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R.M.C. No. 59710

No. 9849

REPORT ON REFRIGERATING MACHINERY AND APPLIANCES.

(Received at London Office

-2 NOV 1936)

Date of writing Report 9-10-1936 When handed in at Local Office 9-10-36 Port of Calcutta

No. in Reg. Book. Survey held at Calcutta Date: First Survey 2-7-36 Last Survey 2-10-1936
79883 (No. of Visits 12)

on the Refrigerating Machinery and Appliances of the S.S. "MASULA" Tons { Gross 7326
Net 4566

Vessel built at Glasgow By whom built Barclay Curlew & Co Yard No. _____ When built 1919-6

Owners British India Steam Navigation Co Ltd Port belonging to Glasgow Voyage _____

Refrigerating Machinery made by J & E Hall Ltd Machine No. 9507 When made 1936

Insulation fitted by Garden Reach Workshops When fitted October 1936 System of Refrigeration CO₂ + Brine

Method of cooling Cargo Chambers Brine grids + air circulation Insulating Material used Granulated + Slab cork

Number of Cargo Chambers insulated 5 Total refrigerated cargo capacity 10,170 cubic feet.

DESCRIPTION OF REFRIGERATING MACHINERY. Where placed Main deck P+S of engine casing

Refrigerating Units, No. of _____ Single, double, or triple _____ Cubic feet of air delivered per hour _____

Total refrigeration or ice-melting capacity in tons per 24 hours _____ Are all the units connected to all the refrigerated chambers _____

Compressors, driven direct or through ^{single}/_{double} reduction gearing. Compressors, single or double acting _____ No. of cylinders _____

Diameter of cylinders _____ Diameter of piston rod _____ Length of stroke _____ No. of strokes per minute _____

Motive Power supplied from _____

Steam Engines, high pressure, compound, or triple expansion, surface condensing. No. of cylinders _____ Diameter _____

Length of stroke _____ Working pressure _____ Diameter of crank shaft journals and pins _____

Breadth and thickness of crank webs _____ No. of sections in crank shaft _____ Revolutions of engines per minute _____

Oil Engines, type _____ 2 or 4 stroke cycle _____ Single or double acting _____ B.H.P. _____

No. of cylinders _____ Diameter _____ Length of stroke _____ Span of bearings as per Rule _____

Maximum pressure in cylinders _____ Diameter of crank shaft journals and pins _____

Breadth and thickness of crank webs _____ No. of sections in crank shaft _____ Revolutions of engine per minute _____

Electric Motors, type See London Report No 58636 date 6-7-36 Kilowatts _____

Volts at _____ revolutions per minute. Diameter of motor shafts at bearings _____

Reduction Gearing, maximum shaft horse power at 1st pinion _____ Revolutions per minute at full power at 1st pinion _____

2nd pinion _____ 1st reduction wheel _____ main shaft _____ Pitch circle diameter, 1st pinion _____ 2nd pinion _____

1st reduction wheel _____ Main wheel _____ Width of face, 1st reduction wheel _____ Main wheel _____

Distance between centres of pinion and wheel faces and the centre of the adjacent bearings, 1st pinion _____ 2nd pinion _____

1st reduction wheel _____ Main wheel _____ Flexible pinion shafts, diameter 1st _____ 2nd _____

Pinion shafts, diameter at bearings, External, 1st _____ 2nd _____ Internal, 1st _____ 2nd _____

Diameter at bottom of teeth of pinion, 1st _____ 2nd _____ Wheel shafts, diameter at bearings, 1st _____

Main _____ Diameter at wheel shroud, 1st _____ Main _____

Gas Condensers, No. of _____ Cast iron or steel casings _____ Cylindrical or rectangular _____

No. of coils in each _____ Material of coils _____ Can each coil be readily shut off or disconnected _____

Water Circulating Pumps, No. and size of _____ how worked _____ Gas Separators, No. of _____

Gas Evaporators, No. of _____ Cast iron or steel casings _____ Pressure or gravity type _____

No. of coils in each casing _____ Material of coils _____ Can each coil be readily shut off or disconnected _____

Direct Expansion or Brine Cooled Batteries, No. of _____ Are there two separate systems, so that one may be in use while the other is being

cleared of snow _____ No. of coils in each battery _____ Material of coils _____ Can each coil be readily shut off or

disconnected _____ Total cooling surface of battery coils _____ Is a watertight tray fitted under each battery _____

Air Circulating Fans, Total No. of _____ each of _____ cubic feet capacity, at _____ revolutions per minute _____

Steam or electrically driven _____ Where spare fans are supplied are these fitted in position ready for coupling up _____

Brine Circulating Pumps, No. and size of, including the additional pump _____ how worked _____

Brine Cooling System, closed or open _____ Are the pipes and tanks galvanised on the inside _____

No. of brine sections in each chamber _____

Can each section be readily shut off or disconnected _____ Are the control valves situated in an easily accessible position _____

NOTE.—THE WORDS WHICH DO NOT APPLY SHOULD BE DELETED.

Im. 631.—E.



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Are thermometers fitted to the outflow and to each return brine pipe *Yes* Where the tanks are closed are they ventilated as per Rule

Where the tanks are not closed is the compartment in which they are situated efficiently ventilated

Steam Condensing Plant. State what provision is made for condensing steam, in terms of Section 4, Clauses 13 and 14

Exhaust to main & auxiliary condensers.

HYDRAULIC AND OTHER TESTS.

DESCRIPTION.	Date of Test.	Working Pressure.	Hydraulic Test Pressure.	Air Test Pressure.	Stamped.	REMARKS.
ENGINE CYLINDERS (IF TESTED)						
GAS COMPRESSORS						
SEPARATORS						
CONDENSER COILS						
EVAPORATOR COILS						<i>See London Report</i>
CONDENSER HEADERS AND CONNECTIONS						
CONDENSER CASINGS						
EVAPORATOR CASINGS						
NH ₃ CONDENSER, EVAPORATOR AND AIR COOLER COILS AFTER ERECTION IN PLACE						
BRINE PIPING AFTER ERECTION IN PLACE	<i>26-9-36</i>	<i>20-25 lbs</i>	<i>50 lbs</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Cooling Test. Has the refrigerating machinery been examined under full working conditions, and found satisfactory *Yes*

Dates of test *1-10-36* Density of Brine *43* by *Tuzdell's* hydrometer

Temperatures (when the cargo chambers are cooled down to the required test temperatures) of air at the snow box and of the return air &

or, delivery and return air at direct expansion or brine cooled batteries & outflow and return brine *-10°F* & *8°F*

atmosphere *98°F* cooling water inlet and discharge *87°F* & *95°F* gas in condensers *106°F* and evaporators *-20°F*

the average temperature of the refrigerated chambers *10°F* and the rise of temperature in these chambers upon the expiration of *12* hours

time after the machinery and cooling appliances have been shut off *18°F*

SPARE GEAR.

Are the machines in accordance with Section 4, Clause 2 of the Rules

Are the working parts of the machines, pumps and motors respectively, interchangeable *Yes*

ARTICLES SUPPLIED AS PER RULE. ADDITIONAL SPARE GEAR SUPPLIED.

See London Report.

ARTICLES REQUIRED BY RULES AND NOT YET SUPPLIED

The foregoing is a correct description of the Refrigerating Machinery.

Manufacturer.

DESCRIPTION OF INSULATION.

	IN LOWER HOLD CHAMBERS.					IN TWEEN DECK CHAMBERS.				
	Air Space.	Outer Lining.	Non-conducting Material.	Thickness of ditto.	Inner Lining.	Air Space.	Outer Lining.	Non-conducting Material.	Thickness of ditto.	Inner Lining.
FRAME No. (Fore Peak) A										
FRAME No. F										
FRAME No. ¹³⁷ 125 A						<i>NIL</i>	<i>NIL</i>	<i>Insulated bulk</i>	<i>10"</i>	<i>1" T+G.</i>
FRAME No. A						<i>NIL</i>	<i>NIL</i>	<i>- do -</i>	<i>10"</i>	<i>1" T+G.</i>
FRAME No. F										
FRAME No. A										
FRAME No. (Boiler Room) A										
FRAME No. (Engine Room) A										
FRAME No. F										
FRAME No. A										
FRAME No. F										
FRAME No. A										
FRAME No. F										
FRAME No. A										
FRAME No. (After Peak) F										
SIDES						<i>NIL</i>	<i>NIL</i>	<i>Insulated bulk</i>	<i>11"</i>	<i>1" T+G.</i>
OVERHEADING						<i>NIL</i>	<i>NIL</i>	<i>- do -</i>	<i>12"</i>	<i>1 1/2" T+G.</i>
FLOORS OF CHAMBERS						<i>NIL</i>	<i>NIL</i>	<i>both slabs</i>	<i>10"</i>	<i>2 1/2" GRATING.</i>
TRUNK HATCHWAYS										
THRUST RECESS, SIDES AND TOP										
TUNNEL SIDES AND TOP										
TUNNEL RECESS, FRONT AND TOP										

FRAMES OR REVERSE FRAMES, FACE *3" from edge of frame to inner lining*

BULKHEAD STIFFENERS, TOP *6" from edge of stiffener* BOTTOM *6" from edge of stiffener* FACE *6" from edge of stiffener*

RIBBAND ON TOP OF DECKS

SIDE STRINGERS, TOP BOTTOM AND FACE

WEB FRAMES, SIDES AND FACE

BRACKETS, TOP *For further particulars please see Seattle report.*

INSULATED HATCHES, MAIN BILGE MANHOLE

HATCHWAY COAMINGS, MAIN BILGE

HOLD PILLARS

MASTS VENTILATORS

Are insulated plugs fitted to provide easy access to bilge suction roses *nil* tank, air, and sounding pipes heels of pillars

and manhole doors of tanks Are insulated plugs fitted to ventilators cargo ports *nil* and side lights *nil*

Is the insulation of the lower hold floor and tunnel top in way of the hatchways protected if so, how

Oil Storage Tanks, where adjacent to the insulated chambers, state what provision has been made for ventilating the air space between the insulation and the bulkhead plating

Coal Bunker Bulkheads, and Brine Outflow and Return Pipes passing through coal bunkers. Is the insulation, so far as practicable, fireproof *Yes*

Where Cooling Pipes pass through watertight bulkheads or deck plating, are the fittings and packing of the stuffing boxes both watertight and fireproof *Yes*

Cargo Battens, Dimensions and spacing, sides floors *2 1/2" x 2 1/2" wood* gratings top

fixed or portable Are screens fitted over the brine grids at chamber sides *air trunks* hinged or permanently fixed *permanent.*

Thermometer Tubes, No. and position in each chamber *2 clear of grids at fore & after ends.*

diameter *2 1/2"* are they fitted in accordance with Section 3, Clause 8 *Yes*

Protection of Pipes. Are all pipes, including air and sounding pipes, which pass through or into insulated chambers, well insulated *Yes*

Draining Arrangements. Where the chambers are situated below the load water line, what provision is made for draining the inside of the chambers *chambers above load water line*

Where sluices, scupper pipes, and drain pipes are fitted are means provided for blanking them off *Screwed caps.*

What provision is made for draining the refrigerating machinery room *Drain pipe to bilge*

brine return room *Drain pipe to bilge* fan room water circulating pump room *Pump - main engine room*

Are all air spaces behind insulation arranged to drain to the bilges, bilge wells, or gutterways of the respective chambers *nil*



All chambers above load water line

Sounding Pipes, No. and position in each chamber situated below the load water line *One in each outboard chamber. Two in centre chamber.*

Diameter *Bilge 1 3/8 Inch Deck 1 1/2* Are all sounding pipes in way of insulated chambers fitted in accordance with Section 3, Clause 11 *Yes.*

Are all wood linings tongued and grooved *Yes* Are cement facings reinforced with expanded steel lattice *✓*

How is the expanded metal secured in place *✓*

How are the cork slabs secured to the steel structure of the vessel *Cork slabs on floor only. Sealed with Bismuth compound & birculati trunk cover grids covered with "Durastic" and branch. ✓*

Air Trunkways in Chambers, inside dimensions, main *completely.*

Are they permanently fixed or collapsible, or portable. *Permanent* State position in chambers *3 sides*

Where air trunkways pass through watertight bulkheads, are they fitted with watertight doors *✓* Are the door frames efficiently insulated *✓*

Are insulated plugs supplied for the doorways *✓* Where are the doors worked from *✓*

Cooling Pipes in Chambers, diameter *1 1/2"* Are they galvanised externally *Yes*

How are they arranged in the chambers *Grids on sides & deck head.*

Thawing Off, what provision is made for removing the snow from the cooling pipes in the chambers *Brine Heater.*

The foregoing is a correct description of the Insulation and Appliances.

J. Bander, General Manager, Garden Reach Workshops Ltd. Builders.

Plans. Are approved Plans or Specifications forwarded herewith for the Refrigerating Machinery *✓* and Insulation *Yes.*

(If not, state date of approval)

Is the Refrigerating Machinery and Appliances duplicate of a previous case *No* If so, state name of vessel *✓*

If the survey is not complete, state what arrangements have been made for its completion and what remains to be done.

Complete except for cargo battens at sides. Arrangements have been made to fit these as required at loading port.

General Remarks (State quality of workmanship, opinions as to class, &c.)

The insulation, structure, fittings, machinery & appliances have been installed under special survey. The materials and workmanship are good and the tests found to be satisfactory.

It is considered that the vessel is eligible to have the record + LLOYDS R.M.C - 10,36 in the Register Book

NOTE - *Where the brine leads pass through the hween deck the casing is sheathed with steel and the pipes lagged with silicate cotton*

It is submitted that this vessel is eligible for THE RECORD. + Lloyds R.M.C 10-36.

RA 4/11/36.

PARTICULARS TO BE ENTERED IN REGISTER BOOK.

REFRIGERATING MACHINES.					System of (1) Refrigerating (2) Insulating the Chambers.	POWER.		INSULATED CARGO CHAMBERS.	
No. of Units.	No. of Compressors.	System.	Makers.	Date of Construction.		Cubic feet of air delivered per hour.	Ice melting capacity per 24 hours. Tons.	No.	Capacity. Cubic ft.
2	2	bart cylinder	J. & S. Hall Ltd	1936	Brine Grids Insulated Slab cork		2 1/2	5	19,170

Fee *£250/-* { Fee applied for, 10-10-1936
 Travelling Expenses £ : { Received by me, 19 .

E. O'Leary
 Surveyor to Lloyd's Register.

Committee's Minute **FRI. 6 NOV 1936**

Assigned *+ Lloyds R.M.C, 10,36*

CERTIFICATE WRITTEN



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Certificate to be sent to Owners