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LLOYD'S REGISTER OF SHIPPING.

(CLASSIFICATION SOCIETY RECOGNISED BY THE JAPANESE GOVERNMENT)

SURVEY FOR FREEBOARD.

PROVISIONAL

Ship's Name M.B.Z.K. 471-2-3-4	Port of Registry --	Official No. --	No. in R.B. --	Gross Tonnage About 3400	Tonnage under Fbd. Deck = V	Date of Launch	Date when Built Building	Report Number 62
Owners Osaka Shosen Kaisha.		Builders Mitsubishi Zosen Kaisha. Nagasaki.		Yard No. 471- 2-3-4.		Port of Survey Nagasaki.		
Type of vessel Complete superstructure Tween deck height 8'6"		Particulars of Classification * 100 A. 1. With Freeboard		Position of Freeboard Deck Assumed at 7'6" below corrected U.S. Deck.		Date of Survey Provisional Name of Surveyor G. Anderson & H. J. Cox.		

PRINCIPAL DIMENSIONS.

Length between perpendiculars 445 ft.	Breadth Moulded = B _o 60.5 ft.	Depth for Freeboard = 33.37 See over. Less assumed 3 1/2" wood deck = 33.08 ft.
Length on Load Line 445 ft.	Thickness of Side plating in ins. x 3/12" + ft.	Depth Moulded to Fbd. deck = D _o 33.08 ft.
Length for Freeboard = L 445 ft.	* (2/12 if plating is joggled)	Round of Beam + ft.
	Breadth for Freeboard = B 60.5 ft.	Depth from base line to top of inner bottom plating or ordinary floors - ft.
		Depth for Tonnage Coef. (Art. 39) = D - 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) = tons.

DEPTH OF DOUBLE BOTTOM (Art. 39)

Depth of Actual Double Bottom
(including plating) or Ordinary Floors ins.
Depth of Standard Double Bottom
(including plating) or Ordinary Floors ins.
Difference
x 1/12 = = d.

SHEER (Arts. 39 and 60-63)

Ordinate	Height of Sheer in inches.	S.M.	Products
1		1	
2		4	
3		2	
4		4	
5		2	
6		4	
7		1	
Sum of Products =			
Mean Height of Sheer = S = $\frac{\text{Sum of Products}}{18}$ = ins.			
Standard Mean Height = S _o = $\frac{1}{3}(L/10 + 10)$ = ins.			
Difference x 1/12 = ft. = d ₁			
Correction (Art. 60-63) = $\frac{2}{3}(1 - e)(S_o - S)$ = ins.			

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

COEFFICIENT OF FINENESS (Art. 39 or 43)

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

$$d_o = 85\% \text{ of } 33.08 = 28.12$$

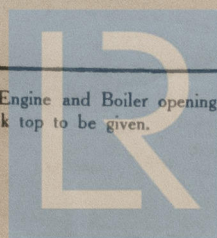
$$\text{or } \frac{35 \times \Delta}{L \times B_o \times d_o} + 0.04$$

$$= \frac{35 \times 15.455}{445 \times 60.5 \times 28.12} + 0.04 = .75$$

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

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C.S. Deck. WOOD DECK (Arts. 5 and 6) Correction.

	Mean Length in ft.	Thickness in ins.	Products
Forecastle	39.9	3.56	
Bridge		2.84	113.3
Poop or R.Q.D.			
Open Deck, fwd.	79.75	3	239.25
.. .. aft.			

Total length = $l =$ Sum of Products = **352.55**
Sum of Products = $t =$ ins.; Sum of Products = $t_1 = .79$ ins.
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 **40.9** ft. ins.
Thickness of Stringer Plate on C.S. Dk. **.66** ins.
Mean Thickness of Wood Deck **.79** ins.
Depth to corrected C.S. Dk. **40.10.45**
less 7.6
7.6.00
33 ft. 4.45 ins. = $D_1 = 33.37$ 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)

Means of Closing openings in bulkhead	Forecastle		Bridge		Poop or Raised Quarter Deck
	Forward End.	Aft End.	Forward End.	Aft End.	
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 = $r =$ Length of Vessel
Corresponding Coef. in Table (Art. 49) = $e =$

Reduction for Complete Superstructure

Complete product

Correction for Superstructures \times

EFFECTIVE LENGTH (Shelter Deck Vessels Arts. 87-92)
 $l + \frac{1}{2}(1 - p)(L - l) =$

(* See Art. 90)

CORRECTION FOR PROPORTIONS L/D (Art. 58)
When D_1 is less than 35 ft. = $\frac{D_1 + 16}{300}(1 - e/2)(L - 12 D_1)$
.. .. ~~49.37~~ $\times 4.56 = 3.67$ ins.
[Note: $e = 1.0$ if more than 5/16 covered]

CORRECTION FOR ROUND OF BEAM (Art. 59) C.S. Deck.
Standard Round of Beam = Length of Beam in ins. = **14.52** ins.
Correction = $\frac{1}{2}(\text{Standard Round of Beam} - \text{Actual Round of Beam})$
= $\frac{1}{2}(14.52 - 12) = 1.26$ 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 $1.2(r - 0.5) D_1 = +$

CORRECTION FOR ACCESS TO CREW'S QUARTERS (Arts. 65-67)
Are Crew berthed in Bridge House or Forecastle?

Height and breadth of gangway

Correction = $-0.12(80 - l) D_1$ or $1.2(r - 0.5) D_1$

SUMMARY.

Freeboard by Tables	98.80
Correction for Sheer	+
.. Partial Wood Deck	39.00
.. Superstructures	
.. Proportions L/D	3.67
.. Round of Beam	.63
.. Freeing Ports	-
.. Access to Crew's Quarters	-
Totals	4.30 39.00
Net Correction	34.70
Geometric Freeboard	64.10 ins.
Corresponding Geometric Draught (mld.)	28.03 ft.
Moulded Draught limited by $\frac{1}{2}(D_1 + 10) + \frac{r}{45}(59 - D_1)$ to	28.03 ft.
Corresponding Freeboard (Summer)	64.10 ins.
Winter Freeboard (Art. 22) = $\frac{1}{2}(D_1 + 10) + \frac{r}{45}(59 - D_1)$	
= $\frac{1}{2}(33.37 + 10) + \frac{34.70}{45}(59 - 33.37) = + 6.40$ ins.	
Tropical Freeboard (Art. 24) do. do.	= - 6.40 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)	15.440
$\frac{1}{4}$ " per foot of Summer Draught = $\frac{40 \times 53}{400} = - 7.28$ 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) **64.10** ins.

Fresh Water Load Line above centre of disc. **7.3** ins.

Tropical Load Line above

Winter Load Line below

Winter N.A. Load Line below

Vertical distance from the point of intersection of the extended line of the upper surface of sheathing 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 **92.2** ins. (*)

Depth Moulded to C.S. Deck = **40.9** ft.
Thickness of Stringer plate **.66** ins.
Actual thickness wood amids. **3.00** ins.
Ass. Freeboard Dk. above top keel (D) **41.0.66**
33.4.45
7.8.21
(*) = 92.2"

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

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 **No scuttle in shell.** (*)

State if there are any cargo ports or scuppers through sides of vessel below upper deck **None.**

State any special features in the construction of the vessel **W.T. Bulkheads extend to 2nd deck i.e. 32'3" above keel**

Weather deck hatch beams scantlings as per Complete Superstructure deck.

Sister vessels

Fee, Yen

Depth of Keel

Draught (btm. keel)

DETAILS OF CONSTRUCTION OF WEATHER DECK HATCHWAYS.

	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
Length and Breadth	27 x 20	35'9" x 20	35'9" x 20	24'9" x 20	33'10" x 20	24'9" x 20
Height above deck and thickness of side and end coaming	30 x .44	30" x .44	30" x .44	30" x .44	30" x .44	30" x .44
Shifting Beams	Number and late Material Six 15 x .34	seven 16 1/2" x .35	seven 13 x .34	four 13 x .34	Six 13 x .34	four. 13 x .34
	Scantlings angles 4 x 3 x .44	4 x 3 x .44	4 x 3 x .44	4 x 3 x .44	4 x 3 x .44	4 x 3 x .44
*Fore and Afters	Number and Material Scantlings		None			
Thickness of hatches	3" O.P.	3" O.P.	3" O.P.	3" O.P.	3" O.P.	3" O.P.
Remarks	Shifting beams as for Complete Superstructure Type.					
* When the fore and afters are of wood the depth should be stated from the underside of hatches.						

top of keel LONGITUDINAL MODULUS.
Height of Assumed Axis above keel = **least 16.3**

Section at **Engine Opening.**

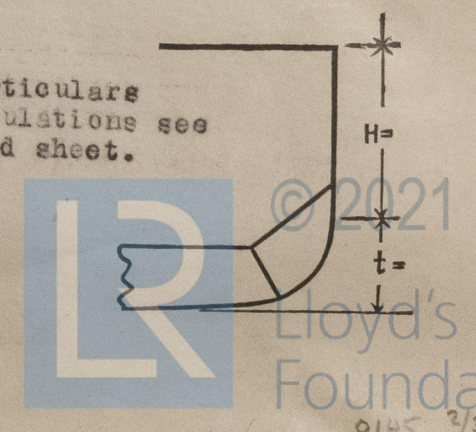
BELOW ASSUMED AXIS.						ABOVE ASSUMED AXIS.					
Item	Scantlings	Area	Lever	Moment	Mt. of Inertia	Item	Scantlings	Area	Lever	Moment	Mt. of Inertia
Flat Keel	55 x .85 x 1/2	23.4	16.3	381	6210	Top Deck Str.	64 x .66	42.2	24.6	1038	25530
" "	" "	" "	" "	" "	" "	" Plating	62.5 x .49	30.6	24.8	759	18820
Centre Girder	60 x .62 x 1/2	18.6	13.8	257	3550	" "	62.5 x .49	30.6	25.0	765	19130
C.G. btm. ang.	5 x 5 x .66 x 1/2	3.1	16.2	50	810	" "	62.5 x .49	30.6	25.2	771	19430
C.G. top angles	3 x 3 x .56 x 1/2	1.8	11.4	21	240	" " Str. Ang.	27.0 x .49	13.2	25.4	335	8510
T.T. Cr. Strake	100 x .56 x 1/2	28.0	11.3	316	3570	" "	6 x .66	7.5	24.6	185	4550
T.T. plating	61					2nd Deck Str.	52 x .44	22.9	16.0	366	5860
" "	69					" Plating	62.5 x .40	25.0	16.0	400	6400
" "	69	1.48	135.5	11.3	1531	" "	73.5 x .40	29.4	16.0	470	7520
" "	69					Str. Plg.	3" x .44	1.3	16.1	21	340
" "	14.25					" Str. Ang.	"				
Margin Plate	57.5 x .56	32.2	13.2	425	5610	3rd Deck Str.	42 x .34	14.3	7.0	100	700
Gusset	12 x .48	5.8	11.0	64	700	" Plating	50 x .30	15.0	7.0	105	740
" Angle	5 x 5 x .56 x 2	10.6	13.2	140	1850	" "	67 x .30	20.1	7.0	141	990
Shell Strake A	72 x .67	48.2	16.2	781	12650	" "	"				
" B	71.5 x .67	47.9	16.2	776	12570	" " Str. Ang.	"				
" C	72 x .67	48.2	16.0	771	12340	Sheerstrake	71.5 x .78	55.8	22.3	1244	27740
" D	71.5 x .67	47.9	16.0	766	12260	Strake below	72 x .65	46.8	16.8	786	13200
" E	52.75 x .67	35.3	15.8	558	8320	Shell Strake	71.5 x .65	46.5	11.3	525	5930
" F	58 x .67	38.9	14.0	545	7630	" "	72 x .65	46.8	5.7	267	1520
" G	52.5 x .65	34.1	10.1	344	3470	" "	38.2 x .65	24.8	1.6	40	60
" H	72 x .65	46.8	5.3	248	1310	Totals below assumed axis					
" I	33.3 x .65	21.6	1.4	30	40	" above assumed axis					
Totals below assumed axis		627.9		8004	110930						
" above assumed axis		503.4		8318	166970						
Sum or Difference		1131.3	278	314	277900						
Moment of Inertia about assumed axis						555800					
						170					
						555630					
DRAUGHT PERMITTED BY LONGITUDINAL STRENGTH (Arts. 81-86) =						22987					
						f. B. 13.39 x 60.5					

TRANSVERSE MODULUS.

Minimum Side Plating (Art. 77) $\frac{0.105445}{100} + \frac{17}{100} = .637$; Standard Frame Spacing (Art. 78) = $.025445 + \frac{17}{100} = .28.125$
Actual Side Plating = **65**; Actual Frame Spacing = **33"**
If actual frame spacing exceeds the standard $\sqrt{\frac{\text{Actual frame spacing}}{\text{Standard frame spacing}}}$ $t =$

Moulded Geometric Draught (d) = H = f₁ =
t = K = f₂ =
d - t = f₁ + f₂ =
Standard I/y = $\frac{s(d-t)(f_1 + f_2)}{1000} = \frac{33 \times 21.6 \times 30.17}{1000} = 21.52$
Frame in ship = at spacing, I/y =
DRAUGHT PERMITTED BY TRANSVERSE STRENGTH = $\frac{I/y \times 1000}{s(f_1 + f_2)} + t =$

For particulars of Calculations see attached sheet.



TRANSVERSE STRENGTH.

	IN WAY OF WING F.O. TANK	IN CARGO HOLD	IN ENGINE ROOM
FRAMES	10"x3½"x.42"B.A.	11"x3½"x.58"B.A.	11"x3½"x.52B.A.
I/Y OF FRAMES	17.6.	26.65	24.65
(H) IN FT.	8.17	17.92	16.88
(K) IN FT. (Depth Mld.to Fbd Dk. = 33.08')	33.58	22.33	22.33
(f 1)	11.13	29.28	26.42
(f 2)	8.29	3.70	3.70
$f_2 \times \frac{20'3"}{20'0"} = f_2 \times 1.0125$	--	3.75	--
(f 1 + f 2)	19.42	33.03	30.12
(f 1 + f 2) x S (S = 33")	640.86	1089.99	993.96
1000 M	17,600	26650	24650
$\frac{1000 M}{S \times (f 1 + f 2)}$	27.48	24.45	24.8
(t) IN FT.	3.83	5.33	6.37
DRAUGHT PERMITTED BY TRANSVERS STRENGTH	31.31	29.78	31.17
REQUIRED DRAUGHT	28.03	28.03	28.03

C.G. top angles

3½"x3½"x56x½

1.8

11.4

21

240

" " " 27.0 x .49

Str. Ang

13.2

25.4

335

8510

24.6

185

4550