

J. 2.

LLOYD'S REGISTER OF SHIPBUILDING

CLASSIFICATION SOCIETY RECOGNISED BY THE JAPANESE GOVERNMENT

FREEBOARD COMPUTATION SHEETS JAPANESE VESSELS

548.	VESSEL'S NAME Belfast Maru (Yard No. 480)	PORT OF SURVEY Kobe	DATE OF REPORT 4th May 1922.
	Tonnage, Gross 6586.4	UNDER DE 6157.33	NAME OF SURVEYOR A. Watt.
	PORT OF REGISTRY Kobe		
	OWNERS Kawasaki Dockyard Co., Ltd.		
	TRADING Cargo.		
	PLAYING LIMITS Ocean going.		
	BUILDERS Kawasaki Dockyard Co., Ltd.		
	DATE WHEN BUILT 1922.	LAUNCHED 14th March 1922.	

Lloyds 100A1 Awning Deck "with Freeboard".
Jishinsho Rule 1st class.

Awning Deck.

Awning Deck.

PRINCIPAL DIMENSIONS

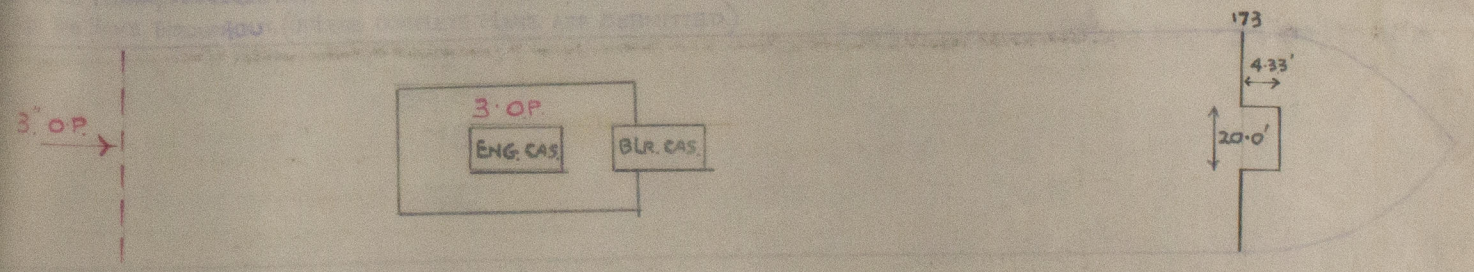
REGISTERED	405	BREADTH, MOULDED	=	53.0	DEPTH, MOULDED	37	0
LOAD LINE	404.64	THICKNESS SIDE PLATING			THICKNESS SIDE PLATING		.54
		IN INS. $\frac{1}{2} = .64$.16	THICKNESS WOOD DECK		✓
		OR IF			CORRECTOR FOR INITIAL		.48
		MOULDED $\frac{1}{2} =$ ✓			WOOD MOULDED SURGE		
					STRUCTURE (CROSS 5-4)		
					CORRECTED DEPTH	37	1.02
FOR FREEBOARD	404.64	BREADTH FOR FREEBOARD	53.16		DEPTH FOR FREEBOARD	37.09	

COMPARISON OF DIMENSIONS (ART. 39)

$$\frac{D(V \pm v)}{(D - 2v)(D + 4v + d)} = \frac{6157.33}{404.64 \times 53.16 - .46 \times 34.52 - .09 \times .68} + 0 = .82$$
$$\frac{43.5 - 44.52}{12} = -.09$$
$$\frac{405 \times .04 \times 30}{100} = 5.0$$

ACTUAL	11.27	DEPTH TO TOP OF DECK	46.50
STANDARD	8.50	DEPTH TO TOP OF DECK	47.02
DISTANCE	2.77	DEPTH TO TOP OF DECK	.52
ACTUAL	24.98	DEPTH TO TOP OF DECK	
STANDARD	16.83	DEPTH TO TOP OF DECK	
DISTANCE	8.15	DEPTH TO TOP OF DECK	

$\frac{1}{2} = 2.77$ FOR VESSELS WITH DOUBLE BOTTOMS
 $\frac{1}{2} = 8.15$ FOR VESSELS WITH ORDINARY FLOORS



Hull Top:- 2 1/2" ceiling on 2" Cross Battens Throughout.

DATE	TIME OF DAY	LOCATION
30.88	3.5-46=3.04 (assume)	93.88
33.96	3.0	101.88

$$L = 64.84$$

4 Sum of products = 195.76

195.76
405.64 48

	Mean length	Cost Art. 90	Height cost	Product
1st part	28.60	1.00	.77	22.02
2nd part	2.28	.75	.77	1.32
Total				23.34

10% of 23.34

16.34

404.64

1214 (177.50) = 0.02
39.00

39.00
48

SUMMARY OF COMPUTATION

FREEBOARD BY THE TABLES 120.21 ins.

Correction for Partial Wood Deck	✓	48
Superstructures	✓	78
Proportions $\frac{1}{2}$ D.	✓	6.81
Round of Beam	✓	19
Shear	✓	5.99
Freeing ports, etc.	✓	✓
Totals	✓	14.25
Net correction		-14.25

Vertical distance from upper edge of central line indicating the height of the centre of the disc (centre of buoyancy)	105.96 ins. 106.0 *
Vertical distance from centre of disc to the Fresh Water line	6.9 ins. measured upward
Vertical distance from centre of disc to the Tropical Load line	6.8 ins. measured upward
Vertical distance from centre of disc to the Winter Load line	6.8 ins. measured downward
Vertical distance from centre of disc to Winter N.A. Load line	✓ ins. measured downward
Vertical distance from a point of section of the vertical line of upper surface of steel	0.00
Crowning draft at the midline of the vessel with the centre of shell plating to the upper of the horizontal line indicating the freeboard deck.	ins. measured upward

Corresponding Geometric Draught = 28.21'

SIDE FRAMING

DESCRIPTION OF FRAMING	SIZE OF FRAMING	QUANTITY	WEIGHT
do.	$9\frac{1}{2} \times 3\frac{1}{2} \times 55$ B.A.	✓	$312.0 \times 9.5 = 2965$
up. Space.	$10 \times 3\frac{1}{2} \times 3\frac{1}{2} \times 50$ L, $3\frac{1}{2} \times 3\frac{1}{2} \times 50$	Upper deck	$52.0 \times 10.0 = 520$
Peak.	$7 \times 3\frac{1}{2} \times 44$ B.A.	✓	$22.21 \times 7.0 = 155$
Peak.	$6 \times 3\frac{1}{2} \times 38$ angle, $3\frac{1}{2} \times 3 \times 38$	Upper deck	$12.79 \times 6.0 = 113$

Total side bracing above top of tank =

$$\begin{array}{r}
 405 \overline{) 3753} \\
 \underline{9.27 \text{ mean}} \\
 \text{Spacing } \underline{2.00} \\
 \underline{11.27}
 \end{array}$$

* Draught limited by Longitudinal strength
to 27.77 ft = 27'-9.24"

Corresponding Freeboard = $37'-0.54" - 27'-9.24"$
= $9'-3.3" = 111.3"$

STRENGTH VALUES

Standard Longitudinal Modulus (Art. 75 & 76)

$$\frac{I}{y} = f \cdot d \cdot B = 11.46 \times 28.21 \times 53.0 = 17140$$

Actual Modulus = 16880

Standard thickness side plating (Art. 77)

$$\frac{0.105L + 17}{100} = \frac{0.105 \times 28.21 + 17}{100} = 0.297$$

Actual thickness =

Standard frame spacing (Art. 78)

$$\frac{0.002L + 17}{100} = \frac{0.002 \times 28.21 + 17}{100} = 0.17$$

or 0.17 if L be not greater than 160 ft =

Actual frame spacing =

When the frame spacing exceeds the standard, the standard thickness of side plating is to be taken as

$$\sqrt{\frac{S}{S_0}} \times t = \sqrt{\frac{11.27}{0.297}} \times 0.297 = 0.51 \text{ ins.}$$

S = Actual frame spacing

S₀ = Standard frame spacing

t = Standard thickness side plating

Standard Transverse Modulus (Arts. 79 & 80)

$$\frac{S \cdot (d-1) \cdot (f_1 + f_2)}{1000} = \frac{11.27 \cdot (53.0 - 1) \cdot (11.46 + 11.46)}{1000} = 16880$$

Actual Transverse Modulus =

DRAUGHT DUE TO LONGITUDINAL STRENGTH (Art. 81)

$$\text{Draught} = \frac{M}{f \cdot B} = \frac{16880}{11.46 \times 53.0} = 27.77 \text{ ft.}$$

DRAUGHT DUE TO TRANSVERSE STRENGTH (Art. 84)

$$\text{Draught} = \frac{1000M}{S(f_1 + f_2)} = \frac{1000 \times 16880}{11.27 \cdot (11.46 + 11.46)} = 27.77 \text{ ft.}$$

© 2020

Lloyd's Register
Foundation

