

J.87

LLOYD'S REGISTER OF SHIPPING.  
(CLASSIFICATION SOCIETY RECOGNISED BY THE JAPANESE GOVERNMENT)  
SURVEY FOR FREEBOARD.

Ship's Name "KIRISHIMA MARU"	Port of Registry --	Official No. --	No. in R.B. --	Gross Tonnage	Tonnage under Fbd. Deck = V 5371.15 <del>5574.78</del>	Date of Launch 3rd. April 1931.	Date when Built 1931	Report Number 79
Owners Kokusei Kisen Kaisha.		Builders Kawasaki Dockyard Co.		Yard No. 563		Port of Survey Kobe.		
Type of vessel Shelter Deck.	Particulars of Classification * 100 A. 1. With Freeboard		Position of Freeboard Deck 2nd. Deck.		Date of Survey While building.			
					Name of Surveyor M.M. Parker & H. J. Cox.			

PRINCIPAL DIMENSIONS.

Length between perpendiculars.....440.....ft.	Breadth Moulded = B <sub>o</sub> .....60.....ft.	Depth Moulded to Fbd. deck = D <sub>o</sub> .....30.06.....ft.
Length on Load Line.....440.....ft.	Thickness of Side plating in ins. x 3/12 * .67" x 3/12 + .17.....ft.	Round of Beam.....14 1/2".....+ 1.21.....ft.
Length for Freeboard = L.....440.....ft.	Breadth for Freeboard = B.....60.17.....ft.	Depth from base line to top of inner bottom plating or ordinary floors.....31.27.....ft.
		Depth for Tonnage Coef. (Art. 39) = D.....27.33.....ft.

CORRECTION TO TONNAGE (Art. 39)

Tonnage between top of ceiling on double bottom  
or ordinary floors as fitted and standard level of  
top of ceiling (v) = + 77.74 tons.

DEPTH OF DOUBLE BOTTOM (Art. 39)

Depth of Actual Double Bottom  
(including plating) or Ordinary Floors above T. of K. 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	108.75	1	108.75
2	49.69	4	198.76
3	12.38	2	24.76
4	0	4	0
5	6.00	2	12.00
6	25.06	4	100.24
7	55.81	1	55.81
Sum of Products =			500.32

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
AP-9, 151	41.0	8	0	8.00	328.00
9-15	13.5	11	.5	11.5	155.25
15-28	39.0	12	.5	12.5	487.50
28-57, 96-131	134.5	11	.5	11.5	2121.75
57-66, 84-96	63.0	11	0	11.0	693.00
66-84	54.0	11	0	11.0	594.00
131-151	45.0	12	.5	12.5	562.50
Sum of Products =					4942.00

Mean Height of Sheer = S =  $\frac{\text{Sum of Products}}{18}$  = 27.80 ins.  
Standard Mean Height = S<sub>o</sub> =  $\frac{1}{3}(L/10 + 10)$  = 18.00 ins.  
Difference 9.80 x 1/12 = .82 ft. = d<sub>1</sub>  
Correction (Arts. 60-63) =  $\frac{2}{3}(1 - e)(S_o - S)$  = 2x.06" x 9.8 = .44 ins.

Sum of Products = Actual Mean Depth of framing 11.23 ins.  
Length of Ship  
Standard ,, ,, 7' 2" = 9.00 ins.  
Difference 2.23 x 2/12 = .37 = 2b

COEFFICIENT OF FINENESS (Art. 39 or 43)

$\frac{100(V + v)}{L(B - 2b)(D + d + d_1) + n}$ $= \frac{544889}{440 \times 59.8 \times 28.21} + = .73$	or	$\frac{35 \times \Delta}{L \times B_o \times d_o} + 0.04$ $= + 0.04 =$
---	----	--

Corrections to Tonnage fro double bottom = +77.74

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.



WOOD DECK (Arts. 5 and 6)			
	Mean Length in ft.	Thickness in ins.	Products
Forecastle	440-4'	3.5	1540
Bridge	436'	3.5	1526
Poop or R.O.D.		3.06	1334.16
Open Deck, Ford.			
.. .. aft.			

Total length =  $l =$  Sum of Products = 1334.16  
Sum of Products =  $t =$  ins.; Sum of Products =  $t_1 = 3.03$  ins.

**CORRECTION FOR DEPTH & CORRECTION FOR FREEBOARD.**  
If no sheathing fitted amidships =  $t_1 = \pm 3.03$  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 = 30 ft. 0.69 ins.  
Thickness of Stringer Plate = .44  
Thickness of Wood Deck Amidships = 0  
Correction for partial wood deck =  $\pm 3.03$   
Depth to use in Freeboard Tables = 30 ft. 4.16 ins. =  $D_1 = 30.35$  ft.

SUPERSTRUCTURES.				
HEIGHT (Arts. 46-48)				
Standard Height = $(0.018 L + 1.2)$ ft. = 7.5 ft.				
	Complete Superstructure	Forecastle	Bridge	Poop or R.O.D.
Actual		About 10.0'	10.0'	
Standard			7.5	

CLOSING APPLIANCES (Arts. 50 and 54)			
	Forecastle	After Bridge Well	Poop or Raised Quarter Deck
Means of Closing openings in bulkhead		wood shiftwood shifting Boarding Boards in Channels	
Corresponding Class	II	II	

EFFECTIVE LENGTH (Arts. 55 and 56)				
	Mean Length	Coef. Art. 56	Height Coef.	Products.
Forecastle closed part	411.89	1.0	1	411.89
Bridge closed part				
.. open part	.53	.75	1	.40
.. .. aft.				
Poop closed part	22.92	1.00	1	22.92
.. open part	.66	.50		.33

Total Effective Length = 435.54  
Total Effective Length =  $r =$  440  
Length of Vessel = .940  
Corresponding Coef. in Table (Art. 49) =  $e =$  .940  
Reduction for Complete Superstructure = 39" ins.  
Product = 36.66 ins.  
Correction for Superstructures = -36.66 ins.

**EFFECTIVE LENGTH (Shelter Deck Vessels Arts. 67-92)**  
 $l + \frac{1}{2}(1 - p)(L - l) = 435.524.5 \times 440 = 437.75$  ft.  
(\* See Art. 90)

**CORRECTION FOR PROPORTIONS L/D (Art. 56)**  
When  $D_1$  is less than 35 ft. =  $\frac{D_1 + 16}{300} (1 - e/2) (L - 12 D_1)$   
" " " greater than 35 ft. =  $\frac{0.17 (1 - e/2) (L - 12 D_1)}{40.22 (1 - e/2) (440 - 364.2)} = 5.86$   
[Note  $e = 1.0$  if more than 5/10 covered] = 300

Are the Engine and Boiler openings covered by a Bridge, Poop, Raised Quarter Deck or enclosed by a strong steel deck house? By Shelter Deck.  
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 All above Freeboard deck.  
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 Uruga Dock Co. No. 374.  
Fee. Yen. Depth of Keel ins.; Draught (btm. keel) ft. ins.

**CORRECTION FOR ROUND OF BEAM (Art. 59)**  
Standard Round of Beam = Length of Beam in ins. = 720  
50 = 14.4 ins.  
Correction =  $\frac{1}{2}$  (Standard Round of Beam - Actual Round of Beam) =  $\frac{1}{2} (14.4 - 11.5) = .03$  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?  
Height and breadth of gangway  
Correction =  $.012 (80 - l) D_1$  or  $1.2 (r - 0.5) D_1$   
= + ins.

**SUMMARY.**  
Freeboard by Tables = 83.94 ins.  
Correction for Sheer = .44  
" " Partial Wood Deck = 3.03  
" " Superstructures = 36.66  
" " Proportions L/D = 5.86  
" " Round of Beam = .03  
" " Freeing Ports  
" " Access to Crew's Quarters = 5.86  
Totals = 40.16  
Net Correction = 34.30  
Geometric Freeboard = 49.64 ins.  
Corresponding Geometric Draught (mld.) = 25.96 ft.  
Moulded Draught limited by (form) to 25.96 ft.  
Corresponding Freeboard (Summer) = 49.6 ins.

Winter Freeboard (Art. 22) =  $\frac{1}{2} (D_1 - 10) + \frac{r}{45} (59 - D_1)$   
=  $\frac{1}{2} (20.35 - 10) + \frac{99}{45} (20.65 - 10) = 5.72$  ins.

Tropical Freeboard (Art. 24) do. do. = - 5.72 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 = - 6.49 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) = 49.6 ins.  
Fresh Water Load Line above centre of disc. = 6.5 ins.  
Tropical Load Line above " " " = 5.7 ins.  
Winter Load Line below " " " = 3.7 ins.  
Winter N.A. Load Line below " " " = 0.00 ins.  
Vertical distance from the point of intersection of the extended line of the upper surface of str. plate of the Second 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.

	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
Length and Breadth	29'3"x18'0"	36'0"x20'0"	30' x 20'		36' x 20'	29'3"x20'
Height above deck and thickness of side and end coaming	50"x.48 side x.44 end	50"x.48 side x.44 end	30"x.48 side x.44 end	same as No. 3	30"x.48 side x.44 end	30"x.48 side x.44 end
Shifting Beams	Five steel 16x.36 plate 4x3x.44 Angle	Seven steel 16.5x.36 4x3x.44	Five steel 13 x.34 4x3x.44		Seven steel 13 x.32 4x3x.44	Five steel 13 x.34 4x3x.44
*Fore and Afters	Number and Material Scantlings		NONE			
Thickness of hatches	All 3"					
Remarks						

**LONGITUDINAL MODULUS. (Minimum)**  
Height of Assumed Axis above base = 16.0'  
Engine Room with double Section at bottom as in hold.

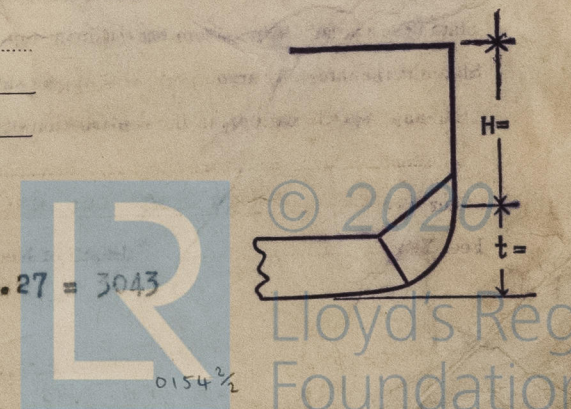
BELOW ASSUMED AXIS.						ABOVE ASSUMED AXIS.					
Item	Scantlings	Area	Lever	Moment	Mt. of Inertia	Item	Scantlings	Area	Lever	Moment	Mt. of Inertia
Flat Keel	54x.84x(1)	22.7	16.1	365	5880	Top Deck Str.	63.5x.68	43.2	24.1	1041	25090
" "						" " "					
Centre Girder	46.07x.62x(1)	14.5	14.1	204	2880	" " Plating	69.5x.58	40.3	24.5	987	24190
C.G. btm. ang.	5x5x.65x(1)	3.0	15.9	48	760	" " "	69.5x.58	40.3	24.8	999	24790
C.G. top angles	1x3x.56x(1)	1.8	12.3	22	270	" " "	22.5x.58	13.1	25.0	328	8190
T.T. Cr. Strake	72x.56x(1)	20.2	12.1	244	2960	" " Str. Ang.	5x6x.70	7.9	23.8	188	4470
T.T. plating	74x.50					2nd Deck Str.	42 x.44	18.5	14.9	263	3730
" "	74x.50					" " Plating	70.25x.42	29.5	14.5	428	6200
" "	74x.50	148.9	12.2	1831	22530	" " "	70.25x.42	29.5	14.9	440	6550
" "	75.75x.50					" " "	33x.42	13.9	15.0	209	3130
Flange	5.25x.50	2.6	12.2	32	390	" " Str. Ang.					
Margin Plate	59x.58	22.6	13.9	314	4370	3rd Deck Str.	42x.34	14.3	5.6	80	450
Flange	5.25x.58	3.0	12.2	37	450	" " Plating	70x.30	21.0	5.6	118	660
" Angle	3x3x.56	3.6	15.2	55	830	" " "	70.25x.30	21.8	5.7	124	710
Shell Strake A	84x.69	58.0	16.0	928	14850	" " "	32.75x.30	9.8	5.8	57	330
" " B	84x.69	58.0	15.9	922	14660	" " Str. Ang.					
" " C	84x.69	58.0	15.9	922	14660	Sheerstrake	51.5x.80	41.2	21.9	902	19760
" " D	84x.69	58.0	15.6	905	14120	Strake below	57x.76	43.3	18.0	779	14030
" " E	84x.69	58.0	12.7	737	9350	Shell Strake J	84x.67	56.3	12.7	715	9080
" " F	72x.67	48.2	6.8	328	2230	" " H	84x.67	56.3	6.3	355	2230
" " G	84x.67	56.3	.3	17	10	" "					
Totals below assumed axis		637.4		7911	111200	Totals above assumed axis		500.2		8013	153590
" above assumed axis		500.2		8013	153590						
Sum or Difference		1137.6		102	264790						

Moment of Inertia about assumed axis = 529580  
Neutral Axis above assumed axis (x) = .0897  
Correction =  $(\text{Total Area} \times x^2 \times 2) = - 182.8$   
Moment of Inertia about Neutral Axis = 529400  
Distance from Neutral Axis to top of Keel = 23.91 ft.  
MODULUS OF SECTION = 22140  
Actual Modulus = 22140  
f. B. = 13.1460 = 28.08'

**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  $\sqrt{\frac{\text{Actual frame spacing}}{\text{Standard frame spacing}}} = \sqrt{\frac{.36}{.28}} \times .63 = .71$   
Moulded Geometric Draught (d) = 25.96 H = 16.29 f<sub>1</sub> = 24.80  
t = 5.27 K = 20.50 f<sub>2</sub> = 3.15  
d - t = 20.69 f<sub>1</sub> + f<sub>2</sub> = 27.95

Standard I/y =  $\frac{s(d-t)(f_1 + f_2)}{1000} =$   
Main Frame in ship = 11x3x.54 R.B.A. at 36" spacing, I/y = 25.3  
DRAUGHT PERMITTED BY TRANSVERSE STRENGTH =  $\frac{I/y \times 1000}{s(f_1 + f_2)} + t = \frac{25300}{36 \times 27.95} + 5.27 = 3043$



Lloyd's Register Foundation