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LLOYD'S REGISTER OF SHIPPING.

(CLASSIFICATION SOCIETY RECOGNISED BY THE JAPANESE GOVERNMENT)

SURVEY FOR FREEBOARD.

Ship's Name S. "KIRISHIMA MARU"	Port of Registry Yokohama.	Official No. 36919	No. in R.B. 25646	Gross Tonnage 5959	Tonnage under Fbd. Deck = V --	Date of Launch 3 April 1931	Date when Built 1931	Report Number 82
Owners Okusai Kisen Kaisha.		Builders Kawasaki Dockyard Co.		Yard No. 563		Port of Survey --		
Type of vessel Complete Superstructure	Particulars of Classification *100A1 with free-board		Position of Freeboard Deck 7'-6" below superstructure Deck.			Date of Survey --		
						Name of Surveyor --		

PRINCIPAL DIMENSIONS.

Length between perpendiculars.....	440	ft.	Breadth Moulded = B _o	60	ft.	Depth Moulded to Fbd. deck = D _o	32.34	ft.	
Length on Load Line.....	440	ft.	Thickness of Side plating in ins. x $\frac{3}{12}$ *.....	.67 x $\frac{5}{12}$	+ .17	ft.	Round of Beam.....	+ 1.21	ft.
	440		*($\frac{2}{12}$ if plating is joggled)				Depth from base line to top of inner bottom plating or ordinary floors -	33.55	ft.
Length for Freeboard = L.....	440	ft.	Breadth for Freeboard = B.....	60.17	ft.		Depth for Tonnage Coef. (Art. 39) = D	29.61	ft.

CORRECTION TO TONNAGE (Art. 39)

Tonnage between top of ceiling on double bottom or ordinary floors as fitted and standard level of
 Tonnage between top of ceiling (S) = **77.74** tons.
 Tonnage above 2nd Deck - See sketch below 515

DEPTH OF DOUBLE BOTTOM (Art. 39)

Depth of Actual Double Bottom (including plating) or Ordinary Floors **above T of L 47.25** ins.
 Depth of Standard Double Bottom (including plating) or Ordinary Floors **46.54** ins.
 Difference **.71**
 x 1/12 = **.06** = d.

SHEER (Arts. 39 and 60-63)

Ordinate	Height of Sheer in inches.	S.M.	Products
1		1	
2		4	
3		2	
4	As in Previous Report.	1	
5		2	
6		4	
7		1	

FRAMING (Art. 39)

Between Frames	Length in ft.	Depth of Frame in ins.	Thickness of Sparring in inches	Total depth in inches	Products ft. x inches

Sum of Products =
 Mean Height of Sheer = S = $\frac{\text{Sum of Products}}{18} = \frac{27.80}{18} = 1.54$ ins.
 Standard Mean Height = S_o = $\frac{1}{3}(L/10 + 10) = \frac{1}{3}(440/10 + 10) = 18.00$ ins.
 Difference **9.80** x 1/12 = **.82** ft. = d₁
 Correction (Arts. 60-63) = $\frac{3}{4}(1 - e)(S_o - S) = \frac{3}{4}(1 - e)(18.00 - 1.54) = -4.44$ ins.

Sum of Products =
 Sum of Products = Actual Mean Depth of framing **11.23** ins.
 Length of Ship = **9.00** ins.
 Standard " " " " **2.23** ins.
 Difference **2.23** x 2/12 = **.37** = 2b

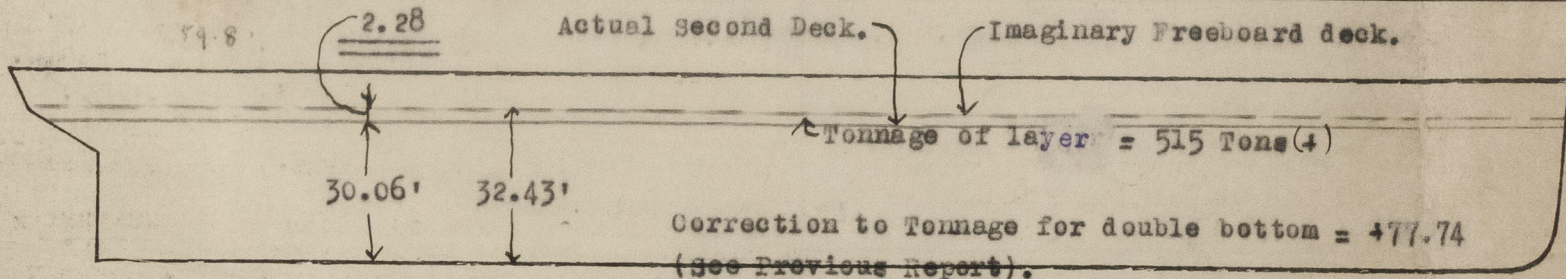
COEFFICIENT OF FINENESS (Art. 39 or 43)

$$\frac{100(V + v)}{L(B - 2b)(D + d + d_1) + n}$$

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 440 x 59.8 x 30.49 + 0 = .74

$$\text{or } \frac{35 \times \Delta}{L \times B_o \times d_o} + 0.04$$

= + 0.04 =



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

(*) Depth Moulded

Depth Moulded to C.S. deck = 40'-0.69"
 Wood Deck Correction = .21
 Thickness of Stringer Plate = .68
 40'-1.58

Imaginary Tween Deck 7'-6.00
 32'-7.58

Standard Wood Deck 3.5
 32'-4.08 = 32.34

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.

WOOD DECK (Arts. 5 and 6)			
	Mean Length in ft.	Thickness in ins.	Products
Forecastle	33.41	3.5-5.60-2.82	94.2
Bridge			
Poop or R.Q.D.			
Open Deck, fwd.			
.. .. aft.			
Total length = l =	Sum of Products =		94.2
Sum of Products = t =	ins. ; Sum of Products = .21 ins.		
l = Mean Thickness.			

CORRECTION FOR DEPTH & CORRECTION FOR FREEBOARD.
 If no sheathing fitted amidships = $t_1 = \pm$ ins. (Arts. 6 and 57 p. 1)
 If sheathing is fitted amidships = $(t - t_1) = \pm$ 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 to C.S. Deck 40'-0.69 ins.
 Thickness of Stringer Plate on C.S. Deck .68"
 Mean Depth to be corrected C.S. Deck 40'-1.58"
 less 7'-6" = 32'-7.58"
 Correction for partial wood deck \pm 7'-6.00"
 Depth to use in Freeboard Tables 32'-7.58" ins. = $D_1 = 32.63$ ft.

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

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

EFFECTIVE LENGTH (Arts. 55 and 56)				
	Mean Length	Coef. Art. 56	Height Coef.	Products.
Forecastle closed part				
.. open part				
Bridge closed part				
.. open part fwd.				
.. .. aft.				
Poop closed part				
.. open part				

Total Effective Length =
 $\frac{\text{Total Effective Length}}{\text{Length of Vessel}} = r =$
 Corresponding Coef. in Table (Art. 49) = e =
 Reduction for Complete Superstructure = ins.
 Correction for Superstructures = 39" 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. = $\frac{D_1 + 16}{300} (1 - e/2) (L - 12 D_1)$
 [Note e = 1.0 if more than 5/10 covered] = 3.93

Are the Engine and Boiler openings covered by a Bridge, Poop, Raised Quarter Deck or enclosed by a 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?
 State the vertical distance from base line at top of keel to lower edge of lowest side scuttle
 State if there are any cargo ports or scuppers through sides of vessel below upper deck
 State any special features in the construction of the vessel
 Sister vessels
 Fee, Yen. Depth of Keel ins. Draught (btm. keel) ft. ins.

CORRECTION FOR ROUND OF BEAM (Art. 59) C.S. Deck.
 Standard Round of Beam = Length of Beam in ins. = 14.4
 Correction = $\frac{1}{2} (\text{Standard Round of Beam} - \text{Actual Round of Beam})$
 = 14.4 - 14.51 = -.05 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	94.87	ins.	
	+	ins.	
Correction for Sheer			.44
.. .. Partial Wood Deck			39.00
.. .. Superstructures	3.93		.03
.. .. Proportions L/D			
.. .. Round of Beam			
.. .. Freeing Ports			
.. .. Access to Crew's Quarters	3.93		39.47
Totals			35.54
Net Correction			59.33
Geometric Freeboard			27.69
Corresponding Geometric Draught (mld.)			
Moulded Draught limited by (longitudinal strength) to			
Corresponding Freeboard (Summer)			59.3
Winter Freeboard (Art. 22) = $\frac{1}{2} (D_1 - 10) + \frac{r}{45} \times (59 - D_1)$			
= $\frac{1}{2} (32.63 - 10) + \frac{1}{45} \times (59 - 32.63) = 6.24$ ins.			
Tropical Freeboard (Art. 24) do. do. = - 6.24 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)			- 6.93 ins.
$\frac{1}{2}$ " per foot of Summer Draught =			

FREEBOARD TO BE ASSIGNED.
 Vertical distance from upper edge of horizontal line indicating the freeboard deck to the centre of the disc. (Summer Line) 59.3 ins.
 Fresh Water Load Line above centre of disc. 6.9 ins.
 Tropical Load Line above " " " 6.2 ins.
 Winter Load Line below " " " 6.2 ins.
 Winter N.A. Load Line below " " " ins.

Vertical distance from the point of intersection of the extended line of the upper surface of the C.S. 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 89.8 ins.

Depth Moulded to C.S. Deck = 40'-0.69"
 Thickness of C.S. stringer = .68"
 Depth for Freeboard. 40'-1.37"
 32'-7.58"
 7'-5.79"
 89.79" (*)

DETAILS OF CONSTRUCTION OF WEATHER DECK HATCHWAYS.

	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
Length and Breadth						
Height above deck and thickness of side and end coaming	See Previous Report.					
Shifting Beams { Number and Material Scantlings						
*Fore and Afters { Number and Material Scantlings						
Thickness of hatches						
Remarks						
* When the fore and afters are of wood the depth should be stated from the underside of hatches.						

LONGITUDINAL MODULUS.						Section at					
Height of Assumed Axis above base =											
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.					
" "						" " "					
" "						" " "					
" "						" " "					
" "						" " Str. Ang.					
Margin Plate						3rd Deck Str.					
" "						" " Plating					
" Angle						" " "					
Shell Strake A						" " "					
" " B						" " Str. Ang.					
" " C						Sheerstrake					
" " D						Strake below					
" " E						Shell Strake					
" " F						" "					
" " G						" "					
Totals below assumed axis						Totals above assumed axis					
" above assumed axis						Neutral Axis above below assumed axis (x) =					
Sum or Difference						Correction = $(\text{Total Area} \times x^2 \times 2) = -$					
Moment of Inertia about assumed axis = 2						Moment of Inertia about Neutral Axis					
						Distance from Neutral Axis to top of Strength deck beam at side = ft.					
						MODULUS OF SECTION =					
						Actual Modulus = 20.08					

DRAUGHT PERMITTED BY LONGITUDINAL STRENGTH (Arts. 81-86) =

TRANSVERSE MODULUS.
 Minimum Side Plating (Art. 77) $\frac{0.105 \times 440}{100} + 17 = .63$; Standard Frame Spacing (Art. 78) = $.025 \times 440 + 17 = 28$
 Actual Side Plating = .67; Actual Frame Spacing = 36
 If actual frame spacing exceeds the standard $\sqrt{\frac{\text{Actual frame spacing}}{\text{Standard frame spacing}}} = \sqrt{\frac{36}{28}} = 1.13$
 Moulded Geometric Draught (d) = 27.74; H = 16.29; f₁ = 24.80
 t = 5.27; K = 23.28; f₂ = 3.98
 d - t = 22.47; f₁ + f₂ = 28.78
 Standard $I/y = \frac{s(d-t)(f_1 + f_2)}{1000} = \frac{11 \times 36 \times (22.47 + 28.78)}{1000} = 25.3$
 Frame in ship = 11 x 36 N.B. at 36" spacing, $I/y = 25.3$
DRAUGHT PERMITTED BY TRANSVERSE STRENGTH $\frac{I/y \times 1000}{s(f_1 + f_2)} = \frac{25300}{36 \times 28.78} = 29.67$

