

No. 2

325
number

SURVEY FOR FREEBOARD.

PRINCIPAL DIMENSIONS.

CORRECTION TO TONNAGE (Art. 39)

DEPTH OF DOUBLE BOTTOM (Art. 39)

SHEER (Arts. 39 and 60—63)

FRAMING (Art. 39)

Sum of Products = 421.68

Sum of Products =

$$\frac{\text{Sum of Products}}{\text{Length of Ship}} = \text{Actual Mean Depth of framing} \dots \text{ins.}$$

Standard „ „ „ „ _____ ins.

Difference x $\frac{1}{12}$ = = 2b

COEFFICIENT OF FINENESS (Art. 37 or 43)

$$= \frac{100 (V \pm v)}{L (B - 2b) (D + d + d_1)} + n \quad \text{or} \quad \frac{35 \times \Delta}{L \times B_o \times d_o} + 0.04$$

$$= \frac{100 (15.200 \pm 0.04)}{430 \times 56 \times 36} + 0.04 = 0.76$$

Sketch showing arrangement and height of double bottom or ordinary floors and of superstructures (unless complete plans are submitted).

Note:- Construction of Hatchways, Ventilators, Casings, and all openings in uppermost deck, same as Full Scantling Vessel.

Sketch of deck erections showing openings in end bulkheads and position and arrangement of closing appliances. Hatchways, and Engine and Boiler openings also to be shown. Extent and thickness of wood deck or composition to be shown in red ink, and extent and thickness of ceiling (and battens) on tank top to be given.

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Lloyd's Register
Foundation

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WOOD DECK (Arts. 5 and 6)			
	Mean Length in ft.	Thickness in ins.	Products
Forecastle			
Bridge			
Poop or R.Q.D.	3" wood deck throughout.		
Open Deck, ford.			
" " aft.			
Total length = l =		Sum of Products =	
Sum of Products	= t =	ins. ;	Sum of Products = t ₁ = ins.
CORRECTION FOR DEPTH & CORRECTION FOR FREEBOARD.			
If no sheathing fitted amidships = t ₁ = $\frac{1}{2}$ ins. (Arts. 6 and 57 p. 1)			
If sheathing is fitted amidships = (t - t ₁) = $\frac{1}{4}$ ins. (Arts. 6 and 57 p. 2)			
* Note : Use the upper sign in correction for depth and the lower sign in correction for freeboard.			
DEPTH TO USE IN FREEBOARD TABLE.			
Depth moulded	36	ft.	0.00 ins.
Thickness of Stringer Plate			0.66 "
Thickness of Wood Deck Amidships			3.00 "
Correction for partial wood deck	+		36 - 3.66 "
Depth to use in Freeboard Tables	36	ft.	3.66 ins. = D ₁ = 36.31 ft.
SUPERSTRUCTURES.			
HEIGHT (Arts. 46-48)			
Standard Height = (0.018 L + 1.2) ft. = 7.5 ft.			
	Complete Superstructure	Forecastle	Bridge
Actual	= /	7.47 = 1.00	8.0 = 1.0
Standard	= /	7.5	7.5
CLOSING APPLIANCES (Arts. 50 and 54)			
	Forecastle	Bridge	Poop or Raised Quarter Deck
Means of Closing openings in bulkhead	Wood doors	Hinged Steel W.T. doors	Wood doors
Corresponding Class	II	I	II
EFFECTIVE LENGTH (Arts. 55 and 56)			
	Mean Length	Coef. Art. 56	Height Coef.
Forecastle closed part	46.68	1.00	1.00
" open part			
Bridge closed part	62.5	1.00	1.00
" open part ford.			
" " aft.			
Poop closed part			
" open part			
Total Effective Length = 109.08			
Length of Vessel = r = $\frac{109.08}{430} = .25$			
Corresponding Coef. in Table (Art. 49) = e = 0.150			
Reduction for Complete Superstructure = 39.00 ins.			
Product = 5.85 ins.			
Correction for Superstructures = 5.85 ins.			
EFFECTIVE LENGTH (Shelter Deck Vessels Arts. 87-92)			
l + $\frac{1}{2}(1-p)(L-l) =$ ft.			
(* See Art. 90)			
CORRECTION FOR PROPORTIONS L/D (Art. 58)			
When D ₁ is less than 35 ft. = $\frac{D_1 + 16}{300} (1 - e/2) (L - 12 D_1)$			
" " greater than 35 ft. = $0.17 (1 - e/2) (L - 12 D_1)$			
[Note e = 1.0 if more than 6/10 covered] = $0.17(1 - \frac{.15}{2})(430 - 12 \times 36.31) = .90$			
CORRECTION FOR ROUND OF BEAM (Art. 59)			
Standard Round of Beam = $\frac{\text{Length of Beam in ins.}}{50} = \frac{13.44}{50} = .2688$ ins.			
Correction = $\frac{1}{4} (\text{Standard Round of Beam} - \text{Actual Round of Beam}) = \frac{1}{4} (.2688 - .9) = 1.11$ ins.			
CORRECTION FOR FREEING PORTS (in vessels less than 15 ft. Depth Art. 64)			
Length of bulwark in feet each side			
Area of Freeing ports each side			
Area of Freeing ports required by Table			
Correction 1.2 (r - 0.5) D ₁ = + ins.			
CORRECTION FOR ACCESS TO CREW'S QUARTERS (Arts. 65-67)			
Are Crew berthed in Bridge House or Forecastle? Forecastle			
Height and breadth of gangway			
Correction = $-.012 (80 - l) D_1$ or $1.2 (r - 0.5) D_1$			
SUMMARY.			
Freeboard by Tables 112.66 ins.			
Correction for Sheer + 3.67			
" " Partial Wood Deck 5.85			
" " Superstructures .90			
" " Proportions L/D 1.11			
" " Round of Beam /			
" " Freeing Ports /			
" " Access to Crew's Quarters /			
Totals 1.11 10.42			
Net Correction 9.31			
Geometric Freeboard 103.35 ins.			
Corresponding Geometric Draught (mld.) 27.693 ft.			
Moulded Draught limited by $\frac{1}{4} \text{ per foot of Summer Draught}$ to 25.08 ft.			
Corresponding Freeboard (Summer) 134.7 ins.			
Winter Freeboard (Art. 22) = $\frac{1}{4} (D_1 - 10) + \frac{1}{4} (59 - D_1)$			
= $\frac{1}{4} (36.31 - 10) + \frac{1}{4} (59 - 36.31) = + 6.7$ ins.			
Tropical Freeboard (Art. 24) do. do. = - 6.7 ins.			
Winter North Atlantic Fbd. (Art. 23) Vessels 330 ft. and below.			
Ratio of effective length of superstructures to length of vessel			
Additional Freeboard + ins.			
Fresh Water Freeboard (Art. 27)			
$\frac{1}{4}$ per foot of Summer Draught = $25.08 \times \frac{1}{4} = - 6.27$ ins.			
FREEBOARD TO BE ASSIGNED.			
Vertical distance from upper edge of horizontal line indicating the freeboard deck to the centre of the disc. (Summer Line) 134.7 ins.			
Fresh Water Load Line above centre of disc. 6.3 ins.			
Tropical Load Line above " " 6.7 ins.			
Winter Load Line below " " 6.7 ins.			
Winter N.A. Load Line below " " / ins.			
Vertical distance from the point of intersection of the extended line of the upper surface of 3" wood of the uppermost continuous deck at mid length of the vessel with the outside of shell plating to the upper edge of the horizontal line indicating the freeboard deck 111 ins.			

Are the Engine and Boiler openings covered by a Bridge, Poop, Raised Quarter Deck or enclosed by a strong steel deck house? Strong Steel Deck House.

If openings are not so protected give thickness of plating and scantlings and spacing of stiffeners of Casings.

Are suitable means provided for closing all openings in them in bad weather? Yes

State the vertical distance from base line at top of keel to lower edge of lowest side scuttle About 33'-6"

State if there are any cargo ports or scuppers through sides of vessel below upper deck No

State any special features in the construction of the vessel

Sister vessels M.V. "Santos Maru"

Fee, Yen. ; Depth of Keel 1.56 ins. ; Draught (btm. keel) 25 ft. 2.52 ins.

DETAILS OF CONSTRUCTION OF WEATHER DECK HATCHWAYS.

	No. 1	No. 2	No. 3 B.D.K.	No. 4	No. 5	No. 6
Length and Breadth	20'3"x 16'0"	27'6"x 18'0"	22'6"x 18'0"	25'0"x 18'0"	20'0"x 16'0"	/
Height above deck and thickness of side and end coaming	24" x .44	24" x .44	18" x .44	24" x .44	24" x .44	
Shifting Beams	3 M. Steel Pl 14 x .34 3 1/2 x 3.42	5 M. Steel 15 x .36 4 x 3 x .44	4 M. Steel 12 x .30 4 x 3 x .44	4 M. Steel 16 x .36 4 x 3 x .44	3 M. Steel 14 x .34 3 1/2 x 3 x .42	
*Fore and Afters	None	None	None	None	None	
Thickness of hatches	3" O.P.	3"	3"	3"	3"	
Remarks	Construction of Hatchways, Ventilators and other openings in uppermost deck same as for Full Scantling Vessel.					
* When the fore and afters are of wood the depth should be stated from the underside of hatches.						

LONGITUDINAL MODULUS.

Height of Assumed Axis above base = 14.4

Section at Engine Opening.

BELOW ASSUMED AXIS.						ABOVE ASSUMED AXIS.					
Item	Scantlings	Area	Lever	Moment	Mt. of Inertia	Item	Scantlings	Area	Lever	Moment	Mt. of Inertia
Flat Keel	1/2 x 53 x .78	20.7	14.4	298	4290	Top Deck Str.	60 x .66	39.6	21.8	863	18810
" "						Coaming eng.	3 x 3 x .34	1.9	22.4	43	960
Centre Girder	1/2 x 48 x .58	13.9	12.4	172	2130	" " Plating	64.5 x .42	27.1	22.0	596	13110
C.G. btm. ang.	5 x 5 x .60	5.6	14.3	80	1140	" " "	68 x .42	28.6	22.1	632	13970
C.G. top angles	3 1/2 x 3 1/2 x .54	3.5	10.5	37	390	" " "	57.5 x .42	24.2	22.3	540	12040
T.T. Cr. Strake	1/2 x 54 x .52	14.0				" " Str. Ang.	6 x 6 x .66	7.5	21.8	164	3580
T.T. plating	66 x .52	34.3				2nd Deck Str.	42 x .48	20.2	14.1	285	4020
" "	66 x .52	34.3				" " Plating	66 x .46	30.4	14.2	432	6130
" "	66 x .52	34.3	10.4	1869	19440	" " "	58.5 x .46	26.9	14.3	385	5510
" "	71 x .52	36.9				Coaming eng.	3 x 3 x .36	2.0	14.4	29	420
" "						" " Str. Ang.	3 x 3 x .48	2.7	14.1	38	540
Margin Plate	48 x .54	25.9				3rd Deck Str.	41 x .38	15.6	5.6	87	490
" "						" " Plating	69 x .34	23.5	5.7	134	760
" Angle	3 1/2 x 3 1/2 x .54 A	3.5	10.3	36	370	" " "	56 x .34	19.0	5.8	110	640
Shell Strake A	78 x .60	46.8	14.3	669	9570	" " "					
" " B	77.5 x .60	46.5	14.3	665	9510	" " Str. Ang.	3 x 3 x .38	2.1	5.6	12	70
" " C	78 x .60	46.8	14.1	660	9210	Sheerstrake	54 x .74	40.0	20.5	820	16810
" " D	69.25 x .60	41.6	13.8	574	7920	Strake below	51 x .66	33.7	16.5	556	9170
" " E	66 x .60	39.6	11.2	444	4970	Shell Strake J	77.25 x .60	46.4	11.7	543	6350
" " F	71.5 x .60	42.9	6.2	266	1650	" " H	77.5 x .60	46.5	5.6	260	1460
" " G	42 x .60	25.2	1.8	45	80	" " G	35 x .60	21.0	1.5	32	50
Totals below assumed axis		516.3		5815	70770	Totals above assumed axis		458.9		6561	114890
" above assumed axis		458.9		6561	114890	Neutral Axis above assumed axis (x) = .76					
Sum or Difference		975.2		746	185660	Correction = (Total Area x x ² x 2) = - 975.2 x .76 ² x 2 = 1130					
Moment of Inertia about assumed axis 371320						Moment of Inertia about Neutral Axis 370190					
Draught Permitted by Longitudinal Strength (Arts. 81-86) = Actual Modulus = $\frac{17763.4}{12.65 \times 56} = 25.08 \text{ ft.} = 25 - .096$						Distance from Neutral Axis to top of Strength deck beam at side = 20.84 ft.					

TRANSVERSE MODULUS.

Minimum Side Plating (Art. 77) $\frac{0.105 \times 430 + 17}{100} = .62$; Standard Frame Spacing (Art. 78) = $.025 \times 430 + 17 = 27.75$

Actual Side Plating = .60; Actual Frame Spacing = 30.00

If actual frame spacing exceeds the standard $\sqrt{\frac{\text{Actual frame spacing}}{\text{Standard frame spacing}}} t = \sqrt{\frac{30}{27.75}} \times .62 = .646$

Moulded Geometric Draught (d) = 27.69 H = 14.42 f₁ = 20.05 In way of Bridge

t = 5.50 K = 23.58 f₂ = 4.07 K = 28.58 f₂ = 5.93

d - t = 22.19 f₁ + f₂ = 24.12 f₁ + f₂ = 25.98

Standard I/y = $\frac{s(d-t)(f_1 + f_2)}{1000} = \frac{30 \times 22.19 \times 24.12}{1000} = 16.05 \text{ ins.}^3$

Frame in ship = 10 x 3 1/2 x .48 B.A. at 30" spacing, I/y = $\frac{17.23 \times 1.05}{1000} = 18.09$

DRAUGHT PERMITTED BY TRANSVERSE STRENGTH = $\frac{I/y \times 1000}{s(f_1 + f_2)} + t = \frac{18.09 \times 1000}{30 \times 25.98} + 5.5 = 28.71$