

DISCHARGED SECTION J78

## LLOYD'S REGISTER OF SHIPPING.

(CLASSIFICATION SOCIETY RECOGNISED BY THE JAPANESE GOVERNMENT)

## SURVEY FOR FREEBOARD.

Ship's Name <b>BUKUNI MARU</b>	Port of Registry <b>Tokio.</b>	Official No. --	No. in R.B. --	Gross Tonnage <b>About 11870</b>	Tonnage under Fbd. Deck = V --	Date of Launch <b>19-12-29</b> <b>15-2-30</b>	Date when Built <b>Building.</b>	Report Number <b>70</b>
Owners <b>pon Yusen Kaisha.</b>		Builders <b>Mitsubishi Zosen Kaisha.</b> <b>Nagasaki.</b>			Yard No. <b>468</b>	Port of Survey <b>Nagasaki.</b>		
Type of vessel <b>HT SCANTLING</b> <b>LE &amp; COMBINED P &amp; B.</b>	Particulars of Classification <b>* 100 A. 1.</b> <b>with Freeboard.</b>		Position of Freeboard Deck <b>Upper deck.</b>		Date of Survey <b>While Building.</b> <b>G. Anderson &amp;</b> <b>H. J. Cox.</b>			
Name of Surveyor								

PRINCIPAL DIMENSIONS.		
Length between perpendiculars <b>505.0ft.</b>	Breadth Moulded = B <sub>0</sub> <b>64.0</b> ft.	Depth Moulded to Fbd. deck = D <sub>0</sub> <b>37.0</b> ft.
Length on Load Line	Thickness of Side plating in ins. $\times \frac{3}{12}$ <b>+</b> ft.	Round of Beam <b>+</b> ft.
Length for Freeboard = L <b>505.0ft.</b>	Breadth for Freeboard = B	Depth from base line to top of inner bottom plating or ordinary floors
		Depth for Tonnage Coef. (Art. 39) = D

CORRECTION TO TONNAGE (Art. 39)	DEPTH OF DOUBLE BOTTOM (Art. 39)
Tonnage between top of ceiling on double bottom or ordinary floors as fitted and standard level of top of ceiling (v) =	Depth of Actual Double Bottom (including plating) or Ordinary Floors
	Depth of Standard Double Bottom (including plating) or Ordinary Floors
	Difference
	$\times \frac{1}{12} =$

SHEER (Arts. 39 and 60-63)				FRAMING (Art. 39)					
Ordinate	Height of Sheer in <del>feet</del>	S.M.	Products	Between Frames	Length in ft.	Depth of Frame in ins.	Thickness of Sparring in inches	Total depth in inches	Products ft. x inches
1	8.25	1	8.25						
2	3.67	4	14.68						
3	.92	2	1.84						
4	0	4	0						
5	.36	2	.72						
6	1.44	4	5.76						
7	3.25	1	3.25						

Sum of Products = <b>34.50x12 = 414.00</b>	Sum of Products =
Mean Height of Sheer = $S = \frac{\text{Sum of Products}}{18} = 23.0$ ins.	Sum of Products = Actual Mean Depth of framing
Standard Mean Height = $S_0 = \frac{1}{3}(L/10 + 10) = 20.17$ ins.	Length of Ship =
Difference = $2.83 \times \frac{1}{12} = .236$ ft. = d,	Standard „ „ „ „
Correction (Art. 60-63) = $\frac{1}{3}(1-e)(S_0-S) = 75 \times .18 \times 2.83 = .38$ ins.	Difference $\times \frac{2}{12} =$ = 2b

COEFFICIENT OF FINENESS (Art. 37 or 43) **85% of 37.0 = 31.45**

or  $\frac{35 \times \Delta}{L \times B_0 \times d_0} + 0.04$

$= \frac{35 \times 21339}{505 \times 64 \times 31.45} + 0.04 = .77$

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

SEE PLANS.

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

WOOD DECK (Arts. 5 and 6)			
	Mean Length in ft.	Thickness in ins.	Products
Forecastle	445.75	3.5	1355.08
Bridge		3.5	
Poop or R.Q.D.		3.5	
Open Deck, ford.	59.25	3.50	207.38
" " aft.			
Total length = l =		Sum of Products = 1562.46	
Sum of Products = t =		Sum of Products = t <sub>1</sub> = 3.09 ins.	

  

CORRECTION FOR DEPTH & CORRECTION FOR FREEBOARD.	
If no sheathing fitted amidships = t <sub>1</sub> = $\pm$ 3.09 ins. (Arts. 6 and 57 p. 1)	
If sheathing is fitted amidships = (t - t <sub>1</sub> ) = $\mp$ 3.09 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	37 ft. 0 ins.
Thickness of Stringer Plate	.46 "
Thickness of Wood Deck Amidships	37 0.46 "
Correction for partial wood deck	$\pm$ 3.09 "
Depth to use in Freeboard Tables	37 ft. 3.55 ins. = D <sub>1</sub> = 37.30 ft.

  

SUPERSTRUCTURES.				
HEIGHT (Arts. 46-48)				
Standard Height = (0.018 L + 1.2) ft. = 7.5 ft.				
	Complete Superstructure	Forecastle	Bridge	Poop or R.Q.D.
Actual		8	8	
Standard		7.5	7.5	

  

CLOSING APPLIANCES (Arts. 50 and 54)			
	Forecastle	Bridge	Poop or Raised Quarter Deck
		Forward End.	After End.
Means of Closing openings in bulkhead	Hinged wood doors.	Intact.	
Corresponding Class	II	I	

  

EFFECTIVE LENGTH (Arts. 55 and 56)				
	Mean Length	Coef. Art. 56	Height Coef.	Products.
Forecastle closed part	38.62	1	1	38.62
" open part	34.67	.75	1	26.00
Bridge closed part	372.46	1	1	372.46
" open part ford.				
" " aft.				
Poop closed part				
" open part				
Total Effective Length =		437.08		
Length of Vessel = r =		505		
Corresponding Coef. in Table (Art. 49) = e =		.820 (well decks)		
Reduction for Complete Superstructure		39.00 ins.		
Product		31.98 ins.		
Correction for Superstructures		31.98 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 <sub>1</sub> 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] =	.17 x 57.4 = +4.88 ins.

CORRECTION FOR ROUND OF BEAM (Art. 59)	
Standard Round of Beam = $\frac{\text{Length of Beam in ins.}}{50} =$	15.36 ins.
Correction = $\frac{1}{2} (\text{Standard Round of Beam} - \text{Actual Round of Beam})$	
= $\frac{1}{2} (15.36 - 6) =$	+ 2.34 ins.

  

CORRECTION FOR FREEING PORTS (in vessels less than 15 ft. Depth Art. 64)	
Length of bulwark in feet each side	ft.
Area of Freeing ports each side	sq. ft.
Area of Freeing ports required by Table	sq. ft.
Correction 1.2 (r - 0.5) D <sub>1</sub> = +	ins.

  

CORRECTION FOR ACCESS TO CREW'S QUARTERS (Arts. 65-67)	
Are Crew berthed in Bridge House or Forecastle?	Yes
Height and breadth of gangway	
Correction = .012 (80 - l) D <sub>1</sub> or 1.2 (r - 0.5) D <sub>1</sub> .012 x 10 x 37.30	
= +	4.48 ins.

SUMMARY.	
Freeboard by Tables	117.78 ins.
Correction for Sheer	.38
" " Partial Wood Deck	3.09
" " Superstructures	31.98
" " Proportions L/D	4.88
" " Round of Beam	2.34
" " Freeing Ports	
" " Access to Crew's Quarters	4.48
Totals	11.70 35.45
Net Correction	23.75 By
Geometric Freeboard	94.03 ins. Slide
Corresponding Geometric Draught (mld.)	29.20 ft. Rule.
Moulded Draught limited by $\frac{L}{100}$ design to	28.7" = 28.58
Corresponding Freeboard (Summer)	101.5 ins.

Winter Freeboard (Art. 22) = $\frac{1}{2} (D_1 - 10) + \frac{r}{45} \times (59 - D_1)$	
= $\frac{1}{2} \times 27.3 + \frac{.87}{45} \times 21.7 =$	+ 7.24 ins.
Tropical Freeboard (Art. 24) do. do.	= - 7.24 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)	
$\frac{1}{2}$ " per foot of Summer Draught = $\frac{\Delta}{40 \times 7} = \frac{19000}{40 \times 64.2} =$	- 7.4 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)	101.5 ins.
Fresh Water Load Line above centre of disc.	7.4 ins.
Tropical Load Line above " " "	7.2 ins.
Winter Load Line below " " "	7.2 ins.
Winter N.A. Load Line below " " "	ins.
Vertical distance from the point of intersection of the extended line of the upper surface of <sup>Stl.</sup> stringer of the upper 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	0.00 ins.

Are the Engine and Boiler openings covered by a Bridge, Poop, Raised Quarter Deck or enclosed by a strong steel deck house? **Yes**

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 36'-0".**

State if there are any cargo ports or scuppers through sides of vessel below upper deck **Yes . . . P. doors in Nos. 2 & 5 Tween Decks.**

State any special features in the construction of the vessel **--**

Sister vessels **--**

Fee, Yen. : Depth of Keel : ins. ; Draught (btm. keel) : ft. : ins.

DETAILS OF CONSTRUCTION OF WEATHER DECK HATCHWAYS.

	No. 1 Pole	No. 2 Upper	No. 3 Bridge	No. 4 From 3k	No. 5 Bridge	No. 6 Bridge.
Length and Breadth	18' x 18'	31'9" x 22'	15' x 20'	17'6" x 20'	27'6" x 20'	17'6" x 18'
Height above deck and thickness of side and end coaming	30" x .44	30" x .50 .44	30" x .44	30" x .44	30" x .50 .44	30" x .44
Shifting Beams	Number and Material 3 15 x .36 4 x 3 x .44	6 18 x .36 5 x 3 x .44	2 13 x .34 4 x 3 x .44	3 12 1/2 x .34 4 x 3 x .44	5 12 1/2 x .34 4 x 3 x .44	3 11 1/2 x .34 4 x 3 x .44
*Fore and Afters	Number and Material Scantlings		None			
Thickness of hatches			All 3"			
Remarks						

\*When the fore and afters are of wood the depth should be stated from the underside of hatches.

Least LONGITUDINAL MODULUS.

Height of Assumed Axis above base =  $46 \times 2/5 = 18.40$  ft.

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	32.25"x.98"	31.6	18.4	581	10.690	Bridge Deck Str.	69.0"x.74"	51.1	27.7	1.415	39.200
Twin Girder	18.0"x.75"	13.5	13.7	185	2.530	Plating	69.0"x.50"	34.5	27.8	.959	26.660
Centre Girder	16.0"x.75"	12.0	17.6	211	3.720	" " Plating	74.5"x.50"	37.3	27.9	1.039	29.000
C.C. beam ang.	18.0"x.75"	13.5	13.7	185	2.530	" " "	72.0"x.50"	36.0	28.0	1.008	28.220
C.C. top angles	12.0"x.75"	9.0	17.4	157	2.730	" " "	26.0"x.50"	13.0	28.1	.365	10.260
T.T. Cr. Strake	40.0"x.56"	22.4	12.9	289	3.730	" " Str. Ang.	6"x6"x.72"	8.1	27.8	.226	6.280
T.T. plating	96.0"x.48"	46.1	12.9	594	7.660	Upper Deck Str.	59"x.46"	27.1	18.7	.507	9.480
" "	54.0"x.48"	25.9	12.9	334	4.310	" " Plating	74.25"x.42"	31.2	18.9	.590	11.150
" "	48.0"x.48"	23.0	12.9	297	3.840	" " "	74.25"x.42"	31.2	19.0	.593	11.270
" "	72.0"x.48"	34.6	12.9	446	5.750	" " "	24.0"x.42"	10.1	19.0	.192	3.640
Gusset Plt.	15.5"x.48"	7.4	12.9	96	1.240	" " Str. Ang.					
" "	6"x.48"	2.9	12.8	37	.470	2nd Deck Str.	56"x.50"	28.0	10.4	.291	3.030
Margin Plate	48.0"x.57"	27.4	14.6	400	5.840	" " Plating	80.5"x.50"	40.3	10.5	.423	4.440
" Angle	6"x6"x.57"	6.5	12.9	84	1.080	" " "					
" Angle	6"x6"x.57"	6.5	16.2	105	1.710	" " "					
Shell Strake A	73.5"x.72"	52.9	18.2	963	17.520	" " Str. Ang.					
" " B	77.25"x.72"	55.6	18.0	1,001	18.030	Sheerstrake	68.25"x.72"	49.1	25.7	1.263	32.460
" " C	76.69"x.72"	55.2	17.8	983	17.500	Strake below	50.13"x.70"	35.1	21.2	.744	15.760
" " D	77.0"x.72"	55.4	17.5	970	16.980	Shell Strake	91.03"x.70"	63.7	15.7	1.000	15.700
" " E	78.09"x.72"	56.2	15.6	877	13.680	" " J	83.44"x.70"	58.4	8.9	.520	4.630
" " F	82.13"x.70"	57.5	10.7	615	6.580	" " H	70.35"x.70"	49.2	2.9	.143	.410
" " G	83.31"x.70"	58.3	4.1	239	.980						
" " H	13.21"x.70"	9.2	0.6	6	0						
Totals below assumed axis		682.6		9,655	149.100	Totals above assumed axis		603.4		11,278	251.590
" above assumed axis		603.4		11,278	251.590						
Sum or Difference		1,286.0		1,623	400.690						

Moment of Inertia about assumed axis

801,380

Neutral Axis above assumed axis (x) =  $1623 \div 1286 = 1.26$  ft.

Correction = (Total Area x x<sup>2</sup> ÷ 2) =  $1286 \times 1.26^2 \div 2 = 4100$

Moment of Inertia about Neutral Axis =  $801,380 - 4100 = 797,280$

Distance from Neutral Axis to top of Strength deck beam at side =  $26.34$  ft.

MODULUS OF SECTION =  $797,280 \div 26.34 = 30,269$

DRAUGHT PERMITTED BY LONGITUDINAL STRENGTH (Ans. 81-86) =  $\frac{\text{Actual Modulus}}{f. B.} = \frac{30,269}{16.47 \times 64} = 28.72$  ft. (by slide rule)

TRANSVERSE MODULUS. at after end of No. 2 Cargo Hold. (least).

Minimum Side Plating (An. 77)  $\frac{0.105 \times 505 + 17}{100} = .70$ ; Standard Frame Spacing (An. 78) =  $.025 \times 505 + 17 = 29.63$

Actual Side Plating =  $.70$ ; Actual Frame Spacing =  $30$

If actual frame spacing exceeds the standard  $\sqrt{\frac{\text{Actual frame spacing}}{\text{Standard frame spacing}}} t = \sqrt{\frac{30}{29.63}} \times .70 = .70$

Moulded Geometric Draught (d) =  $23.56$  H =  $49.24$  f<sub>1</sub> =  $49.24$   
t =  $5.10$  K =  $20.83$  f<sub>2</sub> =  $3.58 (3.25 \times \frac{22}{20})$   
d + t =  $52.82$  f<sub>1</sub> + f<sub>2</sub> =  $52.82$

Standard I/y =  $\frac{s(d-t)(f_1+f_2)}{1000} = \frac{1 \times (52.82 - 5.10)(49.24 + 3.58)}{1000} = 38.0$

Frame in ship =  $10 \times 3 \frac{1}{2} \times .42$  13" Girder. at 30" spacing, I/y = Equivalent =  $38.0$   
R.B.A.  $\frac{I/y \times 1000}{s(f_1+f_2)} + t = \frac{38 \times 1000}{30 \times 52.82} + 5.1 = 29.08$   
DRAUGHT PERMITTED BY TRANSVERSE STRENGTH =  $\frac{29.08}{24 \times 60} = 56.7$  (by slide rule).

13" 10 x 3 1/2 x .42 13" 13 x 3 1/2 x .60 13" 13 x 3 1/2 x .60  
I/y = 56.2 = 56.7 = 38.0

