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LLOYD'S REGISTER OF SHIPPING.

(CLASSIFICATION SOCIETY RECOGNISED BY THE JAPANESE GOVERNMENT)

SURVEY FOR FREEBOARD.

Ship's Name "KWAYO MARU"	Port of Registry Nakamachi	Official No. 29329	No. in R.B.	Gross Tonnage 4363.75	Tonnage under Fbd. Deck = V 3676.64	Date of Launch 25th. Sept. 1923	Date when Built 1923	Report Number 18.
Owners Osaka Iron Works		Builders Osaka Iron Works Innoshima		Yard No. 963		Port of Survey Kobe		
Type of vessel Coop Bridge & Forecastle longitudinal framing.	Particulars of Classification * 100 A.1.		Position of Freeboard Deck Shelter Deck		Date of Survey Whilst building			
					Name of Surveyor S.I. Preston			

PRINCIPAL DIMENSIONS.

Length between perpendiculars 345.00 ft.	Breadth Moulded = B ₀ 49.83 ft.	Depth Moulded to Fbd. deck = D ₀ 28.17 ft.
Length on Load Line 344.83 ft.	Thickness of Side plating in ins. $\times \frac{3}{12}$.54 \times 3/12 = + .14 ft. <small>*(2/12 if plating is joggled)</small>	Round of Beam + 1.00 ft.
Length for Freeboard = L 344.83 ft.	Breadth for Freeboard = B 49.97 ft.	Depth from base line to top of inner bottom plating or ordinary floors 29.17 ft. 3.37 ft.
		Depth for Tonnage Coef. (Art. 39) = D 25.80 ft.

CORRECTION TO TONNAGE (Art. 39) (Ceiling under hatches neglected). Tonnage between top of ceiling on double bottom or ordinary floors as fitted and standard level of top of ceiling (v) = $\frac{344.83 \times 29.9 \times 29}{100} = + 29.90$ tons.	DEPTH OF DOUBLE BOTTOM (Art. 39) Depth of Actual Double Bottom (including plating) or Ordinary Floors 40.46 ins. Depth of Standard Double Bottom (including plating) or Ordinary Floors 41.48 ins. Difference = 1.02 $\times \frac{1}{12} =$ -.09 d.
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SHEER (Arts. 39 and 60-63)				FRAMING (Art. 39)					
Ordnate	Height of Sheer in inches.	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	70.25	1	70.25	AP -FR	344.83	8.0	Nil.	8.0	344.83
2	29.80	4	119.20						
3	7.50	2	15.00						
4	0	4	0						
5	12.00	2	24.00						
6	54.50	4	218.00						
7	120.38	1	120.38						
Sum of Products = 566.83				Sum of Products = 344.83					
Mean Height of Sheer = $S = \frac{\text{Sum of Products}}{18} = \frac{566.83}{18} = 31.49$ ins.				Sum of Products = Actual Mean Depth of framing 8.0 ins.					
Standard Mean Height = $S_0 = \frac{1}{3}(L/10 + 10) = \frac{1}{3}(\frac{344.83}{10} + 10) = 14.83$ ins.				Standard " " " " 7.5 ins. -5.50 +2.00					
Difference 16.66 $\times \frac{1}{12} = 1.39$ ft. = d ₁				Difference 0.5 $\times \frac{2}{12} = 0.08$ = 2b					
Correction (Arts. 60-63) = $\frac{3}{4}(1-e)(S_0-S) = \frac{3}{4}(1-.303)(14.83-31.49) = 8.71$									

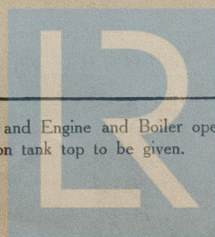
COEFFICIENT OF FINENESS (Art. 37 or 43) $\frac{100(V+v)}{L(B-2b)(D+d+d_1)+n}$ $\frac{100(3676.64 + 4.13)}{344.83(49.97-.08)(25.8-.09+1.39)} = .782$	or $\frac{35 \times \Delta}{L \times B_0 \times d_0} + 0.04$ $= \dots + 0.04 =$
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Sketch showing arrangement 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.

Ceiling on Tank Top $2\frac{1}{2}$ " under Hatchways only.



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WOOD DECK (Arts. 5 and 6)

	Mean Length in ft.	Thickness in ins.	Products
Forecastle	34.85	(3.50-38)	512.77
Bridge	99.25	- 3.12	
Poop or R.Q.D.	30.25		
Open Deck, ford.			
.. aft.			

Total length = $l =$ Sum of Products = **512.77**
Sum of Products = $t =$ ins.; Sum of Products = $t_1 =$ **1.49** ins.

CORRECTION FOR DEPTH & CORRECTION FOR FREEBOARD.
If no sheathing fitted amidships = $t_1 = \pm 1.49$ ins. (Arts. 6 and 57 p. 1)
If sheathing is fitted amidships = $(t - t_1) = \mp$ 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 = **28** ft. **2.0** ins.
Thickness of Stringer Plate = **0.38**
Thickness of Wood Deck Amidships = **28'** **2.38"**
Correction for partial wood deck = \pm **1.49**
Depth to use in Freeboard Tables = **28'** ft. **3.87** ins. = $D_1 =$ **28.32** ft.

SUPERSTRUCTURES.
HEIGHT (Arts. 46-48)
Standard Height = $(0.018 L + 1.2)$ ft. = **7.41** ft.

	Complete Superstructure	Forecastle	Bridge	Poop or R.Q.D.
Actual		8.08	7.89	7.88
Standard		7.41	7.41	7.41

CLOSING APPLIANCES (Arts. 50 and 54)

	Forecastle	Bridge		Poop or Raised Quarter Deck
		Forward End.	Aft End.	
Means of Closing openings in bulkhead	Two door steel	Two door W.T. Hinged	Two door Steel	Two door W.T. Hinged
Corresponding Class	2	1	2	1

EFFECTIVE LENGTH (Arts. 55 and 56)

	Mean Length	Coef. Art. 56	Height Coef.	Products.
Forecastle closed part	34.0	1.00	1.00	34.00
.. open part				
Bridge closed part	99.25	1.00	1.00	99.25
.. open part ford.				
.. .. aft.				
Poop closed part	30.25	1.00	1.00	30.25
.. open part				

Total Effective Length = **163.50**
Total Effective Length = $r =$ **.474**
Corresponding Coef. in Table (Art. 49) = $e =$ **.303**
Reduction for Complete Superstructure = **39.00** ins.
Product = **11.82** ins.
Correction for Superstructures = **.11.82** 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] **28.32 + 16 (1 - .303) (344.8 - 12 x 28.32) = 28.32**

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

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 **37'-11 1/2"**

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 **S/S "Haiyo Maru"**

Fee, Yen.....; Depth of Keel **1.68** ins.; Draught (btm. keel) **23** ft. **9** ins.

CORRECTION FOR ROUND OF BEAM (Art. 59)
Standard Round of Beam = $\frac{\text{Length of Beam in ins.}}{50} =$ **11.76** ins.
Correction = $\frac{1}{4}(\text{Standard Round of Beam} - \text{Actual Round of Beam}) =$ $\frac{1}{4}(11.76 - 12) =$ **-.06** 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 $1.2 (r - 0.5) D_1 = +$ ins.

CORRECTION FOR ACCESS TO CREW'S QUARTERS (Arts. 65-67)
Are Crew berthed in Bridge House or Forecastle?
Height and breadth of gangway
Correction = $.012 (80 - l) D_1$ or $1.2 (r - 0.5) D_1 = +$ ins.

SUMMARY.
Freeboard by Tables **77.13** ins.
Correction for Sheer **8.71**
" " Partial Wood Deck **1.49**
" " Superstructures **11.82**
" " Proportions L/D **0.63**
" " Round of Beam **0.06**
" " Freeing Ports
" " Access to Crew's Quarters
Totals **0.63** **22.08**
Net Correction **21.45**
Geometric Freeboard **55.68** ins.
Corresponding Geometric Draught (mld.) **23.6** ft.
Moulded Draught limited by $\left(\frac{\text{form transverse strength}}{\text{longitudinal strength}} \right)$ to **23.6** ft.
Corresponding Freeboard (Summer) **55.68** ins.

Winter Freeboard (Art. 22) = $\frac{1}{4} (D_1 - 10) + r/45 \times (59 - D_1)$
 $\frac{1}{4} (28.32 - 10) + .474 (59 - 28.32) =$ **+4.91** ins.
Tropical Freeboard (Art. 24) do. do. = **-4.91** 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 $\frac{1}{4} (23.56) =$ **-5.89** 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) **55.7** ins.
Fresh Water Load Line above centre of disc. **5.9** ins.
Tropical Load Line above " " " **4.9** ins.
Winter Load Line below " " " **4.9** ins.
Winter N.A. Load Line below " " " ins.

Vertical distance from the point of intersection of the extended line of the upper surface of the **stringer plate** of the **Shelter** 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.

DETAILS OF CONSTRUCTION OF WEATHER DECK HATCHWAYS.

	Fore No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
Length and Breadth	22'-0"x20'-0"	28'-0"x20'-0"	11'-0"x18'-0"	10'-0"x20'-0"	22'-0"x20'-0"	22'-0"x20'-0"
Height above deck and thickness of side and end coaming	36" x 44	-- same -- as -- No. -- 1. --				
Shifting Beams	4 steel 17"-8 1/2"x.36 A.4x3x44	5 steel same as No. 1	1 steel 13"-6 1/2"x.32 A.4x3x.44	1 steel 18"-9"x.36 A.4x3x.44	4 steel same as -- No. --	4 steel 1. --
*Fore and Afters						
Thickness of hatches	3	3	3	3	3	3
Remarks						

* 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 = Section at

BELOW ASSUMED AXIS.						ABOVE ASSUMED AXIS.					
Item	Scantlings	Area	Lever	Moment	Mt. of Inertia	Item	Scantlings	Area	Lever	Moment	Mt. of Inertia
Flat Keel						Top Deck Str.					
" "						" " "					
Centre Girder						" " Plating					
C.G. btm. ang.						" " "					
C.G. top angles						" " "					
T.T. Cr. Strake						" " Str. Ang.					
T.T. plating						2nd Deck Str.					
" "						" " Plating					
" "						" " "					
" "						" " Str. Ang.					
Margin Plate						3rd Deck Str.					
" "						" " Plating					
" Angle						" " "					
Shell Strake A						" " Str. Ang.					
" " B						Sheerstrake					
" " C						Strake below					
" " D						Shell Strake					
" " E						" "					
" " F						" "					
" " G											
Totals below assumed axis						Totals above assumed axis					
" above assumed axis						Neutral Axis above assumed axis (x) =					
Sum or Difference						Correction = (Total Area x x^2 x 2) =					
						Moment of Inertia about Neutral Axis					
						Distance from Neutral Axis to top of Keel					
						MODULUS OF SECTION =					
						Actual Modulus =					

Moment of Inertia about assumed axis 2

DRAUGHT PERMITTED BY LONGITUDINAL STRENGTH (Arts. 81-86) = $\frac{f_1 B_o}{f_2}$

TRANSVERSE MODULUS.
Minimum Side Plating (Art. 77) $\frac{0.105 \times +17}{100} =$; Standard Frame Spacing (Art. 78) = $.025 \times +17 =$
Actual Side Plating; Actual Frame Spacing
If actual frame spacing exceeds the standard $\sqrt{\frac{\text{Actual frame spacing}}{\text{Standard frame spacing}}} t =$
Moulded Geometric Draught (d) = H = f_1 =
t = K = f_2 =
d - t = f_1 + f_2 =
Standard I/y = $\frac{s(d-t)(f_1 + f_2)}{1000} =$
Frame in ship = at spacing, I/y =
DRAUGHT PERMITTED BY TRANSVERSE STRENGTH = $\frac{I/y \times 1000}{s(f_1 + f_2)} + t =$