



CHINA CLASSIFICATION SOCIETY

**RULES FOR CLASSIFICATION OF
SEA-GOING STEEL SHIPS
AMENDMENTS
(Jan. 2014)**

Effective date: 1 January, 2014

Beijing

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PART ONE PROVISIONS OF CLASSIFICATION

CHAPTER 5 SURVEYS AFTER CONSTRUCTION

Section 2 TYPES AND PERIODS OF SURVEYS

In paragraph 5.2.3.4, the following sentence is inserted after “ afloat as an in-water survey, subject to provisions of Section 11 of this Chapter”:

“Ships of less than 15 years of age may be permitted to carry out two consecutive in-water surveys, provided that relevant requirements of Appendix 21 of this Chapter are complied with.”

Section 9 SURVEYS OF MACHINERY

New paragraph 5.9.4.9 is added as follows:

“5.9.4.9 As part of the Special Survey of Machinery, a dock trial is to be carried out to attending Surveyors’ satisfaction to confirm satisfactory operation of main and auxiliary machinery. If significant repairs are carried out to main or auxiliary machinery or steering gear, consideration should be given to a sea trial to attending Surveyors’ satisfaction.”

Section 11 SURVEYS OF THE OUTSIDE OF THE SHIP’S BOTTOM AND RELATED ITEMS

The existing paragraph 5.11.2.1(7) is deleted.

Section 14 INITIAL CLASSIFICATION SURVEYS OF SHIPS CONSTRUCTED NOT UNDER THE SUPERVISION OF CCS

A new paragraph 5.14.3.1(1)①a(e) is added as follows:

“(e) Damage Stability calculation, where required.”

A new paragraph 5.14.3.1(1)①b(g) is added as follows:

“(g) For CSR ships, plans showing, for each structural element, both as-built and renewal thicknesses and any thickness for “voluntary addition”.”

The existing paragraph 5.14.3.1(1)④a(b) is replaced by the following:

“(b) For ships between 5 and 10 years of age the survey is to include an Annual Survey and inspection of a representative number of ballast spaces, such as fore peak, aft peak, topside tank, hopper tank, double bottom tank, etc.;”.

The existing paragraph 5.14.3.1(1)④a© is replaced by the following:

“(c) For ships of 10 years of age and above but less than 20 years of age, the survey is to include an Annual Survey and inspection of a representative number of ballast spaces and cargo spaces;”.

In paragraph 5.14.3.1(1)④a(d), “bulk carriers (including double side skin bulk carriers)” is replaced by “bulk carriers (including double skin bulk carriers)”.

The existing paragraph 5.14.3.1(1)④a(h) is replaced by the following:

“(h) In the context of applying (c) to (f) above, as applicable, tank testing for ships over 15 years of age is not required to be carried out as part of the class entry survey unless the class entry survey is being credited as a periodical survey for maintenance of class. If the class entry survey is to be credited as a periodical survey for maintenance of class, consideration may be given by CCS to the acceptance of the tank testing carried out by the losing society provided they were carried

out within the applicable survey window of the periodical survey in question.”

A new paragraph 5.14.3.1(1)④a(i) is added as follows:

“(i) In the context of applying (a) to (f) above, as applicable, compliance with rules (e.g. 5.3.5 of Section 3 of this Chapter) that require compliance at the forthcoming due periodical surveys are not required to be carried out/completed as part of the class entry survey unless the class entry survey is credited as a periodical survey for maintenance of class.”

A new appendix 21 is added as follows:

“Appendix 21 Guidelines for Extended Interval between Surveys in Dry-Dock - Extended Dry-docking (EDD) Scheme

1 General requirements

1.1 Introduction

1.1.1 The intervals between inspections of the outside of the ship's bottom are specified in SOLAS, IACS Regulations and CCS Rules and require a minimum of two inspections to be carried out during the 5 year validity period of the Safety Construction Certificate/Special Survey period. SOLAS Regulation I/10(v) only requires a minimum of two inspections of the outside of the ship's bottom and does not specify a ship must be dry-docked out of the water.

1.1.2 IMO Resolution A.1053(27) as amended, “Survey guidelines for the harmonized system of survey and certification”, requires that inspections of the outside of the ship's bottom should normally be carried out with the ship in a dry-dock. However, it also provides that Administrations may give consideration to alternate inspections being carried out with the ship afloat.

1.1.3 This Guidelines recommends the acceptance procedure for pilot schemes which extend the interval between surveys in dry-dock. Ships eligible for the Extended Dry-Docking (EDD) scheme are to meet the provisions and conditions described in this Guidelines.

1.1.4 Qualifying ships may be permitted to carry out two consecutive in-water surveys, subject to the conditions described in this Guidelines. A minimum of two inspections of the outside of the ship's bottom is to be carried out during the statutory renewal period/special survey period of five years and the intervals between any two inspections are not to exceed 36 months.

1.1.5 Pilot schemes which extend the interval between out of water dry-docking surveys are normally tripartite projects between the Owner, Flag Administration and CCS. Acceptance into such a Pilot scheme is subject to the formal written agreement with the ship's Flag Administration including any additional specific Flag Administration requirements.

1.2 Application

1.2.1 Owners/Managers requesting a ship be considered for the EDD scheme, are to apply to CCS in writing confirming and describing compliance with the requirements and conditions specified in this Guidelines.

1.2.2 Upon the Owner's request, the extended interval for each ship will be considered on a case by case basis by CCS. CCS may assist in forwarding the Owner's application to the Flag Administration.

1.2.3 The following ships and ship types are not eligible for the extended dry-docking scheme described in this Guidelines:

- passenger ships;
- ships subject to the Enhanced Survey Program (ESP);
- ships subject to requirements of sections 5 and 16 of Chapter 5 of this PART;
- ships fitted with propulsion thrusters;
- ships where the propeller connection to the shaft is by means of a keyed taper;
- High Speed Craft (HSC).

1.2.4 The dry-docking scheme will operate, based upon the ship's age when entering the scheme. For ships already in service, the extended dry-docking scheme may be implemented at any time until a ship reaches 10 years of age. (Namely that once a ship reaches 10 years of age, inspections of the outside of the ship's bottom must be carried out in dry-dock during the 10 year special survey period.)

1.2.5 No extensions are to be granted for the dry-docking required at the end of each extended dry docking period.

1.3 Information to be submitted by the owner

1.3.1 Prior to acceptance into an EDD scheme, the owner is to submit the following information:

- (1) provisions for carrying out maintenance required on electric/electronic sensors e.g. Echo-sounder, Doppler-Log, Speedlog (propeller speedlog or backpressure speedlog), seawater temperature gauges, electronic draught reading, etc.;
- (2) provisions for maintaining the draft marks fore, aft and midships as well as loadline marks (painted and welded figures) and all other required hull markings;
- (3) maintenance required of thrusters and stabilisers, if fitted, and provision for carrying out surveys or maintenance or as required by the surveyor;
- (4) service experience to-date with hull coating system covered by manufacturer's guarantee that the underwater coatings used are designed to last for the extended period since the coating is to remain effective for the extended dry docking period;
- (5) impressed cathodic protection system or provisions for renewal of external hull sacrificial anodes in the afloat condition.

1.4 Preparatory reviews by CCS

1.4.1 CCS is to carry out the following reviews prior to accepting a ship into an EDD scheme:

- (1) satisfactory review of the items submitted by the owner as required in 1.3 above;
- (2) review of ship's history with particular attention to any previous findings affecting the underwater body.

1.5 Arrangements

1.5.1 Prior to acceptance into an EDD scheme, ships enrolled an extended dry-docking interval scheme are to comply with the following provisions:

- (1) The ship is to comply with the In-Water Survey provisions in accordance with the corresponding requirements of CCS.
- (2) Protective coating in double bottom/double side ballast tanks, void spaces and all other spaces adjacent to the shell is to be maintained in GOOD condition.
- (3) The shafting arrangement is to fulfil the applicable CCS's requirements for Tailshaft Condition Monitoring Survey Arrangement. Namely that the ship is to be assigned with SCM class notation.
- (4) Hull maintenance scheme to be implemented in accordance with ISM requirements.

2 Survey requirements

2.1 In-Water Survey Requirements

2.1.1 The In-Water Survey is to be carried out in accordance with the requirements of 5.2.3, section 2 and section 11, Chapter 5 of this PART.

2.1.2 An in-water survey plan is to be submitted to CCS for review in advance of the survey and should include the following:

- (1) scheduled time and location for survey;
- (2) name of approved diving company;
- (3) means for cleaning of the hull below waterline;
- (4) means of access for examination of sea chests, sea valves and box coolers;
- (5) provisions for determining the condition of anchoring equipment, ranging of anchor chain cables and examination of the chain lockers when due for survey and/or as required by the surveyor;
- (6) provisions for surveying and maintaining sea connections including thickness measurements of sea chests;
- (7) results of inspections by the Owner's personnel of double bottom/double side ballast tanks (during the last 3 years) and other spaces adjacent to the shell with reference to structural deterioration in general, leakages in tank boundaries and piping and condition of the protective coating;
- (8) conditions for internal examination of double bottom/double side ballast tanks (e.g., information regarding tank cleaning, gas freeing, ventilation, lighting, etc.).

2.1.3 Prior to commencement of the in-water survey, a survey planning meeting is to be held

between the attending surveyor(s), the owner's representative in attendance, the diving company and the master of the ship or an appropriate representative appointed by the owner for the purpose of ascertaining that all the arrangements envisaged in the survey plan are in place, so as to ensure the safe and efficient conduct of the survey work to be carried out.

2.1.4 A comprehensive report of findings, gaugings, clearances and any work undertaken, including recordings of representative CCTV images, must be submitted by the ship owner to all involved parties.

2.2 Special survey/statutory renewal requirements

2.2.1 It should be noted that the periodicity of the ships's Special Survey and Statutory Renewal Surveys will not change, therefore provision must be made for carrying out all such surveys and any repairs afloat, where not dry-docking.

2.3 Survey findings

2.3.1 If the In-Water Survey reveals damage, deterioration or other conditions that requires early attention, the surveyor may require that the ship be dry-docked in order that a detailed survey can be undertaken and necessary repairs carried out.

2.3.2 If temporary repairs carried out to any underwater parts are considered acceptable these must be made permanent within a due date decided by the surveyor.

2.3.3 The owner is to request CCS to perform a survey in dry-dock in any event or circumstance in the operation of the ship which could have led to underwater damages or deterioration in the crew's knowledge or opinion.

2.3.4 If the coating condition in double bottom/double side ballast tanks, void spaces and dry spaces is found in less than GOOD condition, the owner is to restore the coating to GOOD.

3 Termination of scheme

3.1 Termination of EDD scheme

3.1.1 The dry-docking survey required for the special survey at 15 years of age is to be carried out in a dry-dock. All ships in an EDD scheme are to be dis-enrolled once the ship reaches 15 years of age.

3.1.2 The Extended Dry-docking Scheme will be terminated in cases of change of the ship's owner, management or Flag Administration.

3.1.3 CCS may dis-enroll a ship from an EDD scheme at any time should it be found that the conditions for maintaining this extended dry-dock scheme are not fulfilled anymore.

3.1.4 Once the conditions for the scheme are no longer present, the ship will return to the normal docking interval and any due dock survey is to be carried out by the due date."

PART TWO HULL

CHAPTER 1 GENERAL

Section 7 FORE DECK FITTINGS

The existing subparagraph 1.7.2.9(5) is replaced by the following:

“(5) On small hatches located between the main hatches, for example between No.1 and No. 2, the hinges are to be placed on the fore edge or outboard edge, whichever is practicable for protection from green water in beam sea and bow quartering conditions.”

CHAPTER 2 HULL STRUCTURES

Section 6 DOUBLE BOTTOMS

In paragraph 2.6.15.3, the words “1.65 times the depth of the web of frames” are replaced by “1.65 times the depth of the web of web frames”.

Section 13 DEEP TANKS

In paragraph 2.13.8.5, “2.13.7.5” is replaced by “2.13.7.4”.

Section 14 STEMS, STERN FRAMES, BULBOUS BOWS, PROPELLER SHAFT BRACKETS AND RUDDER HORNS

The existing paragraph 2.14.2.5 is replaced by the following:

“2.14.2.5 The section modulus W_z of sole pieces (see Figure 2.14.2.5) about the vertical neutral axis (z -axis) at any considered section, is not to be less than that obtained from the following formula:

$$W_z = \frac{K}{80} Px \quad \text{cm}^3$$

where: P — supporting force exerted by the sole piece on rudder blade, in N, to be calculated according to the relevant requirements of Section 1, Chapter 3 of this PART;

K — material factor according to 1.5.1.4 of this PART for fabricated sole pieces; material factor according to 3.1.1.5 of this PART for cast sole pieces;

x — distance between the axis of rudder stock and the section under consideration, in m, to be taken not less than $0.5ls$, ls being the maximum distance, in m, (see Figure 2.14.2.5).”

In paragraphs 2.14.2.7 and 2.14.2.8, every letter “C” is replaced by “K”.

The existing paragraph 2.14.7.3 is replaced by the following:

“2.14.7.3 The section modulus W of rudder horns around the x -axis at any horizontal section is not to be less than that obtained from the following formula:

$$W = \frac{K}{67} M_b \quad \text{cm}^3$$

where: M_b — bending moment at the section under consideration, in N·m, to be calculated according to 2.14.7.2 of this Section;

K — material factor required in 1.5.1.4 of this PART for fabricated rudder horns; material factor required in 3.1.1.5 of this PART for cast rudder horns.”

In paragraphs 2.14.7.4 and 2.14.7.5, every letter “C” is replaced by “K”.




Section 23 STRENGTHENING FOR GRABS

In paragraph 2.23.2.1, “GRAB – [X]” is replaced by “Grab(X)”.

Appendix 3 IACS NO.97 RECOMMENDATION FOR UR S11.2.1.3

(Rev. 5, June 2007)

In paragraph 3, the sentence “Table 1 shows the filling level in partially filled BW tanks Nos.1 (P/S) and 5 (P/S) for the operational conditions during ballast voyage.” is moved to be immediately before Table 1.

In Figure 4(d) Case D, the illustration “” in “Cond. D2-3 (Int.1)*” and the illustration “” in “Cond. D2-5 (Int.1)*” are replaced by “”.

CHAPTER 4 STRENGTHENING FOR NAVIGATION IN ICE

Section 2 ICE STRENGTHENING FOR CLASSES B1*, B1, B2 AND B3

The existing Table 4.2.4.2(4) is replaced by the following:

Structure	Type of framing	l_a (m)
Shell	Transverse	Frame spacing
	Longitudinal	1.7 times frame spacing
Frames	Transverse	Frame spacing
	Longitudinal	Span of longitudinal
Ice stringer	–	Span of side stringer
Web frame	–	2 times web frame spacing

In subparagraph 4.2.4.4(2)(a), the words “ l — span of the frame, in m; where ice stringers are fitted, it may be taken as the distance between ice stringers or between stringer and deck or between stringers and bottom, whichever is the greatest;” are replaced by “ l — span of the frame, in m;”.

In paragraph 4.2.4.6, the words “Web frames within ice belt” are replaced by “Web frames”.

CHAPTER 8 BULK CARRIERS

Appendix 2 HOLD MASS CURVES

The existing Figure 2.1.2 is replaced by the following:

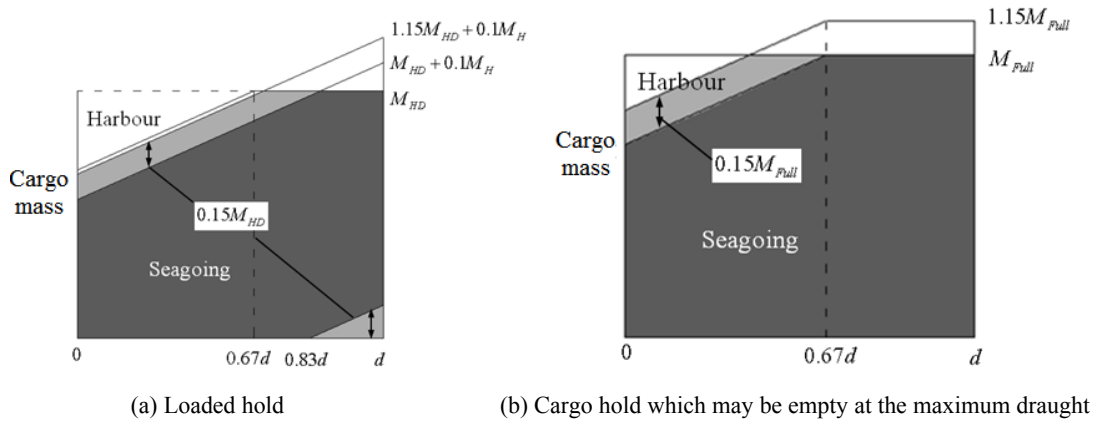


Figure 2.1.2 Mass Curve for Ships with Alternate Load under Multi-port Condition

In paragraph 2.2.3, the formula “ $W_{\max}(T_i) = M_{HD} + 0.1M_H - 1.025V_H \frac{(0.67d - T_i)}{h}$ ” is replaced by “ $W_{\max}(T_i) = M_{HD} - 1.025V_H \frac{(0.67d - T_i)}{h}$ ”.

In paragraph 3.1.3, the sentence “Mass curves of loaded cargo hold for ships with alternate load of packed cargo under no multi-port condition are shown in Figure 3.1.3.” is replaced by “Mass curves of loaded cargo hold for ships with alternate load of packed cargo are shown in Figure 3.1.3.”

The existing Figure 3.1.3 is replaced by the following:

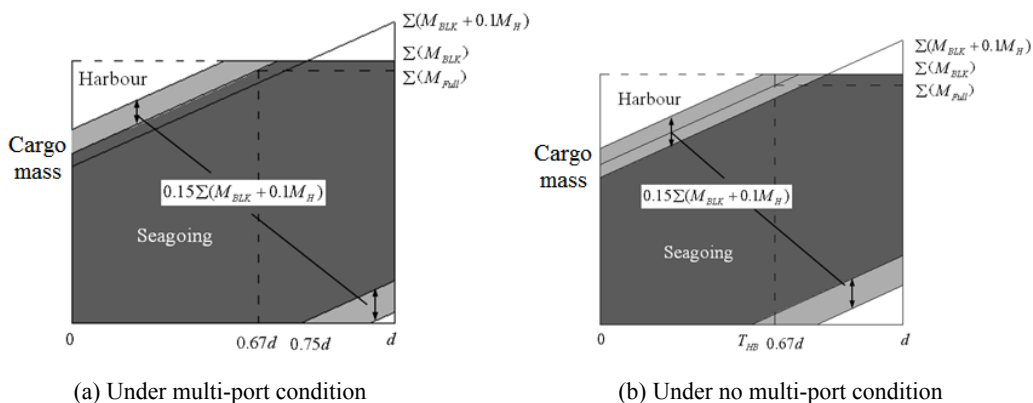


Figure 3.1.3 Mass Curves of Loaded Cargo Hold for Ships with Alternate Load of Packed Cargo

In paragraph 3.1.5, the sentence “Mass curves of loaded cargo hold for ships with alternate without packed cargo under no multi-port condition and ships with homogeneous load are shown in Figure 3.1.5.” is replaced by “Mass curves of loaded cargo hold for ships with alternate load of packed cargo are shown in Figure 3.1.3.”

PART SIX FIRE PROTECTION, DETECTION AND EXTINCTION

CHAPTER 3 FIRE SAFETY MEASURES

Section 4 MISCELLANEOUS

In the existing subparagraph (2) of 3.4.14.1, “4.2.2.7” is replaced by “4.2.2.9”.

PART EIGHT ADDITIONAL REQUIREMENTS

CHAPTER 9 ADDITIONAL REQUIREMENTS FOR SHIPS HAVING INDEPENDENT ICEBREAKING CAPABILITY

The existing Section 3 is replaced by the following:

“Section 3 HULL STRUCTURE

9.3.1 General requirements

9.3.1.1 In respect to the strengthening requirements for ships having an icebreaking capability where the ice load is calculated in accordance with Section 2, Chapter 4 of PART TWO, the actual output power of the main engine at MCR is not to be less than that required for icebreaking in Section 2 of this Chapter.

9.3.2 General requirements for side framing

9.3.2.1 Where a frame or longitudinal frame intersects a boundary between two of the hull regions (see Section 2, Chapter 4 of PART TWO of the Rules), the scantling requirements applicable will be those for the greater region.

9.3.2.2 Extent of tripping brackets: B1* - all regions; B1 – forward and midship regions; B2 and B3 – forward region.

9.3.2.3 The effective weld area attaching ice frames or longitudinal frames to primary members is not to be less than the shear area for the frames or longitudinal frames.

9.3.3 Ice stringers

9.3.3.1 The webs of primary longitudinal members supporting transverse ice frames are to be stiffened and connected to the main or intermediate frames so that the distance s between such stiffeners is not greater than that determined in accordance with the following formula:

$$s = 17.06 \frac{t}{\eta} \sqrt{\frac{t}{F_l}} \quad \text{mm}$$

where: t – thickness, in mm, of the primary longitudinal member adjacent to the shell plating;
 F_l – longitudinal distribution coefficient, see Table 9.3.3.1.

Table 9.3.3.1

Ice class	F _l		
	Fore	Midship	Aft
B1*	1.00	0.98	0.89
B1	0.87	0.75	0.64
B2	0.78	0.64	0.51
B3	0.68	0.53	0.37

η – coefficient,

For the forward region, one of the following values is to be taken, whichever is the least:

$$\eta_1 = 0.653 + 3.217 \frac{\sqrt{P\Delta}}{10^5}$$

$$\eta_2 = 0.876 + 9.908 \frac{\sqrt{P\Delta}}{10^6}$$

$$\eta_3 = 1;$$

For midship and aft regions, one of the following values is to be taken, whichever is less:

$$\eta_1 = 0.653 + 9.908 \frac{\sqrt{P\Delta}}{10^6}$$

$$\eta_2 = 1;$$

P – actual output power of the main engine at MCR, not to be less than that required for icebreaking in Section 2 in this Chapter;

Δ – displacement, in t , see 4.2.2.2, Section 2, Chapter 4 of PART TWO of the Rules.

9.3.4 Stem

9.3.4.1 The section modulus W of the stem in the fore and aft direction is not to be less than that determined in accordance with the following formula:

$$W = 1500F_I^{1.5}\eta^3 \text{ cm}^3$$

where: F_I , η – see 9.3.3.1.

9.3.4.2 The thickness t of side plates of a welded stem constructed as shown in Figure 9.3.4.2 is to be determined in accordance with the following formula:

$$t = 31\eta\sqrt{F_I} \text{ mm}$$

where: F_I , η – see 9.3.3.1.

The dimension of a welded stem is to be determined in accordance with Figure 9.3.4.2.

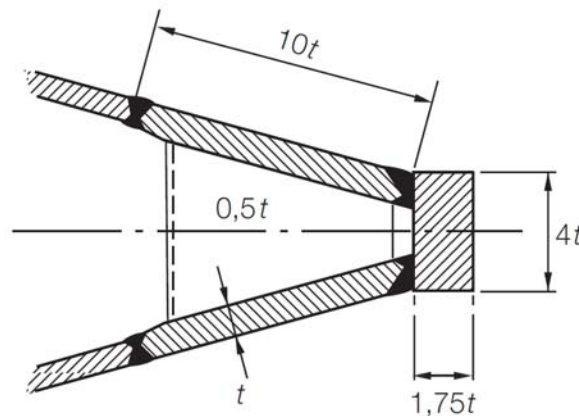


Figure 9.3.4.2 Welded Stem”

Section 4 SIDE FRAMING

The existing Section 4 are deleted.

Section 5 STEM

The existing Section 5 are deleted.

PART NINE DOUBLE-HULL OIL TANKERS STRUCTURE (CSR)

SECTION 8 SCANTLING REQUIREMENTS

The existing Table 8.2.3 is replaced by the following:

Bulkhead	At lower end of l_{cg}	At mid length of l_{cg}	At upper end of l_{cg}
Transverse Bulkhead	C_1	C_{m1}	$0.80C_{m1}$
Longitudinal Bulkhead	C_3	C_{m3}	$0.65C_{m3}$

Where:

$$C_1 = a_1 + b_1 \sqrt{\frac{A_{dt}}{b_{dk}}}, \quad \text{but is not to be taken as less than 0.60}$$

$$C_1 = a_1 - b_1 \sqrt{\frac{A_{dt}}{b_{dk}}}, \quad \text{for transverse bulkhead with no lower stool, but is not to be taken as less than 0.55}$$

$$a_1 = 0.95 - \frac{0.41}{R_{bt}},$$

$$= 1.0, \quad \text{for transverse bulkhead with no lower stool}$$

$$b_1 = -0.20 + \frac{0.078}{R_{bt}},$$

$$= 0.13, \quad \text{for transverse bulkhead with no lower stool}$$

$$C_{m1} = a_{m1} + b_{m1} \sqrt{\frac{A_{dt}}{b_{dk}}}, \quad \text{but is not to be taken as less than 0.55}$$

$$C_{m1} = a_{m1} - b_{m1} \sqrt{\frac{A_{dt}}{b_{dk}}}, \quad \text{for transverse bulkhead with no lower stool, but is not to be taken as less than 0.60}$$

$$a_{m1} = 0.63 + \frac{0.25}{R_{bt}},$$

$$= 0.85, \quad \text{for transverse bulkhead with no lower stool}$$

$$b_{m1} = -0.25 - \frac{0.11}{R_{bt}},$$

$$= 0.34, \quad \text{for transverse bulkhead with no lower stool}$$

$$C_3 = a_3 + b_3 \sqrt{\frac{A_{dl}}{l_{dk}}}, \quad \text{but is not to be taken as less than 0.60}$$

$$C_3 = a_3 - b_3 \sqrt{\frac{A_{dl}}{l_{dk}}}, \quad \text{for longitudinal bulkhead with no lower stool, but is not to be taken as less than 0.55}$$

$$a_3 = 0.86 - \frac{0.35}{R_{bl}},$$

$$= 1.0, \quad \text{for longitudinal bulkhead with no lower stool}$$

The existing Table 8.2.9 is replaced by the following:

Structural Member	Design Load Set ^(1, 5, 6)	Load Component	Draught	Comment	Diagrammatic Representation
Double bottom floors and girders ⁽³⁾	1	P_{ex}	$0.9T_{SC}^{(2)}$	Sea pressure only	
	2	P_{ex}	T_{SC}		
	12	$P_{in}-P_{ex}$	$0.6 T_{SC}$	Net pressure difference between cargo pressure and sea	
	13	$P_{in}-P_{ex}$	(4)		

				pressure	
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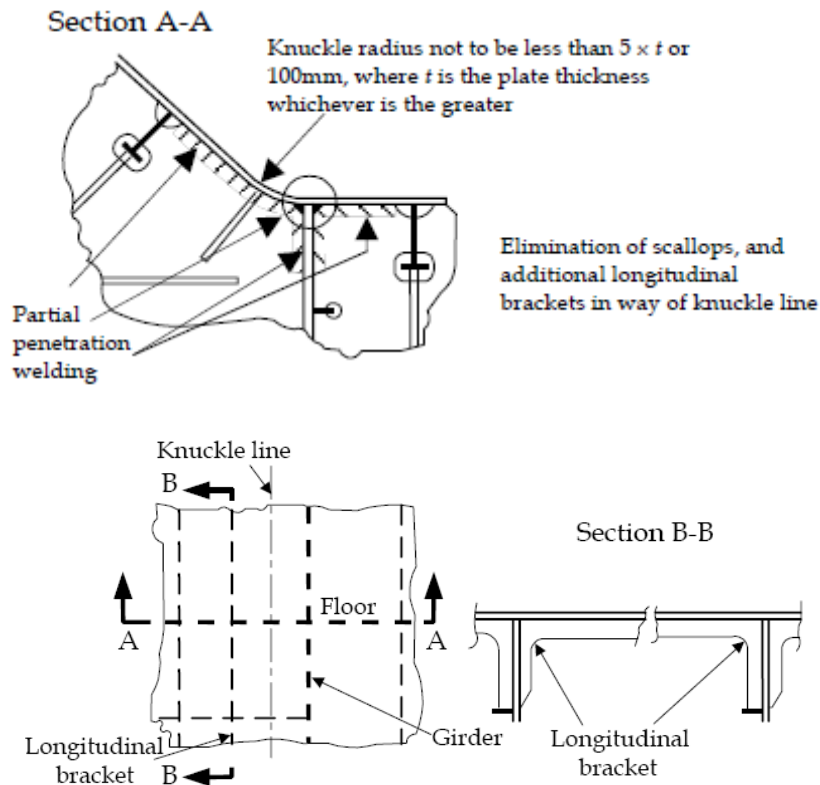
In paragraph 2.6.7.5, the sentence “The required shear area at mid effective bending span is to be taken as 50% of that required in the ends,” is replaced by “The required shear area at mid effective shear span is to be taken as 50% of that required in the ends,”.

The existing Table 8.4.2 is replaced by the following:

Acceptance Criteria Set	Structural Member		β_a	α_a	C_{a-max}
AC1	Longitudinal Strength Members	Longitudinally stiffened plating	0.9	0.5	0.80
		Transversely or vertically stiffened plating	0.9	1.0	0.80
	Other member		0.8	0	0.80
AC2	Longitudinal Strength Member	Longitudinally stiffened plating	1.05	0.5	0.95
		Transversely or vertically stiffened plating	1.05	1.0	0.95
	Other members, including watertight boundary plating		1.0	0	1.00

APPENDIX C FATIGUE STRENGTH ASSESSMENT

The existing Figure C.2.4 is replaced by the following:



Note: Longitudinal brackets may be omitted if it can be demonstrated that the girder provides sufficient support at the knuckle line.

PART TEN BULK CARRIERS STRUCTURE (CSR)

CHAPTER 2 GENERAL ARRANGEMENT DESIGN

Section 1 SUBDIVISION ARRANGEMENT

A new paragraph 3.1.5 is added as follows:

“3.1.5 Sterntubes

Ref. SOLAS Ch. II-1, Part B-2, Reg.12

Serntubes are to be enclosed in a watertight space (or spaces) of moderate volume. Other measures to minimise the danger of water penetrating into the ship in case of damage to sterntube arrangements may be taken at the discretion of the Society.”

CHAPTER 3 STRUCTURAL DESIGN PRINCIPLES

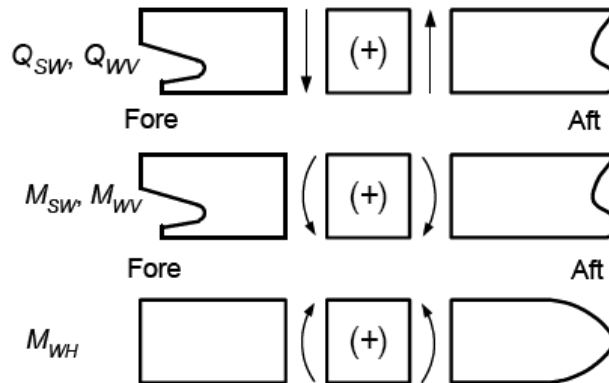
Section 6 STRUCTURAL ARRANGEMENT PRINCIPLES

In paragraph 9.6.3, the formula “ $t_{INS} = (0.8+0.4\ell/b)\cdot t$ ” is replaced by the formula “ $t_{INS} = (0.8+0.4b/\ell)\cdot t$ ”.

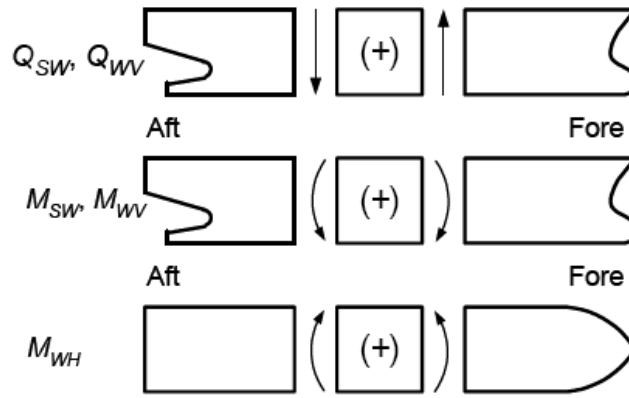
CHAPTER 4 DESIGN LOADS

Section 3 HULL GIRDER LOADS

The existing Figure 1:

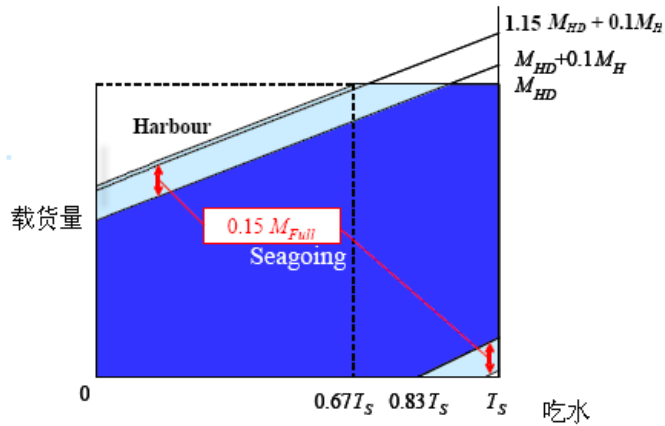


is replaced by:

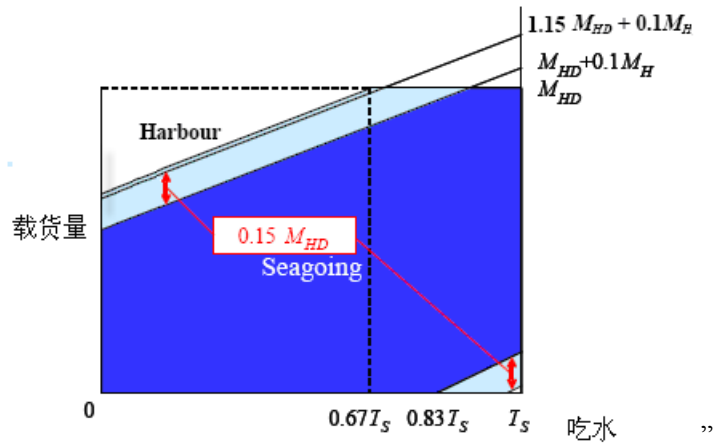


Appendix 1 HOLD MASS CURVES

The existing Figure 1(a):



is replaced by:



In paragraph 2.2.3, the existing formula “ $W_{\max}(T_i) = M_{HD} + 0.1M_H - 1.025V_H \frac{0.67T_s - T_i}{h}$ ” is replaced by “ $W_{\max}(T_i) = M_{HD} - 1.025V_H \frac{0.67T_s - T_i}{h}$ ”.

CHAPTER 6 HULL SCANTLINGS

Section 3 BUCKLING AND ULTIMATE STRENGTH OF ORDINARY STIFFENERS AND

STIFFENED PANELS

In Symbols, Table 1 is replaced by the following:

	$F_1^{(2)}$	Edge stiffener
Stiffeners sniped at both ends	1.00	
Guidance values where both ends are effectively connected to adjacent structures ⁽¹⁾	1.05	Flat bar
	1.10	Bulb section
	1.21	Angle and tee-sections
	1.30	Girders of high rigidity (e.g. bottom transverses)
⁽¹⁾ Exact values may be determined by direct calculations. ⁽²⁾ An average value of F_1 is to be used for plate panels having different edge stiffeners.		

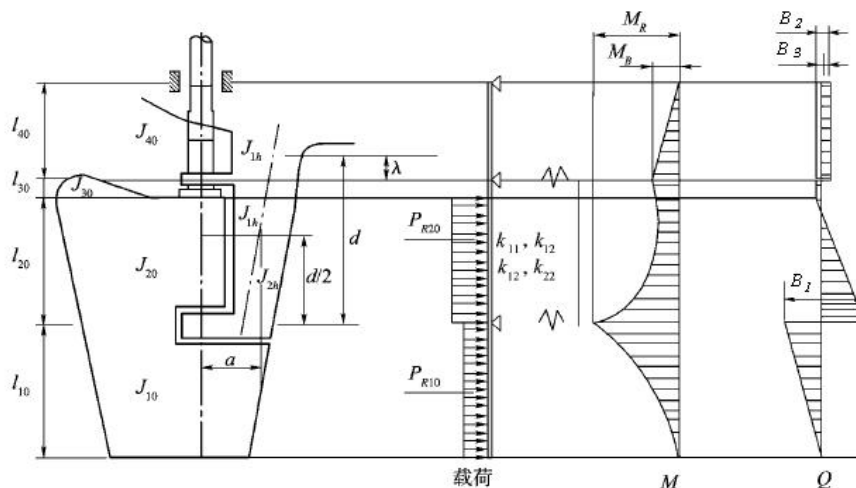
CHAPTER 10 HULL OUTFITTING

Section 1 RUDDER AND MANOEUVRING ARRANGEMENT

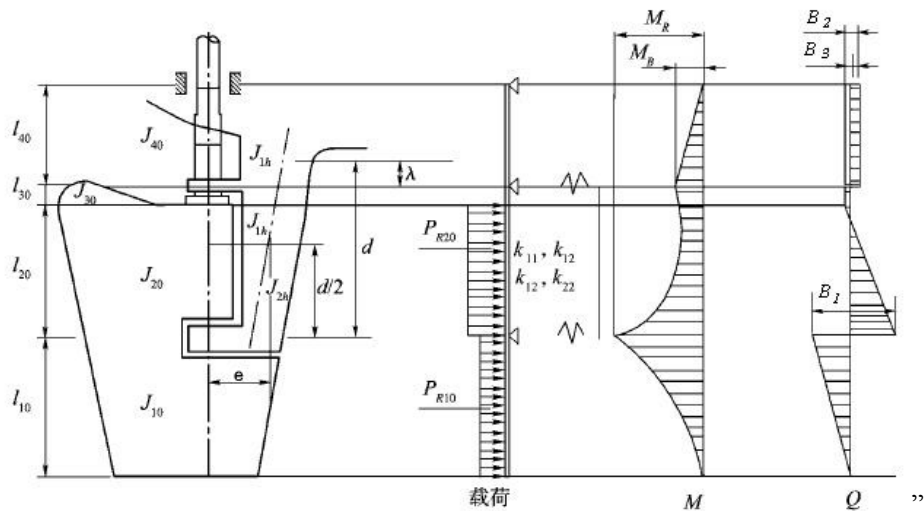
In paragraph 2.1.1, the sentences “ κ_1 : Coefficient, depending on the aspect ratio λ , taken equal to: $\kappa_1 = (\lambda + 2)/3$, where λ need not be taken greater than 2” are replaced by “ κ_1 : Coefficient, depending on the aspect ratio Λ , taken equal to: $\kappa_1 = (\Lambda + 2)/3$, where Λ need not be taken greater than 2”.

In paragraph 3.2.1, the sentences “ M_b : Bending stress at the neck bearing, in N.m” are replaced by “ M_b : Bending moment at the neck bearing, in N.m”

The existing Figure 5:



is replaced by:



In paragraph 4.5.4, the existing formula $p_{req1} = \frac{2Q_F \times 10}{d_m^2 \ell \pi \mu_0}$ is replaced by

$$p_{req1} = \frac{2Q_F}{d_m^2 \ell \pi \mu_0} 10^3$$

CHAPTER 11 CONSTRUCTION AND TESTING

Section 3 TESTING OF COMPARTMENTS

In paragraph 2.3.1, the sentence “When hose testing is required to verify the tightness of the structures, as defined in Tab 1, the minimum pressure in the hose, at least equal to $0.20 \cdot 10^5$ Pa, is to be applied at a maximum distance of 1.5 m. The nozzle diameter is not to be less than 12 mm.” are replaced by the sentences “When hose testing is required to verify the tightness of the structures, as defined in Tab 1, the minimum pressure in the hose, at least equal to $2 \cdot 10^5$ Pa, is to be applied at a maximum distance of 1.5 m. The nozzle diameter is not to be less than 12 mm.”

CHAPTER 13 SHIPS IN OPERATION, RENEWAL CRITERIA

Section 1 MAINTENANCE OF CLASS

The paragraph 1.1.2 is deleted and replaced by term “Void”.

The paragraph 1.1.3 is deleted and replaced by term “Void”.

The following requirements are added:

“

1.2.3 Deck zone

The deck zone includes all the following items contributing to the hull girder strength above the horizontal strake of the topside tank or above the level corresponding to 0.9D above the base line if there is no topside tank:

- strength deck plating
- deck stringer
- sheer strake

- side shell plating
- top side tank sloped plating, including horizontal and vertical strakes
- longitudinal stiffeners connected to the above mentioned platings.

1.2.4 Bottom zone

The bottom zone includes the following items contributing to the hull girder strength up to the upper level of the hopper sloping plating or up to the inner bottom plating if there is no hopper tank:

- keel plate
- bottom plating
- bilge plate
- bottom girders
- inner bottom plating
- hopper tank sloping plating
- side shell plating
- longitudinal stiffeners connected to the above mentioned platings.

1.2.5 Neutral axis zone

The neutral axis zone includes the plating only of the items between the deck zone and the bottom zone, as for example:

- side shell plating
- inner hull plating, if any.

”

Section 2 THICKNESS MEASUREMENT AND ACCEPTANCE CRITERIA

The Section 2 is replaced by the following:

“

Section 2 Acceptance criteria

Symbols

For symbols not defined in this Section, refer to Ch 1, Sec 4.

$t_{renewal}$:	Renewal thickness; Minimum allowable thickness, in mm, below which renewal of structural members is to be carried out $t_{renewal} = t_{as_built} - t_C - t_{voluntary_addition}$
$t_{reserve}$:	Reserve thickness; Thickness, in mm, to account for anticipated thickness diminution that may occur during a survey interval of 2.5 year. ($t_{reserve} = 0.5$ mm)
t_C	:	Corrosion addition, in mm, defined in Ch 3, Sec3
t_{as_built}	:	As built thickness, in mm, including $t_{voluntary_addition}$, if any
$t_{voluntary_addition}$:	Voluntary thickness addition; Thickness, in mm, voluntarily added as the Owner's extra margin for corrosion wastage in addition to t_C
t_{gauged}	:	Gauged thickness, in mm, on one item, i.e average thickness on one item using the various measurements taken on this same item during periodical ship's in service surveys.

1. Local strength criteria

1.1 Application

1.1.1

The items to be considered for the local strength criteria are those defined in UR Z10.2 for single side skin bulk carriers and UR Z10.5 for double side skin bulk carriers.

1.2 Renewal thickness for corrosion other than local corrosion

1.2.1

For each item, steel renewal is required when the gauged thickness t_{gauged} is less than the renewal thickness, as specified in the following formula:

$$t_{gauged} < t_{renewal},$$

Where the gauged thickness t_{gauged} is such as:

$$t_{renewal} < t_{gauged} < (t_{renewal} + t_{reserve})$$

coating applied in accordance with the coating manufacturer's requirements or annual gauging may be adopted as an alternative to the steel renewal. The coating is to be maintained in good condition.

1.3 Renewal thickness for local corrosion

1.3.1

If pitting intensity in an area where coating is required, according to Ch 3, Sec 5, is higher than 15% (see Fig 1), thickness measurements are to be performed to check the extent of pitting corrosion. The 15% is based on pitting or grooving on only one side of a plate.

In cases where pitting is exceeding 15%, as defined above, an area of 300 mm or more, at the most pitted part of the plate, is to be cleaned to bare metal and the thickness is to be measured in way of the five deepest pits within the cleaned area. The least thickness measured in way of any of these pits is to be taken as the thickness to be recorded.

The minimum remaining thickness in pits, grooves or other local areas as defined in Ch 13, Sec 1, [1.2.1] is to be greater than:

- 75% of the as-built thickness, in the frame and end brackets webs and flanges
- 70% of the as-built thickness, in the side shell, hopper tank and topside tank plating attached to the each side frame, over a width up to 30 mm from each side of it, without being greater than $t_{renewal}$.

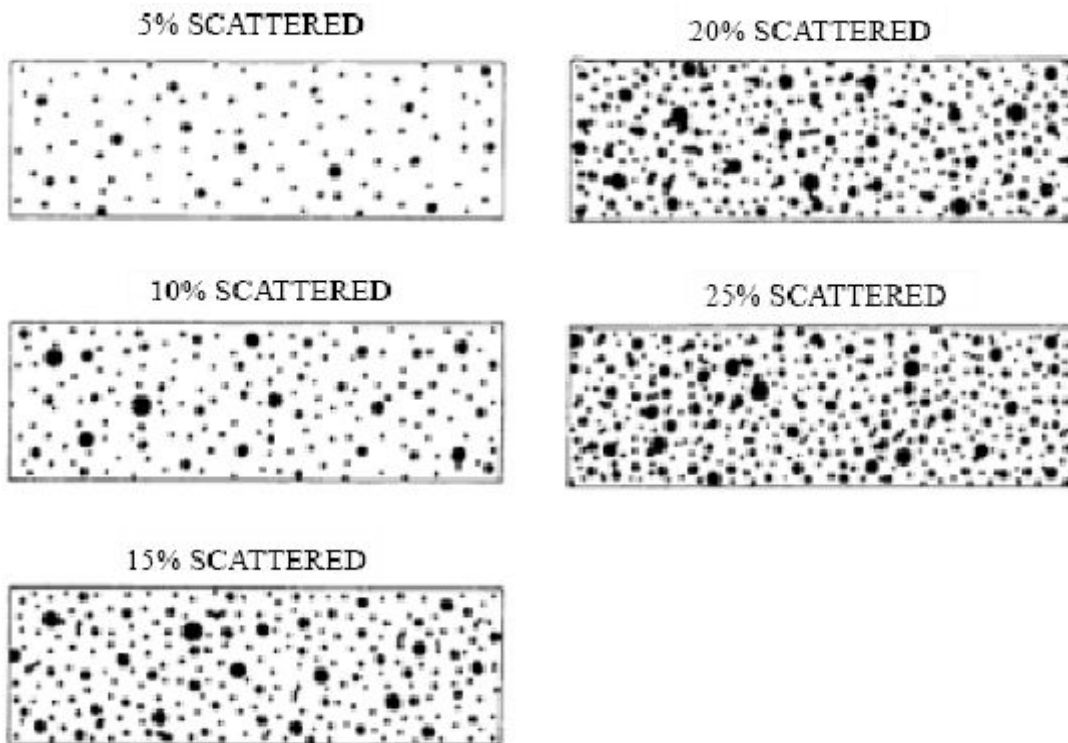


Figure 1: Pitting intensity diagrams (from 5% to 25% intensity)

1.4 Global strength criteria
1.4.1 Items for the global strength criteria

The items to be considered for the global strength criteria are those of the deck zone, the bottom zone and the neutral axis zone, as defined in Ch 13, Sec 1, [1.2].

1.4.2 Renewal thickness

The global strength criteria is defined by the assessment of the bottom zone, deck zone and neutral axis zone, as detailed below.

a) bottom zone and deck zone:

The current hull girder section modulus determined with the thickness measurements is not to be less than 90% of the section modulus calculated according to Ch 5, Sec 1 with the gross offered thicknesses.

Alternatively, the current sectional areas of the bottom zone and of the deck zone which are the sum of the gauged items area of the considered zones, are not to be less than 90% of the sectional area of the corresponding zones determined with the gross offered thicknesses.

b) neutral axis zone:

The current sectional area of the neutral axis zone, which is the sum of the gauged platings area of this zone, is not to be less than 85% of the gross offered sectional area of the neutral axis zone.

If the actual wastage of all items, of a given transverse section, which contribute to the hull girder strength is less than 10% for the deck and bottom zones and 15% for the neutral axis zone, the global strength criteria of this transverse section is automatically satisfied and its checking is no more required.

”