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MSC.1/Circ.1175/Rev.2
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REVISED GUIDANCE ON SHIPBOARD TOWING AND MOORING EQUIPMENT

1 The Maritime Safety Committee, at its eightieth session (11 to 20 May 2005), approved guidance concerning shipboard equipment, fittings and supporting hull structures associated with towing and mooring for the uniform implementation of SOLAS regulation II-1/3-8, adopted by resolution MSC.194(80), which became effective on 1 January 2007.

2 The Committee, at its 102nd session (4 to 11 November 2020), having considered a proposal by the Sub-Committee on Ship Design and Construction, at its sixth session (4 to 8 February 2019), with a view to ensuring a uniform approach towards the application of the provisions of SOLAS regulation II-1/3-8, as amended by resolution MSC.474(102), which became effective on 1 January 2024, approved the *Revised guidance on shipboard towing and mooring equipment* (MSC.1/Circ.1175/Rev.1).

3 The Committee, at its 110th session (18 to 27 June 2025), having considered a proposal by the Sub-Committee on Ship Design and Construction, at its eleventh session (13 to 17 January 2025), with a view to:

.1 ensuring a uniform approach towards the application of the aforementioned SOLAS provisions in relation to the amendment to SOLAS regulation II-1/3-4 including a new requirement for new ships other than tankers of not less than 20,000 gross tonnage (GT) to be fitted with emergency towing arrangements, and

.2 incorporating draft amendments to MSC.1/Circ.1175/Rev.1 derived from the update of IACS Unified Requirement A2 and Recommendation No.10, aimed at updating the method for calculating the Equipment Number, in particular to account for increased funnel sizes due to the installation of equipment such as SOx scrubbers,

approved the *Revised guidance on shipboard towing and mooring equipment* (MSC.1/Circ.1175/Rev.2), as set out in the annex.

4 This revision of the Guidance is applicable to ships constructed on or after 1 January 2028 and does not supersede:

.1 the *Guidance on shipboard towing and mooring equipment* (MSC.1/Circ.1175), which remains applicable to ships constructed on or after 1 January 2007 but before 1 January 2024; nor

.2 the *Revised guidance on shipboard towing and mooring equipment* (MSC.1/Circ.1175/Rev.1), which remains applicable to ships constructed on or after 1 January 2024 but before 1 January 2028.

5 Member Governments are invited to use the annexed Revised Guidance when applying the amended SOLAS regulation II-1/3-8, and to bring it to the attention of all parties concerned.

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ANNEX

SHIPBOARD EQUIPMENT, FITTINGS AND SUPPORTING HULL STRUCTURES ASSOCIATED WITH TOWING AND MOORING

1 Application

1.1 Under SOLAS regulation II-1/3-8, as adopted by resolution MSC.474(102), new displacement type ships, except high-speed craft and offshore units, shall be provided with arrangements, equipment and fittings of sufficient safe working load to enable the safe conduct of all towing and mooring operations associated with the normal operations of the ship. The arrangements, equipment and fittings shall meet the appropriate requirements of the Administration or an organization recognized by the Administration.

1.2 The *Revised guidance on shipboard towing and mooring equipment* (MSC.1/Circ.1175/Rev.2) should apply to ships constructed on or after 1 January 2028. To ships constructed on or after 1 January 2024 and before 1 January 2028, *the Revised guidance on shipboard towing and mooring equipment* (MSC.1/Circ.1175/Rev.1) should apply. To ships constructed on or after 1 January 2007 and before 1 January 2024, the *Guidance on shipboard towing and mooring equipment* (MSC.1/Circ.1175) should apply.

1.3 This circular provides standards for the design and construction of shipboard fittings and supporting hull structures associated with normal towing and mooring operations in harbours or sheltered waters, which Administrations are recommended to implement. This circular also contains design guidance for fittings of ships that are further intended to be towed by another ship or tug, e.g. in an emergency. This circular does not require tow lines nor mandate standards for mooring lines on board the ship. Furthermore, this guidance is not applicable to the design and construction of shipboard fittings and supporting hull structures used for special towing services defined as:

.1 escort towing: Towing service required in some estuaries to control the ship in case of failures of the propulsion or steering system. It should be referred to local escort requirements;

.2 canal transit towing: Towing service for ships transiting canals, e.g. the Panama Canal. It should be referred to local canal transit requirements;

.3 emergency towing for tankers of not less than 20,000 tonnes deadweight: Towing service to assist tankers in case of emergency. It should be referred to paragraph 1 of SOLAS regulation II-1/3-4; and

.4 emergency towing for ships other than tankers of not less than 20,000 gross tonnage: Towing service to assist ships other than tankers in case of emergency. It should be referred to paragraph 2 of SOLAS regulation II-1/3-4.

However, this circular is still applicable to both "tankers of less than 20,000 tonnes deadweight" and "ships other than tankers of less than 20,000 gross tonnage".

1.4 Equipment that is used for both towing and mooring should be in accordance with sections 3 and 4.

APPENDIX A

MOORING AND TOW LINES

1 General

1.1 The mooring lines for ships with Equipment Number (EN) of less than or equal to 2,000 are given in section 2. For other ships the mooring lines are given in section 3.

1.2 The applicable provisions for tow lines are given in section 2.

1.3 The EN should be calculated in compliance with appendix B. Deck cargoes at the ship nominal capacity condition should be included for the determination of side-projected area A. The nominal capacity condition is defined as the theoretical condition where the maximum possible deck cargoes are included in the ship arrangement in their respective positions. For container ships the nominal capacity condition represents the theoretical condition where the maximum possible number of containers is included in the ship arrangement in their respective positions.

1.4 Sections 2 and 3 specify the minimum recommended number and ship design minimum breaking load of mooring lines (MBL_{SD}). The ship design minimum breaking load is defined as the minimum breaking load of new, dry mooring lines or tow line for which shipboard fittings and supporting hull structures are designed in order to meet mooring restraint requirements or the towing requirements of other towing service. As an alternative to sections 2 and 3, the minimum recommendation for mooring lines may be determined by direct mooring analysis in line with the guidance given in appendix A of IACS Recommendation No.10. The designer should consider verifying the adequacy of mooring lines based on assessments carried out for the individual mooring arrangement, expected shore-side mooring facilities, and expected prevalent environmental conditions.

2 Mooring lines for ships with EN ≤ 2000 and tow lines

2.1 The minimum recommended mooring lines for ships having an EN of less than or equal to 2,000 are given in table 1.

2.2 For ships having the ratio A/EN > 0.9 the following number of lines should be added to the number of mooring lines as given in table 1:

one line where $0.9 < \frac{A}{EN} \leq 1.1$,

two lines where $1.1 < \frac{A}{EN} \leq 1.2$,

three lines where $1.2 < \frac{A}{EN}$

2.3 The tow lines are given in table 1 and are intended as own tow line of a ship to be towed by a tug or another ship.

Table 1: Mooring lines for ships with EN ≤ 2000 and tow lines

EQUIPMENT NUMBER		MOORING LINES		TOW LINE*
Exceeding	Not exceeding	No. of mooring lines	Ship design minimum breaking load (kN)	Ship design minimum breaking load (kN)
1	*2*	*3*	*4*	*5*
50	70	3	37	98
70	90	3	40	98
90	110	3	42	98
110	130	3	48	98
130	150	3	53	98
150	175	3	59	98
175	205	3	64	112
205	240	4	69	129
240	280	4	75	150
280	320	4	80	174
320	360	4	85	207
360	400	4	96	224
400	450	4	107	250
450	500	4	117	277
500	550	4	134	306
550	600	4	143	338
600	660	4	160	370
660	720	4	171	406
720	780	4	187	441
780	840	4	202	479
840	910	4	218	518
910	980	4	235	559
980	1,060	4	250	603
1,060	1,140	4	272	647
1,140	1,220	4	293	691
1,220	1,300	4	309	738
1,300	1,390	4	336	786
1,390	1,480	4	352	836
1,480	1,570	5	352	888
1,570	1,670	5	362	941
1,670	1,790	5	384	1,024
1,790	1,930	5	411	1,109
1,930	2,080	5**	437**	1,168
2,080	2,230	**	**	1,259
2,230	2,380	**	**	1,356
2,380	2,530	**	**	1,453
2,530	-	**	**	1,471

* Information is provided in relation to 3.3.1.2 and 3.4.1.2 of the annex to the Revised guidance and provision on board of such a line is not necessary under this guidance.

** For ships with EN > 2,000 see section 3 of appendix A.

3 Mooring lines for ships with EN > 2,000

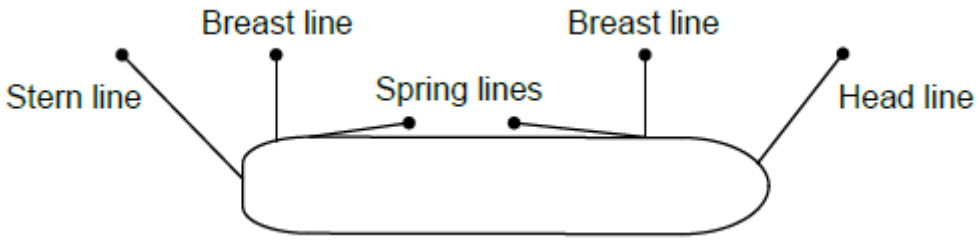
3.1 General

3.1.1 The following is defined with respect to the purpose of mooring lines (see also figure below):

.1 *Breast line*: A mooring line that is deployed perpendicular to the ship, restraining the ship in the off-berth direction;

.2 Spring line: A mooring line that is deployed almost parallel to the ship, restraining the ship in fore or aft direction;

.3 *Head/Stern line*: A mooring line that is oriented between longitudinal and transverse direction, restraining the ship in the off-berth and in fore or aft direction. The amount of restraint in fore or aft and off-berth direction depends on the line angle relative to these directions; and



.4 Breast lines provide the maximum transverse restraint and spring lines the maximum longitudinal restraint against vessel movement in athwart and in fore- aft direction, respectively. Head and stern lines are much less effective for these purposes. The applied mooring layout should follow these principles as far as possible with respect to the port facilities and as far as reasonable with respect to the vertical line angles.

3.1.2 The strength of mooring lines and the number of head, stern and breast lines for ships with an EN > 2,000 are based on the side-projected area A_1. Side-projected area A_1 should be calculated similar to the side-projected area A according to appendix B but considering the following conditions:

.1 the ballast draft should be considered for the calculation of the side-projected area A_1. For ship types having small variation in the draft, like e.g. passenger and ro-ro vessels, the side-projected area A_1 may be calculated using the summer load waterline;

.2 wind shielding of the pier can be considered for the calculation of the side-projected area A_1 unless the ship is intended to be regularly moored to jetty-type piers. A height of the pier surface of 3 m above the waterline may be assumed, i.e. the lower part of the side-projected area with a height of 3 m above the waterline for the considered loading condition may be disregarded for the calculation of the side-projected area A_1; and

.3 deck cargoes at the ship nominal capacity condition should be included for the determination of side-projected area A_1. For the condition with cargo on deck, the summer load waterline may be considered. Deck cargoes may not need to be considered if ballast draft condition generates a larger side-projected area A_1 than the full load condition with cargoes on deck. The larger of both side-projected areas should be chosen as side-projected area A_1. The nominal capacity condition is defined in 1.3.

3.1.3 The mooring lines as given hereunder are based on a maximum current speed of 1.0 m/s and the following maximum wind speed v_w, in m/s:

v_w = 25.0 - 0.002 (A_1 – 2,000) for passenger ships, ferries and car carriers with 2,000 m2 < A_1 ≤ 4,000 m2

= 21.0 for passenger ships, ferries and car carriers with A_1 > 4,000 m^2

= 25.0 for other ships

3.1.4 The wind speed is considered representative of a 30 second mean speed from any direction and at a height of 10 m above the ground. The current speed is considered representative of the maximum current speed acting on bow or stern (±10°) and at a depth of one-half of the mean draft. Furthermore, it is considered that ships are moored to solid piers that provide shielding against cross current.

3.1.5 Additional loads caused by, for example, higher wind or current speeds, cross currents, additional wave loads or reduced shielding from non-solid piers may need to be particularly considered. Furthermore, it should be observed that unbeneficial mooring layouts can considerably increase the loads on single mooring lines.

3.2 Ship design minimum breaking load

3.2.1 The ship design minimum breaking load, in kN, of the mooring lines should be taken as:

$$MBL_{SD} = 0.1 \cdot A_1 + 350$$

3.2.2 The ship design minimum breaking load may be limited to 1,275 kN (130 t). However, in this case the moorings are to be considered as not sufficient for environmental conditions given by 3.1.3. For these ships, the acceptable wind speed v_w*, in m/s, can be estimated as follows:

$$v_w^* = v_w \cdot \sqrt{\frac{MBL_{SD}^*}{MBL_{SD}}}$$

where

v_w is the wind speed as per 3.1.3 above;

MBL_{SD}* the ship design minimum breaking load of the mooring lines intended to be supplied; and

MBL_{SD} the ship design minimum breaking load as recommended according to the formula in 3.2.1. However, the ship design minimum breaking load should not be taken less than corresponding to an acceptable wind speed of 21 m/s, calculated as per the formula below:

$$MBL_{SD}^{*} \geq \left(\frac{21}{v_w}\right)^2 \cdot MBL_{SD}$$

3.2.3 If lines are intended to be supplied for an acceptable wind speed v_w^* higher than v_w as per 3.1.3, the ship design minimum breaking load should be taken as:

$$MBL_{SD}^{*} = \left(\frac{v_w^*}{v_w}\right)^2 \cdot MBL_{SD}$$

3.3 Number of mooring lines

3.3.1 The total number of head, stern and breast lines should be taken as:

$$n = 8.3 \cdot 10^{-4} \cdot A_1 + 6$$

3.3.2 For oil tankers, chemical tankers, bulk carriers and ore carriers, the total number of head, stern and breast lines should be taken as:

$$n = 8.3 \cdot 10^{-4} \cdot A_1 + 4$$

3.3.3 The total number of head, stern and breast lines should be rounded to the nearest whole number.

3.3.4 The number of head, stern and breast lines may be increased or decreased in conjunction with an adjustment to the ship design minimum breaking load of the lines. The adjusted ship design minimum breaking load, MBL_{SD}^{**}, should be taken as:

$MBL_{SD}^{**} = 1.2 \cdot MBL_{SD} \cdot n/n^{**} \leq MBL_{SD}$ for increased number of lines,

$MBL_{SD}^{**} = MBL_{SD} \cdot n/n^{**}$ for reduced number of lines,

where:

MBL_{SD} or MBL_{SD}^{*} specified in 3.2, as appropriate;

n^{**} is the increased or decreased total number of head, stern and breast lines; and

n the number of lines for the considered ship type as calculated according to 3.3.1 or 3.3.2 without rounding.

3.3.5 Vice versa, the ship design minimum breaking load of head, stern and breast lines may be increased or decreased in conjunction with an adjustment to the number of lines.

3.3.6 The total number of spring lines should be taken not less than:

two lines where EN < 5,000; and

four lines where EN ≥ 5,000.

3.3.7 The ship design minimum breaking load of spring lines should be the same as that of the head, stern and breast lines. If the number of head, stern and breast lines is increased in conjunction with an adjustment to the ship design minimum breaking load of the lines, the number of spring lines should be taken as follows, but rounded up to the nearest even number:

$$n_S^* = MBL_{SD} / MBL_{SD}^{**} \cdot n_S$$

where:

MBL_{SD} and MBL_{SD}^* are specified in 3.2, as appropriate;

MBL_{SD}^{**} the adjusted ship design minimum breaking load of lines as specified in 3.3.4; and

n_S the number of spring lines as given in 3.3.6; and

n_S^* the increased number of spring lines.

APPENDIX B

EQUIPMENT NUMBER

The equipment number (EN) should be calculated as follows:

$$EN = \Delta^{\frac{2}{3}} + 2.0\,(hB + S_{fun}) + \frac{A}{10}$$

where:

Δ = Moulded displacement, in tonnes, to the Summer Load Waterline.

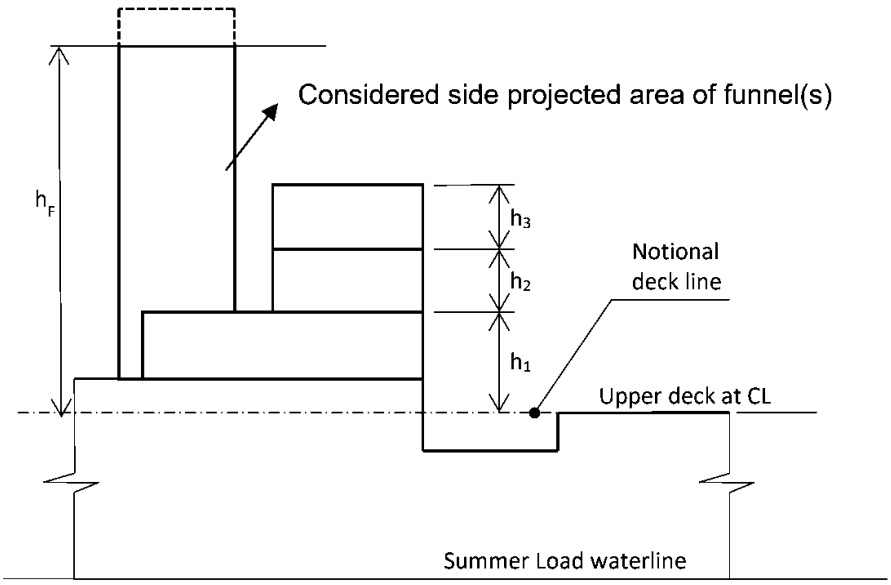
B = Moulded breadth, in metres.

h = Effective height, in metres, from the Summer Load Waterline to the top of the uppermost house.

$$h = a + \sum h_i$$

a = Vertical distance at hull side, in metres, from the Summer Load Waterline amidships to the upper deck.

h_i = Height, in metres, on the centreline of each tier of houses having a breadth greater than B/4; for the lowest tier h_1 is to be measured at centreline from the upper deck or from a notional deck line where there is local discontinuity in the upper deck, see figure below for an example.



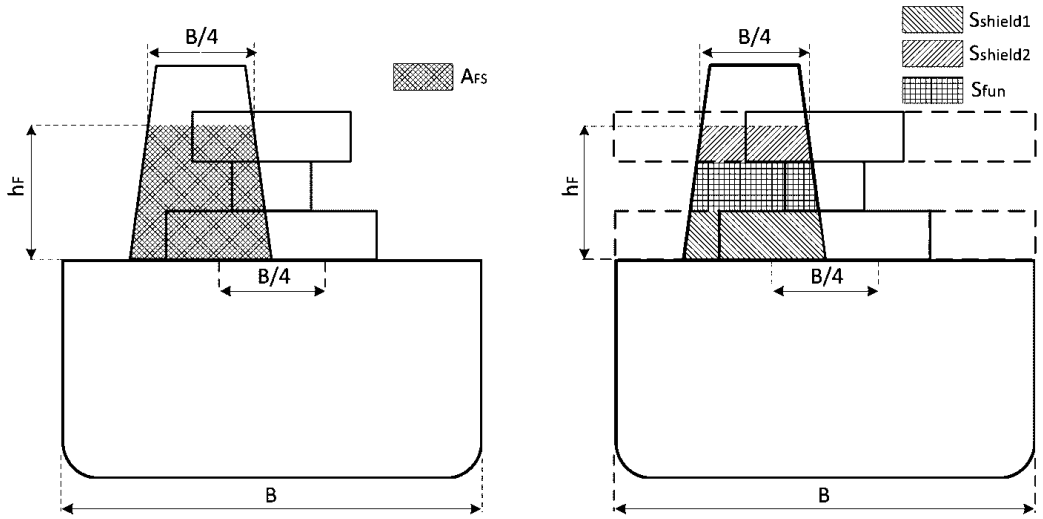
S_{fun} = Effective front-projected area of the funnel, in square metres, defined as:

$$S_{fun} = A_{FS} - S_{shield}$$

A_{FS} = Front-projected area of the funnel, in square metres, calculated between the upper deck at centreline, or notional deck line where there is local discontinuity in the upper deck, and the effective height h_F. A_{FS} is taken equal to zero if the funnel breadth is less than or equal to B/4 at all elevations along the funnel height.

h_F = Effective height of the funnel, in metres, measured from the upper deck at centreline, or notional deck line where there is local discontinuity in the upper deck, and the top of the funnel. The top of the funnel may be taken at the level where the funnel breadth reaches B/4.

S_{shield} = The section of front-projected area A_{FS}, in square metres, which is shielded by all deck houses having breadth greater than B/4. If there are more than one shielded section, the individual shielded sections i.e. $S_{shield1}$, $S_{shield2}$ etc., as shown in the figure below, to be added together. To determine S_{shield}, the deckhouse breadth is assumed B for all deck houses having breadth greater than B/4 as shown for $S_{shield1}$, $S_{shield2}$ in figure below.



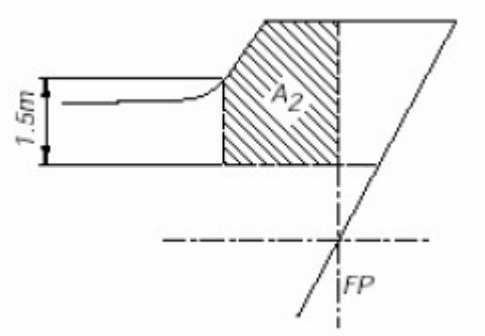
A = Side-projected area, in square metres, of the hull, superstructures, houses and funnels above the Summer Load Waterline which are within the equipment length of the ship and have a breadth greater than B/4. The side-projected area of the funnel is considered in A when A_{FS} is greater than zero. In this case, the side-projected area of the funnel should be calculated between the upper deck, or notional deck line where there is local discontinuity in the upper deck, and the effective height h_F.

NOTES:

1 When calculating h, sheer and trim should be ignored, i.e. h is the sum of freeboard amidships plus the height (at centreline) of each tier of houses having a breadth greater than B/4.

2 If a house having a breadth greater than B/4 is above a house with a breadth of B/4 or less, then the wide house should be included but the narrow house ignored.

3 Screens or bulwarks 1.5 metres or more in height should be regarded as parts of houses when determining h and A. The height of the hatch coamings and that of any deck cargo, such as containers, may be disregarded when determining h and A. With regard to determining A, when a bulwark is more than 1.5 metres high, the area shown below as A2 should be included in A.



4 The equipment length of the ships is the length between perpendiculars but should not be less than 96% nor greater than 97% of the extreme length on the Summer Waterline (measured from the forward end of the waterline).

5 When several funnels are fitted on the ship, the above parameters are taken as follows:

h_F = Effective height of the funnel, in metres, measured from the upper deck, or notional deck line where there is local discontinuity in the upper deck, and the top of the highest funnel. The top of the highest funnel may be taken at the level where the sum of each funnel breadth reaches B/4.

A_{FS} = Sum of the front-projected area of each funnel, in square metres, calculated between the upper deck, or notional deck line where there is local discontinuity in the upper deck, and the effective height h_F. A_{FS} is to be taken equal to zero if the sum of each funnel breadth is less than or equal to B/4 at all elevations along the funnels height.

A = Side-projected area, in square metres, of the hull, superstructures, houses and funnels above the Summer Load Waterline which are within the equipment length of the ship. The total side-projected area of the funnels is to be considered in the side-projected area of the ship, A, when A_{FS} is greater than zero. The shielding effect of funnels in transverse direction may be considered in the total side-projected area, i.e., when the side-projected areas of two or more funnels fully or partially overlap, the overlapped area needs only to be counted once.