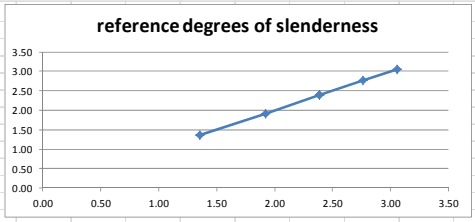
$$\lambda = \sqrt{\frac{R_{eH\_P}}{K\sigma_E}}$$

Figure 1: Validation of procedure for reformulating equations

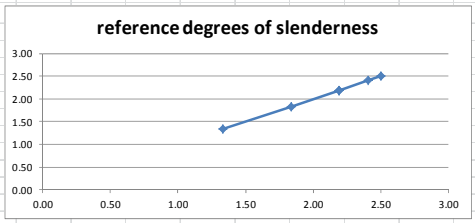
		ReH	E	t	a	b	α	ψ	K	σ_e	λ
Case 3	CSR-BC:	235	206000	10	1200	800	1.50	1	0.87	28.97	3.05
		235	206000	10	1000	800	1.25	1	1.07	28.97	2.76
		235	206000	10	800	800	1.00	1	1.43	28.97	2.39
		235	206000	10	800	800	1.00	1	1.43	28.97	2.39
		235	206000	10	600	800	0.75	1	2.20	28.97	1.92
		235	206000	10	400	800	0.50	1	4.43	28.97	1.35
Case 3	CSR-H:	235	206000	10	1200	800	1.50	1	0.87	28.97	3.05
		235	206000	10	1000	800	1.25	1	1.07	28.97	2.76
		235	206000	10	800	800	1.00	1	1.43	28.97	2.39
Case 6	CSR-H:	235	206000	10	800	800	1.00	1	1.43	28.97	2.39
		235	206000	10	800	600	1.33	1	1.24	51.50	1.92
		235	206000	10	800	400	2.00	1	1.11	115.88	1.35



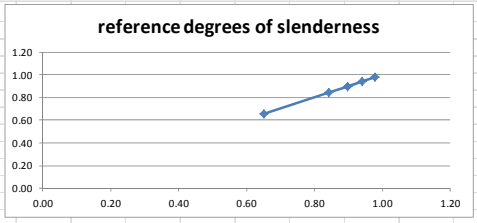
		ReH	E	t	a	b	α	ψ	K	σ_e	λ
Case 4	CSR-BC:	235	206000	10	1200	800	1.50	1	0.87	28.97	3.05
		235	206000	10	1000	800	1.25	1	1.07	28.97	2.76
		235	206000	10	800	800	1.00	1	1.43	28.97	2.39
		235	206000	10	800	800	1.00	1	1.43	28.97	2.39
		235	206000	10	600	800	0.75	1	2.20	28.97	1.92
		235	206000	10	400	800	0.50	1	4.43	28.97	1.35
Case 4	CSR-H:	235	206000	10	1200	800	1.50	1	0.87	28.97	3.05
		235	206000	10	1000	800	1.25	1	1.07	28.97	2.76
		235	206000	10	800	800	1.00	1	1.43	28.97	2.39
Case 7	CSR-H:	235	206000	10	800	800	1.00	1	1.43	28.97	2.39
		235	206000	10	800	600	1.33	1	1.24	51.50	1.92
		235	206000	10	800	400	2.00	1	1.11	115.88	1.35



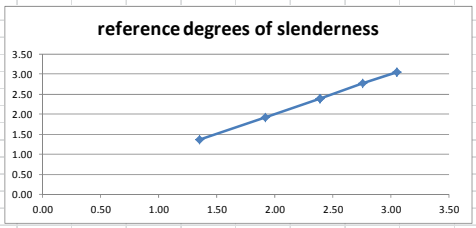
		ReH	E	t	a	b	α	ψ	K	σ_e	λ
Case 7	CSR-BC:	235	206000	10	1200	800	1.50	-	1.30	28.97	2.50
		235	206000	10	1000	800	1.25	-	1.40	28.97	2.40
		235	206000	10	800	800	1.00	-	1.69	28.97	2.19
		235	206000	10	800	800	1.00	-	1.69	28.97	2.19
		235	206000	10	600	800	0.75	-	2.41	28.97	1.83
		235	206000	10	400	800	0.50	-	4.59	28.97	1.33
Case 5	CSR-H:	235	206000	10	1200	800	1.50	-	1.30	28.97	2.50
		235	206000	10	1000	800	1.25	-	1.40	28.97	2.40
		235	206000	10	800	800	1.00	-	1.69	28.97	2.19
Case 8	CSR-H:	235	206000	10	800	800	1.00	-	1.69	28.97	2.19
		235	206000	10	800	600	1.33	-	1.36	51.50	1.83
		235	206000	10	800	400	2.00	-	1.15	115.88	1.33



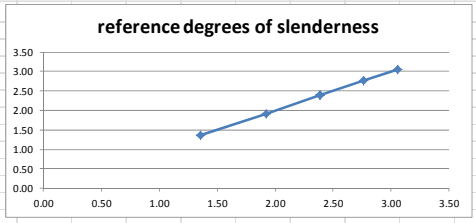
		ReH	E	t	a	b	α	ψ	K	σ_e	λ
Case 10	CSR-BC:	235	206000	10	1200	800	1.50	-	8.46	28.97	0.98
		235	206000	10	1000	800	1.25	-	9.16	28.97	0.94
		235	206000	10	800	800	1.00	-	10.07	28.97	0.90
		235	206000	10	800	800	1.00	-	10.07	28.97	0.90
		235	206000	10	600	800	0.75	-	11.43	28.97	0.84
		235	206000	10	400	800	0.50	-	19.07	28.97	0.65
Case 10	CSR-H:	235	206000	10	1200	800	1.50	-	8.46	28.97	0.98
		235	206000	10	1000	800	1.25	-	9.16	28.97	0.94
		235	206000	10	800	800	1.00	-	10.07	28.97	0.90
Case 14	CSR-H:	235	206000	10	800	800	1.00	-	10.07	28.97	0.90
		235	206000	10	800	600	1.33	-	6.43	51.50	0.84
		235	206000	10	800	400	2.00	-	4.77	115.88	0.65



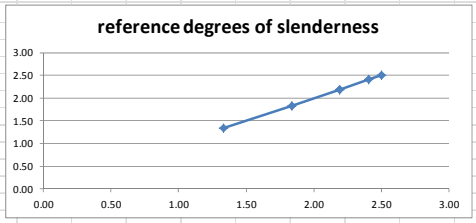
		ReH	E	t	a	b	α	ψ	K	σ_e	λ
Case 3	CSR-BC:	235	206000	10	1200	800	1.50	1	0.87	28.97	3.05
		235	206000	10	1000	800	1.25	1	1.07	28.97	2.76
		235	206000	10	800	800	1.00	1	1.43	28.97	2.39
		235	206000	10	800	800	1.00	1	1.43	28.97	2.39
		235	206000	10	600	800	0.75	1	2.20	28.97	1.92
		235	206000	10	400	800	0.50	1	4.43	28.97	1.35
Case 3	CSR-H:	235	206000	10	1200	800	1.50	1	0.87	28.97	3.05
		235	206000	10	1000	800	1.25	1	1.07	28.97	2.76
		235	206000	10	800	800	1.00	1	1.43	28.97	2.39
Case 6	CSR-H:	235	206000	10	800	800	1.00	1	1.43	28.97	2.39
		235	206000	10	800	600	1.33	1	1.24	51.50	1.92
		235	206000	10	800	400	2.00	1	1.11	115.88	1.35



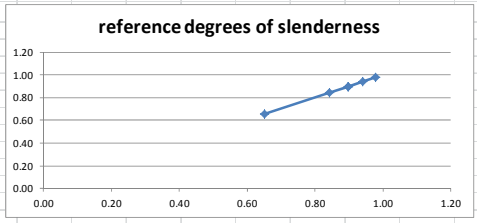
		ReH	E	t	a	b	α	ψ	K	σ_e	λ
Case 4	CSR-BC:	235	206000	10	1200	800	1.50	1	0.87	28.97	3.05
		235	206000	10	1000	800	1.25	1	1.07	28.97	2.76
		235	206000	10	800	800	1.00	1	1.43	28.97	2.39
		235	206000	10	800	800	1.00	1	1.43	28.97	2.39
		235	206000	10	600	800	0.75	1	2.20	28.97	1.92
		235	206000	10	400	800	0.50	1	4.43	28.97	1.35
Case 4	CSR-H:	235	206000	10	1200	800	1.50	1	0.87	28.97	3.05
		235	206000	10	1000	800	1.25	1	1.07	28.97	2.76
		235	206000	10	800	800	1.00	1	1.43	28.97	2.39
Case 7	CSR-H:	235	206000	10	800	800	1.00	1	1.43	28.97	2.39
		235	206000	10	800	600	1.33	1	1.24	51.50	1.92
		235	206000	10	800	400	2.00	1	1.11	115.88	1.35



		ReH	E	t	a	b	α	ψ	K	σ_e	λ
Case 7	CSR-BC:	235	206000	10	1200	800	1.50	-	1.30	28.97	2.50
		235	206000	10	1000	800	1.25	-	1.40	28.97	2.40
		235	206000	10	800	800	1.00	-	1.69	28.97	2.19
		235	206000	10	800	800	1.00	-	1.69	28.97	2.19
		235	206000	10	600	800	0.75	-	2.41	28.97	1.83
		235	206000	10	400	800	0.50	-	4.59	28.97	1.33
Case 5	CSR-H:	235	206000	10	1200	800	1.50	-	1.30	28.97	2.50
		235	206000	10	1000	800	1.25	-	1.40	28.97	2.40
		235	206000	10	800	800	1.00	-	1.69	28.97	2.19
Case 8	CSR-H:	235	206000	10	800	800	1.00	-	1.69	28.97	2.19
		235	206000	10	800	600	1.33	-	1.36	51.50	1.83
		235	206000	10	800	400	2.00	-	1.15	115.88	1.33



		ReH	E	t	a	b	α	ψ	K	σ_e	λ
Case 10	CSR-BC:	235	206000	10	1200	800	1.50	-	8.46	28.97	0.98
		235	206000	10	1000	800	1.25	-	9.16	28.97	0.94
		235	206000	10	800	800	1.00	-	10.07	28.97	0.90
		235	206000	10	800	800	1.00	-	10.07	28.97	0.90
		235	206000	10	600	800	0.75	-	11.43	28.97	0.84
		235	206000	10	400	800	0.50	-	19.07	28.97	0.65
Case 10	CSR-H:	235	206000	10	1200	800	1.50	-	8.46	28.97	0.98
		235	206000	10	1000	800	1.25	-	9.16	28.97	0.94
		235	206000	10	800	800	1.00	-	10.07	28.97	0.90
Case 14	CSR-H:	235	206000	10	800	800	1.00	-	10.07	28.97	0.90
		235	206000	10	800	600	1.33	-	6.43	51.50	0.84
		235	206000	10	800	400	2.00	-	4.77	115.88	0.65



2) New load cases 18 and 19:

The equations for buckling factor *K* have been developed for new load cases 18 and 19 on the basis of ANSYS analyses.

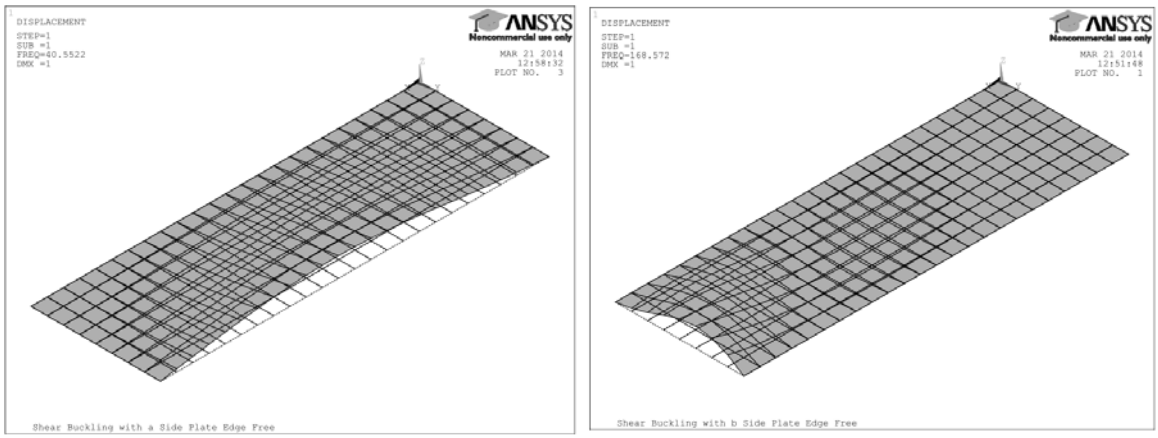
The properties of the 10 plate panel models used in the analyses are shown in Table 3.

Table 3: Properties of the 10 plate panel models

α	a [mm]	b [mm]	t [mm]	E [N/mm²]	R_{eH} [N/mm²]	σ_c [N/mm²]
5	4250	850	12	206000	315	37.11
4	3400	850	12	206000	315	37.11
3	2550	850	12	206000	315	37.11
2	1700	850	12	206000	315	37.11
1	850	850	12	206000	315	37.11
1	850	850	12	206000	315	37.11
2	1700	850	12	206000	315	37.11
3	2550	850	12	206000	315	37.11
4	3400	850	12	206000	315	37.11
5	4250	850	12	206000	315	37.11

Typical deflection plots for the new load cases are shown in Figure 2.

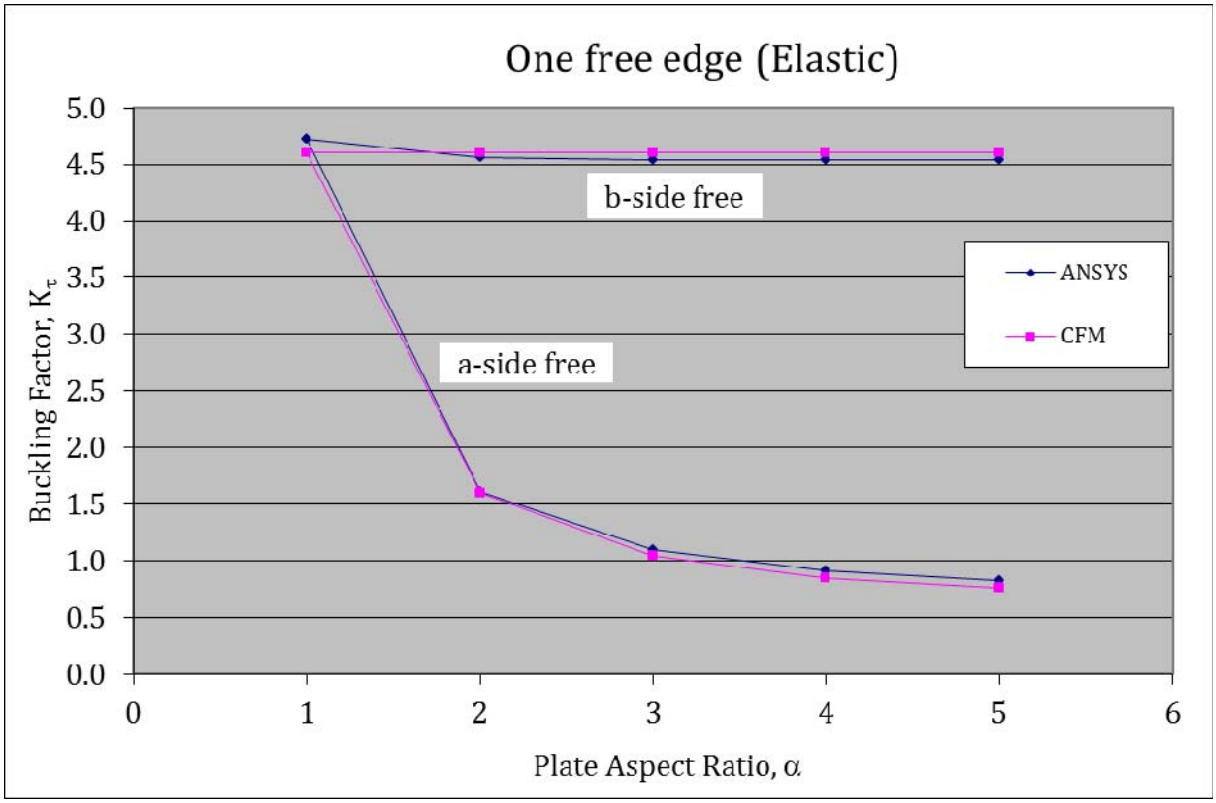
Figure 2: Typical deflection plots



Shear buckling with a side plate edge free (Case 18) Shear buckling with b side plate edge free (Case 19)

Results of the FE analyses are shown in Figure 3.

Figure 3: Elastic buckling comparison plot



Based on these FE results, the buckling factor *K* can be calculated as follows:

a-side free (Case 18): $K = 0.6 + 4/\alpha^2$, and
b-side free (Case 19): $K = 0.6 + 4/1^2 = 4.6$.

These CFM formulae are compared to the FE results in Figure 3.

For the free b-side, the effect of aspect ratio α is negligible, i.e. all of the buckling takes place at the free end (see Figure 2).

The foregoing equations need to be multiplied by $3^{0.5}$, so that they can be used directly in the equation for the reference degree of slenderness λ, i.e.

a-side free (Case 18): $K = 3^{0.5}(0.6 + 4/\alpha^2)$, and
b-side free (Case 19): $K = 3^{0.5}(0.6 + 4/1^2) = 3^{0.5}(4.6) = 8$.

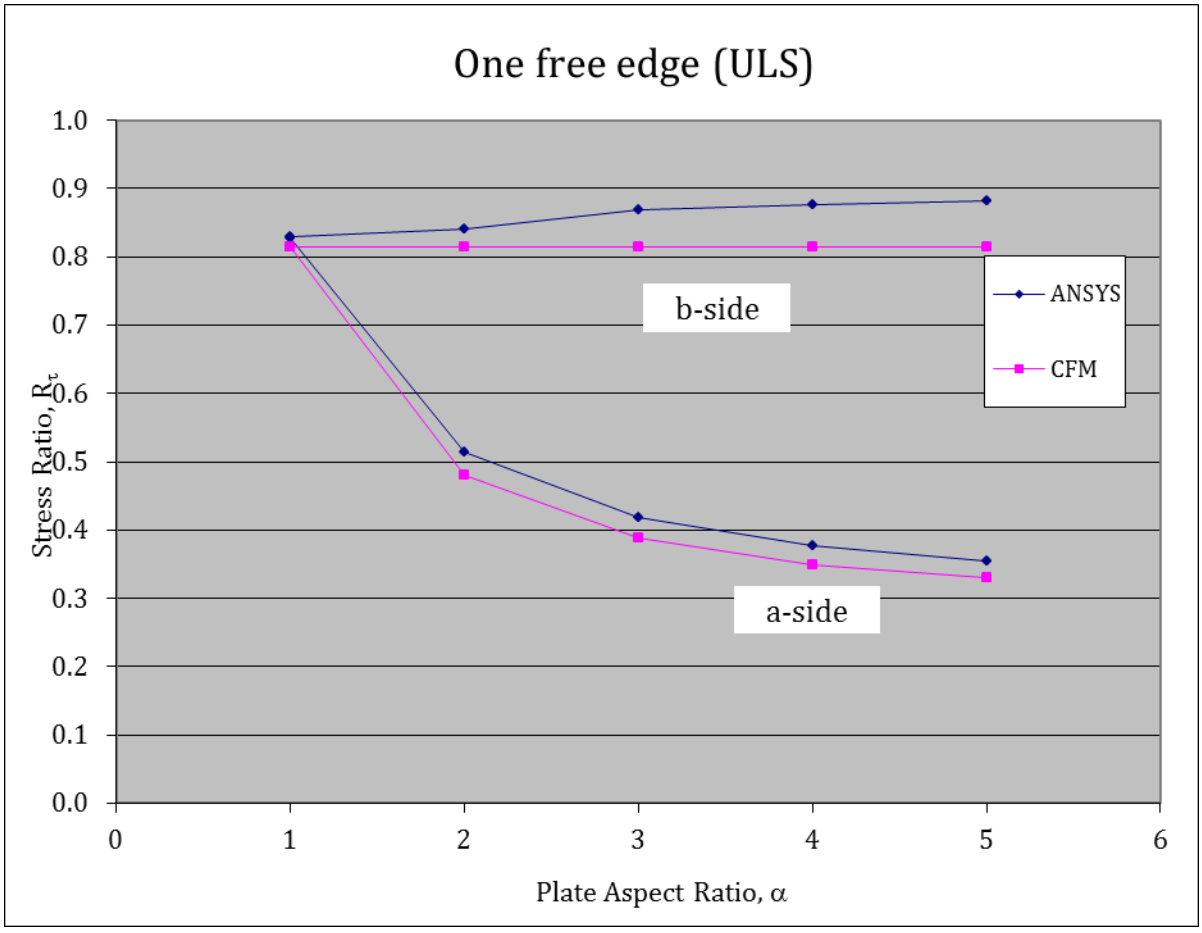
Using these formulae for buckling factor *K*, the ultimate strength of plating (β = 2.8) has also been studied using the existing CFM equation for the plate reduction factor under shear, Cτ:

$$C_\tau = 1 \text{ for } \lambda \le 0.84$$

$$C_\tau = \frac{0.84}{\lambda} \text{ for } \lambda > 0.84$$

A plot comparing CFM and FE results is shown in Figure 4. The comparison validates the existing CFM equation used to calculate Cτ.

Figure 4: ULS comparison plot



3. Impact in Scantlings/Illustrate the consequences of the Rule change proposal on representative ships.

1) For new load cases 6, 7, 8 and 14, there is no impact since they are simply the reformulation of already existing load cases.

2) For new load cases 18 and 19, it is unclear how these cases have been handled in the past. Nevertheless, the impact on steelweight will be negligible.

Pt. 1, Ch. 8, Sec. 5, [2.3.5]

1. Reason for the Rule Change
Clarification of Rule text by amending effective breadth to effective width.

Pt. 1, Ch. 8, Appendix 1

1. Reason for the Rule Change
Amendment proposed to clarify that curved panels are to be treated as irregular panels.

Pt. 1, Ch. 9, Sec. 2, [2.1.3]

1. Reason for the Rule Change
IACS received the comment from industry that the requirement in Pt 1, Ch 9, Sec 2, [2.1.3] should be modified so as to be able to use very fine mesh analysis according to Ch 9, Sec 5, [1] to [4] instead of the screening method specified in Ch 9, Sec 5, [6]. After verification, it is concluded that the requirement can be amended.

2. Background
The very fine mesh analysis according to Ch 9, Sec 5, [1] to [4] is considered equivalent as the screening fatigue procedure as given in Ch 9, Sec 5, [6] in application of Ch 9, Sec 2, [2.1.3].

3. Impact in Scantlings
This amendment is for clarification of rule application. No impact on scantlings is expected.

Pt. 1, Ch. 9, Sec. 2, Table 3

1. Reason for the Rule Change
Editorial clarification.

2. Background
According to Pt 1, Ch 1, Sec 4, Table 7, the "corrugated bulkhead" is the collective terminology of "corrugation" and "lower/upper stool" if any. Hence, "corrugations", not the "corrugated bulkhead", connect to stools or inner bottom.

Referring to Pt 1, Ch 9, Sec 2, Table 3, item 5 and Pt 1, Ch 9, Sec 6, [8], a discrepancy in the rule is found as below:

- Pt 1, Ch 9, Sec 2, Table 3, item 5: Lower side frame bracket toe at the most critical frame position(1)

- Pt 1, Ch 9, Sec 6, [8]: Lower and Upper toe of Hold Frame

The proposal clarifies that both the lower and upper toes of hold frames should be considered.

3. Impact in Scantlings

This amendment is for clarification of rule application. No impact on scantlings is expected.

Pt. 1 Ch. 9, Sec. 5, Table 2 Stress magnification factor

1. Reason for the Rule Change

Wrong numbers have been found for Stress Magnification Factors SMF for lower stool in above mentioned table in the Rules.

2. Background

With respect to a simple screening procedure it has been decided to include the more severe Stress Magnification Factor SMF in case of two hot spots. This has not been followed in the last Rule edition for the lower stool. With this Rule Change Proposal also for the lower stool the SMF's have been changed to the more severe ones. With this RCP the Rule is now in line with the TB document.

As wrong numbers in the Rule have been corrected only, the current TB
TB REP_PT1_CH09_SEC05_SMF FOR SCREENING FATIGUE
is still valid and no further update is needed.

3. Impact in Scantlings

As the stress magnification factors in the current Rule version were too small this RCP lead to increased requirements. But it has to be emphasized that only the screening procedure is affected. In case of insufficient fatigue life a hot spot stress analysis may follow which is not affected by this RCP.

Pt. 1, Ch. 9, Sec. 6, [4.1.6]

1. Reason for the Rule Change

The terms "side girder" and "horizontal girder" used in Pt 1, Ch 9, Sec 6, [4.1.6] are replaced by "side stringer".

2. Background

This amendment is just a corrigendum.

3. Impact in Scantlings

No impact in scantling is expected by the corrigendum.

Pt. 1, Ch. 10, Sec. 1, Symbols

1. Reason for the Rule Change

Editorial change.

2. Background

It is to clarify the intent of the Rule requirement.

3. Impact in Scantlings

There is no impact on scantlings due to this change.

Pt. 1, Ch. 10, Sec. 4, 1.3.5 c)

1. Reason for the Rule Change
This is a misprint and transverse sloshing pressure need not be applied on a vertical web frame. The vertical web is parallel to the direction of the liquid movement in the case of the transverse sloshing and no significant net pressure will occur on the web.

Pt. 1, Ch. 11, Sec. 2, Table 1

1. Reason for the Rule Change
Editorial change.

2. Background
It is to clarify the intent of the Rule requirement.

3. Impact in Scantlings
There is no impact on scantlings due to this change.

Pt. 1, Ch. 11, Sec. 3, [3.9.1] General

1. Reason for the Rule Change
Editorial change.

2. Background
Table 2 is needed for guidance of the breaking strength as the table should be referred to from the subsequent Sec 4 [3.1.7] c) & [5.1.6] c).

3. Impact in Scantlings
There is no impact on scantlings due to this change.

Pt. 1, Ch. 11, Sec. 4, Symbols

1. Reason for the Rule Change
Editorial change.

2. Background
The normal stress has been defined in line with UR A2

3. Impact in Scantlings
There is no impact on scantlings due to this change.

Pt. 1, Ch. 11, Sec. 4, [3.1.5]

1. Reason for the Rule Change
Editorial change.

2. Background
Cross reference sections to be corrected

3. Impact in Scantlings
There is no impact on scantlings due to this change.

Pt. 1, Ch. 11, Sec. 4, [3.1.7] c)

1. Reason for the Rule Change
Editorial change.

2. Background
As explained in TB of Pt1, Ch 11, Sec 3, [3.9.1]

3. Impact in Scantlings
There is no impact on scantlings due to this change.

Pt. 1, Ch. 11, Sec. 4, [5.1.6] c)

1. Reason for the Rule Change
Editorial change.

2. Background
As explained in TB of Pt1, Ch 11, Sec 3, [3.9.1]

3. Impact in Scantlings
There is no impact on scantlings due to this change.

Pt. 1, Ch. 12, Sec. 1, [3.3.1] b)

1. Reason for the Rule Change
The term "bent plates subject to lateral liquid pressure" were used to define that this requirement is applicable to boundaries normally subjected by liquid pressure. It was not the intention to apply it to watertight bulkheads between dry compartments which will only be subjected to liquid loads in case of accidental flooding. To clarify this issue it is proposed to

modify this definition to "bent plates at boundaries to tanks or ballast holds" hence this additional requirement will not be applicable to bent plates as corrugated bulkheads between dry cargo hold even if they shall be designed against liquid pressure due to accidental flooding.

2. Background

The proposed amendment is in line with the answer provided to KC ID: 816

3. Impact in Scantlings

There is no impact on scantlings due to this change.

Pt. 1, Ch. 12, Sec. 3, [2.3.2]

1. Reason for the Rule Change

Editorial change.

2. Background

It is to clarify the intent of the Rule requirement.

3. Impact in Scantlings

There is no impact on scantlings due to this change.

Pt. 1, Ch. 12, Sec. 3, [2.4.6]

1. Reason for the Rule Change

Increased welding requirement of the most highly stressed part of vertical fabricated corrugation.

2. Background

The lowest 15% of the corrugation span has the highest shear and bending (where the scantlings calculated at the connection have to be maintained up to this point) thus the welds also have to be compatible. It is relative to KC ID 811.

3. Impact in Scantlings

No impact in scantling is expected by the Rule change proposal.

Pt. 1, Ch. 12, Sec. 3, [2.5.2]

1. Reason for the Rule Change.

The updated definition of partial penetration welding has the limit of $f<t_{as\text{-}built}/3$. Therefore the intermediate case $f=t_{as\text{-}built}/2$ is not relevant.

2. Impact in Scantlings

No impact in scantling is expected by the Rule change proposal.

Pt. 1, Ch. 12, Sec. 3, Table 2 and 3

1. Reason for the Rule Change.

It has been decided to add new table giving the weld factors for hatch covers, different fittings and equipment (source: CSR-OT Table 6.5.1). Therefore a new Table 3 is introduced; all relevant locations are excluded from existing Table 2. Existing Table 3 is renumbered into Table 4, all references are updated.

2. Impact in Scantlings
No impact in scantling is expected by the Rule change proposal.

Pt. 1, Ch. 13, Sec. 2, [1.2.1]

1. Reason for the Rule Change
Editorial change.

2. Background
It is to clarify the intent of the Rule requirement.

3. Impact in Scantlings
There is no impact on scantlings due to this change.

Pt. 2, Ch. 1, Sec. 3, [1.1.1]

1. Reason for the Rule Change
Definition of P can be misleading.

2. Background
The design load case sets WB-4 and WB-6 are to be considered. According Pt.1 Ch.6 Sec.2 Table 1, the definition of the pressure in WB-4 to WB-6 is the same as that in Ch.6 Sec2 [3.3.1] of CSR BC. So RCP1 is in line with CSR BC.

In addition, the requirement in [1.1.2] is for the ballast hold in heavy ballast condition according to Pt.1 Ch.6 Sec.5, in which the span of the side frame is different from that in [1.1.1].

3. Impact in Scantlings
No impact in scantling is expected by the Rule change proposal.

Pt. 2, Ch. 1, Sec. 3, [1.1.1]

1. Reason for the Rule Change
The coefficient is amended from 5.5 to 5 to align with CSR-BC.

2. Background
The requirement of net shear sectional area A_{shr} of cargo hold side frames of single side bulk carriers is enlarged 1.1 times more than that required in external release 1 July 2012. By comparison to that required by CSR BC, although the enlarged coefficient 5.5 = 5 × 1.1, the coefficient C_t = 0.9 is also considered for S+D design load set in CSR-H, while no consideration in CSR BC for only S+D condition. 5 / 0.9 = 5.5, which means 1.1 has already been considered in external release 1 July 2012 and it is not necessary to enlarge another 1.1 times in external release 1 April 2013.

- CSR-H (1 April 2013):

$$A_{shr} = 5.5\, a_S \frac{P\, s\, l_{SF}}{C_t\, \tau_{eH} \sin\phi} \left(\frac{l_{SF} - 2\, l_g}{l_{SF}} \right)$$

- CSR-H (1 July 2012):

$$A_{shr} = 5\, a_S \frac{P\, s\, l_{SF}}{C_t\, \tau_{eH} \sin\phi} \left(\frac{l_{SF} - 2\, l_g}{l_{SF}} \right)$$

$$A_{sh} = 1.1\,\alpha_s\,\frac{5\,(P_s + P_w)\,s\,l}{\tau_a \sin\phi}\left(\frac{l - 2\,l_e}{l}\right)$$

- CSR BC (Ch 6, Sec 2, 3.3.1):

The proposed amendment is in line with the answer provided to KC ID: 571

3. Impact in Scantlings

This amendment is for clarification of rule application. No impact on scantlings is expected.

Pt. 2, Ch. 1, Sec. 3, [2.4.1] & [2.4.2]

1. Reason for the Rule Change

Editorial change.

2. Background

It is to clarify the intent of the Rule requirement.

3. Impact in Scantlings

There is no impact on scantlings due to this change.

Pt. 2, Ch. 1, Sec. 3, Symbols, [2.3.2] and [2.4.2], Table 2

1. Reason for the Rule Change

The rules are amended to define effective span used in Pt 2, Ch 1, Sec 3, [Symbol] and [2.3.2]. For stiffeners, the force is to be based on the effective bending span, not on full length.

2. Background

If the force from the dunnage is placed directly above a bracket, it will not contribute to the bending of the stiffener and will be directly transferred to the web frame such as floor through the bracket. Similar for the shear force, if the force is directly above a bracket, it is not so relevant to check the shear capacity of the longitudinal stiffener web. Based on this, it is reasonable to deduct the length of the brackets when calculating the force for the longitudinal. It is relative to CSR KC ID 1048.

The stiffener span is incorporated in the factor K_3 shown in Table 2. In Table 2, the used l is defined as the distance between floors, however, the span reductions due to brackets can be considered here technically. Hence, the definition of l_{bdg} is added in Pt 2, Ch 1, Sec 3, [Symbol] and all the symbols "l" used in Pt 2, Ch 1, Sec 3, [2.3.2] are replaced by l_{bdg}.

3. Impact in Scantlings

No impact in scantling is expected by the Rule change proposal.

Pt. 2, Ch. 1, Sec. 3, [3.3.3] & [3.3.4]

1. Reason for the Rule Change

Editorial change.

2. Background

It is to clarify the intent of the Rule requirement.

3. Impact in Scantlings

There is no impact on scantlings due to this change.

Pt. 2, Ch. 1, Sec. 4, Table 1 & Table 2

1. Reason for the Rule Change

It is to clarify the intent of the Rule requirement.

2. Background

The "supported by girder ends" do not correspond to bulk carriers but other type of ships.

3. Impact in Scantlings

There is no impact on scantlings due to this change.

Pt. 2, Ch. 1, Sec. 4, [4.3.1], [4.4.1], [4.5.1] and [4.6.1]

1. Reason for the Rule Change

The requirements of Pt. 2, Ch. 1, Sec. 4, 4.3.1, 4.4.1, 4.5.1 and 4.6.1 are from CSR BC Ch. 6, Sec. 4, 2.2.1, 2.3.1, 2.4.1 and 2.5.1 respectively, they are to be in line with CSR BC.

2. Background

Copy/paste from CSR BC to CSR-H is wrong.

3. Impact in Scantlings

No impact in scantling is expected by the Rule change proposal.

Pt. 2, Ch. 1, Sec. 5, [3.2.1] Primary supporting members

1. Reason for the Rule Change

The reason for this Rule change proposal is to align the method of calculating effective width of attached plating of primary supporting members of cargo hatch covers with the general method used for all hull structures given in Pt 1 Ch 3 Sec 7 [1.3.2].

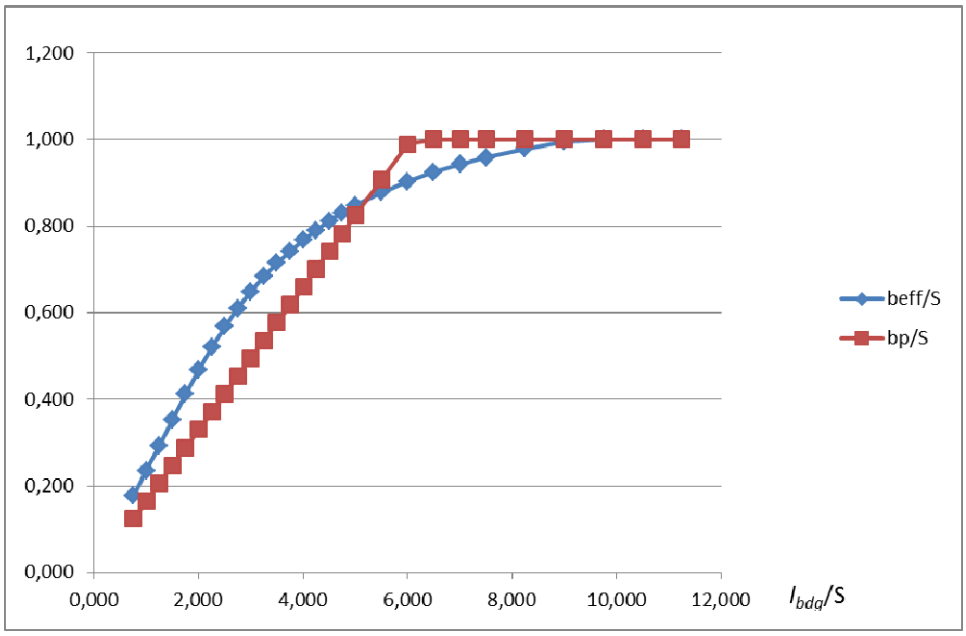
2. Background

The general method for effective width calculation given in Pt 1 Ch 3 Sec 7 [1.3.2] is considered to be more accurate and generic than the simplified expression currently used for cargo hatch covers.

3. Impact in Scantlings

The consequences of this Rule change proposal is expected is illustrate in figure 1, red curve is current formulation and blue curve is the proposed method. The impact on scantlings will be dependent on length/spacing ratio of the member. For ratios less than 5 (in general short members) the proposed formulation will give increased effective width and potentially lower scantling requirement than current formulation. For ratios between 5 and 10 the effective width will be reduced, i.e. the scantling requirements will increase. For these longer members the bending stresses of the primary supporting members are important to check for yield in the face plate and buckling of the attached plate, hence possible non-conservative results with the current formulation will be removed. For length/spacing ratios exceeding 10, i.e. very long members, both the proposed formulation and the current method will give 100% effective width.

Figure 1



Pt. 2, Ch. 1, Sec. 5, [5.1.1], [5.2.3], [5.3.4]

1. Reason for the Rule Change
Please see the TB report "Buckling assessment of hatch cover with U type stiffeners".

Pt. 2, Ch. 1, Sec. 5, [5.4.3]

1. Reason for the Rule Change
Editorial change.

2. Background
Clarification

3. Impact in Scantlings
There is no impact on scantlings due to this change.

Pt. 2, Ch. 2, Sec. 2, [1.3.1]

1. Reason for the Rule Change
The requirement is to be in line with IACS UR F2.

2. Background
The requirement is revised to be consistent with the IACS UR F2 (Rev.2) adopted on November 2012. During the discussion on the amendment of F2, IACS could not clearly define the "appropriate tests" showing the paint to be used does not increase the incendiary sparking hazard. Therefore, IACS decided not to describe the treatment of "tests" at the moment.

3. Impact in Scantlings
There is no impact on scantlings due to this change.

Pt. 2, Ch. 2, Sec. 4, [1.5.1]

1. Reason for the Rule Change
Editorial change.

2. Background
The same has been described in [1.2.1]

3. Impact in Scantlings
There is no impact on scantlings due to this change.