

PHILIPPINE SHIP SAFETY

RULES AND REGULATIONS

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WOODEN HULL

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SUBJECT FOR FINAL REVIEW

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CHAPTER I

SCOPE AND COVERAGE

Regulation 1

General

These Rules and Regulations are geared to ensure that all ships made of wood and motorbanca of Philippine ownership and/or registry, are so designed, constructed, maintained, operated and inspected in accordance with these standards.

Regulation 2

Application

1 All new wooden hull ships and motorbanca intended for operating within the territorial waters of the Philippines, the keels of which are laid or which are at a similar stage of construction on or after 01 January 2019 shall comply with these regulations.

2 For the purpose of these Regulations:

- .1 the expression ships constructed means ships the keels of which are laid or which are at a similar stage of construction;
- .2 the expression all ships means ships constructed before, on or after 01 January 2019;

3 Repairs, alteration, modifications and outfitting.

- .1 All existing ships which undergo repairs and outfitting related thereto shall continue to comply with at least the requirements previously applicable to these ships.
- .2 Repairs, alterations and modifications which substantially alter the dimensions of ship or substantially increase a ship service life and outfitting related thereto shall comply with this rules and regulations. In so far as the Administration deems reasonable and practicable.

CHAPTER II

LOAD LINE

Regulation 1

Load Marking for Wooden-Hulled Ships and for Wooden-Hulled Boats with Outriggers

- 1 All motor boat owners/operators must, at all times and under any conditions, maintain clear and visible load line markings on their boats. Load line marking of a motor boat shall be visible at all times.
- 2 A new Maximum Load Marking Certificate shall be issued if there are changes in the boat's name, distinctive numbers or letters and homeport.
- 3 Motor boat that underwent alteration, modification which affects the size shall be subjected to a new survey, assignment of load line marking and issuance of a new certificate. The old certificate ceases to be valid.
- 4 A Maximum Load Line Marking Certificate shall be valid for a period of not exceeding five (5) years from the date of initial/ renewal survey subject to annual survey and endorsement of the Certificate.

Regulation 2

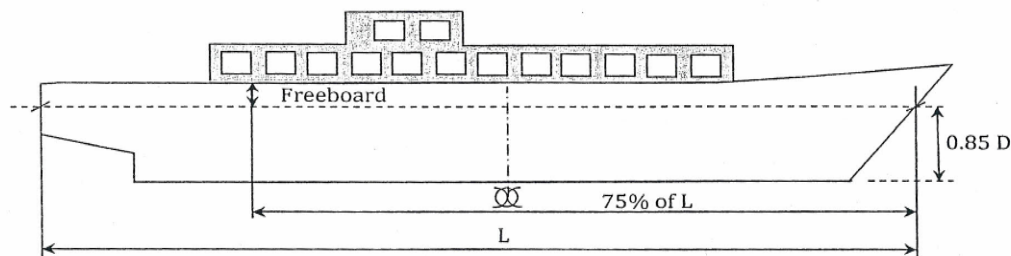
Freeboard

- 1 The minimum freeboard shall be that freeboard at which boats in their maximum condition of loading meet the requirements that the Administration considers appropriate in relation to the type of boat, its service and area of its operation. The minimum free board shall be the greater of:

- .1 250mm; and
- .2 $300 + 44 \times (L - 4.5)$ mm

where L = the length of the vessel in M

- 2 Where the minimum freeboard of a loaded boat occurs at the aft to a point 75% of the length of the boat from the foreside of the foremost part of the boat, excluding guardrails, the minimum freeboard shall be taken to be the freeboard measured at the 75% of the length point. (see Figure 1)



(Figure 1)

3 The Administration may accept a lesser value of freeboard where the construction or the type of vessel makes it impracticable to achieve the freeboard value as calculated above, provided that,

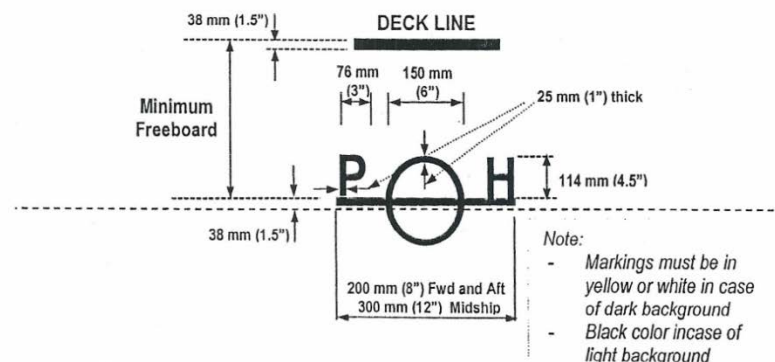
- .1 The minimum freeboard as assigned shall take into consideration that the floaters of the motor boat with outriggers are not in a submerged position; and,
- .2 The safety of the motor boat and the passengers are not compromised.

4 The freeboard shall be taken as the vertical distance between the waterline at which the ship is floating with maximum load on board and shall be measured as follows:

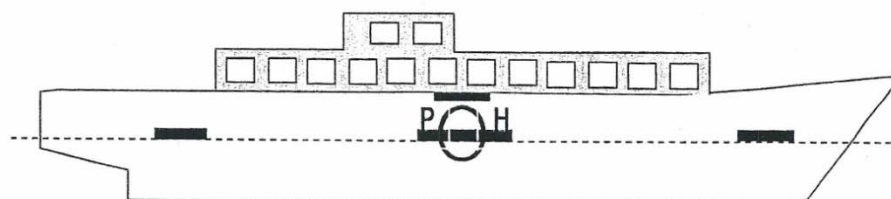
- .1 For a flush deck or well decked boat, from the waterline to the top of the weather deck at the side of the boat;
- .2 For a partially-decked boat, from the waterline to the top of the deck or to the top of the gunwale, whichever is less; or
- .3 For an open vessel, from the waterline to the top of the gunwale.

5 Details of Maximum Load Line Markings

- .1 Boats shall have permanent load line markings placed on each side forward, amidships and aft to indicate the maximum freeboard as determined in accordance with Regulation 2. Such a load line mark shall be a horizontal line of at least 200 mm in Length forward and aft, 300 mm amidships with markings as illustrated in item 4.2, this section. The load line mark should be 38 mm in height, with its upper edge passing through the point of maximum draft. The maximum load mark shall be painted using high grade marine paint in a contrasting color with that of the side shell paint. (Figure 3)
- .2 The letters P and H which indicate the Authority by whom the load lines are assigned shall be indicated alongside the load line ring. The ring shall be 25 mm thick with a diameter of 150 mm while the letter marks shall each



(Figure 2)



Profile (Figure 3)

measure at approximately 114 mm in height, 76 mm in width and thickness of 25 mm.

- .3 Illustration of Maximum Load Marking:

Regulation 3

Implementation

The Administration shall henceforth principally undertake the conduct of actual survey, assignment of maximum load line marking and issuance of the Certificate, through its duly authorized registered Naval Architect.

Regulation 4

Cancellations

- 1 The Administration may cancel a Certificate on any of the following grounds:
 - .1 Tampering or alteration of maximum load markings;
 - .2 Operating/navigating without or with expired/invalid Certificate;
 - .3 Late renewal of Certificate;
 - .4 Failure to meet and maintain the quality of paint marking;
 - .5 Failure to comply for annual Load Marking endorsement.

CHAPTER III

CONSTRUCTION OF WOODEN HULL SHIPS AND FOR WOODEN HULL BOATS WITH OUTRIGGERS

Regulation 1

Materials

1 Wood Species

- .1 The species of wood which may be used for the various constructional members are given in Table 1. A general indication of their known performance in service has been indicated, but in view of the differences in construction methods and in the use of the ship, design considerations may influence the selection of species.
- .2 Group 1 are the species of wood considered to be the most suitable for the purposes set out in Table 1. Group 2 and Group 3 are in descending order of preference, but within each group no attempt has been made to list the individual species in order of preference. It is presumed that the designer will relate the known characteristics, e.g. strength, density, bending and working capabilities, of particular species to the constructional design.
- .3 The inclusion of a wood in Table 1 does not imply that all material available under the particular name is suitable for the use shown, and care must be exercised to ensure that an appropriate grade is obtained.

2 Wood Quality

- .1 The wood is to be of good quality and properly seasoned and is to be free from heart, sapwood, decay, insect attack, splits, shakes and other imperfections which would adversely affect the efficiency of the material. It is also to be generally free from knots, although an occasional sound inter grown knot would be acceptable.
- .2 The wood for the centerline members is to be reasonably seasoned and, where there is a risk of excessive drying-out, it is to be coated with boiled linseed oil or varnish, as soon as erected to prevent splitting.

3 Plywood

The plywood used for the hull and deck planking should be of high grade marine quality.

4 Metal Fastenings

- .1 The materials used for fastenings are to be a suitable composition of the following metal:
 - .1 Copper
 - .2 Galvanized Iron
 - .3 Galvanized steel
 - .4 Silicon bronze

- .5 Aluminum bronze
- .6 Stainless-steel

Table 1 Suitable Woods for Moulded Hull Construction

SPECIES		
Group1	Group2	Group3
Aranga	Banuyo	Almanit
Bansalagin	Dungon	Amugis
Ipil	Guijo	Apitong
Molave	Kalamansanay	Lumbayao
Narra	Malugai	Mayapis
Supa	Mangachapuy	Pagatpat
Tindalo	Narig	Palosapis
Yacal		Pine (Benguet)
		RedLauan
		Tanguile

5 Other materials

- .1 Other materials intended for structural use are to be of good quality, suitable for the purpose intended and to comply with the Administration requirements appropriate to the material. Details of these materials are to be stated on the relevant construction drawings.
- .2 Suitable arrangements are to be made to insulate aluminum alloys from timber and dissimilar metals. Paints containing either lead, mercury or copper are not to be used in conjunction with these alloys.

Regulation 2

Determination of Scantlings

1 General

- .1 The scantlings of a wooden hulled ship of conventional form and proportions, up to a length of 30 m are to be determined from Tables 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 and 14.
- .2 The scantlings will be specially considered where the ship is of unusual design, form or proportions or where either the speed exceeds 20knots or the length, L, exceeds 30m.

2 Recommended Wood for Hull Construction

- .1 The scantlings for the wood members shown in Tables 1, 2, 3, 4, 6, 7, 11, 12 and 14 are based on the following groups, which are for an air-dried condition of about 15percent moisture content:

Frames	}	Group1
Floors		

Keel Stem Sternpost Deadwood
Countertimbers

Group2

Hullplanking
Shelves and clamps
Stringers
Beams and knees
Deck Planking
Deckhouse

Group3

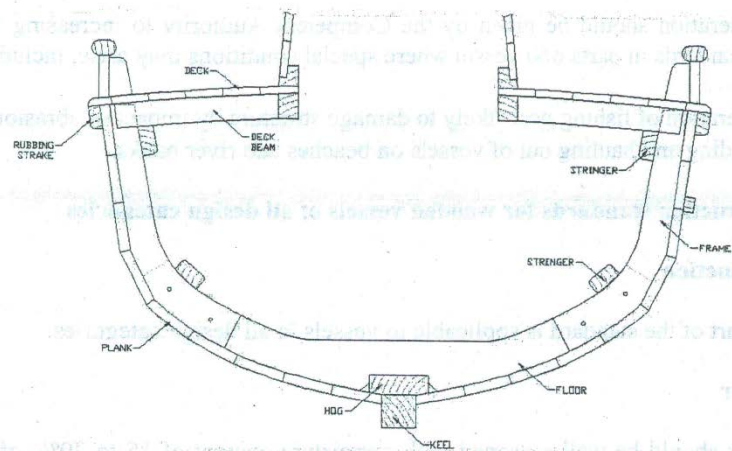


Fig.1 Typical midship section for wooden hulled ship

3

DUGOUT(BAUL)

- .1 The scantlings of the dug-out are given in Table 1.
- .2 Group 2 Wood Materials used for dug out, please refer to Regulation 1 Table 1.

Table 1 Dugout (Baul)

Length of Boat	Type of Wood	Minimum Thickness	Remarks
Below 8 meters	Group 2	3 inch (76.2 mm)	The materials for Dug-out, refer to Regulation I, Table 1
8m– 11.99 m	Group 2	3 inch (76.2 mm)	
12m– 15.99 m	Group 2	3 inch (76.2 mm)	
16m– 19.99 m	Group 2	4 inch (101.6 mm)	
20m– 23.99 m	Group 2	4.5 inch (114.3 mm)	
24m– 27.99 m	Group 2	5 inch (127 mm)	
28m– 31.99 m	Group 2	6 inch (152.4 mm)	
Above 32 meters	Group 2	Thickness should be increased by 25% from the value of 28m – 31.99 m	

Regulation 3

Centerline Structure

1 Wood Keel

- .1 The scantlings of wood keels or the wood keel and hog are given in Table B. The moulding is to be maintained throughout but the siding maybe tape red towards the ends where it is to be not less than the siding of the stem or stern post. The rabbet for the garboard strake is to have a faying surface not less than twice the thickness of the garboard strake or, for plywood, as given in Table 9.

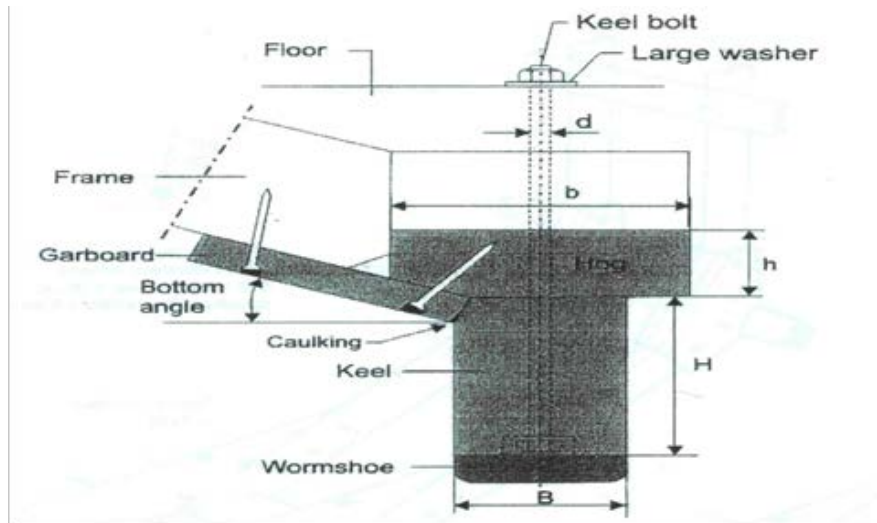


Fig.2 Wood Keel

- .2 When the length, L , does not exceed 10 m the wood keel is to be in one length. In larger craft, the keel should, where possible, be in one length but when a scarph is necessary in the centerline structure it is to have a length, l , not less than 6 times the moulding, m , of the item. The scarph is to be of the hooked or tabled type if bolted (see Fig. 3), or plain type without lips if glued. The depth of the lips is to be about $\frac{1}{4}$ to $\frac{1}{7}$ of the moulding.

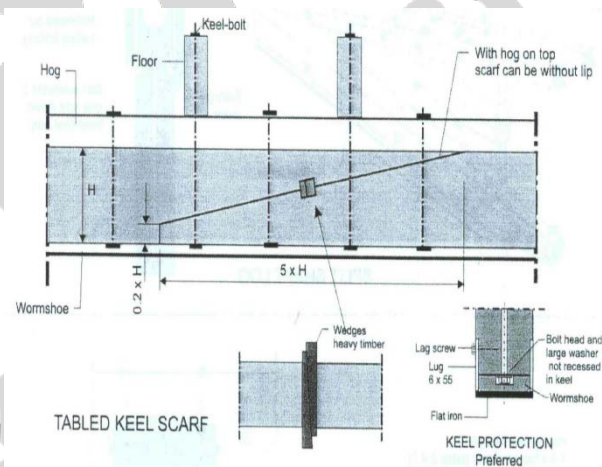


Fig.3 Common types of scarphed joints

- .3 Soft wood stop waters are to be fitted in bolted scarphs in keels and other centerline structure, in way of plank back rabbet and in other positions where considered necessary by the Administration. For typical details, see Fig. 3.
- .4 Scarphs in the keel and hog are to be at least 1.5 m apart and the keel scarph, where fitted, is to be clear of engine seating.
- .5 Where the keel is cut for a center board the siding is to be increased.

Table 2 Keel, Hog, Stem, Sternpost and Fastenings

Length L, m	Moulding and Siding of Keel		Siding and Moulding of Stem at Heel, mm	Siding and moulding of Stem at Head and Sternpost Mm	Diameter of Bolts	
	Minimum Siding of Keel, mm	Sectional Area of Keel or Keel and Hog, cm ²			Centerline Structure	Keel Scarph
6	70	80	75	75	10	8
8	80	130	90	85	10	8
10	90	190	110	95	12	8
12	105	250	125	105	14	10
14	115	310	140	115	14	12
16	125	380	160	125	16	12
18	140	450	175	140	18	12
20	150	520	195	150	20	12
22	165	600	210	160	20	14
24	180	690	230	170	20	14
26	190	770	245	180	20	14
28	205	860	260	190	20	16
30	220	950	280	200	21	18

Notes:

1. The moulding of the keel is to be not less than the siding, and the moulding of the hog is to be not less than twice the thickness of the outside planking.

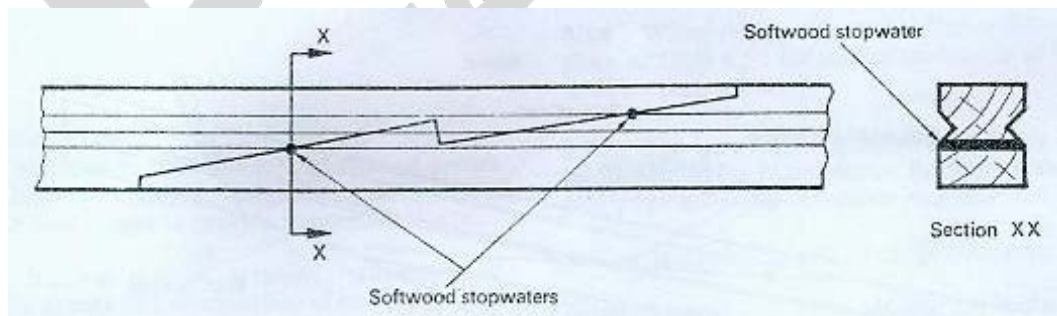


Fig.4 Typical Hooked Keep Scarph Showing Position of Stop waters

2 Stem

1. The scantlings of the stem are given in Table 2 and are to be uniformly tapered from head to heel. The scantlings at the heel may be required to

be increased, depending on the shape of the forefoot, to enable an adequate scarf to the keel to be arranged.

- .2 Where the hull form is such that there is a large radius at the stem head a suitable apron (or fashion pieces) is to be provided to give adequate landing for the outside planking.
- .3 For size of fastenings, see Table 2.

3 Sternpost

- .1 The scantlings of the stern post are given in Table 2. The sternpost may be tapered to suit the form of the craft but the siding at the after edge of the back rabbet is to be not less than that required by Table 2 and care is to be taken to ensure there is adequate material to take the fastenings of the outside planking.
- .2 The lower end of the sternpost is to be ten one or half-lapped to the keel. An inside dead wood or knee is to be fitted and adequately through fastened to the sternpost, and false keel, if fitted.
- .3 For size of fastenings, see Table 2.

4 Counter Wood

- .1 There are of the counter wood at its forward end is to be not less than the area of the sternpost and may gradually be reduced to 75 percent of this area at its after end.
- .2 The counter wood is to be securely fastened to the sternpost and it is recommended that, where practicable, the sternpost should be tenoned or scarfed to the counter timber and through fastened.
- .3 For size of fastenings, see Table 2.

Regulation 4

Framing

1 General

- .1 The hull is to be provided with an efficient system of side and bottom framing in conjunction with stringers, bulk heads or web frames to provide transverse rigidity.
- .2 The framing may be arranged transversely or longitudinally or may be a combination of both.
- .3 All frames are to be beveled or formed to lay closely against the planking.
- .4 Where the heels of frames terminate at the centerline construction members they are to be let in to and fastened to them unless floors are fitted at every frame.

2 Types of Frames

- .1 The following types of frames may be used, subject to the limitations given

in paragraph.3 and.4:

Type1 Bent frames only

Type2 Grown frames only

- .2 Alternative framing systems to those in paragraph.1 will be specially considered.
- .3 The use of Type1 is to be confined to ship having a depth, D , not exceeding 2.7m.
- .4 Where the depth, D , exceeds 3.0m the framing must be Type 2.

3 Scantlings

- .1 The scantlings and spacing of the various types of frames are given in Table 3.
- .2 In no case is the mean moulding of grown, bent or laminated frames to be less than two-thirds of the actual siding except where an increase in the siding is required by paragraph .6. In all cases the siding is to be suitable for the required fastenings.
- .3 Where the spacing of steel frames differs from that given in Table 3 the section modulus is to be modified in direct proportion.
- .4 The scantlings determined from Table 3 are to be maintained for $\frac{3}{5} L$ amidships. Forward of and abaft this region the following reductions may be made:
 - Bent frames - Siding reduced by 10 percent
 - Grown frames - Moulding at heel and siding at head and heel reduced by 20 percent
- .5 In ships the framing adjacent to the mast is to be increased each side as given below or equivalent arrangements provided:

Type 1:	Bent frames only	Three grown frames f Type 2or 3 scantlings (see Table 3) are to be fitted or alternatively, the siding of three bent frames increased by 60 percent
Type 2:	Grown frames only	The siding of three frames increased by 50 percent

- .6 Where internal ballast is fitted the frames maybe required to be increased in strength.

4 Grown Frames

- .1 Grown frames are to be cut to shape from wood having the required curvature of grain.

- .2 The siding of each grown frame is to be uniform over its length and the moulding is to be a fair taper from heel to head.
- .3 Grown frames may be butted or scarphed. Scarphs are to be glued and have a length not less than 6 times the siding. Where frames are butted, the butts are to be close fitted and side clamps arranged. The clamps are to have a sectional area not less than that of the frame and a length not less than 12 times the frame siding. The clamp is to be through fastened to the frame by not less than three fastenings on each side of the butt and is to lay closely to the planking.

5 Bent Frames

- .1 The siding and moulding of bent frames are to be uniform over the length of the frame. Each frame is to be in one piece from keel to gunwale and, where the form is suitable, maybe continuous from gunwale to gunwale.

Table 3 Frames

Depth, D,m	Type1 Bent Wood Frames only			Type2 Grown Frames only		
	Siding,m m	Moulding, mm	Frame spacing, mm	Siding, mm	Moulding mm	
					At heel	At head
1.5	24	19	115	24	31	24
1.8	34	25	170	34	40	31
2.1	40	30	185	42	50	37
2.4	48	36	200	52	61	46
2.7	56	40	215	62	74	55
3	65	45	230	72	87	65
3.3	---	---	---	81	100	80
3.6	---	---	---	90	117	98
3.9	---	---	---	100	140	117

Notes:

1. For limitation on use of Types 1, see *Regulation 4* paragraph 2.3 and 2.4
2. The frame spacing given in the Table is measured from center to center.

Regulation 5

Floors

1 General

- .1 Wood floors are to be cut from timber having a suitable grain.

- .2 Where, at the ends, the frames are continuous across the centerline structure, floors are not required but, where practicable, the frames are to be attached to the centerline structure by two through fastenings.
- .3 Limber holes are to be provided in the bottom structure as required for efficient drainage of the ship.

2 Type of Floors

The type of floor to be fitted is dependent on the frame type adopted as follows:

Type 1:	Bent frames only	<p>(a) Strap floors on every frame within $\frac{3}{5}L$ amidships (on alternates If D does not exceed 2.4 m for motor ship and on every third frame forward and aft.</p> <p>(b) Angle floors spaced as for strap floors in (a).</p> <p>(c) Where $\frac{3}{5}L$ amidships falls within the waterline length floors are to be on alternates to end of waterline.</p> <p>(d) The fitting of wood floors in association with bent frames will be specially considered.</p>
Type 2:	Grown frames only	(a) Wood floors on every frame

3 Scantlings and Construction

- .1 The scantlings of floors are to be as given in Table 4 and the lengths of arms, etc., are to be measured as shown in Fig.5. At the ends of the ship the length of arms need not exceed one-third the length of the frame.
- .2 The cross-sectional area at the ends of the arms is to be not less than half that given in Table 4 for the middle line.

Table 4 - Floors

Depth, D, mm	Floors on Grown						Floors Bent Wood Frames		
	Length of Arms, mm		Strap Floors, mm		Wood Floors at Middle line		Length of Arms, mm	Strap Floors, mm	
	For 3/5L Amidships	Beyond 3/5L Amidships	At Throat	At Point	Moulding, mm	Siding, mm		At Throat	At Point
1.5	380	250	25x10	20x10	55	25	250	25x 6	15x6
1.8	430	300	35x13	30x10	75	35	300	25x9	17x6
2.1	480	350	45x16	40x10	95	45	350	25x12	19x6
2.4	530	390	50x19	45x10	115	55	390	27x12	21x6
2.7	580	430	55x22	50x12	135	62	430	29x15	24x6
3.0	630	480	62x25	53x14	155	70	480	32x16	26x6
3.3	680	530	70x28	56x16	170	80	530	35x17	29x6
3.6	730	570	75x31	60x18	185	90	-	-	-
3.9	780	620	80x31	63x20	200	100	-	-	-

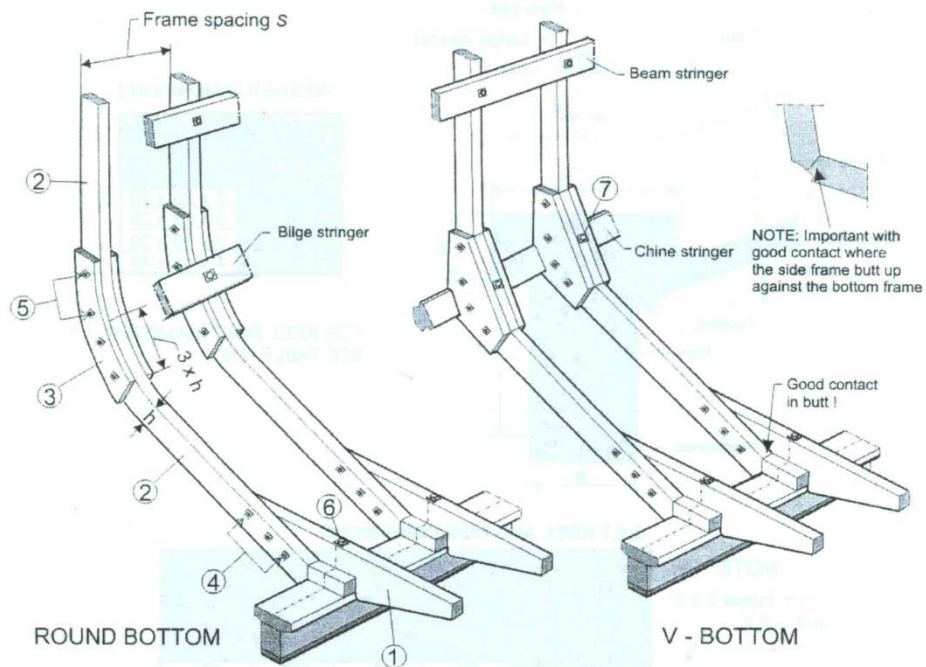


Fig.5 Typical floors

4 Fastenings

- .1 The size of the floor fastenings are to be as given in Table 5.
- .2 There are to be not less than three fastenings in each arm where the length of arm does not exceed 250 mm or four when the arm is 250 mm or greater.
- .3 The throat is to be attached to the wood keel by not less than two through bolts where practicable.

Table 5 Floor Fastenings

Depth, D, m	Diameter of Bolts in Throat, mm		Diameter of Bolts at Arms, mm	
	Grown Frames	Bent Frames	Grown Frames	Bent Frames
Ship				
1.5	8	6	6	6
1.8	10	8	8	6
2.1	12	8	8	6
2.4	12	10	10	8
2.7	14	12	12	8
3.0	18	12	12	10
3.3	20	12	12	10
3.6	20	-	14	-
3.9	20	-	16	-

Regulation 6

Beam Shelf and Clamp, Bilge Stringers, Breast Hooks and Bottom Girders

1 Beam Shelf

- .1 The cross-sectional area of beam shelf for $\frac{3}{5}$ L amidships is to be given in Table 6. Outside this length the area may be gradually reduced to the ends where it may be 25 percent less than that amidships.
- .2 The area of beam shelf determined from Table 6 is to be that clear of beams; the section removed for the beam end is not to impair the efficiency of the shelf.

Table 6 Beam Shelf and Bilge Stringer Scantlings and Fastenings

Length, L, m	Cross Sectional Area of Beam Shelf cm ²	Cross-sectional Area of Bilge Stringer cm ²	Diameter of Bolts, mm		
			Arms of Breast hooks	Beam Shelf Stringer	Hanging Knees
6	32	22	8	6	6
8	40	29	8	6	6
10	50	35	8	6	6
12	60	50	10	8	8
14	80	60	12	8	8
16	100	70	12	8	8
18	110	85	12	10	10
20	130	100	14	12	12
22	150	110	14	12	12
24	170	125	14	12	12
26	190	140	14	12	12
28	210	150	16	12	12
30	240	165	18	14	14

- .3 Where the beam shelf is not fitted in one length, a plain glued scarp is to be arranged. Scarps are to be suitably positioned in relation to joints in other longitudinal members and to hanging knees, etc. The face of the scarp is generally to be in the vertical plane.
- .4 Where there is a raised deck, it is recommended that the main beam shelf be carried to the ends. Where, however, this is not done suitable arrangements are to be made to maintain the longitudinal continuity of the shelf, and the frame scantlings in way may be required to be increased.
- .5 The beam shelf is to be attached to each frame by one through fastening where the moulding of the shelf does not exceed 180 mm and by two through fastenings where the moulding exceeds 180 mm. The size of fastenings is given in Table 6.
- .6 For size of fastenings, see Table 6.

2 Bilge Stringer

- .1 A bilge stringer is to be fitted where the framing is Type 1 (bent only), or where the length, L, exceeds 9.0 m for Type 2.
- .2 The cross-sectional area of bilge stringers for $\frac{3}{5} L$ amidships is to be given in Table 6. Outside this length the area may be gradually reduced to the ends where it may be 25 percent less than amid ships. The greatest dimension of the stringer is to be fitted against the frames.
- .3 Scarps in the port and star board stringers are to be staggered and suitably positioned in relation to joints in other members. The face of the

scarph in the stringer is to be cut parallel to the frames.

- .4 Stringers are to be attached to each frame by one through fastening where the moulding of the stringer does not exceed 180 mm and by two through fastenings when the moulding exceeds 180 mm.
- .5 As an alternative to the fitting of a bilge stringer two or more side stringers maybe fitted. Where two side stringers are fitted the cross-sectional area of each is to be not less than 60 percent of the area for the bilge stringer.
- .6 For size of fastenings, see Table 6.

3 Breast Hooks

- .1 The beam shelf and stringer ends are to be efficiently attached to the centerline construction. Breast hooks and transom quarter knees are to be fitted as necessary.
- .2 The ends of the ship are to be suitably strengthened and particular attention is to be given to this where there is a large overhang.
- .3 For size of fastenings, see Table 6.

4 Bottom Girders

- .1 The engine seating is to be of substantial construction to suit the power of the machinery.
- .2 The longitudinal girders forming the engine seating is to extend as far forward and aft as practicable and to be adequately supported by transverse floors and/or brackets.

Additional side girders may be required in the machinery space and in the bottom of the ship forward.

Regulation 7

Bulkheads

- 1 Collision bulkhead shall be fitted which shall be water tight up to the free board deck. This bulkhead shall be located at a distance from the forward perpendicular of not less than five percent and not more than eight percent of the length of the ship. No doors are to be fitted in collision bulkheads.
- 2 In collision bulkheads the spacing of stiffeners is to be not greater than 460 mm.
- 3 In ships of 15 m length and above, the machinery is to be enclosed between watertight bulkheads extending to the upper deck. Where the arrangement of the bulkheads to the upper deck interferes with the accommodation, modified arrangements may be submitted for consideration. Where accommodation is fitted over the machinery space, the deck is to be gas tight.
- 4 In ships of less than 15 meters length, the machinery is to be enclosed by gastight bulkheads to protect accommodations spaces from gas and vapor fumes from machinery, exhaust and fuel systems.

5 Where practicable, the stern tube should be enclosed in a watertight compartment.

6 All bulkheads should be watertight.

7 The scantlings of wood bulkheads will be specially considered depending on the method of construction.

8 At the level of the decks below the upper deck, angles or flats are to be suitably attached to the bulkheads for taking the fastenings of the wood deck.

Regulation 8

Hull Planking

1 General

- .1 The outside shell may be constructed with wooden planks or marine plywood.
- .2 The thickness of the outside shell and deck planking is to be given in Table 7.

Table 7 Outside and Deck Planking

Length, L, m	Wooden Plank mm	Marine Plywood mm
6	19	9.5
8	21.5	9.5
10	24	9.5
12	28	12.7
14	32	12.7
16	36	12.7
18	39	19.05
20	41.5	19.05
22	43.5	19.05
24	45.5	25.4
26	47.5	25.4
28	50	25.4
30	52	25.4

Notes

1. The basic thicknesses are applicable to single skin carvel or strip outside planking and to a laid deck.

2 Single Skin

- .1 Butts of the outside planking are to be spaced not less than 1.2 m apart and no butts are to be in the same frame space unless there are three strakes between, see Fig. 5. The arrangement of butts at the ends of the craft is to be to the Surveyor's satisfaction.
- .2 The butts in the garboard strake are to be kept clear of the keel scarph. Butts in the sheer strake are to be clear of butts in the covering board.
- .3 Butts in the planking are to be strapped or scarphed.

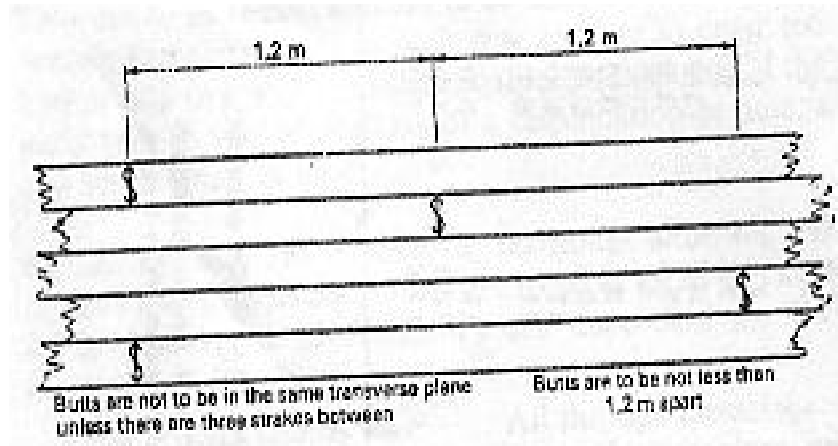


Fig.6 Spacing of Butts

- .4 Wood or metal butt straps are to be arranged between the frames but a drainage space is to be left between the strap and the frame. The breadth is to be sufficient to overlap the adjacent planks by about 12 mm.
- .5 Wood butt straps are to have the same thickness as the planking. Metal straps are to be not less than $\frac{1}{6}$ of the planking thickness, see Fig. 7.
- .6 The planking and the straps are to be through fastened. The size of the fastenings is to be as required by Table 8 for planking to frames, and the number is to be as follows:

Width of Planking, Fastening in mm	Number of Each Plank End
Under 100	3
100 and under 200	4
200 and under 250	5

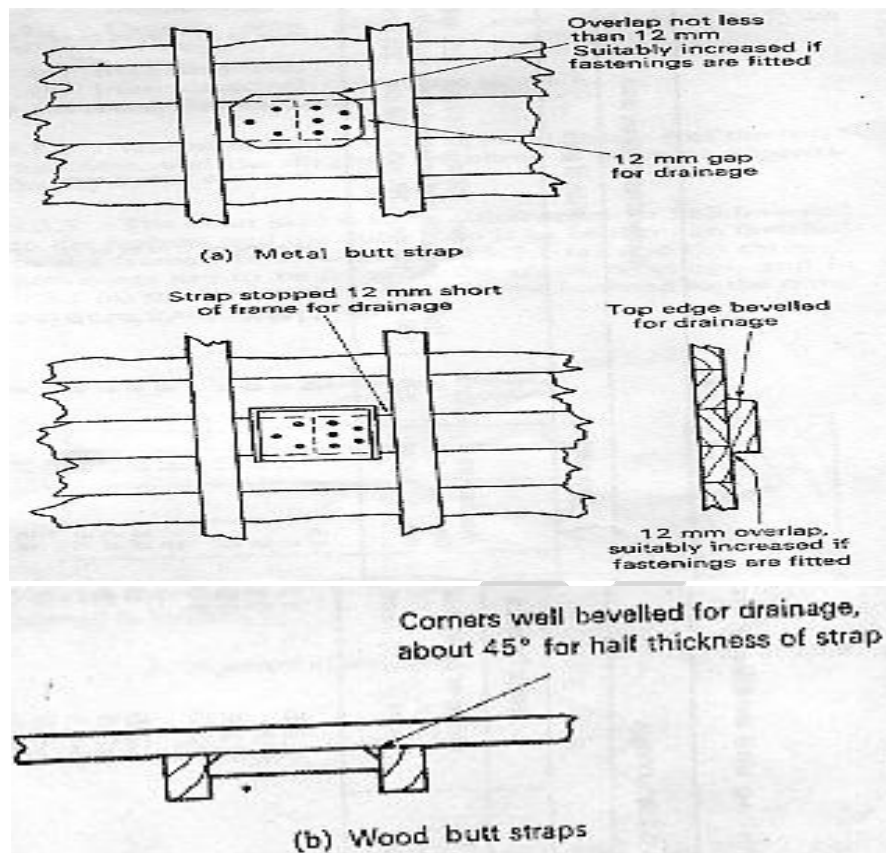


Fig. 7 Typical butt straps on single skin hull planking

- .7 Where, with planks of normal breadth, the length of snapped ends exceeds 250mm, the planks are to be checked into the centerline structure (see Fig. 7). The size of the fastenings is to be as for the garboard strake (see paragraph.8).

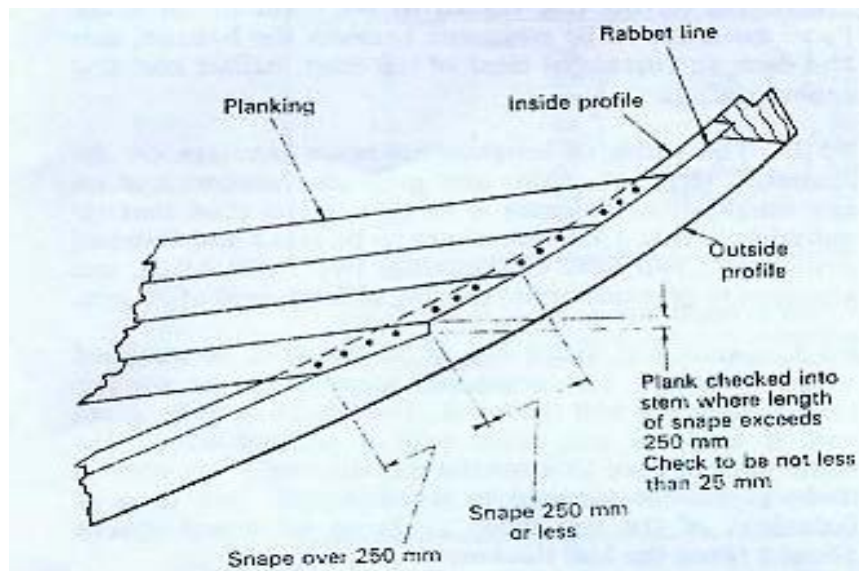


Fig.8 Connection of single planking to centerline structure
(for normal breadth of planking)

- .8 The garboard strakes are to be screw fastened to the keel or hog. The screws are to be of the size required by Table 8 for outside planking to Type 2 grown frames. They are to be reeled, and are to be spaced not more than twelve diameters apart in each row and are to enter the keel or hog to a depth at least equal to the thickness of the garboard. In way of deadwoods a combination of dumps and screws may be used.
- .9 Seams between planks should be caulked with an organic material and then filled with flexible waterproof filler. Synthetic fibers should not be used for caulking.
- .10 The size and number of fastenings attaching the outside planking to the frames are to be as given in Table 8. The type of fastenings are dependent on the framing as follows:

Type1:	Bent frames	All throughout fastenings
Type2:	Grown frames	Through fastenings to be arranged in way of beam shelf, bilge (or side) stringer. The remainder may be screws.

Table 8 Fastenings for Outside and Deck Planking

Planking Thickness mm	Size of Fastenings						
	Outside Planking						
	Grown Frames					Bent Frames	
	Bolts mm	Wood Screws		Copper Ship Nails		Copper Ship Nails	
		Dia. mm	Gauge	Size mm	Gauge	Size mm	Gauge
19	5	5	10	4.5	7	2.5	12
20.5	5	5	10	5	6	3	11
22	6	5	10	6.5	3	3.5	10
23.5	6	5	10	6.5	3	3.5	10
25	6	5.5	12	6.5	3	3.5	9
26.5	6	5.5	12	6.5	3	3.5	9
28	6	5.5	12	6.5	3	4.5	7
29.5	6	5.5	12	6.5	3	4.5	7
31	8	6.5	14	7.5	1	5	6
32.5	8	6.5	14	7.5	1	5	6
34	8	6.5	14	7.5	1	5.5	5
35.5	8	7	16	7.5	1	5.5	5
37	8	7	16	7.5	1	5.5	5
38.5	8	7	16	7.5	1	5.5	5
40	10	8	16	9.5	3/0	6	4
41.5	10	8	18	9.5	3/0	6	4
43	10	8	18	9.5	3/0	-	-
44.5	10	8	18	9.5	3/0	-	-
46	12	8.5	20	11	5/0	-	-
47.5	12	8.5	20	11	5/0	-	-
49	12	8.5	20	11	5/0	-	-
50.5	12	10	24	12.5	7/0	-	-
52	12	10	24	12.5	7/0	-	-

Continuation Table 8 Fastenings for Outside and Deck Planking

Planking Thickness mm	Number of fastenings per plank							
	Deck Planking			Width of Plank				
	Wood Screws		Bolt, mm	Under 100 mm	100 mm and under 150 mm	150 mm and under 180 mm	180 mm and under 205 mm	205 mm and under 225 mm
	Dia. mm	Gauge						
19	4.5	8	5	2	2	3	3	3
20.5	5	10	5	2	2	3	3	3
22	5	10	6	2	2	3	3	3
23.5	5	10	6	2	2	3	3	3
25	5	10	6	1	2	2	3	3
26.5	5.5	12	6	1	2	2	3	3
28	5.5	12	6	1	2	2	3	3
29.5	5.5	12	6	1	2	2	3	3
31	5.5	12	6	1	2	2	3	3
32.5	6.5	14	8	1	2	2	3	3
34	6.5	14	8	1	2	2	3	3
35.5	6.5	14	8	1	2	2	3	3
37	6.5	14	8	1	2	2	2	3
38.5	7	16	8	1	2	2	2	3
40	7	16	8	1	2	2	2	3
41.5	7	16	8	1	2	2	2	3
43	8	18	10	1	2	2	2	3
44.5	8	18	10	1	2	2	2	3
46	8	18	10	1	2	2	2	3
47.5	8	18	10	1	2	2	2	3
49	8	18	10	1	2	2	2	3
50.5	8.5	20	12	1	2	2	2	3
52	8.5	20	12	1	2	2	2	3

3 Plywood Planking

- .1 Plywood is to be fitted in as large panels as practicable having due regard to the form of the ship. Panel butts are to be staggered between the bottom, side and deck and arranged clear of the mast, and engine seating.
- .2 The width of longitudinal seam landings on the centerline structure, chine and gunwale members and on any longitudinal stringers is to be not less than that required by Table 9. Seams are to be glued and fastened with one or two rows of fastenings (see Table 9), and arranged to give maximum spacing of fastenings of 50 mm.
- .3 Butts and seams are to be scarped or strapped where necessary. The

length of a scarp is to be not less than 8 times the hull thickness. The scarp is to be glued and, if made in situ, fitted with a backing strap of a width not less than 10 times the hull thickness. The strap is to be glued and fastened to the hull with two rows of fastenings of the size given in Table 10 and spaced about 8 times the hull thickness.

- .4 Butt straps are to be of the width given in Table 10 and the same thickness as the hull planking. The strap is to be glued and double or triple fastened to the hull with two rows of fastenings of the size given in Table 10.
- .5 The hull planking is to be attached to the frames by fastenings of the size given in Table 9, spaced generally not more than 75 mm apart.

4 Hull Sheathing

- .1 While is not required that the outside planking be sheathed, if this is done it must be efficiently carried out to the satisfaction of the Administration.

Table 9 Plywood Planking: Overlaps and Fastenings

Plywood planking thickness, mm	Minimum breadth of landing between		Fastenings		
	Hull planking and keel or chine, mm	Hull or deck planking and shelf or longitudinal, mm	Wood screws		Copper boat nails, gauge
			Gauge	Dia, mm	
6	25	25	8	4.2	10
8	28	28	10	4.9	10
10	32	32	10	4.9	8
13	44	35	12	5.6	8
16	50	44	12	5.6	8
19	57	50	14	6.3	6
22	63	57	14	6.3	3
25	63	57	16	7.0	3

Table 10 Plywood Planking: Butts and Straps

Plywood planking thickness, mm	Breadth of butt strap, mm	Fastenings		
		Wood screws		Copper boat nails, gauge
		Gauge	Dia, mm	
6	Double fastened { 150	8	4.2	10
8		10	4.9	10
10		10	4.9	8
13		12	5.6	8
16	Treble fastened { 280	12	5.6	8
19		14	6.3	6
22		14	6.3	3
25		16	7.0	3

Notes

1. The gauge of woods screws given in the Table is Standard Gauge
2. The diameter of the wood screw is the nominal diameter of the unthreaded shank.

Regulation 9

Beams

1 Scantlings

The scantlings of ordinary beams, half beams and strong beams are to be not less than those given in Table 11.

2 End Attachments

- .1 All beams are to be fastened to the shelf by dovetails or dowels. See Fig. 9.
- .2 As an alternative to paragraph .1, whereas plywood deck is fitted the beams need not be dovetailed or dowelled but maybe carried past the shelf and checked over it. The depth of the check is to be about one-quarter of the depth of the beam and the beam is to be screw or dump fastened to the shelf.
- .3 Hanging knees are to be fitted as required by Table 11 and are to be arranged at the mast and other strong beams to give a suitable dis position over the length of the ship.
- .4 Hanging knees may be steel straps, flanged plates, angle bar, or grown or laminated timber.

- .5 The dimensions of strap hanging knees are given in Table 11 but at the ends of the craft the length of arms need not exceed one-third of the length of the frame or beam. Angle knees are to have equivalent strength.
- .6 The minimum moulding at the throat of grown or laminated knees is to be 60 or 40 percent, respectively, greater than that required by Table 3 for ordinary grown frames at the heel.
- .7 Each arm is to be connected to the beam and to the frame by four bolts of the diameter given in Table 6. The bolts need not pass through the deck or outside planking.

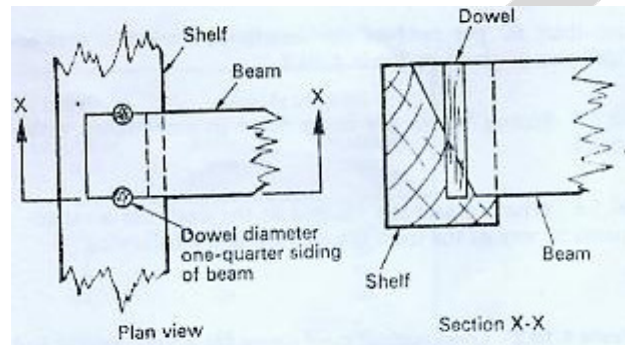


Fig. 9 Dowel fastening of Beam and at Shelf

Table 11 Beams and Hanging Knees

Length of beam mm	Spacing of ordinary beams center to center mm	Ordinary beams for 3/5 L amidship				Ordinary beams beyond 3/5 L amidship, half beams throughout			
		At middle		At ends		At middle		At ends	
		Siding mm	Moulding mm	Siding mm	Moulding mm	Siding mm	Moulding mm	Siding mm	Moulding mm
1.8	250	30	45	30	30	26	33	26	26
2.1	175	36	53	36	36	32	40	32	32
2.4	300	41	60	41	41	36	45	36	36
2.7	325	46	66	46	46	40	50	40	40
3.0	350	51	72	51	51	43	54	43	43
3.3	375	55	78	55	55	46	58	46	46
3.6	400	59	83	59	59	50	63	50	50
3.9	425	62	88	62	62	53	66	53	53
4.2	450	66	94	66	66	56	70	56	56
4.5	475	69	99	69	69	58	74	58	58
4.8	500	72	103	72	72	61	78	61	61
5.1	525	75	108	75	75	63	82	63	63
5.4	550	79	112	79	79	65	86	65	65
5.7	575	82	117	82	82	67	91	67	67
6.0	600	85	121	85	85	69	96	69	69
6.3	625	88	125	88	88	70	100	70	70
6.6	650	91	130	91	91	71	105	71	71
6.9	675	96	137	96	96	73	112	73	73
7.2	700	102	145	102	102	75	120	75	75

3 Local Reinforcements

- .1 The beams and deck are to be suitably strengthened in way of masts, windlass, cleats, sheet winches, etc. Where a mast is stepped on the deck the structural arrangements will be specially considered.
- .2 All deck openings are to be properly framed with carlings fitted to receive the half beams.

Regulation 10

Deck Planking

1 General

- .1 Decks may consist of laid planks or marine plywoods.
- .2 The thickness of laid planks and marine plywoods is to be as given in Table 7.
- .3 Where the beam spacing differs from that given in Table 11, the Table thickness is to be modified at the rate of 1.5 mm per 50 mm difference.

2 Laid decks

- .1 Butts of the deck planking are to be spaced not less than 1.2 m apart and no butts are to be in the same transverse plane unless there are three strakes between. See Fig.6.
- .2 Butts are to be arranged on a beam and are to be of the scarph or caulked lip unless the siding of the beam is sufficient to allow a caulked square butt to be used. See Fig. 10.
- .3 Deck planks are to be attached to the beams by either screw fastenings from above, or side fastening by nails. See Fig. 11.
- .4 Where the beam spacing has been increased it may be necessary to fit horizontal dowels in the planking between the beams.
- .5 The number and size of screws are to be as given in Table 8. Deck covering boards are to be screw fastened to the sheer strake and beams. The screws to the sheer strake are generally to be spaced not more than 12 diameters apart.

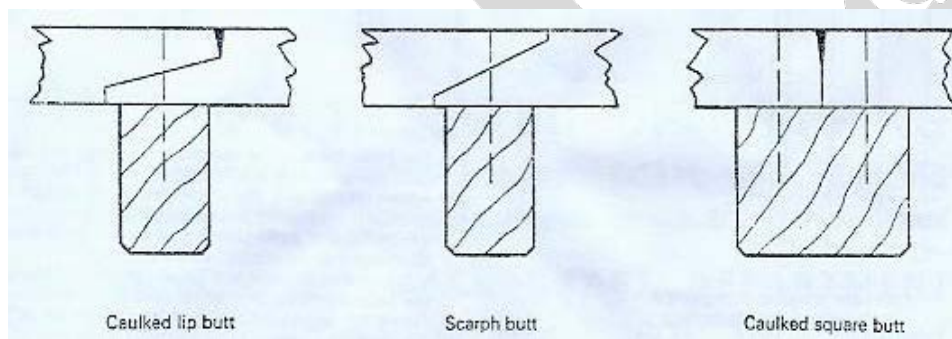


Fig. 10 Butts of Deck Planking

3 Plywood Decks

- .1 Plywood decks are to be fitted in panels as large as practicable.
- .2 Butts are to be clear of those in the side planking and are not to be placed in the vicinity of the mast. They are to be on a strong beam or are to be strapped.
- .3 Seams are to be strapped or scarphed or may be arranged on a longitudinal member having a width sufficient to give a landing of not less than that required by Table 9. Butts and seams are to be sealed watertight.
- .4 Plywood decks are to be glued or bedded to the beams and at the deck edges. They are also to be fastened to the beams and at the edges by screws or barbed nails, as required by Table 9. The fastenings in seams and butts landing on structural members are to be as required for deck

edges. If a strap is fitted, it is to be as required by Regulation 8, paragraph 3.4 for hull plywood planking.

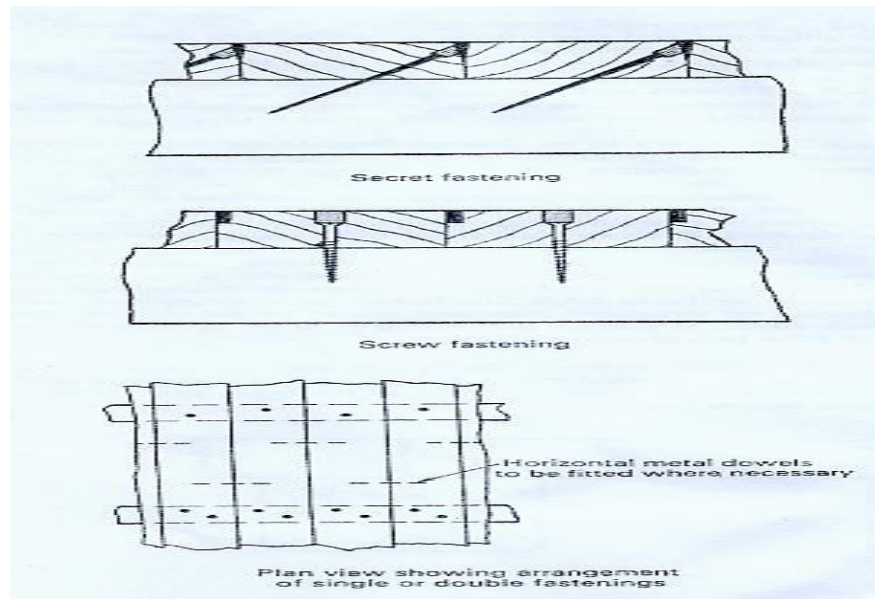


Fig.11 Deck fastenings (laid decks)

4 Water tightness

- .1 Laid decks are to be caulked or any acceptable deck seaming compound, applied in accordance with the manufacturer's recommendations, may be used. Wood dowels are to be glued.
- .2 All weather decks are to be hose tested on completion.

5 Deck Fittings

- .1 Fittings fixed to the deck are to be bedded on a suitable waterproofing compound to maintain the water tightness of the deck.
- .2 It is recommended that in way of heavy fittings such as windlasses, winches, fairleads, etc., the deck planking and the fastening holes be coated with a suitable wood preservative prior to the application of the water proofing compound.
- .3 Guard rail stanchions are to be bedded on a suitable water proofing compound and are to have not less than three fastenings through the palm, one of which is to be a through fastening.

Regulation 11

Deckhouse

1 General

Deck deckhouses are to be substantially constructed and efficiently connected to the carlings and beams.

2 Deckhouse

.1 The scantlings of a deckhouse to be as given in Tables 12 and 14.

Table 12 Scantling of Deckhouse

Length, L, m	Coaming Thickness, mm	Coach roof Deck Thickness, mm
6	17	13
8	19	15
10	22	17
12	24	19
14	26	22
16	29	24
18	32	26

Notes

- Where the deckhouse coaming or deck is of plywood the Table thickness maybe reduced by 30 percent.
- If the deck is covered with canvas or other approved sheathing the Table thickness may be reduced by 1.5 mm.
- Where the beam spacing differs from that given in Table 14, the deck thickness is to be modified at the rate of 1.5 mm per 50 mm difference

Table 14 Deckhouse Beams

Length of Beam, mm	Spacing Center to Center mm	At Middle of Beam		At Ends of Beam	
		Siding mm	Moulding mm	Siding mm	Moulding mm
1.2	255	28	41	28	28
1.5	280	30	44	30	30
1.8	305	34	48	34	34
2.1	330	38	53	38	38
2.4	2.4	41	57	41	41
2.7	2.7	43	60	43	43
3.0	3.0	44	63	44	44
3.3	3.3	44	65	44	44
3.6	455	41	68	46	46
3.9	480	48	71	48	48
4.2	505	50	75	50	50

- Where the deckhouse deck is of plywood the thickness determined from Table 12 may be reduced by 30 percent.
- Where plywood is sheathed with a laid deck the combined thickness may be 30 percent less than the thickness in Table 12 provided that:
 - the thickness of the plywood is not less than 30 percent of the

- combined thickness and in no case is less than 6 mm, and
- .2 where the laid planking is less than 19 mm, the seams are filled with an approved flexible seam compound.
 - .4 If the deckhouse deck is covered with canvas or other approved sheathing the thickness determined from Table 12 may be reduced by 1.5 mm.
 - .5 Where the deckhouse beam spacing differs from that given in Table 14 the strength of the beams is to be modified in direct proportion and the deck thickness is to be modified at the rate of 1.5 mm per 50 mm difference.
 - .6 On small deckhouse where it is desired to dispense with beams the deck thickness will be specially considered.
 - .7 The deckhouse and side deck are to be adequately stiffened in way of the mast. Where a mast is stepped on the coach roof the structural arrangements will be specially considered.

Regulation 12

Cruising Multi-Hulls

1 General

- .1 The procedure given in this Regulation for determining scantlings assumes that:

A catamaran has two identical, but opposite handed, hulls, a trimaran has a main hull and two identical, but opposite handed, floats having a length not less than 80 percent of that of the main hull.
- .2 The scantlings of the hulls and floats are related to the dimensions of the craft as defined as follows:

Catamarans: Breadth, B, is the greatest breadth over both hulls.
trimarans: Breadth, B, is the greatest breadth over floats.
- .3 The breadth, B₁, is the greatest breadth of a single hull in a catamaran and of the main hull in a trimaran. It is to be measured between the points of intersection of the extension of hull sides to the normal line of deck.

2 Keel and Centerline Structure

- .1 The scantlings of the keel and hog are to be 30 percent of the cross-sectional area given in Table 2. The moulding is to provide an adequate landing, as given in Table 9, for the bottom planking, but the siding may be tapered from a mid-ships to the end and may be shaped to form. The keel assemble maybe required to be increased over the $\frac{1}{2} L$ amidships where the bulkheads or frames are widely spaced to support the hull when a ground or on a carriage.
- .2 The moulding of the stem is to provide an adequate landing in

accordance with Table 9 for the hull planking. The stem may be sided to form, but is to be not less than 1 ½ times the moulding at the foot. The moulding may be required to be increased if its strength is impaired by the checking out for longitudinal stringers. A fore-foot knee, sided not less than the stem, and with adequate arms, is to be fitted. An external apron piece, moulded not less than 60 percent of the stem moulding, is to be glued and screwed to the stem. A nosing or fairing piece is to be adequately fastened to the stem apron.

- .3 Where a counter-stern is fitted, the sternpost and counter timber are to comply with Regulation 3 & 4, and the scantlings are to be not less than 50 percent of those given in Table 2. In transom stern designs, the transom is to be not less than the hull planking required by Regulation 8, and is to be attached to the keel by a knee similar to that of the stem forefoot.

3 Framing

- .1 The frames and floors are to be in accordance with Regulation 4 and 5.
- .2 The gunwale and chine members are to be in accordance with Regulation 6 and the areas are to be not less than 50 percent of those given in Table 6 for a beam self or bilge stringer, respectively. The landing for the hull planking is to be not less than that given in Table 9.

4 Main Beams or Outriggers

- .1 The hulls in catamarans and the floats in trimarans are to be supported by two or more continuous beams extending over the breadth, B, of the craft. The main beams are to be suitable positioned longitudinally to keep racking stresses to a minimum.
- .2 The beams may be of solid or laminated timber, or maybe fabricated webs with top and bottom plates, with no undue breaks in the strength of the beams. The beams are to be attached to suitable bulkheads or webs in the hulls and floats.

5 Hull Planking

- .1 The hull planking is to be in accordance with Regulation 8 and maybe generally be reduced in thickness by an additional 10 percent. The planking of the underside of the hull-bridge or float arms may generally be reduced by 25 percent.
- .2 The forward end of the hull bridge is to be substantially framed, and the planking is to be of the same thickness of the main hulls.

6 Deck Structure

The beams and deck planking are to be in accordance with Regulation 9 and 10. The deck planking may be reduced by 10 percent.

7 Superstructures

The superstructures are to in accordance with Regulation 12, but the scantlings given in Table 12 and 14 may be reduced by 15 percent.

8 Equipment Number

- .1 The equipment of anchors, chain cables, hawsers and warps are to be determined based on an 'Equipment' which is to be calculated as follows:

For catamarans:

$$\text{Equipment Number} = 21.52L \left(\frac{B_1}{2} + D \right) + 5.38A$$

For trimarans:

$$\text{Equipment Number} = 16.14L \left(\frac{B_1}{2} + D \right) + 5.38A$$

Where L , B_1 and D , areas defined in General Requirements-Definitions

B and B_1 , are defined in Regulation 12, paragraph 1.2 and 1.3.

A = the summation of the respective length times height, in m^2 , of all erections above the weather deck which have a length or breadth greater than $\frac{B}{2}$.

CHAPTER IV

MACHINERY INSTALLATION

Regulation 1

Definitions

1 Definitions

- .1 Units and formula included are shown in SI units followed by metric units in brackets, where appropriate.
- .2 Where the metric version of the shaft power, i. e. (ship), appears in paragraph .1, ship is equivalent to 75 kgfm/s or 0.735 kW.

Regulation 2

Plans and Particulars

1 Plans

- .1 The following plans in triplicate, are to be submitted for consideration at the earliest opportunity:

Arrangement and details of the straight shafting and stern tube, including the method of attachment of the stern tube to the hull and any bracket or supports.

Propeller, where the diameter exceeds 1m.

Diagrammatic arrangement of exhaust systems indicating materials, methods of cooling and, if waters pray injected, the method of draining.

Starting air system and receivers

Diagrammatic arrangement of pump and piping systems, including air and sounding pipes.

Diagrammatic arrangement of bilge pumps and piping

2 Particulars

Diagrammatic arrangement of oil fuel piping.

Separate fuel tanks having a capacity exceeding 250 Liters.

- .1 The following particulars are to be submitted with the plans of the crank shaft and gear box, as applicable:
 - .1 Name of manufacturer.
 - .2 Type of designation
 - .3 Number of cylinders
 - .4 Firing order of cylinders from free end of the engine.
 - .5 Maximum combustion pressure and mean indicated pressure.
 - .6 Proposed shaft power and revolutions per minute of the engine.
 - .7 Revolutions per minute of the propeller.

- .2 Where the ship have a length of 12 m or less and have no sub- division, plans of bilge systems are not required but particulars of the bilge pumps and diameters of suction pipes are to be submitted.

Regulation 3

Materials

1 Shafting

- .1 Shafts are to be manufactured from carbon or carbon manganese steel or corrosion resistant ferrous or non-ferrous materials which have been forged or rolled.
- .2 Proposals to use extruded non-ferrous materials will receive special consideration.
- .3 Material tests are not required where the maximum diameter does not exceed 80 mm provided suitable documentary evidence of the material specification can be verified.

2 Pumps and Piping Systems

- .1 Hull-side valves and cocks, in let chests, distance pieces and other sea connections are to be of steel, bronze or other approved ductile material, but due attention is to be paid to the compatibility of the material with that of the hull structure. Ordinary cast iron is not acceptable.
- .2 In bilge pump systems and in engine cooling water systems, the pipes are to be manufactured of steel, copper or, in general.
- .3 In oil fuel and lubricating oil systems, the pipes are to be manufactured from steel or copper. However, the use as short joining lengths to the engine of flexible pipes of approved type such as synthetic rubber hoses with single or double closely woven integral wire braider in force mentor convoluted metal pipes with wire braid protection will receive special consideration.

3 Separate Oil Tanks

- .1 Separate oil tanks are to be manufactured from steel, aluminum or a suitable alloy. Steel tanks will require protection against corrosion.
- .2 A suitable means for draining water or sludge from the base of fuel tanks should normally be provided.

Regulation 4

Engine Seating

1 General

- .1 Rigid engine seating is to be constructed integral with the hull of the craft. They are to permit easy access to any fittings such as lubricating oil connections, bilge suctions and seacocks.
- .2 Where the hulls are constructed of wood and the hull surfaces in the vicinity of the engine seating are not adequately protected against oil contamination, drip trays are to be fitted under those parts of the engine and gear box where leakage of oil fuel or lubricating oil might occur. Means are to be provided for removing any leakage easily.

2 Holding Down Bolts

- .1 A sufficient number of fitted bolts or dowels or, alternatively, adequate thrust and collision chocks are to be provided.
- .2 The heads and nuts of holding down bolts are to be properly landed in the fully tightened position and the nuts provided with suitable locking arrangements.
- .3 Where the seating is formed from deep wooden bearers the recesses to accommodate the nuts and washers of the holding down bolts are to be cut at a sufficient depth to ensure ample wood in compression when the nuts are tightened.
- .4 Engine mountings of wood or fabricated from approved reinforced plastics are to be provided with steel or other suitable metal plates in way of engine feet.

3 Resilient Mountings

- .1 Where resilient mountings are fitted, the name of the manufacturer and details of the type of mounting are to be indicated on the plan of shafting.
- .2 Suitable flexible shafting, electric cabling and piping connections are to be provided between the machinery seated on resilient mountings and the associated fixed installations.
- .3 Satisfactory arrangements are to be made to transmit the propeller thrust.

Regulation 5

Starting Arrangements

1 Starting Capacity

Air receivers or batteries used for starting main propulsion engines are to have sufficient capacity to provide, without recharging, not less than twelve consecutive starts of each main engine, if of the reversible type, and not less than six consecutive starts, if of the non-reversible type.

2 Compressed Air

Where compressed air is used for starting purposes, at least two air compressors are to be provided. One compressor maybe operated from the main engine, the other is to be independently driven.

DRAFT
24 JANUARY 2019

CHAPTER V

Propulsion, Shafting and Propellers

Regulation 1

Screw Shafts and Tube Shafts

1 Tube Shafts

A tube shaft is a shaft which passes through a stern tube, but does not carry a propeller.

2 Materials

- .1 Screw shafts and tube shafts are to be manufactured, in general, from materials having chemical composition and mechanical properties as shown in Table 2.1.1.
- .2 Where it is proposed to use materials other than those included in Table 2.1.1, particulars of the chemical composition and mechanical properties including the corrosion fatigue strength in seawater are to be submitted for consideration.
- .3 In theselection of materials for propellers, shafts, keys', locking nuts, etc., consideration is to be given to their compatibility.

3 Diameter of Shafts

- .1 The diameter of screw shafts and tube shafts of materials having properties as shown in Table 2.1.1, is to be not less than that obtained from Fig.2.1.1. In no case is the diameter to be less than 25 mm for carbon and carbon manganese steel shafts and 20 mm for the other materials included in Table 2.1.1.
- .2 Where it is proposed to use materials other than those included in Table 2.1.1, the diameter will be specially considered.

Table 2.1.1 Chemical composition and mechanical properties of screw shaft materials

Material	Chemical composition In%				Minimum tensile strength, in N/mm ² (kg f/mm ²)	Minimum yield or proof stress, in N/mm ² (kg f/mm ²)	Elongation on $5.65 \sqrt{S_0}$
Carbon and carbon Manganese steel	C	0.16	To	0.24			
	Si	0.45	Max to				
	Mn	0.50					
	S P	0.05	max	0.9	400(41)	200(20.5)	26
Stainless steel type 316 (austenitic)	C		Max to				
	Si						
	Mn	70.0		1.0			
	Si	0.2	to	2.0			
	Mn	0.05	to	13.0	460(47)	165(47)	40
	Ni	10	to	18.5			
	Cr	16.5	to	3.0			
	Mo	2.25	to				
Stainless steel type 431 (martensitic)	C	0.12	to				
	Si	0.8	to				
	Mn	1	to		850(87)	675(69)	11
	Ni	2	to	3			
	Cr	15	to	18			
Manganese bronze (high tensile brass)	Cu	56	Max to				
	Sn	1.1	to	60			
	Pb	0.05	to	1.5	510(52)	245(25)	20
	Mn	0.03	to	2			
	Fe	0.025	to	1.2			
	Zn remainder						
Aluminum bronze	Al	8	to	11			
	Ni	4	to	6			
	Fe	4	to	6			
	Mn	2	max		740(75)	390(40)	40
	Cu remainder						
Nickel copper alloy-monel	Ni	63	to 70				
	Mn	2	max				
	Fe	2.5	max				
	C	0.3	max		580(59)	380(39)	40
	Si	0.5	max				
	Si	0.025	max				
	Cu remainder						

Nickel copper alloy- monelK 500	Ni	63	to 70				
	Mn	1.5	max				
	Fe	2	max				
	C	0.25	max				
	Si	1	max		960(98)	685(70)	18
	Si	0.01	max				
	Al	2	to				
	Ti	0.25	to				
	Cu remainder						

4 Shaft Protection

- .1 Screw shafts and tube shafts made from carbon or carbon manganese steel are to be protected by a continuous bronze liner, where exposed to sea water. Alternatively, the liner may be omitted provided the shaft is arranged to run in an oil lubricated bush with an approved oil sealing gland at the after end. Lengths of shafting between stern tubes and brackets which are readily visible when the craft is slipped maybe protected by approved coatings.
- .2 Means for the protection of screw shafts and tube shafts are not required when the shafts are made of corrosion resistant material such as stainless steel and bronze.

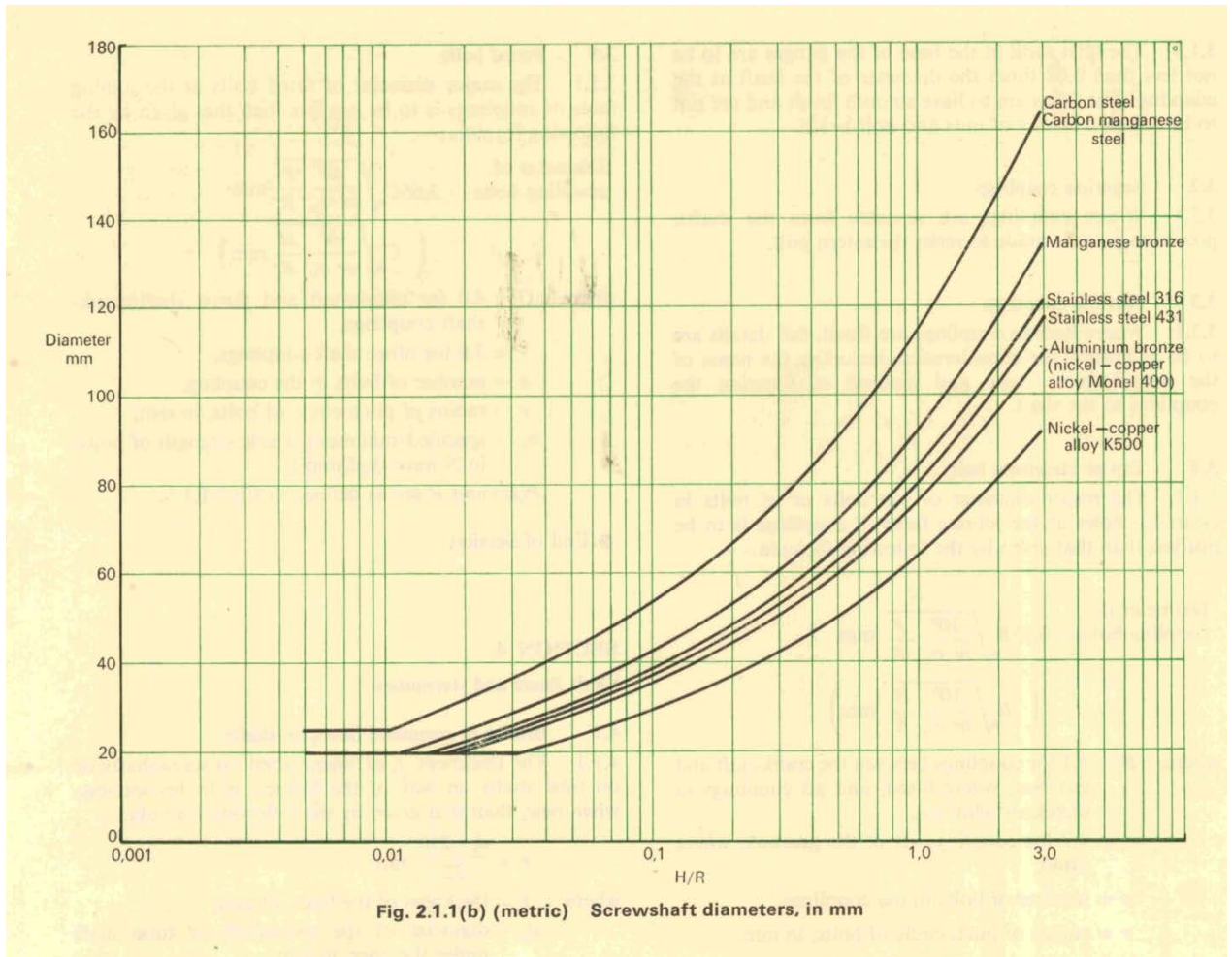


Fig.2.1.1 (metric) – Screw Shaft Diameters, mm

Regulation 2

Intermediate Shafts

Shaft Diameter

1 The diameter, d , of a carbon or carbon manganese steel intermediate shaft is to be not less than determined by the following formula:

$$d = 0.8 \sqrt[3]{\left(\frac{560}{\sigma_u + 160}\right)} mm$$

$$d = 0.8 \sqrt[3]{\left(\frac{57}{\sigma_u + 16}\right)} mm$$

Where d_s = size of a carbon manganese steel screw shaft obtained from Fig. 2.1.1, in mm,

σ_u = specified minimum tensile strength of the intermediate shaft material, in N/mm² (kg f/mm²).

2 Where it is proposed to use materials other than carbon and carbon manganese steel, particulars of the chemical composition and mechanical properties are to be submitted and the diameter will be specially considered.

Regulation 3

Couplings

1 Coupling Flanges

- .1 The thickness of the coupling flanges at the pitch circle of the bolt holes is to be not less than the diameters of the bolts at the joining faces of the couplings.
- .2 In no case is the thickness of the intermediate shaft coupling flange to be less than 0.2 of the diameter of the intermediate shaft required by Regulation 2.
- .3 The thickness of the screw shaft coupling flange is to be not less than 0.25 of the diameter of the intermediate shaft as required by Regulation 2 based on the screw shaft material.
- .4 The fillet radii at the base of the flanges are to be not less than 0.08 times the diameter of the shaft at the coupling. The fillets are to have smooth finish and are not to be recessed in way of nuts and bolt heads.

2 Separate Couplings

Where couplings are separate from the shafts, provision is to be made to resist the stern pull.

3 Flexible Couplings

Where flexible couplings are fitted, full details are to be submitted for consideration including the name of the manufacturer, type and method of securing the couplings is to the shaft.

4 Tap or Clearance Bolts

- .1 The major diameter of tap bolts or of bolts in clearance holes at the joining faces of couplings is to be not less than that given by the following formula:

$$\text{Diameter of coupling bolts} = 3.65B \sqrt{\frac{10^6 P}{nr\sigma_0 R}} \text{ mm}$$

$$\left(B \sqrt{\frac{10^6 H}{nr \sigma_0 R}} \text{ mm} \right)$$

- Where B = 5.1 for couplings between the crank shaft and gearbox, where fitted, and all couplings in directing installations
= 4.7 for couplings aft of the gear box, where fitted
 n = number of bolts in the couplings
 r = radius of pitch circle of bolts, in mm,
 σ_0 = specified minimum yield stress of the bolt material, in N/mm^2 (kg f/mm^2)

Where it is proposed to use wasted bolts, the shank diameter is to be not less than 90 percent of that required by the formula.

2. In order to obtain the required force at the joining faces of the coupling, the bolt tightening torque, T_b , is to be not less than that given by the following formula:

$$T_b = A \frac{d_b P}{nr R} \text{ Nm}$$

$$\left(T_b = \frac{A}{13.35} \frac{d_b H}{nr R} \text{ kgfm} \right)$$

but in no case is T_b to exceed $\frac{d_b^3 \sigma_0}{11600} \text{ Nm (kgfm)}$

- where A = 31000 for couplings between the crank shaft and gear box, where fitted, and all couplings in direct drive installations,
= 26300 for couplings aft of the gearbox, where fitted,
 d_b = actual major diameter of bolt, in mm.
 σ_0 = specified minimum yield stress of the bolt material in N/mm^2 (kgf/mm^2) n, r, P (H) R

5 Fitted Bolts

The major diameter of fitted bolts at the joining faces of couplings is to be not less than that given by the following formula:

$$\text{Diameter of coupling bolts} = 3.65 C \sqrt{\frac{10^6 P}{nr \sigma_0}} \text{ mm}$$

$$\left(C \sqrt{\frac{10^6 H}{nr \sigma_o R}} \text{ mm} \right)$$

Where:

- C = 4.0 for crank shaft and thrust shaft/crank shaft, couplings,
= 3.0 for other shaft couplings,
n = number of bolts in the couplings
r = radius of pitch circle of bolts, in mm,
 σ_o = specified minimum tensile strength of bolts, in N/mm²(kgf/mm²)

Regulation 4

Shaft Liners and Stern Tubes

1 Bronze or Gunmetal Liners on Shafts

- .1 The thickness, t , of liners fitted on screw shafts or ion tube shafts, in way of the bushes, is to be not less, when new, than that given by the following formula:

$$t = \frac{d_s + 230}{32} \text{ mm}$$

Where:

- t = thickness for the liner, in mm,
 d_s = diameter of the screw shaft or tube shaft under the liner, in mm.

- .2 The thickness of a continuous liner between the bushes is to be not less than $0.75t$.
.3 Where a liner is fitted, effective means are to be provided for preventing water from reaching the shaft at the part between the after end of the liner and the propeller boss.

2 Stern Tubes

- .1 The length of the bearing in the stern tube or propeller bracket next to and supporting the propeller is to be as follows;
.1 For water lubricated bearings the length is to be not less than four times the diameter required for the screw shaft.
.2 For water lubricated bearings lined with two or more circumferentially spaced sectors of an approved plastics material, in which it can be shown that the sectors operate on hydrodynamic principles, the length of bearing is to be such that the nominal bearing pressure will not exceed 0,
.3 0.55 N/mm^2 (5.6 kgf/cm^2). The length of the bearing is to be not less

than twice its diameter.

- .4 For bearings which are white-metal lined, oil lubricated and provided with an approved type of oil sealing gland, the length of the bearing is to be approximately twice the diameter required or the screw shaft and is to be such that the nominal bearing pressure will not exceed 0.8N/mm^2 (8.1kgf/cm^2). The length of the bearing is to be not less than 1.5 times its diameter.
- .5 For bearings of cast iron and bronze which are oil lubricated and fitted with an approved oil sealing gland, the length of the bearing is, in general, to be not less than four times the diameter required for the screw shaft.
- .6 For bearings which are grease lubricated, the length of the bearing is to be not less than four times the diameter required for the screw shaft.
- .2 The bearing in the stern tube is to be secured to prevent rotational and axial movement.
- .3 Where screw shaft bearings and tube shaft bearings are made of lignum vitae or approved plastics materials, they are to be so designed as to ensure adequate water lubrication. Depending on the location of the bearing, it may be necessary to supply water to the bearing from a circulating pump or other pressure source.
- .4 Stern tubes are to be carefully fitted and well secured to the hull of the craft. The stern tube, propeller brackets and fastenings in wood craft are to be of corrosion resistant material. The tubes are to be of adequate thickness to provide support for the shaft bushes and to maintain shaft alignment.
- .5 In steel or aluminum craft where the stern tubes are fabricated from the same material as the hull and are not supported and connected at intervals throughout their length to the hull structure, the thickness is to be not less than 0.05 times the internal diameter of the tubes.
- .6 Where stern tubes are fabricated from glass reinforced plastics, full details of the lay-up are to be submitted. The concentricity and alignment of the tube are to be assured and suitable surface finish and fit are to be provided for supporting bushes.
- .7 The sealing gland at the forward end of the stern tube is to be readily and easily accessible for examination and adjustment. The adjustment and securing of the sealing gland is to be made of studs and nuts.

Regulation 5

Shaft Bearing and Alignment

1 Shaft Bearings

- .1 Long unsupported lengths of shafting are to be avoided by the fitting of

steady bearings at suitable positions. Where the span between bearings exceeds 30 diameters, whirling calculations of the propeller and shafting system are to be submitted for consideration.

.2 Bearings fitted under flooring are to be readily accessible.

2 Shaft Alignment

.1 The engines, shafting, stern tubes and propeller brackets are to be carefully fitted and well secured to the hull of the craft so that satisfactory alignment of the shafting will be maintained in service.

.2 The alignment of the stern tube and propeller brackets is to be demonstrated before launching and the shafting and engine alignment verified when afloat.

.3 An approved level indicating device or a glass level gauge fitted with a self-closing valve at the lower end may be used in lieu of sounding pipes for sounding the tanks.

Regulation 6

Propellers

1 Propeller Boss

.1 The propeller boss is to be a good fit on the screw shaft cone. The forward edge of the bore of the propeller boss is to be rounded. The length of the forward fitting surface is to be approximately equal to the diameter of the screw shaft.

.2 It is recommended that audible or visual alarms be fitted to give warning of loss or excessive temperature of cooling water.

2 Keys and Keyways

.1 Rounded ended or sled-runner ended keys are to be used, and the keyways in the propeller boss and cone of the screw shaft are to be provided with a smooth fillet at the bottom of the keyways. The radius of the fillet is to be at least 0,0125 of the diameter of the screw shaft at the top of the cone. The sharp edges at the top of the keyways are to be removed.

.2 Two screwed pins are to be provided for securing the key in the keyway, and the forward pin is to be placed at least one-third of the length of the key from the end. The depth of the tapped holes for the screwed pins is not to exceed the pin diameter, and the edges of the holes are to be slightly beveled. The omission of pins for keys for small diameter shafts will be specially considered.

.3 The distance between the top of the cone and the forward end of the keyway is to be not less than 0.2 of the diameter of the screw shaft at the top of the cone.

.4 The effective sectional area of the key in shear is to be not less than:

$$\frac{d_3}{2.6d_1} mm^2$$

Where:

- d = diameter required for the intermediate shaft determined in accordance with 2.1.1, based on material having a specified minimum tensile strength of 400N/mm² (41kgf/mm²), in mm
- d_1 = diameter of shaft at mid length of the key, in mm.

3 Propeller Brackets

- .1 Propeller brackets are to be carefully fitted and well secured to the hull of the craft.
- .2 For the scantlings of the arms of propeller brackets.

Regulation 7

Determination of Materials Used for Outrigger Arms

1 Bamboo

- .1 Factors to be considered in selection of bamboo culms (whole plants) to be used as outriggers arms and floater:
 - .1 Use only bamboo showing a pronounced brown color. This will ensure that the plant is at least three years old, which is fully grown.
 - .2 Avoid bamboo cut early summer. These culms are generally weaker due to increase fiber moisture content
- .2 The bamboo outriggers should be continuous in length, without cut or scarped and shall be placed above of deck planking.
- .3 Sandwich wooden system for outrigger arms must be applied. The outrigger arms shall be supported by plank from top and bottom with at least ½ of the length of the outrigger arms varied as specified on Table 11 and Figure 4.

2 Timber

- .1 The outrigger arm should be free from scarphed.
- .2 The sizes and materials of outrigger arms as specified in Table 11 and Figure 4.

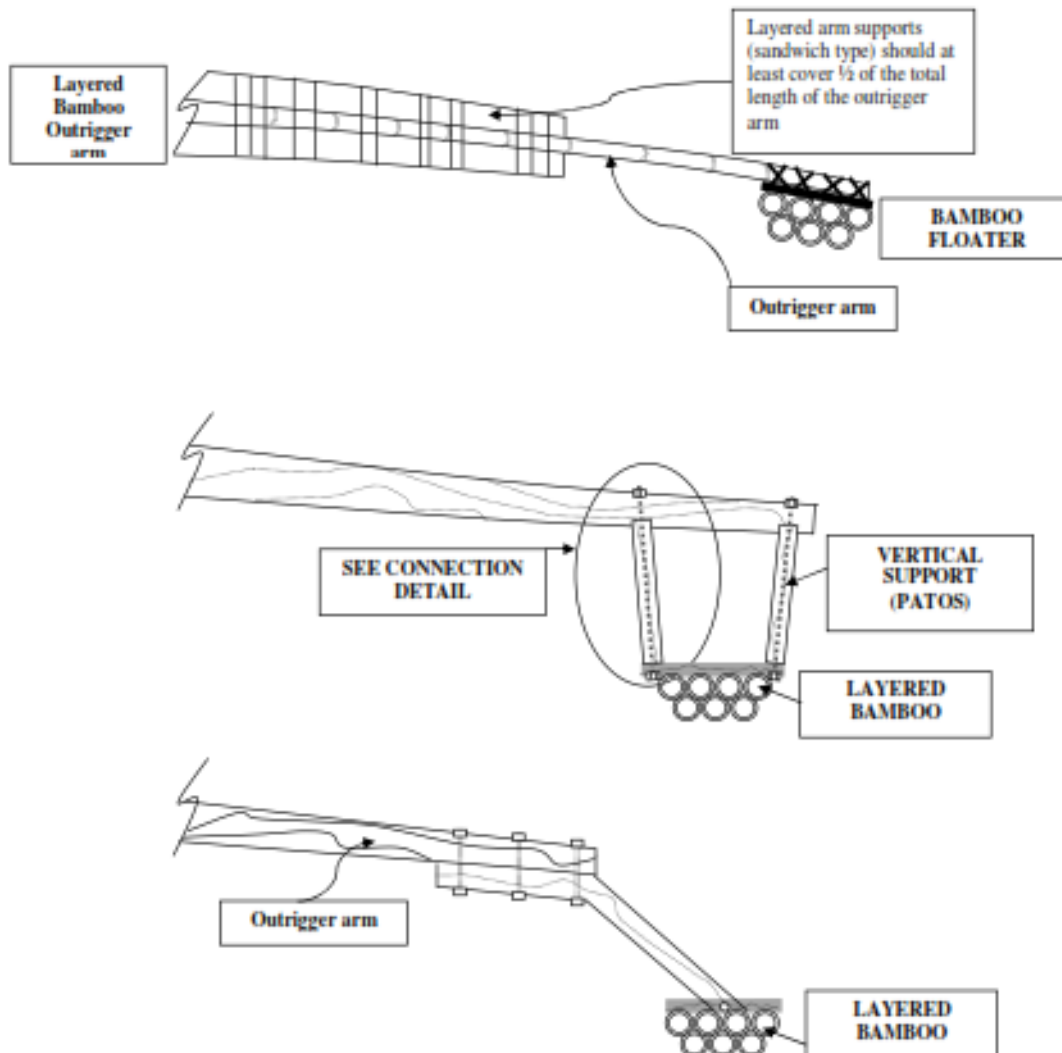
Table 11 Outrigger Arms

Length of Boat	Type of Materials	Minimum No. of Outrigger Arms	Minimum No. of Bamboo	Minimum Diameter of Bamboo	Minimum Size of Outrigger Arms	Minimum Distance from the side of the hull
Below 8 meters	Bamboo w/ plank support (top & bottom) sandwich type	3	3	3 inch dia. (76.2 mm)		3.00 meters
8 m– 11.99 m	Bamboo w/ plank support (top & bottom) sandwich type	3	3	3 inch dia. (76.2 mm)		3.00meters
12 m-15.99 m	Bamboo w/ plank support (top & bottom) sandwich type	3	4	3 inch dia. (76.2 mm)		3.00 meters
16 m–19.99 m	Group 1	4			4inch (101.6 mm)/ 4inch (101.6 mm)	4.00 meters
20 m–23.99 m	Group 1	4			6inch (152.4 mm)/ 6inch (152.4 mm)	5.00 meters
24 m–27.99 m	Group 1	4			8inch (203.2 mm)/ 8inch (203.2 mm)	5.00 meters
28 m–31.99 m	Group 1	4			10inch (254 mm)/ 10inch (254 mm)	7.00 meters
32 m and above	Group 1				Scantling should be increased by 25% from 28 m-31.99 m	

Note:

- Layered arm support (sandwiched type) should at least cover one-half (1/2) of the total length of the outrigger arms. See Figure No.4.
- The design of the outrigger arms, subject to the satisfaction of the Administration.
- Group 1 Materials – refer to Regulation 1, Table A

OUTRIGGER ARMS AND FLOATERS
(Figure 4)



Regulation 8

Floater

1 Bamboo

- .1 The length of the bamboo to be used as a outrigger can be determined per Table 12, the number of bamboo to be use depends upon on the size of the boat to ensure sufficient strength and buoyancy against heeling.
- .2 The size of ties to be use in grouping/combination of bamboo reinforcement shall be determined in Table 13.

2 Other Materials

Fiberglass and other materials maybe use as a floater, subject for review and to the satisfaction of the Administration.

Table 12 Floater

Length of Boat	Type of Wood	Minimum No. of Bamboo	Minimum Diameter at center	Remarks	Distance from the side hull	Method Of Attachment
Below 8meters	Bamboo	3	4inch	The minimum Number of bamboo outrigger or other materials will varies depends on the design, subject to the satisfaction of the Administration	Same distance as indicated in the Table of Outrigger Arms	Direct attachment to the outrigger arms using fishing line, subject to the satisfaction of the Administration or Using vertical extension (patos) should be bolted.
			(101.6mm)			
8m-11.99m	Bamboo	4	4inch			
			(101.6mm)			
12m-15.99m	Bamboo	4	4inch			
			(101.6mm)			
16m-19.99m	Bamboo	6	4inch			
			(76.2mm)			
20m-23.99m	Bamboo	6	4inch			
			(101.6mm)			
24m-27.99m	Bamboo	8	4inch			
			(101.6mm)			
28m-31.99m	Bamboo	8	4inch			
			(101.6mm)			
32m and above		Scantlings should be Increased by 25% from the value of 28m- 31.99m				

Regulation 9

Ties and Knots

- 1 Use 5 meters in length of fishing line of each bamboo ties to the vertical support of the outrigger arms (patos).
- 2 The size of fishing line depends on the length of the boat, as shown in Table 13.

Table 13 Ties and Knots

Length of Boat	Type of Materials	Minimum Gauge	Remarks
Below 8 meters	Fishing Line	200#	Ties and knots, subject to the satisfaction of the Administration.
8m- 11.99m	Fishing Line	200#	
12m-15.99m	Fishing Line	250#	
16m-19.99m	Fishing Line	300#	
20m-23.99m	Fishing Line	300#	
24m-27.99m	Fishing Line	350#	
28m -31.99m	Fishing Line	350#	
32m and above	Fishing Line	Increased by 25% From 28m 31.99m	

Regulation 10

Wood Treatment and Painting

1 Wood Treatment

- .1 Timber exposed to seawater or freshwater should be treated with a suitable paint or preservative to ensure ongoing structural strength and god longevity.
- .2 All components should be primed with suitable paint or preservative before final assembly. This ensures that water does not enter into and remain in structural parts.
- .3 Paints and preservatives should be applied on a regular basis especially in areas where abrasion is common.

2 Application of Painting for Hull and Deck Planking

- .1 Apply one (1) coat of marine paint (primer) all throughout of the hull and deck planking
- .2 Sanding and application of three (3) coats of marine epoxy (putty)
All through out of the hull and deck planking
- .3 Apply one (1) coat of marine paint (primer)
- .4 Apply one (1) coat of marine paint (glossy)
- .5 Apply two (2) coats of anti-fouling in dug-out

Regulation 11

Visibility

- 1 Pilot Cockpit shall be located where the boat captain has clear visibility of the seaway.
- 2 The side of the boat, at all times, is to be visible from the Pilot Cockpit, regardless of the weather conditions.

Regulation 12

Watertight Integrity

Drainage of Boat with Deck

- 1 The weather deck on all boat shall be watertight or fitted with closure to ensure watertight integrity. The drainage from the weather deck shall be such that the watertight integrity is not compromised.
- 2 When a deck is fitted with partial bulkheads such that shipped water may be trapped, the partial bulkheads shall be provided with efficient freeing ports.
- 3 The area freeing ports shall be at least 5% of the bulkheads area and be situated in the lower third of the bulkheads height, the bottom of which shall be flush with the deck.
- 4 In a boat in which freeing ports cannot be fitted, other efficient means of clearing trapped water from the vessel shall be provided to the satisfaction of the Administration.
- 5 Structures and spaces considered non-watertight shall be provided with efficient drainage free flow of water from the deck.

Regulation 13

Subdivision

- 1 Collision Bulkheads
 - .1 A new boat of 20 m or more in length is required to have a collision bulkhead fitted in accordance with regulations 9, 2.1 and 2.2.
 - .2 A new boat of less than 20 m length shall have a collision bulkhead where it carries 12 or more passengers.
 - .3 The Administration shall determine the extent to which this regulation is applied to existing boat.
- 2 Construction and Location of Collision Bulkheads
 - .1 Each collision bulkhead required by regulation 9.1 shall be constructed in accordance with regulation 9.3 except that it shall:-
 - .1 extend to the weather deck or tone deck above the bulkhead deck, whichever is lower.
 - .2 not to be fitted with any type of penetration or opening except penetration may be made where they are located as high and as far

inboard as practicable and they have a means to make them watertight.

- .2 The forward collision bulkhead required to be on a boat by regulation 9.1 shall be:-
 - .1 located at least 5 percent but not more than 8 percent of the length between perpendiculars (LBP) aft of the forward perpendiculars.
 - .2 installed in a single plane, with no recess or step, at least up to the bulkhead deck.
- .3 The after collision bulkhead on a double-ended boat of 20 m (65 feet) or more in length required by regulation 9.1.3 shall be;
 - .1 located at least 5 percent but not more than 8 percent of the LBP forward of the after perpendiculars and; shall be;
 - .2 installed in a single plane, with no recess or step, at least up to the bulkhead deck.

3 Watertight Subdivision Bulkheads

- .1 Where a boat is required to be fitted with watertight collision or subdivision bulkhead shall be of sufficient strength to be capable of remaining watertight with a head of water to the top of the bulkhead.
- .2 Each watertight bulkhead shall be extended to the bulkhead deck and shall be installed in one plane with outsteps or recesses in so far as in reasonable or practicable.
- .3 The number of penetration in a watertight bulkhead shall be minimized. A penetration in a watertight bulkhead shall be as high and as far in board in the bulkhead as practicable, and made watertight.
- .4 The Administration shall determine the extent to which this regulation is applied to existing boat.

4 Subdivision of Cargo Boat

A new boat of 12 m or more in length carrying cargo shall be fitted with watertight bulkheads at each end of the main propulsion machinery space.

5 Subdivision of Passenger Boat

- .1 A new passenger boat of 20 m or more in length shall be fitted with watertight bulkheads fitted in accordance with regulation 9.6.
- .2 A new boat of less than 20 min length shall have watertight bulkheads in accordance with regulation 9.6.2, where it:
 - .1 carries 50 or more passenger; or
 - .2 is of more than 12 min length and is certified to operate in coastal waters; or

.3 is certified to operate in exposed waters.

6 Location of Watertight Bulkheads for Subdivision

.1 The maximum distance between adjacent main transverse watertight bulkheads on a banca, required by regulation 9.5 to comply with this regulation, shall not to be more than the smaller of the following:

- .1 one third of the length of the bulkhead deck; or
- .2 the distance given by the following equation:

$$d = (F)(f)(L) D$$

Where:

F= the floodable length factor from Table III/21.1;

f= the effective freeboard in meters calculated for each pair of adjacent bulkheads in accordance with 9.6.2;

L= Length over Deck in meters measured over the bulkheads deck; and

D= the depth in meters (feet), measured amidship at a point one-quarter of the maximum beam out from the centerline, from the inside of the bottom planking or plating to the level of the top of the bulkhead deck. (See Figure III/21-1).

Table 21
Table of Floodable Length Factors

$(d/L) \times 100$	F
15	0.33
20	0.34
25	0.36
30	0.38
35	0.43
40	0.48
45	0.54
50	0.61
55	0.63
60	0.58
65	0.53
70	0.48
75	0.44
80	0.40
85	0.37
90-100	0.34

Note 1: Where:

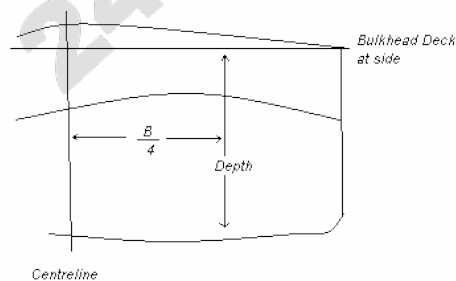
d=distance in meters (feet) from the midpoint of the compartment to the forward-most point on the bulkhead deck excluding sheer; and

L= length over deck in meters (feet) measured over the bulkhead deck.

Note 2:

Intermediate values of floodable length factor may be obtained by interpolation.

Figure III/21-1 Transverse Location for Measuring Depth (D)



- i. The effective freeboard for each compartment is calculated by the following:

$$f = (a+b)/2$$

Where:

f = the effective freeboard in meters (feet).

a = the free board in meters (feet) measured:

- .1 at the forward main transverse watertight bulkhead; and
- .2 from the deepest waterline to:
 - .1 the top of the bulkhead deck on a flush deck boat; and
 - .2 where the boat has a stepped bulkhead deck, then to the line shown in Figure III/21-2; or
 - .3 where a boat has an opening scuttle (porthole) below the bulkhead deck, then to the line Figure III/21-3.

b = the free board in meters (feet) measured:

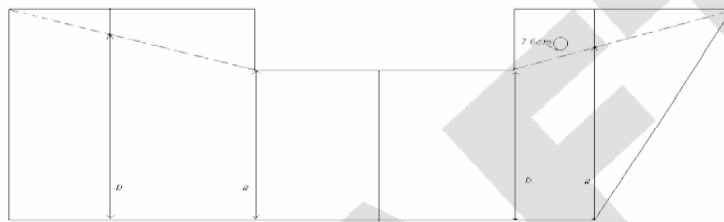
- .1 at the aft main transverse watertight bulkhead; and
- .2 from the deepest waterline to:
 - .1 The top of the bulkhead deck on a flush deck boat;
 - .2 where a boat has a stepped bulkhead deck, the line shown in Figure III/21-2; or
 - .3 where a boat has an opening scuttle (porthole) below the bulkhead deck, the line shown in Figure III-21-3.

Figure III/21-2 Free board Measurement Boat with Stepped Bulkhead Deck



(a and b shown for two sample compartment)

Figure III/21-3 Freeboard Measurement Boat with Stepped Bulkhead Deck and a Porthole below the Bulkhead Deck



A boat to be fitted with watertight bulkheads shall be measured in accordance with the simplified subdivision calculation.

Regulation 14

Watertight and Weathertight Openings

1 Hatchways

- .1 A hatchway, which gives access to spaces below the weather deck shall be of efficient construction and be provided with efficient means of weathertight closure.
- .2 A cover to a hatchway shall be hinged, sliding or permanently secured by other equivalent means to the structure of the boat and be provided with sufficient locking devices to enable it to be positively secured in the closed position.
- .3 A hatchway with a hinged cover which is located in the forward portion of the boat shall normally have the hinges fitted to the forward side of the hatch, as protection of the opening from boarding sea.
- .4 Hatches, which are required to be kept closed for safety reasons, when the boat is at sea shall have prominent "keep closed" warning notices attached to the vessel structure on both sides.

2 Plank Sheer (Sintas)

- .1 The scantlings of the plank sheers (sintas) are given in Table 8.
- .2 The Group 3 Wood Materials, please refer to Regulation 1 Table A.

- .3 Plank Sheer is supporting the outrigger arm and fastened to the frames and beam shelf.

Table 8 Plank Sheer (Sintas)

Length of Boat	Type of Wood	Minimum Thickness	Minimum Width
Below 8 meters	Group3	2 inch(50.8mm)	4 inch(101.6mm)
8m-11.99m	Group3	2 inch(50.8mm)	4 inch(101.6mm)
12m-15.99m	Group3	2inch(50.8mm)	6inch(152.40mm)
16m-19.99m	Group3	2inch(50.8mm)	6inch(152.40mm)
20m-23.99m	Group3	3inch(76.2mm)	8inch(203.2mm)
24m-27.99m	Group3	3inch(76.2mm)	8inch(203.2mm)
28m-31.99m	Group3	3inch(76.2mm)	8inch(203.2mm)
32m and above	Group3	Scantlings should be increased by 25%from the value of 28m-31.99m	

CHAPTER VI

Electrical Installation

Regulation 1

General Requirements

1 General

The requirements of this part are applicable to the electrical installations in wooden hulled ship where:

- .1 All electrical auxiliary services necessary for maintaining the ship in normal operational and habitable conditions will be ensured without recourse to the emergency source of electrical power;
- .2 Electrical services essential for safety will be ensured under various emergency conditions; and
- .3 The safety of passengers, crew and ship from electrical hazards will be ensured.

2 Plans

The following plans, in triplicate copies to be signed and sealed by Professional Electrical Engineer (PEE) and submitted for approval:

- .1 Schematic Wiring Diagram
- .2 Schedule of Load and Specification

3 Additions and Alterations

An addition, temporary or permanent, is not to be made to the rated load of an existing installation until it has been established that the rating of the existing cables, switch gear and other equipment is adequate for the increased load subject for approval of the Administration.

4 Survey

The installation is to be under the charge of a duly registered professional electrical engineer or registered electrical engineer or registered master electrician and shall be inspected and tested by the MARINA surveyor to their satisfaction.

Regulation 2

System Design

1 Systems of Distribution

Type of Systems

- .1 Alternating Current System:
 - .1 3-phase,3 wire insulated system;
 - .2 Single phase,2 wire insulated system,
 - .2 For Direct Current System, 2 wire insulated system
- Ear thing connections are not to be made to hull sheathing, skin fittings or

plumbing.

2 System Protection

- .1 Electrical systems and equipment shall be protected from the effects of over current by suitably rated fuses or circuit breaker.
- .2 Circuit breakers shall be:
 - .1 the proper voltage type and rating;
 - .2 be the manual reset type;
 - .3 have instantaneous short circuit protection capable of repeatedly opening the circuit in which they are used without failure; and
 - .4 be of trip-free type
- .3 Fuses of the proper rating may be used for circuit protection, but shall be used in conjunction with a switch located between the fuse and source of power, fuse holders shall be suitable for use in sea atmospheres.
- .4 A master battery isolating switch shall be provided in accordance with the following:
 - .1 be capable of carrying the continuous maximum current of the system in each ungrounded conductor;
 - .2 the continuous rating of the switch shall be not less than the total ratings of the main over current protection devices connected to it;
 - .3 be capable of carrying the intermittent maximum cranking current of the largest engine cranking motor;
 - .4 shall be located as close to the battery as practicable but readily accessible in the event of an emergency;
 - .5 when used with a diode rectified alternator or third brush generator incorporate a means for breaking the field circuit when the battery
 - .6 Load is removed from the system.
- .5 Each ungrounded conductor of circuits supplying lights, motors or electrical accessories shall be protected against overload at the distribution panel or switchboard serving as the source of power; each navigation light branch circuit shall be protected by a separate overcurrent device installed in each ungrounded conductor.

3 Batteries

- .1 Batteries shall be located in a compartment, locker or boxed reserved solely for that purpose; they shall not be located in accommodation spaces; batteries intended for emergency purposes shall be installed in a protected location as high as possible in the vessel.
- .2 Indication shall be provided that the battery is being maintained in a state of charge.

4 Cables

- .1 Cables may be of a suitable commercial grade with stranded copper conductors and rated for at least 75° C service.
- .2 Portable cords or portable cables shall not be used for fixed wiring.
- .3 Cables shall be secured by clips or straps of non-ferrous material; staples shall not be used for this purpose.
- .4 Cables shall be routed as high as possible above the bilge with prime consideration given to the protection of the wiring from mechanical damage and heat damage.
- .5 Exposed wiring subject to mechanical damage shall be protected by conduit or other equivalent means.
- .6 Cables terminating in equipment capable of generating high temperatures such as lighting fixtures etc., shall be suitable for operation at the temperature of the equipment.
- .7 Current carrying capacities of cables will be assigned in accordance with current rating specified on Philippine Electrical Code.

5 Switchboards & Distribution Panels

- .1 Switchboard and electrical distribution panels shall be located in accessible well ventilated locations protected from rain spray, where necessary, panels shall be provided with a drip shield.
- .2 Switchboard or other electrical panels or junction boxes located adjacent to weather decks or in open cockpits shall be enclosed or protected from deck wash.
- .3 Switchboards shall be so installed that no pipes or tanks are above them within the same space; where this is unavoidable, pipes shall be without joints in such positions.
- .4 Switchboard supports shall be of substantial and durable construction and shall be capable of withstanding electro-mechanical stresses which may arise from short-circuit faults; all panels shall be of substantial construction to withstand vibration, and hinged panels and doors of dead front switchboards shall be provided with positioners and stops.
- .5 Switchboards and panel boards shall be designed so there are no exposed live parts accessible to operating personnel under normal operation.

6 Distribution

- .1 Joints and connections in all electrical conductors shall be mechanically and electrically secure and made only in junction or outlets boxes.
- .2 Joints shall be capable of withstanding the vibration and movement encountered in normal service.
- .3 Metal alloys used shall be corrosion-resistant and galvanically compatible

with copper conductors.

- .4 With the exception of the thread cutting type of connector, twist-on type connectors shall not be used for making joints in cables.
- .5 Lamps which are exposed to the weather, spray and drip shall be enclosed in weatherproof fittings.

DRAFT
24 JANUARY 2019

CHAPTER VII

Regulations for Preventing Collisions at Sea, 1972 Light and Shapes

Regulation 1

Visibility of Lights

The lights prescribed in these Regulation shall have an intensity so as to be visible at the following minimum ranges:

- 1 In vessels of 12 meters or more in length but less than 50 meters in length:
 - .1 a mast headlight, 5 miles; except that where the length of the vessel is less than 20 meters, 3 miles;
 - .2 a sidelight, 2 miles;
 - .3 astern light, 2 miles;
 - .4 a towing light, 2 miles;
 - .5 a white, red, green or yellow all-round light, 2 miles.
- 2 In vessels of less than 12 meters in length:
 - .1 A mast head light, 2 miles;
 - .2 a sidelight, 1 miles
 - .3 a stern light, 2 miles;
 - .4 a towing light, 2 miles;
 - .5 a white, red, green or yellow all-roundlight, 2 miles
- 3 In inconspicuous, partly submerged vessels or objects being towed by a white all-round light, 3 miles.

Regulation 2

Power-Driven Vessels Underway

A power-driven vessel underway shall exhibit:

- 1 A mast headlight forward;
- 2 A second mast headlight abaft of and higher than the forward one; except that a vessel of less than 50 meters in length shall not be obliged to exhibit such light but may do so;
- 3 sidelights;
- 4 a stern light.

Regulation 3

Positioning and Technical Details of Lights and Shapes

- 1 Vertical Positioning and Spacing of Lights
 - .1 On a power-driven vessel of 20 meters or more in length the mast

headlights shall be placed as follows:

- .1 The forward mast headlight, or if only one mast headlight is carried, then that light, at a height above the hull of not less than 6 meters, and, if the breadth of the vessel exceeds 6 meters, then at a height above the hull not less than such breadth, so however that the light need not be placed at a greater height above the hull than 12 meters;
- .2 When two mast headlights are carried the after one shall be at least 4.5 meters vertically higher than the forward one.
- .2 The vertical separation of mast headlights of power-driven vessels shall be such that in all normal conditions of trim the after light will be seen over and separate from the forward light at a distance of 1.000 meters from the stem when viewed from sea-level.
- .3 The mast headlight of a power-driven vessel of 12 meters but less than 20 meters in length shall be placed at a height above the gunwale of not less than 25 meters.
- .4 A power-driven vessel of less than 12 meters in length may carry the uppermost light at a height of less than 2.5 meters above the gunwale. When however a mast headlight is carried in addition to sidelights and a stern light or the all-round light prescribed in Regulation 2 is carried in addition to sidelights, then such mast headlight or all-round light shall be carried at least 1 meter higher than the sidelights.
- .5 The mast headlight or lights prescribed in Regulation 2 shall be so placed as to be above and clear of all other lights and obstructions except as described in subparagraph .2.
- .6 When it is impracticable to carry the all-round lights below the mast headlights, they may be carried above the after mast headlight(s) or vertically in between the forward mast headlight(s) and after mast headlight(s), provided that in the latter case the requirement of Regulation 3 shall be complied with.
- .7 The sidelights of a power-driven vessel shall be placed at a height above the hull not greater than three quarters of that of the forward mast headlight. They shall not be so low as to be interfered with by deck lights.
- .8 The sidelights, if in a combined lantern and carried on a power-driven vessel of less than 20 meters in length, shall be placed not less than 1 meter below the mast headlight.
- .9 When the Regulation prescribe two or three lights to be carried in a vertical line, they shall be spaced as follows:
 - .1 On a vessel of 20 meters in length or more such lights shall be spaced not less than 2 meters apart, and the lowest of these lights shall, except where a towing light is required, be placed at a height of not less than 4 meters above the hull;

- .2 on a vessel of less than 20 meters in length such lights shall be spaced not less than 1 meters apart and the lowest of these lights shall, except where a towing light is required, be placed at a height of not less than 2 meter above the gunwale;
- .3 when three lights are carried they shall be equally spaced.
- .10 The lower of the two all-round lights prescribed for a vessel when engaged in fishing shall be at a height above the sidelights not less than twice the distance between the two vertical lights.
- .11 The forward anchor light when two are carried shall not be less than 4.5 meters above the after one. On a vessel of 50 meters or more in length this forward anchor light shall be placed at a height of not less than 6 meters above the hull.

2 Horizontal Positioning and Spacing of Lights

- .1 When two mast headlights are prescribed for a power-driven vessel, the horizontal distance between them shall not be less than one half of the length of the vessel but need not be more than 100 meters. The forward light shall be placed not more than one quarter of the length of the vessel from the stem.
- .2 On a power-driven vessel of 20 meters or more in length the sidelights shall not be placed in front of the forward mast headlights. They shall be placed at or near the side of the vessel.
- .3 When the lights are placed vertically between the forward mast headlight(s) and the after mast headlight(s) these all-round lights shall be placed at a horizontal distance of not less than 2 meters from the fore and aft centerline of the vessel in the athwart ship direction.
- .4 When only one mast headlight is prescribed for a power driven vessel, this light shall be exhibited forward of amidships; except that a vessel of less than 20 meters in length need not exhibit this light forward of amidships but shall exhibit it as far forward as is practicable.

3 Screens for Sidelights

The sidelights of vessels of 20 meters or more in length shall be fitted within board screens painted matt black, and meeting the requirements of Regulation 9 of Chapter III. On vessels of less than 20 meters in length the sidelights, if necessary to meet the requirements of Regulation 9 of Chapter III, shall be fitted with in board matt black screens. With a combined lantern, using a single vertical filament and a very narrow division between the green and red sections, external screens need not be fitted.

4 Shapes

- .1 Shapes shall be black and of the following sizes:
 - .1 A ball shall have a diameter of not less than 0.6 meter;
 - .2 A cone shall have a base diameter of not less than 0.6 meter and a

height equal to its diameter;

- .3 A cylinder shall have a diameter of at least 0.6 meter and a height of twice its diameter;
- .4 a diamond shape shall consist of two cones having a common base.
- .2 The vertical distance between shapes shall be at least 1.5 meters.
- .3 In a vessel of less than 20 meters in length shapes of lesser dimensions but commensurate with the size of the vessel may be used and the distance apart may be correspondingly reduced.

5 Color Specification of Lights

The chromaticity of all navigation lights shall conform to the following standards, which lie within the boundaries of the area of the diagram specified for each color by the International Commission on Illumination (CIE). The boundaries of the area for each color are given by indicating the corner co-ordinates, which are as follows:

.1 White

x	0.525	0.525	0.452	0.310	0.310	0.443
y	0.382	0.440	0.440	0.348	0.283	0.382

.2 Green

x	0.028	0.009	0.300	0.203
y	0.385	0.723	0.511	0.356

.3 Red

x	0.680	0.660	0.735	0.721
y	0.320	0.320	0.265	0.259

.4 Yellow

x	0.612	0.618	0.575	0.575
y	0.382	0.382	0.425	0.406

6 Intensity of Lights

- .1 The minimum luminous intensity of lights shall be calculated by using the formula:

$$I = 3.43 \times 10^6 \times T \times D^2 \times K^{-D}$$

$$I = 3.43 \times 10^6 \times T \times D^2 \times K^{-D}$$

Where: I is luminous intensity in candelas under service conditions,

- T is threshold factor 2×10^{-7} lux,
- D is range of visibility (luminous range) of the light in nautical miles,
- K is atmospheric transmissivity.

For prescribed lights the value of K shall be 0.8, corresponding to a meteorological visibility of approximately 13 nautical miles.

- .2 A selection of figures derived from the formula is given in the following table:

Range of visibility (luminous range) of light in nautical miles D	Luminous intensity of light in candelas for K= 0.8 miles
1	0.9
2	4.3
3	12
4	27
5	52
6	94

Note: The maximum luminous intensity of navigation lights should be limited to avoid undue glare. This shall not be achieved by a variable control of the luminous intensity.

7 Horizontal Sectors

- .1 In the forward direction, sidelights as fitted on the vessel shall show the minimum required intensities. The intensities shall decrease to reach practical cut-off between 1 degree and 3 degrees outside the prescribed sectors.

For stem lights and mast headlights and at 22.5 degrees abaft the beam for sidelights, the minimum required intensities shall be maintained over the arc of the horizon up to 5 degrees within the limits of the sectors. From 5 degrees within the prescribed sectors the intensity may decrease by 50 percent up to the prescribed limits; it shall decrease steadily to reach practical cut-off at not more than 5 degrees outside the prescribed sectors.

- .2 All-round lights shall be so located as not to be obscured by masts, top masts or structures within angular sectors of more than 6 degrees except anchor lights, which need not be placed at an impracticable height above the hull.

If it is impracticable to comply with paragraph .2 of this regulation by exhibiting only one all-round light, two all-round lights shall be used suitably positioned or screened so that they appear, as far as practicable, as one light at a distance of one mile.

8 Vertical Sectors

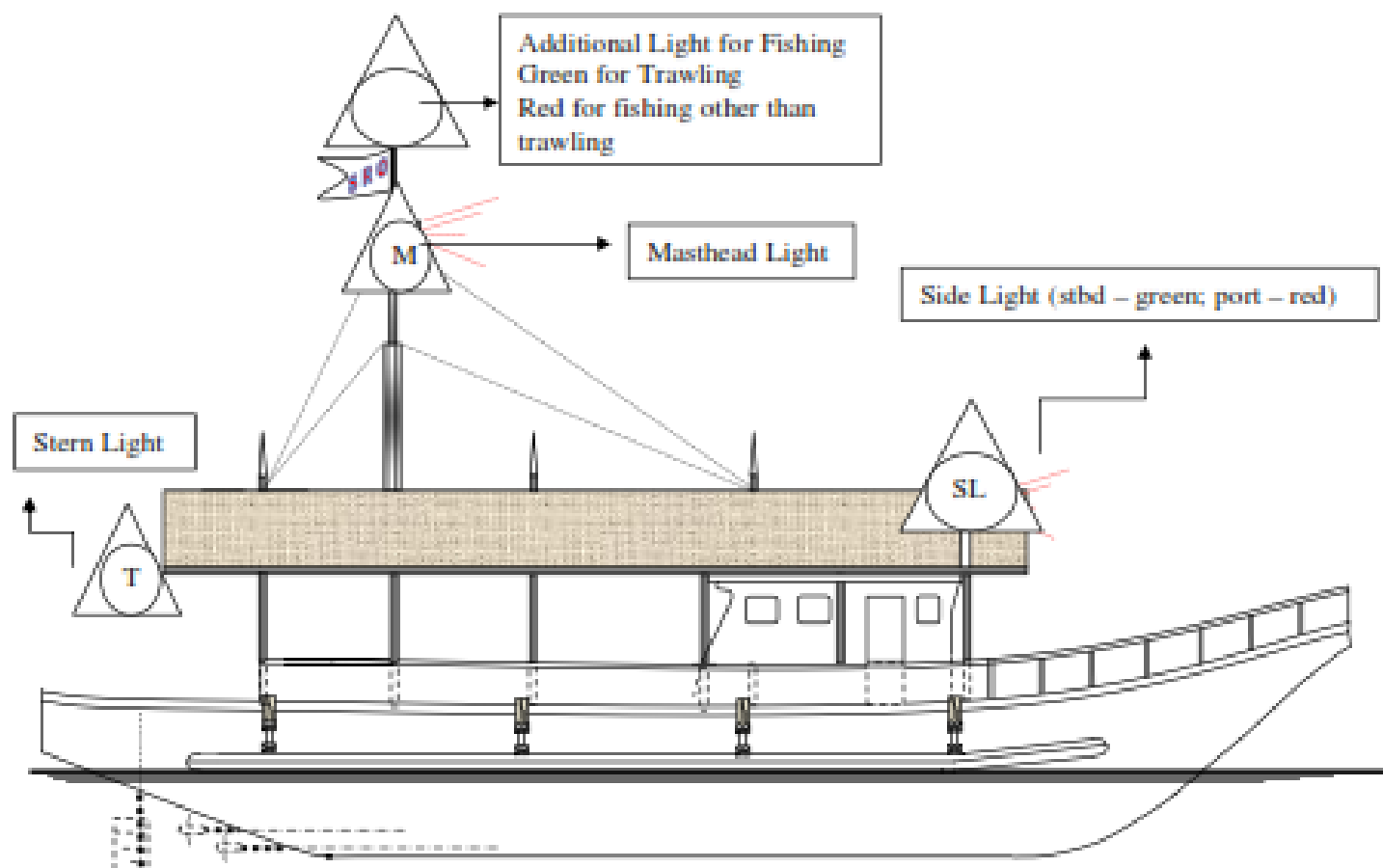
- .1 The vertical sectors of electric lights as fitted, with the exception of lights on sailing vessels under way shall ensure that:
 - .1 At least the required minimum intensity is maintained at all angles from 5 degrees above to 5 degrees below the horizontal;
 - .2 At least 60 percent of the required minimum intensity is maintained from 7.5 degrees above to 7.5 degrees below the horizontal.
- .2 In the case of sailing vessels underway the vertical sectors of electric lights as fitted shall ensure that:
 - .1 at least the required minimum intensity is maintained at all angles from 5 degrees above to 5 degrees below the horizontal;
 - .2 at least 50 percent of the required minimum intensity is maintained from 25 degrees above to 25 degrees below the horizontal.
- .3 In the case of lights other than electric these specifications shall be met as closely as possible.

9 Manoeuvring Light

The manoeuvring light shall be placed in the same fore and aft vertical plane as the mast headlight or lights and, where practicable, at a minimum height of 2 meters vertically above the forward mast headlight, provided that it shall be carried not less than 2 meters vertically above or below the after mast headlight. On a vessel where only one mast head light is carried the manoeuvring light, if fitted, shall be carried where it can best be seen, not less than 2 meters vertically apart from the mast headlight.

10 Approval

The construction of lights and shapes and the installation of lights on board the vessel shall be to the satisfaction of the Administration.



Positioning of Navigational Lights for Wooden Hulled Vessel with Outriggers

CHAPTER VIII

FIRE PROTECTION, DETECTION AND EXTINCTION

Regulation 1

Application to Existing Ships

The provisions of the present chapter shall apply to existing ships, within a period not exceeding three (3) years from the date of entry into force of the present Regulations, where they are regarded by the Administration as necessary and reasonable.

Regulation 2

Fire Prevention

- 1 Paints, varnishes or other substances with a nitro-cellulose or toxic base, or highly flammable products shall not be used.
- 2 Precautions shall be taken to avoid combustible substances or vapors coming into contact with parts reaching elevated temperatures. In particular:
 - .1 Arrangements shall be made to ensure that sparks or flames from smoke ducts such as those of cooking or heating appliances cannot penetrate ventilation ducts;
 - .2 Appliances with naked flames or unprotected resistors for lighting and heating of accommodation shall be prohibited;
 - .3 Electric Cable shall comply with the requirements of Chapter VI of this Regulation.
- 3 Insulation materials shall be approved by the appropriate authority.
- 4 The fixing of combustible parts less than 60 cm from appliances such as ovens and furnaces shall be prohibited unless special precautions are taken to insulate them.
- 5 Materials readily rendered ineffective by heat shall not be used for overboard scuppers, discharges which are close to the water line or for accessories whose destruction in the event of fire would give rise to a risk of flooding.
- 6 Oil or oil fuel pipes shall be of steel or other authorized materials taking into account the risk of fire.

Regulation 3

Arrangements for Combustible Fuel, Lubricating Oil and Other Flammable Oils

- 1 No combustible liquid shall be used as fuel whose flashpoint, determined by an approved test, is less than 60°C (closed crucible test), except in emergency generators, in which case the flashpoint shall be not less than 43°C.
- 2 Safe and efficient means of ascertaining the amount of fuel contained in any tank shall be provided. If such means consist of sounding pipes, their upper ends shall be located in safe positions and fitted with appropriate shutoff devices. If an oil-level gauge is used, it shall be fitted with a self-closing control cock at each end. All cocks shall be fixed directly to the walls of the tank. The use of plastics for oil-level gauges is prohibited. The use of refracting glass oil-level gauges is permitted provided that a protection against shocks is installed. Tighteners shall be fitted to prevent disconnection of oil-

level gauges.

3 Precautions shall be taken to prevent any overpressure on tanks or in any part of the fuel supply system, including filling pipes. Outlet valves and air or overflow pipes shall discharge the fuel into a safe place in such a way that it gives rise to no danger.

4 Pumps which form part of the oil fuel lines shall be separate from any other lines and the inversion of the flow of such pumps shall be fitted with an effective, closed circuit, outlet valve.

5 No oil fuel tank shall be situated where spillage or leakage there from can constitute a hazard by falling on heated surfaces. Precautions shall be taken to prevent any oil that may escape under pressure from any pump, filter or heater from coming into contact with heated surfaces.

6 Oil fuel pipes and their valves and fittings shall be of steel or other approved material, except that the restricted use of flexible pipes may be permitted by the appropriate authority. Such flexible pipes and end attachments shall be of approved fire-resisting materials or coated with fire-resisting coatings, to the satisfaction of the appropriate authority.

7 When necessary, oil fuel lines shall be screened or otherwise suitably protected to avoid, as far as practicable, oil spray or oil leakages on to hot surfaces or into machinery air intakes. The number of joints in such piping systems shall be kept to a minimum.

8 Oil fuels, lubricating oils and other flammable oils shall not be carried in forepeak tanks. Furthermore, oil fuels shall not be stored forward of the collision bulkhead or its extension.

Regulation 4

Storage and Use of Oil Fuels

1 Air outlet pipes in oil fuel compartments and tanks shall terminate with an S-bend with a close-mesh metal cowl and a detachable closing device. A hole of 5 to 6 mm in diameter shall be pierced in the closing device.

The closing device may be replaced by a system such as an automatic ball-valve if it provides equivalent safety.

2 Oil fuels with a flashpoint less than 60°C but not less than 43°C may be used subject to the agreement of the Administration to supply emergency fire-pump motors and auxiliary motors which are not situated in machinery spaces.

Regulation 5

Pressurized Water Fire-Extinguishing Systems

1 Any pressurized water fire-extinguishing system, required to be installed by the present chapter, shall consist of pipes fed by one or more pumps and serving nozzles through hydrants and hoses.

2 Fire pumps

.1 Except as otherwise provided in the present chapter, fire pumps shall be mechanically driven by motors independent of the propulsion machinery.

.2 Sanitary, ballast and bilge pumps, as well as general service pumps may be regarded as fire pumps, provided that they are not normally used for extraction of oil fuel.

- .3 Fire pumps shall be fitted with safety valves if they are capable of operating at a pressure exceeding that for which the pipes and their attachments have been calculated and tested.
 - .4 Each mechanically powered pump, where required to be fitted by the present chapter, shall be capable of delivering for fire-fighting purposes a quantity of water, at the pressure specified in paragraph 3.2, not less than two-thirds of the quantity required to be dealt with by a bilge pump under the provisions of Regulation 4 of Chapter IV of BOOK I General Provision.
- 3 Fire mains
- .1 The diameter of the fire main shall be sufficient for the effective distribution of the maximum discharge of one fire pump.
 - .2 Where a fire pump delivers the quantity of water specified in subparagraph 3.1 above through any adjacent fire hydrants, a pressure of at least 0.21 N/mm² (2.1 kg/cm²) shall be maintained at all hydrants affected.
 - .3 The arrangement of the fire main shall be such that it is capable of delivering water very rapidly. The controls shall be easy to operate and readily accessible.
- 4 Pipes and hydrants
- .1 The number and position of hydrants shall be such that at least one jet of water may reach any part of the ship normally accessible to the crew while the ship is being navigated and any part of any cargo space when empty.
 - .2 Pipes and hydrants shall be so placed that the fire hoses may be easily coupled to them. In ships where deck cargo may be carried, the positions of the hydrants shall be such that they are readily accessible and the pipes shall be arranged as far as practicable to avoid risk of damage by such cargo.
 - .3 Cocks or valves shall be fitted to pipes such that any of the hydrants may be shut off while the pumps are in operation and continue to supply other hoses connected to other hydrants.
 - .4 Fire hoses of materials readily affected by heat shall not be used unless suitably protected.
- 5 Hoses and nozzles
- .1 Fire hoses shall be of approved materials. They shall not exceed fifteen (15) meters in length. Hoses shall be fitted with the necessary couplings and attachments.
 - .2 On open decks, a hose shall not be required for each hydrant, but the number of hoses installed shall be sufficient, in the area concerned, such that the jet required by the present Regulation can be delivered in all circumstances.
 - .3 Fire hoses and their attachments shall be maintained in a permanently serviceable condition.
 - .4 The diameter of nozzles (full jet) shall be not less than 10 mm.
 - .5 All nozzles shall be fitted with a shutoff device, as well as a sprinkler jet.

Regulation 6

Fire Extinguishers

- 1 All fire extinguishers shall be of an approved type.
- 2 One of the portable fire extinguishers intended for use in any space shall be stowed near the entrance to that space, preferably outside.
- 3 The number of spare charges shall be determined by the Administration to the extent that recharging of used extinguishers may be effected.

Regulation 7

Fire Drills

Fire drills shall be conducted under the same conditions as those required by Regulation 3 of Chapter VI, in order to check the condition of fire-fighting equipment and train the crew in its use.

Regulation 8

Ready Availability of Fire-Extinguishing Appliances

- 1 Fire-extinguishing appliances shall be kept in good order and be available for immediate use at all times.
- 2 Equipment and systems shall be subject to periodic tests to ensure that they are in good working order or special checks depending on their nature, at least once a year. The date and purpose of such inspections shall be recorded in a maintenance and test log, and noted in the ship's log.

Regulation 9

Substitutes

Where in this chapter any special type of appliance, apparatus, extinguishing medium or arrangement is specified, in any new and existing vessels, any other type of appliance, etc., may be allowed if the Administration is satisfied that it is not less effective.

Regulation 10

Portable Fire Extinguishers

- 1 Control stations, public spaces, corridors and service spaces shall be provided with portable fire extinguishers of approved type and design. At least five (5) portable extinguishers shall be provided, and so positioned, as to be readily available for immediate use.
- 2 In addition, at least one extinguisher suitable for machinery space fires shall be positioned outside each machinery space entrance.

Regulation 11

Fire Control Plan

- 1 All ships shall be provided a permanently exhibited fire control plan duly approved by the Administration.
- 2 Fire control plan shall be kept up-to-date. Description in such plan shall be in the English language.

3 In addition, instructions concerning the maintenance and operation of all the equipment and installations on board for the fighting and containment of fire shall be kept under one cover, readily available in an accessible position.

Regulation 12

Notification of Crew and Passengers

1 General emergency alarm system

All ship shall be provided with a general emergency alarm system approved by the Administration which will be used for notifying crew and passengers of a fire.

2 Public address system

A public address system or other effective means of communication shall be available throughout the accommodation and service spaces and control stations and open decks.

3 Provision shall be made on board for embarkation station to be properly equipped for evacuation of passengers into life-saving appliances.

Regulation 13

Means of Escape

1 In order to ensure immediate assistance from the crew in an emergency situations, the crew accommodation, including any cabins, shall be located with due regard to easy, safe and quick access to the public spaces from inside the ships. For the same reason, easy, safe and quick access from the operating compartment to the public spaces shall be provided.

2 The design of the ships shall be such that all occupants may safely evacuated the ships into survival craft under all emergency conditions, by the day or by night. The positions of all exits which may be used in an emergency and of all lifesaving appliances, the practicability of the evacuation procedure, and evacuation time to evacuate all passengers and crew shall be demonstrated.

3 Public spaces, evacuation routes, exits, lifejacket stowage (under passenger seats), survival craft stowage, and the embarkation stations shall be clearly and permanently marked and illuminated.

4 Each enclosed public space and similar permanently enclosed space allocated to passengers or crew shall be provided with at least two exits, as widely separated as practical. All exits shall clearly indicate the directions to the evacuation station and safe areas.

.1 Exit doors shall be capable of being readily operated from inside and outside the ships in daylight and in darkness. The means of operation shall be obvious, rapid and of adequate strength. Doors along escape route should where appropriate, open in the direction of escape flow from the space served.

.2 The ships shall have sufficient number of exits which are suitable to facilitate the quick and unimpeded escape of persons wearing approved lifejackets in emergency conditions, such as collision damage or fire.

- .3 Sufficient space for a crew member shall be provided adjacent to exits for ensuring the rapid evacuation of passengers.
- .4 All exits, together with their means of opening, shall be adequately marked for the guidance of passengers, adequate marking shall be provided for the guidance of rescue personnel outside the ships.

Regulation 14

Fire Protection Requirements for Ships of Less Than 24 Meters

- 1 The minimum number of portable fire extinguishers on board shall be as follows:

Length of Vessel	Number of Extinguishers
Not over 10 m	2
Over 10 m but not over 15 m	3
Over 15 m but not over 24 m	5
Over 24 m	*

*The ship's approved fire control plan shall be the basis in determining the minimum number of portable fire extinguishers required.

- 2 All ship shall be provided with fire buckets as follows:

- .1 At least three fire buckets shall be provided which shall be of a material which is not readily flammable. They shall be painted red, clearly marked with the word "FIRE" and provided with lanyards of sufficient length, having regard to the size of the ship;
- .2 The capacity of each of the fire buckets referred to in this part shall be at least nine liters;
- .3 Fire buckets provided in compliance with this Regulation shall not be used for any other purpose than extinguishing fire;

- 3 Where the provision of fixed fire extinguishing systems is considered to be impracticable, the Administration may accept alternate arrangements.

CHAPTER IX

LIFE-SAVING APPLIANCE

Regulation 1

General Requirements

1 Life-saving appliances and equipment shall be of the approved type and shall be acquired from an accredited manufacturer/supplier or serviced by an accredited servicing entity. Life-saving appliances and equipment on board ships acquired from abroad must also be type-approved and proof thereof to be checked and certified by the Administration.

2 In areas where the approval of the Administration is impracticable, a surveyor from the Administration shall conduct actual testing of the rigid life raft, buoyant apparatus and life jacket. The surveyor shall provide a description of the appliances and equipment and the testing made indicating there in the observations and findings resulting from the testing conducted and should be recorded in the log book provided by the company

3 The Administration may, if it considers that the sheltered nature and conditions of the voyage are such as to render the application of any specific requirements of this Regulation unreasonable or unnecessary. Approved alternative specifications that are considered equally effective under circumstances may be allowed.

4 Where novel life-saving appliances or arrangements are to be approved, the Administration shall ensure that they provide the same safety standards as specified herein and such appliances and arrangements are evaluated and tested in accordance with the recommendations of the Organization.

Regulation 2

Rationalized Safety Requirements

1 Liferafts, lifefloats, lifebuoy, buoyant apparatus and life preservers shall be readily available in case of emergency and shall be kept in good working order and ready for immediate use at all times when the ship is being navigated, or in so far as reasonable and practicable when the ship is, not being navigated.

2 Type approved lifejackets shall be provided in each and every passenger accommodation, which shall be stored or located within reach of the passengers and can be used immediately at the time of emergency.

3 The decks on which lifeboats, liferafts, lifefloats, buoyant apparatus and life preservers are carried shall be kept clear of cargo or any other obstructions which may interfere with the immediate launching of the life-saving appliances.

4 Sufficient ladders, as applicable, shall be provided to facilitate embarkation into the lifeboats and liferafts when waterborne;

5 Liferafts, lifefloats buoyant apparatus, life preservers and lifebuoys shall be clearly marked with the name of the ship as well as the approved maximum number of persons for each applicable life-saving appliances.

6 Liferafts, lifefloats, buoyant apparatus and preservers shall be stored in such a manner that:

- .1 They are capable of being launched in the shortest possible time;
- .2 They shall not impede the launching or handling of other lifesaving appliances;
- .3 They shall not impede the marshalling of persons at the embarkation stations or their embarkation; and
- .4 They shall be capable of being put in the water safely and rapidly even under unfavorable condition of list and trim.

7 Lifejackets shall be provided in every passenger accommodation:

- .1 Passenger accommodation with lying/bunker arrangements - lifejackets shall be stowed immediately overhead or under the bed, in each accommodation. Lifejackets in first class accommodations may be stowed in properly marked cabinets.
- .2 Passenger accommodation with seating arrangements - lifejackets shall be stowed immediately overhead or under the seat.
- .3 Every common area shall be provided with additional lifejackets the number of which should be equivalent to at least twenty five percent (25%) of the total passenger capacity such area can accommodate, stored in a properly marked cabinet easily seen by and accessible to the passengers at all times.
- .4 No lifejacket locker/cabinet shall be permanently locked during voyage.
- .5 The number of lifejacket in every locker/cabinet shall be clearly indicated.
- .6 Lifejacket for children and infants shall be distributed during embarkation and collected upon arrival.
- .7 Proper safety information and signage (regarding stowage location, donning procedures, etc.). Shall be provided in all conspicuous places and should be clear and easily understood. Actual demonstration of the donning of lifejacket or showing of safety film/video on passenger ships shall be conducted prior departure.
- .8 Number of type-approved lifejackets on board ships:
 - .1 Every ship shall carry type-approved lifejackets equivalent to the total number of authorized persons on board.
 - .2 In passenger ships, additional 10% and 5% of the actual number of persons allowed on-board shall be provided for children and infants, respectively or such greater number as maybe required to provide a lifejacket for each child.
 - .3 Additional lifejackets shall be required at each of the common areas.

- .4 Additional lifejackets shall also be provided for every officer/crew at each watch/work stations.

Table 2.1 – Lifejacket sizing criteria Lifejacket marking Infant Child Adult

Lifejacket Marking		Infant	Child	Adult
User's size:				
	Weight (kg)	less than 15	15 or more but less than 43	43 or more
	Height (cm)	less than 100	100 or more but less than 155	155 or more

Regulation 3

Training and Abandon Ship Drills

- 1 Every crew member shall be trained in launching and maneuvering life-saving appliances
- 2 The method and instructions for use of life-saving appliances and arrangements shall be exhibited at muster stations and common crew areas.
- 3 Every crew member shall participate in at least one abandon ship drill and one fire drill every month. Each drill shall be the occasion of a training session on the use of the corresponding equipment.
- 4 The conduct of the above drills and corresponding training shall be recorded in an official logbook.

Regulation 4

Stowage, Launching and Recovery of Survival Craft

- 1 Survival craft shall be stowed such that:
 - .1 neither the survival craft nor its launching gear will interfere with the operation of any other survival craft at any other launching station,
 - .2 they are as near the water surface as is safe and practicable
 - .3 they are kept in a state of continuous readiness and that two members of the crew can carry out preparations for embarkation and launching in less than five minutes.
- 2 The arrangements for the recovery of survival craft shall be to the satisfaction of the Administration.

Regulation 5

Marking of Survival Craft

All survival craft shall be marked in capital letters in the Roman alphabet with:

- .1 the name of the ship and its homeport.
- .2 the name of the authority which approved the craft
- .3 the maximum number of persons for which it is approved to carry.

Regulation 6

Operational Readiness, Maintenance and Inspections

- 1 Operational readiness
Before the ship leaves port and at all times during the voyage, all life-saving appliances shall be in good working order and ready for immediate use.

2 Maintenance

Instructions for maintenance on board of survival craft and rescue boats shall be posted and easily understood.

3 Weekly inspection

The following tests and inspections shall be carried out weekly:

- .1 All survival craft, rescue boats and launching appliances shall be visually inspected to ensure that they are ready for use; and
- .2 the general emergency alarm system shall be tested.

4 Monthly inspections

Inspection of the life-saving appliances, including lifeboat equipment, shall be carried out monthly using a checklist to ensure that they are complete and in good order. A report of the inspection shall be entered in the logbook.

Regulation 7

Public Address Systems

1 Except as noted in paragraph 5, ships shall be equipped with a public address system.

2 On a ship of 20 m or more in length, the public address system shall be a fixed installation and be audible during normal operating conditions throughout the accommodation spaces and all other spaces normally manned by crew members.

3 A ship with more than one passenger deck or with overnight accommodation shall have the public address system operable from the operating station.

4 On a ship of less than 20 m in length, a battery powered bullhorn may serve as the public address system where it can be demonstrated to be audible throughout the accommodation spaces of the ship during normal operating conditions. The bullhorn's batteries shall be continually maintained at a fully charged level by use of a battery charger or other means acceptable to the Administration.

5 On a ship of less than 20 m in length carrying less than 50 passengers, a public address system is not required where the Administration is satisfied that a public announcement made from the operating station without amplification can be heard throughout the accommodation spaces of the vessel during normal operating conditions.

Regulation 8

Record of Passengers

The master of a ship shall keep an accurate list of all passengers, which shall be recorded in the passenger manifest.

Regulation 9

Passenger Safety

1 Before getting underway on a voyage where passengers are carried, the master of a ship shall ensure that suitable public announcements are made informing all passengers of the following, as applicable to the vessel's operations and arrangement:

- .1 a general explanation of emergency procedures;
- .2 the location of emergency exits and survival craft embarkation areas;

- .3 the stowage location of lifejackets;
- .4 the proper method of putting on and adjusting lifejackets of the type carried on the vessel including a demonstration of the proper donning of a lifejacket;
- .5 the location of the instruction placards for lifejackets and other lifesaving devices; and
- .6 that all passengers will be required to wear lifejackets when possible hazardous conditions exist, as directed by the master.

2 Ferries operating on short runs of less than 15 minutes may substitute bulkhead placards or signs for the announcement required in .1 where the Administration determines that the announcements are not practical due to the ship's unique operation.

Regulation 10

Communications

Ship covered by this regulation, including motorbancas, shall carry at least one two-way VHF radio-telephone apparatus.

Regulation 11

Minimum Requirements of Life-Saving Appliances and Equipment

1 Ships Engaged In Coastal Waters

- .1 Survival Ships: (To cover the total number of persons the ship is authorized to carry)
 - .1 Lifeboat or combination of liferaft and lifeboat, or
 - .2 Liferaft (Inflatable/Rigid Type)
 - 100% inflatable/rigid type or combination of equivalent approved-type liferaft which shall cover up to 50% of the total number of persons the ship is authorized to carry;
- .2 Lifebuoys:
 - .1 Four (4) Lifebuoys for ships less than 20 meters in length;
 - .2 Six (6) lifebuoys for ships 20 meters but less than 40 in length;
 - .3 Eight (8) lifebuoys for ships 40 meters and above;
 - .4 50% of the required lifebuoys, and in no case less than two (2), shall be fitted with self igniting lights with at least one (1) of which shall be fitted with self activated smoke signal as well as a buoyant line of at least 25 meters in length.
- .3 Lifejackets:
 - .1 Every ship shall carry at least one (1) approved-type lifejacket for each and every person authorized on board with an additional 10% and 5% of the total number of persons allowed on-board, suitable for children and infants respectively.
 - .2 In addition to the requirement above, sufficient number of lifejackets for persons on watch at work station shall be provided.

In addition, a sufficient number of lifejackets shall be carried for persons on watch and which should be stowed on navigating bridge, in the engine room or control stations and in any other manned watch station.

.4 Distress Flares:

- .1 Every ship shall carry at least four (4) rocket parachute flares.

2 Ships Engaged In Protected Waters

.1 Survival Ships: (To cover the total number of persons the ship is authorized to carry)

- .1 Lifeboat or combination of liferaft, or

- .2 Liferaft (Inflatable/Rigid Type)

- 100% inflatable/rigid type or combination of equivalent approved-type liferaft which shall cover up to 50% of the total number of persons the ship is authorized to carry;

.2 Lifebuoys:

- .1 Two (2) Lifebuoys for ships less than 20 meters in length;

- .2 Four (4) lifebuoys for ships 20 meters but less than 40 meters in length;

- .3 Six (6) lifebuoys for ships 40 meters and above; and

- .4 50% of the required lifebuoys, shall be fitted with self-igniting lights with at least one (1) of which shall be fitted with self-activated smoke signal as well as a buoyant line of at least 25 meters in length.

.3 Lifejackets:

- .1 Every ship shall carry at least one (1) approved-type lifejacket for each and every person authorized on board with an additional 10% and 5% of the total number of persons allowed on-board, suitable for children and infants respectively.

- .2 In addition to the requirement above, sufficient number of lifejackets for persons on watch at work station shall be provided. In addition, a sufficient number of lifejackets shall be carried for persons on watch and which should be stowed on navigating bridge, in the engine room or control stations and in any other manned watch station.

.4 Distress Flares:

- .1 Every ship shall carry at least two (2) rocket parachute flares if and when allowed for night time navigation.

3 Life Saving Appliances and Equipment for Motorbanca Engage in Coastal Waters

- .1 No motorbanca with length less than 12 meters or 15 GT shall be allowed to operate under this category.
- .2 Life Saving Appliances
 - .1 Survival Craft: (To cover the total number of persons the motor banca is authorized to carry)
 - .2 Lifeboat or combination of liferaft, or Liferaft (Inflatable/Rigid Type or Buoyant Apparatus)
 - .3 Lifebuoys:
 - .4 Four (4) lifebuoys for motor bancas less than 20 meters in length; Six (6) lifebuoys for motor bancas 20 meters and over in length; 50% of the required lifebuoys, and in no case less than two (2), shall be fitted with self-igniting lights and if when allowed to sail during nighttime navigation with at least (1) of which shall be fitted with buoyant line of at least 25 meters in length.
 - .5 Lifejackets:

Every motor banca shall carry at least one (1) approved-type lifejacket for each and every person authorized on board with an additional 10% and 5% of the total number of persons allowed on-board, suitable for children and infants respectively
 - .6 Distress Flares:

Every motor banca shall carry at least two (2) rocket parachute flares if and when allowed to sail during nighttime navigation.
- 4 Life Saving Appliances and Equipment for Motorbanca in Protected Waters
 - .1 Lifebuoys:

Two (2) Lifebuoys for ships less than 20 meters in length;
Four (4) lifebuoys for ships 20 meters and over in length;
50% of the required lifebuoys, shall be fitted with self igniting lights if allowed for nighttime navigation which shall be fitted with a buoyant line of at least 25 meters in length.
 - .2 Lifejackets:

Every motor banca shall carry at least one (1) approved-type lifejacket for each and every person authorized on board with an additional 10% and 5 % of the total number of persons allowed on-board, suitable for children and infants respectively.
 - .3 Distress Flares:

Every motor banca shall carry at least one (1) rocket parachute flares if and when allowed to sail during nighttime navigation.
 - .4 Survival Craft: (To cover the total number of persons the motor banca is authorized to carry)
 - .5 Lifeboat or combination of liferaft, or Liferaft (Inflatable/Rigid Type or Buoyant Apparatus)

The equivalent approved-type liferaft shall be an alternative floatation devices similar to the model design and construction, as illustrated in the Annex of this regulation.

Regulation 12

Manning and Survival Procedures

- 1 All persons manning such ships shall be trained in launching and operating the survival crafts.
- 2 Illustrations and instructions relating to the use of life-saving appliances in appropriate languages shall be posted at muster stations and other crew spaces.
- 3 Posters or signs shall be provided on or in a vicinity of survival craft and their launching controls.
- 4 Muster stations shall be provided close to the embarkation stations. Both shall be adequately illuminated by lighting supplied from the emergency source of electric power.
- 5 Each member of the crew shall participate in at least one abandon ship drill and one fire drill every month. On board training in the use of life-saving appliances, including survival craft equipment shall be provided at such drills.
- 6 Records shall be maintained relating to abandon ship drills, fire drills and on board training, in such-log-books as may be prescribed by the Administration.

Regulation 13

Muster List, Emergency Instructions and Manuals

- 1 Clear instructions to be followed in the event of an emergency shall be provided of each person on board.
- 2 Muster lists shall specify the tails of the general emergency alarm, public address system and action to be taken by the crew and passenger when this alarm is sounded. It shall be exhibited in conspicuous places throughout the ship, including the control compartment, engine room and crew accommodation spaces.
- 3 Illustrations and instructions in appropriate languages shall be posted in public spaces and be conspicuously displayed at assembly stations at other passenger spaces and near each seat to inform passengers of:
 - .1 their assembly station;
 - .2 the essential actions they must take in an emergency; and
 - .3 the method of donning lifejackets.
- 4 Posters or signs shall be provided on or in a vicinity of survival craft and their launching controls.
- 5 Muster stations shall be provided close to the embarkation stations. Both shall be adequately illuminated by lighting supplied from the emergency source of electric power.

6 Each member of the crew shall participate in at least one abandon ship drill and one fire drill every month. On board training in the use of life-saving appliances, including survival craft equipment shall be provided at such drills.

7 Records shall be maintained relating to abandon ship drills, fire drills and on board training in such deck/engine logbook as may be prescribed by the Administration.

DRAFT
24 JANUARY 2019

CHAPTERX

Radio Communications

Regulation 1

General Requirements

- 1 The national regulations on radio Communications issued by the National Telecommunications Commission (NTC) apply to all ships covered by this book.
- 2 No provision in this Regulation shall prevent the use by any ship, survival ships or person in distress, of any means at their disposal to attract attention, make known their position and obtain help.

Regulation 2

Functional Requirements

- 1 Ships while at sea shall be provided with radio installations capable of complying with the functional requirements identified in this Regulation throughout its intended voyage.
- 2 Ships, while at sea, shall be capable of:
 - .1 transmitting ship-to-shore distress alerts by at least two separate and independent means, each using a different radio communication service;
 - .2 receiving shore-to-ship distress alerts;
 - .3 transmitting and receiving ship-to-ship distress alerts;
 - .4 transmitting and receiving search and rescue coordinating communications;
 - .5 transmitting and receiving on-scene communications;
 - .6 transmitting and where applicable receiving signals for locating;
 - .7 transmitting and receiving maritime safety information;
 - .8 transmitting and receiving general radio communications to and from shore-based radio systems or networks; and
 - .9 transmitting and receiving bridge-to-bridge communications.

Regulation 3

Ship Requirements

- 1 Every radio installation shall:
 - .1 be so located that no harmful interference of mechanical, electrical or other origin affects its proper use or that of other equipment;
 - .2 be so located as to ensure the greatest possible degree of safety and operational availability;
 - .3 be protected against the harmful effects of water, extremes of temperature and other adverse environmental conditions;
 - .4 be provided with reliable, efficient and permanently installed electric lighting;
 - .5 be clearly marked with the call sign, the ship station identity and other

codes as applicable.

2 Control of the VHF radiotelephone channels, required for navigational safety, shall be immediately available on the navigation bridge.

Regulation 4

Watches

1 Every ship, while at sea, shall maintain a continuous watch on the distress frequencies corresponding to the sea area in which the ship is navigating.

2 Every ship, while at sea, shall maintain a radio watch for broadcasts of maritime safety information on the appropriate frequency or frequencies on which such information is broadcast for the sea area in which the ship is navigating.

3 Each ship, while at sea, shall maintain a continuous listening watch on:

- .1 VHF Channel 16;
- .2 radiotelephone distress frequency 2,182KHz.

Regulation 5

Maintenance Requirements

1 The Administration shall ensure that radio equipment required by this chapter is maintained to provide the availability of the functional requirements and to meet the recommended performance standards of such equipment.

2 Adequate information shall be provided to enable the equipment to be properly operated and maintained.

3 The availability of the radio equipment shall be ensured by using one of the following method:

- .1 duplication of equipment
- .2 shore-based maintenance, or
- .3 at-sea electronic maintenance capability.

Regulation 6

Radio Equipment

1 All ships shall be provided with the following radio communication equipment:

- .1 Ships operating in the protected areas:
 - .1 VHF radio Installation;
- .2 Ships operating in coastwise voyage;
 - .1 VHF, MF/HF SSB Radio Installation (20 – 100 watts power output);
 - .2 GPS (150 GT and above);
 - .3 AIS (300 GT and above).

Regulation 7

Sources of Energy

There shall be available at all times, while the ship is at sea, a supply of electrical energy sufficient to operate the radio installations and to charge any batteries used as part of a reserve source or sources of energy for the radio installations for a period of 18 hours as specified in these Rules and Regulations.

Regulation 8

Radio Logs

1 A radio log shall be maintained in accordance with the Radio Regulations in a ship which is fitted with a GMDSS radio communication station. Every qualified operator, master, officer or crew member maintaining a listening watch in accordance with Regulation 4 shall enter in the log his name and the details of all incidents connected with the radio service which occur during his watch which may appear to be of importance to safety of life at sea. In addition, there shall be entered in the log:

- .1 details required by the Radio Regulations;
- .2 the time listening watch begins when the ship leaves port, and the time at which it ends when the ship reaches port;
- .3 the time at which listening watch was discontinued for any reason together with the reason thereof, and the time at which listening watch was resumed thereafter; and
- .4 details of the maintenance of the batteries (if provided), including a record of the charging required.

2 Radio logs shall be available for inspection by the officers authorized by the Administration to make such inspection.

CHAPTER XI

Safety of Navigation

Regulation 1

Danger Messages

- 1 The master of each ship which meets with dangerous derelict, or any other direct danger to navigation, or a tropical storm (signal no. 2 and above) or winds of force 10 or above on the Beaufort scale shall communicate such information by all the means at his disposal to ships in the vicinity and to the competent authorities at the first point on the coast with which he can communicate.
- 2 All radio messages issued under this Regulation shall be preceded by the safety signal, using the procedure as prescribed by the Radio Regulations.
- 3 The information to be transmitted shall be as complete as practicable and may be sent in plain language preferably in English.
- 4 The following information is required in danger messages:
 - .1 Derelicts and other direct dangers to navigation:
 - .1 The kind of derelict or danger observed.
 - .2 The position of the derelict or danger when last observed.
 - .3 The time and date when the danger was last observed.
 - .2 Tropical cyclones (storms):
 - .1 A statement that a tropical cyclone has been encountered. This obligation should be interpreted in a broad spirit, and information transmitted whenever the master has good reason to believe that a tropical cyclone is developing or exists in the neighborhood.
 - .2 Time, date and position of ship when the observation was taken.
 - .3 As much of the following information as is practicable should be included in the message:
 - .1 barometric pressure, preferably corrected (stating millibars, millimeters, or inches, and whether corrected or uncorrected);
 - .2 barometric tendency (the change in barometric pressure during the past three hours);
 - .3 true wind direction;
 - .4 wind force (Beaufort scale);
 - .5 state of the sea (smooth, moderate, rough, high);
 - .6 swell (slight, moderate, heavy) and the true direction from which it comes. Period or length of swell (short, average, long) would also be of value;
 - .7 true course and speed of ship.

- .3 When a Master has reported a tropical cyclone or other dangerous storm, it is desirable, but not obligatory, that further observations be made and transmitted hourly, if practicable, but in any case at intervals of not more than 3 hours, so long as the ship remains under the influence of the storm.
- .4 Winds of force 10 or above on the Beaufort scale for which no storm warning has been received. This is intended to deal with storms other than the tropical cyclones referred to in paragraph 2; when such a storm is encountered, the message should contain similar information to that listed under the paragraph but excluding the details concerning sea and swell.

Regulation 2

Misuse of Distress Signals

The use of any distress signal, except for the purpose of indicating that a ship, aircraft or person is in distress, and the use of any signal, which may be confused with any international distress signal, is prohibited.

Regulation 3

Distress Messages: Obligations and Procedures

1 The master at sea, on receiving a signal from any source that another ship or aircraft or survival craft thereof is in distress, is bound to proceed with all speed to the assistance of the persons in distress informing them if possible that he is doing so. If he is unable or, in the special circumstances of the case, considers it unreasonable or unnecessary to proceed to their assistance, he must enter in the log-book the reason for failing to proceed to the assistance of the persons in distress.

2 The master shall be released from the obligation imposed by paragraph 1 if he is informed by the persons in distress or by the master of another ship which has reached such persons that assistance is no longer necessary. If the Master of a ship receives such release, this has to be documented by him from the duty to render assistance.

3 A ship which receives any kind of distress message, shall simultaneously report this immediately to the nearest Coast Guard, Ports Authority or Coastal Radio Station under providing all relevant data to introduce immediate life-saving actions.

Regulation 4

Safe Navigation and Avoidance of Dangerous Situations

1 Prior to proceeding to sea, the master shall ensure that the intended voyage has been planned using the appropriate nautical charts and nautical publications for the area concerned.

2 The voyage plan shall identify a route which:

- .1 takes into account any relevant ships' routing systems;
- .2 ensures sufficient sea room for the safe passage of the ship throughout the voyage; anticipates all known navigational hazards and adverse weather conditions; and takes into account the marine environmental protection measures that apply, and avoids, as far as possible, actions and activities which could cause damage to the environment.

Regulation 5

Navigational Equipment

The information provided by navigational systems and equipment shall be displayed that the probability of misreading is reduced to a minimum. Navigational system and equipment shall be capable of giving readings to optimum accuracy.

Regulation 6

Marine Magnetic Compass with Light

- .1 ships shall be fitted with:
 - .1 a standard magnetic compass, except as provided in subparagraph .4
 - .2 a steering magnetic compass, unless heading information provided by the standard compass required under paragraph 1 is made available and is clearly readable by the helmsman at the main steering position;
 - .3 adequate means of communication between the standard compass position and the normal navigation control position to the satisfaction of the Administration; and
 - .4 means for taking bearings as nearly as practicable over an arc of the horizon of 360°.
- .2 Each compass referred to in subparagraph 1 shall be properly adjusted and its table or curve of residual deviations shall be available at all times.
- .3 The Administration, if it considers it unreasonable or unnecessary to require a standard magnetic compass, may exempt individual ships or classes of ships from these requirements if the nature of the voyage, the ship's proximity to land or the type of ship does not warrant a standard compass, provided that a suitable steering compass is in all cases carried.

Regulation 7

Navigation Lights/Signal Lights

- 1 Designs and installations of navigational lights/signal lights shall be in conformity with the color, height and angle of visibility prescribed under COLREG.
- 2 Requirements of Regulation V/11 of SOLAS 74, as amended, relating to the provision of an efficient daylight signaling lamp not solely dependent upon the ship's main source of electrical power are applicable to ships of over 150 GT. The Administration may extend this requirement to all ships to which these Rules and Regulations apply.

Regulation 8

Radars

- 1 All covered ships shall, as far as practicable, be fitted with a radar installation capable of operating in the 9 GHz frequency band. A ship may be exempted from compliance with the requirements of paragraph 2 at the discretion of the Administration, provided that the equipment is fully compatible, with the radar transponder for search and rescue.

2 All equipment fitted in compliance with this Regulation shall be of type-approved by the Administration. Equipment installed on board cargo ships conform to appropriate performance standards not inferior to those adopted by the Organization. Equipment fitted prior to the adoption of related performance standards may be exempted from full compliance with those standards at the discretion of the Administration having due regard to the recommended criteria which the Organization might adopt in connection with the standards concerned.

Regulation 9

Rudder Angle Indicator

All covered ships constructed shall be fitted with indicators showing the rudder angle, the rate of revolution of each propeller and in addition, if fitted with variable pitch propellers or lateral thrust propellers, the pitch and operational mode of such propellers. All these indicators shall be readable from the conning position.

Regulation 10

Life-Saving Signals

Life-saving signals shall be used by ships when communicating with ships or persons in distress or when communicating with life-saving stations, maritime rescue units and aircraft engaged in search and rescue operations. An illustrated table describing the life-saving signals shall be readily available to the officer of the watch of every ship. Life-saving signals maybe in the form of sounds, lights and/or any device approved in maritime practice.

Regulation 11

Global Positioning Systems (GPS)

All covered ships shall be fitted with a global positioning device (GPS).

Regulation 12

Automatic Identification System (AIS)

All ships of 300 GT and above shall be fitted with a Class "A" Automatic Identification System (AIS).

Regulation 13

Regulations on Deck Logs and Engine Logs

All ships shall maintain a deck log where the condition of the atmosphere, the prevailing winds, the course sailed and or the number of engines used and the engine speeds the distance covered, the maneuvers executed and other incidents of navigation. Entries related to any damage to the hull, engines, that may occur and the cause, as well as such injuries and damages as may occur to the cargo, and the amount and value of jettisoned cargo, if any, shall be entered in the deck or engine logbook.

Regulation 14

Nautical Publications

All ships shall carry adequate and up-to-date nautical charts and nautical publications to plan and display the ship's route for the intended voyage and to plot and monitor positions throughout the voyage.

Regulation 15*International Code of Signals*

Ships required to carry radio installations shall carry the International Code of Signals. This publication may also be carried by any other ship, which, in the opinion of the Administration, has a need to use it.

Regulation 16*Routeing*

Ships shall comply with the traffic separation schemes or routeing requirements applicable to the area including avoidance of passage through areas designated as areas to be avoided by Ships or certain classes of ships.

DRAFT
24 JANUARY 2019