RULES FOR CONSTRUCTION OF WOODEN HULLED BOATS WITH OUTRIGGERS

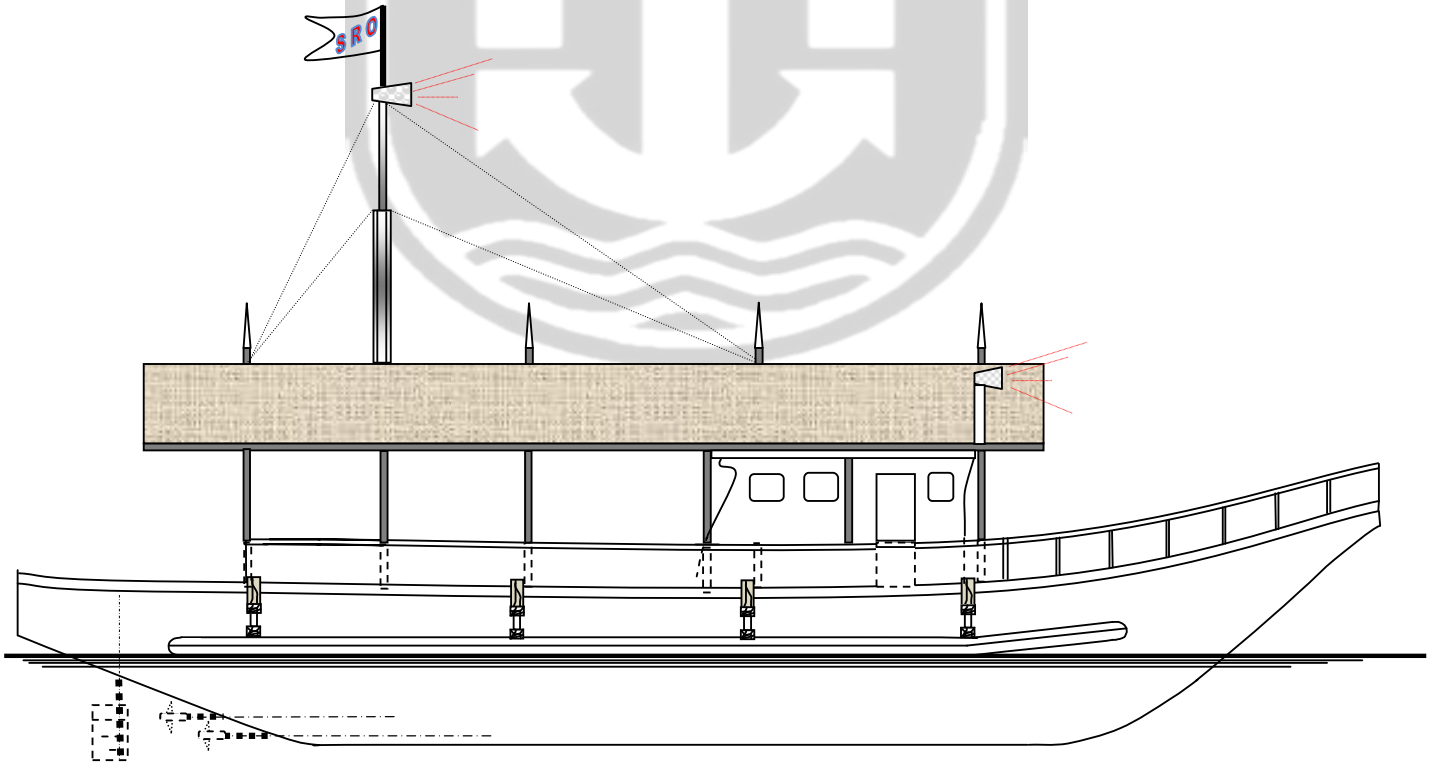


TABLE OF CONTENT

RULES FOR CONTRUCTION OF WOODEN HULLED BOATS WITH OUTRIGGERS

GENERAL REQUIREMENTS

1. Application

1. These Rules have been established by the Maritime Industry Authority (MARINA) and set out;

   a. A minimum standard of type of wood, thickness, framings, frame spacing, etc., used in the construction of wooden hulled motor boat with outrigger.

   b. The plans required for approval and the periodical survey, under P. D. 1059.

2. These rules shall be consulted as a guidance and reference as to the appropriate minimum standard acceptable to the industry.

3. Existing wooden hulled boat with outriggers built prior to the implementation of the rules, in accordance with the traditional methods and materials, maybe accepted upon evaluation and approval by the Administration.

2. Definition of Terms

For purposes of these Regulations, the following terms are defined as follows:

1. Administration - refers to Maritime Industry Authority
2. Bulkhead - transverse watertight subdivision of boat
3. Deck Planking - is the top watertight skin of the boat bounded by the side shell.
4. Dug-Out (Baul) - is the bottom structural member where frames, stem and the stern are fastened
5. Floater - long thin floating canoes or cluster of bamboos or other similar buoyant materials held by outrigger used to prevent a boat from capsizing.
6. Outrigger - a beam projected outward from the side of a boat to secure the masts, sail or hold a floater.
7. Plank Sheer (Sintas) - longitudinal upper edge structural member of the boat
8. Side Shell - is the watertight skin of the boat supported by stiffeners and frames.

CHAPTER 1
RULES FOR HULL CONSTRUCTION

SECTION 1 - Materials

1. Wood Species

1. The species of wood which may be used for the various constructional members are given in Table A. The 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 vessel, 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 A. 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 A 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.

Table A - Suitable Woods For Moulded Hull Construction

SPECIES		
Group 1	**Group 2**	**Group 3**
Aranga	Banuyo	Almanit
Bansalagin	Dungon	Amugis
Ipil	Guijo	Apitong
Molave	Kalamansanay	Lumbayao
Narra	Malugai	Mayapis
Supa	Mangachapuy	Pagatpat
Tindalo	Narig	Palosapis
Yacal		Pine (Benguet)
		Red Lauan
		Tanguile

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.

2. The wood for the centreline 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

1. The plywood used in the hull and deck structure is to 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:
   - Copper
   - Galvanized Iron
   - Galvanized steel
   - Silicon bronze
   - Aluminium bronze
   - Stainless steel

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.

SECTION 2 - Determination of Sizes for Structural Members

1. General

- The sizes of structural members of motor boat with outriggers are to be determined from Table 1 to Table 10.

- The scantlings will be specially considered where the ship is of unusual design, form or proportion or where the length, L, exceeds 30 m.

2. Recommended Wood for Hull Construction

1. The scantlings for the wood members shown in Tables A, and Table 1 to 10 are based on the following groups, which are for an air-dried condition of about 15 per cent moisture content:-

Frames Floors	Group 1
Keel Stem Sternpost Deadwood Counter timbers Dugout	Group 2
Hull planking Shelves and clamps Stringers Beams and knees Deck Planking	Group 3

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 Section 1 Table A.

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 Section I, Table A
8 m – 11.99 m	Group 2	3 inch (76.2 mm)	
12 m – 15.99 m	Group 2	3 inch (76.2 mm)	
16 m – 19.99 m	Group 2	4 inch (101.6 mm)	
20 m – 23.99 m	Group 2	4.5 inch (114.3 mm)	
24 m – 27.99 m	Group 2	5 inch (127 mm)	
28 m – 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	

3. Centerline Structure

3.1 Wood Keel

The scantlings of wood keels are given in Table B. The Rule moulding is to be maintained throughout but the siding may be tapered towards the ends where it is to be not less than the Rule siding of the stem or sternpost. 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 C.

Table B - Keel

Length, L Mm	**Moulding and Siding of Keel**			
	Moulding mm	Siding mm	Minimum Siding of Keel mm	Sectional Area of Keel or Keel and Hog Cm^2
6	75	150	70	80
8	90	185	80	130
10	110	220	90	190
12	125	255	105	250
14	140	285	115	310
16	160	320	125	380
18	175	355	140	450
20	195	385	150	520
22	210	410	165	600
24	230	435	180	690
26	245	455	190	770
28	260	470	205	860
30	280	480	220	950

Table C - 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

Single fastened

Double fastened

3.1.1 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 centreline 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. A), or plain type without lips if glued. The depth of the lips is to be about 1/4 to 1/7 of the moulding.

3.1.2 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.

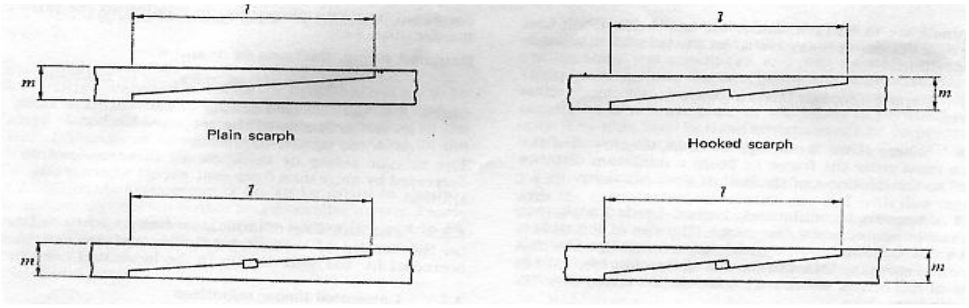


Fig. A Common types of bolted scarphed joints

4. SIDE SHELL PLANKING

1. The scantlings of the side shell planking are given in Table 2.

2. Plywood is to be fitted in as large panels as practicable having due regard to the form of the boat. Panel butts are to be staggered between the bottom, side and deck and arranged clear of the mast, and engine seating.

3. The width of longitudinal seam landings on the centreline structure, chine and gunwale members and on any longitudinal stringers is to be not less than that required by Table C. Seams are to be glued and fastened with one or two rows of fastenings (*see* Table C), and arranged to give maximum spacing of fastenings of 50 mm.

4. The side planking is to be attached to the frames by fastenings of the size given in Table C, spaced generally not more than 75 mm apart.

Table 2 - Side Shell Planking

Length of Boat	Type of Wood	Minimum Thickness
Below 8 meters	Marine Ply	1/4 inch (6.35 mm)
8 m – 11.99 m	Marine Ply	1/4 inch (6.35 mm)
12 m – 15.99 m	Marine Ply	3/8 inch (9.52 mm)
16 m – 19.99 m	Marine Ply	1/2 inch (12.7 mm)
20 m – 23.99 m	Marine Ply	3/4 inch (19.05 mm)
24 m – 27.99 m	Marine Ply	3/4 inch (19.05 mm)
28 m – 31.99 m	Marine Ply	3/4 inch (19.05 mm)
Above 32 meters	Marine Ply	Thickness should be increased by 25% from the value of 28 m-31.99 m

5. SIDE FRAMINGS and SIDE STRINGERS

1. The scantlings of the side framings and side stringers are given in Table 3 and 4.

2. The Group 3 Wood Materials, please refer to Section 1 Table A.

3. The hull is to be provided with an efficient system of side and bottom framing in conjunction with stringers, bulkheads or web frames to provide transverse rigidity.

Table 3 - Side Framings

Length of Boat	Type of Wood	Thickness	Width	Height/ Spacing
Below 8 meters	Group 3	1.5 inch(38.1 mm)	2 inch (50.8 mm)	12 inch (304.8 mm)
8 m - 11.99 m	Group 3	1.5 inch (38.1 mm)	2 inch (50.8 mm)	12 inch (304.8 mm)
12 m - 15.99 m	Group 3	2 inch (50.8 mm)	2 inch (50.8 mm)	12 inch (304.8 mm)
16 m - 19.99 m	Group 3	2 inch (50.8 mm)	3 inch (76.2 mm)	12 inch (304.8 mm)
20 m - 23.99 m	Group 3	2 inch (50.8 mm)	3 inch (76.2 mm)	12 inch (304.8 mm)
24 m - 27.99 m	Group 3	4 inch (101.6 mm)	4 inch (101.6 mm)	16 inch (406.4 mm)
28 m - 31.99 m	Group 3	4 inch (101.6 mm)	4 inch (101.6 mm)	16 inch (406.4 mm)
32 m and above	Group 3	Scantlings should be increased by 25% from the value of 28 m-31.99 m		

Table 4 - Stringer / Stiffener

Length of Boat	Type of Wood	Thickness	Width	Minimum Spacing
Below 8 meters	Group 3	1 inch (25.4 mm)	2 inch (50.8 mm)	at least 2 stiffeners but
8 m - 11.99 m	Group 3	1 inch (25.4 mm)	2 inch (50.8 mm)	not > 24 inch (609.6 mm)
12 m - 15.99 m	Group 3	2 inch (50.8 mm)	2-1/2 inch (63.5mm)	-do-
16 m - 19.99 m	Group 3	2 inch (50.8 mm)	3 inch (76.2 mm)	-do-
20 m - 23.99 m	Group 3	2 inch (50.8 mm)	4 inch (101.6 mm)	-do-
24 m - 27.99 m	Group 3	3 inch (76.2 mm)	6 inch (152.40 mm)	-do-
28 m - 31.99 m	Group 3	3 inch (76.2 mm)	7 inch (177.80 mm)	-do-
32 m and above	Group 3	Scantling should be increased by 25% from the value of 28 m-31.99 m		-do-

6. DECK PLANKING

1. The scantlings of the deck plankings are given in Table 5.

2. Plywood decks are to be fitted in panels as large as practicable.

3. 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.

4. 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 C. Butts and seams are to be sealed watertight.

5. 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 C. The fastenings in seams and butts landing on structural members are to be as required for deck edges.

Table 5 - Deck Planking

Length of Boat	Type of Wood	Minimum Thickness
Below 8 meters	Marine Ply	1/4 inch (6.35 mm)
8 m - 11.99 m	Marine Ply	1/2 inch (12.7 mm)
12 m - 15.99 m	Marine Ply	1/2 inch (12.7 mm)
16 m - 19.99 m	Marine Ply	1/2 inch (12.7 mm)
20 m - 23.99 m	Marine Ply	1/2 inch (12.7 mm)
24 m - 27.99 m	Marine Ply	3/4 inch (19.05 mm)
28 m - 31.99 m	Marine Ply	3/4 inch (19.05 mm)
32 m and above	Marine Ply	Thickness should be increased by 25% from the value of 28 m – 31.99 m

7. DECK FRAMINGS

1. The scantlings of the deck framings are given in Table 6.

2. The Group 3 Wood Materials, please refer to Section 1 Table A.

3. The framings may be arranged transversely or longitudinally or may be a combination of both.

4. The beams and deck are to be suitably strengthened in way of masts, coachroof ends, etc. Where a mast is stepped on the deck the structural arrangements will be specially considered.

5. All deck openings are to be properly framed with carlings.

Table 6 - Deck Framing

Length of Boat	Type of Wood	Minimum Thickness	Minimum Width	Minimum Spacing
Below 8 meters	Group 3	2 inch (50.8 mm)	2 inch (50.8 mm)	same as side framings
8 m - 11.99 m	Group 3	2 inch (50.8 mm)	2inch (50.8 mm)	same as side framings
12 m - 15.99 m	Group 3	2 inch (50.8 mm)	2 inch (50.8 mm)	same as side framings
16 m - 19.99 m	Group 3	2 inch (50.8 mm)	2 inch (50.8 mm)	same as side framings
20 m - 23.99 m	Group 3	2 inch (50.8 mm)	3 inch (76.2 mm)	same as side framings
24 m - 27.99 m	Group 3	2 inch (50.8 mm)	3 inch (76.2 mm)	same as side framings
28 m - 31.99 m	Group 3	3 inch (76.2 mm)	3 inch (76.2 mm)	same as side framings
32 m and above	Group 3	Scantling should be increased by 25% from the value of 28 m - 31.99 m		same as side framings

8. BULKHEAD

1. The scantlings of the bulkheads are given in Table 7.

2. Collision bulkhead shall be fitted which shall be watertight up to the freeboard 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.

3. In collision bulkheads the spacing of stiffeners is to be not greater than 460 mm.

4. In ships of 15 m Rule 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 gastight.

5. In ships of less than 15 m Rule length, the machinery is to be enclosed by gastight bulkheads to protect accommodation spaces from gas and vapour fumes from machinery, exhaust and fuel systems.

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

7. All bulkheads should be watertight.

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

Table 7 - Bulkhead

Length of Boat	Type of Wood	Min. No. of Bulkhead	Thickness	Stiffeners
Below 8 meters	Marine Ply	2	1/4 inch (6.35 mm)	2 x 2 inch (50 x 50 mm)
8 m - 11.99 m	Marine Ply	2	1/4 inch (6.35 mm)	2 x 2 inch (50 x 50 mm)
12 m - 15.99 m	Marine Ply	3	1/2 inch (12.7 mm)	2 x 2 inch (50 x 50 mm)
16 m - 19.99 m	Marine Ply	3	1/2 inch (12.7 mm)	2 x 2 inch (50 x 50 mm)
20 m - 23.99 m	Marine Ply	4	1/2 inch (12.7 mm)	2 x 2 inch (50 x 50 mm)
24 m - 27.99 m	Marine Ply	4	1/2 inch (12.7 mm)	2 x 3 inch (50 x 76 mm)
28 m - 31.99 m	Marine Ply	4	1/2inch (12.7 mm)	2 x 3 inch (50 x 76 mm)
32 m and above	Marine Ply	4	Scantlings should be increased by 25% from the value of 28 m-31.99	

9. 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 Section 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	Group 3	2 inch (50.8 mm)	4 inch (101.6 mm)
8 m - 11.99 m	Group 3	2 inch (50.8 mm)	4 inch (101.6 mm)
12 m - 15.99 m	Group 3	2 inch (50.8 mm)	6 inch (152.40 mm)
16 m - 19.99 m	Group 3	2 inch (50.8 mm)	6 inch (152.40 mm)
20 m - 23.99 m	Group 3	3 inch (76.2 mm)	8 inch (203.2 mm)
24 m - 27.99 m	Group 3	3 inch (76.2 mm)	8 inch (203.2 mm)
28 m – 31.99 m	Group 3	3 inch (76.2 mm)	8 inch (203.2 mm)
32 m and above	Group 3	Scantlings should be increased by 25 % from the value of2 8 m -31.99 m	

10. BULWARK PLANKING

1. The scantlings of the bulwark planking are given in Table 9
2. Bulwark planking is to be fitted in panels as large as practicable.

Table 9 - Bulwark Planking

Length of Boat	Type of Wood	Minimum Thickness	Height
Below 8 meters	Marine Ply	1/4 inch (6.35 mm)	12 inch (304.8 mm)
8 m - 11.99 m	Marine Ply	1/4 inch (6.35 mm)	12 inch (304.8 mm)
12 m - 15.99 m	Marine Ply	1/4 inch (6.35 mm)	12 inch (304.8 mm)
16 m - 19.99 m	Marine Ply	1/4 inch (6.35 mm)	12 inch (304.8 mm)
20 m - 23.99 m	Marine Ply	1/4 inch (6.35 mm)	24 inch (609.6 mm)
24 m - 27.99 m	Marine Ply	1/2 inch (12.7 mm)	24 inch (609.6 mm)
28 m - 31.99 m	Marine Ply	1/2 inch (12.7 mm)	24 inch (609.6 mm)
32 m and above	Marine Ply	Thickness should be increased by 25% from the value of 28 m – 31.99 m	

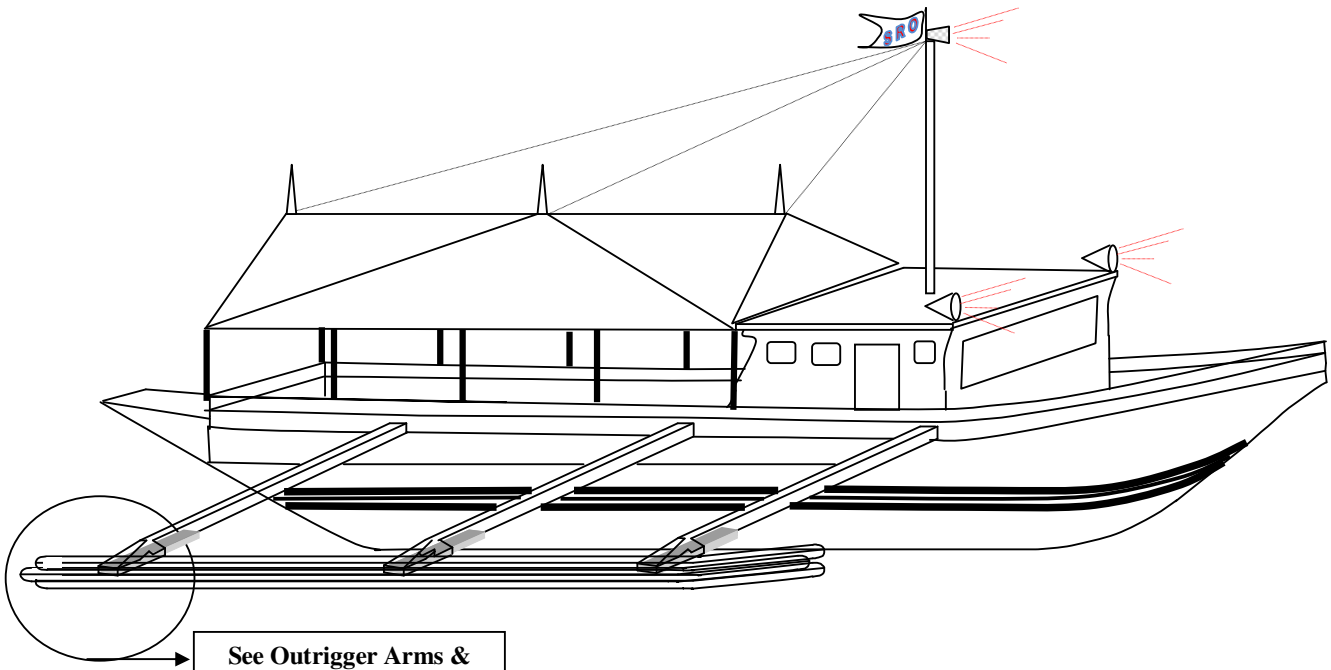
11. BULWARK STIFFENERS

41. The scantlings of the bulwark stiffeners are given in Table 10.
42. The Group 3 Wood Materials, please refer to Section 1 Table A.
43. The stiffeners may be arranged transversely or longitudinally or maybe combination of both

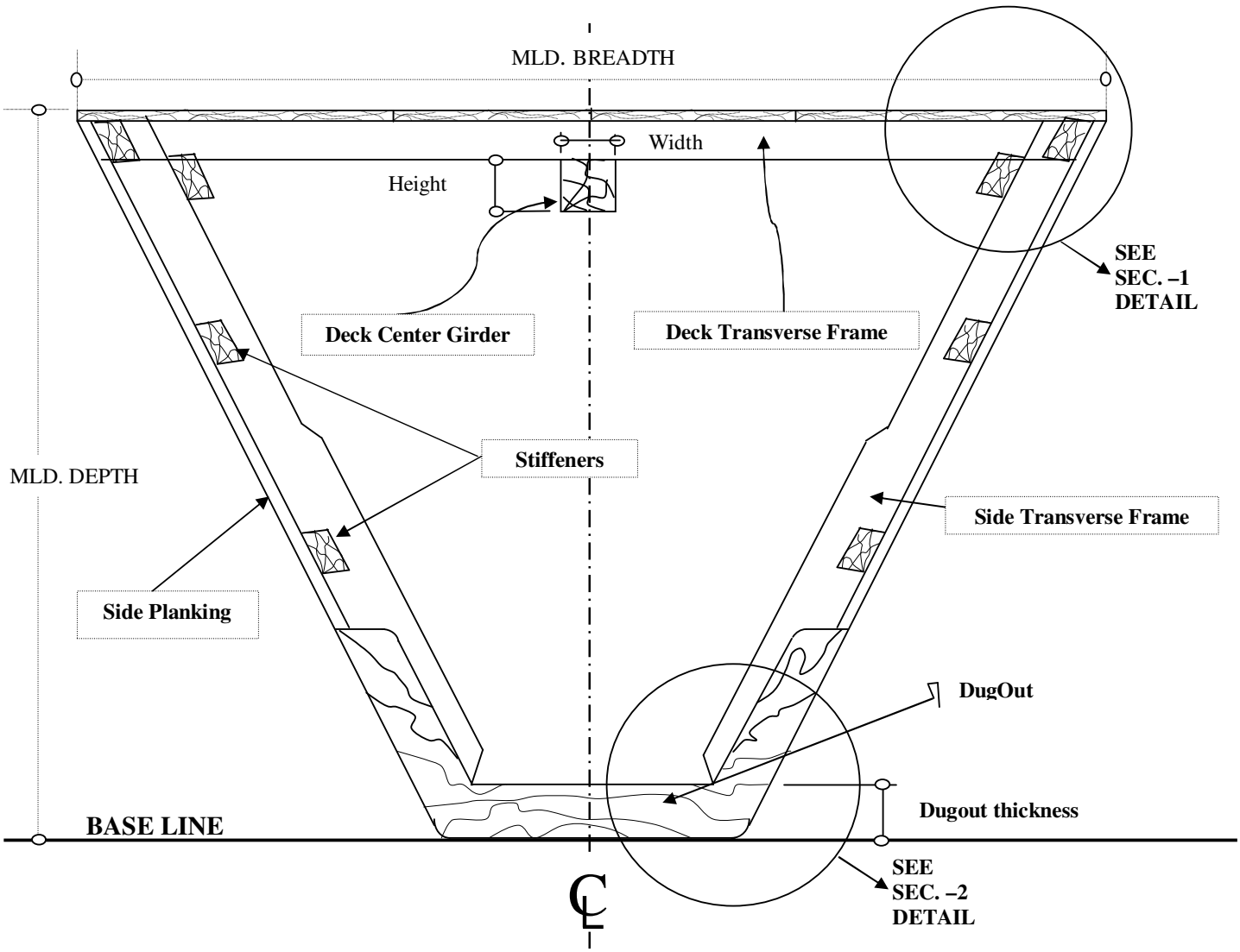
Table 10 - Bulwark Stiffeners

Length of Boat	Type of Wood	Thickness	Width	Minimum Spacing
Below 8 meters	3rd Group	1.5 inch (38.1 mm)	2 inch (50.8 mm)	12 inch (304.8 mm)
8 m - 11.99 m	3rd Group	1.5 inch (38.1 mm)	2 inch (50.8 mm)	12 inch (304.8 mm)
12 m - 15.99 m	3rd Group	2 inch (50.8 mm)	2 inch (50.8 mm)	12 inch (304.8 mm)
16 m - 19.99 m	3rd Group	2 inch (50.8 mm)	3 inch (76.2 mm)	12 inch (304.8 mm)
20 m - 23.99 m	3rd Group	2 inch (50.8 mm)	3 inch (76.2 mm)	12 inch (304.8 mm)
24 m - 27.99 m	3rd Group	4 inch (101.6 mm)	4 inch (101.6 mm)	12 inch (304.8 mm)
28 m - 31.99 m	3rd Group	4 inch (101.6 mm)	4 inch (101.6 mm)	12 inch (304.8 mm)
32 m and above	3rd Group	Scantlings should be increased by 25% from the value of 28 m – 31.99 m		12 inch (304.8 mm)

PROFILE
(FIGURE 1)



See Outrigger Arms & Floaters Drawing

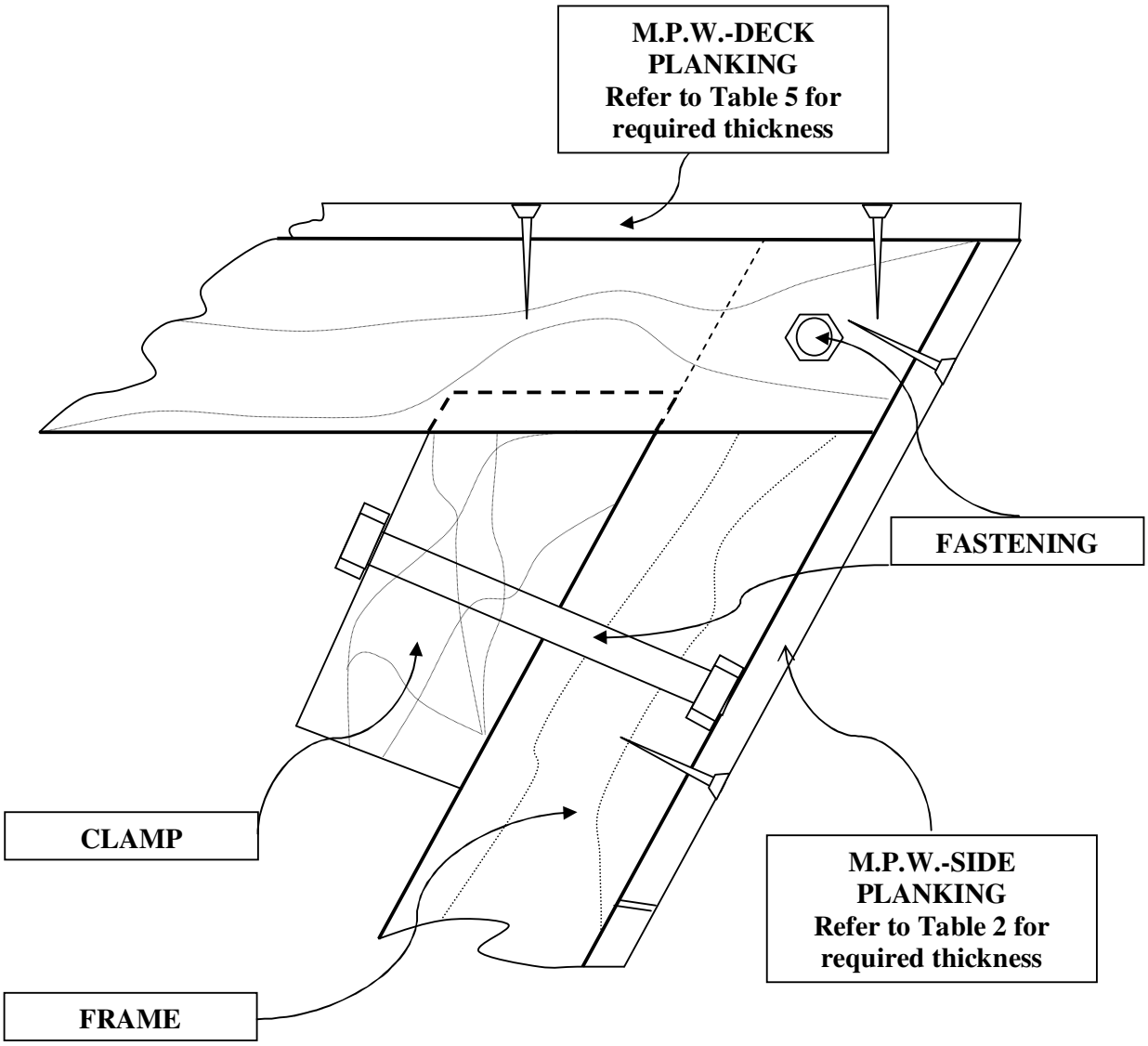


MIDSHIP SECTION

(FIGURE 2)

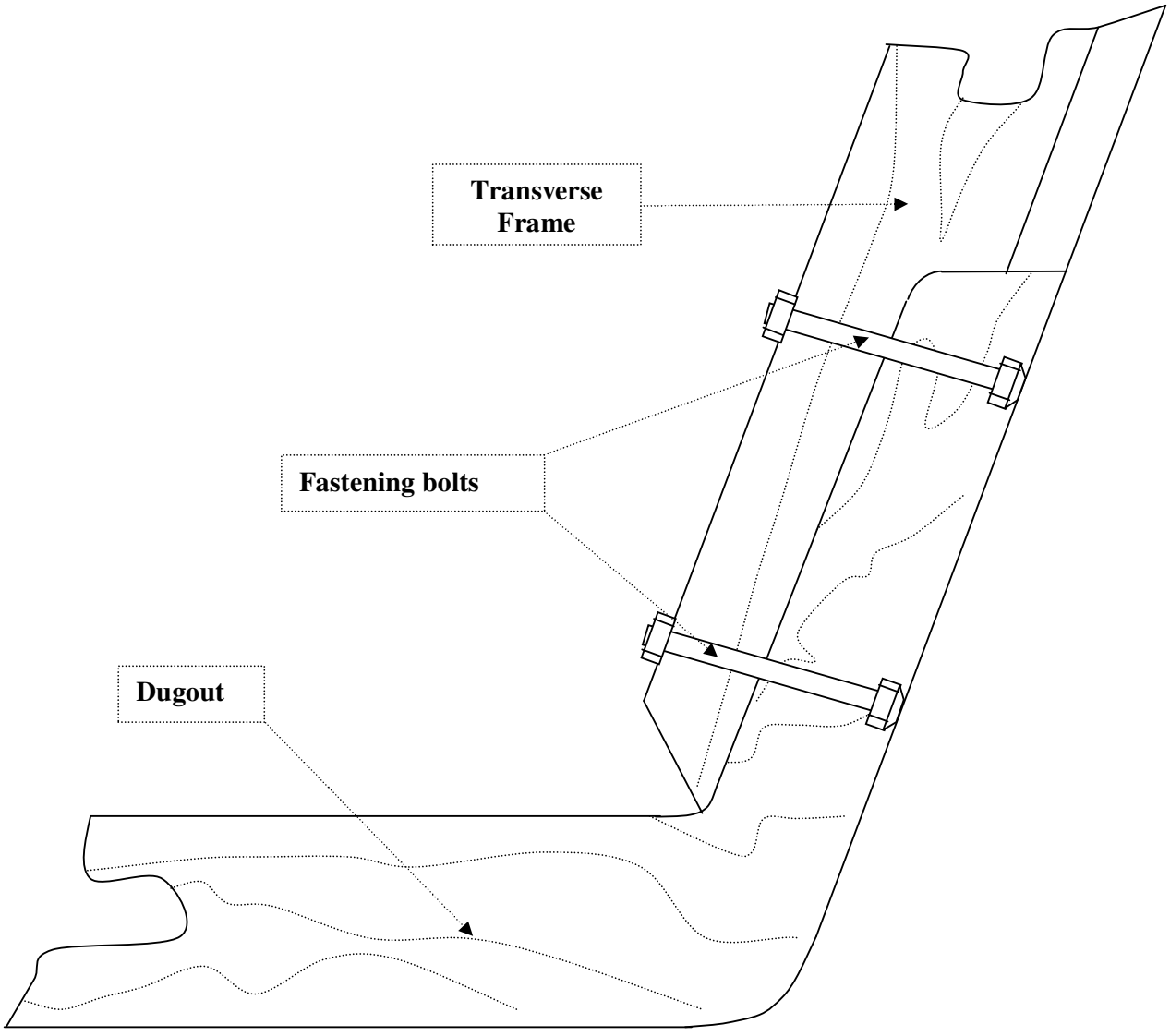
Not To Scale

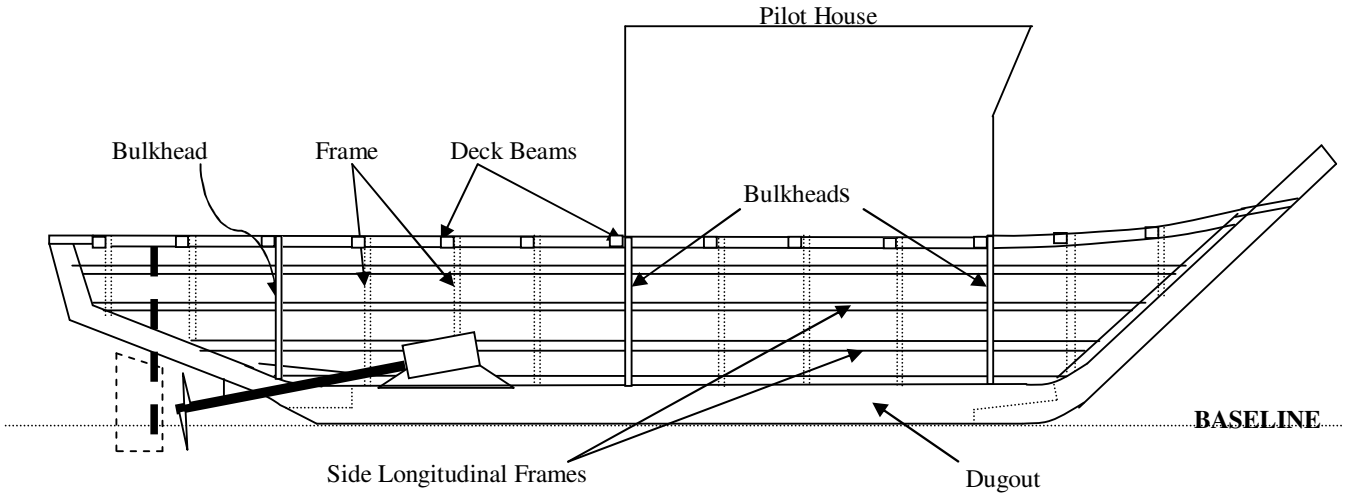
Sec-1 - Detail



Not To Scale

Sec-2 - Detail





CONSTRUCTION PROFILE
(FIGURE 3)

SECTION 3 - 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:

    a. Use only bamboo showing a pronounced brown color. This will ensure that the plant is at least three years old, which is fully grown.

    b. 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.

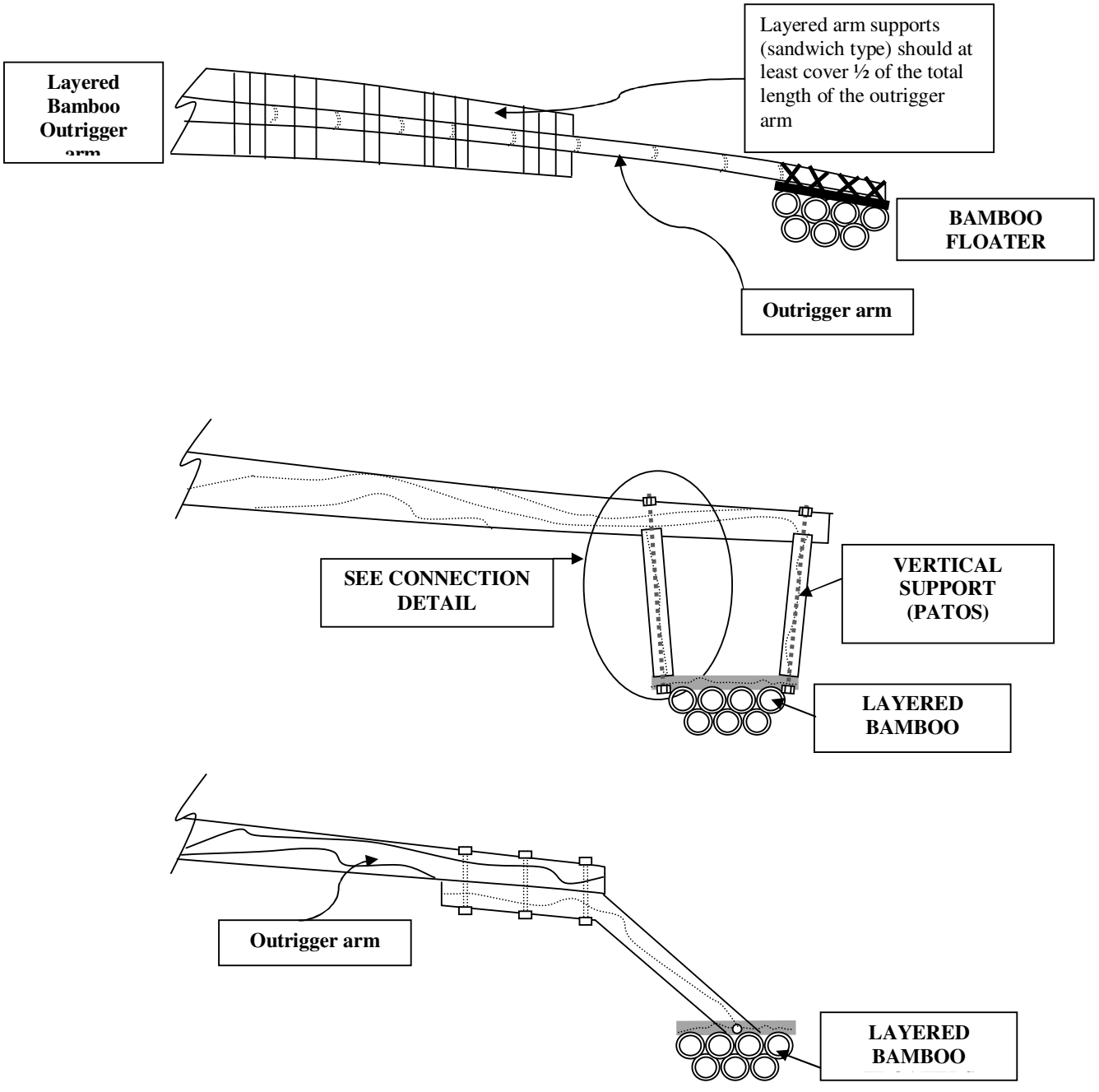
Table 11 – Outrigger Arms

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. (76.2mm)		3.00 meters
8 m – 11.99 m	Bamboo w/ plank support (top & bottom) sandwich type	3	3	3 inch dia. (76.2mm)		3.00 meters
12 m -15.99 m	Bamboo w/ plank support (top & bottom) sandwich type	3	4	3 inch dia. (76.2mm)		3.00 meters
16 m – 19.99 m	Group 1	4			4 inch (101.6 mm)/ 4 inch (101.6 mm)	4.00 meters
20 m – 23.99 m	Group 1	4			6 inch (152.4 mm)/ 6 inch (152.4 mm)	5.00 meters
24 m – 27.99 m	Group 1	4			8 inch (203.2 mm)/ 8 inch (203.2 mm)	5.00 meters
28 m – 31.99 m	Group 1	4			10 inch (254 mm)/ 10 inch (254 mm)	7.00 meters
32 m and above	Group 1				Scantling should be increased by 25% from 28 m -31.99 m	

Note:

1. 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.
2. The design of the outrigger arms, subject to the satisfaction of the Administration.
3. Group 1 Materials – refer to Section 1, Table A

OUTRIGGER ARMS AND FLOATERS
(Figure 4)



SECTION 4 - Floater

1. Bamboo

1. The length of the bamboo to be use 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 8 meters	Bamboo	3	4 inch (101.6 mm)	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.
8 m -11.99 m	Bamboo	4	4 inch (101.6 mm)			
12 m – 15.99 m	Bamboo	4	4 inch (101.6 mm)			
16 m – 19.99 m	Bamboo	6	4 inch (76.2 mm)			
20 m – 23.99 m	Bamboo	6	4 inch (101.6 mm)			
24 m – 27.99 m	Bamboo	8	4 inch (101.6 mm)			
28 m – 31.99 m	Bamboo	8	4 inch (101.6 mm)			
32 m and above		Scantlings should be increased by 25% from the value of 28 m – 31.99 m				

SECTION 5 - 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

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

SECTION 6 - Wood Treatment and Painting

1. Wood Treatment

1. Timber exposed to sea water or fresh water 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

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

SECTION 7 - Visibility

1. Pilot Cockpit shall be located where the boat captain has clear visibility of the sea way.

2. The side of the boat, at all times, is to be visible from the Pilot Cockpit, regardless of the weather conditions.

SECTION 8 - Watertight Integrity

1. **Drainage of Boat With Deck**

    1. The weather deck on all boat shall be watertight of 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 bulkwarks such that shipped water may be trapped, the partial bulkwarks shall be provided with efficient freeing ports.

    3. The area freeing ports shall be at least 5% of the bulkwarks area and be situated in the lower third of the bulkwarks 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.

SECTION 9 – 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 9.2.2.

2. A new boat of less than 20 m in 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 to one 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 without steps or recesses insofar 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 inboard 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 m in 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 m in 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:

$$d = \frac{(F)\ (f)\ (L)}{D}$$

Where:

F = the floodable length factor from Table III/21.1;
f = the effective freeboard in metres calculated for each pair of adjacent bulkheads in accordance with 9.6.2;
L = Length Over Deck in metres 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 III/21
TABLE OF FLOODABLE LENGTH FACTORS

(d/L) x 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

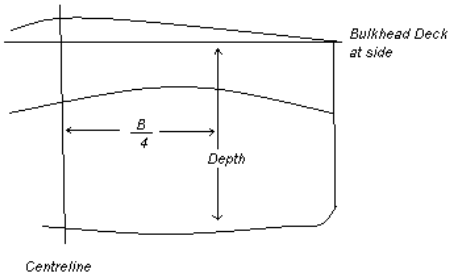
Note 1: Where:

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

a = the freeboard in metres (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 freeboard in metres (feet) measured:

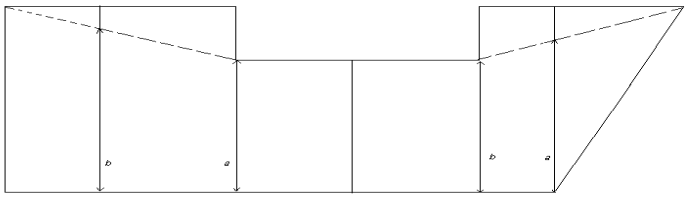
1. at the aft main transverse watertight bulkhead; and
2. from the deepest waterline to:

    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

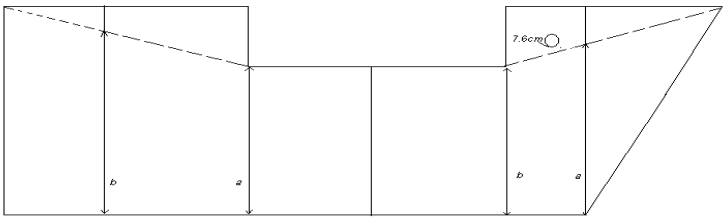
3. where a boat has an opening scuttle (porthole) below the bulkhead deck, the line shown in Figure III-21-3.

Figure III/21-2
Freeboard 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



2. A boat, required by regulation III/20 to be fitted with watertight bulkheads shall be measured in accordance with the simplified subdivision calculation.

Section 10 - Watertight and Weathertight Openings

a. 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.

CHAPTER 2
MAIN PROPULSION AND STEERING ARRANGEMENT

SECTION 1 - Main Propulsion

Main Propulsion of motor boat shall be approved, designed and constructed in accordance with good boatbuilding practice. Marine engine be fitted on board should comply with this regulation, however, marinized engine or hand crank type may be accepted provided their propelling shaft linkages converted to marine use and installation shall be to the satisfaction of surveyor.

1. Installation Particulars

1. The following installation requirements apply generally to all compartments housing internal combustion engines. All woodwork within 1.8 m (6 ft) directly over the cylinders and within 1.2 m (4 ft) of unjacketed cylinders, exhaust pipes & cylinders, exhaust pipes & silencers is to be lagged.

2. Engine Seating is to be constructed with the hull of the motor boat. They are easy access to any repair or works to be done, in case of maintenance.

3. Drip trays are to be fitted under the engine seating where leakage of oil might occur. Means are to be provided for removing any leakage easily.

4. Monitoring services such engine revolution (RPM), jacket water discharge temperature, lubrication oil pressure and fuel temperature (if applicable) shall be provided and shall be readily visible.

5. Piping used in the fuel system shall be ferrous material or other material typed approved by the Administration.

2. Starting Arrangement

1. Storage batteries to be used for starting the main engines are to have sufficient capacity of six times without re-charging the battery. (Charging facilities shall be available for the batteries when the main engine is running)

2. In case for manual starting of the engine, an adequate space for such activities must be provided.

3. All propulsion engines, except those engines fitted with hand starting arrangements, should be provided with a secondary means of starting.

4. Other means of starting acceptable to the Administration.

3. Controls and Instruments

The control should be properly constructed and operate efficiently. Instrumentation system for the propulsion engine should, where practicable, show the following parameters:

.1 RPM;
.2 cooling water temperature; and
.3 lubricating oil pressure.

4. Fuel Tanks

1. Fuel tanks are to be manufactured from steel, aluminium or any suitable alloy. Steel tanks will require protection against corrosion.

2. A suitable means of draining water or any residue from the base of the fuel tanks should be normally provided.

3. Gauge to indicate the fuel level may be provided and shall be readily visible. Glass contents gauges, where fitted, should have self closing valves at the base and be protected by metal rods or slotted covers.

4. Fixed fuel tanks should be fitted with separate filling and air pipes

5. A closing valve should be fitted on the fuel pipe line, as close as possible to the tank, and should be closable from the outside the engine room.

6. Petrol tanks should not be integral with the hull structure. An efficient system should be installed to ensure that petrol does not spill into the hull of the boat when tanks are being filled. It should not be placed closed to any sources of heat or close to electrical machinery that may cause sparking. Petrol filling should be effectively bonded or earthing.

5. Pumps and Piping System

A. Fuel Oil installation

1. A vessel may be fitted with an inboard gasoline engine where:

2. The engine is located in an efficiently enclosed space adjacent a handmade portable fire extinguishers

3. Provision is made to ventilate the engine space thoroughly before the engine is started.

4. Electrical devices within the engine and tank compartments have protection against ignition of surrounding flammable gasses.

5. Tanks for fuel oil should be of sound and efficient construction and safe in operation and should be located remote from heated surfaces and not be situated above hot surfaces and electrical equipment.

6. Tanks and piping should be arranged to minimize in the event of leakage or rupture the possibility that fuel would come into contact with hot surfaces or electrical components.

7. Piping systems should be sound construction and suitable for the service intended.

B. Bilge Pumping System

Decked Boat should have an efficient bilge pumping arrangement fitted and where practicable, each watertight compartment should have a bilge suction fitted with a non-return valve and strainer.

C. Exhaust Systems

The exhaust systems should be of sound construction, and hoses of a suitable material, well supported, free from defects, and not in contact with combustible materials.

D. Materials for Valves and Associated Piping - Sea Water System

Valves, pipes and fittings serving as sea inlets and discharges attached directly to the hull of the boat below the loaded waterline should be cast steel, bronze or other equivalent and compatible material. Care should be taken not to use dissimilar metals when joints are required and particularly when lengths of pipes are replaced.

E. Ventilation of Spaces relating to Gasoline

A space containing machinery powered by or fuel tanks for gasoline shall have a ventilation system that complies with this regulation and consist of the following:

1. For an enclosed space:

- At least two natural ventilation supply ducts located at one end of the space and that extend to the lowest part of the space or to the bilge on each side of the space.

- A mechanical exhaust

2. Ventilation of Spaces relating to diesel

3. A space containing diesel machinery shall be fitted with at least two ducts to furnish natural or powered supply and exhaust ventilation. The total inlet area and the total outlet area of each ventilation duct shall not less than 650 mm^2 (one square inch) for each 300 cm (foot) of beam of the vessel. These minimum areas shall be increased as necessary when the ducts are considered as part of the air supply to the engines.

4. A duct shall be of rigid permanent construction, which does not allow any vapour flow except through normal openings and made of non-combustible materials.

SECTION 2 - Steering Arrangement

2. I - General

1. The steering gear shall secure a steady and safe manuevering of the boat at the maximum engine power for which the boat is certifies. The steering devices shall be protected so that they do not come in contact with cargo and the like which can block or make difficult the steering.

2. A steering console or similar arrangement in the steering system shall be built, stiffened and secured in such a way that it can absorb the forces to which it will be exposed taking into account also the forces of the operator of the boat will transfer to the wheel at heeling and often movements of the boat.

3. Boats should be provided with an alternative means of steering which would operate if the main system fails, this may include a steering oar.

2.2 - Propeller Shafts

1. The shaft diameter shall comply with the engine manufacturer's requirements but shall be at least:

$$d - k\sqrt[3]{p/r} \quad \text{mm}$$

p = is the maximum continuous power in kw
r = Propeller Revolutions per second
k = 30 for carbon steel

Other shaft material shall be specially considered having regard to the seawater fatique properties of the material.

2. Shaft Brackets

The wall thickness of a shaft bearing shall be at least:

$$t = d \mid 230/32 \quad \text{mm}$$

Where:

d = is the shaft diameter in mm.

The length of the shaft bearing shall be at least 3 d for bearing in stern tubes and 2 d for other brackets.

CHAPTER 3 - ELECTRICAL
RULES FOR ELECTRICAL INSTALLATION

SECTION 1 - General Requirements

1.1 General

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

    a. 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;

    b. electrical services essential for safety will be ensured under various emergency conditions; and

    c. the safety of passengers, crew and ship from electrical hazards will be ensured.

1.2 Plans

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

    - Schematic Wiring Diagram
    - Schedule of Load and Specification

1.3 Additions and Alterations

1. 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, switchgear and other equipment is adequate for the increased load subject for approval of the Administration.

1.4 Survey

1. 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.

SECTION 2 - System Design – General

2.1 Systems of Distribution

Type of Systems

1. Alternating Current System:

   - 3-phase, 3 wire insulated system;
   - Single phase, 2 wire insulated system,

2 For Direct Current System, 2 wire insulated system

Note: Per P.E.C. Art. 10.6.1 The watercraft structure shall not be used as a normal current carrying conductor for power, heating and lighting system.

Earthing connections are ***not to be made*** to hull sheathing, skin fittings or plumbing.

2.2 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:

   (a) the proper voltage type and rating;
   (b) be the manual reset type;
   (c) have instantaneous short circuit protection capable of repeatedly opening the circuit in which they are used without failure; and
   (d) 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:

   (a) be capable of carrying the continuous maximum current of the system in each ungrounded conductor;
   (b) the continuous rating of the switch shall be not less than the total ratings of the main over current protection devices connected to it;
   (c) be capable of carrying the intermittent maximum cranking current of the largest engine cranking motor;

(d) shall be located as close to the battery as practicable but readily accessible in the event of an emergency;
(e) when used with a diode rectified alternator or third brush generator incorporate a means for breaking the field circuit when the battery 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.

2.3 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.

2.4 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.

2.5 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.

2.6 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.

CHAPTER 4
LIGHTS AND SHAPES APPLIED TO MOTOR BOATS:

Section 1

General

- Power-driven wooden hulled boat shall have the following navigational lights.

    (1) Masthead light
    (2) Sidelight.
    (3) Stern Light.
    (4) Sidelight

- Navigational lights shall be so installed that the angle of visibility and the minimum height above the decks requires therein shall be assured.

- The light from navigational lights fixture shall not be obscured by any part of the motorboat structure.

- Navigational light fixture shall be wired by means of a short length of a heavy duty portable cable to a watertight receptacle outlet located adjacent thereto.

- Each lamp shall be connected to each branch circuit conductors by means of an individual portable cable and receptacle plug.

Definitions

(a) **"Masthead light"** means a white light placed over the fore and aft centreline of the vessel showing an unbroken light over an arc of the horizon of 225 degrees and so fixed as to show the light from right ahead to 225 degrees abaft the beam on either side of the vessel and shall be installed on the forepart of the boat at the height above the gunwale of not less than 2700 mm.

(b) **"Sidelights"** means a green light on the starboard side and a red light on the port side each showing an unbroken light over an arc of the horizon of 112.5 degrees and so fixed as to show the light from right ahead to 22.5 degrees abaft the beam on its respective side. In a vessel of less than 20 metres in length the sidelights may be combined in one lantern carried on the fore and aft centreline of the vessel.

(On the starboard side a light fixture showing GREEN, and on the port side showing RED).

(c) **"Sternlight"** means a white light placed as nearly as practicable at the stern showing an unbroken light over an arc of the horizon of 135 degree and so fixed as to show the light 67.5 degrees from right aft on each side of the vessel.

(d) **All-round light"** means a light showing an unbroken light over an arc of the horizon of 360 degrees.

Section 2

2.1 Additional lights for Fishing Boats

(1) When engaged in trawling, the watercraft shall be fitted with two lights in a vertical line, over the other, not less than 1200 mm nor more than 3600 mm apart. The upper light fixture shall be **GREEN** and the lower light fixture shall be **WHITE** and each shall be visible at a distance of at least 3.75 km all round the horizon.

(2) When engaged in fishing other than trawling, whether underway or at anchor, the watercraft shall be fitted with light fixtures as prescribed in (1) above, except that the upper of the two vertical lights shall be **RED.**

NAVIGATIONAL LIGHT ILLUSTRATION

0