RUSSIAN MARITIME REGISTER OF SHIPPING

RULES

FOR THE CLASSIFICATION AND CONSTRUCTION OF SMALL SEA FISHING VESSELS

PART III

EQUIPMENT, ARRANGEMENTS AND OUTFIT

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RULES FOR THE CLASSIFICATION AND CONSTRUCTION OF SMALL SEA FISHING VESSELS

Rules for the Classification and Construction of Small Sea Fishing Vessels of Russian Maritime Register of Shipping (RS, the Register) have been approved in accordance with the established approval procedure and come into force on 1 January 2022.

The present edition of the Rules is based on the 2021 edition taking into account the amendments and additions developed immediately before publication.

The Rules are published in the following parts:

Part I "Classification";
Part II "Hull";
Part III "Equipment, Arrangements and Outfit";
Part IV "Stability and Freeboard";
Part V "Subdivision";
Part VI "Fire Protection";
Part VII "Machinery Installations";
Part VIII "Systems and Piping";
Part IX "Machinery";
Part X "Boilers, Heat Exchangers and Pressure Vessels";
Part XI "Electrical Equipment";
Part XII "Refrigerating Plants";
Part XIII "Materials";
Part XIV "Welding";
Part XV "Automation";
Part XVI "Structure and Strength of Fiber-Reinforced Plastic Ships";
Part XVII "Radio Equipment";
Part XVIII "Navigational Equipment".

REVISION HISTORY
(purely editorial amendments are not included in the Revision History)

For this version, there are no amendments to be included in the Revision History.

1 GENERAL

1.1 APPLICATION

1.1.1 The requirements of this Part of the Rules for the Classification and Construction of Small Sea Fishing Vessels[1] apply to equipment, arrangements and outfit of small sea fishing vessels navigating in a displacement condition.

1.1.2 The equipment, arrangements and outfit designed for special purposes supply (for example, catching and processing arrangements) are not subject to the Register supervision.

[1] Hereinafter referred to as "these Rules".

1.2 DEFINITIONS AND EXPLANATIONS

The definitions and explanations relating to the general terminology of these Rules are given in Part I "Classification".

For the purpose of this Part the following definitions have been adopted.

Auxiliary steering gear is the equipment other than any part of the main steering gear necessary to steer the ship in the event of failure of the main steering gear, but not including the tiller, quadrant or components serving the same purpose.

Main steering gear is the machinery, rudder actuators, steering gear power units, if any, ancillary equipment and the means of applying torque to the rudder stock (for example, tiller or quadrant) necessary for effective movement of the rudder for the purpose of steering the ship under normal service conditions.

Power actuating system is the hydraulic equipment provided for supplying power to turn the rudder stock, comprising a steering gear power unit or units, together with associated pipes and fittings, and a rudder actuator. The power actuating systems may share common mechanical components, i.e. tiller, quadrant and rudder stock, or components serving the same purpose.

Steering gear unit is:

in the case of electric steering gear, an electric motor and its associated electrical equipment;

in the case of electrohydraulic steering gear, an electric motor and its associated equipment and connected pump;

in the case of other hydraulic steering gear, a driving engine and connected pump.

Steering gear control system is the equipment, by which orders are transmitted from the navigating bridge to the steering gear power units. The steering gear control systems comprise transmitters, receivers, hydraulic control pumps and their associated motors, motor controllers, piping and cables.

1.3 SCOPE OF SUPERVISION

1.3.1 General provisions on supervision over ship's equipment, arrangements and outfit are given in Part I "Classification".

1.3.2 The following items included into ship's equipment, arrangements and outfit are subject to the Register supervision during their manufacture.

1.3.2.1 Rudder and steering gear:

.1 rudder stocks;
.2 rudder blade;
.3 nozzle rudders;
.4 rudder axles;
.5 pintles of rudders and nozzle rudders;
.6 bushes of pintles;
.7 fastenings of rudder stocks, rudder stock with rudder blade or nozzle rudder, and also of rudder axles with sternframe (muff couplings, keys, bolts, nuts, etc.);
.8 parts of the system of rudder stops;
.9 rudder stock bearings.

1.3.2.2 Anchor arrangement:

.1 anchors;
.2 chain cables or ropes;
.3 anchor stoppers;
.4 devices for securing and releasing the inboard end of chain cable or rope;
.5 anchor hawse pipes.

1.3.2.3 Mooring arrangement:

.1 mooring ropes;
.2 mooring bollards, belaying cleats, fairleaders, chocks, rollers and stoppers.

1.3.2.4 Towing arrangement:

.1 tow lines;
.2 towing bitts and chocks.

1.3.2.5 Life-saving appliances:

.1 rescue boats;
.2 liferafts (inflatable and rigid);
.3 lifebuoys;
.4 lifejackets;
.5 immersion and anti-exposure suits;
.6 thermal protective aids;
.7 launching appliance winches;
.8 engines of rescue boats;
.9 line-throwing appliances;
.10 means of rescue;
.11 self-igniting lights of lifebuoys;
.12 self-activating smoke signals of lifebuoys;
.13 launching appliances of liferafts and rescue boats;
.14 containers for inflatable liferafts;
.15 release mechanism of liferafts and rescue boats;
.16 hydrostatic release units;
.17 lights of liferafts and rescue boats;
.18 buoyant rescue quoits with buoyant line;
.19 parachute flares, hand flares and buoyant smoke signals;
.20 food rations;
.21 watertight receptacles with freshwater;

.22 sea-activated power sources for lights of lifejackets, liferafts and for lifebuoy self-igniting lights.

1.3.2.6 Cargo handling gear:

.1 ship derricks: metal structures, winches and reels, components and ropes;

.2 cranes and hoists: metal structures, machinery, components and ropes, safety devices;

.3 machinery drives;

.4 electrical equipment of cargo handling gear.

1.3.2.7 Masts and rigging:

.1 metal, wooden and glass-reinforced plastic spars;

.2 standing ropes;

.3 permanent attachments to masts and decks (eyeplates, hoops, etc.);

.4 loose gear of masts and rigging (shackles, turnbuckles, etc.).

1.3.2.8 Closing appliances of openings in hull, superstructures and deckhouses:

.1 side and deck scuttles;

.2 doors in superstructures and deckhouses;

.3 companion hatches, skylights and ventilating trunks;

.4 ventilators;

.5 manholes to tanks;

.6 hatchway covers.

1.3.2.9 Equipment of ship's spaces:

.1 ceiling and battens in holds;

.2 exit doors from ship's spaces in escape routs;

.3 stairways and vertical ladders;

.4 guard rails and bulwark.

1.3.2.10 Emergency outfit:

.1 collision mats;

.2 tools;

.3 materials.

1.3.3 The Register supervision of the manufacture of the items specified in 1.3.2.1.7, 1.3.2.1.8, 1.3.2.7, 1.3.2.9.1, 1.3.2.10.2 and 1.3.2.10.3 is confined to review of the relevant technical documentation.

1.3.4 For all the items specified in 1.3.2 the following documents shall be submitted to the Register:

.1 assembly drawing;

.2 calculations (no stamps of approval are needed);

.3 detail drawings, if parts or assemblies are not manufactured in accordance with standards or specifications approved by the Register.

1.3.5 The following equipment, arrangements and outfit are subject to the Register supervision when the ship is under construction:

.1 rudder and steering gear;

.2 anchor arrangement;

.3 mooring arrangement;

.4 towing arrangement;

.5 life-saving appliances;

.6 cargo handling gear;

.7 masts and rigging;

.8 openings in hull, superstructures and deckhouses and their closing appliances;

.9 arrangement and equipment of ship's spaces;

.10 emergency outfit.

1.4 MATERIALS AND WELDING

1.4.1 Steel forgings and castings, steel plates, sections and bars and also chain steel used for the items specified in 1.3.2.1.1 — 1.3.2.1.5, 1.3.2.1.7, 1.3.2.2.1 and 1.3.2.2.2 shall meet the requirements of Part XIII "Materials" of the Rules for the Classification and Construction of Sea-Going Ships[1]. Steel forgings may be substituted with round rolled steel with a diameter of up to 150 mm. Materials for other items of equipment, arrangements and outfit shall meet the requirements specified in the design documentation approved by the Register, unless expressly provided otherwise in these Rules.

1.4.2 The grades of steel plates and sections for the items specified in 1.3.2.1.2 and 1.3.2.1.3 shall be selected according to 1.2.3.1 of Part II "Hull" of the Rules for the Classification.

1.4.3 Welding of structural elements of ship's equipment, arrangements and outfit shall be carried out in accordance with the requirements of Part XIV "Welding" of the Rules for the Classification; besides, welded structures and joints of items specified in 1.3.2.8.6 shall meet the applicable requirements of 1.7 of Part II "Hull" of the Rules for the Classification.

[1] Hereinafter referred to as "the Rules for the Classification".

1.5 DESIGN ACCELERATIONS DUE TO HEAVE OF THE SEA

1.5.1 Necessity for use of dimensionless, gravity related, design accelerations shall be proved by the relevant calculations acknowledged by the Register.

2 RUDDER AND STEERING GEAR

2.1 GENERAL

2.1.1 Every ship shall be provided with a reliable device ensuring its steering and course-keeping facilities. Such devices may be: rudder, nozzle rudder, etc., approved by the Register.

2.1.2 The requirements of this Section apply only to ordinary streamlined rudders. Rudder and steering gear of other types may be allowed by the Register, provided the calculations confirming their strength have been submitted.

2.2 TYPES AND COMPOSITION OF RUDDER AND STEERING GEAR

2.2.1 Rudder and steering gear comprises the following components:
rudder (rudder blade, rudder stock);
steering engine or control column;
steering drive;
rudder rests;
restricters.

2.2.2 The requirements of this Section apply to the types of rudder and steering gear, which diagrams are shown in Fig. 2.2.2.

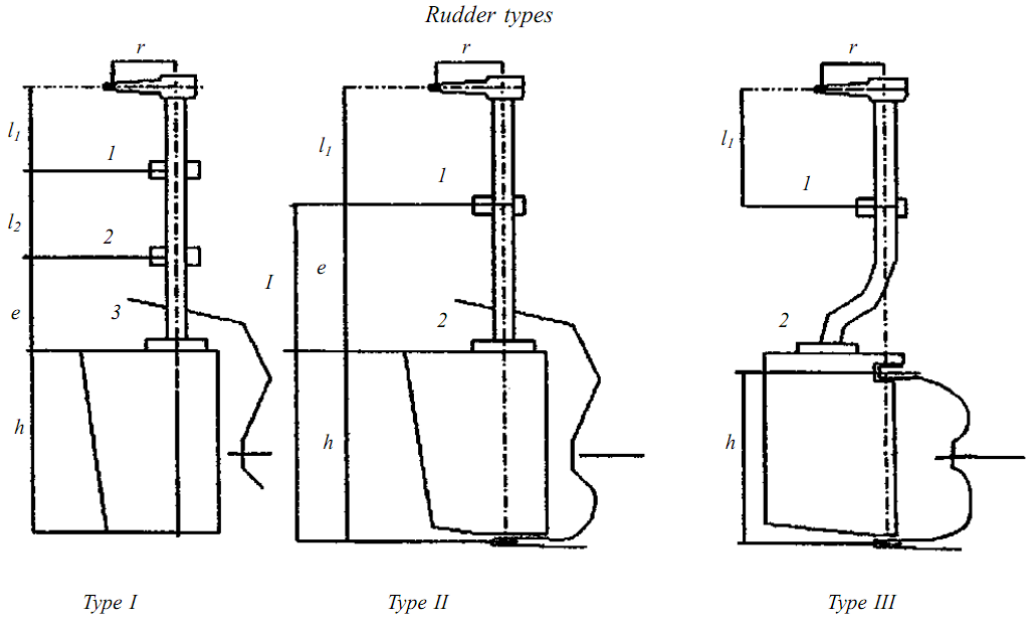

Fig. 2.2.2

2.2.3 All the main components of rudder and steering gear shall be calculated on the basis of the assumption that steel with yield stress not less than 235 MPa is used.

2.3 RUDDER STOCK

2.3.1 The diameter of the rudder stock head d_0, in cm, shall not be less than the value determined by the formula

$$d_0 = K\sqrt[3]{Av_s^2 r} \qquad (2.3.1\text{-}1)$$

where K = factor equal to:
2,54 – for rudders operating directly behind the propeller;
2,25 – for rudders not operating directly behind the propeller;
A = rudder blade area, in m^2;
v_s = the maximum ahead speed, in knots, with the ship on the summer load waterline, but not less than 8;
r = distance between the hydrodynamic force pressure center and the rudder blade centre line, in m, determined by the formula

$$r = \left[2{,}54\left(0{,}333 - \frac{A_1}{A}\right) + 0{,}119\right]\frac{A}{h_r} \qquad (2.3.1\text{-}2)$$

where A_1 = part of the rudder blade area located forward of its centre line, in m^2;
h_r = mean height of the rudder blade part abaft the centre line of the rudder stock, in m.

2.3.2 The diameter of the rudder stock d_1, in cm, in way of section 1 in Fig. 2.2.2 (in way of the upper bearing) shall not be less than determined by the formula

$$d_1 = d_0\sqrt[6]{1 + 4/3 + l_1^2/r_1^2} \qquad (2.3.2)$$

where l_1 = distance along the rudder stock centre line from the middle of the upper bearing to the middle of the quadrant or tiller, in m;
r_1 = radius of the steering gear quadrant or tiller resultant force arm measured from the centre line of the rudder stock, in m. When the quadrant or tiller are located forward of the rudder stock centre line, value of r_1 shall be assumed to be positive; when the quadrant or tiller are located aft of the rudder stock centre line, it is assumed to be negative.

2.3.3 For rudder of type I (refer to Fig. 2.2.2) the rudder stock diameter d_2, in cm, in way of section 2 (in way of the lower bearing) shall not be less than determined by the formula

$$d_2 = d_0\sqrt[6]{1 + \frac{1}{3} + \frac{(h+2e)^2}{r^2}} \qquad (2.3.3)$$

where h, e = dimensions shown in Fig. 2.2.2, in m.

The diameter of rudder stock of type I in way of section 3 is assumed to be equal to d_2.

2.3.4 For type II, diameter of rudder stock d_2, in cm, in way of section 2 in Fig. 2.2.2 (in way of rudder stock and rudder blade coupling) shall not be less than determined by the formula

$$d_2 = d_0\sqrt[6]{1 + \frac{4}{3} + \frac{h^2}{l_2^2}\left(\frac{l_1}{r_1} + \frac{1}{2}\times\frac{e}{r}\right)^2} \qquad (2.3.4)$$

where l_2 = dimension shown in Fig. 2.2.2, in m.

2.3.5 Rudder stock design shall not have any abrupt stepped transition. The change in the rudder stock diameter between the adjacent sections mentioned in the formulae shall not be more sudden than that permitted by the linear low.

Where the change of the rudder stock diameter is stepped, the steps shall be provided with fillets having as large radius as practicable. The transition of the rudder stock into the flange shall be carried out with a radius of fillet of not less than 0,12 times the diameter of the rudder stock in way of the flange.

2.4 RUDDER BLADE

2.4.1 Rudder blade area may be determined by calculation or selected on the basis of rudder blade area of a prototype ship, designation, dimensions, lines of the lines drawing and speed of which are close to the same of the designed ship.

2.4.2 In order to reduce hydrodynamic forces applied to the rudder and decrease resistance of self-propelled ships with relatively high speed, it is recommended to use profiled rudder blade.

2.4.3 From the standpoint of design, it is recommended to use steel, hollow profiled rudder blade, which represents a welded structure. In order to protect the internal chamber from water getting inside it, it is recommended to fill it with such materials like foamed polyurethane or apply corrosion protection coating on it.

2.4.4 Internal chamber of the rudder blade shall be watertight; it shall be tested for water tightness by 0,02 MPa during 15 min.

2.4.5 The thickness of the streamlined rudder blade side plating s, in mm, shall not be less than determined by the formula

$$s = 0{,}025d_0 + 3 \tag{2.4.5}$$

where d_0 = rudder blade diameter.

2.4.6 The streamlined rudder blade side plating shall be stiffened from the inside by horizontal ribs and vertical web plates. The thickness of the web plates shall not be less than that of the rudder blade side plating.

2.4.7 The horizontal and vertical web plates shall be provided with sufficient number of openings for free drainage of water, which may penetrate inside the rudder blade.

2.4.8 The streamlined rudder blade shall be provided with top and bottom plates, the thickness of which shall not be less than 1,2 times the side plating thickness. The top and bottom plates shall be fitted with drain plugs of corrosion-resistant metal.

2.4.9 When plate rudder is used, thickness of side plating s_1 shall not be less than determined by the formula

$$s_1 = 0{,}08d_0 + 4. \tag{2.4.9}$$

2.4.10 The section modulus of these web plates, including the effective flange, and the rudder piece W, in cm^3, shall be:

for rudder of type I at the upper edge – not less than

$$W = 0{,}1d_2^3. \tag{2.4.10-1}$$

This section modulus may gradually decrease reaching 50 % of its value at the rudder lower edge;

for rudder of type II – not less than

$$W = 0{,}057\frac{d_0^3 h}{r}\left[\frac{r}{r_1}\times\frac{l_1}{l_2} + \frac{1}{2}\left(1 + \frac{e}{l_2}\right)\right]^2; \tag{2.4.10-2}$$

for rudder of type III – not less than

$$W = 0{,}012\frac{d_0^3 h}{r} \qquad (2.4.10\text{-}3)$$

2.5 RUDDER BLADE AND RUDDER STOCK COUPLING

2.5.1 Design of the rudder blade and rudder stock coupling shall ensure strength and reliable connection of these two component parts and possibility to dismantle the rudder blade without dismantling the stock.

2.5.2 The following types of coupling may be accepted for joining rudder blade wth rudder stock: flange coupling, keyed flange coupling or keyed cone coupling.

2.5.3 If the parts are joined by horizontal flange coupling, the diameter of coupling bolts d_3, in cm, shall not be less than

$$d_3 = 0{,}62\sqrt{\frac{d_i^3}{zr_2}} \tag{2.5.3}$$

where d_i = diameter of the rudder stock at the coupling flange, in cm;
z = number of coupling bolts;
r_2 = mean distance from the centre of the bolts to the centre of the system of the flange bolt holes, in cm.

For rudders of type I and type II, d_2, determined by Formulae (2.3.3) and (2.3.4), shall be taken as d_i; for rudder of type III d_0, determined by Formula (2.3.1-1), shall be taken.

2.5.4 Only the fitted bolts shall be employed. The bolts and nuts shall be efficiently secured.

2.5.5 The thickness of the coupling flanges shall not be less than the diameter of the bolts. The centers of the holes for bolts shall be distant from the outside edges of the flange by not less than 1,15 times the bolt diameter.

2.5.6 When the cone coupling is used, the cone length of the rudder stock fitted to the rudder blade shall not be less than 1,5 times the diameter of the rudder stock in way of the coupling; the cone on the diameter shall not be more than 1:10.

2.5.7 A key shall be set on the cone generatrix, the working sectional area of the key (product of the key length by its width) A_f, in cm^2, shall not be less than

$$A_f = 92{,}2\frac{d_0^2 h}{R_{eH}} \tag{2.5.7}$$

where R_{eH} = upper yield stress of the key material, in MPa.

The key height shall not be less than half its width.

2.5.8 The external diameter of the rudder stock threaded portion shall not be less than 0,9 times the minimum cone diameter. The height of the nut shall not be less than 0,8 times the external diameter of the rudder stock threaded portion. To prevent self-unscrewing, the nut shall be securely fastened.

2.6 RUDDER PINTLES

2.6.1 The diameter of the pintle, including its liner, where fitted, d_4, in cm, shall not be less than determined by the formula

for rudder of type II

$$d_4 = 0{,}365\sqrt{\frac{d_0^3}{pr}\left[\frac{r}{r_1}\times\frac{l_1}{l_2}+\frac{1}{2}\left(1+\frac{e}{l_2}\right)\right]^2}; \qquad (2.6.1\text{-}1)$$

for rudder of type III

$$d_4 = 0{,}258\sqrt{\frac{d_0^3}{pr}} \qquad (2.6.1\text{-}2)$$

where p = the surface pressure specified in Table 2.6.1.

Table 2.6.1

Materials for rubbing parts	Surface pressure, p, in MPa
Stainless steel or bronze against lignum vitae	2,4
Stainless steel against kaprolon	5,0
Stainless steel against bronze or vice versa	6,9
Stainless and wear-resistant steels in combination	7,0

2.6.2 The ratio of bearing height of the pintle to diameter d_4 shall not be less than 1 or more than 1,3.

2.6.3 The length of the cone part of the pintles in rudder gudgeon shall not be less than the diameter d_4; the cone on the diameter shall not be more than 1:10.

2.6.4 The external diameter of the pintles threaded portion shall not be less than 0,8 times the minimum cone diameter. The nut height shall not be less than 0,6 times the external diameter of the pintle threaded portion.

2.6.5 To prevent self-unscrewing, the pin and the pintles shall be securely fastened.

2.7 RUDDER STOCK BEARINGS

2.7.1 A thrust bearing shall be installed to take the mass of the rudder and rudder stock. Measures shall be taken against axial displacement of the rudder blade and rudder stock upwards for a value exceeding that permitted by the construction of the steering gear.

2.7.2 A stiffing box shall be fitted in way of passage of the rudder stock through the top of a rudder trunk, which is open to sea to prevent water from entering the ship's space. The stuffing box shall be fitted in a place accessible for examination and maintenance at all times.

2.7.3 It is required to check the chosen dimensions of the thrust friction bearings for surface pressure. To ensure the specified surface pressure, the height of the bearing bush h_b, in cm, shall not be less than

$$h_b = 0{,}01\frac{R_i}{pd_i} \tag{2.7.3-1}$$

where d_i = diameter of the rudder stock with liner at the point of the considered bearing installation, in cm;

R_i = design value of the reaction of the considered bearing, in N, determined by the formulae:

reaction of the upper bearing for rudder of type II

$$R_1 = 13{,}3\frac{d_0^3}{r}\left[\frac{r}{r_1}\left(1+\frac{l_1}{l_2}\right)+\frac{1}{2}\left(1+\frac{e}{l_2}\right)\right]; \tag{2.7.3-2}$$

reaction of the lower bearing for rudder of type I

$$R_2 = 13{,}3\frac{d_0^3}{r}\left[\frac{3}{2}+\frac{1}{2}\frac{a}{l_2}+\frac{r}{r_1}\frac{l_1}{l_2}\right] \tag{2.7.3-3}$$

reaction of the upper bearing for rudder of type II

$$R_3 = 13{,}3\frac{d_0^3}{r}\left[\frac{r}{r_1}\left(1+\frac{l_1}{l_2}\right)-\frac{1}{2}\frac{h}{l_2}\right]; \tag{2.7.3-4}$$

reaction of the upper bearing for rudder of type III shall be assumed equal to zero.

2.8 STEERING GEAR SYSTEM OF STOPS

2.8.1 The steering gear shall be provided with a system of stops permitting to put the rudder over either side only to angle β°:

$$(\alpha° + 1°) < \beta° < (\alpha° + 1{,}5°) \qquad (2.8.1\text{-}1)$$

where $\alpha°$ = the maximum hard-over angle, to which the steering gear control system is adjusted (as a rule, it shall be assumed $\alpha° < 35°$).

All parts of the system of stops, including those, which are at the same time the parts of the steering gear, shall be calculated to take forces corresponding to an ultimate reverse torque M_t, in kN×cm, determined by Formula (2.8.1-2); at that the stresses in these parts shall not exceed 0,95 times the upper yield stress of their material

$$M_t = 2{,}7d_0^3. \qquad (2.8.1\text{-}2)$$

2.9 STEERING GEAR

2.9.1 Each ship shall be provided with a main steering gear and an auxiliary steering gear.

2.9.2 The main steering gear shall be capable of putting the fully immersed rudder over at the maximum forward speed from 35° on either side to 30° on the other side in not more than 28 s.

2.9.3 The main steering gear may be hand-operated, provided the above-mentioned requirement is met, and with a force of not over 120 N applied to the steering wheel handles and with the number of steeringwheel rotations not more than 25 during shifting the rudder from hard over to hard over.

2.9.4 The auxiliary steering gear shall be independent from the main steering gear and shall be capable of putting the rudder over from 15° on one side to 15° on the other side in not more than 60 s with the ship running ahead at half the maximum speed, but not less than 5 knots.

2.9.5 The auxiliary steering gear may be hand-operated, provided the above-mentioned requirement is met; with a force of not over 160 N per helmsman. The rudder tackle may be used as the auxiliary steering gear.

2.10 REQUIREMENTS FOR LOCATION ONBOARD

2.10.1 Mutual location of the component parts of the steering gear shall ensure the safe and convenient operation.

2.10.2 Along the ship the rudder shall be located as far as possible from the ship's center of gravity to make sure that when the rudder is putting over, the maximum value of the ship's reverse torque is generated.

2.10.3 At all the hard-over angles, the rudder from top view shall not get beyond the hull lines (with the exception of ships with hinged type rudder).

2.10.4 In order to raise the rudder efficiency, it is required to take the minimum value of the gap between the upper rudder blade edge and the side plating, provided the condition of the required rudder hard-over angle is observed.

2.10.5 Location of the lower edge of the rudder blade shall take into consideration design and operation trim of the ship, so that the rudder damage due to hitting the ground is prevented.

2.10.6 Lower support shall be designed for the rudders of ships designated for operation in shallow waters.

2.10.7 Arrangement of the steering rope and roller drives shall ensure the location of the rollers and steering rope with the minimum number of sharp bends.

2.10.8 Rotating and moving parts of the steering gear shall be fenced.

3 ANCHOR ARRANGEMENT

3.1 GENERAL

3.1.1 Each ship shall be provided with an anchor arrangement for riding the ship at anchor.

3.1.2 The anchor arrangement shall include:

anchor;

chain cables or ropes;

anchor hawse pipes;

anchor stoppers;

devices for securing and releasing the inboard end of chain cable or rope.

3.2 EQUIPMENT NUMBER

3.2.1 Anchor arrangement components shall be chosen in compliance with the Equipment Number according to Table 3.2.1. The Equipment Number N_c is determined by the formula

$$N_c = k_c\left(\Delta^{2/3} + 2Bh + 0{,}1A\right) \qquad (3.2.1\text{-}1)$$

where k_c = factor equal to 1,0 for ships, the maximum forward speed at draught to the summer load waterline does not exceed 5 knots, and equal to 0,75 for ships with higher speed;
Δ = ship's volume displacement to the summer load waterline, in m^3;
B = ship's breadth, inm;
h = height from the summer load waterline to the top of the foremost deckhouse, in m, which is determined by the formula

$$h = a + \sum h_i \qquad (3.2.1\text{-}2)$$

where a = distance from the summer load waterline amidships to the top of the upper deck plating at side, in m;
h_i = height at the center line of each tier of superstructure or deckhouse having a breadth greater than $0{,}25B$, in m. In case of ships with two or more superstructures or deckhouses along the length, only one superstructure or deckhouse of the considered tier with the greatest breadth is taken into account.
For the lowest tier h_i shall be measured at the center plane from the upper deck, or, in case of a stepped upper deck, from a notional line, which is continuation of the upper deck.
When calculating h, sheer and trim shall be ignored;
A = area in profile view of the hull, superstructures and deckhouses above the summer load waterline, which are within the ship's length L and also have a breadth greater than $0{,}25B$, in m^2.

Table 3.2.1

Equipment Number N_c		Bower anchors		Chain cables for bower anchors			Mooring ropes			Tow line	
Exceeding	Not exceeding	Number	Mass per anchor	Total length, in m	Grade, in mm		Number	Length of each rope, in m	Actual breaking strength, in kN	Length, in m	Actual breaking strength, in kN
					Grade 1	Grade 2					
10	15	1	30	55		–	2	30	29	–	–
15	20	1	40	55	1	–	2	30	29	–	–
20	25	1	50	82,5		–	2	40	29	–	–
25	30	1	60	82,5	1	–	2	50	29	–	–
30	40	2	80	165	11,0	–	2	50	29	120	65
40	50	2	100	192,5	11,0	–	2	60	29	150	81
50	60	2	120	192,5	12,5	–	2	60	29	180	98
60	70	2	140	192,5	12,5	–	2	80	29	180	98
70	80	2	160	220	14	12,5	2	100	34	180	98
80	90	2	180	220	14	12,5	2	100	37	180	98
90	100	2	210	220	16	14	2	110	37	180	98
100	110	2	240	220	16	14	2	110	39	180	98

[1] Chain cable or wire rope may be used; chain breaking load or actual breaking strength of wire rope being not less than 44 kN.

3.3 BOWER ANCHORS

3.3.1 Ships with Equipment Number of 35 and less may have only one bower anchor.

3.3.2 If the number of bower anchors determined in accordance with Table 3.2.1 is 2, the second bower anchor is supposed to be a spare anchor on condition that provision is made for it quick getting ready for use.

3.3.3 Anchors of the following types are permitted to be used on ships:

Hall's;

Gruson's;

admiralty.

3.3.4 The equipment of ships with anchors of other approved types is allowed.

3.3.5 In terms of their specifications, the anchors used shall comply with the requirements of Section 10 of Part III "Equipment, Arrangements and Outfit" of the Rules for the Classification.

3.4 CHAIN CABLES AND ROPES FOR BOWER ANCHORS

3.4.1 Ships, in which the second bower anchor is permitted to be a spare one, may be equipped with only one chain cable, the length of which is two times less than that required in Table 3.2.1.

Chain cables of bower anchors shall be graded 1 or 2 dependent on their strength as specified in Part XIII "Materials" of the Rules for the Classification.

3.4.2 Chain lengths, which diameter is less than 15 mm, may have no studs.

3.4.3 Chains, which diameter is less than 15 mm, may not be divided into chain lengths. If the chain is divided into chain lengths, the length shall be interconnected with joining links or joining shackles.

Depending on their location in the chain cable, the lengths are divided into the following:

anchor length fastened to the anchor;

intermediate lengths;

inboard end chain length secured to the chain cable releasing device.

3.4.4 The anchor length of chain shall consist of a swivel, an end link and a minimum quantity of common and enlarged links, required to form an independent length of chains.

The anchor length of chains may consist only of a swivel, an end link and a joining link, provided the relation between the dimensions of the chain cable parts allows forming such a length. In chain cables, which are not divided into lengths of chains, the swivel shall be included into each chain cable as near to the anchor as possible. In all cases, the pins of swivels shall face the middle of the chain cable.

The anchor length shall be connected with the anchor shackle with the aid of an end shackle, the pin of which shall be inserted into the anchor shackle.

3.4.5 The intermediate lengths of chains shall not be less than 25 m and not more than 27,5 m; the chains consisting of the odd number of links. The total length of two chain cables given in the Equipment Tables is a sum of intermediate lengths of chains only without the anchor and inboard end lengths of chains.

If the number of intermediate lengths of chains is odd, the starboard chain cable shall have one intermediate lengths of chains more than the port chain cable.

3.4.6 For the ships equipped with only one chain cable, its length determined in compliance with requirements of 3.4.1 is a sum of intermediate lengths of chains without anchor lengths and the inboard end lengths of chains.

3.4.7 The inboard end length of chains shall consist of a special link of enlarged size (provided, however, that this link is capable of passing freely through the wildcat of the anchor machinery), being secured to the chain cable releasing device, and of the minimum number of common and enlarged links required for forming an independent chain length. The inboard end length of chains may consist of one end link only provided the relation between the dimensions of the chain cable parts and the chain cable releasing device allows forming such a length.

3.4.8 The chain cables may be replaced with wire ropes or synthetic fibre ropes.

The actual breaking strength of such ropes shall not be less than the breaking load of the corresponding chain cables; their length shall not be less than 1,5 times the length of the chain cables.

Wire ropes of trawl winches complying with these requirements may be used as anchor cables.

3.4.9 The end of each wire rope shall be spliced into a thimble, clamp or socket, and connected to the anchor by means of a joining shackle being equal to the wire ropes in strength.

3.5 ANCHOR APPLIANCES

3.5.1 Stoppers.

3.5.1.1 Each bower-anchor chain cable or rope shall be provided with a stopper holding the anchor in the hawse pipe when stowed for sea or, in addition, intended for riding the ship at anchor.

3.5.1.2 Where the stopper is intended only for securing the anchor in the hawse pipe when stowed for sea, its parts shall be calculated to withstand the chain cable strain equal to twice the weight of the anchor, the stresses in the stopper parts not exceeding 0,4 times the upper yield stress of their material. Where the stopper comprises a chain cable or rope, this shall have safety factor 5 in relation to the breaking load of the chain cable or actual breaking strength of the rope under the action of force equal to twice the weight of the anchor.

3.5.1.3 Where the stopper is intended for riding the ship at anchor, its parts shall be calculated on assumption that the stopper will be subjected to a force in the chain cable equal to 0,8 times its breaking load. The stresses in the stopper parts shall not exceed 0,95 times the upper yield stress of their material. Where the stopper comprises a chain cable or rope, they shall have strength equal to that of the chain cable, for which they are intended.

3.5.2 Device for securing and releasing the inboard end of the chain cable.

The parts of the device for securing and releasing the inboard end of the chain cable shall be calculated for strength under the force acting on device, which is equal to 0,6 times the chain breaking load, stresses in these parts not exceeding 0,95 times the upper yield stress of their material.

3.5.3 Laying of chain cables.

3.5.3.1 Laying of chain cables shall provide for their free run when dropping or hoisting the anchors.

3.5.3.2 The anchor shank shall easily enter the hawse pipe under the mere action of the chain cable tension and shall readily take off the hawse pipe when the chain cable is released.

3.5.3.3 The hawse pipe shall have the internal diameter equal to at least 10 diameters of the chain cable; the wall thickness shall not be less than 0,4 times the diameter of the chain cable.

3.5.3.4 When the anchor arrangement does not include anchor hawse pipe, anchor machinery and anchor stopper for rope securing when riding the ship at anchor, mooring arrangement elements (mooring bollards, fairleaders, cleats) may be used, or securing of the wire rope end to the ship's structures shall be provided.

3.5.4 Chain lockers.

3.5.4.1 For stowage of each bower anchor chain, lockers shall be provided.

When one chain locker is designed for two chains, it shall be provided with an internal division so that separate stowage of each chain is secured.

3.5.4.2 The chain locker shall be of a shape, capacity and depth adequate to provide an easy direct lead of the cables through the chain pipes, an easy selfstowing of the cables and their free veering away when dropping the anchors.

3.5.4.3 The chain locker design and closures of its access openings shall be watertight to the extent required to make sure that if the chain locker is flooded occasionally, it would not damage the essential auxiliary appliances or equipment (located outside the chain locker) or would not influence the proper ship's operation.

3.5.4.4 When a rope is used instead of the chain cable, a special reel shall be provided for its storage.

3.6 ANCHOR MACHINERY

3.6.1 Anchor machinery shall be fitted on the deck in the fore part of the ship for dropping and hoisting the anchors, as well as for holding the ship with the bower anchors dropped if the mass of the anchor exceeds 50 kg.

3.6.2 Hand-operated anchor machinery, as well as other deck machinery for dropping and hoisting the anchors may be used.

3.6.3 Anchor machinery with hand drive shall be fitted in such a way that the handle in its lowest position be at the height not less than 500 mm and in the uppermost position — not less than 1200 mm above the ship's deck.

3.7 SPARE PARTS

3.7.1 Each ship, carrying a spare anchor and equipped with a chain cable for bower anchor, shall have:

spare anchor length of chain — 1 pc.;

spare joining links — 2 pcs;

spare end shackle — 1 pc.

3.7.2 Each ship equipped with a spare anchor and wire rope for bower anchor shall have a spare set of parts for joining the wire rope and anchor shackle.

4 MOORING ARRANGEMENT

4.1 GENERAL

4.1.1 Each ship shall be supplied with mooring arrangement for warping to coastal or floating berths and for reliable fastening of the ship to them.

4.1.2 The number, length and actual breaking strength of mooring ropes shall be determined from Table 3.2.1.

4.1.3 The length of individual mooring ropes may be reduced by up to 7 % as against the prescribed value, provided that the total length of all mooring ropes is not less than the prescribed one.

4.1.4 In case mooring ropes made of synthetic fiber are used, their actual breaking strength F_s, in kN, shall not be less than determined by the formula

$$F_s = 0{,}0742\delta_m F_r^{8/9} \tag{4.1.4}$$

where δ_m = mean elongation at breaking of a synthetic fiber rope, in %, but not less than 30 %. Where no data on δ_m are available, it shall be assumed equal to:
45 % for polyamide ropes;
35 % for polypropylene ropes;

F_r = actual breaking strength of the mooring rope specified in 3.2.1, in kN.

4.2 MOORING ROPES

4.2.1 Mooring ropes may be of steel wire, natural fibre or synthetic fiber material.

Not with standing the breaking strength specified in Table 3.2.1, the diameter of the mooring rope made from natural or synthetic fiber material shall not be less than 20 mm.

4.2.2 Steel wire ropes shall have at least 144 wires and not less than 7 fibre cores. The wires of ropes shall have a zinc coating in compliance with recognized standards.

4.2.3 Natural fibre ropes may be manilla, sizal or hemp ropes.

4.2.4 The synthetic fibre ropes shall be manufactured from approved homogeneous materials (polypropylene, capron, nylon, etc.).

4.2.5 In all other respects, the ropes shall meet the requirements of 6.6 of Part XIII "Materials" of the Rules for the Classification.

4.3 MOORING APPLIANCES

4.3.1 The number and position of mooring bollards, fairleaders and other mooring appliances depend on the constructional features, purpose and general arrangement of the ship.

4.3.2 Bollards may be of steel or cast iron. The ships equipped only with natural fibre or synthetic fibre ropes are permitted to use the bollards made of light alloys. As to the method of manufacture, the bollards may be welded or cast.

4.3.3 The outside diameter of the bollard column shall not be less than 10 diameters of the steel wire rope, not less than 5,5 diameters of the synthetic fibre rope, and not less than one circumference of the natural fibre rope, for which the bollard is designed. The distance between the axes of bollard columns shall not be less than 25 diameters of the steel wire rope or 3 circumferences of the natural fibre rope.

4.3.4 The mooring bollards, fairleaders and other mooring appliances, except wire stoppers, as well their beds shall be designed in such a way that with the strength equal to the actual breaking strength of the mooring rope, for which it is intended, stresses in the parts shall not exceed 0,95 of the upper yield stress of their material.

The breaking strength of the wire stopper shall not be less than 0,15 of the actual breaking strength of the rope, for which it is intended.

5 TOWING ARRANGEMENT

5.1 GENERAL

5.1.1 Each ship with Equipment Number N_c not less than 30 shall be provided with towing arrangement for its safe towing by another ship.

5.1.2 The towing arrangement shall be designed in complex with design of the anchor and mooring arrangement and other deck arrangement.

5.2 TOW LINE

5.2.1 The length and actual breaking strength of the tow line shall be determined from Table 3.2.1 according to Equipment Number.

5.2.2 The tow lines may be of steel wire, natural fibre or synthetic fibre material. The requirements of 4.1.4 — 4.2.5 for mooring ropes are also applicable to the tow line.

5.2.3 The tow lines shall have lights on one end and the respective marks on the other one.

5.2.4 The tow lines shall be stored on reels or raised platforms.

5.3 TOWING APPLIANCES

5.3.1 The number and location of towing bollards and chocks depend on the constructional features, purpose, type and general arrangement of the ship.

5.3.2 Requirements of 4.3.2 — 4.3.4 introduced for mooring bollards, fairleaders and chocks also apply to towing bollards and chocks.

6 LIFE-SAVING APPLIANCES

6.1 GENERAL

6.1.1 Application.

This Section lays down the requirements, which the life-saving appliances and arrangements shall comply with, and specifies the number of these appliances and arrangements and their location on board the ship.

6.1.2 Definitions and explanations.

Highly visible colour is a saturate orange or yellow colour.

Life-saving appliance is an appliance capable of sustaining the lives of persons in distress from the time of abandoning ship.

Retro-reflective material is a material, which reflects in the opposite direction a beam of light directed on it.

6.2 REQUIREMENTS FOR EQUIPMENT OF SHIPS WITH LIFE-SAVING APPLIANCES

6.2.1 Communications.

6.2.1.1 Visual signals.

Ships shall be equipped with at least 6 rocket parachute flares stored at the navigating bridge or nearby.

6.2.1.2 Onboard communications and alarm systems.

6.2.1.2.1 At least two two-way VHF radiotelephone apparatus shall be provided onboard the ship. This apparatus shall meet the requirements of Section 14 of Part IV "Radio Equipment" of the Rules for the Equipment of Sea-Going Ships. At least one radar transponder shall be carried on the ship.

6.2.1.2.2 A general emergency alarm system shall be provided and shall be used for summoning crew to muster stations and to initiate the actions included in the muster list.

6.2.2 Personal life-saving appliances.

6.2.2.1 Lifebuoys.

6.2.2.1.1 Lifebuoys shall:

.1 be so distributed as to be readily available on both sides of the ship; at least one lifebuoy shall be placed in the vicinity of the stern;

.2 be so stowed as to be capable of being rapidly cast loose, and not permanently secured in any way;

.3 be available onboard to the amount of at least 4 items.

6.2.2.1.2 At least one lifebuoy on each side of the ship shall be fitted with a buoyant lifeline with length of not less than 30 m.

6.2.2.1.3 Not less than one half of the total number of lifebuoys shall be provided with lifebuoy selfigniting lights and lifebuoy self-activating smoke signals. Lifebuoys with lights and those with lights and smoke signals shall be equally distributed on both sides of the ship; they shall not be lifebuoys fitted with buoyant lifelines.

6.2.2.2 Lifejackets.

6.2.2.2.1 A lifejacket shall be provided for every person on board the ship. In addition, a sufficient number of lifejackets shall be carried for persons on watch. Lifejackets shall be stowed on the bridge and at any other manned watch station.

The ship may not be provided with lifejackets, except the lifejackets for persons on watch, if the immersion suits required in 6.2.2.3 may be classified as lifejackets.

6.2.2.2.2 Lifejackets shall be so placed as to be readily accessible and their position shall be plainly indicated.

6.2.2.3 Immersion suits.

An immersion suit shall be provided for every person onboard, except the cases, when the ship is constantly engaged in warm climates or when embarkation appliances are boarded from a position on deck less than 2 m above the waterline in the lightest sea-going condition.

6.2.3 Survival craft.

6.2.3.1 The ship shall carry liferafts on each side of such aggregate capacity as will accomodate all the persons on board. Unless these rafts can be easily transferred for launching on either side of the ship, additional rafts shall be provided on both sides so that their capacity will accommodate 50 % of the total number of persons on board. In the event of any liferaft being lost or rendered unserviceable, there shall be sufficient number of liferafts available for use on each side to accommodate the total number of persons on board, including the liferafts, which are stowed in a position providing for easy side-to-side transfer.

6.2.3.2 Taking into consideration nature of voyages and weather conditions, the ship may be fitted with liferafts with aggregate capacity sufficient to accommodate all the persons on board.

6.2.3.3 The ship shall carry one rescue boat. Capacity of the rescue boat may be less than six persons. The ship may be exempted from the requirement to carry a rescue boat,

provided its dimensions and maneuverability, vicinity of search and rescue services, and hydrometeorological conditions in the area of navigation do not dictate necessary fulfillment of this requirement.

6.2.4 Line-throwing appliances.

6.2.4.1 All ships shall be provided with line-throwing appliances comprising two rockets and two lines each.

6.2.4.2 Lines shall have the length not less than 230 m.

6.3 TECHNICAL REQUIREMENTS FOR LIFE-SAVING APPLIANCES

6.3.1 Communications, namely visual signals (parachute flares), onboard communications and alarm systems shall meet the requirements of the Rules for the Equipment of Sea-Going Ships.

6.3.2 All life-saving appliances shall meet the requirements of the Rules for the Equipment of Sea-Going Ships.

6.3.3 Liferafts and rescue boats shall be stowed in compliance with the requirements in 2.4 of Part II "Life-Saving Appliances" of the Rules for the Equipment of Sea-Going Ships.

7 CARGO HANDLING GEAR

7.1 GENERAL

7.1.1 Cargo handling gear on board the ships is intended for loading, unloading and moving of loads from one position to another.

7.1.2 Cargo handling gear composition and lifting capacity shall be defined depending on the kind of cargo shipped, cargo carrying capacity of holds, dimensions of cargo hatches and the ship's design features.

7.1.3 It is recommended to use derricks or cat davits with a safe working load of not less than 1,0 t as cargo handling gear on board small ships.

7.1.4 When cargo handling gear with higher safe working load are used, they shall comply with the requirements of the Rules for the Cargo Handling Gear of Sea-Going Ships.

7.2 SELECTION OF EQUIPMENT AND TECHNICAL REQUIREMENTS

7.2.1 Cargo handling gear shall be designed in such a way that will enable their safe operation with up to 5° heel and up to 2° trim at the maximum jib radius.

7.2.2 Methods for calculation of forces and stresses in structural elements of cargo handling gear are not regulated.

The forces are determined in relative values. When forces are determined, it shall be assumed that all the forces applied to the boom head cross at the same point on the boom axis.

7.2.3 The length of ship derricks shall be selected on the basis of the requirement to ensure the required jib radius and the safe height for cargo transferring above the ship structures.

7.2.4 The cargo handling gear shall be designed in such a way that the operator's workplace would ensure sufficient view of the hatch opening and the ship deck and would be beyond the cargo transferring area. No ladders shall be located in the operation area of the derricks and cranes.

7.2.5 Provision shall be made to ensure efficient securing of derricks and cat davits when they are stowed for sea.

7.2.6 The ship cranes, ship derricks and hoists shall be so designed as to ensure their secure attachment to the ship's hull. Ship's hull structures at the point of the cargo handling gear attachment shall be appropriately reinforced.

7.2.7 In case manually driven cargo handling gear is used, the force on a handle to be applied by each operator shall not exceed 160 N when working with one hand and 250 N when working with two hands.

7.3 REQUIREMENTS FOR LOCATION ONBOARD

7.3.1 Location of cargo handling gear on board the ship shall be determined by the purpose, design features of the ship and the mutual location of the cargo hatches.

7.3.2 Cargo winches and other devices shall be arranged in such a way that they would not impede free passage along the deck. Distance between the device and other ship structures shall not be less than 600 mm.

7.3.3 Height of the winch controls location above the deck or deck plating shall not be less than 0,8 m but not more than 1,1 m.

7.3.4 Access shall be provided to all the parts that require maintenance, periodical examination and repair.

8 SIGNAL MASTS

8.1 GENERAL

8.1.1 The requirements of this Section refer to the masts, which are intended only for carrying signal means: navigation lights, day signals (flags, signal shapes), antennas and radar reflectors.

8.1.2 Arrangement, height and provision of signal means on the signal masts shall comply with the requirements of Part III "Signal Means" of the Rules for the Equipment of Sea-Going Ships.

8.2 TECHNICAL REQUIREMENTS

8.2.1 The mast heel shall be rigidly fixed in all directions.

8.2.2 The masts with length l up to 8,0 m shall not be stayed masts. When the length l exceeds 8,0 m, along with unstayed masts, the stayed masts may also be used.

8.2.3 The outside diameter d and the thickness t, in mm, at the heel of the masts made of steel having the upper yield stress from 215 up to 255 MPa shall not be less than those given in Table 8.2.3.

Table 8.2.3

Mast length from the heel to top l, in m	Mast fastening			
	unstayed mast		stayed mast	
	d, mm	t, mm	d, mm	t, mm
3,0	39,9	4,0	–	–
4,0	93,4	4,0	–	–
5,0	120,5	4,0	–	–
6,0	149,5	4,0	–	–
7,0	175,6	4,0	–	–
8,0	207,4	4,0	–	–
9,0	241,5	5,0	198,0	5,0
10,0	278,2	5,0	220,0	5,0
11,0	319,5	5,0	251,5	5,0
12,0	360,2	5,0	294,0	5,0
Note. For intermediate length values the mast parameters shall be determined by means of interpolation.				

8.2.4 While the thickness of the mast plates is maintained constant throughout the length l, the diameter of the mast may be gradually decreased upwards to a value of:

0,5d at 0,75l distance from the heel for unstayed masts;

0,75d at the shroud eyeplates for stayed masts.

The mast length from the shroud eyeplates to the top shall not exceed 1/3l.

The masts shall be stayed by the shrouds as follows:

.1 horizontal distance a, in m, from the deck (or bulwark) stay eyeplate to the transverse plane through the mast stay eyeplate shall not be less than $a = 0{,}15h$ where h is the vertical distance from the mast stay eyeplate to the deck (or bulwark) stay eyeplate;

.2 horizontal distance b, in m, from the deck (or bulwark) stay eyeplate to the longitudinal plane through the mast stay eyeplate shall not be less than $b = 0{,}30h$;

.3 the value a shall not exceed the value b.

8.2.5 The actual breaking strength of ropes F, in kN, used for the mast shrouds as specified in 8.2.4, shall not be less than $F = 0{,}49(l^2 + 10l + 25)$.

In other respects, the ropes for shrouds shall comply with the requirements of the Rules for the Classification.

The loose gear of shrouds (shackles, turnbuckles, etc.) shall be such that their safe working load is not less than 0,25 times the actual breaking strength of the above mentioned ropes.

8.2.6 Where the mast is made of high tensile steel, light alloys, glass-reinforced plastics or wood, the mast is fitted, in addition to a yard arm, lights, day signals, antennas and radar reflectors, with other equipment having considerable weight, detailed strength calculation of this mast shall be carried out according to the procedure approved by the Register.

9 OPENINGS AND THEIR CLOSING APPLIANCES

9.1 SIDE SCUTTLES

9.1.1 Side scuttles shall not be fitted in the spaces below the upper deck.

In the bulkheads of enclosed superstructres and deckhouses it is allowed that instead of side scuttle the windows could be fitted. At that either hardened glass or triplex shall be used.

9.1.2 Skylights shall be made for illumination of under-deck spaces; at that height of the coamings above the deck shall not be less than 300 mm. No scuttles shall be fitted aflush the deck.

9.1.3 The main frame, glazing bead, deadlight and ring for securing the glass shall be made of steel, brass or aluminum alloy. The glasses used for the side scuttles shall be hardened. The glazing bead and deadlight shall be fitted with gaskets. The ear-nuts and nuts being screwed off by a special wrench shall be made of corrosion-resistant material.

9.1.4 The side scuttles and windows in the foremost walls of superstructures and deckhouses shall have the glass thickness with strength equivalent to thicknesses of not less than 8 mm for 250 mm diameter and not less than 12 mm for 350 mm diameter. For the side scuttles and windows in the side and aft walls, the glass thickness shall provide the strength equivalent to the thicknesses of not less than 6 mm for 250 mm diameter and not less than 10 mm for 400 mm diameter. All the above mentioned side scuttles and windows shall be fitted with deadlights.

9.1.5 Windows of the wheel house shall provide the required view, tightness and strength. The glasses shall be hardened and shatterproof, or made of the equivalent material, which permanently remains transparent. No stained glass is allowed.

9.2 CLOSING APPLIANCES OF OPENINGS IN WATERTIGHT BULKHEADS

9.2.1 Access openings in watertight bulkheads shall be equipped with permanently watertight hung doors (covers), strength of which shall be equivalent to the one of the bulkheads. Doors (covers) shall be fitted with sealing and quick-response fixtures for manual opening (or battening) from both sides of the bulkhead.

9.2.2 Sleeves, welded-on portions or other joints ensuring watertightness of the structure shall be used for laying pipelines through watertight bulkheads. Openings for fastening studs shall not pass through bulkhead panel, but shall end on the welded-on portions.

9.3 HATCH COVERS

9.3.1 Openings on the open deck areas for loading (unloading), for access to the lower rooms, illumination and ventilation, shall be protected with durable cargo hatches, companion hatches, skylights or ventilation hatches, which shall not open to inside.

9.3.2 As a standard tightening fixture, cargo hatches shall have hinged joint covers, shiftable or dismountable covers. Shift of the covers under the action of waves shall be excluded. Watertightness of these covers shall be ensured by means of sealers and efficient clamping and battening means. It is allowed to use tarpaulins and fasteners for them for dismountable covers.

9.3.3 Hatch cover hinges shall be located on the hatch forward edge to prevent it from opening by a wave. Hatch covers shall be of the same strength as structural elements of the deck, taking into consideration effect of the cargoes shipped on them.

9.3.4 All the hatches in the upper deck, which are not protected with a closed superstructure or deckhouse and are closed with covers, watertightness of which under the sea effect is ensured by means of tarpaulin pieces and fasteners for the same, shall have coamings of reliable design. Hatch coaming height shall not be less than 300 mm.

Design loads on covers of the hatches located in area 1 shall not be less than 6,9 kPa, and for those located in area 2 — not less than 5,2 kPa.

Height of fan coamings in all the cases shall not be less than 200 mm.

9.3.5 For skylights it is required to envisage for possibility to fix a dismountable plug, should the glass get damaged.

9.3.6 Hatches, which may remain open for a long time at sea due to operation conditions, shall meet the following requirements:

hatch area shall be minimal required one and, as a rule, shall not exceed 1 m^2;

maximal breadth of companion hatch opening, as a rule, shall not exceed 1 m;

hatch center shall be located maximally close to the center plane.

9.4 CLOSING APPLIANCES OF OPENINGS IN SUPERSTRUCTURES AND DECKHOUSES

9.4.1 All passage openings in the outer walls and superstructure and deckhouse decks shall be fitted with permanently hung doors (covers) with reliable sealing and fixtures for quick manual battening from both sides.

9.4.2 External doors and covers shall not open to the inside. Side wall doors shall open towards the bow. All the doors and covers shall be fitted with at least 300 mm height coamings.

9.5 HEIGHT OF HATCHWAY AND DOOR COAMINGS

9.5.1 Coamings of the openings of hatch covers and door openings shall be of such height, that their upper edge would not touch the water at 25° of the ship's heel.

9.5.2 Height of coamings, in mm, above the deck plating shall not be less than:

300 — for doors leading from the deck to the engine room, and all the hatches;

250 — for other doors.

9.5.3 Application of coamings with less height may be allowed, provided the designer confirms that the ship's safety is not diminished.

9.6 FREEING PORTS

9.6.1 If bulwark on the open deck areas forms wells, efficient freeing ports shall be provided to ensure quick water freeing from the deck.

9.6.2 Area of freeing ports shall not be less than 10 % of area of continuous bulwark section. Lower edges of freeing ports shall be located at the minimum practically possible height above the deck level.

9.6.3 Openings of freeing ports, as far as possible, shall be fitted with covers; actions shall be taken to prevent their jamming. Openings shall have a grid with up to 200 mm distance between the rods.

9.6.4 Efficient freeing ports shall be provided to ensure water freeing from the cockpits overboard.

9.7 VENTILATORS AND AIR PIPES

9.7.1 Ventilators shall as far as possible be located closer to the ship center plane and laid through the upper part of superstructures, deckhouses, companions and capes.

9.7.2 Ventilators to spaces below the deck shall be fitted with coamings efficiently connected to the deck. Height of the coamings shall make sure they will not be flooded at the ship heel up to 25°. In any case height of the coamings shall not be less than 300 mm for engine room fans and not less than 250 mm for other cases.

9.7.3 Outlet ends of ventilating pipes shall be fitted with permanently fastened watertight closing fixture.

9.7.4 Air pipe areas, which are protruding above the decks, shall be of high durability design.

In all the cases air pipe height measured from the upper deck to the lower edge of the opening, from where the fluid can flow downwards, shall not be less than 450 mm. On a superstructure or deckhouse deck this height shall not be less than 150 mm. Outlet ends of air pipes shall be fitted with automatically enabled closing fixtures, which are not mandatory for air pipes of ballast tanks.

10 ARRANGEMENT AND EQUIPMENT OF SPACES. DECK RAILS. EMERGENCY OUTFIT

10.1 LOCATION AND EQUIPMENT OF SPACES

10.1.1 The requirements for the arrangement and equipment of machinery spaces are specified in Part VII "Machinery Installations" and those relating to refrigerating machinery spaces, refrigerant storerooms, as well as refrigerated cargo spaces are set forth in Part XII "Refrigerating Plants".

10.1.2 No accommodation spaces shall be arranged forward of the collision bulkhead and abaft of the afterpeak bulkhead below the bulkhead deck.

10.1.3 The chart room and the wheelhouse shall be located in a common place.

10.1.4 The ship's control station shall be located on the navigating bridge of the wheelhouse. The navigating bridge shall be located so as to ensure:

proper visual control of the ship's running;

good visibility with the maximum view of water surface;

good audibility of sound signals of the approaching ships;

possibility of visual control of fishing gear functioning.

10.1.5 The view of the sea surface from the ship's control station shall not be obscured by more than two ship's lengths and forward of the bow to 10° on either side under all conditions of draught and trim. Presence of separate blind sectors not exceeding 5° is allowed.

10.1.6 The horizontal field of vision from the ship's control station shall be provided over an arc of at least 225°, i.e. to not less than 22,5° abaft the beam on either side of the ship.

From each bridge wing the horizontal field of vision shall be provided over an arc of not less than 225°, i.e. from at least 45° on the opposite side and then from right ahead to right astern.

From the main steering position the horizontal field of vision shall be provided at least 60° on each side.

10.1.7 The ship's side shall be visible. The lower edge of the navigating bridge front windows shall be as close as possible to the bridge deck and shall not obstruct to the view.

The upper edge of the navigating bridge front windows shall be at such height, which shall provide a forward view from the ship's control station for a person with a height of eye of 1800 mm, when the ship is pitching. Depending on the ship design, the specified height may be reduced to 1600 mm.

10.1.8 Design and location of windows in the wheelhouse shall comply with the following requirements:

number of framings between the windows shall be minimum and they shall not be installed immediately forward of workstation of watch officer;

to avoid reflections the wheelhouse front windows shall be inclined from the vertical plane top out, at an angle of not less than 10° and not more than 25°;

polarized and tinted glass for windows shall not be used;

at all times, regardless of weather conditions, at least two wheelhouse front windows shall provide a clear view and depending on the wheelhouse configuration an additional number of windows shall be fitted with means of effective cleaning, anti-icing and anti-fogging devices.

10.2 EQUIPMENT OF HOLDS

10.2.1 When in ships not having double bottom wooden ceiling is placed on top of the floors, it shall be solid and shall extend up to the bilge. The ceiling is recommended to be made of portable sections of such dimensions and so constructed as to allow of their ready removal at any place. The thickness of the wooden ceiling shall not be less than 40 mm.

10.2.2 When in ships having double bottom wooden ceiling is fitted, it shall have a thickness of not less than 50 mm.

The application of the ceiling made from approved synthetic material is allowed.

10.2.3 The wooden ceiling shall not be laid directly on the inner bottom metal plating, but shall be embedded in a bituminous or epoxy composition approved by the Register, or placed on battens of 25 — 30 mm in thickness along the floors. The wooden ceiling over the bilges shall be placed so as to be readily removable.

10.2.4 It is recommended that the cargo battens made of wood shall be fitted on sides in refrigerating spaces. The thickness of wooden battens shall not be less than 40 mm.

10.3 EXITS, DOORS, CORRIDORS, STAIRWAYS AND VERTICAL LADDERS

10.3.1 Location and arrangement of exits, doors, corridors, stairways and vertical ladders shall ensure ready access of persons from spaces to the places of embarkation into rescue means.

10.3.2 The wheelhouse shall have two exits, one to each side of the navigating bridge, with a passageway through the house from side to side.

10.3.3 The width of each exit from accommodation and service spaces shall not be less than 0,6 m. The sizes of the ladderways from cargo spaces shall not be less than 0,6×0,6 m.

10.3.4 The exit doors and ladderway covers shall be so arranged that they can be operated from both sides.

Doors shall open as follows:

.1 doors of accommodation and service spaces giving access to the corridor, inside the spaces or outside, if they do not hinder the exits from other spaces;

.2 doors of public rooms, outside or each side;

.3 doors in the end bulkheads of superstructures and in external transverse bulkheads of deckhouses, outside in the direction of the nearest side;

.4 doors in the external longitudinal bulkheads of deckhouses, outside in the forward direction.

In cargo ships the inner doors duplicating the doors specified in 10.3.4.3 and 10.3.4.4 on cargo ships may open inside the space.

No sliding doors shall be fitted at exits and means of escape, except for doors of the wheelhouse.

The doors referred to in 10.3.4.1 shall not be provided with hooks for holding the door open. It is permitted that such doors be fitted with buffers and spring catchers to fix the door in the open position and to allow for its closure without entering the space.

10.3.5 Doors of accommodation spaces shall have in their lower portions detachable panels 0,4×0,5 m in size.

10.3.6 All corridors and passageways shall ensure free movement of persons along them. Width of corridors and passageways shall not be less than 0,6 m.

10.3.7 All between deck stairways shall be of steel frame construction or of equivalent material on agreement with the Register (refer to 1.2 of Part VI "Fire Protection" of the Rules for the Classification).

10.3.8 The width of stairway shall not be less than the width of the corridor or passageway.

10.4 GUARD RAILS AND BULWARK

10.4.1 All exposed parts of the freeboard decks, superstructure decks and deckhouse tops shall be provided with efficient guard rails or bulwarks.

10.4.2 The height of the bulwarks or guard rails above the deck shall not be less than 1 m. However, where this height would interfere with the normal operation of the ship, a lesser height may be approved, provided the adequate protection of the crew is ensured to the satisfaction of the Register.

10.4.3 The distance between the stanchions of the guard rails shall not be more than 1,5 m, at least every third stanchion shall be supported by a stay.

Removable and hinged stanchions shall be capable of being locked in the upright position.

10.4.4 The gunwale, hand rails and guard rails shall be generally of rigid construction; wire ropes may only be accepted in lieu of guard rails in special circumstances and then only in limited lengths; wire ropes shall be made taut by means of turn-buckles.

Lengths of chains may only be accepted in lieu of rigid guard rails, if they are fitted between two fixed stanchions or between the fixed stanchion and bulwark.

10.4.5 The opening below the lowest course of the guard rails shall not exceed 230 mm. The outer courses of rails shall not be more than 380 mm apart.

10.4.6 Crew protection may be ensured by arrangement of combined railing on the upper deck, namely:

.1 in bottom part (1/2 — 2/3 of the total height), bulwarks, in upper part, one or two guard rails. Guard rails may be collapsible and made from rope or chain;

.2 in addition to fixed bulwark and guard rails there may be areas with collapsible railing.

In the areas where collapsible railing is used due to the process procedure, guard rails shall be provided.

It is allowed to install fishing gear on the deck areas not fitted with railings and bulwarks. In such case these deck areas shall be enclosed and fitted with guard rails.

10.4.7 To provide water removal from the deck, bulwarks shall be fitted with freeing ports in compliance with the requirements of 1.1.6.5 of Part II "Hull" of the Rules for the Classification.

10.4.8 Freeing ports may not be fitted, if the bulwark height is not more than 2/3 of the value required in compliance with these Rules and if calculations confirm that the initial ship stability is sufficient at its loading with empty hold (holds) and with catch cargo on the deck up to the level of actual bulwark height.

10.4.9 Sea outlets shall be fitted with non-return shut-off valve with local control; openings shall be made in the bulwark in the water accumulation areas as scuppers for water draining from the upper deck.

10.5 EMERGENCY OUTFIT

10.5.1 The items listed in Tables 10.5.2 and 10.5.3 available in the ship but intended for other purposes may be included into the emergency outfit, provided these items have corresponding markings and their permanent storage places are situated above the bulkhead deck.

10.5.2 Recommended amount of emergency outfit is given in Table 10.5.2.

Table 10.5.2

Nos	Item, unit	Size	Quantity
1	Thrummed pad, pc	0,4×0,5 m	1
2	Set of rigging tools	As per Table 9.5.3	1
3	Set of fitter's tools	As per Table 9.5.3	1
4	Pine plugs for ships with side scuttles, pc	Side scuttle diameter 10×30×150 mm	2
5	Pine plugs, pc	Side scuttle diameter 10×30×150 mm	2
6	Unbleached canvas, m^2	–	2
7	Tarred tow, kg	–	10
8	Hexagon-head bolt, pc	M16×260 mm	2
9	Hexagonal nut, pc	M16	4
10	Washer for bolt, pc	M16	8
11	Construction nail, kg	l = 70 mm	1
12	Construction nail, kg	l = 150 mm	1
13	Cement (quick setting), kg	–	100
14	Sand, natural, kg	–	100
15	Accelerator for concrete setting, kg	–	5
16	Minium, kg	–	5
17	Carpenter's axe, pc	–	1
18	Hack-saw, pc	l = 600 mm	1
19	Shovel, pc	–	1
20	Bucket, pc	–	1
21	Lantern of explosion-proof type, pc	–	1
22	Stop of telescopic type, pc	–	1

10.5.3 Set of fitter's tools and rigging tools specified in Table 10.5.2 shall be completed according to Table 10.5.3.

Table 10.5.3

Nos	Item	Size	Quantity per set	
			rigging	fitter's
1	Tape measure	l = 2000 mm	1	–
2	Bench hammer	0,5 kg	1	1
3	Sledge hammer	3,0 kg	–	1
4	Rigger's mallet	–	1	–
5	Puncher (dumb iron)	–	1	–
6	Chisel	b = 20 mm; l = 200 mm	1	1
7	Marline spike	l = 300 mm	1	–
8	Carpenter's chisel	b = 20 mm	1	–
9	Screw auger	Ø18 mm	1	–
10	Tongs	l = 200 mm	1	–
11	Hollow punch	Ø 18 mm	–	1
12	Hollow punch	Ø 25 mm	–	1
13	Triangular file	l = 300 mm	–	1
14	Half-round file	l = 300 mm	–	1
15	Multi-purpose tongs	l = 200 mm	–	1
16	Screw driver	b = 10m	–	1
17	Adjustable wrench	Jaw width up to 36 mm	–	1

Nos	Item	Size	Quantity per set	
			rigging	fitter's
18	Wrench	Jaw width up to 24 mm	–	1
19	Rigger's knife	–	1	–
20	Hack-saw frame	–	–	1
21	Hack-saw blade	–	–	6
22	Kit-bag	–	1	1

10.5.4 Completeness and minimum amount of emergency outfit shall be determined by the shipowner.

10.5.5 The emergency outfit shall be stored in emergency station. Emergency stations may be special spaces, boxes or places allocated on the deck or in spaces.

10.5.6 A free passage shall be provided in front of the emergency station; the passage width shall be selected depending on the overall dimensions of the outfit stored in the station but not less than 0,6 m.

The passage to the emergency station shall be as straight and short as practicable.

10.5.7 Items of emergency outfit and cases for their storage shall be painted blue either entirely or in a stripe. The cases for emergency equipment storage shall have the distinct inscription to indicate the name of the material, weight and warranted storage period.

10.5.8 The emergency station shall be provided with distinct inscriptions "Emergency Station".

10.5.9 The pads shall be made of natural fibre rope strands and be thrummed with natural fibre spun yarn. A canvas shall be sewn on the bottom side of the pad.

Russian Maritime Register of Shipping

Rules for the Classification and Construction of Small Sea Fishing Vessels
Part III
Equipment, Arrangements and Outfit

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