RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

RULES

Part C Hull Construction and Equipment

2010 AMENDMENT NO.1

Rule No.24 15th April 2010

Resolved by Technical Committee on 5th February 2010

Approved by Board of Directors on 23rd February 2010

Rule No.24 15th April 2010
AMENDMENT TO THE RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

"Rules for the survey and construction of steel ships" has been partly amended as follows:

Part C HULL CONSTRUCTION AND EQUIPMENT

Chapter 1 GENERAL

1.2 Welding

Note of Table C1.5 has been amended as follow.

Notes:
1 Where longitudinal strength members are mutually connected by fillet welds, the fillet sizes are to be in accordance with **Table C1.4** and this Table, except that the total throat areas of fillet joints are not to be less than the minimum sectional area of the members.
2 Where the ends of frames, beam and stiffeners are directly fillet welded to deck, shell, inner bottom or bulkhead plates, the fillet sizes are not to be less than 0.7 times the web thickness of the members.
3 Where beams, frames, stiffeners and girders are intermittently welded to deck, shell, inner bottom plates and bulkhead plates, the fillet welds are to be partly continuous as shown in **Fig.C1.1**(a). Where the members are backed by other members at the opposite side as shown in **Fig.C1.1**(b) or (c), the fillet welds are to be continuous for a proper length at the ends of the members or at the toes of the brackets of the members. The fillet weld may be as shown in **Fig.C1.1**(d), where the whole lengths of the joints are welded with the effective fillet size not less than *F*2.
4 Where the rider plates or inner bottom plates consist of bed plates of the main engine seating or seatings of other important machinery, the kind of fillet is to be in accordance with the requirements for the type of seating.
5 For connections other than those specified in double bottoms with longitudinal framing, the requirements for transverse framing are to be applied.
6 In cases where the bulkheads of compartments intended to carry liquid cargoes are corrugated bulkheads, the welding of the corrugated bulkheads is to be in accordance with the requirements given in **14.4**. In cases where the bulkheads of compartments not intended to carry liquids cargo are corrugated bulkheads, the kind of fillet weld used for the corrugated bulkhead is to be in accordance with the requirements for bulkheads.

Chapter 14 DEEP TANKS

14.2 Deep Tank Bulkheads

14.2.4 Corrugated Bulkheads

Sub-paragraph -2 has been amended as follow.

2 The section modulus per half pitch of corrugated bulkheads is not to be less than that obtained from the following formula:

$7CShl^2$ (cm^3)

Where:

S: As specified in **13.2.4-2**

l: Length (*m*) between the supports, as indicated in **Fig C14.1**

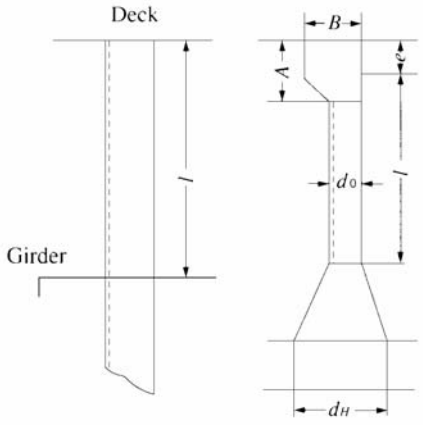
C: Coefficient given in **Table C14.3**, according to the type of end connection

h: As specified in **14.2.3**

For bulkheads with lower stools of which the width in the longitudinal direction at the lower end, d_H, is less than 2.5 times the web depth of the bulkhead, d_0 (*See* **Fig. C14.1**), the measurement of *l* and the values of *C* are to be at the discretion of the Society.

For vertically corrugated bulkheads, the section modulus per half pitch of the upper part of a corrugated bulkhead which is located above one third of the span measured between the upper deck and the supporting point may not be less than 75% of that obtained by the above formula.

Fig. C14.1 Measurement of *l*



$$e = A - \frac{d_0}{2B}A$$

Table C14.3 Values of *C*

Column	Lower end	Upper end		
		Supported by Girders	Welded directly to deck	Welded to stool efficiently supported by ship structure
(1)	Supported by girders or welded directly to decks or inner bottoms	1.00	1.50	1.35
(2)	Welded to stool efficiently supported by ship structure	1.50	1.20	1.00

Section 14.4 has been added as follow.

14.4 Welding of Corrugated Bulkheads

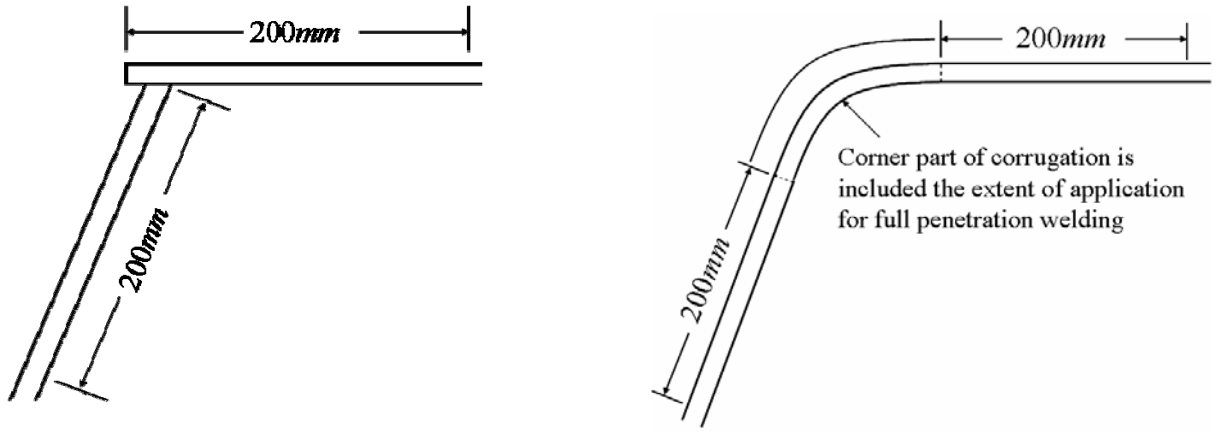
14.4.1 General

1 The welding of corrugated bulkheads is to be in accordance with **Table C 14.4**.

Table C14.4 Welding of Corrugated Bulkheads

Type of Corrugated bulkhead		Application	Welding
Vertically corrugated bulkhead	Without stool	Upper deck	Double continuous fillet welding with a fillet weld leg length that is not less than 0.7 times the thickness of the corrugated bulkhead.
		Inner bottom	(1) For ships having a length, L_1, of 150*m* and above · Full penetration double bevel welds (2) For ships having a length, L_1, that is less than 150*m* · Full penetration double bevel welds for webs and flanges of the corrugated bulkhead that are within about 200*mm* from the corner of the corrugation (see **Fig.C14.2**) · For other parts, double continuous fillet welding with a fillet weld leg length that is not less than 0.7 times the thickness of the corrugated bulkhead.
		Corrugated bulkhead	Full penetration double bevel welds
	Lower stool	Top plate	(1) For ships having a length, L_1, that is less than 150*m* · Full penetration double bevel welds (2) For ships having a length, L_1, that is less than 150*m* · Full penetration double bevel welds for webs and flanges of the corrugated bulkhead that are within about 200*mm* from the corner of the corrugation (see **Fig.C14.2**) · For other parts, double continuous fillet welding with a fillet weld leg length that is not less than 0.7 times the thickness of the corrugated bulkhead.
	Upper stool	Bottom plate	Double continuous fillet welding with fillet weld leg length that is not less than 0.7 times the thickness of the corrugated bulkhead.
Horizontally corrugated bulkhead		Upper deck, Inner bottom, Corrugated bulkhead	Double continuous fillet welding with a fillet weld leg length that is not less than 0.7 times the thickness of the corrugated bulkhead.

Fig. C14.2 Extent of about 200*mm* from the Corner of the Corrugation



(a) Welded type (b) Bent type

2 For the supporting members of corrugated bulkheads or stools, such as floors, girders or other primary supporting members and stiffeners, fillet weld leg length is to be suitably increased or to be bevelled and welded. In cases where the angle between the side plating of a lower stool and inner bottom plating is relative small, the fillet weld leg lengths for supporting members to inner bottom plating are to be suitably increased taking into account such an angle.

3 In cases where stools are fitted, the fillet weld leg length for the top or bottom plating of stools to the side plating of stools as well as the side plating of stools to inner bottom plating is to be suitably increased or to be bevelled and welded.

4 In cases where gusset plates and shedder plates are fitted at the lower parts of corrugated bulkheads, the welding is to be in accordance with the requirements given in **31A.3.5-5.(2)** and **-6.(5)**.

Chapter 23 BULWARKS, GUARDRAILS, FREEING ARRANGEMENTS, CARGO PORTS AND OTHER SIMILAR OPENINGS, SIDE SCUTTLES, RECTANGULAR WINDOWS, VENTILATORS AND GANGWAYS

23.6 Ventilators

Paragraph 23.6.5 has been amended as follows.

23.6.5 Closing Appliances

1 Ventilators to machinery and cargo spaces are to be provided with a means for closing the openings that is capable of being operated from outside the spaces in case of fire. Furthermore, these ventilators are to be provided with an indicator that enables confirmation whether the shutoff is open or closed from outside of the ventilator as well as suitable means of inspection for closing appliances.

2 All ventilator openings in exposed positions on the freeboard and superstructure decks are to be provided with efficient weathertight closing appliances. Where the height of the coaming of any ventilator exceeds 4.5*m* above the surface of the deck for the freeboard deck, raised quarter decks and superstructure decks for $0.25L_f$ forward or 2.3*m* for the other superstructure decks, such closing appliances may be omitted unless required in **-1**.

3 In ships not more than 100*m* in length for freeboard, the closing appliances mentioned in **-2** are to be permanently provided; where not so provided in other ships, they are to be conveniently stowed near the ventilators to which they are to be fitted.

EFFECTIVE DATE AND APPLICATION

1. The effective date of the amendments is 15 April 2010.

2. Notwithstanding the amendments to the Rules, the current requirements may apply to ships for which the date of contract for construction is before the effective date.

GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

GUIDANCE

Part C Hull Construction and Equipment

2010 AMENDMENT NO.1

Notice No.42 15th April 2010

Resolved by Technical Committee on 5th February 2010

Notice No.42 15th April 2010
AMENDMENT TO THE GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

"Guidance for the survey and construction of steel ships" has been partly amended as follows:

Part C HULL CONSTRUCTION AND EQUIPMENT

Amendment 1-1

C14 DEEP TANKS

C14.2 Deep Tank Bulkheads

Paragraph C14.2.4 has been amended as follow.

C14.2.4 Corrugated Bulkheads

1 ~~Construction under~~ Upper and lower structures supporting corrugated bulkheads
~~Solid floors are to be provided under the corrugated bulkhead or the structure under the corrugated bulkhead is to be reinforced by means of brackets, as shown in **Fig. C14.2.4-1**.~~

(1) In cases where stools are not fitted with corrugated bulkheads, the standard upper and lower structures supporting the corrugated bulkheads are to be in accordance with **Table C14.2.4-1**.

Table C14.2.4-1 Upper and lower structures supporting corrugated bulkheads

Type of corrugated bulkhead		Location	Supporting structure
Vertically corrugated bulkhead	Transverse	Lower	Floors with a thickness that is the same as that of the lower part of a corrugated bulkhead are to be arranged beneath both flanges of the corrugated bulkhead or a floor with a thickness that is the same as that of the lower part of a corrugated bulkhead is to be arranged beneath one flange of the corrugated bulkhead and a bracket with a web depth that is not less than 0.5 times the depth of the corrugation is to be arranged beneath the other side flange of the corrugated bulkhead. (See **Fig.C14.2.4-1.**)
	Longitudinal	Upper	An on-deck longitudinal girder or an on-deck longitudinal with a web thickness of not less than 80% of the thickness of the upper part of a corrugated bulkhead is to be arranged above both flanges of the corrugated bulkhead.
		Lower	Girders (center girders or side girders) with a thickness that is the same as that of the lower part of a corrugated bulkhead are to be arranged beneath both flanges of the corrugated bulkhead or a girder with a thickness that is the same as that of the lower part of a corrugated bulkhead is to be arranged beneath one flange of the corrugated bulkhead and an inner bottom longitudinal with a web depth that is not less than 0.5 times the depth of the corrugation or an equivalent stiffener is to be arranged beneath the other side flange of the corrugated bulkhead.
Horizontally corrugated bulkhead	Transverse	Lower	A floor with a thickness that is the same as that of the lower part of a corrugated bulkhead is to be arranged beneath the web of the corrugated bulkhead.
	Longitudinal	Upper	An on-deck longitudinal girder with a web thickness that is not less than 80% of the thickness of the upper part of a corrugated bulkhead is to be arranged above the web of the corrugated bulkhead.
		Lower	A girder (center girder or side girder) with a thickness that is the same as that of the lower part of a corrugated bulkhead is to be arranged beneath the web of the corrugated bulkhead.

(2) In cases where a stool is fitted with a corrugated bulkhead, the standard lower stool and structures supporting such a lower stool are to be in accordance with the following **(a)** and **(b)**:

(a) The thickness of the top plate and the uppermost part of the side plating of the lower stool is to be the same as that of the lower part of the corrugated bulkhead.

(b) At the bottom of a lower stool, floors in a double bottom are to be arranged beneath the side plating of the lower stools for transverse corrugated bulkheads and girders (center girders or side girders) are to be arranged beneath the side plating of the lower stools for longitudinal corrugated bulkheads. In addition, the thickness of the upper part of floors and girders are to be the same as that of the side plating of the lower stool.

(3) In cases **(1)** and **(2)** above, any openings such as slots or scallops providing penetration for stiffeners to a floor, web of transverses or girders are to be eliminated or covered by collar plates.

2 Section modulus of corrugated bulkheads

Where the width d_H in the direction of the ship's length of the lower stool of the corrugated bulkhead at the inner bottom is less than 2.5 *times* the web depth d_0 of the corrugated bulkhead, the span l between supports is to be measured as shown in **Fig. C14.2.4-2**. Further, the section modulus per half pitch of the corrugated bulkhead and the section modulus of the lower stool at the inner bottom are to be obtained from the formulae in **14.2.4-2, Part C of the Rules**, using the value of C

in **Table C14.2.4-1**.

3 Construction of corrugated bulkheads

The corrugation angle, ϕ, of a corrugated bulkhead is not to be less than 55 *degrees*. (See **Fig. C14.2.4-3.**)

4 In evaluating the corrugated bulkheads of compartments intended to carry liquid cargoes with specific gravity, ρ, more than 1.0, the scantlings of the corrugated bulkheads are to be calculated by multiplying *h* by ρ before using the formulae specified in **14.2.4-1.** to **-3, Part C of the Rules**.

Fig. C14.2.4-1 Example of structures supporting vertically corrugated bulkheads (Transverse bulkheads)

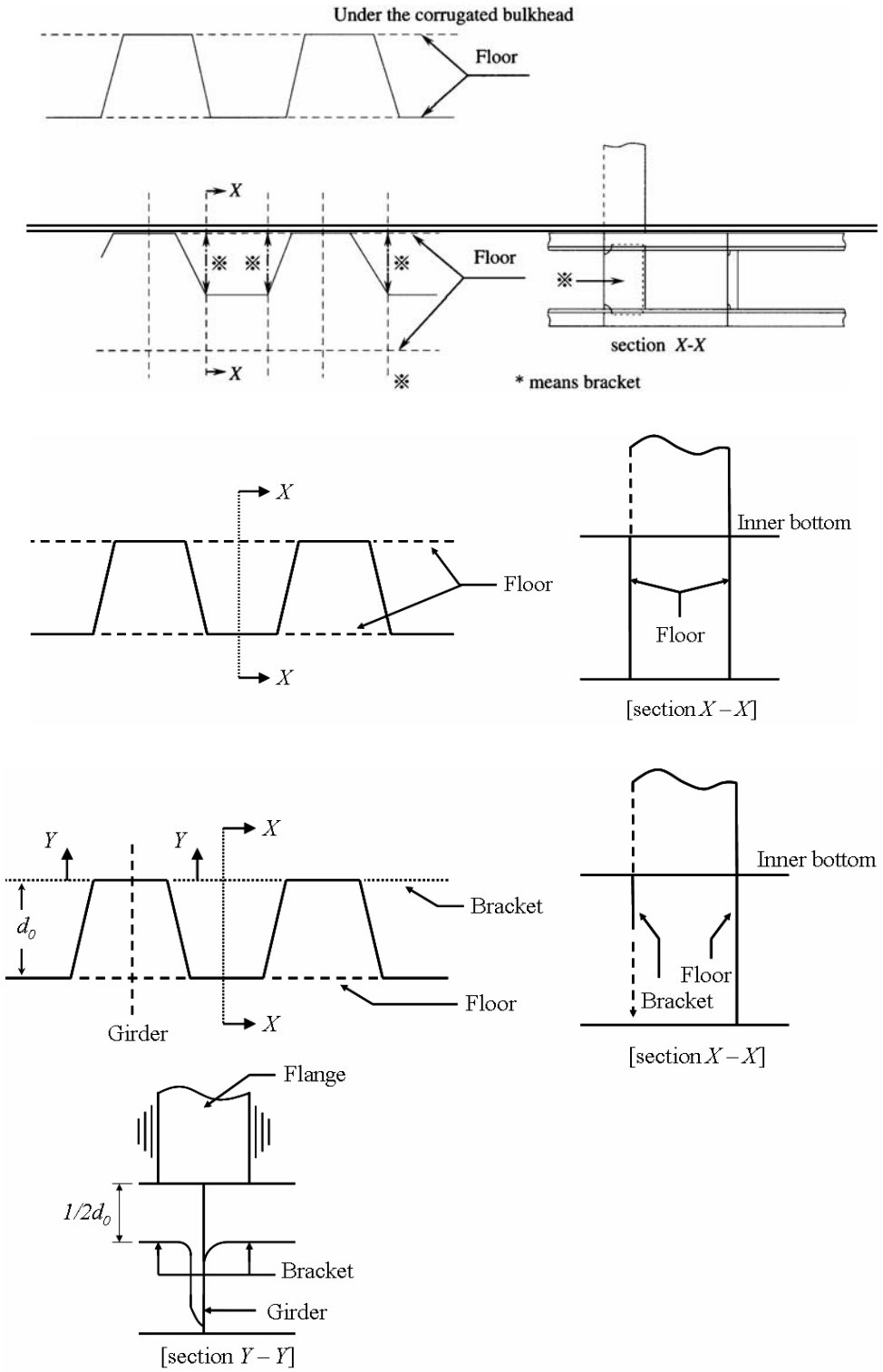


Fig. C14.2.4-2. Measurement of l where $d_H/d_0 < 2.5$

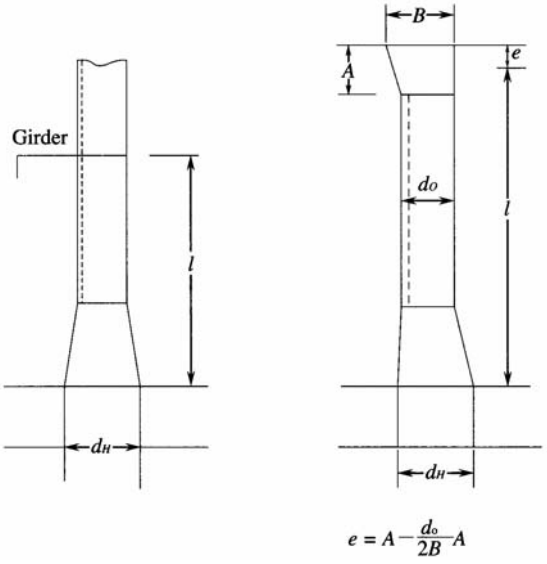


Fig. C14.2.4-3. Definition of the corrugation angle of a corrugated bulkhead

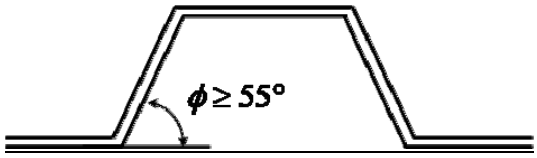


Table C14.2.4-~~1~~2 Coefficient C

Upper end support	Supported by girder	Connected to deck	Connected to stool
Section modulus of corrugated bulkhead	1.00	0.85	0.78
Section modulus of stool at bottom	1.00	1.50	1.35

C23 BULWARKS, GUARDRAILS, FREEING ARRANGEMENTS, CARGO PORTS AND OTHER SIMILAR OPENINGS, SIDE SCUTTLES, RECTANGULAR WINDOWS, VENTILATORS AND GANGWAYS

C23.6 Ventilator

Paragraph C23.6.5 has been amended as follows.

C23.6.5 Closing Appliances

1 Closing appliances required in **23.6.5, Part C of the Rules** are to be of steel or other equivalent materials. Furthermore, the closing appliances of the ventilators for machinery and cargo spaces required in **23.6.5-1, Part C of the Rules** are to be have inherent corrosion resistance properties or be provided with an adequate anticorrosion treatment.

2 With respect to the provisions of **23.6.5, Part C of the Rules**, mechanical ventilation systems are to be provided with warning plates stating that the closing appliances of mechanical ventilation systems are generally to be closed after the ventilation system has been shut off, unless reinforced.

3 With respect to the provisions of **23.6.5-1, Part C of the Rules**, in cases where internal checks of ventilators are impossible even if equipment installed on board is used, e.g. large ventilators that have cowls which cannot be easily removed easily or ventilators that have fans installed above, an inspection port at least 150*mm* in diameter is to be installed in the coaming of the ventilator. In addition, such inspection ports are to be provided with suitable covers so as not to spoil the water tightness/weather tightness and fire resistance required for the coaming of ventilators.

EFFECTIVE DATE AND APPLICATION (Amendment 1-1)

1. The effective date of the amendments is 15 April 2010.

2. Notwithstanding the amendments to the Guidance, the current requirements may apply to ships for which the date of contract for construction is before the effective date.

Amendment 1-2

Annex C35.2.4 GUIDANCE FOR DECISION OF ALTERNATIVE MEANS OF ACCESS

2.5 Rafting

2.5.2 Safety Routines

Sub-paragraph -1 has been amended as follows.

1 Safety measures, including the following, should be taken by an authorised person prior to survey to the satisfaction of the attending surveyor(s):

(1) The surface of the water in the tank should be calm (under all foreseeable conditions the expected rise of water within the tank should not exceed 0.25*m*) and the water level ~~either~~ stationary ~~or decreasing~~. On no account should the level of the water be rising while the boat or raft is in use.

(2) Except where permanent means of access is provided in each bay to allow safe entry and exit in accordance with **2.5.1-6**, at no time should the upside of the boat or raft be allowed to be within 1*m* of the deepest under deck web face flat.

(3) The tank or space in which the boat or raft will be used should contain clean ballast water only. When a thin sheen of oil on the water is observed, further testing of the atmosphere should be done to ensure that the tank or space is safe for entering.

(4) If the tanks (or spaces) are connected by a common venting system, or inert gas system, the tank in which the boat or raft will be used should be isolated to prevent a transfer of gas from other tanks (or spaces).

(5) Appropriate lifejackets should be available for all participants.

(6) The boat or raft should be tethered to the access ladder and an additional person should be stationed down the access ladder with a clear view of the boat or raft.

(7) A communication system should be arranged between the survey party in the tank or space being examined, the responsible officer on deck, the navigation bridge and the personnel in charge of handling the ballast pump(s) in the pump control room.

(8) Adequate and safe lighting should be provided for the safe and efficient conduct of the survey.

Appendix C3 SAMPLE OF SHIP STRUCTURAL ACCESS MANUAL

Ship Structure Access Manual

Part I Manual for Safe Access

5 Instructions

5.4 Instructions for Safety Rafting (if applicable)

Paragraph 5.4.2 has been amended as follows.

5.4.2 When rafts or boats will be used for close-up survey the following conditions should be observed:

(1) Only rough duty, inflatable rafts or boats, having satisfactory residual buoyancy and stability even if one chamber is ruptured, should be used.

(2) The boat or raft should be tethered to the access ladder and an additional person should be stationed down the access ladder with a clear view of the boat or raft.

(3) Appropriate lifejackets should be available for all participants.

(4) The surface of the water in the tank should be calm (under all foreseeable conditions the expected rise of water within the tank should not exceed 0.25*m*) and the water level ~~either~~ stationary ~~or falling~~. On no account should the level of the water be rising while the boat or raft is in use.

(5) The tank or space must contain clean ballast water only. When a thin sheen of oil on the water is observed, further testing of the atmosphere should be done to ensure that the tank or space is safe for entering.

(6) For rafting of cargo tanks, at no time should the upside of the boat or raft be allowed to be within 1*m* of the deepest under deck web face flat so that the survey team is not isolated from a direct escape route to the tank hatch. Filling to levels above the deck transverses should only be contemplated if a permanent means of access, as per paragraph 5.4.3.2, below, is provided. For bulk cargo holds designed to be filled with water (*e.g.* ballast holds) and where the water is permitted to be filled up to a height not less than 2*m* below the top of side frames (*e.g.* air draft holds), rafting may be utilized in lieu of permanent means of access to side frames (ref. TP Table 2 - 1.8) provided the structural capacity of the hold is sufficient to withstand static loads at all levels of water needed to survey the side shell frames

(7) If the tanks (or spaces) are connected by a common venting system, or inert gas system, the tank in which the boat or raft is to be used should be isolated to prevent a transfer of gas from other tanks (or spaces).

EFFECTIVE DATE AND APPLICATION (Amendment 1-2)

1. The effective date of the amendments is 1 July 2010.