Bulker Q&As and CIs on the IACS CSR Knowledge Centre

KCID No.	Ref.	Type	Topic	Date completed	Question/CI	Answer	Attachment
224	9/2.3.1.2	Question	stiffeners	2006/11/22	This requirement is excessive than our experience. In structural design, stiffeners are suitably arranged on floors to prevent excessive vibration of them. And scantlings are determined taking account of vibration.	The CSR doesn't take into account the vibration effects for the scantlings, as it is outside the scope of classification.The floor webs are to be stiffened enough to withstand the forces induced by rudder post, propeller post and rudder horn.As a direct calculation of floors and their stiffening arrangement is generally never carried out in this area, it is preferable to indicate a value for the maximum spacing of web stiffeners.	
225	9/3.3.1.3	Question	frame spacing	2006/11/29	This requirement is excessive than our experience. This requirement should be reconsidered taking account of present designs.Please revise the rule as follows, or delete the rule:"not greater than 5 frame spacing	According to the last sentence of [3.1.3], wider spaces may be accepted based on the discretion of the Society. This sentence has been added to respond the comments from Industry. Therefore, the text is kept as it is.	
227	9/4.5.3.1	Question	shear area	2006/11/22	It seems that the equation of Ash is missing. Please confirm.	The formula is not missing, but the words "and the shear area Ash, in cm2," should be deleted.	
249 attc	9/2.5.1.3	Question	Connection of aft peak structure with rudder horn	2006/12/1	The vertical extension of the hull structure is required not to be less than the horn height. This requirement is considered primitive without detailed strength basis. Normally, the vertical extension is between outer shell and steering gear flat and there may be many designs that could not comply with this requirement. Please delete this requirement or amend it considering strength basis.	The feedback is noted and we will consider a rule change proposal.	Y
269	Table 9.1.2	Question	Min plate thickness	2006/11/23	We can not see the reason for IACS to change the coefficient from 0.7 to 0.9 on the denominator of the second term in the equation. The proposal will reduce the required plate thickness at intact condition and bow flare area. We would like to stress that plating cannot be treated in the same way as a IACS stiffener where the corresponding coefficient is 90% (i.e. 0.9) of the yielding. Propose to remain as it is.	The reason of changing the coefficient from 0,7 to 0,9 is a matter of editorial correction, which was forgotten at the time of publication.This coefficient if normally equal to 0,9 as defined in Table 6 in Chapter 6, Section 1 for platings not contributing to the hull girder longitudinal strength.	
270	Table 9.2.2	Question	Min plate thickness	2006/11/23	We can not see the reason for IACS to change the coefficient from 0.7 to 0.9 on the denominator of the second term in the equation. The proposal will reduce the required plate thickness at intact condition and bow flare area. We would like to stress that plating cannot be treated in the same way as a IACS stiffener where the corresponding coefficient is 90% (i.e. 0.9) of the yielding. Propose to remain as it is.	The reason of changing the coefficient from 0,7 to 0,9 is a matter of editorial correction, which was forgotten at the time of publication.This coefficient if normally equal to 0,9 as defined in Table 6 in Chapter 6, Section 1 for platings not contributing to the hull girder longitudinal strength.	

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271	9/5.2.4.3	Question	watertight	2006/11/23	IACS's proposal to change the word "watertight" into "weathertight" is not acceptable unless there is a Load line coaming. Propose to retain watertight.	The change from watertight to weathertight is correct. LL Regulation requests a coaming heigth of 600mm for Pos.1 and 450mm for Pos.2. Subject to this the access hatches need to be weathertght only. In the CSR text in para. 2.4.1 we refer to the required coaming height. Consequently the access hatches as mentionend under para. 2.4.3 have to fulfill the requirement 'weathertight'. We assume the questioner has mixed this with flushdeck hatches. They have to be watertight.	
301	9/5.1.5.1 & Table 9.5.2	Question	Allowable stresses of external Pressure	2006/12/21	The external Pressure of 0.8 / 0.46 ReH allowable stresses in table 2 of Ch 9, Sec 5, 1.5.1, it is subjected to Ch 4, sec 5, [2], we think that the correct one should be subject to Ch 4, sec 5, [2.2]; the other loads are water ballast load, cargo load and container load etc. If not, please inform us what other loads are with the detail load.|	The Table 2 of Ch 9 Sec 5 is correct. The other loads specified in Table 2 are interpreted as internal loads such as inertia pressure due to water ballast in ballast hold.	
304	9/5.4.2.1	Question	hatch coaming	2007/1/31	Regarding to the load point, some classes require to use the hatch cover top, but others are still on the top of hatch coaming yet. Which is correct one, on top of hatch cover or top of coaming? If the load point is based on top of coaming, the sea load can be reduced a hatch cover depth height (900-1200 mm) from coaming to hatch cover top. We propose that load point on top of cover is for the sea load, on top of coaming is for water ballast load.	The proposal is agreed, but should be more specific on the location of the load point. Regarding the second and last points in Ch 9, Sec 5, [4.2.1], we will consider the rule correction as follows: "- transversely, at hatchway side, - vertically, at the top of the hatch cover for sea pressures, and at the top of the hatch coaming for internal pressures due to ballast water."	
305	9/5.7.5	Question	Cleat for water ballast load	2006/12/26	Because the internal WB loads of CSR are very large on hatch cover bottom side, we advice that an allowable stress of cleat is needed, and propose it is 0.9-1.0 ReH. As some class have an allowable and some have not it.	As [7.3] and [7.5] are coming from UR S21, the dimensioning of cleats is covered under [7.3.5], whatever the loads are.	
309 attc	Ch 9/ 5	Question	hatch cover	2006/12/21	Regarding to the triangular load like water ballast, both way of triangular load and average uniformed load may be used based on class by class or local office by office, but both calculation results is very different. What's CSR standard for folding and side rolling hatch cover from 1 to 5 (see attachment)?	The load cases are "H1" and "H2", the internal pressure due to water ballast in ballast hold is treated as uniform load. The load cases are "P1", "P2", "R1" and "R2", the internal pressure due to water ballast in ballast hold is treated as triangular load.	Y
312	9/1.4.4.4 & 9/2.4.3.4	Question	FEA	2007/1/31	Which sub-section should be adopted to determine the scantlings of deck primary supporting members of the fore part and the aft part in accordance with Ch 6/Sec.4? For example, if the ship length L is 150m or above, the direct strength analysis would be applied according to the provision specified in Ch 7(see Ch 6/Sec 4/[1.3.1]), but the procedure in Ch 7 is applied on the cargo hold structures in midship area.	For ships greater than 150 m in length, Ch 6, Sec 4 requires normally FEA analysis. However, in the fore and aft parts, it seems that prescriptive formulae may be used instead of FEA. In such a case, the requirements in Ch 6, Sec 4, [2.6] may also be considered as being applicable to primary supporting members in fore and aft parts for ships greater than 150m. We will consider the further rule development about the application of FEA to cargo areas outside midship region and determination of the scantling of primary supporting members outside midship cargo regions for ships of 150m in length and above.	

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336 attc	9/5.5.5	Question	Section modulus	2007/2/8	We would like to confirm a way to apply the requirement of this sub-paragraph to a structural member shown in the attachment. (1) Which position, A, B or C, shown in Figure, is to be selected to calculate w0 and I0? We consider that position B is suitable for this requirement. Please confirm. (2) Which position, A, B, C or else, is to be considered when the requirement of net section modulus of ordinary stiffeners, w, is applied? We consider that position A is appropriate for this requirement. Please confirm.	According Fig. 1 a symmetrical beam with l_1 < 0.5 l_0 is the basis for this simplification. The example in the attachment is not covered by the assumptions of the requirement, i.e., a symmetrical beam. For an unsymmetrical beam as shown the attached document, the calculation should be carried out by direct calculations or beam analysis as stated in [5.4.1].	Y
376	Table 9/3.7.2 & Table 2	Question	net thickness	2007/1/24	Ch.9 Sec.3 [7.2] Table 2. We assume the bedplate net thickness is in mm, not m.	We agree with the comment and will consider a rule amemdment proposal.	
377	9/5.2.2	Question	formula	2007/1/24	Ch.9 Sec.5 [5.2.2] The first formula is incorrect? Should read t=10s, not t=0.01s	We agree with the comment and will consider a rule amemdment proposal.	
378	9/5.5.5.1	Question	formula	2007/3/12	Our understanding of this item is that the section modulus for a stiffener/PSM with variable cross section always is to be at least equal to the section modulus of a stiffener/PSM with constant cross section (w = wCS). This means there is nothing to gain by varying the cross section. Example: For a simply supported PSM with constant CS the section modulus at midspan, w0, will be governing. Our understanding is that for a PSM with varying CS, the minimum section modulus is w0, independent of the position along the axis (w = wCS = w0). We have the same problem for moment of inertia. Please clarify.	With respect to the names given in 9/5.5.5.1, considering wCS=w0 gives a section modulus of wCS=w0 only if w1>=0.8*w0, i.e only if the stiffener/PSM's cross section is not really varying. For 0=<w1=,0.8*w0, the section modulus to be considered is given by the second formula and is greater than the midspan section modulus w0. In addition, we can consider that the midspan section modulus w0 is not to be equal to the section modulus of an constant cross section stiffener/PSM for this calculation; it has to be used for the 9/5.5.5.1. A similar approach can be applied to inertias. Furthermore, these calculations can be replaced by a direct approach as it is usually made.	
379	9/5.6.3.1	Question	formula	2007/2/22	Ch.9 Sec.5 [6.3.1] What is the background for the factor 15.98 in this formula? Is it a misprint for 15.8?	This formula comes from IACS UR S21, S21.4.2. The constant value 15.98 is obtaind from muttiplying 14.9 by squareroot of 1.15 (=Scoam specified in UR S21.4.2). Therefore, the formula is correct.	
413	Table 9.3.2 & 9/3.7.2	CI	Net Sectional area of bedplates	2007/10/8	Ch.9 Sec. 3 [7.2] Table 2 The requirement for net sectional area of bedplates is significantly exceeding current designs, in some cases by more than 50%. The requirement for a typical Handymax vessel with current design has P=9500kW, nr = 130, LE=8.5m The required bedplate net area is 640cm2. Current design is about 430cm2, which is a nearly 50% increase.	It was not intended to increase the scantlings compared to current design. We noted your comment. The following interpretation are prepared and will be submit it to the Hull Panel for review. "The net scantlings of the structural elements in way of seatings are to be determined by the engine manufactures. They are to be checked on the basis of calculation result supplied by the engine manufacturers. If these calculations are not supplied, the net scantlings of the structural elements in way of the internal combustion engine seatings are to be obtained from the formulae in Table 2."	

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468	9/4.4.1.1, 4.2.1, 4.5.1 & 5.3.2	CI	Scantlings of s/structures & deckhouses	2009/10/6	According to Ch 3 Sec 2 [2.1.1], the scantling of superstructure and deckhouses specified in Ch 9 Sec 4 is based on the gross scantling concept. Also, according to Ch 9 Sec 4, [1.2.1], all scantling and dimensions refered to in [4] and [5] are gross. In the requirement of [4.1.1], [4.2.1], [4.5.1] and [5.3.2], the thickness formulae are given as follows. [4.1.1] t=1.21s*(k*pSI)^0.5+tc, [4.2.1] t=1.21s*(k*PD)^0.5+tc, [4.5.1] t=8s*(k)^0.5+tc, [5.3.2] t=0.9s*(kpA)^0.5+tc Where, tc is defined as corrosion addition defined in Ch 3, Sec 3, specified in "Symbols". To refference to the corrosion addition defiend in Ch 3 Sec 3 means that the scantling is based on the net scantling concept. This is inconsistet with the requirement in Ch 3 Sec 2 [2.1.1] and Ch 9 Sec 4 [1.2.1]. According to Technical Background, these formulae are based on the current GL Rules. In the original formula, tk instead of tc is used and tk is taken equal to 1.5mm. Please consider revising the text.	As you pointed out, the reference to the corrosion addition, tc, defined in Ch 3 Sec 3 in the formulae is inconsistent with the requirements in Ch 3 Sec 2 [2.1.1] and Ch 9 Sec 4 [1.2.1]. These requirements have come from the current GL Rules and there are no intention to modify the scantling approach concept specified in Ch 9 Sec 4 [1.2.1]. Therefore, the value of tc used in these formulae is taken equal to 1.5mm as an interpretation, according to the current GL Rules. This has been reflected in RCN 1-7 to the July 2008 Rules.	
476 attc	9/5.1.5.1	CI	Allowable stress on hatch covers	2007/8/23	Ch. 9 Sec. 5 1.5.1. Allowable stress on hatch covers: Reference in the rule text is made to ILLC Reg.15(6) and 16(5). Regulation 15(6) is relevant for “Hatchways closed by portable covers and secured weathertight by tarpaulins and battening devices”. The allowable stress for pontoon hatch covers given as Sigma_A = 0.68ReH is originating from Reg. 15(6). Regulation 16(5) is relevant for “Hatchways closed by weathertight covers of steel or other equivalent materials. The allowable stress for “weathertight hatch cover” Sigma_A = 0.8 ReH is originating from Reg. 16(5). It is our interpretation that 15(6) is not relevant for modern bulk carriers. UR S21 and UI LL70 are both covering Reg. 16 and relevant for pontoon hatch covers. We assume that Pontoon hatch covers in modern bulk carriers should be treated as “weathertight hatch covers” with allowable stress Sigma_A = 0.8ReH. This is not clear as Table 2 is written in the current rules.	The Common Interpretation is as follows: - If hatch covers are considered weathertight by construction, and without the need of tarpaulins and battening devices, the allowable stresses to be used are those corresponding to the line "Weathertight hatch cover" in the Tab 2, i.e. 0.8ReH for sigma. This is in line with ILLC Reg.16(5). - If hatch covers are considered weathertight by using tarpaulins and battening devices, the allowable stresses to be used are those corresponding to the line "Pontoon hatch cover" in the Tab 2, i.e. 0.68ReH for sigma. This is in line with ILLC Reg.15(6).	Y
477	9/5.5.2.3	Question	Critical buckling stress	2007/10/4	Ch. 9 Sec. 5 5.2.3 Critical buckling stress check. Last sentence of the requirement states: “In addition, the bi-axial compression stress in the hatch cover plating, when calculated by means of finite element analysis, is to comply with the requirements in Ch.6 Sec.3” We assume the sentence originates from UR S21 3.6. In case of FEM analysis, please advise if biaxial buckling in accordance with requirement of Ch. 6 Sec. 3 is additional or instead of the uniaxial buckling requirement in 5.2.3.	The Common Interpretation is as follows: - If no finite element analysis is performed for the buckling of the hatch cover plating, only the criteria for buckling for uniaxial compression is to be checked. - If a finite element analysis is performed for the buckling of the hatch cover plating, criteria for buckling for bi-axial compression are to be checked.	

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494	Table 9.1.1 & Table 9.2.1	CI	Fore part & Aft part	2007/9/13	Ref. Ch. 9 Sec. 1 "Fore Part" Table 9.1.1 and Ch. 9 Sec. 2 " Aft Part" Table 9.2.1. Q1: Tables 9.1.1 and 9.2.1 are referring to "Platform". It is assumed that this is a non-watertight horizontal member. Please confirm. Q2: Tables 9.1.1 and 9.2.1 are extracts of Table 6.1.2. Tables 9.1.1 and 9.2.1 are incomplete with respect to horizontal and vertical watertight boundaries. Please advise if relevant items of Table 6.1.2 may be used for watertight items in fore/aft part. Please consider completing the Tables 9.1.1 and 9.2.1 with watertight divisions.	A1:Platform referred in tables 9.1.1 and 9.2.1 are effectively non-watertight horizontal member. A2:Tables 9.1.1 and 9.2.1 are incomplete with respect to horizontal and vertical watertight boundaries, and relevant items of Table 6.1.2 may be used for watertight items in fore/aft part.	
495	9/1.3 & 9/2.2	CI	Fore part & Aft part load model	2007/9/28	Ref. Ch. 9 Sec. 1 "Fore Part – load model" [3] and Ch. 9 Sec. 2 [3] "Aft Part - load model" Following pressures are explicitly given for calculation: 1.External pressure according to Ch. 4 Sec.5 2.Internal lateral pressure in testing condition according to Ch.4 Sec. 6 [4] Internal pressures due to liquid ps+pw according to Ch. 4 Sec. 6 [2] is not specified for Fore/Aft regions. Please advise if Ch. 4 Sec. 6 [2] pressures need to be considered for fore and aft regions or if only testing pressures should be applied.	it is quite clear that internal pressures defined in Ch 4, Sec 6, [2] need also to be considered for fore and aft regions in addition of testing pressures. **Also Included in Corrigenda 5**	
500	9/1.5.4.1 & 9/1.5.4.2	CI	Loaded area between the supports of the structure considered	2007/9/28	In Ch 9, Sec 1, (5.4.1] and [5.4.2], a parameter A defined as "Loaded area between the supports of the structure considered" is used in the determination of the net thickness of girders and floors in flat bottom forward area. The definition of this parameter is not clear enough and needs interpretation, or formula to calculate it.	In 5.4.1,Girders A is given by the following formula. A=S*l Where, S: Spacing of center or side girders under consideration, in m. l: Span of floors under consideration, in m. In 5.4.2, Floors A is given by the following formula. A=S*l Where, S: Spacing of floors under consideration, in m. l: Span of center or side girders under consideration, in m. **Also Included in Corrigenda 5**	
524	Ch.9, Sec.1 & 2	RCP	Scantlings of Fore Part and Aft Part structures	2007/9/28	1) The question relates to scantlings of Fore Part and Aft Part structures in flooding condition(Ch.9, S.2, 1.1.2). It being noted that there is no specific paragraph in Fore Part referring to need of scantling assessments in case the fore part is arranged with floodable spaces other than the fore peak tank, it is requested that the requirement in Ch.9, S.2,1.1.2 be incorporated in Fore Part, as well. 2) In Ch.9, S.1 and S.2, there is no requirement of net minimum thickness of plating for watertight bulkhead, while CSR Tanker Rules specify. It is requested that net minimum thickness of plating for watertight bulkhead in Fore Part and Aft Part be specified.	1) We noticed your advice and will prepare a rule change accordingly. 2) Tables 9.1.1 and 9.2.1 are incomplete with respect to horizontal and vertical watertight boundaries, and relevant items of Table 6.1.2 may be used for watertight items in fore/aft part.	

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535	9/5.5.3.2 & 9/5.5.4.2	RCP	Minimum thickness of web of primary supporting member and ordinary stiffeners	2007/10/26	1. Ch 9 Sec 5 [5.3.2] and [5.4.2] We think it is wrong in Ch 9 Sec 5 [5.3.2] and [5.4.2] to link both minimum thickness of web of primary supporting member and ordinary stiffeners with tnet = 6 mm & tnet = 10s of hatch cover top plate on Ch 9 Sec 5 [5.2.2] in the following reasons. (1) The minimum net thickness specified in Ch 9 Sec 5 [5.2.2] is required for steel plating forming the tops of hatch covers by ILLC Reg.16 (5) (c) which is only applied to the top plate, not to the web of primary supporting members and ordinary stiffeners. (2) If the current ordinary stiffener size L 125*75*7 or stiffener with a U-profile are satisfied with the strength requirement specified in IACS UR S21, the stiffener spacing is required to be reduced to 450 to 500 from 600 or 700 mm so that it complies with the minimum net thickness [tnet = 10s] specified in Ch9 Sec5 [5.2.2]. In addition, the web thickness of such stiffeners is increased by 1 to 2mm due to the minimum net thickness of 6mm. The stiffener weight of the hatch cover will be increased about 40% compared to the current one which satisfies the requirements of IACS UR S21. Therefore, we propose to revise the requirement for minimum net thickness requirement for webs of primary supporting members and ordinary stiffeners specified in Ch 9 Sec 5 [5.3.2] and [5.4.2], respectively.	In Ch 9, Sec 5, [5.3.2],the web minimum net thickness of the ordinary stiffener, in mm, is to be not less than 4 mm. In Ch 9, Sec 5, [5.4.2],the web minimum net thickness of the primary supporting member, in mm, is to be not less than 6 mm.	
536	9/5.1.4.1	Question	Stiffeners with a U-profile	2007/10/26	Ch 9 Sec 5 1.4.1 Corrosion additions (1) Box type stiffeners such as stiffeners with a U-profile are used in many hatch covers. The internal environment in a stiffener with a U-profile is similar to the one for internal structures of double skin hatch covers. Therefore, we consider that the total corrosion addition for such stiffeners should be 1.5mm for single skin hatch covers. Please clarify the requirement on the corrosion addition of such stiffeners. (2) In applying a finite element analysis in order to evaluate the stresses in the primary supporting members of hatch covers, are FE models considered a full corrosion addition or a half corrosion addition? (3) In calculating the net moment of inertia of a primary supporting member, does a full corrosion addition subtract from the gross offered thickness of a primary supporting member?	1) As pointed out by the questioner, the corrosion environment inside of a box-type stiffener may be the same of the inside of double skin hatch cover, but the corrosion environment outside of a box type stiffener is the same of the cargo side of a hatch cover. Therefore a corrosion addition of 2mm has to be applied. 2) We think that full corrosion addition has to be considered, because in comparison of the hatch cover to the bulk carrier hull it can be assumed, that the whole hatch cover structure may corrode simultaneously, because the environmental conditions are not so different. 3) When calculating the net moment of inertia of a primary supporting member, full corrosion addition has to be considered to be in line with S21.3.5 and the design approach in Ch6.	

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537	Table 9.5.2	Question	Weathertight hatch covers and pontoon hatch covers	2007/10/19	3. Ch 9 Sec 5 Table 2 (1) The allowable stress for weathertight hatch covers and pontoon hatch covers subjected to external pressure are 0.80 ReH and 0.68 ReH, respectively, in accordance with Reg.15 and Reg.16 of ILLC, but the allowable stress for both weathertight hatch covers and pontoon hatch covers subjected to other loads is the same. Why does the same allowable stress apply to the different types of hatch cover? Please clarify. (2) According to ILLC, external pressure is only external wave pressure acting on the hatch cover. As CSR considers 4 load cases, i.e., H, F, R and P, the external pressure for R1, R2, P1 and P2 at any point of an exposed deck is considered, in addition to the external pressure for load cases H1, H2, F1 and F2, that is the same as IACS UR S21. Therefore, we understand that "External pressure, as defined in Ch 5 Sec 5, 2" means the external pressure specified in Ch 4 Sec 5 [2.2] and [2.3] and does not include "Load carried on exposed deck" specified in Ch 4 Sec 5 [2.4]. We also understand that other loads in Table 2 mean "load carried on exposed deck" and internal pressure due to liquid in ballast hold specified in Ch 4 Sec 6 [2] Please confirm.	A1: For loads which are different from ILLC sea loads, the practice of some classification Societies, since many years, is to consider an allowable stress different from the one indicated by ILLC and applicable for all types of hatch covers. A2: This is related to question 527 and your interpretation is correct: - external pressures are sea pressures - other loads are those defined in Ch9 Sec5 [4.1.3] to [4.1.6].	
538	9/5.5.2.3	CI	Stresses in the primary supporting member	2008/4/11	4.Ch 9 Sec 5 [5.2.3] (1) Where the stresses in the primary supporting member are evaluated by FEA, the uni-axial buckling check can be omitted since the buckling strength check using the bi-axial compression stress in the hatch cover plating is carried out in accordance with the requirements of Ch 6 Sec 3. Please confirm. (2) As there is no stiffener buckling factor "c" or F1 in Table 1 of Ch 6 Sec 3 for special shape stiffeners such as a stiffener with a U-profile, please make an interpretation for the buckling factor of a stiffener with a U-profile.	A1 The Common Interpretation is as follows: - If no finite element analysis is performed for the buckling of the hatch cover plating, only the criteria for buckling for uniaxial compression is to be checked. - If a finite element analysis is performed for the buckling of the hatch cover plating, criteria for buckling for bi-axial compression are to be checked. A2 According to the stuffiness of the stiffener with U-profile, we think the coefficient factor F1 is acceptable to the same value for girders specified in Table 1 of Ch 6 Sec 3, i.e., F1 = 1.30. However a higher F1 value than 1.30 may be accepted provided the buckling strength of panel stiffened by U-beams is verified by non-linear buckling analysis using FEA.	
543	Ch.9 Sec.1, Sec.2 and Sec.3	CI	Scantlings of PSMs in Fore Part, Aft Part & E/R	2007/10/23	Although scantling of PSMs in Fore part, Aft part and E/R are regulated in Ch9 Sec1 through Sec3 in CSR, scantling requirement for not all the PSMs are regulated in Ch9. Scantling requirements of some of the PSMs, such on decks or deep tank bulkheads, refer to Ch6 Sec4. In Ch6 Sec4, scantling formulas are regulated for ships having ship's length L less than 150m, and direct strength analysis is required for ships having L=150m or more according to provisions in Ch7. However, Ch7 regulates direct strength analysis of cargo hold structures only. Please advise how to determine scantling of PSMs in Fore part, Aft part and E/R for ships having L=150m or more.	According to the agreed answer of question #312, PSM in the fore and aft part of the vessel may be designed according Ch6, Sec4, 2.6. We will consider the further rule development about the determination of the scantling of primary supporting members outside midship cargo regions for ships of 150m in length and above.	

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582 attc	9/3.2.1.9	CI	Manhole Dimensions	2008/2/7	Chapter 9, Section 3. [2.1.9]: 1) The 2nd paragraph has the general requirements for the manhole size in floors. We note that many ships are designed with two separate tanks vertically in way of main engine bed. The access manholes exceeding the above size limit due to lower floor height in way are designed in each upper and lower tanks as shown in the attachment. We understand that such arrangement may be acceptable provided the shear area of the floor is not less than that with the hole of 40% of floor local depth based on minimum required thickness in way and the local strength is satisfied. Please confirm or otherwise advise. 2) We understand that the requirements in paragraph 2 of 9-3/2.1.9 is not applicable to girders. Please confirm.	A1 - Where access manholes dimensions exceed the size limit in Ch 9, Sec 3, [2.1.9] due to lower floor height in way, such arrangement may be acceptable provided that the shear area of the floor is not less than that with the hole of 40% of floor local depth based on minimum required thickness in way and that the local strength is satisfied. A2 - The requirements in paragraph 2 of 9-3/2.1.9 are also applicable to girders.	Y
559	Text 9/3	CI	Longitudinal strength and local strength of plates and stiffeners in machinery space	2008/4/10	Regarding the requirements of longitudinal strength and local strength of plates and stiffeners in machinery space, our interpretations are as follows; 1. Longitudinal strength 1-a. Longitudinal bending and shear strength are checked according to Ch5, Sec1. 1-b. Hull girder ultimate strength is checked according to Ch5, Sec2. 2. Local strength of plate and stiffener 2-a. Flooding requirements in Ch6, Sec1, 3.2.2 and Ch6, Sec2, 3.2.5 are applied with considering longitudinal stress sigma_x as similar to cargo area 2-b. Buckling requirements in Ch6, Sec3 3.1.2 and 4 are applied with considering longitudinal stress sigma_x and tau as similar to cargo area Please clarify above interpretations.	1. Longitudinal strength in machinery space 1-a. Longitudinal bending and shear strength are checked according to Ch5, Sec1, provided flooding in machinery space needs not be considered . 1-b. Hull girder ultimate strength is checked according to Ch5, Sec2, provided flooding in machinery space needs not be considered . 2. Local strength of plate and stiffener in machinery space 2-a. Requirements in Ch6, Sec1, 3.2.2 and Ch6, Sec2, 3.2.5 are applied with considering longitudinal stress sigma_x in intact condition. 2-b. Buckling requirements in Ch6, Sec3 3.1.2 and 4 are applied with considering longitudinal stress sigma_x and tau as similar to cargo area.	
583	Ch.9 Sec.3/4 & 5	RCP	scantlings for platform structures and pillars	2007/3/23	9-3/4 and 9-3/5: The platforms and pillars will support the loads of machinery, independent tanks etc.. However there is no loads specified in CSR for determining the scantlings for platform structures and pillars. It is also impracticable to obtain the dynamic loads for each machinery weight due to lack of information. Therefore, based on current CSR , it is impracticable to determine the scantlings of platforms and pillars in engine room except the minimum plate thickness specified in CSR. As an alternative, we think that each Class Society Rules may be used for determining the scantlings of platforms and pillars in addition to the minimum plate thickness requirements specified in CSR. Please confirm. Also suggest CSR to specify the loads for platforms in engine room and pillars.	1) There are no specific loads in CSR BC for determining the scantlings of platforms in machinery spaces. There is only a minimum plate thickness requirement. 2) For determining the scantlings of platforms and pillars in addition to the minimum plate thickness requirements specified in CSR for BC, a Rule Change will be considered in future.	

KCID No.	Ref.	Type	Topic	Date completed	Question/CI	Answer	Attachment
613	Symbol 9.5 & 9 Sec.5	CI	Hatch Cover of ballast hold	2008/4/24	Reference is made to Ch.9 Sec. 5 Q1 Requirement for hatch cover of ballast hold In Chapter 9 Sec.5 Symbols, it is stated that "FS = 0 and FW = 0.9 for hatch covers of the cargo ballast hold". It is our understanding, these coefficients are applicable to ballast pressure only and not sea pressure or cargo pressure. If so, please consider rephrasing the paragraph to "FS = 0 and FW = 0.9 for ballast pressure of hatch covers on the cargo ballast hold". Q2 Ballast pressure calculation When calculating ballast pressure according to Ch.4 Sec.6 [2.2] we assume that the fixed value of (x-xB) may be utilized. (0.75lh or -0.75lh) Please confirm and if relevant, update rules accordingly. Q3 Structural calculation a. When ballast pressure or dry cargo pressure is considered for the hatch cover, please advise the formula to use in order to calculate the required plate thickness, section modulus and shear area of stiffeners? Can the formula in Ch.6 Sec.1 [3.2.1] and Ch.6 Sec.2 [3.2.3] or the formula in Ch.9 Sec.5 5.3.3 be used? b. In Ch.9 Sec. 5 bending stresses of primary supporting members are accounted for when calculating scantlings of local structures such as plate and stiffeners. If we use the formulas of Ch. 6 Sec. [3.2.1] and Ch. 6 Sec.2 [3.2.3], shall primary bending stress be accounted for? (Ref. lambdaP and lambdaS factors) Please clarify the rules.	A1. Your understanding that the coefficient FS = 0 and FW = 0.9 are applicable to ballast pressure only is right. A2: This fixed value has to be used in prescriptive assessment of structure. A3:Formulae as per Chapter 9, Sec.5 should be used.	
620	9/5.5.4.6	Question	Error in the formula giving kt	2008/5/12	In Ch 9, Sec 5, [5.4.6], it seems that there is an error in the formula giving kt, which is not in accordance with UR S21. Please confirm?	It is right. The formula of kt should be modified from kt=5.35+4*(a/d)^2 to kt=5.35+4/(a/d)^2, to be in accordance with UR S21.3.6.3. This editorial correction will be issued as a Corrigenda.	
654	9/1.4	Question	collision bulkhead	2008/9/10	How is the additional safety taken into account for the collision bulkhead, when not subjected to lateral loads from tanks, hence fore peak is void space?	The scantling of collision bulkhead is enhanced to the other bulkheads, according to Ch 6 Sec 1, [3.2.2] for bulkhead plating and Ch 6 Sec 2, [3.2.5] for ordinary stiffeners. Where the collision bulkhead is a boundary of void space, the scantling may be derived by considering the void space as flooded, using the requirements mentioned above. We will consider a rule change for primary supporting members under flooded condition.	

KCID No.	Ref.	Type	Topic	Date completed	Question/CI	Answer	Attachment
663	9/3.7.2.1	RCP	minimum Scantlings of the structural elements	2008/5/13	1.In the course of applying CSR for Bulkers, CCS has found some problems existing with the CSR requirements relating to minimum scantlings of the structural elements in way of machinery seatings, as specified in CSR BC, Chapter 9 - Other Structures, Section 3, 7.2 Minimum scantlings, which is quoted below for easy reference: "7.2.1 The net scantlings of the structural elements in way of the internal combustion engine seatings are to be obtained from the formulae in Tab 2." 2. This requirement is found to be irrational since the calculation results proved to be unnecessarily large. 2.1 CCS is of the opinion that the internal combustion engine manufacturers are the ones who should be responsible for the design of the engine seatings since they have the richest experience of application and the authority, and accordingly the design of the seatings should follow the suggestions/instructions provided by the manufactures. 3. Therefore, CCS proposes to substitute the above mentioned paragraph and tab.2 by the new "7.2.1 The net scantlings of the structural elements in way of the internal combustion engine seatings are to be in accordance with the scantlings provided by the manufactures."	As the same question is uploaded on KC ID 413, please refer to the answer in KC ID 413.	
665	9/3.4.1.2	RCP	Transverse spacing	2008/4/24	Transverse spacing in machinery space In Ch9, Sec3, 3.1.3, the side transverse spacing is restricted upto 4/5 frame spacings. On the other hand, greater spacing is also permitted at the last sentence stated below; "Side transverse spacing greater than that above may be accepted provided that the scantlings of ordinary frames are increased, according to the Society's requirements to be defined on a case by case basis." In Ch9, Sec3, 4.1.2, the platform transverse spacing is restricted upto 4 frame spacings. Can greater spacing be permitted as similar to the above?	The primary support i.w.o. the platform is to be integrated with the primary members in the side. Hence where larger spacings are allowed in the side it will result in an equally larger spacing in the platform.	
666	9/1.4.4.4 & 9/2.4.3.4	Question	deck primary supporting members	2008/9/10	According to the answer in KC 312, the requirement of Ch6 Sec4, 2.6 is applicable to deck primary supporting members in Fore and Aft. In calculating the scantling of the members in Fore and Aft according to the formula specified in Ch 6 Sec 4, 2.6.3, we understand that the applicable allowable shear stress and lamda_s are R_y/square root (3) and 0.9 instead of 0.4 R_y and 0.8, respectively, because the lamda_p is 0.9 in the formula for plating of aft part specified in Ch 9 Sec 2. Please confirm the above.	Your interpretation is not right. If the scantling formulae for primary supporting members are used in the fore and aft part, lambda-s and the allowable shear stress, given in CH6, Sec4, are to be used (i.e. lambda-s equal to 0.8 and allowable shear stress tau-a equal to 0.4Ry). However we will consider a rule change in Ch.9 Sec.1 [4.4.4] and Ch.9 Sec.2 [4.3.4] so that the requirements to primary supporting members are coherent within Ch.9 Sec.1 and Ch.9 Sec.2 respectively.	

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684	Symbol 9.5, 9/5.5.3.2, 9/5.5.4.2 & 9/5.5.4.6	RCP	minimum net thickness of web plate of ordinary stiffeners and primary support members	2008/5/13	According to Ch.9, Sec.5, Symbols: s is defined as length, in m, of the shorter side of the elementary plate panel. My understanding to the minimum net thickness of web plate of ordinary stiffeners and primary supporting members is as follows: According to Ch.9, Sec.5, [5.3.2], The minimum net thickness of web plate of ordinary stiffeners should be (tnet)min=min(10s,6), while in the calculation, the parameter s should be of web plate panel of ordinary stiffeners (normally web height) and should have no relation to the top plate panels of hatch cover. This understanding can also apply to determine the minimum net thickness of web plate of primary supporting members. According to Ch.9 Sec.5, [5.4.2],The minimum net thickness of web plate of primary supporting members should be (tnet)min=min(10s,6) the parameter s should be of web plate panel of primary supporting members (normally web height) and also have no relation to the top plate panels of hatch cover. If the above understanding is correct, then there will be no limit to use the current widely used ordinary stiffenr L125x75x7 in hatch covers of vessels with CSR BC notation. We propose to revise the text for minimum net thickness of web plate of ordinary stiffeners and primary supporting members in Ch.9 Sec.5 [5.3.2] and [5.4.2], respectively. The formula kt in Ch.9, Sec.5 [5.4.6] should be corrected as kt=5.35+4.0/(a/d)^2 or kt=5.35+4.0(d/a)^2.	Regarding the minimum net thickness of web of ordinary stiffeners and primary supporting members, please refer to the answer in KC ID 535. In addition, the correct formula for kt is kt=5.35+4.0/(a/d)^2 as specified in IACS UR S21.3.6.3. We will consider the Rule Change proposal or edditorial correction on this matter.	
686	9/5.5.2.1	CI	Water Ballast Pressure	2008/4/10	FEM's Fs and Fw for water ballast pressure on Ch 9 Sec 5 The water ballast pressure will be calculated by using Fw (=0.9) for net thickness (Ch9, Sec 5. 5.2.1) and isolated beam models. We think it can be applied for FEM too, is it correct?	We think that the combination of the static load and dynamic load for hatch cover in way of ballast hold is introduced as a special case. Therefore, the factor FW=0.9 is also applicable for FEA.	
693	9/4.3.2.1	Question	Lateral pressure for deck	2008/5/1	Ch9 Sec4, 3.2.1 regulates the lateral pressure for deck to be p_D in Ch4 Sec5, 2.1. However p_D in Ch4 Sec5, 2 is the external pressure on the exposed deck. No clear indications are found in CSR for the lateral pressure on the unexposed deck, such as the deck inside of accommodation. Please clarify the above.	A lateral load for unexposed decks will be defined. We will initiate a rule change proposal.	

KCID No.	Ref.	Type	Topic	Date completed	Question/CI	Answer	Attachment
699 attc	9/3.2.1.8	Question	wef stiffener	2008/9/10	With regard to a requirement of web stiffener on non-watertight double bottom floor in Engine Room, it is requested to provide the detailed technical background while it is understood to have been based on the protection of web plate buckling, and it is also requested to modify it considering current designs with almost no damage record. Re. the technical background, it is noted that the equation in 6/2.4.1.2 is not dimensionally balanced, i.e., left side = cm3, right side = m5. In addition, 9/3.2.1.8 requires the section modulus as 1.2 times of that required by 6/2.4.1.2. The reason of this 1.2 times should be also clarified. Re. the section modulus requirement compared with the current design of non-CSR, it is noted that CSR BC Rule requires much severe web stiffener scantling than that of non-CSR. Our example calculations show: (A)Capesize – 300*90*13/17 (CSR),à200*90*8/14 (as built) (B)Panamax – 150*16 FB (as 200*20 FB (CSR),àbuilt) 250*90*9/15à (C)Handymax – 200*90*9/14 (as built) (CSR) Hence the requirement should be modified considering current designs with almost no damage record..	The formula in Ch 6 Sec 2 [4.1.2) is the based on the following assumption. (See attached file) (a) web stiffener is flat bar type. (b) thickness of web of web stiffener is equal to that of web of PSM. (c) the height of web stiffener is approximately equal to (stiffener length/12) as specified in Ch 3 Sec 6 [5.1.2] (d) the effect of the attached plate is considered as a function of spacing of web stiffener This requirement is provided to ensure the minimum stiffeness of web stiffener, hence this requirement is applicable to all types of stiffener (flat bar, angle, T-section). The meaning of 1.2 times of that required by Ch 6 Sec 2 [4.1.2] seams to the safety margin based on experiences. When the effect of the attached plate is considered, the mentioned example is probably satisfied with the requirement in Ch 9 Sec 3 [2.1.8]. However, we will consider the RCP in order to elminate the dimentional unbalance between left side and right side in the formula of Ch 6 Sec 2 [4.1.2] together with the carifiction of the application. Furthermore, according to this TB, the answer in KC ID 418 should be modified as follows: The net sction modulus of web stiffener of non-watertight primary supporting member should be calculated with the attached plating, according to Ch 3 Sec 6 [4.3.1].	Y
700	9/3.3.1.2	Question	Longitudinal Structure	2008/7/16	Ch9 Sec3, 3.1.2 regulates that the longitudinal structure should be maintained for at least 0.3 times the length of the machinery space. We have an opinion that the above requirement is not applicable to the following members. -Longitudinal bulkheads -Topside slant plates -Bilge hopper slant plates Because the longitudinal continuity of the above members can be ensured by the appropriate fitting of girders/large brackets on the back side of E/R bulkhead. Please confirm the above.	We confirm your interpretation. The extension concerns only the longitudinal structure attached to the side shell and doesn't apply to the plantings and attached ordinary stiffeners of stringers of DSS, topside tank and bilge hopper tank. In addition, the continuity of strength is to be ensured in the machinery space in way of stringers of DSS and strake of topside tank / bilge hopper tank directly attached to the side shell.	
709	9/6.3.3.4	Question	Required thickness of thoughened glasses in side scuttles	2008/5/28	Ch.9, Sec.6, [3.3.4] specifies the required thickness of toughened glasses in side scuttles. Is the calculated thickness to be rounded up or round off or others? For instance, in case the calculated values are 12.24mm, 12.27mm, 12.40mm, 12.52mm, 12.85mm, what are the required actual thicknesses respectively?	The glass thickness to be fitted is the thickness available from the glasses manufacturers and above the calculated value.	

KCID No.	Ref.	Type	Topic	Date completed	Question/CI	Answer	Attachment
723	9/2.4.1.1 & Table 1	Question	Net minimum thickness of plating	2009/6/2	To which dose the tank top plate of steering gear flat correspond in Table 1 ,[Inner bottom] or [Platform and wash bulkhead] ?	Platform and wash bulkheads in Table 1 Ch 9 Sec 2 are non-watertight plating members. As the tank top plate of steering gear flat is a watertight plating member and not inner bottom, the net minimum thickness for the tank top plate of steering gear flat is not specified in Table 1. As an interpretation, the net minimum thickness for the tank top plate of steering gear flat is the same as that for watertight bulkhead specified in Ch 6 Sec 1, Table 2, i.e. 0.6xL^(0.5) mm.	
724	9/2.5.2.1	Question	side transverse	2009/6/2	Is there any exceptional easing steps concerning spacing of a ship's side transverse spacing?	The required side transverse spacing is based on design experience and service history. It has proven to be satisfactory and cannot be relaxed.	
725	9/3.1.2.3	Question	Primary Support Members	2009/6/2	Please explain a specific procedure of the direct strength calculation in engine room construction.	Refer to KC ID 543 which states: PSM in the fore and aft part of the vessel may be designed according Ch6, Sec4, 2.6. We will consider the further rule development about the determination of the scantling of primary supporting members outside midship cargo regions for ships of 150m in length and above. For the time being, the direct strength calculation should be submitted to the Society for examination on a case by case basis, as specified in Ch 9 Sec 3, [1.2.3].	
726	9/3.2.1.1	Question	double bottom general	2009/6/2	Please explain the reason that the double bottom is to be transversely framed.	The width of aft peak tank is generally narrow at the double bottom level of engine room when the engine room is located immediately forward of aft peak tank. Considering the aspect ratio (l/b) of double bottom in such an engine room becomes very large, where l is the length of engine room and b is the mean breadth of engine room, it would be natural to provide main supporting members transversely. This requirement stands on this background.	
727 attc	9/3.2.1.2	Question	double bottom height	2009/6/2	We would like to have your confirmation whether the arrangement of overlapping tank top is acceptable as continuous structure. Please see attachment below.	CSR-BC allows only a sloped transition, when the inner bottom of the cargo area is on another level than that of the machinery space.	Y
728	9/3.3.1.2	Question	longitudinal structure within the machinery space	2009/6/2	Is the extension of longitudinal structure applied to the platings of topside tank and bilge hopper tank?	The extension described in [3.1.2] concerns only the longitudinal structure attached to the side shell and doesn't apply to the platings and attached ordinary stiffeners of side stringers, topside tank and bilge hopper tank. However, in the light of Ch 9, Sec 3, [1.3.2], the continuity of strength is to be ensured in the machinery space in way of side stringers and strake of topside tank / bilge hopper.	

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729	9/3.4.1.2	Question	platform transverse	2009/6/2	Is it possible to arrange platform transverses 5 frame spacings as well as 3.1.3 Side transverses? Usually , the platform transverses are connecting to side ransverses continuously.	According to the last sentence of [3.1.3], wider spaces may be accepted based on the discretion of the Society.	
730	9/3.6.1.1	Question	Ordinary stiffener spacing	2009/6/2	Is there any exceptional easing steps to the regulation about 750 mm spacing? Usually, the vertical stiffeners are connecting to the deck longitudinals continuously.	No, there is not. The required value of about 750mm for spacing, which was developed based on many years of experience, is applied and considered to be satisfactory. However, the vertical stiffeners are to be connected to the deck longitudinals continuously.	
739	9/2.3.1.2	RCP	frame spacing	2008/9/10	The requirement in Ch 9, Sec 2, [3.1.2] requiring that "Solid floors are to be fitted at every frame spacing" seems very severe and is not in line with some actual design of ships.We would like to ask IACS to review this requirement and to introduce a Rule Change Proposal.	It is not required to built solid floors at every frame spacing in the whole aft peak area. Solid frames up to the tank top are only required in way and near of rudder post, propeller post and rudder horn. The transverse extension depends on the arrangements proposed. It might be neccessary to built solid floors below tank top over the whole breadth, e.g. if no longitudinal walls are arranged. In case, where floors are not extended over the full breadth, paragraph [3.1.3] covers the design of the transverse primary supporting members. We will consider a rule change to clarify this requirement	
759	9/1.2.3.2	RCP	Spacing of solid floors	2008/10/27	The requirement in Ch 9, Sec 1, [2.3.2] says that the spacing of solid floors should be Min.[3.5m, 4 frame spaces] in case of the longitudinal stiffened system. We understand the philosophy that the spacing must not be too big, however, for example, when the design in fore part has a spacing of 3.75m (5 frame spaces), the actual difference of spacing is just 0.25m from the requirement. Is it possible to allow a greater value of spacing after confirmination that the strength or scantlings are enough, on the basis of FE analysis, for exemple? We would like to ask IACS to review this requirement and to introduce a Rule Change Proposal.	Such larger distances may be used, when the structure is verified by means of FEA deemed appropriately by the Society, using direct, calculated, slamming loads	

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763	Table 9.3.2	Question	net cross sectional area rule	2009/3/3	We have noted your answer concerning our complaints on requirements for Net Cross Sectional Area on tank top bedplates (KC ID #611). Your answer does not lead to a better understanding of the problem since we have already been informed about the answer on the approved question KC ID#413. We do not understand the reason for the requirement and would like you to explain the meaning of this formulae. As an example the width of each tank top bedplate for our engine S70MC-C is 1365 mm. When fulfilling the IACS rules the thickness is required to be 69 mm and the cross sectional area will be 1826 cm^2. Accordingly a width of 2640 mm of each tank top bedplate is required. This will in some cases mean that the tank top plate penetrates the hull at the aft part of the engine. Alternatively the thickness of the bedplate must be twice the normal size, 134 mm which is obviously a meaningless size. So we are of the opinion that the IACS rule on net cross sectional area should refer to “bedplates in total” and not to “each bedplate” as we proposed in our letter to IACS. Several shipyards are asking us for calculations on this matter, referring to the question KC ID#413, but it is not possible for us to make such calculations.	Your comment has been reflected to the Rule Change Proposal 4 which has been reviewed according to PR 32.	
766	9/3.2.1.8	Question	web stiffeners	2009/3/3	Please confirm that the following our interpretation, on the web stiffeners on the double bottom floors and side transverse web frames in machinery space, is correct. 1) In Ch 9 Sec 3 [2.1.8], Ch 3 Sec 6 is referred to in the first sentence, as "in addition to the requirements in Ch 3 Sec 6". It means the stiffeners provided to the double bottom floors in Machinery space shall comply with Ch.3 Sec 6 and Ch 9 Sec 3 [2.1.8]. The depth of the stiffeners provided to the floors in Machinery space is to be more than 1/12 stiffener length and the section modulus is to be not less than 1.2 times that required in Ch 6 Sec 2 [4.1.2]. 2) There is no cross reference to Ch.3 Sec 6 in the side transverse requirements in [3.1.3] of Ch 9 Sec 3 "Machinery space". Accordingly it is not required to apply the requirements of C3 Sec 6 to the web stiffeners on the side transverses in machinery space.	It is agreed that some requirements of Ch 3 Sec 6 are applicable to the structural arrangement of the entire hull structure. In this regard, modifications in CSR will be prepared for clarification.	
770	9/6.6.3.1	RCP	coaming height of energency generator room	2008/9/10	Coaming height of emergency generator room. Ch9 Sec6, 6.3.1 states the coaming height of emergency generator room with reference to 8.1.3. However 8.1.3. requires closing appliance and it seems that the reference is to be corrected to 8.1.2. Please confirm it.	This is typo. We will conisider an editorial correction.	
785	9/4.3.2.1	CI	Lateral pressure for deck	2009/3/3	The lateral pressure for decks of superstructures and deckhouses is defined in Ch9, Sec4, [3.2.1]. This requirement refers to the external pressure pD defined in Ch4, Sec5, [2.1], which is a pressure for EXPOSED deck. In case of non-exposed decks of superstructure and deckhouses, as no internal pressure is defined for such decks in Ch4, Sec6, we would like to know what is the pressure to be used?	Effectively, no internal pressure is defined in CSR-BC for non-exposed decks of superstructures and deckhouses. Such internal pressure will be added in CSR-BC, and we suggest to use a value of 5 kN/m2 including dynamic load effect.	

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789	9/5.5.4.5	CI	deflection limit	2008/9/10	We would like to confirm the interpretation of "Common Structural Rules for Bulk Carriers" Part CSR-B Ch.9 Sec.5 5.4.5 : Deflection Limit of Primary supporting members for Hatch Covers. We interpret this Ch.9 Sec.5 5.4.5 as follows: As clearly described as "when loaded by sea pressure" in Ch.9 Sec.5 5.4.5, necessary considering load to keep deflection within the limit (= ulmax) is only the "Sea pressures" defined in Ch.9 Sec.5 4.1.2 and does not include the "Internal pressures due to ballast water" defined in Ch,9 Sec.5 4.1.3, even in case of Ballast hold Hatch Covers. We are looking forward to receiving your reply with your confirmation to above our interpretation.	The "Sea pressure" means the pressure defined in [4.1.2] of Ch 9 Sec 5. Even when the requirement of [5.4.5] applies to the hatch cover of ballast hold, sea pressure defined in [4.1.2] of Ch 9 Sec 5 is only considered.	
799	Table 9.2.5	Question	cast propeller post	2009/3/3	In Chapter 9, Section 2, Table 5 the following change is proposed: Column: "Cast propeller post", Row "R" the formula should be changed from: 50 L^1/2 to: 50 mm. Reason: typo found in the formula coming from RINA Rules and corrected in RINA Rules 2008.	Your comment is noted and we will consider a rule change proposal changing to 50 mm from 50L^1/2.	
802	9/5.7.3.5	Question	securing arrangements	2009/3/3	In the first part of [7.3.5], the general formula for determining the gross cross area A of each securing device is given. Then, in the second part of [7.3.5], some special cases (packing line pressures exceeding 5 N/mm or securing arrangements which are particularly stressed due to the unusual width of the hatchway) are specified and the corresponding net cross area A. Why the general formula is given for the gross cross area A when the cross area for particular cases is the net one?	[7.3.5] is the copy of a part of UR S21.5.1 which specifies A as net sectional area. In the light of S21.5.1 "gross cross area" is a typo which should be corrected. However the "gross cross area" of the current CSR is intended to mean the area measured at the root of threads of securing device which is same as the "net sectional area" of S21.5.1. Accordingly the foregoing correction of the current rule text from "gross cross area" to "net cross area" will be considered as Corrigenda.	
816	9/5.5.2.1 & 9/5.5.3.3	Question	hatch cover top plating	2009/3/3	CSR for bulker specifies the prescriptive rule requirements to the thickness of hatch cover top plating in Ch.9 Sec. 5 [5.2.1] and the section modulus and shear area of ordinary stiffener in Ch.9 Sec. 5 [5.3.3]. 1) Is it acceptable to apply FEA for the to evaluation of those scantlings in lieu of the prescriptive rule requirements in Ch.9 Sec. 5 [5.2.1] and [5.3.3] provided: (i) all other relevant rules (e.g. minimum thickness, buckling etc.) are to be fully complied with, and (ii) the allowable stresses, specified in Table 2 of Ch.9 Sec.5 [1.5] are to be used in FEA for the scantling evaluation of top plating and ordinary stiffeners? 2) If FEA is acceptable please advise the criteria on the modeling.?	The formula for t_net, given in CH9, Sec5, 5.2.1, is equivalent to S21.3.3. This requirement is a minimum requirement, which can not be superseded by a direct calculation.	

KCID No.	Ref.	Type	Topic	Date completed	Question/CI	Answer	Attachment
823	9/5.1.4.2 & Table 3/3	Question	corrosion addition	2009/3/3	The 2nd sentence in Ch.9, Sec.5, [1.4.1] reads: "The corrosion addition for hatch coamings and coaming stays is defined according to Ch 3, Sec 3." The 1st sentence in UR S21.6.2 reads: "For the structures of hatch coamings and coaming stays, the corrosion addition t_s is to be 1.5mm." We believe that the following corrosion additions for L>=150m are to be applied referring to Ch.3 Sec.3 Table 1; (a) Hatch coaming web: Roundup0.5[(1.8+1.0)]+0.5=3.5mm (b) Web of horizontal stiffener on coamings: Roundup0.5[(2x1.7)]+0.5=4.0mm (c) Flange of horizontal stiffener on coamings: Rounduo0.5[(2x1.0)]+0.5=2.5mm (d) Coaming stays: Roundup0.5[(2x1.0)]+0.5=2.5mm. Please confirm the above corrosion additions.	Your understanding is correct.	
825	9/1.2.3	Question	collision bulkhead	2009/3/10	Ch.9 Sec.1 is applicable to the structure in the area located forward of the collision bulkhead, the bow flare area and the flat bottom forward area, according to Ch9 Sec1, 1.1.1. Each requirement has individual applicable areas, such as the bow flare area in 4.1.1 and the bottom forward area in 5.1.1. We are of the opinion that the requirements in 2.3 are applicable to the area located forward of the collision bulkhead only. In other words, the requirements in 2.3 are not applicable to the area located aft of the collision bulkhead. Please confirm the above.	Your understanding is right.	
826	9/5.6.2.4	Question	hatch coaming	2009/3/10	Hatch coaming stiffeners are required to be estimated with considering the wave lateral pressure as stated in Ch9 Sec5, 6.2.1. In addition, hatch coaming stiffeners in way of ballast hold are also required to be estimated with considering the ballast pressure in Ch4 Sec6 as stated in 6.2.4. In this context, to consider the ballast pressure in Ch4 Sec6, the hatch coaming stiffeners need to be applied with the applicable requirements in Ch6 Sec2. More specifically, we are of the opinion that following applications of the requirements in Ch6 Sec2 should be considered; 1) Hatch coaming stiffeners in way of ballast holds; Applicable : Section modulus and shear area in 3.2 Applicable : Dimensions in 2.3 2) The other hatch coaming stiffeners NA : Section modulus and shear area in 3.2 NA : Dimensions in 2.3 Please confirm the above applications	The hatch coaming is a part of the central part as defined in Ch1 Sec1 [2.1.3], hence all the relevant requirements in Ch6 shall be complied with, in addition to the relevant requirements in Ch9 Sec5.	
834	9/1.2.2.1	Question	tripping brackets	2009/1/26	Ch.9 Sec.1 [2.2.1] Tripping brackets in fore part According to the technical background this requirement is based on URS 12. URS 12 deals with asymmetrical sections, while no distinction is made between symmetrical and asymmetrical sections in Ch.9 Sec.1 [2.2.1]. Please clarify if this requirement applies to symmetrical sections.	The reference, given in the technical background, is wrong. This paragraph is based on GL-Rules I-Part 1, Section 9A 5.5. The requirements are valid for symmetrical and asymmetrical side frames, because the loads (sea and tank pressures) act not parallel to the webs of the frames and cause oblique bending. We will adjust the technical background on this paragraph.	

KCID No.	Ref.	Type	Topic	Date completed	Question/CI	Answer	Attachment
835	9/2.5.2.1	Question	side transverse spacing	2009/2/11	Please explain why the required side transverse spacing is reduced to 2 frame spacing in way of the rudder horn. This is not in line with common industry practice. According to Chapter 9, Section 2 [3.1.2] solid floors are to be fitted at every frame spacing in way of the rudder horn and are to be extended up to the peak tank top. In our opinion, this requirement should give proper support for the rudder horn, and the requirement in Chapter 9, Section 2 [5.2.1] can therefore be disregarded.	Referring to answer to question ID739 on 9/2.3.1.2, a rule change will be issued covering both requirements 9/2.3.1.2 and 9/2.5.2.1.	
836	9/3.2.1.5	Question	machinery space	2009/3/10	"Forward of the machinery space forward bulkhead, the bottom girder are to be tapered for at least three frame spaces and are to be effectively connected to the hull structure." This implies that the additional bottom girder in way of the machinery seating has to be extended into the pipe duct in the aftmost cargo hold. In our opinion, there is no room to extend this additional girder inside the pipe duct. The requirement is not in accordance with common industry practice and should be disregarded.	As the framing system and girder system changes at the engine room bulkhead there is a change in hull girder stiffness and in local stiffness. The extend of the foundation girders into the adjacent space (e.g. pipe duct or tank) reduces this abrupt change of stiffness. Structural continuity is to be ensured in double bottom by bottom girders tapered and effectively connected to hull structure forward of engine room. Specific designs are to be allowed on a case by case basis by each Society, provided the above provisions are respected. A Rule Change proposal will be made.	
847	Table 9.1.1	Question	fore peak	2009/2/11	Reference is made to Ch.9 Sec.1 Table 1 and to KC ID 494 What is the correct application of Table 1 for a non-tight floor top in the fore peak? Should this structure be regarded as platform or inner bottom?	A non tight floor in the fore peak is considered as a platform with regard to Ch.9 Sec. 1 Tab.1	
863	Table /9.2.5	Question	single screw ship	2009/6/23	Ch9 Sec2, Table5 requires thicknesses t1 and t2 of cast propeller posts of single screw ship. The applicable area of required thicknesses t1 and t2 is not so clear as to distinguish required thickness at any point of post. Please confirm it.	t1 is the post minimum thickness, to be measured at the connection with the shell plating (excluding a possible tapered transition to the shell plating thickness) t2 is the post maximum thickness, to be measured at the edge of the circular area with radius R. In addition, the word "to be taken not less than 19mm" and Note 1 in Table 5 should be deleted because it is impossible for CSR ships >=90m. In order to clarify these, figure in the table and the wording will be corrected in the next corrigenda.	
887	9/2.6.5.1	Question	stern tube thickness	2009/9/18	1st paragraph in Ch.9 Sec. 2 [6.5.1] reads:"The sterntube thickness is considered by the Society on a case by case basis. In no case, however, may it be less than the thickness of the side plating adjacent to the stern-frame." Please confirm that the thickness of the side plating to be used is the required net thickness?	Answer: Your understanding is correct. The thickness of the side plating to be used is the required net thickness. This requirement has also to be considered within the harmonisation.	
891	9/2.3.1.2	ci	Aft peak	2009/9/8	Ch9 Sec2, 3.1.2 requires “Floors are to be provided with stiffeners located at intervals not exceeding 800 mm.” in its last sentence. We are of following opinions; - This requirement is applicable only in way of and near the rudder post, propeller post and rudder horn. - Intervals of stiffeners depend on the thickness of floor as required in Ch3 Sec6, 5.2.1 Please confirm the above.	The last sentence of Ch9 Sec2, 3.1.2 “Floors are to be provided with stiffeners located at intervals not exceeding 800 mm.” is applicable only in way of and near the rudder post, propeller post and rudder horn. This requirement should be applied in addition to Ch3 Sec6, 5.2.1.	

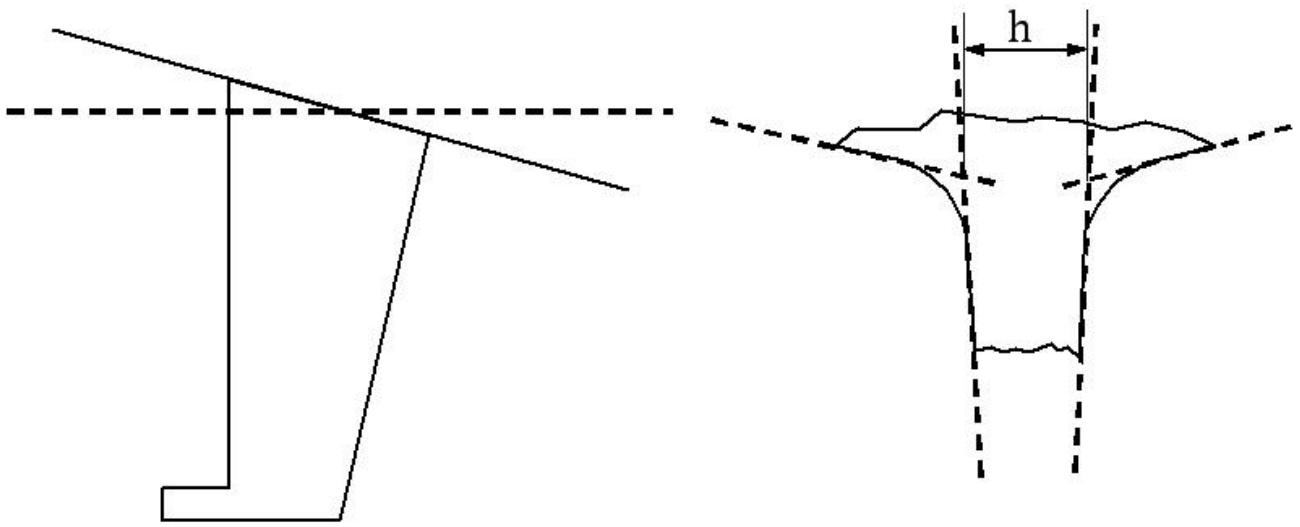
KCID No.	Ref.	Type	Topic	Date completed	Question/CI	Answer	Attachment
930	Text 9/2.4.2.3 (tanker) & Text 9/1.4.3.3(bulker)	question	max net thickness	2009/6/23	Incorrect reference number in 2008RCN1-4 The last sentences of Ch9 Sec1, 4.3.3 and Ch9 Sec2, 4.2.3 indicate the reference to the requirement of maximum net thickness of web of ordinary stiffener in Ch6 Sec2. However the reference number is incorrect, because the maximum web thickness requirement has been moved from 2.2.2 to 2.2.3 in Ch6 Sec2 during finalization of the RCP. Please correct the reference number of the last sentences of Ch9 Sec1, 4.3.3 and Ch9 Sec2, 4.2.3 as follows; “The net dimensions of ordinary stiffeners are to comply with the requirement in Ch 6 Sec 2, [2.2.3] and [2.3].”	Your comment is correct. The reference number of the last sentences of Ch9 Sec1, 4.3.3 and Ch9 Sec2, 4.2.3 should be as follows: “The net dimensions of ordinary stiffeners are to comply with the requirement in Ch 6 Sec 2, [2.2.3] and [2.3].” This will be corrected in the next corrigenda.	
932	9/1.2.3.3	Question	bottom girder spacing	2009/7/16	Chapter 9 Section 1 [2.3.3] requires in the fore part that ”In case of transverse framing, the spacing of bottom girders is not to exceed 2.5m”. Is a spacing of bottom girders of 2.7m acceptable considering the similar Q & A in KC759?	The spacing of bottom girders of 2.7m may be used when the structure is verified by means of FEA deemed appropriately by the Society, using directly calculated slamming loads.	
970	9/2.4.2.3	Question	Net thickness of web of ordinary stiffeners	2010/3/30	CSR BC Ch.9 Sec.2 [4.2.3] [QUOTE] The net thickness of the web of ordinary stiffeners, in mm, is to be not less than the greater of: • t = 3.0 + 0.015L2 • 40% of the net required thickness of the attached plating, to be determined according to [4.1]. [UNQUOTE] The requirements of the net thickness of plating according to [4.1] only include the requirements of net minimum thickness, net thickness under intact conditions and net thickness under testing conditions. We think the net thickness requirement under flooded conditions, to be determined according to [1.1.2], should be considered for the net required thickness of the attached plating. Please consider.	Your understanding is correct. 40% of the net required thickness of the attached plating, to be determined according to [1.1.2] and [4.1].	

KCID No.	Ref.	Type	Topic	Date completed	Question/CI	Answer	Attachment
971	9/1.4.3.3 & 9/2.4.2.3	Question	stiffeners	2009/10/27	CSR BC Ch.9 Sec.1 [4.3.3] and Sec.2 [4.2.3]. [QUOTE] The net dimensions of ordinary stiffeners are to comply with the requirement in Ch 6, Sec 2, [2.2.2] and [2.3]. [UNQUOTE] We think the reference to [2.2.2] should be corrected to [2.2.3]. Please consider.	The reference number of the last sentences of Ch9 Sec1, 4.3.3 and Ch9 Sec2, 4.2.3 should be as follows: “The net dimensions of ordinary stiffeners are to comply with the requirement in Ch 6 Sec 2, [2.2.3] and [2.3].” This will be corrected in the next corrigenda.	
1001	9/1.7	Q&A	Forecastle requirements	2010/5/12	CSR BC Ch.1 Sec.4 [3.13.1] [QUOTE] Ref. ILLC, as amended (Resolution MSC.143(77) Reg. 3(10,g)) A forecastle is a superstructure which extends from the forward perpendicular aft to a point which is forward of the after perpendicular. The forecastle may originate from a point forward of the forward perpendicular. [UNQUOTE] From the above definition, a forecastle is defined as a superstructure, but the requirements of forecastle are given in Ch.9 Sec.1 Fore Part. We propose that 1.The requirements of forecastle given in Ch.9 Sec.1 Fore Part should be transferred to Ch.9 Sec.4 Superstructures and Deckhouses. 2.The requirements of forecastle structure, such as forecastle deck, supporting member, ordinary stiffener and etc., should be added. Please consider.	1.The requirements of forecastle given in Ch.9 Sec.1 Fore Part should be transferred to Ch.9 Sec.4 Superstructures and Deckhouses. This will be considered in the next Corrigenda. 2. The requirements of forecastle structure, such as forecastle deck, supporting member, ordinary stiffener and etc., should not be included. A reference of the forecastle to bow flare reinforcement in Ch.9 Sec.1 should be made. This will be considered in the next Corrigenda.	
1003	9/1.5.2.1	Question	intermediate longitudinal	2009/12/16	For clarity, please give the definition of intermediate longitudinal, referred in Ch.9 Sec.1 [5.2.1].	Intermediate longitudinals (additional stiffeners) are stiffeners installed in the spacing between ordinary stiffeners (so the stiffener spacing is halved).	

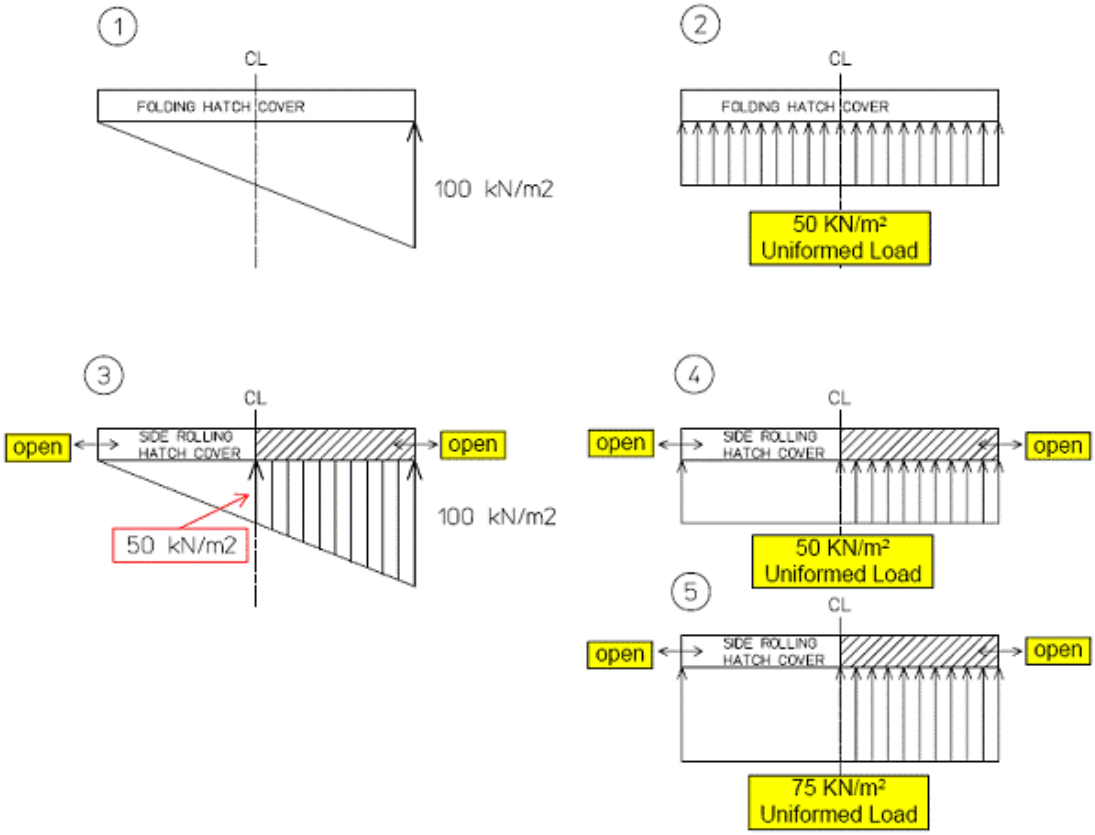
KCID No.	Ref.	Type	Topic	Date completed	Question/CI	Answer	Attachment
1012	9/2.4.3.1 & KC ID 896	Q&A	Net thickness of PSMs	2010/5/12	With reference to KC ID 896: The answer to KC ID 896 is quoted below: [Quote] A1) Yes, deck PSM have to fulfill the requirements of Ch.6 Sec.4 considering the loads defined in Ch.9 sec.2 [2.2], and in particular the minimum web thickness defined in Ch.6 Sec.4 [1.5.1]. A2) No, the requirement for a minimum web thickness defined in Ch.9 Sec.2 [4.3.1] applies to all the PSM except those of the deck (see answer A1 herein). A rule change will be issued for clarifying this. [Unquote] Ch.9 Sec.2 [4.3.1] only specifically mentions floors. No mention is made of any other PSM. However, Answer 2 (A2) goes beyond the scope of Ch.9 Sec.2 [4.3.1]. A2 implies that all PSM, except those decks, are required to apply the formula given in 4.3.1. If A2 is applied, there will be a large impact on scantlings. In addition, we consider that a technical background clearly explaining the difference between the minimum net thickness of deck PSMs and other PSMs in the same space should be provided. Therefore, please confirm the effective application date of KC ID 896 and if necessary, please revise the answer to KC ID 896.	KC 896 is categorised as a Rule Change as defined in PR32, hence implementation date will be decided by Hull Panel.	

KCID No.	Ref.	Type	Topic	Date completed	Question/CI	Answer	Attachment
1018	9/3.3.1.2 & 9/3.1.3.2	Interpretation	Extension of longitudinal structure within the machinery space	2010/3/30	We understand from KC Question ID 700 and 728 that the extension of longitudinal structure for at least 0.3 times the length of the machinery space is only required for the upper portions of the side shell. Due to generally finer hull form in way of the engine room, particularly for the lower part of the aft cross section, it is not always practical to extend longitudinal side shell structure aft of the engine room forward bulkhead for the stipulated 0.3 times of the length of the machinery space. Such extension, especially in the lower part of the hull cross-section below the level of the topside tank, may require deeper side shell web frame structure resulting in a reduction in usable volume and floor area in the engine room space. In every case the hull girder strength, ultimate strength of the cross-section aft of the engine room forward bulkhead are checked and prescriptive buckling check of side shell panels in the machinery space are carried out. Side shell plate panels in the lower hull cross-section are not planar but have a curvature that provides added buckling resistance. Furthermore the satisfactory service experience of numerous bulk carriers of all sizes that have been built without such a specific extension of side shell longitudinal structure could be considered. We request the urgent confirmation of the above interpretation and/or issuance of a CI to this effect.	It would appear reasonable to limit extension of side shell longitudinal structure for 0.3 times the length of the machinery space to side shell structure above the lowest level of the top side tank, subject to the condition that abrupt structural discontinuities between longitudinal and transversely framed structure are to be avoided and that hull girder strength, ultimate strength and prescriptive buckling checks of the cross-sections and side shell panels in the machinery space are performed and satisfied. The extension of longitudinal stiffeners of the upper part of the side shell is to be maintained in view of the generally higher stresses in this area, the relative ease of providing such extension and to improve strength margin in this region of higher stress. Due consideration is to be given to proper tapering of major longitudinal members as required by Ch. 9/3.1.3.2. Notwithstanding the above, bottom shell and bilge longitudinal stiffeners in the aftermost cargo hold of larger and full form vessels are to be extended into the engine room to the extent practicable. We agree with your proposal and a CI will be issued to this effect.	
1039	9/5.2.2.1	CI	Requirement of ballast hold and hatch cover of the ballast hold	2010/5/17	Regarding the requirement of Ch.9, Sec.5, 2.2.1, we would like to confirm that a ballast hold is not included in ballast tanks and other tanks, and a hatch cover of the ballast hold is required to be weathertight.	Your interpretation is correct. A hatch cover of the ballast hold is required to be weathertight.	
1074 attc	9/3.2.2	Interpretation	Definition of Margin Plate	2010/11/15	There is no definition of “Margin Plate” in CSR Bulk Carrier. 1. Rule Application of CSR Bulk Carrier: Chapter 9, Section 3/2.2. Table 1: Minimum Thickness Application of Margin Plate. 2. Since there is no definition about “Margin Plate” in CSR Bulk Carrier Rule, we are using the “Margin Plate” definition in CSR Tanker (Ref. Sec.4/ Table 4.1.1) 3. According to the definition of terms in CSR Tanker, we may think of the following two cases; Case 1 & Case 2 (see attachments) 4. Does you consider both cases are Margin Plate? or One of two cases is Margin Plate?	The definition of Margin Plate in Ch9/Sec3/Table 1 should be given and in line with CSR OT in which the definition comes from IACS Recommendation 82,"Surveyor’s Glossary, Hull terms and hull survey terms". Both Case 1 and Case 2 are Margin Plate. A corrigenda will be considered.	Y

KC#249



KC#309


1
CL
FOLDING HATCH COVER
100 kN/m2
2
CL
FOLDING HATCH COVER
50 KN/m²
Uniformed Load
3
CL
open
SIDE ROLLING
HATCH COVER
open
100 kN/m2
50 kN/m2
4
CL
open
SIDE ROLLING
HATCH COVER
open
50 KN/m²
Uniformed Load
5
CL
open
SIDE ROLLING
HATCH COVER
open
75 KN/m²
Uniformed Load

Attachment

Ch 9, Sec 5, [5.5.1]

We would like to confirm a way to apply the requirement of this sub-paragraph to a structural member shown in the attachment.

(1) Which position, A, B or C, shown in Figure, is to be selected to calculate w_0 and I_0?
We consider that position B is suitable for this requirement. Please confirm.

(2) Which position, A, B, C or else, is to be considered when the requirement of net section modulus of ordinary stiffeners, w, is applied?
We consider that position A is appropriate for this requirement. Please confirm.

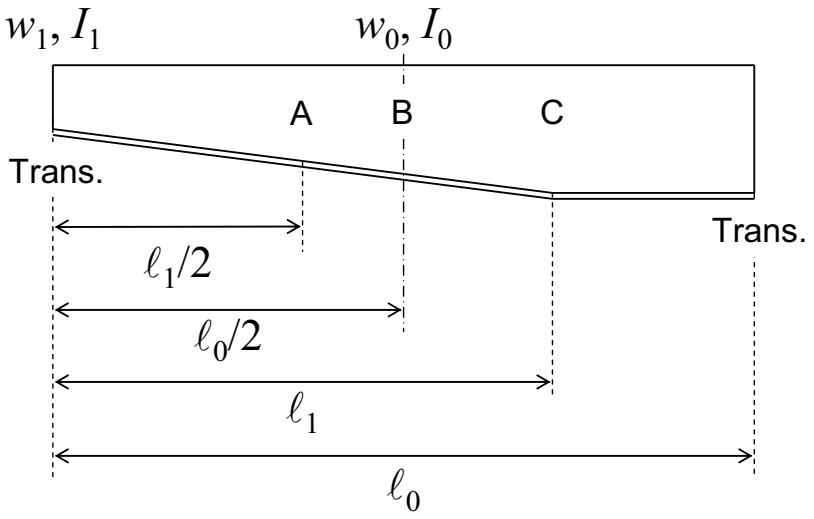


Figure : Variable cross-section stiffener

KC#476

KC#476 Technical background

The proposed answer by BV relies onto the ILLC regulations 15(6) and 16(5) that are to be fully applied. The excerpts of ILLC are added herein.

Pontoon covers

The proposed interpretation is:

> If hatch covers are considered weathertight by using tarpaulins and battening devices, the allowable stresses to be used are those corresponding to the line "Pontoon hatch cover" in the Tab 2, i.e. 0.68ReH for sigma. This is in line with ILLC Reg.15(6)

This regulation ILLC 15(6) is:

> *(6)*. Where pontoon covers used in place of portable beams and covers are made of mild steel, the strength shall be calculated in accordance with the requirement of regulation 16 (2) to (4) and the product of the maximum stress thus calculated and the factor 1.47 shall not exceed the minimum upper yield point strength of the material. They shall be so designed as to limit the deflection to not more than 0.0044 times the span. Mild steel plating forming the tops of covers shall be not less in thickness than 1% of the spacing of stiffeners or 6 mm if that be greater.

Hatch cover minimum design loads

The proposed interpretation is:

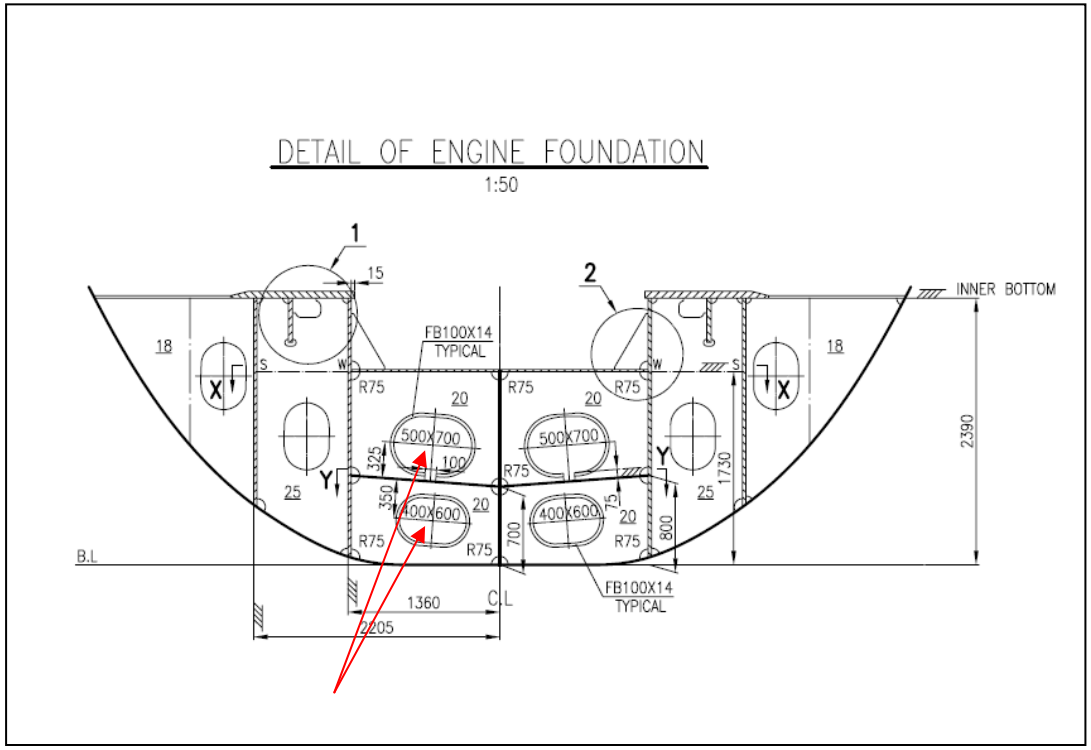
> If hatch covers are considered weathertight by construction, and without
> the need of tarpaulins and battening devices, the allowable stresses to be used are those corresponding to the line "Weathertight hatch cover" in the Tab 2, i.e. 0.8ReH for sigma. This is in line with ILLC Reg.16(5).

The regulation ILLC 16(5) is:

> *(5)*. All hatch covers shall be designed such that:
> *(a)*. the product of the maximum stress determined in accordance with the above loads and the factor of 1.25 does not exceed the minimum upper yield point strength of the material in tension and the critical buckling strength in compression;
> *(b)*. the deflection is limited to not more than 0.0056 times the span;
> *(c)*. steel plating forming the tops of covers is not less in thickness than 1% of the spacing of stiffeners or 6 mm if that be greater; and
> *(d)*. an appropriate corrosion margin is incorporated.

KC#582

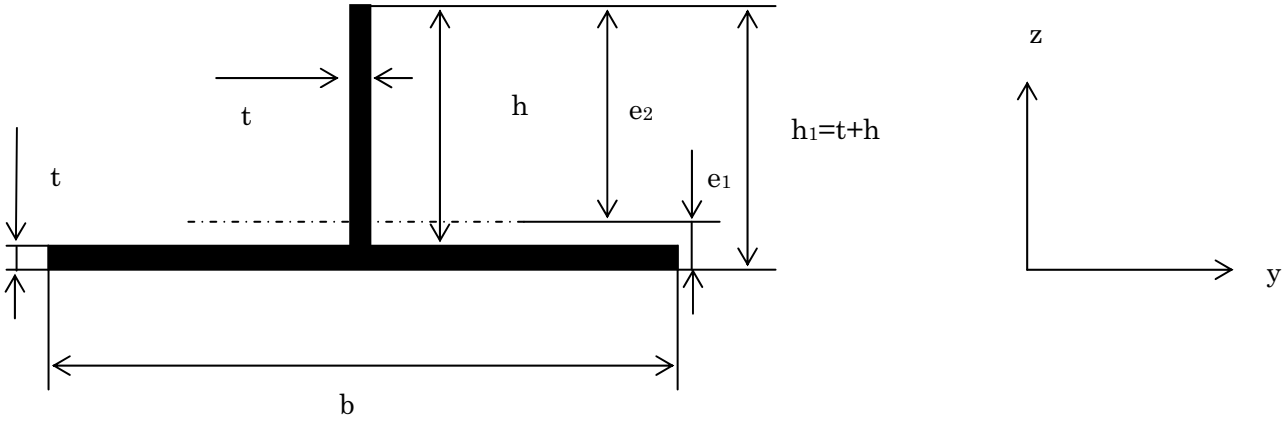
Double bottom Floor of E/R



KC#699

The background of formula for net section modulus of web stiffener in Ch 6 Sec 2 [4.1.2]

Model　Web stiffener is flat bar type and the web thickness of the web stiffener is equal to that of the attached plate



In this case, the moment of inertia of the stiffener with attached panel is given by the following equations.

Moment of inertia $$I_y = \frac{h_1^{\,3} t + (b-t)t^3}{3} - t(b+h) * e_1^{\,2} \tag{1}$$

$$e_1 = \frac{1}{2}\frac{h_1^{\,2} + (b-t)t}{b+h} \quad \text{and} \quad e_2 = h_1 - e_1 \tag{2}$$

Minimum Section modulus $$Z = I_y / e_2 \tag{3}$$

Normally, $t << b, and\ t << h$, then the equation (3) for the section modulus can be expresses by the following equation

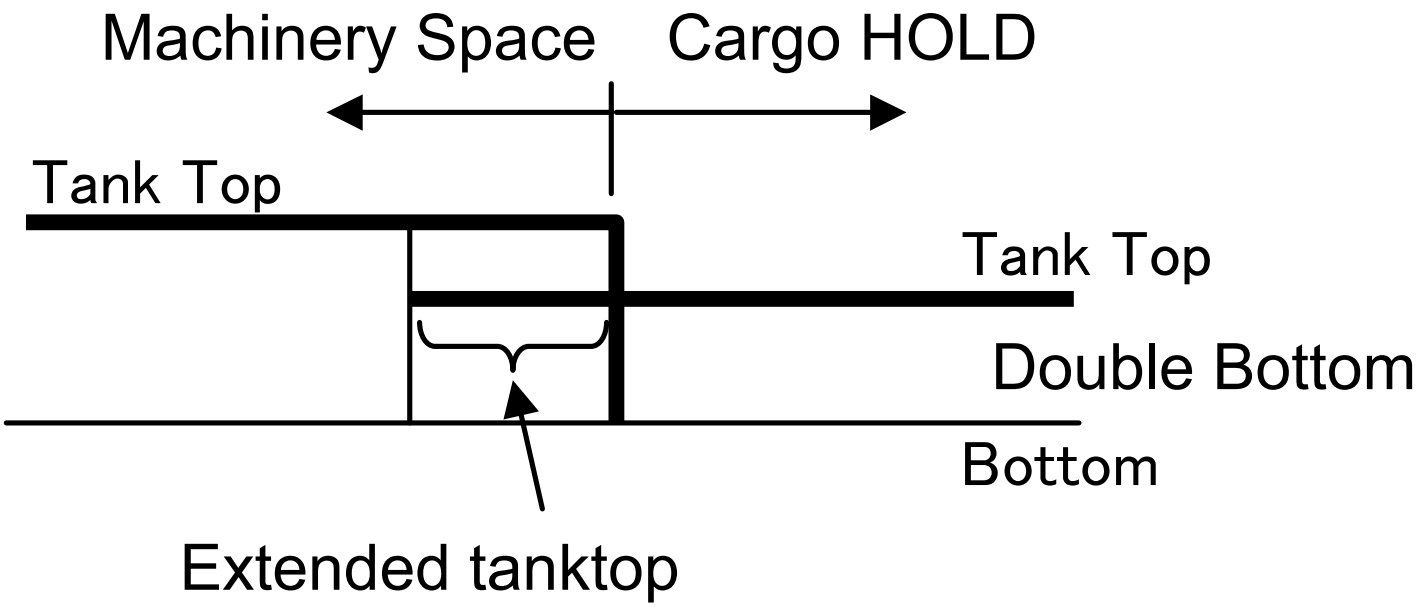
$$\begin{aligned} Z = \frac{th^2}{6}\frac{1+4b/h}{1+2b/h} &= \frac{th^2}{6}\left(2 - \frac{1}{1+2b/h}\right) \\ &= \frac{th^2}{3}\left(1 - \frac{0.5}{1+2b/h}\right) \end{aligned} \tag{4}$$

If the term $\left(1 - \frac{0.5}{1+2b/h}\right)$ is assumed to be proportional to the square of a spacing Ss, in m, of web stiffener and the height of web stiffener can be assumed to be $\ell/12$, where ℓ is the length of web stiffener, according to the requirement in Ch 3 Sec 6 5.2.1, then we can get the following equation.

$$Z = \frac{th^2}{3}\left(1 - \frac{0.5}{1+2b/h}\right) = \frac{t}{3}\left(\frac{\ell}{12}\right)^2 S_s^{\,2} = \frac{1}{432} t\ell^3 S_s^{\,2} \approx 2.5 * 10^{-3} t\ell^2 S_s^{\,2} \tag{5}$$

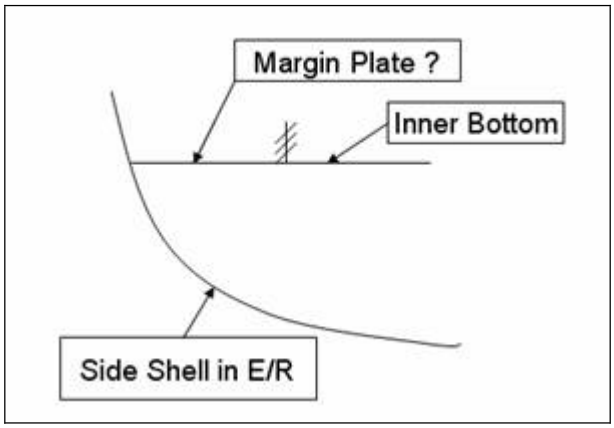
Considering the used units of symbols, we can get the rule formula in Ch 6 Sec 2 [4.1.2].

KC#727


Machinery Space
Cargo HOLD
Tank Top
Tank Top
Double Bottom
Bottom
Extended tanktop

KC#1074

Case 1:



Case 2: