

RESOLUTION A.320(IX)

Amended by A.514(13)

Adopted on 12 November 1975
Agenda item 7(c)

**REGULATION EQUIVALENT TO REGULATION 27 OF THE
INTERNATIONAL CONVENTION ON LOAD LINES, 1966**

THE ASSEMBLY,

NOTING Article 16(i) of the IMCO Convention concerning the functions of the Assembly,

BEARING IN MIND Article 8 of the International Convention on Load Lines, 1966, concerning Equivalents,

RECALLING that it adopted in Resolution A.172(ES.IV) the Recommendation for Uniform Application and Interpretation of Regulation 27 of the International Convention on Load Lines, 1966,

RECOGNIZING the need for improvement in the text of Regulation 27 of the Convention, having regard to provisions of the Recommendation (Annex to Resolution A.172(ES.IV)) and experience gained in applying that Regulation,

HAVING CONSIDERED the proposed Regulation equivalent to Regulation 27 of the International Convention on Load Lines, 1966, approved by the Maritime Safety Committee at its thirty-second session,

ADOPTS the text of the Regulation which is at Annex to this Resolution as equivalent to Regulation 27 of the International Convention on Load Lines, 1966, which supersedes the Recommendation annexed to Resolution A.172(ES.IV),

RECOMMENDS governments concerned to accept the application of the Regulation as being equivalent to Regulation 27 of the International Convention on Load Lines, 1966,

REQUESTS the Maritime Safety Committee to continue its consideration of improvements to the International Convention on Load Lines, 1966, including Regulation 27 thereof.

ANNEX

**REGULATION EQUIVALENT TO REGULATION 27 OF THE
INTERNATIONAL CONVENTION ON LOAD LINES, 1966**

Types of Ships

(1) For the purposes of freeboard computation, ships shall be divided into Type "A" and Type "B"

Type "A" Ships

(2) A Type "A" ship is one which:

(a) is designed to carry only liquid cargoes in bulk;

- (b) has a high integrity of the exposed deck with only small access openings to cargo compartments, closed by watertight gasketed covers of steel or equivalent material; and
- (c) has low permeability of loaded cargo compartments.

(3) A Type "A" ship, if over 150 metres (492 feet) in length to which a freeboard less than Type "B" has been assigned, when loaded to its summer load water-line, shall be able to withstand the flooding of any compartment or compartments, with an assumed permeability of 0.95, consequent upon the damage assumptions specified in paragraph (12) of this Regulation, and shall remain afloat in a satisfactory condition of equilibrium as specified in paragraph (13) of this Regulation. In such a ship, if over 225 metres (738 feet) in length, the machinery space shall be treated as a floodable compartment, but with a permeability of 0.85.

(4) A Type "A" ship shall be assigned a freeboard not less than that based on Table A of Regulation 28.

Type "B" Ships

(5) All ships which do not come within the provisions regarding Type "A" ships in paragraphs (2) and (3) of this Regulation shall be considered as Type "B" ships.

(6) Type "B" ships, which in position 1 have hatchways fitted with hatch covers which comply with the requirements of Regulation 15, other than paragraph (7), shall be assigned freeboards based upon the values given in Table B of Regulation 28, increased by the values given in the following table:

**Freeboard increase over tabular freeboard for Type "B" ships,
for ships with hatch covers not complying with Regulation 15(7) or 16**

Length of ship (metres)	Freeboard increase (millimetres)	Length of ship (metres)	Freeboard increase (millimetres)	Length of ship (metres)	Freeboard increase (millimetres)
108 and below	50	139	175	170	290
109	52	140	181	171	292
110	55	141	186	172	294
111	57	142	191	173	297
112	59	143	196	174	299
113	62	144	201	175	301
114	64	145	206	176	304
115	68	146	210	177	306
116	70	147	215	178	308
117	73	148	219	179	311
118	76	149	224	180	313
119	80	150	228	181	315
120	84	151	232	182	318
121	87	152	236	183	320
122	91	153	240	184	322
123	95	154	244	185	325
124	99	155	247	186	327
125	103	156	251	187	329
126	108	157	254	188	332
127	112	158	258	189	334
128	116	159	261	190	336
129	121	160	264	191	339
130	126	161	267	192	341
131	131	162	270	193	343
132	136	163	273	194	346
133	142	164	275	195	348
134	147	165	278	196	350
135	153	166	280	197	353
136	159	167	283	198	355
137	164	168	285	199	357
138	170	169	287	200	358

Freeboards at intermediate lengths of ship shall be obtained by linear interpolation.
Ships above 200 metres in length shall be dealt with by the Administration.

**Freeboard increase over tabular freeboard for Type "B" ships,
for ships with hatch covers not complying with Regulation 15(7) or 16**

Length of ship (feet)	Freeboard increase (inches)	Length of ship (feet)	Freeboard increase (inches)
350 and below	2.0	510	9.6
360	2.3	520	10.0
370	2.6	530	10.4
380	2.9	540	10.7
390	3.3	550	11.0
400	3.7	560	11.4
410	4.2	570	11.8
420	4.7	580	12.1
430	5.2	590	12.5
440	5.8	600	12.8
450	6.4	610	13.1
460	7.0	620	13.4
470	7.6	630	13.6
480	8.2	640	13.9
490	8.7	650	14.1
500	9.2	660	14.3

Freeboards at intermediate lengths of ship shall be obtained by linear interpolation.
Ships above 660 feet in length shall be dealt with by the Administration.

(7) Type "B" ships, which in position 1 have hatchways fitted with hatch covers complying with the requirements of Regulations 15(7) or 16, shall, except as provided in paragraphs (8) to (13) inclusive of this Regulation, be assigned freeboards based on Table B of Regulation 28.

(8) Any Type "B" ship of over 100 metres (328 feet) in length may be assigned freeboards less than those required under paragraph (7) of this Regulation, provided that, in relation to the amount of reduction granted, the Administration is satisfied that:

- (a) the measures provided for the protection of the crew are adequate;
- (b) the freeing arrangements are adequate;
- (c) the covers in positions 1 and 2 comply with the provisions of Regulation 16 and have adequate strength, special care being given to their sealing and securing arrangements; and
- (d) the ship, when loaded to its summer load water-line, shall be able to withstand the flooding of any compartment or compartments, with an assumed permeability of 0.95, consequent upon the damage assumptions specified in paragraph (12) of this Regulation, and shall remain afloat in a satisfactory condition of equilibrium as specified in paragraph (13) of this Regulation. In such a ship, if over 225 metres (738 feet) in length, the machinery space shall be treated as a floodable compartment, but with a permeability of 0.85.

(9) In calculating the freeboards for Type "B" ships which comply with the requirements of paragraphs (8), (11), (12) and (13) of this Regulation, the values from Table B of Regulation 28 shall not be reduced by more than 60 per cent of the difference between the "B" and "A" tabular values for the appropriate ship lengths.

(10) (a) The reduction in tabular freeboard allowed under paragraph (9) of this Regulation may be increased up to the total difference between the values in Table A and those in Table B of Regulation 28 on condition that the ship complies with the requirements of:

- (i) Regulation 26 other than paragraph (4) as if it were a Type "A" ship;

- (ii) paragraphs (8), (11) and (13) of this Regulation; and
 - (iii) paragraph (12) of this Regulation, provided that throughout the length of the ship any one transverse bulkhead will be assumed to be damaged, such that two adjacent fore and aft compartments shall be flooded simultaneously, except that such damage will not apply to the boundary bulkheads of a machinery space.
- (b) In such a ship, if over 225 metres (738 feet) in length, the machinery space shall be treated as a floodable compartment, but with a permeability of 0.85.

Initial Condition of Loading

(11) The initial condition of loading before flooding shall be determined as follows:

- (a) The ship is loaded to its summer load water-line on an imaginary even keel.
- (b) When calculating the vertical centre of gravity, the following principles apply:
 - (i) Homogeneous cargo is carried.
 - (ii) All cargo compartments, except those referred to under (iii) of this sub-paragraph, but including compartments intended to be partially filled, shall be considered fully loaded except that in the case of fluid cargoes each compartment shall be treated as 98 per cent full.
 - (iii) If the ship is intended to operate at its summer load water-line with empty compartments, such compartments shall be considered empty provided the height of the centre of gravity so calculated is not less than as calculated under (ii) of this sub-paragraph.
 - (iv) Fifty per cent of the individual total capacity of all tanks and spaces fitted to contain consumable liquids and stores is allowed for. It shall be assumed that for each type of liquid, at least one transverse pair or a single centre line tank has maximum free surface, and the tank or combination of tanks to be taken into account shall be those where the effect of free surfaces is the greatest; in each tank the centre of gravity of the contents shall be taken at the centre of volume of the tank. The remaining tanks shall be assumed either completely empty or completely filled, and the distribution of consumable liquids between these tanks shall be effected so as to obtain the greatest possible height above the keel for the centre of gravity.
 - (v) At an angle of heel of not more than 5 degrees in each compartment containing liquids, as prescribed in (ii) of this sub-paragraph except that in the case of compartments containing consumable fluids, as prescribed in (iv) of this sub-paragraph of this paragraph, the maximum free surface effect shall be taken into account.
Alternatively, the actual free surface effects may be used, provided the methods of calculation are acceptable to the Administration.
 - (vi) Weights shall be calculated on the basis of the following values for specific gravities:

salt water	1.025
fresh water	1.000
oil fuel	0.950
diesel oil	0.900
lubricating oil	0.900

Damage Assumptions

(12) The following principles regarding the character of the assumed damage apply:

- (a) The vertical extent of damage in all cases is assumed to be from the base line upwards without limit.
- (b) The transverse extent of damage is equal to $B/5$ or 11.5 metres (37.7 feet), whichever is the lesser, measured inboard from the side of the ship perpendicularly to the centre line at the level of the summer load water-line.
- (c) If damage of a lesser extent than specified in sub-paragraphs (a) and (b) of this paragraph results in a more severe condition, such lesser extent shall be assumed.
- (d) Except where otherwise required by paragraph (10)(a) the flooding shall be confined to a single compartment between adjacent transverse bulkheads provided the inner longitudinal boundary of the compartment is not in a position within the transverse extent of assumed damage. Transverse boundary bulkheads of wing tanks, which do not extend over the full breadth of the ship shall be assumed not to be damaged, provided they extend beyond the transverse extent of assumed damage prescribed in sub-paragraph (b) of this paragraph.

If in a transverse bulkhead there are steps or recesses of not more than 3.05 metres (10 feet) in length located within the transverse extent of assumed damage as defined in sub-paragraph (b) of this paragraph, such transverse bulkhead may be considered intact and the adjacent compartment may be floodable singly. If, however, within the transverse extent of assumed damage there is a step or recess of more than 3.05 metres (10 feet) in length in a transverse bulkhead, the two compartments adjacent to this bulkhead shall be considered as flooded. The step formed by the after peak bulkhead and the after peak tank top shall not be regarded as a step for the purpose of this Regulation.

- (e) Where a main transverse bulkhead is located within the transverse extent of assumed damage and is stepped in way of a double bottom or side tank by more than 3.05 metres (10 feet), the double bottom or side tanks adjacent to the stepped portion of the main transverse bulkhead shall be considered as flooded simultaneously. If this side tank has openings into one or several holds, such as grain feeding holes, such hold or holds shall be considered as flooded simultaneously. Similarly in a ship designed for the carriage of fluid cargoes, if a side tank has openings into adjacent compartments, such adjacent compartments shall be considered as empty and flooded simultaneously. This provision is applicable even where such openings are fitted with closing appliances, except in the case of sluice valves fitted in bulkheads between tanks and where the valves are controlled from the deck. Manhole covers with closely-spaced belts are considered equivalent to the unpierced bulkhead except in the case of openings in topside tanks making the topside tanks common to the holds.
- (f) Where the flooding of any two adjacent fore and aft compartments is envisaged main transverse watertight bulkheads shall be spaced at least $1/3L^{2/3}$ or 14.5 metres ($0.495L^{2/3}$ or 47.6 feet), whichever is the lesser, in order to be considered effective. Where transverse bulkheads are spaced at a lesser distance, one or more of these bulkheads shall be assumed as non-existent in order to achieve the minimum spacing between bulkheads.

Condition of Equilibrium

(13) The condition of equilibrium after flooding shall be regarded as satisfactory provided:

- (a) The final water-line after flooding, taking into account sinkage, heel, and trim, is below the lower edge of any opening through which progressive flooding may take place. Such openings shall include air pipes, ventilators and openings which are closed by means of weathertight doors (even if they comply with Regulation 12) or hatch covers (even if they comply with Regulation 16 or Regulation 19(4)), and may exclude those openings closed by means of manhole covers and flush scuttles

(which comply with Regulation 18), cargo hatch covers of the type described in Regulation 27(2), hinged watertight doors in an approved position which are secured closed while at sea and so logged, remotely operated sliding watertight doors, and side scuttles of the non-opening type (which comply with Regulation 23).

- (b) If pipes, ducts or tunnels are situated within the assumed extent of damage penetration as defined in paragraph 12(b) of this Regulation, arrangements are to be made so that progressive flooding cannot thereby extend to compartments other than those assumed to be floodable in the calculation for each case of damage.
- (c) The angle of heel due to unsymmetrical flooding does not exceed 15 degrees. If no part of the deck is immersed, an angle of heel of up to 17 degrees may be accepted.
- (d) The metacentric height in the flooded condition is positive.
- (e) When any part of the deck outside the compartment assumed flooded in a particular case of damage is immersed, or in any case where the margin of stability in the flooded condition may be considered doubtful, the residual stability is to be investigated. It may be regarded as sufficient if the righting lever curve has a minimum range of 20 degrees beyond the position of equilibrium with a maximum righting lever of at least 0.1 metre (4 inches) within this range. The area under the righting lever curve within this range shall be not less than 0.0175 metre-radians (0.689 inch-radians). The Administration shall give consideration to the potential hazard presented by protected or unprotected openings which may become temporarily immersed within the range of residual stability.
- (f) The Administration is satisfied that the stability is sufficient during intermediate stages of flooding.

Ships without means of Propulsion

(14) A lighter, barge, or other ship without independent means of propulsion shall be assigned a freeboard in accordance with the provisions of these Regulations. Barges which meet the requirements of paragraphs (2) and (3) of this Regulation may be assigned Type "A" freeboards:

- (a) The Administration should especially consider the stability of barges with cargo on the weather deck. Deck cargo can only be carried on barges to which the ordinary Type "B" freeboard is assigned.
- (b) However, in the case of barges which are unmanned, the requirements of Regulations 25, 2C(2) and (3), and 39 shall not apply.
- (c) Such unmanned barges which have on the freeboard deck only small access openings closed by watertight gasketed covers of steel or equivalent material may be assigned a freeboard 25 per cent less than those calculated in accordance with these Regulations.