The Merchant Shipping (Carriage Of Grain) Rules, 1974

UNION OF INDIA
India

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Rule
THE-MERCHANT-SHIPPING-CARRIAGE-OF-GRAIN-RULES-1974 of 1974

- Published on 18 February 1974
- Commenced on 18 February 1974
- [This is the version of this document from 18 February 1974.]
- [Note: The original publication document is not available and this content could not be verified.]

The Merchant Shipping (Carriage Of Grain) Rules, 1974Published vide Notification Gazette of India, 1974, Part 2, Section 3(i), page 547.

1902.

G.S.R. 248, dated 18th February, 1974. - Whereas the draft of the Merchant Shipping (Carriage of Grain) Rules, 1973, was published as required by sub-section (5) of Section 332 of the Merchant Shipping Act, 1958 (44 of 1958) at pages 1038 to 1046 of the Gazette of India, Part II, Section 3, Sub-section (i), dated the 19th May, 1973, under the notification of the Government of India in the Ministry of Shipping and Transport No. G.S.R. 531, dated the 5th may, 1973, inviting objections and suggestions from all persons likely to be affected thereby within a period of forty-five days from the date of publication of the notification in the Official Gazette;And whereas the said Gazette was made available to the public on the 19th May, 1973;And whereas, no objections and suggestions have been received from the public on the said draft;Now, therefore, in exercise of the powers conferred by sub-section (5) of Section 332 and Section 458 of the said Act and in supersession of the Indian Merchant Shipping (Carriage of Grain) Rules, 1954, the Central Government hereby makes the following rules, namely :-

1. Short title, commencement and application.

(1)These rules may be called the Merchant Shipping (Carriage of Grain) Rules, 1974.(2)They shall come into force on the date of their publication in the Official Gazette.(3)Unless expressly provided otherwise, they shall apply to---(a)all Indian Ships;(b)ships other than Indian ships,(i)when they are loaded with grain at any port or place in India or within the territorial waters of India; or(ii)when

they enter any port or place in India or come within the territorial water of India laden with grain.

2. Definitions.

- In these rules, unless the context otherwise requires,-(i)"Act" means the Merchant Shipping Act, 1958 (44 of 1958);(ii)"compartment" means a hold, or cargo space bounded by bulkheads at each end and having decks above and below;(iii)"feeders" means feeders constructed in accordance with the requirements specified in the First Schedule;(iv)"grain" includes wheat, maize or corn, oats, rye, barley, rice, pulses and seeds;(v)"metacentric height" means the distance between the transverse metacentre (M) and the centre of gravity (G) corrected for the free surface effects of liquids in tanks, and for the purposes of rule 5, for the free surface effects of grain in feeders;(vi)"Schedule" means a Schedule to these rules;(vii)"shifting boards" means shifting boards constructed in accordance with the requirements specified in the Second Schedule;(viii)"shores" means shores conforming to the requirements specified in the Third Schedule;(ix)"stays" means stays the fitting of which conforms to requirements of the Fourth Schedule;(x)"upright" means upright, the fitting of which conforms to the requirements of the Fifth Schedule.

3. Trimming.

(1)In compartments entirely fitted with bulk grain, the grain shall be trimmed so as to fill all the spaces between the beams and in the wings and ends.(2)In compartments partly filled with bulk grain, the grain shall be levelled except where it is impracticable to do so.

4. Stowage of full compartment.

(1)Except as hereinafter provided, any compartment which is entirely filled with bulk grain shall be divided either :(a)by a longitudinal bulkhead or shifting boards in line with, or not more than five per cent of the moulded breadth of the ship from the centre line, or(b)by longitudinal bulkhead or shifting boards off the centre line of the ship :Provided that the distance between them does not exceed sixty per cent of the moulded breadth of the ship and that, in the latter case, trimming hatches of suitable size suitably placed are provided in the wings at longitudinal intervals of not more than 7.62 metres with end trimming hatches placed not more than 3.66 metres from transverse bulkheads.(2)In every case, the longitudinal bulkheads or shifting boards shall be properly constructed and fitted grain tight with proper fittings between the beams.(3)(a)In any compartment which is a hold, the longitudinal bulkheads or shifting boards shall extend downwards from the underside of the deck to a distance of at least-one-third of the depth of the hold or 2.44 metres, whichever is greater.(b)In compartments in between decks and superstructures or in any compartment other than a hold, such longitudinal bulkheads or shifting boards shall extend from deck to deck.(4)The provisions of sub-rules, (1), (2) and (3) shall not apply to--(a)a compartment other than a hold, if bagged grain or other suitable cargo therein is tightly stored in the wings to a width, at any point, of not less than twenty per cent, of the corresponding breadth of the ship;(b)parts of the compartments where the maximum breadth of the deckhead within such parts does not exceed one half of the moulded breadth of the ship;(c)except in the case of compartments loaded with bulk linseed, those parts of a compartment which, in ships which maintain throughout

the voyage a metacentric height of not less than 0.31 metres in the case of single deck or two deck ships and not less than 0.36 metres in the case of other ships, are(i)below and within 2.13 metres of a feeder, but only below or abreast of a hatchway, if that feeder contains, or all the feeders collectively feeding a compartment, contain not less than five per cent, of the quantity of grain carried in the compartment which is fed;(ii)below or abreast of a hatchway where the bulk grain beneath the hatchway is trimmed in the form of a saucer hard up to the deck-head beyond the hatchway to a depth in the centre of the saucer of not less than 1.83 metres measured below the deck line and is topped off with bagged grain or other suitable bagged cargo so as to fill the hatchway and the saucer below and is stowed tightly against the deckhead, the longitudinal bulkheads, the hatchway beams and the hatchway side and end coamings.

5. Feeders.

(1)Any compartment which, is entirely filled with bulk grain shall be provided with feeders which shall be constructed in accordance with the requirements of the First Schedule or with such other requirements that the Central Government or any other officer authorised by the Central Government in this behalf, may prescribe from time to time by notification in the Official Gazette.(2)Such feeders shall be so placed as to ensure a free flow of grains to all parts of the compartment containing bulk grain :Provided that feeders shall not be required--(a)When bulk grain is carried in deep tanks which are primarily constructed for the carriage of liquids and in which the greatest width does not exceed one-half of the moulded breadth of the ship, or which are divided by one or more permanent steel longitudinal divisions sited not more than one-half of the moulded breadth of the ship apart, subject to the condition that the tanks and tank lids are securely closed;(b)When bulk grain is trimmed in the form of a saucer hard up to the deck head beyond the hatchway to a depth in the centre of the saucer of not less than 1.83 metres measured below the deck line and is topped with bagged grain or other suitable bagged cargo so as to fill the hatchway and the saucer below and is stowed tightly against the deck head, the longitudinal bulkheads, the hatchway beams and the hatchway side and end coamings.(3)Subject to the provisions of sub-clause (i) of Cl. (c) of sub-rule (4) of rule 4 each feeder shall contain not less than two per cent. of the quantity of grain carried below deck level in the part of the compartment which it feeds.(4)Each feeder shall be fitted with a longitudinal bulkhead or shifting boards extending to the full depth of the feeder :Provided that such longitudinal bulkhead or shifting boards need not be fitted in a single deck or two deck ships which maintains, throughout the voyage, metacentric height of 0.31 metres, or any other ship which maintains, throughout the voyage, a metacentric height of 0.36 metres---(i)if the feeder contains, or all feeders collectively feeding a compartment contain, not less than five per cent of the quantity of grain carried below deck level in that compartment;(ii)if the sinkage of grain amounting to two per cent. of the volume of the compartment fed would not cause the free grain surface to fall below the lower extremities of the feeder or feeders at deck level;(iii)if a shift of the free grain surface to an angle of 12 degree to the horizontal would not cause that surface to fall below the lower extremities of the feeder or feeders at deck-level.Explanation. - For the purpose of this sub-rule, the effects of the additional free grain surfaces within the feeders due to the omission of centre-line divisions shall be taken into account in calculating the metacentric height referred to in Cl. (c) of sub-rule (4) of rule 4. The correction to the metacentric height to each feeder shall be made in accordance with the formula set out in the Sixth Schedule.

6. Common Loading.

- In any ship when compartments above one another are entirely to be filled with grain, such compartments may be loaded as one compartment subject to the following conditions namely,--(a)except as provided for in Cl. (c) sub-rule (4) of rule 4, longitudinal bulkhead or shifting boards shall be fitted(i)deck to deck in the tween decks of a two deck ship;(ii)for the upper one-third part of the total depth of the compartments loaded in common, in the case of all other ships.(b)openings each of at least 0.37 sq. metres shall be provided in the wings of the deck immediately below the upper-most deck of the compartments loaded in common and forward and aft of the main hatchway. Such openings shall provide, in combination with the main or other hatchways, a feeding distance of not more than 2.44 metres measured in a fore and aft line, and(c)the provisions of rules 5 and 7 shall apply to compartments loaded in common as if they were one single compartment.

7. Trimming and Bagging of End Compartments.

(1)When the distance, measured in fore and aft line from any part of a hold or compartment to the nearest feeder exceeds 7.62 metres from the nearest feeder the bulk grain in the end spaces beyond 7.62 metres shall be levelled off at a depth of at least 1.83 metres below the deck and the end spaces filled with bagged grain built upon a suitable platform.(2)Such platform shall be constructed in accordance with the requirements of rule 8.

8. Stowage of Partly Filled Compartments.

(1)Except as hereinafter provided any compartment which is partly filled with bulk grain shall be divided either by-(a)(i)a longitudinal bulkhead; or(ii)shifting boards;in line, with or not more than five per cent. of the moulded breadth of the ship from the centre line, or(b)(i)two or more longitudinal bulkheads, or(ii)shifting boards;off the centre line of the ship :Provided that the distance between them does not exceed sixty per cent. of the moulded breadth of the ship.(2)In every case the longitudinal bulkheads or shifting boards shall be properly constructed and shall extend from the bottom of the compartment to a height of not less than 0.61 metres above the surface of the bulk grain.(3)The provisions of sub-rules (1) and (2) shall not apply to--(a)a part of a compartment below or abreast of a hatchway partly filled with grain other than linseed where :(i)a metacentric height of not less than 0.31 metres is maintained throughout the voyage in the case of a single deck or two deck ship, or(ii)a metacentric height of not less than 0.36 metres is maintained throughout the voyage in the case of any other ship :(b)a compartment, which is a hold, if the bulk grain contained therein does not exceed one-third of the capacity of the hold or where such a hold is divided by a shaft tunnel, one-half of the capacity of that hold;(c)a compartment other than a hold, if bagged grain or other suitable cargo therein is tightly stowed in the wings to a width at any point, of not less than twenty per cent of the corresponding breadth of the ship;(d)those parts of a compartment where the maximum breadth of the deckhead within such parts does not exceed one-half of the moulded breadth of the ship.(4)When any compartment is partly filled with bulk grain the bulk grain shall be levelled and topped off with bagged grain or other suitable cargo tightly stowed and extending to a height of not less than 1.22 metres above the top of the bulk grain within

those parts of the compartment which are divided by a longitudinal bulkhead or shifting boards, and to a height to not less than 1.52 metres in those parts of compartment which are not so divided :Provided that in the case of a compartment which is a hold in which the bulk grain does not exceed one-third of the capacity of the hold or where such a hold is divided by a shaft tunnel, one-half of the capacity of the hold, the depth of the bagged grain or other suitable cargo shall be not less than 1.22 metres.(5)The bagged grain or other suitable cargo shall be supported on suitable platforms laid over the whole surface of the bulk grain and such platforms shall consist of---(a)bearers spaced not more than 1.22 metres apart and 25 millimetre boards laid thereon spaced not more than 0.10 metres apart; or(b)strong separation cloths with adequate overlapping.

9. Limitation on Number of Partly Filled Compartments.

(1)Except in the case of ships in which a metacentric height of not less than 0.31 metres in the case of single deck or two deck ships or of not less than 0.30 metres in the case of other ships is maintained throughout the voyage, not more than two compartments may be partly filled with bulk grain except that other compartments may be partly filled with bulk grain if they are filled up to the deckhead with bagged or other suitable cargo.(2)For the purpose of this rule :-(a)superimposed tween decks shall be regarded as separate compartments and separate from any lower hold below them;(b)feeders and partly filled spaces referred to in Cl. (c) of rule 10 shall not be regarded as compartments; and(c)holds or compartments provided with one or more grain tight longitudinal sub-divisions shall be regarded as one hold or compartment.

10. Bulk-grain in Tween Decks and Superstructures.

- Bulk grain shall not be carried in compartments which are in a superstructure of a ship, or in the tween deck of a two deck ship, or in the suppermost tween deck of a ship having more than two decks except under the following conditions, namely :-(a)the bulk grain or other cargo shall be so stowed as to ensure maximum stability;(b)in all cases either a metacentric height of not less than 0.31 metres in the case of single deck of two deck ships or of not less than 0.36 metres in the case of other ships is maintained throughout the voyage or, alternatively, the aggregate quantity of bulk grain or other cargo carried in such compartments does not exceed twenty-eight per cent. by weight of the remaining cargo and the Master is satisfied that the ship will have adequate stability throughout the voyage :Provided that the limitation of twenty-eight per cent. specified in this clause will not apply when the grain cargo carried above deck or in the upper most tween deck spaces consists of oats, barley or cotton seeds;(c)the deck area of any part of such compartments which contains bulk grain and which is only partly filled does not exceed 93 square metres; and(d)all such compartments in which bulk grain is stowed are either sub-divided by transverse bulk-heads at intervals of not more than 30.50 metres or, when this distance is exceeded, the excess space is entirely filled with bagged or other suitable cargo.

11. Stowed of Specially Suitable Ships.

(1)The provisions of rules 4 to 10, both inclusive, shall not apply to any ship in which the effect of any transverse shift of grain is limited by means of longitudinal divisions or other constructional

feature to such an extent that the list resulting from a shift of grain, calculated on the basis of the assumptions made in sub-rule (2), does not exceed 5 degrees at any state of the voyage.(2)In calculating the list of a ship referred in sub-rule (1), assumption shall be made that the grain surfaces, which are levelled or which are constrained by a boundary having an angle or inclination of less than 30 degrees to the horizontal, settle 2 per cent by volume and more through an angle of 12 degrees with their original surface of 8 degrees if overstowed in the accordance with the provision of sub-rules (4) and (5) of rule 8.(3)Every such ship to which the provisions of rules 4 to 10, both inclusive, do not apply shall carry a grain loading plan and sufficient stability information to show that for the stowage arrangement to be adopted, the calculated list referred to in sub-rule (1) will not be exceeded.

12. Water Ballast Tanks.

- Double bottom tanks which are taken into account in calculating the metacentric height referred to in rules 4,5,8,9 and 10, or in calculating the list referred to in rule 11, shall have adequate watertight longitudinal sub-division except where the width of the tank measured at half length does not exceed 60 per cent. of the ship's moulded breadth.

13. Bagged Grain.

- Bagged grain shall be carried in sound bags which shall be securely closed and, except as provided in sub-item (iv) of item (b) of the proviso to rule 16, well filled.

14. Loading of Home-Trade Ships.

- Except in regard to the stowage of bulk grain in the tween deck of a two deck ship or the upper most tween deck of a ship having more than two decks the fore-going provisions of these rules shall not apply to any home-trade ship in which bulk grain is carried subject to the compliance with the provisions of rules 15 and 16.Explanation. - For the purposes of these rules any ship partially lightened at a port or place in India for a voyage to any other port or place in India shall be as treated as a home-trade ship.

15. Stowage of Full Compartments in Home-Trade Ships.

- In Home-Trade Ships, stowage of any compartment which is entirely filled with bulk grain shall be as follows :(a)the hatchway shall contain not less than 4 per cent. of the quantity of bulk grain carried below deck level in the compartment which it feeds, or(b)the bulk grain beneath the hatchway shall be trimmed in the form of a saucer and topped off with bagged grain or other suitable bagged cargo in the manner specified in sub-Cl. (ii) of Cl. (c) of sub-rule (4) of rule 4, except that the compartment may not be fitted with bulkheads or shifting boards in respect of any ship making a voyage during seasons of fair weather as defined in the Seventh Schedule.

16. Stowage of Partly Filled Compartments of Home-Trade Ships.

- In Home Trade Ships, the stowage of any compartment which is partly filled with bulk grain comply with the provisions of rule 8:Provided that not more than two compartments may be stowed in either of the following ways, namely :-(a)the bulk grain shall be levelled off and over-stowed with at least two tiers of bagged grain laid on separation cloths, or with other suitable cargo supported on platforms or separation clothes; or(b)(i)the bulk grain shall be divided from empty space in the hold by one of the following methods, namely:-Method 1. - A transverse vertical wooden grain tight bulk head shall be fitted in the fore part of the compartment in such a way as to reduce the capacity of the compartment to that required for the stowage of the grain.Method 2. - A strongly and tightly constructed transverse vertical bulkhead of bagged grain shall be used. The bulk head shall contain sufficient rows of bags laid in the fore and aft direction to enable it to withstand the effects of pitching and scending during the voyage. Its foundation shall be on the floor of the compartment and shall consist of not less than four rows of bags. These requirements of four rows may be narrowed to two rows of bags at the top provided that only two rows are considered to be adequate for providing and maintaining the required support.Method 3. - A sloping bulkhead shall be constructed of stepped bags of grain. The bags shall be packed tightly together and bedded into the grain in a fore and aft direction. They shall lie horizontally and overlap not less than one-half of their length. The lowest tier shall be so arranged as to rest upon a firm and solid foundation and shall be placed on the floor of the compartment or on separation cloths laid on the levelled grain surface reaching to one of the ship's traverse bulkheads. The bags shall be well locked into the frames at the ship's side and a double tier shall be laid at the side of the compartment. The bulkheads shall be secured in the hatchway and the top tier of bags shall be so wedged tightly against the web beams or the hatch end coamings that they will be secured against fore and aft movement.(ii)The bulk grain shall be stowed in such a way as to confine its loose surface within the limits of the hatchway in such a manner that it will serve as a feeder. The part of the compartment containing bulk grain shall be so confined as to prevent any of it getting into the empty part of the compartment. The bulk grain shall be trimmed tightly into one end of the compartment; the wings and beam spaces shall be filled; and as much grain as possible shall be stowed at same end of the hatchway so as to ensure a sufficient supply for feeding purposes.(iii)Where the bulk grain is not sufficient to reach up into the hatchway the grain surface shall be trimmed level athwartships and the fore and aft slopes reduced considerably below the natural angle of repose and the surface of the grain secured by not less than two tiers of bagged grain or other suitable cargo tightly staowed. The bagged grain or other suitable cargo shall be supported on suitable platforms or on strong separation cloths laid over the whole surface of the bulk grain.(iv)The bags referred to in this clause shall be loosely filled and where used in construction of bulk heads shall be arranged with their mouths laid towards the bulk grain.Grain fittings

17. General.

- All timber used for grain fittings shall be of good sound quality and of a type and grade which has been proved to be satisfactory for the intended use. The actual finished dimensions of the timber shall be in accordance with the requirements for the particular fitting specified in these rules. Plywood of an exterior type, bounded with waterproof glue and fitted in such a manner as to ensure

that direction of the grain in the face piles is perpendicular to the supporting uprights or binders, may be used provided that its strength is equivalent to that of solid timber of the appropriate scantling.

18. Shifting Boards.

- Every shifting board used for complying with any of the provisions of these rules shall be of the size, strength and specification set out in the second Schedule.

19. Uprights.

- Every upright used for complying with any of the provisions of these rules except those used in feeders to which requirements of Cl. (b) of sub-paragraph (2) of paragraph 2 of the First Schedule apply, shall be of the size, strength and specification set out in the Fifth Schedule.

20. Shore.

- Every wooden shore used for complying with any of the provisions of these rules those used in feeders for which separate provisions are made in these rules shall be of the size, strength and specification set out in the Third Schedule.

21. Feeding Holes.

- Where the depth of the hatchway and beams or side girders exceed 0.381 metres (381 millimetres) below the surface of the deck, feeding spaced approximately 0.610 metres (610 millimetres) apart shall be provided as near to deck level as practicable to allow the grain to flow through such beams or girders into the compartments. Such feeding holes shall be of 51 millimetres in diameter where the depth of the hatchway and beams or side girders exceeds 0.381 metres (381 millimetres) but does not exceed 0.457 metres (457 millimetres) and of 88 millimetres in diameter where such depth exceeds 0.457 metres (457 millimetres).

22. Offences.

- Contravention of or failure to comply with any of the provisions of these rules by any person shall be deemed as failure to take all necessary and reasonable precautions for preventing the grain cargoes from shifting and it shall constitute an offence under sub-Secs. (1) and (2) of Section 332 of the Act.First Schedule[See rules 2 (iii) and 5 (1)]

1. Construction of Feeders and Bulkheads. - Feeders and Bulkheads shall be of sufficient strength to withstand the pressure of the grain and shall be grain tight.

2. Construction of wood feeders and bulkheads. - (1) The construction of wood feeders shall conform to either of the specifications and methods set out in sub-paragraphs (2) and (3) of this paragraph.

(2)In feaders constructed of horizontal boards and supported by uprights the following provisions shall apply, namely :-(a)Board. - The unsupported span of 63 millimetres boards shall not exceed the maximum permitted unsupported span specified in Tables 1 and 2 hereinafter set out for feeder sides and feeder ends respectively. The unsupported span for otherboard which shall not be less than 63 millimetres thick, shall not exceed that obtained by modifying the span specified in the aforesaid Tables in direct proportion to the thickness of the board.Table 1Maximum permitted unsupported span of 63 millimetres horizontal boards on feeder sides in metres

Height of feederin metres	Length of feederin metres								
	1	2	3	4	5	6	7	8	9	10
2.5	3.35	2.70	2.39	2.21	2.09	2.00	1.93	1.88	1.83	1.79
3.0	3.26	2.59	2.28	2.10	1.99	1.90	1.83	1.78	1.73	1.69
3.5	3.20	2.51	2.20	2.02	1.91	1.82	1.75	1.70	1.66	1.62
4.0	3.14	2.43	2.13	1.95	1.84	1.75	1.68	1.63	1.59	1.55
4.5	3.11	2.37	2.07	1.89	1.78	1.69	1.63	1.58	1.54	1.50
5.0	3.08	2.31	2.02-	1.84	1.73	1.64	1.58	1.53	1.49	1.45
5.5	3.05	2.27	1.98	1.80	1.69	1.60	1.54	1.49	1.45	1.41
6.0	3.05	2.26	1.95	1.77	1.66	1.57	1.51	1.46	1.42	1.38
6.5	3.05	2.25	1.93	1.74	1.63	1.54	1.48	1.43	1.39	1.35
7.0	3.05	2.25	1.92	1.73	1.60	1.51	1.45	1.40	1.36	1.32
7.5	3.05	2.25	1.91	1.72	1.58	1.49	1.43	1.38	1.34	1.30

Note :- At intermediate feeder heights or breadths, the maximum unsupported span of 63 millimetres boards shall be obtained by interpolation.Table 2Maximum permitted unsupported span of 63 millimetres horizontal boards on feeder ends in metres

Heightof feeder in metres	Lengthof feeder in metres								
	1	2	3	4	5	6	7	8	9	10
2.5	3.75	3.21	3.18	3.18	3.18	3.18	3.18	3.18	3.18	3.18
3.0	3.62	3.02	2.89	2.88	2.88	2.88	2.88	2.88	2.88	2.88
3.5	3.51	2.89	2.67	2.65	2.65	2.65	2.65	2.65	2.65	2.65
4.0	3.40	2.81	2.51	2.46	2.46	2.46	2.46	2.46	2.46	2.46
4.5	3.32	2.74	2.40	2.32	2.21	2.31	2.31	2.31	2.31	2.31
5.0	3.26	2.68	2.34	2.20	2.18	2.18	2.18	2.18	2.18	2.18
5.5	3.25	2.63	2.30	2.13	2.08	2.07	2.07	2.07	2.07	2.07
6.0	3.25	2.63	2.27	2.08	2.00	1.97	1.97	1.97	1.97	1.97

6.5	3.25	2.63	2.25	2.04	1.93	1.89	1.89	1.89	1.89	1.89
7.0	3.25	2.63	2.63	2.01	1.87	1.82	1.82	1.82	1.82	1.82
7.5	3.25	2.63	2.21	1.98	1.82	1.76	1.76	1.76	1.76	1.76

Note : - At intermediate feeder heights or lengths, the maximum unsupportedspan of 63 millimetre boards shall be obtained by interpolation.(b)Feeder upright. - The section modules in cms[1] of uprights used to support the horizontal boards shall be not less than that given by the expression 79.20 psh in the case of wood uprights or the expression of 792 psh in the case of steel uprights whereP = Pressure load in tonnes per metre length of feeder side, or breadth of feeder end, on the portion of the feeder side or feeder end supported by the upright, obtained respectively from Tables 3 and 4 hereinafter set out.S = Half the distance in metres between the nearest upright or support on each side;H = Unsupported height of upright in metres.The scantlings of uprights at feeder corners shall be sufficient to withstand the combined stresses due to feeder side and end loading. Uprights constructed of metals other than steel shall be of equivalent strength to the upright referred to in the aforesaid Table 3.Table 3Pressure load in tons per metre length of feeder side

Heightof feeder in metres	Breadthof feeder in metres									
	1	2	3	4	5	6	7	8	9	10
2.0	1.10	1.55	1.90	2.17	2.40	2.59	2.76	2.92	3.07	3.21
2.5	1.49	2.11	2.61	3.05	3.43	3.75	4.01	4.24	4.41	4.55
3.0	1.90	2.80	3.48	4.04	4.51	4.92	5.27	5.57	5.83	6.05
3.5	2.33	3.52	4.44	5.12	5.66	6.15	6.60	7.02	7.43	7.73
4.0	2.77	4.24	5.38	6.25	6.95	7.57	8.12	8.62	9.08	9.52
4.5	3.22	5.00	6.38	7.42	8.32	9.09	9.74	10.34	10.94	11.54
5.0	3.68	5.78	7.43	8.69	9.76	10.68	11.42	12.22	12.92	13.57
5.5	4.15	6.60	8.49	10.03	11.24	12.33	13.26	14.09	14.90	15.69
6.0	4.63	7.44	9.61	11.37	12.81	14.07	15.16	16.10	17.00	17.89
6.5	5.13	8.32	10.78	12.76	14.43	15.86	17.12	18.22	19.22	20.18
7.0	5.65	9.24	12.00	14.21	16.08	17.69	19.12	20.40	21.57	22.66
7.5	6.20	10.10	13.24	15.68	17.74	19.53	21.17	22.67	24.03	25.25

Note :- At intermediate feeder heights or breadths the pressure load per metre length of feeder side shall be obtained by interpolation.Table 4Pressure load in tonnes per metre breadth of feeder end

Height of feederin metres	length of feederin metres									
	1	2	3	4	5	6	7	8	9	10
2.0	0.67	0.75	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
2.5	0.97	1.14	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
3.0	1.27	1.65	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72
3.5	1.60	2.17	2.33	2.36,	2.36	2.36	2.36	2.36	2.36	2.36
4.0	1.96	2.71	3.03	3.07	3.07	3.07	3.07	3.07	3.07	3.07
4.5	2.36	2.28	3.78	3.86	3.87	3.87	3.87	3.87	3.87	3.87

5.0	2.75	3.88	4.57	4.73	4.77	4.77	4.77	4.77	4.77	4.77
5.5	3.11	4.48	5.39	5.69	5.76	5.76	5.76	5.76	5.76	5.76
6.0	3.50	5.14	6.20	6.65	6.85	6.88	6.88	6.88	6.88	6.88
6.5	3.86	5.75	7.05	7.69	7.97	8.07	8.07	8.07	8.07	8.07
7.0	4.19	6.37	7.90	8.76	9.14	9.35	9.35	9.35	9.35	9.35
7.5	4.52	6.99	8.74	9.82	10.34	10.69	10.69	10.69	10.69	10.69

Note :- At intermediate feeder heights or lengths the pressure per metre length of feeder side shall be obtained by interpolation.(c)Wire Stays. - The breaking strength in tonnes of horizontal wire stays used to support feeder side, or end uprights shall be not less than that given by the expression 3P1S where---P1 = Pressure load in tonnes per metre length of feeder side, or breadth of feeder end, on the portion of the feeder side or feeder end supported by the wire stays, obtained respectively from Tables 3 and 4 hereinbefore set out.= Half the distance in metres between the nearest upright or support on each side;(d)Shores. - The moment of inertia in (cms) 4 of shores used given by the expression 27.00 ..... in the case of wood shores or by the expression in 1.43

P1Si2COSø| in the case of steel shores

where.---P1 = Pressure load in tonnes per metre length of feeder side, or breadth of feeder end, on the portion of the feeder side or feeder end supported by the shore, obtained respectively from Tables 3 and 4 hereinbefore set out;S = Half the distance in metres between the nearest upright or support on each side;I1, = Length of shore in metres; andø = Inclination of the shore to the horizontal which shall be not greater than 45 degrees.(3)Where feeders are constructed of vertical boards, the following provision shall apply namely:(a)Boards. - The thickness of vertical boards in cms. shall be not less than that given by the expression 1.527 Ph2 where--P = Pressure load in tonne per metre length of feeder side, or breadth of feeder end, on the portion of feeder side or feeder end supported by the boards, obtained respectively from Tables 3 and 4 hereinbefore set out; andP2 = Unsupported span of boards in metres.(b)Binders. - The section modulus in centimetres3 of horizontal binders used to support the vertical boards shall not be less than that given by the expression 79.2- P1S1 in the case of wood binders or by the expression 7.92 P1S11 in the case of steel binders whereP1 = Pressure load in tonnes per metre length of feeder side, or breadth of feeder end, on the portion of feeder side or feeder end supported by the binder, obtained respectively from Tables 3 and 4 hereinbefore set out. The vertical extent of the feeder supported by the binder shall be taken as half the distance between the nearest supports above and below the binders; andS1 = Unsupported length of binder in metres. Binders constructed of metals other than steel shall be of equivalent strength to steel binders.Where binders are formed by two planks or metal angle bars or other sections, one fitted on each side of the vertical boards, the effective section modulus shall be taken as 70 per cent of the section modulus obtained by considering each plank or metal angle bar or other section to be fully effective about the neutral axis of the combined section.(c)Wire Stays. - The breaking strength in tonnes of horizontal wire stays used to support binders shall not be less than that given by the expression 3P1S2. Where-P1 = Pressure load in tonnes per metre length of feeder side, or breadth of feeder end, on the portion of the feeder side or feeder end supported by the binder, obtained respectively from Tables 3 and 4 hereinbefore set out. The vertical extent of the feeder supported by the binder shall be taken as half the distance between the nearest supports above and below the binders;S2 = Half the distance in metres between the nearest support on each side.(d)Shores. - The moment of inertia in centimetres of shores used to support

binders shall be not less than that given by the expression| 27.00 P1S2l2COSø| in the case of wood shores or by the expression| 1.43 P1S2l2COSø| in the case of steel shores where-P1 and S2 have the same meaning as given in Cl. (c) of this sub-paragraph;ø = the inclination of the shore to the horizontal which shall be not greater than 45 degrees; andI1 = Length of shore in metres.Second Schedule[See rules 2 (vii) and 18]Requirements for shifting Boards

1. Shifting boards shall have a thickness of not less than 51 millimetres and shall be fitted grain tight and supported by uprights where necessary.

2. The maximum unsupported span of shifting boards of various thickness shall be as follows :

Thickness	Maximumunsupported span
(i) 51millimetres	244 centimetres.
(ii) 63millimetres	355centimetres.
(iii) 76millimetres	396 centimetres.

3. The ends of all shifting boards shall be securely housed with a 76 millimetres minimum bearing length.

4. Where shifting boards of 63 millimetres or 76 millimetres are used the boards may be butt-jointed in way of the uprights and at least 10 centimetres of board shall be supported. Where shifting boards of 51 millimetres are used, the joints shall overlap by at least 23 centimetres at the uprights.

5. Where no permanent grain tight divisions exist, wood filling pieces of the same thickness as the shifting boards shall securely fitted grain tight between the beams.

Third Schedule[See rules 2 (viii) and 20]Requirements of shores

1. Any wood shores except ashore used in feeders to which requirements of Cl. (d) sub-paragraph (2) of paragraph 2 of the First Schedule apply, shall be in single piece and shall be securely fixed at each end and heated against the permanent structure of the ship except that it shall bear directly against the side plating of the ship.

2. Subject to provisions of paragraphs 3 and 4 of this Schedule, the minimum size of every such wood shore shall be as follows :-

Lengthof shores in metres	Rectangularsection in centimetres	Diameterof circular section in centimetres
1	2	3
1.Not exceeding 3.05 metres	15.24x 10.61	13.90
2.Over 3.05 metres but not exceeding 4.88 metres	15.24x 15.24	16.50
3.Over 4.88 metres but not exceeding 6.10 metres	15.24x 15.24	17.78
4.Over 6.10 metres but not exceeding 7.32 metres	20.32x 15.24	19.05
5.Over 7.32 metres but not exceeding 8.54 metres	20.32x 15.24	20.32
6.Over 8.54 metres	20.32x 15.24	21.59

Note. - Shores of 7.32 metres or more in length shall be securely bridged at approximately mid-length.

3. Where the vertical unsupported span of the upright is less than 243.84 centimetres or the horizontal distance between the upright is less than 396.24 centimetres, the size of the shore may be reduced in proportion.

4. Where the angle of the shore to the horizontal exceeds 10 degrees the next larger shore to that required under the provision of paragraph 2 of this Schedule shall be fitted, provided that it in no case shall the angle between any shore and the horizontal exceed 45 degrees.

Fourth Schedule[See rule 2 (ix)]Requirements for Stays

1. Where stays are used in any grain fittings except in feeders for which separate provisions are made in Cl. (c) of sub-paragraph (2) of paragraph 2 of the First Schedule, the following provisions shall apply :

(a)the stays shall be fitted horizontally and shall be of 7.62 centimeters circumference galvanised flexible steel wire rope of 6 x 12 construction having a breaking strength of not less than 19.97 tonnes;(b)the rigging screws shall be of 3.17 centimetres diameter and shall be fitted in accessible positions;(c)the shackles shall be of 2.54 centimetres;(d)the eye bolts through the uprights shall be of 3.17 centimetres; and(e)either eye plates of 2.54 centimetres thickness shall be securely attached to the side stringers or frames or 2.54 centimetres shackles passed through the frame.

2. Where shifting boards do not extend to the full depth of the hold, the shifting and their uprights shall be supported or stayed so as to be as efficient as shifting board which do not extend to the full depth of the hold.

Fifth Schedule[See rules 2 (x) and 19)Requirements for Uprights

1. The horizontal distances between the centres of the uprights except those used in feeders to which requirements of Cl. (b) of sub-paragraph (2) of paragraph 2 of the First Schedule apply, shall be appropriate for the spans of boards set out in the Second Schedule. Such distances shall, in no case, be greater than 396 centimetres. Unless means are provided to prevent the ends uprights being dislodged from their sockets, the depth of housing at each end of each upright shall not be less than 76 millimetres. If an upright is not secured at the top, the upper most shore or stay shall be not more than 549 centimetres down from the deck or top of the upright.

2. The vertical unsupported span of an upright supported on each side by wood shores complying with the requirements of the Third Schedule or by wire stays complying with the requirements of the Fourth Schedule shall be either the distance between the shores or stays or the distance from the ends of the upright to the nearest shore or stay whichever is greater.

3. Wood uprights shall consist of two planks, one on each side of the Shifting board. They shall be thorough bolted in a reeled pattern at alternative boards and shall conform with the scantlings given in the following Table I, namely :-

Table IScantling of double wood plank uprights in centimetres

Verticalun supportedspan in metres	Horizontaldistance between centres of uprights in metres				
	2	2.5	3	3.5	4
Holds up to					
2	25x5	25x5	25x5	25x5	25x5
2.5	25x5	25x5	23x7.5	23x7.5	23x7.5
3	23x7.5	23x7.5	23x7.5	23x7.5	23x7.5
3.5	23x7.5	23x7.5	28x7.5	28x7.5	23x10
4	28x7.5	28x7.5	23x10	23x10	23x10
4.5	23x10	23x10	30x10	30x10	30x10

5	23x10	23x10	23x10	30x10	30x10
5.5	23x10	23x10	30x10	30x10	-
6	30x10	30x10	30x10	-	-
6.5	30x10	30x10	-	-	-

Verticalunsupported span in metres	Horizontaldistance between centres of uprights in metres				
	2	2.5	3	3.5	4
'T ween decks &superstructures up to					
2	25x5	25x5	25x5	25x5	25x5
2.5	25x5	25x5	23x7.5	23x7.5	23x7.5
3	23x7.5	23x7.5	28x7.5	28x7.5	28x7.5
3.5	28x7.5	28x7.5	28x7.5	23x10	23x10
4	28x7.5	23x10	23x10	30x10	30x10
4.5	23x10	23x10	30x10	30x10	30x10
5	23x10	30x10	30x10	30x10	.....
5.5	30x10	30x10	.....	.....	.....
Thickness ofhorizontal boards in centimetres	5	5	6	7.5	7.5

Note. - At intermediate vertical span or horizontal distances the scantlings applicable to the next higher span on spacing shall apply.

4. Steel uprights shall conform with the section modulus given in the following Table II, namely :-

Table IISection Modulus of Steel Uprights in cubic centimetres

Verticalunsupported span in metres	Horizontaldistance between centres of uprights in metres				
	2	2.5	3	3.5	4
Holds upto 2	27.86	34.82	41.79	48.75	55.72
2.5	37.36	46.70	56.04	65.38	74.72
3	51.94	64.92	77.91	90.89	103.87
3.5	66.51	83.13	99.76	116.39	133.02
4	81.09	101.36	121.63	141.90	162.17
4.5	95.66	119.57	143.49	167.40	191.32
5	110.24	137.80	165.36	192.92	220.48
5.5	124.82	156.03	187.23	218.43	249.63
6	139.39	174.24	209.09	243.93	278.78

6.5	153.97	192.46	230.96	269.45	307.94
7	168.54	210.67	252.81	294.95	337.09
7.5	183.12	228.90	274.69	320.47	366.25
8	197.70	247.12	296.55	345.97	395.40
8.5	212.27	265.34	318.41	371.48	424.55
9	226.85	283.56	340.28	396.99	453.71
9.5	241.42	301.78	362.14	422.50	482.86
10	256.00	320.00	384.01	448.01	512.02
10.5	270.58	338.22	405.87	473.52	541.17
11	285.16	356.45	427.74	499.03	570.32
11.5	299.73	374.67	449.61	524.54	599.48
12	314.31	392.89	471.47	550.05	628.63
12.5	328.80	411.12	493.34	575.56	657.78

Verticalunsupported span in metres	Horizontaldistance between centres of uprights in metres				
	2	2.5	3	3.5	4
Tweendecks and superstructures upto 2	32.45	40.56	48.67	56.79	64.90
2.5	43.92	54.90	65.88	76.86	87.84
3	54.57	68.21	81.85	95.50	109.14
3.5	71.94	89.92	107.91	125.89	143.88
4	90.17	112.71	135.26	157.80	157.80
4.5	108.40	135.50	162.60	189.70	216.80
5	126.63	158.29	189.95	221.61	253.26
5.5	144.86	181.07	217.28	253.50	289.72
Thicknessof horizontal Boards in centimetres	5	5	6	6	7

Note. - At intermediate vertical spans or horizontal distances the section modulus steel upright shall be obtained by interpolation.

5. Where uprights are formed by two angle bars or other sections, one fitted on each side of the shifting boards and through bolted at alternate boards, the effective section modulus shall be taken at 70 per cent of the section modulus obtained by considering each angle bar or section to be fully effective about the neutral axis of the combined section.

6. Uprights constructed of metals other than steel shall be of equivalent strength to the uprights referred to in table II above.

Sixth Schedule[See rule 5 (4)1Methods of correction of metacentric height of feeders for free grain surface effects.The correction of metacentric height in cms. of each feeder for the effects of free grain surfaces shall be made in accordance with the following formula, namely :-Where-L-Length of feeders in metres;B-Breadth of feeders in metres;C-Displacement of ship in tonnes; andD-Stowage rate of the grain cargo in question in cubic metres per tonne.Seventh Schedule(See rule 15)Fair Weather and Foul Weather SeasonsFor the purposes of these rules ----(1)The expression "fair weather season' of "fair weather" wherever it occurs shall mean---(a)in the Arabian Sea, the season from the 1st of September to the 31st of May; and(b)in the Bay of Bengal, the seasons from the 1st of December to the 30th of April.(2)The expression "foul weather season' of "foul weather" wherever it occurs shall mean---(a)in the Arabian Sea, the season from the 1st of June to the 31st of August; and(b)in the Bay of Bengal, the seasons from the 1st of May to the 30th of November.