



**CỤC ĐĂNG KIỂM VIỆT NAM - VIETNAM REGISTER**  
**PHÒNG TÀU BIỂN**

SEA-GOING SHIP CLASSIFICATION AND REGISTRY DEPARTMENT

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**THÔNG BÁO KỸ THUẬT- TECHNICAL INFORMATION**

**Ngày: 03/08/2007**

**Số thông báo: 028KT/07TB**

*Nội dung: Bảo vệ két dầu nhiên liệu của tàu theo Quy định 12A, Phụ lục I của Công ước MARPOL 73/78.*

**Kính gửi: Các Chủ tàu/ Công ty quản lý tàu chạy tuyến quốc tế**

**Các Đơn vị thiết kế tàu biển**

**Các Nhà máy đóng tàu**

**Các Chi cục Đăng kiểm tàu biển**

Tại Khoá họp thứ 54 (tháng 03 năm 2006), Ủy ban Bảo vệ môi trường biển (MEPC) của Tổ chức Hàng hải quốc tế (IMO) đã thông qua Nghị quyết MEPC.141(54) sửa đổi, bổ sung Công ước quốc tế về ngăn ngừa ô nhiễm do tàu gây ra (MARPOL 73/78). Nghị quyết MEPC.141(54), có hiệu lực áp dụng từ ngày 01 tháng 08 năm 2007, đưa ra các yêu cầu về bảo vệ két dầu nhiên liệu của các tàu mới có chứa tổng cộng từ 600 m<sup>3</sup> dầu nhiên liệu trở lên tại Quy định 12A, Phụ lục I của Công ước MARPOL 73/78.

Liên quan đến vấn đề nêu trên, chúng tôi xin gửi đến các Quý Cơ quan, kèm theo Thông báo kỹ thuật này, bản sao Nghị quyết MEPC.141(54) với một số lưu ý như sau:

**1. Phạm vi áp dụng**

Mỗi két dầu nhiên liệu (là dầu được sử dụng cho động lực đẩy tàu và các máy phụ của tàu) có thể tích lớn hơn 30 m<sup>3</sup>, ngoại trừ két không thường xuyên chứa dầu nhiên liệu như két tràn, lắp đặt trên các tàu mới có chứa tổng cộng từ 600 m<sup>3</sup> dầu nhiên liệu trở lên phải áp dụng các yêu cầu về bảo vệ của Quy định 12A.

Tàu mới được định nghĩa như sau:

- .1 Là tàu có hợp đồng đóng mới vào hoặc sau ngày 01 tháng 08 năm 2007; hoặc:
- .2 Nếu không có hợp đồng đóng mới, tàu được đặt sống chính hoặc ở giai đoạn đóng mới tương đương vào hoặc sau ngày 01 tháng 02 năm 2008; hoặc:
- .3 Tàu được bàn giao vào hoặc sau ngày 01 tháng 08 năm 2010; hoặc:

- .4 Tàu được hoán cải lớn:
  - .1 Có hợp đồng hoán cải sau ngày 01 tháng 08 năm 2007; hoặc:
  - .2 Nếu không có hợp đồng hoán cải, công việc hoán cải của tàu được bắt đầu sau ngày 01 tháng 02 năm 2008; hoặc:
  - .3 Công việc hoán cải của tàu được hoàn thành sau ngày 01 tháng 08 năm 2010.

## **2. Tóm tắt các yêu cầu của Quy định 12A**

Quy định 12A đưa ra các yêu cầu về bảo vệ két dầu như sau:

- .1 Giới hạn thể tích của két dầu nhiên liệu không quá 2500 m<sup>3</sup>;
- .2 Hệ thống đường ống trong các két dầu liên quan phải được bố trí ở trên khoảng cách chỉ ra dưới đây, ngoài trừ trường hợp chúng được trang bị các van cách ly điều khiển từ xa tại vị trí đi vào két.
- .3 Có hai biện pháp lựa chọn, đó là biện pháp mệnh lệnh (prescriptive) và biện pháp quyết định (deterministic), để xác định phạm vi bảo vệ các két dầu nhiên liệu.

## **3. Biện pháp mệnh lệnh (áp dụng phương pháp bảo vệ hai vỏ)**

Két dầu phải được bảo vệ bằng đáy đôi với chiều cao không nhỏ hơn B/20 (trị số nhỏ nhất là 760 mm) hoặc 2 m, lấy trị số nào nhỏ hơn, và két mạn thoả mãn yêu cầu sau:

- .1 Đối với tàu có chứa tổng cộng dưới 5000 m<sup>3</sup> dầu nhiên liệu:  
Chiều rộng tối thiểu là  $0,4 + 2,4C/20000$  m, với trị số nhỏ nhất là 1,0 m. Tuy nhiên, đối với két có thể tích nhỏ hơn 500 m<sup>3</sup>, trị số nhỏ nhất là 760 mm.
- .2 Đối với tàu có chứa tổng cộng từ 5000 m<sup>3</sup> dầu nhiên liệu trở lên:  
Chiều rộng tối thiểu là  $0,5 + C/20000$  m, với trị số nhỏ nhất là 1,0 m, hoặc 2 m, lấy trị số nào nhỏ hơn.  
C là thể tích tổng cộng (98% thể tích két chứa) của toàn bộ dầu nhiên liệu trên tàu.

## **4. Biện pháp quyết định (đánh giá tràn dầu)**

Đối với các kiểu tàu, chẳng hạn như tàu chở container, nếu việc bố trí đáy đôi để bảo vệ két dầu không thể thực hiện được, Quy định 12A cho phép áp dụng biện pháp đánh giá tràn dầu dựa trên việc áp dụng phương pháp xác suất và các hàm mật độ hư hỏng phù hợp với việc bố trí thực tế của các két dầu.

Thông báo kỹ thuật này được nêu trong mục: *Thông báo của VR/ Thông báo kỹ thuật TB* của trang tin điện tử của Cục Đăng kiểm Việt Nam: <http://www.vr.org.vn>

Nếu Quý cơ quan cần thêm thông tin về vấn đề nêu trên, đề nghị vui lòng liên hệ:

*Cục Đăng kiểm Việt Nam, Phòng Tàu biển*

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Xin gửi đến các Quý Cơ quan lời chào trân trọng.

TRƯỞNG PHÒNG TÀU BIỂN

Nơi nhận:

-Như trên

-QP, VRQC, CTB, MT

-Lưu TB

**Nguyễn Vũ Hải**

**ANNEX 2**

**RESOLUTION MEPC.141(54)**

**Adopted on 24 March 2006**

**AMENDMENTS TO THE ANNEX OF THE PROTOCOL OF 1978 RELATING TO  
THE INTERNATIONAL CONVENTION FOR THE PREVENTION OF  
POLLUTION FROM SHIPS, 1973**

**(Amendments to regulation 1, addition to regulation 12A, consequential amendments  
to the IOPP Certificate and amendments to regulation 21 of the revised  
Annex I of MARPOL 73/78)**

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee (the Committee) conferred upon it by international conventions for the prevention and control of marine pollution,

NOTING article 16 of the International Convention for the Prevention of Pollution from Ships, 1973 (hereinafter referred to as the "1973 Convention") and article VI of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973 (hereinafter referred to as the "1978 Protocol") which together specify the amendment procedure of the 1978 Protocol and confer upon the appropriate body of the Organization the function of considering and adopting amendments to the 1973 Convention, as modified by the 1978 Protocol (MARPOL 73/78),

NOTING ALSO that the revised Annex I to MARPOL 73/78 was adopted by resolution MEPC.117(52) and is expected to enter into force on 1 January 2007,

HAVING CONSIDERED proposed amendments to regulation 1, proposed new regulation 12A, consequential amendments to the Supplement (Forms A and B) of the IOPP Certificate, and proposed amendments to regulation 21 of the revised Annex I to MARPOL 73/78,

1. ADOPTS, in accordance with article 16(2)(d) of the 1973 Convention, the amendments to the revised Annex I of MARPOL 73/78, the text of which is set out at Annex to the present resolution;
2. DETERMINES, in accordance with article 16(2)(f)(iii) of the 1973 Convention, that the amendments shall be deemed to have been accepted on 1 February 2007, unless prior to that date, not less than one-third of the Parties or Parties the combined merchant fleets of which constitute not less than 50 per cent of the gross tonnage of the world's merchant fleet, have communicated to the Organization their objection to the amendments;
3. INVITES the Parties to note that, in accordance with article 16(2)(g)(ii) of the 1973 Convention, the said amendments shall enter into force on 1 August 2007 upon their acceptance in accordance with paragraph 2 above;

4. REQUESTS the Secretary-General, in conformity with article 16(2)(e) of the 1973 Convention, to transmit to all Parties to MARPOL 73/78 certified copies of the present resolution and the text of the amendments contained in the Annex; and

5. REQUESTS FURTHER the Secretary-General to transmit to the Members of the Organization which are not Parties to MARPOL 73/78 copies of the present resolution and its Annex.

ANNEX

**AMENDMENTS TO THE REVISED MARPOL ANNEX I**

**1 Addition of paragraph 28.9 to regulation 1**

The following new paragraph 28.9 is added after the existing paragraph 28.8 of regulation 1:

- “28.9 ship delivered on or after 1 August 2010 means a ship:
- .1 for which the building contract is placed on or after 1 August 2007; or
  - .2 in the absence of a building contract, the keels of which are laid or which are at a similar stage of construction on or after 1 February 2008; or
  - .3 the delivery of which is on or after 1 August 2010; or
  - .4 which have undergone a major conversion:
    - .1 for which the contract is placed after 1 August 2007; or
    - .2 in the absence of contract, the construction work of which is begun after 1 February 2008; or
    - .3 which is completed after 1 August 2010.”

**2 Addition of new regulation 12A on oil fuel tank protection**

*The following new regulation 12A is added after the existing regulation 12:*

**“Regulation 12A – Oil fuel tank protection**

- 1 This regulation shall apply to all ships with an aggregate oil fuel capacity of 600 m<sup>3</sup> and above which are delivered on or after 1 August 2010, as defined in regulation 1.28.9 of this Annex.
- 2 The application of this regulation in determining the location of tanks used to carry oil fuel does not govern over the provisions of regulation 19 of this Annex.
- 3 For the purpose of this regulation, the following definitions shall apply:
  - .1 “Oil fuel” means any oil used as fuel oil in connection with the propulsion and auxiliary machinery of the ship in which such oil is carried.
  - .2 “Load line draught (d<sub>s</sub>)” is the vertical distance, in metres, from the moulded baseline at mid-length to the waterline corresponding to the summer freeboard draught to be assigned to the ship.

- .3 “Light ship draught” is the moulded draught amidships corresponding to the lightweight.
  - .4 “Partial load line draught ( $d_p$ )” is the light ship draught plus 60% of the difference between the light ship draught and the load line draught  $d_s$ . The partial load line draught ( $d_p$ ) shall be measured in metres.
  - .5 “Waterline ( $d_B$ )” is the vertical distance, in metres, from the moulded baseline at mid-length to the waterline corresponding to 30% of the depth  $D_s$ .
  - .6 “Breadth ( $B_s$ )” is the greatest moulded breadth of the ship, in metres, at or below the deepest load line draught ( $d_s$ ).
  - .7 “Breadth ( $B_B$ )” is the greatest moulded breadth of the ship, in metres, at or below the waterline ( $d_B$ ).
  - .8 “Depth ( $D_s$ )” is the moulded depth, in metres, measured at mid-length to the upper deck at side. For the purpose of the application, “upper deck” means the highest deck to which the watertight transverse bulkheads except aft peak bulkheads extend.
  - .9 “Length ( $L$ )” means 96% of the total length on a waterline at 85% of the least moulded depth measured from the top of the keel, or the length from the foreside of the stem to the axis of the rudder stock on that waterline, if that be greater. In ships designed with a rake of keel the waterline on which this length is measured shall be parallel to the designed waterline. The length ( $L$ ) shall be measured in metres.
  - .10 “Breadth ( $B$ )” means the maximum breadth of the ship, in metres, measured amidships to the moulded line of the frame in a ship with a metal shell and to the outer surface of the hull in a ship with a shell of any other material.
  - .11 “Oil fuel tank” means a tank in which oil fuel is carried, but excludes those tanks which would not contain oil fuel in normal operation, such as overflow tanks.
  - .12 “Small oil fuel tank” is an oil fuel tank with a maximum individual capacity not greater than 30 m<sup>3</sup>.
  - .13 “C” is the ship’s total volume of oil fuel, including that of the small oil fuel tanks, in m<sup>3</sup>, at 98% tank filling.
  - .14 “Oil fuel capacity” means the volume of a tank in m<sup>3</sup>, at 98% filling.
- 4 The provisions of this regulation shall apply to all oil fuel tanks except small oil fuel tanks, as defined in 3.12, provided that the aggregate capacity of such excluded tanks is not greater than 600 m<sup>3</sup>.
- 5 Individual oil fuel tanks shall not have a capacity of over 2,500 m<sup>3</sup>.

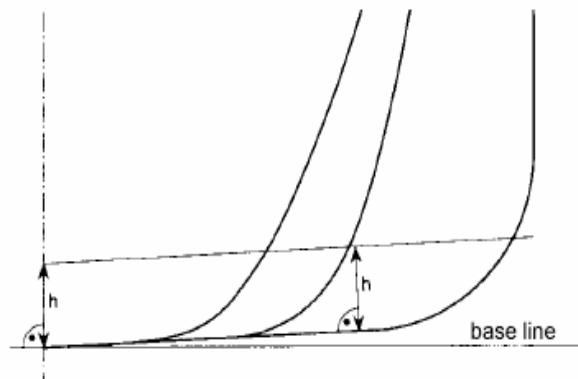
6 For ships, other than self-elevating drilling units, having an aggregate oil fuel capacity of  $600 \text{ m}^3$  and above, oil fuel tanks shall be located above the moulded line of the bottom shell plating nowhere less than the distance  $h$  as specified below:

$$h = B/20 \text{ m or,}$$

$$h = 2.0 \text{ m, whichever is the lesser.}$$

The minimum value of  $h = 0.76 \text{ m}$

In the turn of the bilge area and at locations without a clearly defined turn of the bilge, the oil fuel tank boundary line shall run parallel to the line of the midship flat bottom as shown in Figure 1.



**Figure 1 – Oil fuel tank boundary lines for the purpose of paragraph 6**

7 For ships having an aggregate oil fuel capacity of  $600 \text{ m}^3$  or more but less than  $5,000 \text{ m}^3$ , oil fuel tanks shall be located inboard of the moulded line of the side shell plating, nowhere less than the distance  $w$  which, as shown in Figure 2, is measured at any cross-section at right angles to the side shell, as specified below:

$$w = 0.4 + 2.4 C/20,000 \text{ m}$$

The minimum value of  $w = 1.0 \text{ m}$ , however for individual tanks with an oil fuel capacity of less than  $500 \text{ m}^3$  the minimum value is  $0.76 \text{ m}$ .

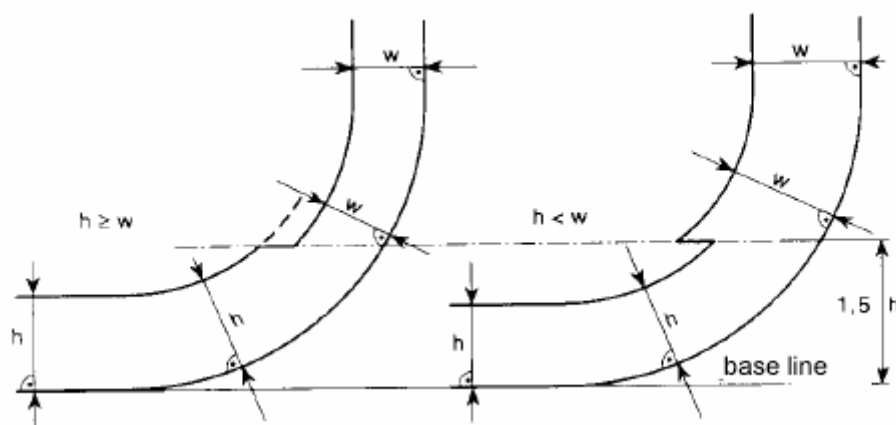
8 For ships having an aggregate oil fuel capacity of  $5,000 \text{ m}^3$  and over, oil fuel tanks shall be located inboard of the moulded line of the side shell plating, nowhere less than the distance  $w$  which, as shown in Figure 2, is measured at any cross-section at right angles to the side shell, as specified below:

$$w = 0.5 + C/20,000 \text{ m or}$$

$$w = 2.0 \text{ m, whichever is the lesser.}$$

The minimum value of  $w = 1.0 \text{ m}$





**Figure 2 – Oil fuel tank boundary lines for the purpose of paragraphs 7 and 8**

9 Lines of oil fuel piping located at a distance from the ship's bottom of less than  $h$ , as defined in paragraph 6, or from the ship's side less than  $w$ , as defined in paragraphs 7 and 8 shall be fitted with valves or similar closing devices within or immediately adjacent to the oil fuel tank. These valves shall be capable of being brought into operation from a readily accessible enclosed space the location of which is accessible from the navigation bridge or propulsion machinery control position without traversing exposed freeboard or superstructure decks. The valves shall close in case of remote control system failure (fail in a closed position) and shall be kept closed at sea at any time when the tank contains oil fuel except that they may be opened during oil fuel transfer operations.

10 Suction wells in oil fuel tanks may protrude into the double bottom below the boundary line defined by the distance  $h$  provided that such wells are as small as practicable and the distance between the well bottom and the bottom shell plating is not less than  $0.5 h$ .

11 Alternatively to paragraphs 6 and either 7 or 8, ships shall comply with the accidental oil fuel outflow performance standard specified below:

- .1 The level of protection against oil fuel pollution in the event of collision or grounding shall be assessed on the basis of the mean oil outflow parameter as follows:

$$O_M < 0.0157 - 1.14E-6 \cdot C \quad 600 \text{ m}^3 \leq C < 5,000 \text{ m}^3$$

$$O_M < 0.010 \quad C \geq 5,000 \text{ m}^3$$

Where  $O_M$  = mean oil outflow parameter;  
 $C$  = total oil fuel volume.

- .2 The following general assumption shall apply when calculating the mean oil outflow parameter:
  - .1 the ship shall be assumed loaded to the partial load line draught  $d_p$  without trim or heel;

- .2 all oil fuel tanks shall be assumed loaded to 98% of their volumetric capacity;
- .3 the nominal density of the oil fuel ( $\rho_n$ ) shall generally be taken as 1,000 kg/m<sup>3</sup>. If the density of the oil fuel is specifically restricted to a lesser value, the lesser value may be applied; and
- .4 for the purpose of these outflow calculations, the permeability of each oil fuel tank shall be taken as 0.99, unless proven otherwise.
- .3 The following assumptions shall be used when combining the oil outflow parameters:

- .1 The mean oil outflow shall be calculated independently for side damage and for bottom damage and then combined into a non-dimensional oil outflow parameter  $O_M$ , as follows:

$$O_M = (0.4 O_{MS} + 0.6 O_{MB}) / C$$

where:

$$\begin{aligned} O_{MS} &= \text{mean outflow for side damage, in m}^3 \\ O_{MB} &= \text{mean outflow for bottom damage, in m}^3 \\ C &= \text{total oil fuel volume.} \end{aligned}$$

- .2 For bottom damage, independent calculations for mean outflow shall be done for 0 m and 2.5 m tide conditions, and then combined as follows:

$$O_{MB} = 0.7 O_{MB(0)} + 0.3 O_{MB(2.5)}$$

where:

$$\begin{aligned} O_{MB(0)} &= \text{mean outflow for 0 m tide condition, and} \\ O_{MB(2.5)} &= \text{mean outflow for minus 2.5 m tide condition, in m}^3. \end{aligned}$$

- .4 The mean outflow for side damage  $O_{MS}$  shall be calculated as follows:

$$O_{MS} = \sum_1^n P_{S(i)} O_{S(i)} \quad [\text{m}^3]$$

where:

$$\begin{aligned} i &= \text{represents each oil fuel tank under consideration;} \\ n &= \text{total number of oil fuel tanks;} \\ P_{S(i)} &= \text{the probability of penetrating oil fuel tank } i \text{ from side damage,} \\ &\quad \text{calculated in accordance with paragraph 11.6 of this regulation;} \\ O_{S(i)} &= \text{the outflow, in m}^3, \text{ from side damage to oil fuel tank } i, \text{ which is} \\ &\quad \text{assumed equal to the total volume in oil fuel tank } i \text{ at 98\%} \\ &\quad \text{filling.} \end{aligned}$$

- .5 The mean outflow for bottom damage shall be calculated for each tidal condition as follows:

$$.1 \quad O_{MB(0)} = \sum_1^n P_{B(i)} O_{B(i)} C_{DB(i)} \text{ [m}^3\text{]}$$

where:

- $i$  = represents each oil fuel tank under consideration;
- $n$  = total number of oil fuel tanks;
- $P_{B(i)}$  = the probability of penetrating oil fuel tank  $i$  from bottom damage, calculated in accordance with paragraph 11.7 of this regulation;
- $O_{B(i)}$  = the outflow from oil fuel tank  $i$ , in  $\text{m}^3$ , calculated in accordance with paragraph 11.5.3 of this regulation; and
- $C_{DB(i)}$  = factor to account for oil capture as defined in paragraph 11.5.4.

$$.2 \quad O_{MB(2.5)} = \sum_1^n P_{B(i)} O_{B(i)} C_{DB(i)} \text{ [m}^3\text{]}$$

where:

- $i$ ,  $n$ ,  $P_{B(i)}$  and  $C_{DB(i)}$  = as defined in subparagraph .1 above
- $O_{B(i)}$  = the outflow from oil fuel tank  $i$ , in  $\text{m}^3$ , after tidal change.

.3 The oil outflow  $O_{B(i)}$  for each oil fuel tank shall be calculated based on pressure balance principles, in accordance with the following assumptions:

- .1 The ship shall be assumed stranded with zero trim and heel, with the stranded draught prior to tidal change equal to the partial load line draught  $d_p$ .
- .2 The oil fuel level after damage shall be calculated as follows:

$$h_F = \{(d_p + t_C - Z_l)(\rho_S)\} / \rho_n$$

- where:  $h_F$  = the height of the oil fuel surface above  $Z_l$ , in m;
- $t_C$  = the tidal change, in m. Reductions in tide shall be expressed as negative values;
- $Z_l$  = the height of the lowest point in the oil fuel tank above the baseline, in m;
- $\rho_S$  = density of seawater, to be taken as  $1,025 \text{ kg/m}^3$ ; and,
- $\rho_n$  = nominal density of the oil fuel, as defined in 11.2.3.

.3 The oil outflow  $O_{B(i)}$  for any tank bounding the bottom shell plating shall be taken not less than the following formula, but no more than the tank capacity:

$$O_{B(i)} = H_W \cdot A$$

where:

$$H_W = 1.0 \text{ m, when } Y_B = 0$$

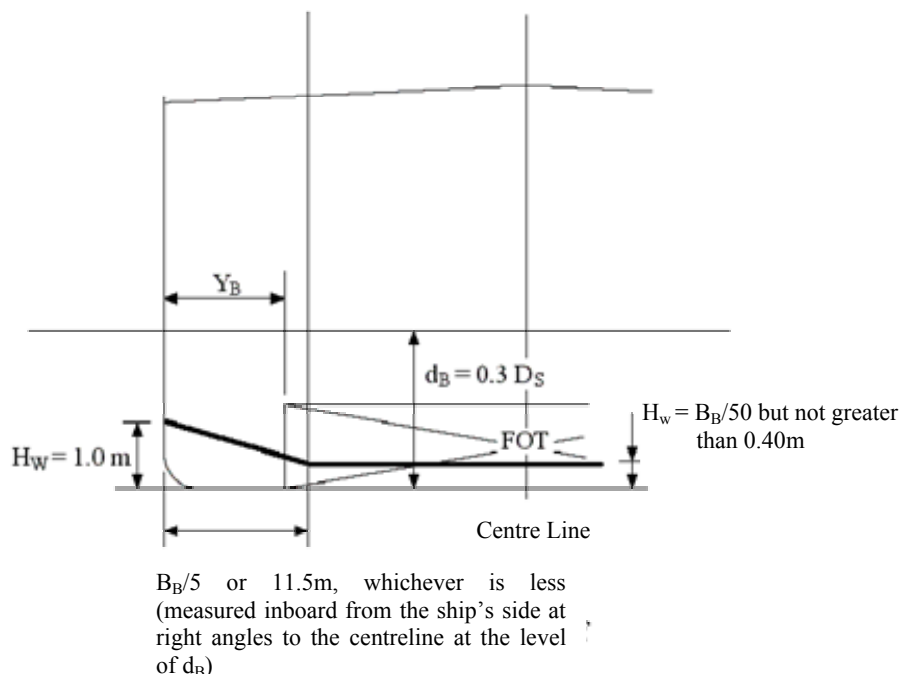
$$H_W = B_B/50 \text{ but not greater than } 0.4 \text{ m, when } Y_B \text{ is greater than } B_B/5 \text{ or } 11.5 \text{ m, whichever is less}$$

“ $H_W$ ” is to be measured upwards from the midship flat bottom line. In the turn of the bilge area and at locations without a clearly defined turn of the bilge,  $H_W$  is to be measured from a line parallel to the midship flat bottom, as shown for distance “ $h$ ” in Figure 1.

For  $Y_B$  values outboard  $B_B/5$  or 11.5 m, whichever is less,  $H_W$  is to be linearly interpolated.

$Y_B$  = the minimum value of  $Y_B$  over the length of the oil fuel tank, where at any given location,  $Y_B$  is the transverse distance between the side shell at waterline  $d_B$  and the tank at or below waterline  $d_B$ .

$A$  = the maximum horizontal projected area of the oil fuel tank up to the level of  $H_W$  from the bottom of the tank.



**Figure 3 – Dimensions for calculation of the minimum oil outflow for the purpose of subparagraph 11.5.3.3**

- .4 In the case of bottom damage, a portion from the outflow from an oil fuel tank may be captured by non-oil compartments. This effect is approximated by application of the factor  $C_{DB(i)}$  for each tank, which shall be taken as follows:

$C_{DB(i)} = 0.6$  for oil fuel tanks bounded from below by non-oil compartments;

$C_{DB(i)} = 1$  otherwise.

- .6 The probability  $P_S$  of breaching a compartment from side damage shall be calculated as follows:

.1  $P_S = P_{SL} \cdot P_{SV} \cdot P_{ST}$

where:  $P_{SL} = (1 - P_{Sf} - P_{Sa})$  = probability the damage will extend into the longitudinal zone bounded by  $X_a$  and  $X_f$ ;

$P_{SV} = (1 - P_{Su} - P_{Sl})$  = probability the damage will extend into the vertical zone bounded by  $Z_l$  and  $Z_u$ ;

$P_{ST} = (1 - P_{Sy})$  = probability the damage will extend transversely beyond the boundary defined by  $y$ ;

- .2  $P_{Sa}$ ,  $P_{Sf}$ ,  $P_{Su}$  and  $P_{Sl}$  shall be determined by linear interpolation from the table of probabilities for side damage provided in 11.6.3, and  $P_{Sy}$  shall be calculated from the formulas provided in 11.6.3, where:

$P_{Sa}$  = the probability the damage will lie entirely aft of location  $X_a/L$ ;

$P_{Sf}$  = the probability the damage will lie entirely forward of location  $X_f/L$ ;

$P_{Sl}$  = probability the damage will lie entirely below the tank;

$P_{Su}$  = probability the damage will lie entirely above the tank; and

$P_{Sy}$  = probability the damage will lie entirely outboard the tank.

Compartment boundaries  $X_a$ ,  $X_f$ ,  $Z_l$ ,  $Z_u$  and  $y$  shall be developed as follows:

$X_a$  = the longitudinal distance from aft terminal of  $L$  to the aft most point on the compartment being considered, in m;

$X_f$  = the longitudinal distance from aft terminal of  $L$  to the foremost point on the compartment being considered, in m;

$Z_l$  = the vertical distance from the moulded baseline to the lowest point on the compartment being considered, in m. Where  $Z_l$  is greater than  $D_S$ ,  $Z_l$  shall be taken as  $D_S$ ;

$Z_u$  = the vertical distance from the moulded baseline to the highest point on the compartment being considered, in m. Where  $Z_u$  is greater than  $D_S$ ,  $Z_u$  shall be taken as  $D_S$ ; and,

$y$  = the minimum horizontal distance measured at right angles to the centreline between the compartment under consideration and the side shell, in m<sup>1</sup>.

In way of the turn of the bilge,  $y$  need not to be considered below a distance  $h$  above baseline, where  $h$  is lesser of  $B/10$ , 3 m or the top of the tank.

### .3 Table of Probabilities for side damage

$X_a/L$	$P_{Sa}$	$X_r/L$	$P_{Sr}$	$Z_l/D_S$	$P_{Sl}$	$Z_u/D_S$	$P_{Su}$
0,00	0,000	0,00	0,967	0,00	0,000	0,00	0,968
0,05	0,023	0,05	0,917	0,05	0,000	0,05	0,952
0,10	0,068	0,10	0,867	0,10	0,001	0,10	0,931
0,15	0,117	0,15	0,817	0,15	0,003	0,15	0,905
0,20	0,167	0,20	0,767	0,20	0,007	0,20	0,873
0,25	0,217	0,25	0,717	0,25	0,013	0,25	0,836
0,30	0,267	0,30	0,667	0,30	0,021	0,30	0,789
0,35	0,317	0,35	0,617	0,35	0,034	0,35	0,733
0,40	0,367	0,40	0,567	0,40	0,055	0,40	0,670
0,45	0,417	0,45	0,517	0,45	0,085	0,45	0,599
0,50	0,467	0,50	0,467	0,50	0,123	0,50	0,525
0,55	0,517	0,55	0,417	0,55	0,172	0,55	0,452
0,60	0,567	0,60	0,367	0,60	0,226	0,60	0,383
0,65	0,617	0,65	0,317	0,65	0,285	0,65	0,317
0,70	0,667	0,70	0,267	0,70	0,347	0,70	0,255
0,75	0,717	0,75	0,217	0,75	0,413	0,75	0,197
0,80	0,767	0,80	0,167	0,80	0,482	0,80	0,143
0,85	0,817	0,85	0,117	0,85	0,553	0,85	0,092
0,90	0,867	0,90	0,068	0,90	0,626	0,90	0,046
0,95	0,917	0,95	0,023	0,95	0,700	0,95	0,013
1,00	0,967	1,00	0,000	1,00	0,775	1,00	0,000

$P_{Sy}$  shall be calculated as follows:

$$\begin{aligned}
 P_{Sy} &= (24.96 - 199.6 y/B_S) (y/B_S) && \text{for } y/B_S \leq 0.05 \\
 P_{Sy} &= 0.749 + \{5 - 44.4 (y/B_S - 0.05)\} \{(y/B_S) - 0.05\} && \text{for } 0.05 < y/B_S < 0.1 \\
 P_{Sy} &= 0.888 + 0.56 (y/B_S - 0.1) && \text{for } y/B_S \geq 0.1
 \end{aligned}$$

$P_{Sy}$  is not to be taken greater than 1.

.7 The probability  $P_B$  of breaching a compartment from bottom damage shall be calculated as follows:

<sup>1</sup> For symmetrical tank arrangements, damages are considered for one side of the ship only, in which case all “ $y$ ” dimensions are to be measured from that side. For asymmetrical arrangements reference is made to the Explanatory Notes on matters related to the accidental oil outflow performance, adopted by the Organization by resolution MEPC.122(52).

.1  $P_B = P_{BL} \cdot P_{BT} \cdot P_{BV}$

where:  $P_{BL} = (1 - P_{Bf} - P_{Ba})$  = probability the damage will extend into the longitudinal zone bounded by  $X_a$  and  $X_f$ ;

$P_{BT} = (1 - P_{Bp} - P_{Bs})$  = probability the damage will extend into transverse zone bounded by  $Y_p$  and  $Y_s$ ; and

$P_{BV} = (1 - P_{Bz})$  = probability the damage will extend vertically above the boundary defined by  $z$ ;

.2  $P_{Ba}$ ,  $P_{Bf}$ ,  $P_{Bp}$  and  $P_{Bs}$  shall be determined by linear interpolation from the table of probabilities for bottom damage provided in 11.7.3, and  $P_{Bz}$  shall be calculated from the formulas provided in 11.7.3, where:

$P_{Ba}$  = the probability the damage will lie entirely aft of location  $X_a/L$ ;

$P_{Bf}$  = the probability the damage will lie entirely forward of location  $X_f/L$ ;

$P_{Bp}$  = probability the damage will lie entirely to port of the tank;

$P_{Bs}$  = probability the damage will lie entirely to starboard the tank; and

$P_{Bz}$  = probability the damage will lie entirely below the tank.

Compartment boundaries  $X_a$ ,  $X_f$ ,  $Y_p$ ,  $Y_s$  and  $z$  shall be developed as follows:

$X_a$  and  $X_f$  as defined in 11.6.2;

$Y_p$  = the transverse distance from the port-most point on the compartment located at or below the waterline  $d_B$ , to a vertical plane located  $B_B/2$  to starboard of the ship's centreline;

$Y_s$  = the transverse distance from the starboard-most point on the compartment located at or below the waterline  $d_B$ , to a vertical plane located  $B_B/2$  to starboard of the ship's centreline; and

$z$  = the minimum value of  $z$  over the length of the compartment, where, at any given longitudinal location,  $z$  is the vertical distance from the lower point of the bottom shell at that longitudinal location to the lower point of the compartment at that longitudinal location.

.3 Table of probabilities for bottom damage

$X_a/L$	$P_{Ba}$	$X_f/L$	$P_{Bf}$	$Y_p/B_B$	$P_{Bp}$	$Y_s/B_B$	$P_{Bs}$
0,00	0,000	0,00	0,969	0,00	0,844	0,00	0,000
0,05	0,002	0,05	0,953	0,05	0,794	0,05	0,009
0,10	0,008	0,10	0,936	0,10	0,744	0,10	0,032
0,15	0,017	0,15	0,916	0,15	0,694	0,15	0,063
0,20	0,029	0,20	0,894	0,20	0,644	0,20	0,097
0,25	0,042	0,25	0,870	0,25	0,594	0,25	0,133
0,30	0,058	0,30	0,842	0,30	0,544	0,30	0,171
0,35	0,076	0,35	0,810	0,35	0,494	0,35	0,211
0,40	0,096	0,40	0,775	0,40	0,444	0,40	0,253
0,45	0,119	0,45	0,734	0,45	0,394	0,45	0,297
0,50	0,143	0,50	0,687	0,50	0,344	0,50	0,344
0,55	0,171	0,55	0,630	0,55	0,297	0,55	0,394
0,60	0,203	0,60	0,563	0,60	0,253	0,60	0,444
0,65	0,242	0,65	0,489	0,65	0,211	0,65	0,494
0,70	0,289	0,70	0,413	0,70	0,171	0,70	0,544
0,75	0,344	0,75	0,333	0,75	0,133	0,75	0,594
0,80	0,409	0,80	0,252	0,80	0,097	0,80	0,644
0,85	0,482	0,85	0,170	0,85	0,063	0,85	0,694
0,90	0,565	0,90	0,089	0,90	0,032	0,90	0,744
0,95	0,658	0,95	0,026	0,95	0,009	0,95	0,794
1,00	0,761	1,00	0,000	1,00	0,000	1,00	0,844

$P_{Bz}$  shall be calculated as follows:

$$P_{Bz} = (14.5 - 67 z/D_S) (z/D_S) \quad \text{for } z/D_S \leq 0.1$$

$$P_{Bz} = 0.78 + 1.1 \{(z/D_S - 0.1)\} \quad \text{for } z/D_S > 0.1$$

$P_{Bz}$  is not to be taken greater than 1.

- .8 For the purpose of maintenance and inspection, any oil fuel tanks that do not border the outer shell plating shall be located no closer to the bottom shell plating than the minimum value of  $h$  in paragraph 6 and no closer to the side shell plating than the applicable minimum value of  $w$  in paragraph 7 or 8.

12 In approving the design and construction of ships to be built in accordance with this regulation, Administrations shall have due regard to the general safety aspects, including the need for maintenance and inspection of wing and double bottom tanks or spaces.”

**3 Consequential amendments to the Supplement of the IOPP Certificate (Forms A and B)**

*The following new paragraph 2A is added to the Supplement of the IOPP Certificate (Forms A and B):*

“2A.1 The ship is required to be constructed according to regulation 12A and complies with the requirements of:



paragraphs 6 and either 7 or 8 (double hull construction)

paragraph 11 (accidental oil fuel outflow performance).

2A.2 The ship is not required to comply with the requirements of regulation 12A. ”

#### **4 Amendments to regulation 21**

*The text of existing paragraph 2.2 of regulation 21 on Prevention of oil pollution from oil tankers carrying heavy grade oil as cargo is replaced by the following:*

“oils, other than crude oils, having either a density at 15°C higher than 900 kg/m<sup>3</sup> or a kinematic viscosity at 50°C higher than 180 mm<sup>2</sup>/s; or”

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