



SOCIALIST REPUBLIC OF VIETNAM

QCVN 63 : 2013/BGTVT

**NATIONAL TECHNICAL REGULATION ON
TONNAGE MEASUREMENT OF
SEA-GOING SHIPS**

HANOI - 2013

Preamble

National Technical Regulation on Tonnage Measurement of Sea-going Ships - QCVN 63: 2013/BGTVT is compiled by Vietnam Register, verified by the Ministry of Science and Technology, promulgated by the Minister of Transport by Circular No. 06/2013/TT-BGTVT dated May 02th 2013.

QCVN 63: 2013/BGTVT has been developed on the basis of Vietnam Standards TCVN 7145:2003 "Rules for the Tonnage Measurement of Sea-going Ships".

NATIONAL TECHNICAL REGULATION ON TONNAGE MEASUREMENT OF SEA-GOING SHIPS

I GENERAL

1.1 Application and Scope

1.1.1 Application

- 1 This National Technical Regulation (hereinafter referred to as "Regulation") apply to determine the tonnage for the ships flying Vietnamese flag.
- 2 Unless required by shipowner, the Regulation shall not apply to warships, ships servicing war, and pleasure yachts not used in commercial purposes.

1.1.2 Scope

This Regulation apply to organizations, individuals involving ships which fall under the application as specified in 1.1.1 above are Vietnam Register (hereinafter referred to as the "VR"); shipowners; ship designers, ship yards; ship repairing yards and ship operators.

1.2 References and Terminologies

1.2.1 References

- 1 QCVN 21: 2010/BGTVT, National Technical Regulation - Rules for the classification and construction of sea-going steel ships promulgated in accordance with Circular 12/2010/TT-BGTVT dated 21 April 2010.
- 2 The Circular No.32/2011/TT-BGTVT: Circular regarding amendment and supplementation of a number of articles of the Regulation on registration of Vietnamese seagoing ships, promulgated together with Transport Minister's Decision No. 51/2005/QĐ-BGTVT dated 12 October 2005.
- 3 MARPOL 73/79: International Convention for the Prevention of Pollution from Ships, adopted by International Maritime Organization (IMO) on 02 November 1973.

1.2.2 Terminologies

- 1 In this Regulation the following terms and definitions are to be applied:
 - (1) "Gross tonnage" and "Net tonnage" are the parameters determined as specified by the requirements in 2.2.2 Section II of the this Regulation;
 - (2) "Determining the tonnage of ship" means measuring and determining the necessary parameters of the ship to specify the gross tonnage and net tonnage of the ship;
 - (3) "Upper Deck" is the uppermost complete deck exposed to weather and sea, which has permanent means of weathertight closing all openings. in the weather part thereof, and

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below which all openings in the sides of the ship are fitted with permanent means of watertight closing. In a ship having a stepped upper deck, the lowest line of the exposed deck is taken as the upper deck.

In a ship with two or more decks, having openings in either side of ship below the uppermost deck, which are not closed but limited by weathertight bulkheads and decks, the first deck below such openings should be considered as the upper deck;

- (4) "Length of ship" (L) as defined in 1.2.1-8 Part 11 Section II of QCVN21: 2010/BGTVT;
- (5) "Breadth of ship" (B) as defined in 1.2.1-36 Part 11 Section II of QCVN21: 2010/BGTVT;
- (6) "Moulded depth" (D) as defined in 1.2.1-34 Part 11 Section II of QCVN21: 2010/BGTVT;
- (7) "Enclosed spaces" are all those spaces that are bounded by the ship's hull, by fixed or portable partitions or bulkheads, by decks or coverings other than permanent or movable awnings;
- (8) "Excluded Spaces" mean spaces that are not included in the volume of enclosed spaces;
- (9) "Passengers" are every person on the ship other than the master and members of the crew or other persons employed or engaged in any capacity on board a ship on the business of that ship and child under one year of age;
- (10) "Cargo Spaces" are enclosed spaces appropriated for the transport of cargo;
- (11) "Weathertight" means that in any sea conditions water will not penetrate into the ship.

II TECHNICAL REQUIREMENTS

CHAPTER 1 GENERAL

1.1 General

- 1 The tonnage of a ship consists of gross tonnage and net tonnage.
- 2 The gross tonnage and the net tonnage shall be determined in accordance with the requirements of this Chapter. The last value of gross tonnage and net tonnage shall be rounded without decimal.

CHAPTER 2 SURVEY, MEASUREMENT AND DETERMINATION OF TONNAGE FOR SEA-GOING SHIP

2.1 General

2.1.1 General

When it is intended to review, measure, determine and certify the tonnage for sea-going ships in accordance with the Regulation, the following technical necessary plans and documents of ship are to be submitted to VR by shipowner for approval.

2.1.2 Submission of Technical Documentation for Approval

1 Include records:

- (1) All necessary technical specifications of ships such as principal dimensions, arrangements, construction, utilization of the spaces, totally permitted passengers of ship, crew, etc;
- (2) General arrangement plans;
- (3) Midship section plans;
- (4) Construction profile plans;
- (5) Tank capacity plans;
- (6) Lines plans;
- (7) Hatch coaming plans;
- (8) Hatch cover plans;
- (9) Poop, Forecastle plans;
- (10) Deckhouse, cabin, Accommodation space plans;
- (11) Mast plans;
- (12) Funnel plans;
- (13) Hold cargo plans;
- (14) Calculate sheet of gross tonnage and net tonnage of ship in accordance with the Regulation. In this calculate sheet all the spaces considered as closed spaces, excluded spaces, enclosed spaces appropriated for the transport of cargoes and number of passengers as well as the plans of arranging passengers in passenger rooms (in case of passenger ship) and other concerning details.

2 Submission of other plans and documents not specified above may be required where deem necessary by VR.

2.1.3 Survey and Measure for Issuing Tonnage Certificate for Sea-going Ships

All the data for determining the concerned tonnage of ship as specified in 2.1.2 shall be asserted by surveyor's survey and measure on the regarded ship, and endorsed by surveyor before issuing the tonnage certificate.

2.2 Determination of Tonnage for Ships

2.2.1 Determination of Volume

- 1 It is necessary to determine exactly the volumes of enclosed spaces (V) and the volumes of cargo spaces (V_c) when determining the gross tonnage and the net tonnage of ship.
- 2 The enclosed spaces of ship consist of the enclosed spaces under upper deck and the enclosed spaces above this deck as specified in 1.2.2-1(3) Section I. There is no distinction between enclosed spaces as being bounded by the ship's hull, by fixed or portable partitions and nor the absence of a partition or bulkhead.
 - (1) Tanks, permanently located on the upper deck, provided with removable pipe connections to the cargo system or the vent (de-airing) lines of the ship, should be included in enclosed spaces.
 - (2) The volume of steel pontoon weathertight covers on hatchway coamings should be included in the calculations of the total volume of the ship. If such covers are open on the underside, their volumes should also be included in enclosed spaces.
 - (3) Multi-purpose ships which have the facility to trade with cargo hatches opened or closed should always be measured with the hatch covers considered to be closed.
 - (4) Masts, kingposts, cranes, crane and container support structures, which are completely inaccessible and above the upper deck, separated on all their sides from other enclosed spaces should not be included in the total volume of all enclosed spaces. Air trunks having a cross-sectional area not exceeding 1 m^2 may also be excluded in enclosed spaces. All mobile cranes should be exempted.
 - (5) The volumes of the appendages such as bulbs, fairwaters, propeller shaft bossings or other structures should be included in the total volume.
 - (6) Volumes within the hulls of ships, such as split-hull barges and dredgers, should be retained in enclosed spaces notwithstanding that the space within the hull is temporarily opened to the sea when discharging cargoes.
- 3 Cargo spaces are enclosed spaces appropriated for the transport of cargo, which is to be discharged from the ship, provided that such spaces have been included in the computation of gross tonnage. Such cargo spaces shall be certified by permanent marking with the letters CC (cargo compartment) to be so positioned that they are readily visible and not to be less than 100 mm in height.
 - (1) In oil tankers the volume of the segregated ballast tanks should not be included in cargo spaces provided they are not to be used for cargo.
 - (2) The volumes of clean ballast tanks in oil tankers should be included in cargo space when the ship is fitted with a crude oil washing system permitting dual purposes cargo/clean ballast tank using.
 - (3) The volumes of dedicated clean ballast tanks should not be included in cargo space provided that:

- (a) The ship carries a single IOPP Certificate which indicates it is operating with dedicated clean ballast tanks in accordance with Regulation 1 (17), Annex I of MARPOL 73/78;
- (b) There are separate pipe lines and pump of charging and discharging for clean ballast tanks.
- (c) There is no pipe line connecting clean ballast tanks of fresh water system.
- (d) The tanks are not used for any kinds of cargo, provision or material of ship.
- (e) The following notation is inserted in the REMARKS column on the Tonnage Certificate:

"This ship carries an IOPP Certificate in conformity with Regulation 1(17), Annex I of MARPOL 73/78. The following tanks are dedicated solely to the carriage of clean ballast water".

- (4) The volumes of slop tanks for cargo residues of oil tankers should be included in cargo space;
 - (5) The volume of refrigerating machinery used for refrigerating cargoes and situated within the boundaries of the cargo spaces should be included in cargo space;
 - (6) The volumes of mail rooms, baggage compartments separate from passenger accommodation, and bonded stores for passengers should be included in cargo space. The volume of provision rooms for crew or passengers and bonded stores for crew should not be included in cargo space;
 - (7) On combination carriers, where the owners request to have the dual-purpose oil/ballast tanks converted to ballast tanks and excluded from cargo space, the ballast tanks should be required to be permanently disconnected from the oil cargo system and not used for the carriage of cargo. The ship should then be remeasured in accordance with 2.2.2-3(3). Any ballast tanks not to be included in cargo space should be solely allocated to ballast, connected to an independent ballast system, and not used to carry cargo;
 - (8) When determining the volumes of cargo spaces, no account should be taken of insulation, sparring or ceiling which is fitted within the boundaries of the space concerned. For ships which have permanent independent cargo tanks constructed within the ship, e.g. gas tankers, the volume to be included in cargo space should be calculated to the structural boundary of such tanks, irrespective of insulation which may be fitted on the inside or outside of the tank boundary;
 - (9) The volumes of dual-purpose spaces such as those used for both ballast and cargo should be included in cargo space;
 - (10) Spaces allocated to passenger automobiles should be included in cargo space;
- 4** All measurement for calculating the volumes shall be taken in centimetres. The volumes shall be calculated by generally accepted methods for the space concerned and with

accuracy acceptable. The calculation shall be sufficient, detailed and easy for checking.

- 5 All volumes included in the calculation of gross and net tonnage shall be measured, irrespective of the fitting of insulation or the like, to the inner side of the shell or structural boundary plating in ships constructed of metal, and to the outer surface of the shell or to the inner side of structural boundary surfaces in ships constructed of any other material.
- 6 Enclosed spaces above the upper deck not exceeding 1 m³ should not be measures. Appendages and spaces open to the sea not exceeding 1 m³ or having a cross-section area not exceeding 1 m² should not be measures.
- 7 Notwithstanding the provisions of 1.1.2(7) Section I of this Regulation, the spaces specified in subparagraphs (1) to (5) below shall be called excluded spaces and shall not be included in the volume of enclosed spaces, except that any such space which fulfils at least one of the following three conditions shall be treated as an enclosed space:
 - The space is fitted with shelves or other means for securing cargo or stores;
 - The openings are fitted with any means of closure;
 - The construction provides any possibility of such openings being closed.
 - (1) A space within an erection opposite an end opening extending from deck to deck except for a curtain plate of a depth not exceeding by more than 25 mm the depth of the adjoining deck beams, such openings having a breadth equal to or greater than 90 per cent of the breadth of the deck at the line of the opening at a distance from the opening equal to one half of the width of the deck at the line of the opening (Figure 8 in Appendix A);
 - (2) Should the width of the space because of any arrangement except by convergence of the outside plating, become less than 90 per cent of the breadth of the deck, only the space between the line of the opening and a parallel line drawn through the point where the athwartships width of the space becomes equal to, or less than, 90 per cent of the breadth of the deck shall be excluded from the volume of enclosed spaces (Figures 9, 10 and 11 in Appendix A).
 - (3) Where an interval which is completely open except for bulwarks or open rails separate any two spaces, the exclusion of one or both of which is permitted under subparagraphs (1) and/or (2), such exclusion shall not apply if the separation between the two spaces is less than the least half breadth of the deck in way of the separation (Figures 12 and 13 in Appendix A).
 - (4) A space under an overhead deck covering open to the sea and weather, having no other connection on the exposed sides with the body of the ship than the stanchions necessary for its support. In such a space, open rails or a bulwark and curtain plate may be fitted or stanchions fitted at the ship's side, provided that the distance between the top of the rails or the bulwark and the curtain plate is not less than 0.75 m or one-third of the height of the space, whichever is the greater (Figure 14 in Appendix A).
 - (5) A space in a side-to-side erection directly in way of opposite side openings not less in

height than 0.75 m or one-third of the height of the erection, whichever is the greater. If the opening in such an erection is provided on one side only, the space to be excluded from the volume of enclosed spaces shall be limited inboard from the opening to a maximum of one-half of the breadth of the deck in way of the opening (Figure 15 in Appendix A).

- (6) A space in an erection immediately below an uncovered opening in the deck overhead, provided that such an opening is exposed to the weather and the space excluded from enclosed spaces is limited to the area of the opening (Figure 16 in Appendix A).
- (7) A recess in the boundary bulkhead of an erection which is exposed to the weather and the opening of which extends from deck to deck without means of closing, provided that the interior width is not greater than the width at the entrance and its extension into the erection is not greater than twice the width of its entrance (Figure 17 in Appendix A).
- (8) Hawse pipes, sea-valve recesses, thruster tunnels, stem chutes in fishing vessels, dredging wells in dredgers and other similar spaces fitted in the ship's hull should be dealt with as spaces open to the sea.
- (9) The space between the side longitudinal bulkhead of a deckhouse and the bulwark below a deck extending from side to side supported by stanchions or vertical plates connected to the bulwarks, should be treated as an excluded space.
- (10) Space located within the boundaries of permanent or movable awnings should be subject to treatment as excluded spaces.

2.2.2 Determination of Tonnage of Ships of 24 m and above in Length

- 1 The gross tonnage of a ship (GT) shall be determined by the following formula:

$$GT = K_1V$$

Where:

$K_1 = 0.2 + 0.02 \log_{10}(V)$ (or as tabulated in Table 2.1);

V : Total volume of all enclosed spaces of the ship (m^3).

- 2 The net tonnage of a ship (NT) shall be determined by the following formula and shall not be taken as less than 0.30GT:

$$NT = K_2V_c \left(\frac{4d}{3D} \right)^2 + K_3 \left(N_1 + \frac{N_2}{10} \right)$$

Where:

$\left(\frac{4d}{3D} \right)^2$: Shall not be taken as greater than unity;

$K_2V_c \left(\frac{4d}{3D} \right)^2$: Shall not be taken as less than 0.25GT;

V_c : Total volume of cargo spaces (m^3);

$K_2 = 0,2 + 0,02 \log_{10}(V_c)$ (or as tabulated in Table 2.1);

$$K_3 = 1,25 \cdot \frac{GT + 10000}{10000};$$

D: Moulded depth amidships (m);

d: Moulded draught amidships (m) shall be one of the following draughts:

(a) For ships to which QCVN 21: 2010/BGTVT in force applies:

- (i) The draught corresponding to the Summer Load Line (other than timber load lines) assigned in accordance QCVN 21: 2010/BGTVT Part 11;
- (ii) For passenger ships, the draught corresponding to the deepest subdivision load line assigned in accordance with Part 9 QCVN 21: 2010/BGTVT.

(b) For ships to which QCVN 21: 2010/BGTVT does not apply but which have been assigned a load line in compliance with national requirements, the draught corresponding to the summer load line so assigned.

N_1 : Number of passengers in cabins with not more than 8 berths.

N_2 : Number of other passengers.

$N_1 + N_2$: Total number of passengers the ship is permitted to carry as indicated in the ship's passenger certificate. When $N_1 + N_2$ is less than 13, N_1 and N_2 shall be taken as zero.

3 Change of Net Tonnage.

- (1) When the characteristics of a ship, such as V, V_c , d, N, or N_2 as defined in - 1 and -2 above, are altered and where such an alteration results in an increase in its net tonnage as determined in accordance -2, the net tonnage of the ship corresponding to the new characteristics shall be determined and shall be applied without delay.
- (2) A ship to which load lines referred to in sub-paragraphs (a)(i) and (a)(ii) of -2 in above are concurrently assigned shall be given only one net tonnage as determined in accordance with -2 and that tonnage shall be the tonnage applicable to the appropriate assigned load line for the trade in which the ship is engaged.
- (3) When the characteristics of a ship such as V, V_c , d, N, or N_2 as defined in - 1 and -2 in above are altered or when the appropriate assigned load line referred to in (a) (i) and (a) (ii) of paragraph -2 in above is altered due to the change of the trade in which the ship is engaged, and where such an alteration results in a decrease in its net tonnage of ship, a new Tonnage Certificate incorporating the net tonnage so determined shall not be issued until twelve months have elapsed from the date on which the current Certificate was issued. Provided that this requirement shall not apply when:
 - (a) If the ship is transferred to the flag of another State;

- (b) If the ship undergoes major alterations or modifications such as the removal of a superstructure which requires an alteration of the assigned load line, or
- (c) To passenger ships which are employed in the carriage of large numbers of unberthed passengers in special trades, such, for example, as the pilgrim trade.

Table 2.1 Coefficients K_1 , or K_2 (V or V_c : m^3)

V or V_c	K_1 or K_2	V or V_c	K_1 or K_2	V or V_c	K_1 or K_2	V or V_c	K_1 or K_2
10	0.2200	45000	0.2931	330000	0.3104	670000	0.3165
20	0.2260	50000	0.2940	340000	0.3106	680000	0.3166
30	0.2295	55000	0.2948	350000	0.3109	690000	0.3168
40	0.2320	60000	0.2956	360000	0.3111	700000	0.3169
50	0.2340	65000	0.2963	370000	0.3114	710000	0.3170
60	0.2356	70000	0.2969	380000	0.3116	720000	0.3171
70	0.2369	75000	0.2975	390000	0.3118	730000	0.3173
80	0.2381	80000	0.2981	400000	0.3120	740000	0.3174
90	0.2391	85000	0.2986	410000	0.3123	750000	0.3175
100	0.2400	90000	0.2991	420000	0.3125	760000	0.3176
200	0.2460	95000	0.2996	430000	0.3127	770000	0.3177
300	0.2495	100000	0.3000	440000	0.3129	780000	0.3178
400	0.2520	110000	0.3008	450000	0.3131	790000	0.3180
500	0.2540	120000	0.3016	460000	0.3133	800000	0.3181
600	0.2556	130000	0.3023	470000	0.3134	810000	0.3182
700	0.2569	140000	0.3029	480000	0.3136	820000	0.3183
800	0.2581	150000	0.3035	490000	0.3138	830000	0.3184
900	0.2591	160000	0.3041	500000	0.3140	840000	0.3185
1000	0.2600	170000	0.3046	510000	0.3142	850000	0.3186
2000	0.2660	180000	0.3051	520000	0.3143	860000	0.3187
3000	0.2695	190000	0.3056	530000	0.3145	870000	0.3188
4000	0.2720	200000	0.3060	540000	0.3146	880000	0.3189
5000	0.2740	210000	0.3064	550000	0.3148	890000	0.3190
6000	0.2756	220000	0.3068	560000	0.3150	900000	0.3191
7000	0.2769	230000	0.3072	570000	0.3151	910000	0.3192
8000	0.2781	240000	0.3076	580000	0.3153	920000	0.3193
9000	0.2791	250000	0.3080	590000	0.3154	930000	0.3194
10000	0.2800	260000	0.3083	600000	0.3156	940000	0.3195
15000	0.2835	270000	0.3086	610000	0.3157	950000	0.3196
20000	0.2860	280000	0.3089	620000	0.3158	960000	0.3196
25000	0.2880	290000	0.3092	630000	0.3160	970000	0.3197
30000	0.2895	300000	0.3095	640000	0.3161	980000	0.3198
35000	0.2990	310000	0.3098	650000	0.3163	990000	0.3199
40000	0.2920	320000	0.3101	660000	0.3164	1000000	0.3200

Note:

Coefficients K_1 or K_2 at intermediate values of V or V_c shall be obtained by linear interpolation.

2.2.3 Determination of Tonnage of Ships of less than 24 m in Length

- 1 The gross tonnage of a ship shall be determined by the following formula:

$$GT = (V_1 + V_2)K_1$$

Where:

V_1 : Total volume of ship up to upper deck (m^3);

$$V_1 = L B D C;$$

L: Length of ship (m);

B: Breadth of ship (m);

D: Moulded depth of ship (m);

C: Coefficient shall be taken as 0.68;

V_2 : Volume of enclosed spaces above the deck (m^3);

K_1 : Constant coefficient shall be taken as 0.25.

- 2 The gross tonnage of a ship shall be determined by the following formula:

$$NT = 0.3GT$$

Where:

GT: Gross tonnage of ship.

III REGULATION ON MANAGEMENT

1.1 General

1.1.1 Tonnage measurement of ships

- 1 Ships must be Tonnage measurement according to to requirements of this regulation.
- 2 The tonnages of ships according to this Regulation shall be determined again in the cases as followings:
 - (1) All the alteration or conversion reduce or increase the tonnage of ship 1 % and above;
 - (2) Where the net tonnage is to be determined again as specified in 2.2.2-3 Chapter 2 Section II;
 - (3) Whenever required by the shipowner.

1.2 Certification

1.2.1 Certificate

All ships intended to be registered and classed with VR are to be International tonnage certificate for ships of 24 m in length and more, Ships of less than 24 m in length are to be tonnage certificate. In the tonnage certificate the gross tonnage and net tonnage of ship are specified according to the requirements of this Regulation.

1.2.2 Procedure for issuance of Tonnage Certificates

Procedure for issuance of Tonnage Certificates shall be in compliance with Circular No.32/2011/TT-BGTVT.

1.2.3 Validity of Tonnage Certificate

- 1 Unless there are the modifications as specified in 1.1-2 (1) and (2), the validity of tonnage certificate of ship shall be lasted until the ship does not fly Vietnamese flag.
- 2 In case there are modifications as showed in -1 above, the shipowner should inform VR in order to measure, review the ship again and submit all the calculated data for modifying the tonnage of ship to VR for approval.
- 3 The tonnage certificate of sea-going ship is invalid when ship is transferred to the flag of another State.
- 4 When a ship flying one's flag other than Vietnamese, having been issued tonnage certificate according to Tonnage Measurement of Ships, 1969 turns into flying Vietnamese flag, her tonnage certificate shall be valid not longer than three months or until being reviewed and issued new substitute tonnage certificate by VR.

1.2.4 Kinds of Survey for Certifying Tonnage

1 Kinds of survey for certifying tonnage include as followings:

- (1) Initial survey, measure and determine to certify tonnage for new ships;
- (2) Survey, measure and determine to certify tonnage again for ships with modifications as specified in 1.1-2;
- (3) Survey, measure and determine to certify tonnage for ship turning into flying Vietnamese flag or other's flag under authorization.

IV RESPONSIBILITIES OF ORGANIZATIONS, INDIVIDUALS

1.1 Responsibilities of shipowners, ship operators, ship designers, ship yards and ship repairing yards

1.1.1 Shipowners, ship operators

To apply all relevant requirements in this Regulation for ships being built, converted, renovated, repaired and during operation in compliance with requirements in this Regulation.

1.1.2 Ship Designer

- 1 Tonnage measurement of ships in compliance with relevant requirements of this Regulation.
- 2 To prepare sufficient design documents as required in compliance with requirements of this Regulation.

1.1.3 Ship Yards, Ship Repairing Yards

- 1 To be capable in terms of warehouse, manufacturing shop, building facilities etc. and competent manpower to meet requirements for Tonnage measurement of ships.
- 2 To ensure and to be in compliance with approved designs.
- 3 To undergo VR' supervision on the Tonnage measurement of Ships.

1.2 Responsibilities of Vietnam Register

1.2.1 Approval of the Design, supervision

To assign surveyors having competence and of sufficient standard to carry out the tonnage measurement, supervision ships being built, converted, renovated, repaired and during operation in compliance with requirements in this Regulation.

1.2.2 Instructions for application

VR is to give instructions for application of requirements of this Regulation to shipowners, ship operators, ship designers, ship yards and ship repair yards, inspection offices of VR.

1.2.3 Amendment to this Regulation

Based on the fact, Vietnam Register shall have responsibility to petition Ministry of Transport to amend, supplement the annually this Regulation.

1.3 Responsibilities of the Ministry of Transport

Ministry of Transport is responsible to verify on the regular or random basis the implementation of relating organizations in compliance with this Regulation

V IMPLEMENTATION

- 1.1 VR manages survey system, supervision, Tonnage measurement of ships falling in to the application of this Regulation. To organise the printing, dissemination and instructions for application of this Regulation for organizations and individuals which are the objectives of application.
- 1.2 In case of inconsistency, the requirements of this Regulation prevail over the requirements of others.
- 1.3 In case the documents referred to in this Regulation are amended, implemented or replaced, the latter shall prevail over the former.
- 1.4 This Regulation and its amendment apply to Tonnage measurement on or after effective date of this Regulation.

APPENDIX A

GUIDANCE FOR DETERMINING THE TONNAGE OF SHIPS

1 Explanations of Definition

1.1 The moulded depth of ship is specified as followings:

The moulded depth of metal ship is the vertical distance measured from the top of the keel to the underside of the upper deck at side in midships (Figure 1).

In wood ships the distance is measured from the lower edge of the keel rabbet (Figure 2).

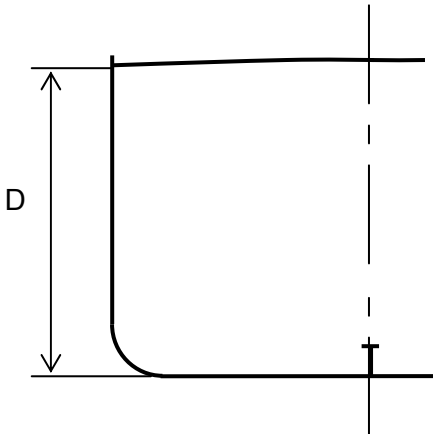


Figure 1

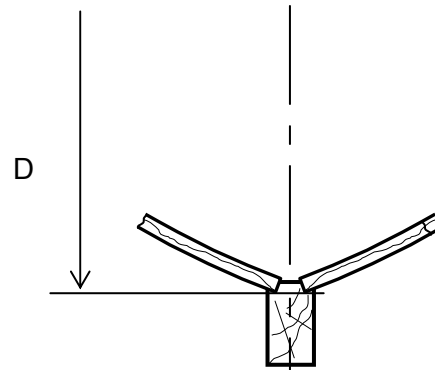


Figure 2

In ships having rounded gunwales, the moulded depth shall be measured to the point of intersection of the moulded lines of the deck and side shell plating, the lines extending as though the gunwales were of angular design. (Figure 3).

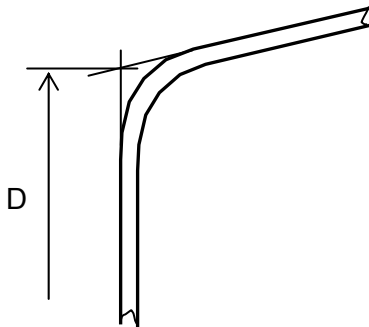


Figure 3

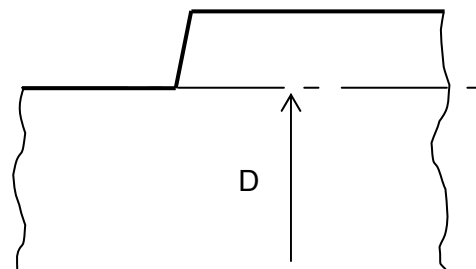


Figure 4

In ships having multi decks, the moulded depth shall be measured to the upper deck as specified in 1.2.2-1(3) Section I. Where the upper deck is stepped over the point measured for moulded depth, the moulded depth shall be measured to the imagined deck line (Figure 4).

1.2 Specification of moulded depth (D) for ships with an open mooring deck aft or stepped upper deck.

When calculating the net tonnage for ships with an open mooring deck aft, the moulded depth should be measured to the line of the open mooring deck continued forward parallel to the raised part of the upper deck (depth D_1 in Figure 5) if the open part extends over 1.0

m and not to the raised part of the upper deck (depth D_2 in Figure 5). If the upper deck is continued aft over the mooring deck, the moulded depth should still be taken as D_1 as specified in above, provided that the side openings allow the space below the upper deck to be considered as an excluded space according to the requirements in 2.2.1-7 (2) and (3) Chapter 2.

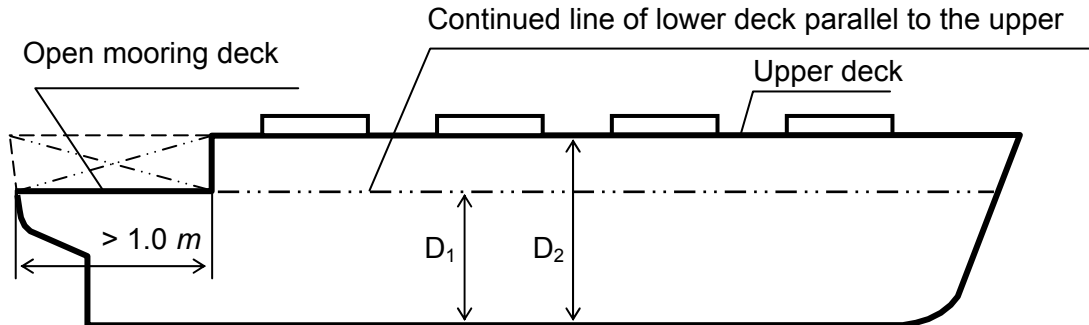


Figure 5

For ships with a step in the upper deck extending across the full breadth and greater than 1 m in length, the moulded depth should be measured to the line of the lower point of the exposed deck extended parallel to the raised part of the exposed deck (depth D_1 in Figure 6) and not to the raised part of the upper deck (depth D_2 in Figure 6) and vice versa.

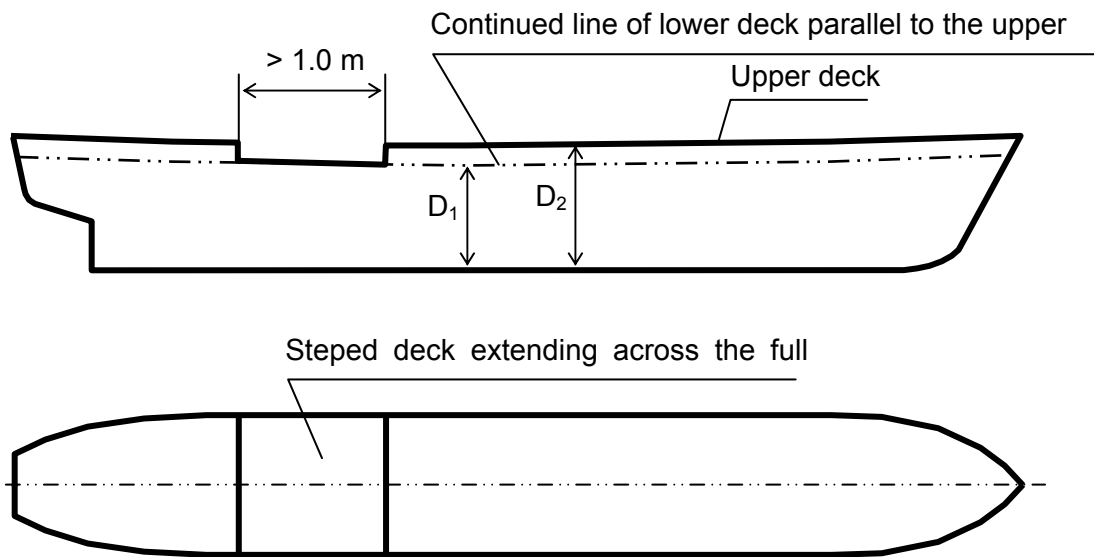


Figure 6

1.3 "Upper Deck" In a ship with two or more decks having openings in the side of the ship below the uppermost deck, which are not closed but limited inboard by weathertight bulkheads and decks, the first deck below such openings should be considered the upper deck (see Figure 7).

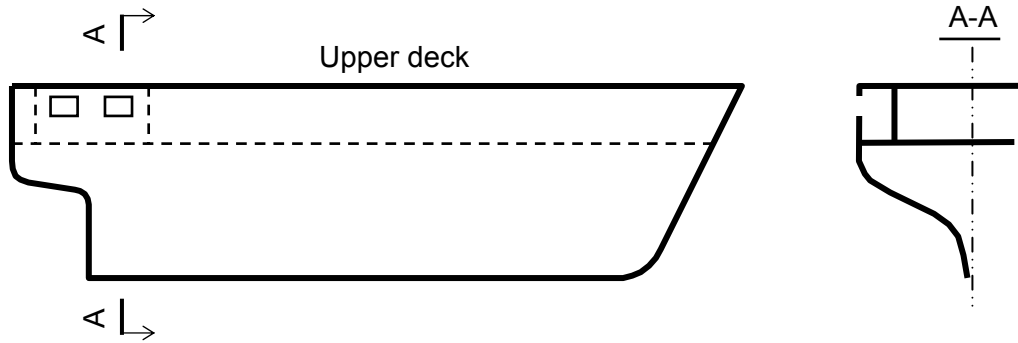


Figure 7

In open-top container ship which is exempted from the requirements to fit weathertight hatch covers on the uppermost deck exposed to weather and sea, the upper deck should be considered as the deck specified in 1.3 above.

1.4 Enclose space

In open-top container ships, an opening in a deck such as the absence of hatch covers should not preclude a space from being included in the enclosed space.

Shelter above container stacks

In the case of open-top containerships having movable non-load-bearing covers (shelter) of light construction resting on the container guides, the space above the hatch coamings up to the covers does not qualify as an excluded space according to the requirements in 2.2.1-7 Chapter 2 Section II. For this particular design, however, an exception can be made in accordance with the requirements in 2.1.1-3 Chapter 2 Section II. The space can be excluded provided that this type of ship meets the requirements of an open-top containership without such covers.

1.5 Other explanations

(1) Livestock carriers

Livestock carriers are most often converted ships. Above the existing upper deck, one or more decks are constructed. Between these decks, the livestock corrals and their associated spaces are arranged, separated by, for example, railings, fences or gangways. The corrals are open to the air.

Stanchions, fences and railings to keep livestock in the corrals are "other means for securing cargo" according to the requirements in 2.2.1-7 Chapter 2 Section II.

Livestock structures should be included the gross tonnage.

(2) Dockships

A dockship may include in its main structural characteristics the absence of hatch covers above the cargo space but may have a dock deck above the moulded draught together with side erections.

The dockships considered are described as: a dockship open-ended at the stem and a dockship fitted with a stern door or a grill stem door.

(3) Open-top containerships

An open-top container ship means a ship which is designed for the carriage of containers and is constructed like an open "U", with a double bottom and above this high-sided erections without hatch covers on the upper deck and without a complete deck above the moulded draught and needs to be regarded as ship of a novel type as specified in 2.1.1-3 Chapter 2.

2 Excluded Spaces

The following spaces shall be excluded when determining the tonnage:

Note the following notations in the figures:

Excluded Spaces

O: Excluded space

C: Enclosed space

I: Space to be considered as an enclosed space and to be used for determining the tonnage.

Figure 8: A space (normally above upper deck) within an erection opposite an end opening (vertical direction in the figure) having a breadth equal to or greater than $0.9B$ and the depth from deck to deck, the excluded space shall be taken at a distance equal to $B/2$ inside the space from the line of the opening.

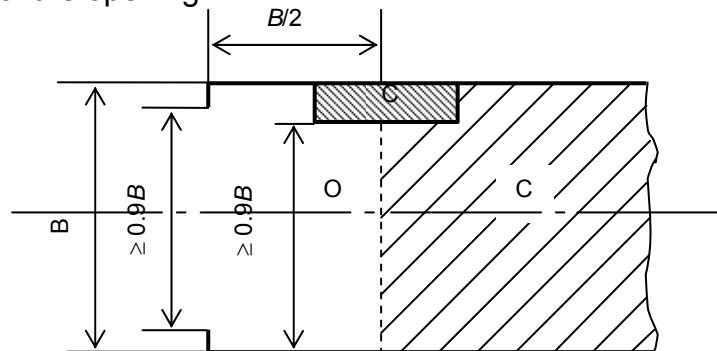


Figure 8

Figure 9: A space (normally above upper deck) within an erection opposite an end opening (vertical direction in the figure) having a breadth equal to or lesser than $0.9B$ and the depth from deck to deck, the excluded space shall be taken into the space from the line of the opening to the end of breadth to be greater than $0.9B$.

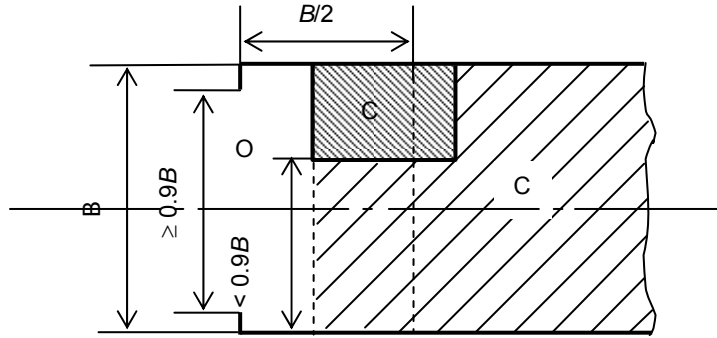


Figure 9

Figure 10 and Figure 11: Applying to the spaces to be taper because of ship's structure.

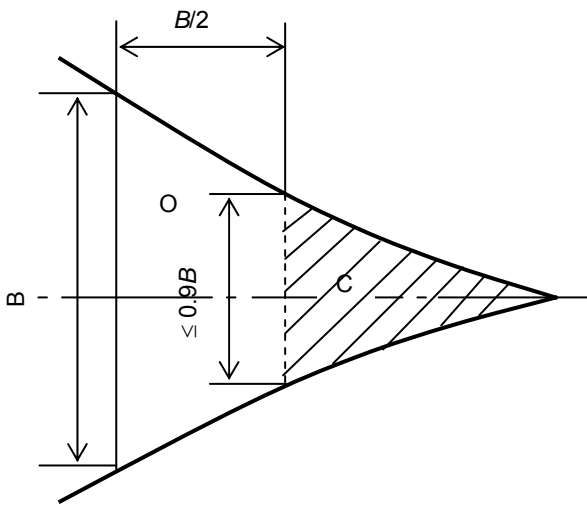


Figure 10

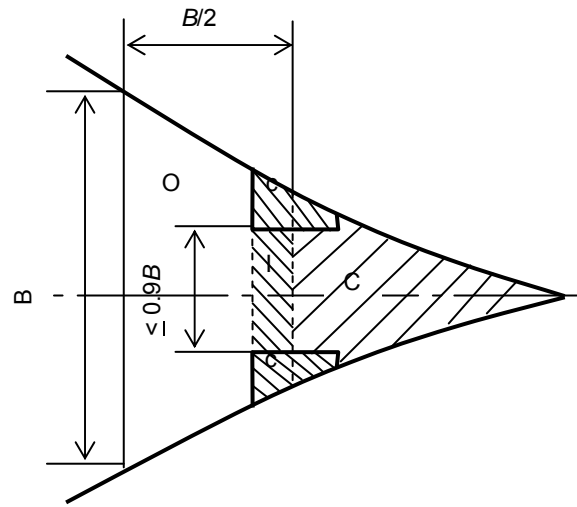


Figure 11

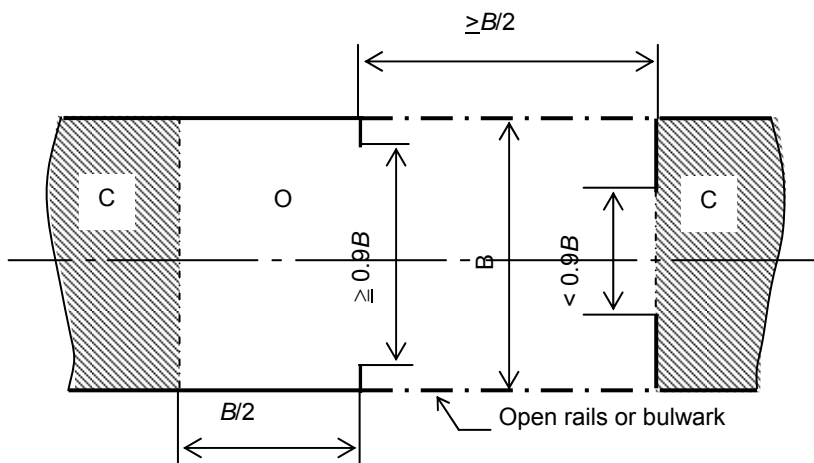


Figure 12

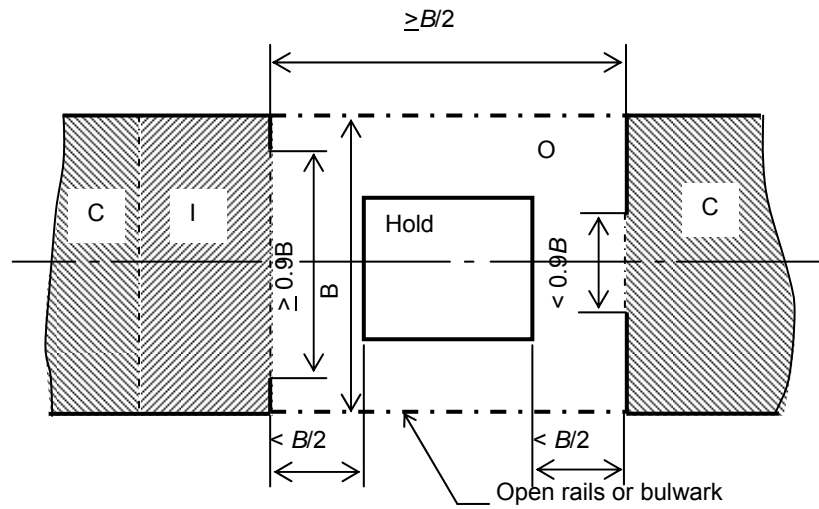
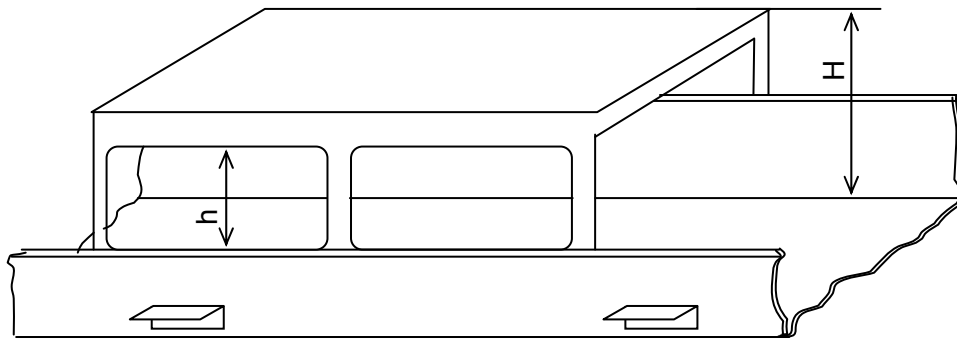


Figure 13

Figure 14: The space below the upper deck meets the condition as specified in the figure.



h at least $H/3$ or 0.75 m whichever is the greater

Figure 14

Figure 15: A space within an erection opposite an opening extending from side to side with the depth as the following in the figure.

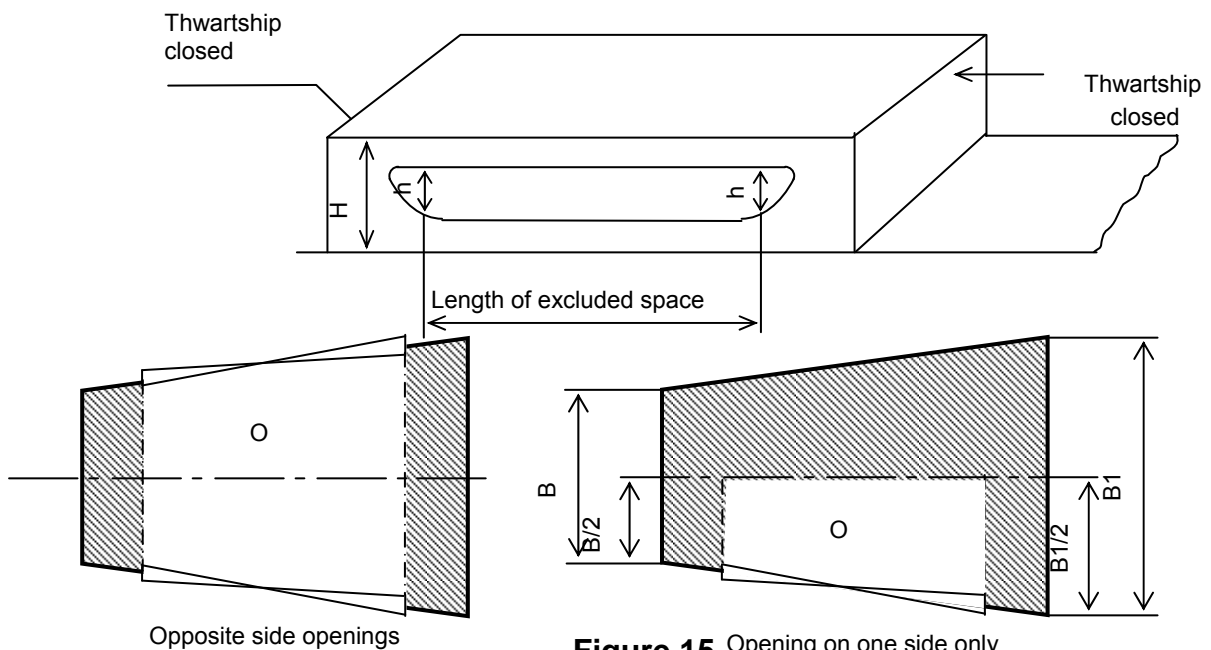
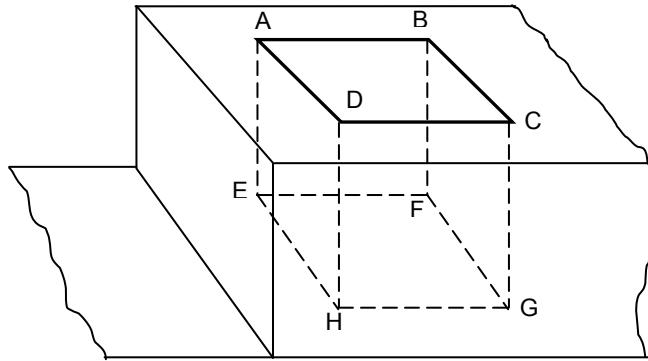


Figure 15 Opening on one side only

Figure 16: Space inside the construction, just below the opening of upper deck and exposed to the weather.



ABCD - Opening in the deck

Space ABCDEFGH shall be excluded from enclosed space

Figure 16

Figure 17: The spaces are extreme inside the erection to be exposed to the weather, have the opening from deck to deck and without any weathertight covers as specified in the figure.

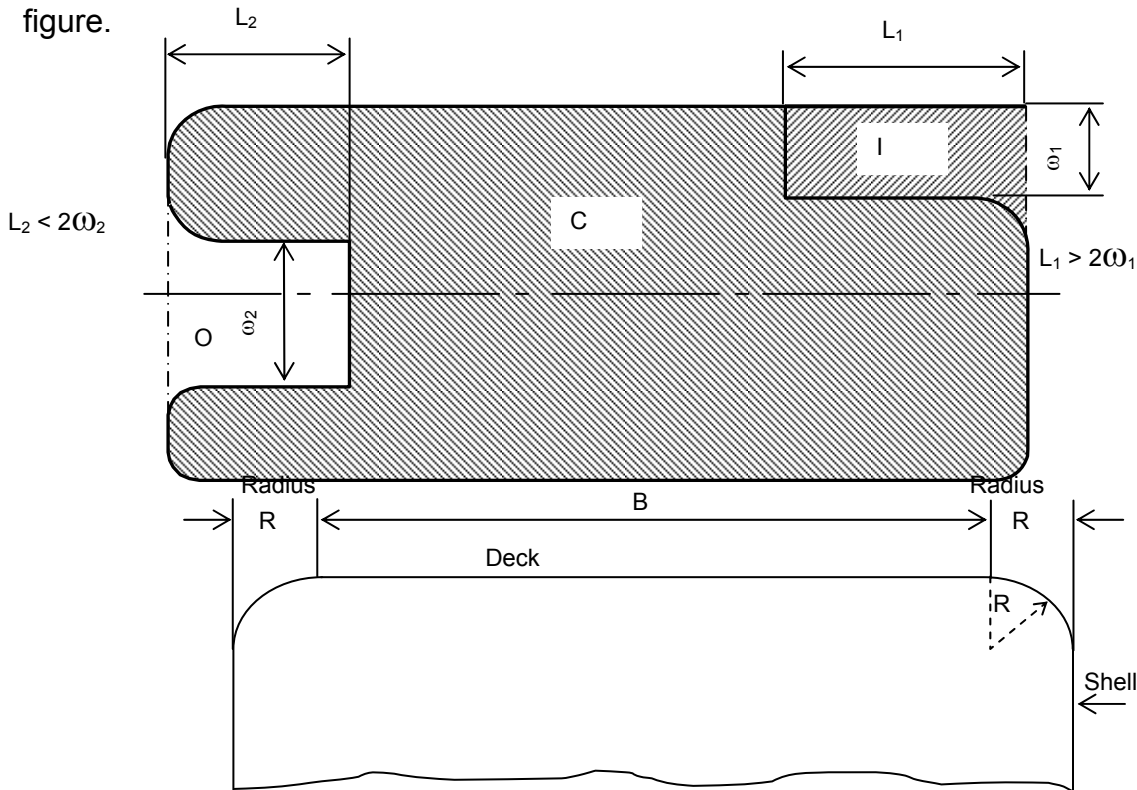


Figure 18 Ships with rounded gunwales

3 Method for determining the volume of ships

As to the method for determining the volume, it is probable to apply an approximate method, provided that this method obtains the recognized maximum degree of accuracy.

Generally, Bonjean Curves are used for determining the tonnage of ships. It is exact to utilize the Bonjean Curves for determining the tonnage of ships. However, the following method may obtain higher degree of accuracy.

In that case, the volume of ships can be directly determined according to lines and arrangement drawings of ships. Depending on the size and the shape of ships, the lines may be created into 10 to 20 stations. However, with the high curved lines, it is necessary to create some more auxiliary stations for higher degree of accuracy. The position of the end stations are to be coincide with fore and aft perpendicular lines of ship's length. Specifically it is as followings:

(1) The volume of ship up to upper deck can be determined according to following formula:

$$V_t = (\sum m_i A_i) \Delta L$$

Where:

A_i : The areas of cross sections at main and auxiliary stations up to upper deck of ship (m^2);

ΔL : The space of the main stations (m);

m_i : Coefficients to be specified according to the positions of main and auxiliary stations.

$$m_i = (i_m - i_i) / 2$$

Trong đó:

i_m : Number sign of the aft station from the considered station;

i_i : Number sign of the fore station from the considered station.

Referring to the Figure 19 and Figure 20 the example for determining coefficients of m are as followings:

$$m = \frac{-0.25 - (-0.4)}{2} = 0.075$$

$$m = \frac{0 - (-0.40)}{2} = 0.20$$

$$m = \frac{0.5 - (-0.25)}{2} = 0.375$$

$$m = \frac{1 - 0}{2} = 0.5$$

$$m = \frac{1.5 - 0.5}{2} = 0.5$$

$$m = \frac{2 - 1}{2} = 0.5$$

$$m = \frac{2.5 - 1.5}{2} = 0.50$$

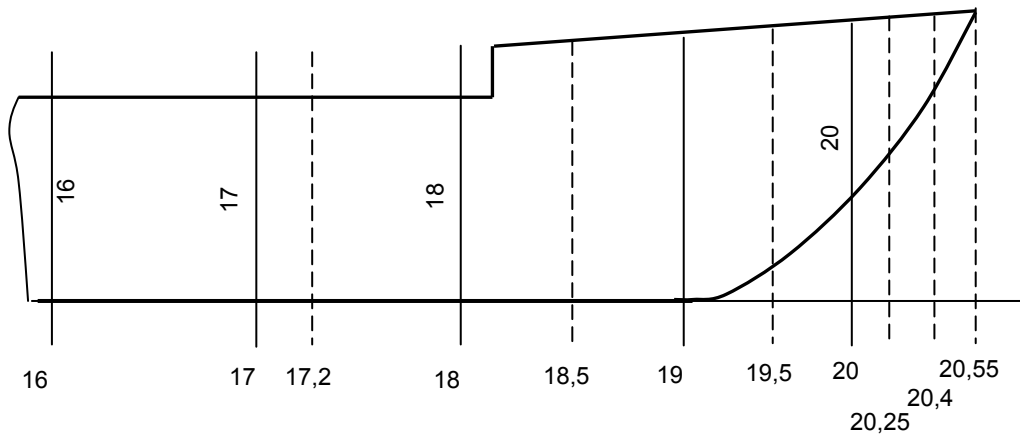


Figure 19 Positions of the auxiliary stations and coefficients of m in fore part of ship

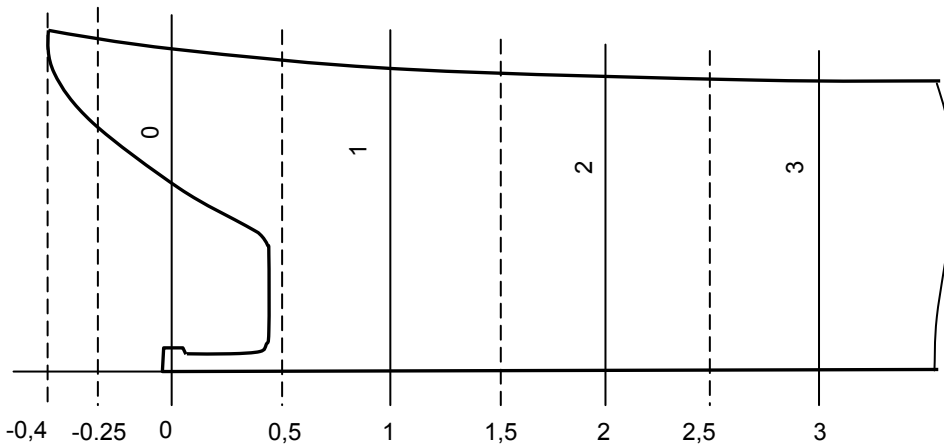


Figure 20 Positions of the auxiliary stations and coefficients of m in aft part of ship

$$m = \frac{3 - 2.5}{2} = 0.25$$

$$m = \frac{5 - 3}{2} = 1$$

$$m = \frac{17.2 - 16}{2} = 0.6$$

$$m = \frac{18 - 17}{2} = 0.5$$

$$m = \frac{18.5 - 17.2}{2} = 0.65$$

$$m = \frac{19 - 18}{2} = 0.5$$

$$m = \frac{19.5 - 18.5}{2} = 0.5$$

$$m = \frac{20 - 19}{2} = 0.5$$

$$m = \frac{20.25 - 19.5}{2} = 0.375$$

$$m = \frac{20.40 - 20}{2} = 0.20$$

$$m = \frac{20.55 - 20.25}{2} = 0.15$$

$$m = \frac{20.55 - 20.40}{2} = 0.075$$

(2) Determination of the areas of the cross section at the main and auxiliary stations:

(a) The areas of the cross section at the main and auxiliary stations are to be:

$$W_i = 2(\sum n_i y_i) \Delta d$$

Trong đó:

y_i : The ordinates of the water lines from the symmetrical plane to the inside surface of shell platings (m);

Δd : The spaces between the main water lines (m);

n_i : The correlative coefficients of main and auxiliary water line;

Coefficients of n_i are specified as followings:

$$n_i = \frac{J_t - J_d}{2}$$

J_t : Number sign of the upper water line from the considered water line;

J_d : Number sign of the underneath water line from the considered water line.

The example for determining (Referring to Figure 21).

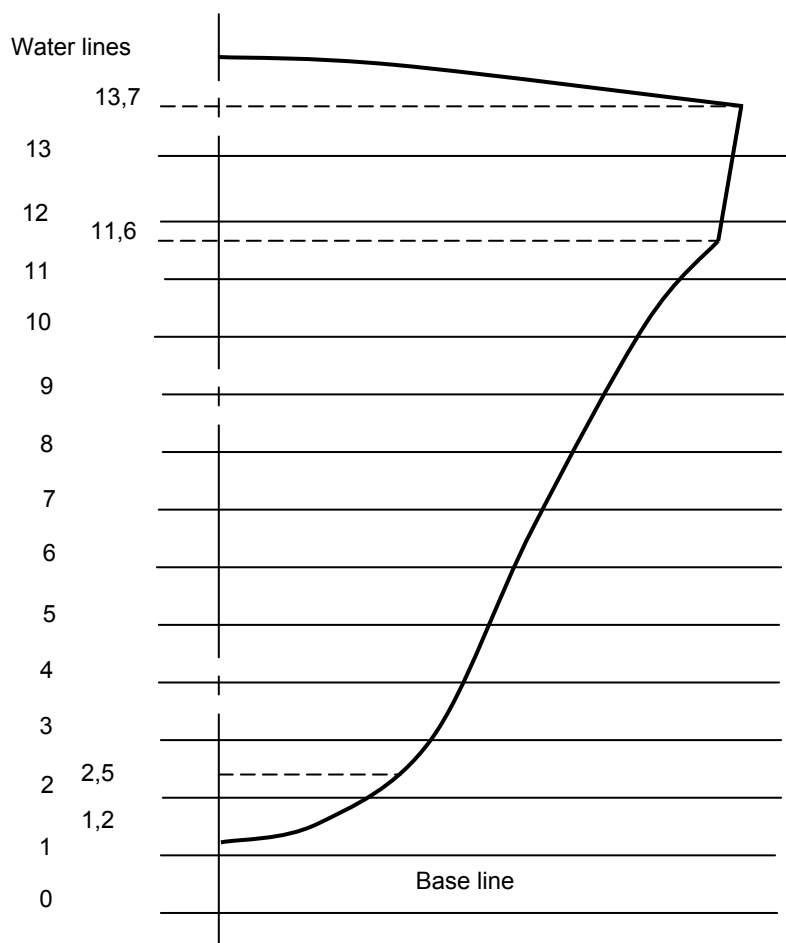


Figure 21 Positions of the water lines and adjustment coefficients of n_i

Coefficients of n are to be obtained as followings:

$$n = \frac{2 - 1.2}{2} = 0.40$$

$$n = \frac{2.5 - 1.2}{2} = 0.65$$

$$n = \frac{3 - 2}{2} = 0.50$$

$$n = \frac{4 - 2.5}{2} = 0.75$$

$$n = \frac{5 - 3}{2} = 1$$

$$n = \frac{11 - 9}{2} = 1$$

$$n = \frac{11.6 - 10}{2} = 0.80$$

$$n = \frac{13 - 11.6}{2} = 0.70$$

$$n = \frac{13.7 - 12}{2} = 0.85$$

$$n = \frac{13.7 - 13}{2} = 0.35$$

(b) The areas of cross sections of cambers are determined as followings:

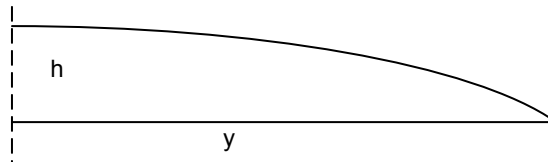


Figure 21

$$S = \frac{4}{3}h.y$$

Where:

h: The camber height of beams at the symmetrical (m);

y: Distance from the symmetrical plane to the inside surface of shell platings (m).

If there are no cambers the areas of cross sections of these parts are determined as following:

$$S = h.y$$

The volumes of the appendages can be determined according to the shapes.

The volumes of the open spaces are also determined according to the shapes and shall be deducted from the volume of ship.

(3) The determination of enclosed spaces above main deck:

The usage of arrangement drawing

The compartments, tanks, openings and erections, whose breaths are narrower than ship's breath, located on the deck or above can be determined according to the shapes.

Example: Determining the volume of the space whose shape as Figure 23.

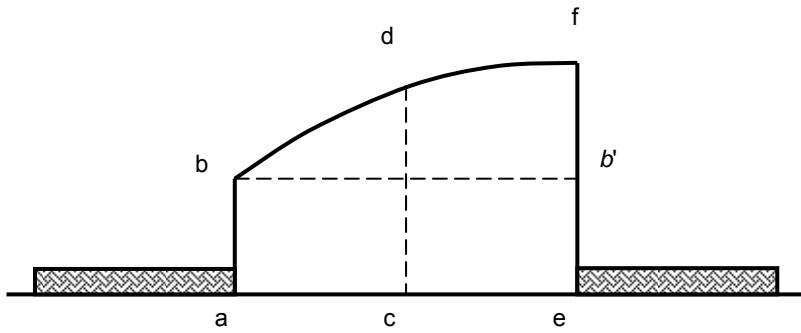


Figure 23

$$V = \frac{E}{6}(ab + 4cd + ef)bb'$$

Where:

bb': The breath of the erection (m);

E: The length of the erection (m);

ab: The minimum height of the (m);

cd: The average height of the (m);

ef: The maximum height (m).

(4) The determination of volume of cargo.

The volume of cargo space can be determined according to capacity plan or directly obtained by mean of the lines drawing. When determining the volume of cargo space in hold and in superstructure by mean of lines drawing the auxiliary stations and water lines can be used for higher degree of accuracy.

The volumes of cargo spaces in superstructure and other spaces extended from side to side on the uppermost deck and above can be determined basing on arrangement drawing and the actual shape.

When determining the cargo space, the volumes to be covered by the hatch coaming can be determined by mean of the actual shape.

Example: The volume of space inside the hatch coaming as in Figure 24.

$$V = l.b.h - \frac{4}{3}ca.ae.l$$

Where:

l: The length of cargo hatch (m);

b: The breath of cargo hatch (m);

- h: The height of cargo hatch coaming (m);
- ca: The camber height of the beams inside the line of cargo hatch (m);
- ae: One half of the breath of cargo hatch (m).

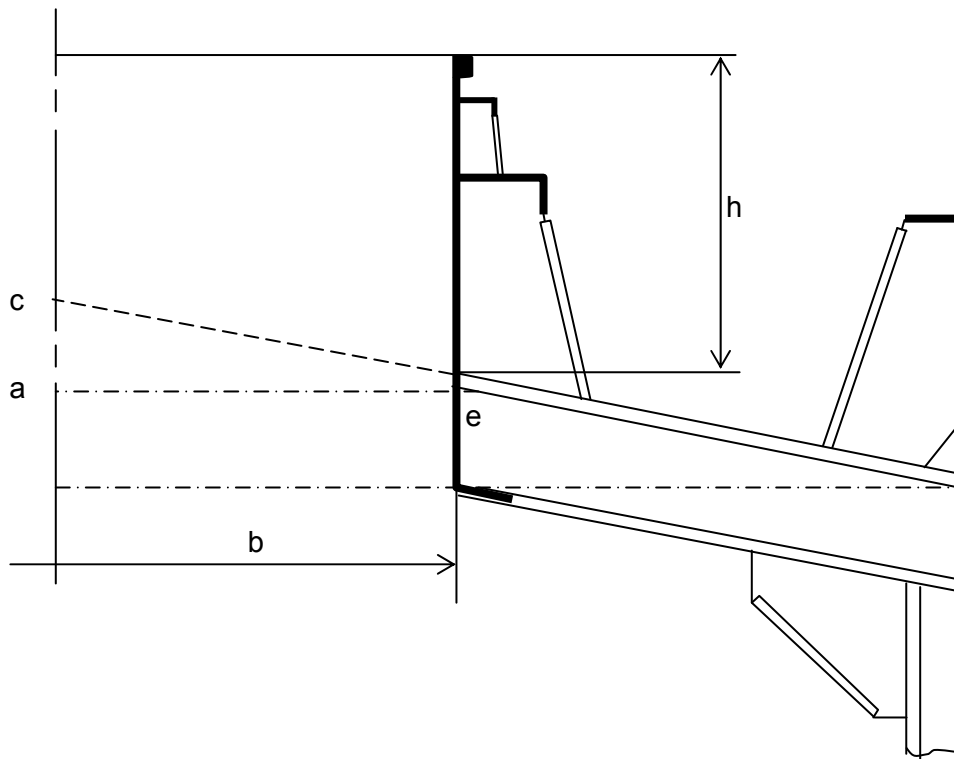


Figure 24