

## REPORT ON REFRIGERATING MACHINERY AND APPLIANCES.

(Received at London Office)

MAR 5 1940

Date of writing Report 18/1/40 When handed in at Local Office 18/1/40 Port of SYDNEY, N.S.W.  
 No. in Reg. Book. 29968 Survey held at SYDNEY, N.S.W. Date: First Survey 31/10/39 Last Survey 11/1/1940  
 (No. of Visits 9)  
 on the Refrigerating Machinery and Appliances of the S.S. "MONTORO" Tons Gross 4088  
Net 2521  
 Vessel built at Glasgow By whom built Clyde S.B. and Co. Ltd. Yard No. 296 When built 1911-12  
 Owners Burns, Philp and Co. Ltd. Port belonging to Singapore Voyage   
 Refrigerating Machinery made by Linde British Refrigeration Machine No.  When made 1911  
 Insulation fitted by Burns, Philp and Co. Ltd. When fitted Jan 1931 Jan 1940 System of Refrigeration Ammonia  
 Method of cooling Cargo Chambers Brine Insulating Material used Charcoal  
 Number of Cargo Chambers insulated 4 Total refrigerated cargo capacity 14913 cubic feet.

DESCRIPTION OF REFRIGERATING MACHINERY. Where placed In deck house on forward deck.

Refrigerating Units, No. of one Single, double, or triple double Cubic feet of air delivered per hour   
 Total refrigeration or ice-melting capacity in tons per 24 hours 25 Are all the units connected to all the refrigerated chambers ✓  
 Compressors, driven direct or through single reduction gearing. Compressors, single or double acting Compound - Single acting No. of cylinders 2 HP - 2 1/2  
 Diameter of cylinders 6 3/16" and 10" Diameter of piston rod 1 3/4" Length of stroke 9 7/8" No. of strokes per minute   
 Motive Power supplied from Main boilers.  
 Steam Engines, high pressure, compound, or triple expansion, surface condensing. No. of cylinders 2 Diameter 11" and 14"  
 Length of stroke 9 7/8" Working pressure 180 lbs. Diameter of crank shaft journals and pins 5"  
 Breadth and thickness of crank webs 6 1/16" x 3 7/32" No. of sections in crank shaft 2 Revolutions of engines per minute 160  
 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  No. of  Rated  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 1 double Cast iron or steel casings Cast iron Cylindrical or rectangular Rectangular  
 No. of coils in each 3 each side Material of coils Mild steel Can each coil be readily shut off or disconnected yes.  
 Water Circulating Pumps, No. and size of 3 - 5 1/2" x 7" x 8" duplex how worked Steam driven duplex Gas Separators, No. of 2  
 Gas Evaporators, No. of 2 Cast iron or steel casings Steel Pressure or gravity type Gravity  
 No. of coils in each casing 3 Material of coils Mild steel Can each coil be readily shut off or disconnected yes.  
 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 one each of 1200 cubic feet capacity, at 900 revolutions per minute  
 Steam or electrically driven Electrically (S.H.P.) 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 2 - duplex 5" x 5" x 6" how worked Steam driven  
 Brine Cooling System, closed or open open Are the pipes and tanks galvanised on the inside No.  
 No. of brine sections in each chamber N° 1 TWEEN DECK - 3. N° 1 ORHOP DECK - 4  
STAR? CHAMBER IN N° 1 ORHOP DECK - 2 CHAMBER IN N° 2 TWEEN DECK - 2  
 Can each section be readily shut off or disconnected yes. Are the control valves situated in an easily accessible position yes.

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



Are thermometers fitted to the outflow and to each return brine pipe *Yes*. Where the tanks are closed are they ventilated as per Rule *Yes*.  
Where the tanks are not closed is the compartment in which they are situated efficiently ventilated *Yes*.  
Steam Condensing Plant. State what provision is made for condensing steam, in terms of Section 4, Clauses 13 and 14. *Refrigerating machine and auxiliaries connected to main and auxiliary condensers in engine room.*

#### 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	30/10/39		1.500 lbs.	500 lbs.		3 new coils & 3 coils stated to have been removed in March 1939
" EVAPORATOR COILS	21/11/39		200 lbs.			
" CONDENSER HEADERS AND CONNECTIONS						
" CONDENSER CASINGS						
" EVAPORATOR CASINGS						
NH <sub>3</sub> CONDENSER, EVAPORATOR AND AIR COOLER COILS AFTER ERECTION IN PLACE	19/12/39					
BRINE PIPING AFTER ERECTION IN PLACE	29/12/39		50 lbs.			
	9/1/40					

Cooling Test. Has the refrigerating machinery been examined under full working conditions, and found satisfactory *Yes*.  
Dates of test 10/1/40 11/1/40 Density of Brine 1250 by 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. *Yes* & *Yes*, outflow and return brine - 4°F & 0°F  
atmosphere 76°F. cooling water inlet and discharge 74°F & 78°F. gas in condensers 90°F. and evaporators - 10°F.  
the average temperature of the refrigerated chambers 10°F. and the rise of temperature in these chambers upon the expiration of 18 hours  
time after the machinery and cooling appliances have been shut off 14°F.

#### SPARE GEAR.

Are the machines in accordance with Section 4, Clause 2 of the Rules *Yes*.  
Are the working parts of the machines, pumps and motors respectively, interchangeable *Yes*.

ARTICLES SUPPLIED AS PER RULE	ADDITIONAL SPARE GEAR SUPPLIED.
Lengths and kinds of piping of each size used, together with flanges, couplings and screwing apparatus.	one half crank shaft complete.
Assorted cocks, valves, flanges and fittings.	one H.P. piston and rings.
Assorted bolts, studs and nuts.	one L.P. piston and rings.
Quantity of packing and gaskets.	one piston rod.
one complete set of crank shaft coupling bolts.	one H.P. or L.P. valve spindle.
one compressor piston rod complete.	2 eccentric complete with eccentric straps.
one set of compressor suction and delivery valves and boxes for each size used.	one set of H.P. compressor piston rings.
one complete set of packing for compressor piston rods.	one H.P. compressor cover.
one gas regulator valve complete.	one L.P. compressor cover.
one set of valves for water circulating and brine pumps.	

ARTICLES REQUIRED BY RULES AND NOT YET SUPPLIED one compressor piston for each size used.

The foregoing is a correct description of the Refrigerating Machinery.

*J. Corryghan* Manufacturer.  
For BURNS, PHILP & COMPANY LIMITED.  
Superintending Engineer.

#### 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 167				N°1 TWEEN DECK	✓	✓	CHARGOLITE	12"	1"	
FRAME No.	A 154					✓	✓	CHARGOLITE	12"	1"	
FRAME No.	F 167				N°1 ORFUP DECK	✓	✓	CHARGOLITE	12"	1"	
FRAME No.	A 140					✓	✓	CHARGOLITE	12"	1"	
FRAME No.	F 144				N°2 TWEEN DECK	✓	✓	CHARGOLITE	12"	1"	
FRAME No.	A 114					✓	✓	CHARGOLITE	12"	1"	
FRAME No. (Boiler Room)	F										
FRAME No. (Engine Room)	A										
FRAME No.	F										
FRAME No.	A										
FRAME No.	F										
FRAME No.	A										
FRAME No. (After Peak)	F					✓	✓	CHARGOLITE	12"	1"	
SIDES			✓	CHARGOLITE 10"	1"	✓	✓	CHARGOLITE	10"	1"	
OVERHEADING						✓	✓	✓	✓	✓	
FLOORS OF CHAMBERS											
TRUNK HATCHWAYS											
THRUST RECESS, SIDES AND TOP											
TUNNEL SIDES AND TOP											
TUNNEL RECESS, FRONT AND TOP											
FRAMES ON REVERSE FRAME, FACE 3 1/2" CHARGOLITE - 1" LINING.											
BULKHEAD STIFFENERS, TOP		✓		BOTTOM	✓		AND FACE		✓		
RIBBAND ON TOP OF DECKS				IN N°2 TWEEN DECK ONLY	3'6"						
SIDE STRINGERS, TOP		✓		BOTTOM	✓		AND FACE		✓		
WEB FRAMES, SIDES		✓			AND FACE	✓					
BRACKETS, TOP				INSULATED OUTSIDE FACE OF BRACKETS	BOTTOM	✓		AND FACE		✓	
INSULATED HATCHES, MAIN			✓	4" COPPER LINING EACH SIDE	BILGE	✓		MANHOLE		✓	
HATCHWAY COAMINGS, MAIN		✓			BILGE						
HORN PILLARS				IN N°1 TWEEN DECK SHEATHED WITH 1" WOOD.							
MASTS		✓		VENTILATORS	9" CHARGOLITE AND 1" LINING.						
Are insulated plugs fitted to provide easy access to bilge suction roses tank, air, and sounding pipes Yes. heels of pillars ✓											
and manhole doors of tanks ✓ Are insulated plugs fitted to ventilators Yes. cargo ports ✓ and side lights ✓											
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 ✓											
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 3" x 1" BATTENS SPACED 9" floors 3" x 2" SPACED 9" tunnel top ✓											
fixed or portable PORTABLE Are screens fitted over the brine grids at chamber sides DECK ONLY hinged or permanently fixed (SEPARATED)											
Thermometer Tubes, No. and position in each chamber N°1 TWEEN DECK 2. N°1 ORFUP DECK 2. STAFF CHAMBER IN N°1 ORFUP DECK 1. N°2 TWEEN DECK 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 2 TAPPED DRAINS TO HOLD BILGES Where ✓, scupper pipes, and drain pipes are fitted are means provided for blanking them off Yes.											
What provision is made for draining the refrigerating machinery room on deck.											
brine return room Stuffed drain to hold fan room ✓ water circulating pump room (in main engine room) ✓											
Are all air spaces behind insulation arranged to drain to the bilges, bilge wells, or gutterways of the respective chambers ✓											



Sounding Pipes, No. and position in each chamber situated below the load water line

Diameter ☒ Are all sounding pipes in way of insulated chambers fitted in accordance with Section 3, Clause 11. ☒Are all wood linings tongued and grooved ☒ 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 ☒

Air Trunkways in Chambers, inside dimensions, main

Are they permanently fixed or collapsible, or portable ☒State position in chambers ☒Screens over brine pipes in N° 2 Tween Deck chamber only. ☒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" Bore**Are they galvanised externally ☒How are they arranged in the chambers **in N° 1 Orlop and B'ly Decks - on sides and overhead****On N° 2 Tween Deck - on sides only.**Thawing Oil, what provision is made for removing the snow from the cooling pipes in the chambers **Warm brine.**The foregoing is a correct description of the Insulation and Appliances. **For BURNS, PHILP & COMPANY LIMITED**

Plans. Are approved Plans or Specifications forwarded herewith for the Refrigerating Machinery (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

This vessel when built was fitted with refrigerating machinery and appliances which were classed Lloyd's P.C. until 1931 at which time all the insulation was removed and only partly renewed. The refrigerating machinery has not been altered and has been under frequent examination under working conditions at this port for the issue of Cert. 13 (17.1.40) since being withdrawn from class. (Sgd. P.M.S. N° 12073)

**General Remarks** (State quality of workmanship, opinions as to class, &c.) The insulation of N° 1 Orlop Deck has been found out and partly renewed on account of repairs to shell plating and bulkheads. The chamber in N° 2 Tween Deck has been altered and enlarged and the forward end of N° 1 Orlop Deck has now been insulated.

The additional insulation and renewals fitted under special survey material and workmanship good. The refrigerating machinery completely found out and examined. Three gas condenser coils and all brine leads which are insulated renewed.

The chamber in N° 2 Tween Deck specially fitted for the carriage of sealed produce brine piping on sides only with screens over brine piping and fan for air circulation.

The installation seen tested and working satisfactorily and is eligible in my opinion to have the record of Lloyd's P.C. 1-40 noted in the Register Book.

## PARTICULARS TO BE ENTERED IN REGISTER BOOK.

REFRIGERATING MACHINES.					System of (1) Refrigerating (2) Insulating the Chambers	POWER.		INSULATED CARGO CHAMBERS.	
No. and whether Single or otherwise.	Makers.	Date of Construction.	System.	Type.		Cubic feet of air delivered per hour.	Ice melting capacity per 24 hours. Tons.	No.	Capacity.
1-2	Linde British	1911	Ammonia	Linde	Burns Fair		2.5	4	14913
	1-2 Refrigeration Co. Ltd.				Chaswell				

Fee £9:0:0

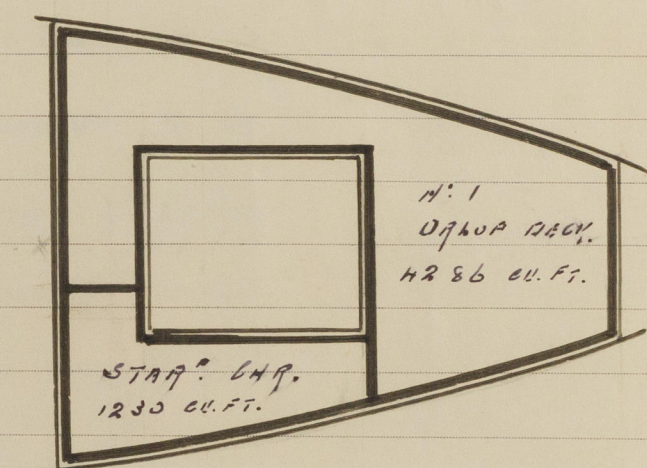
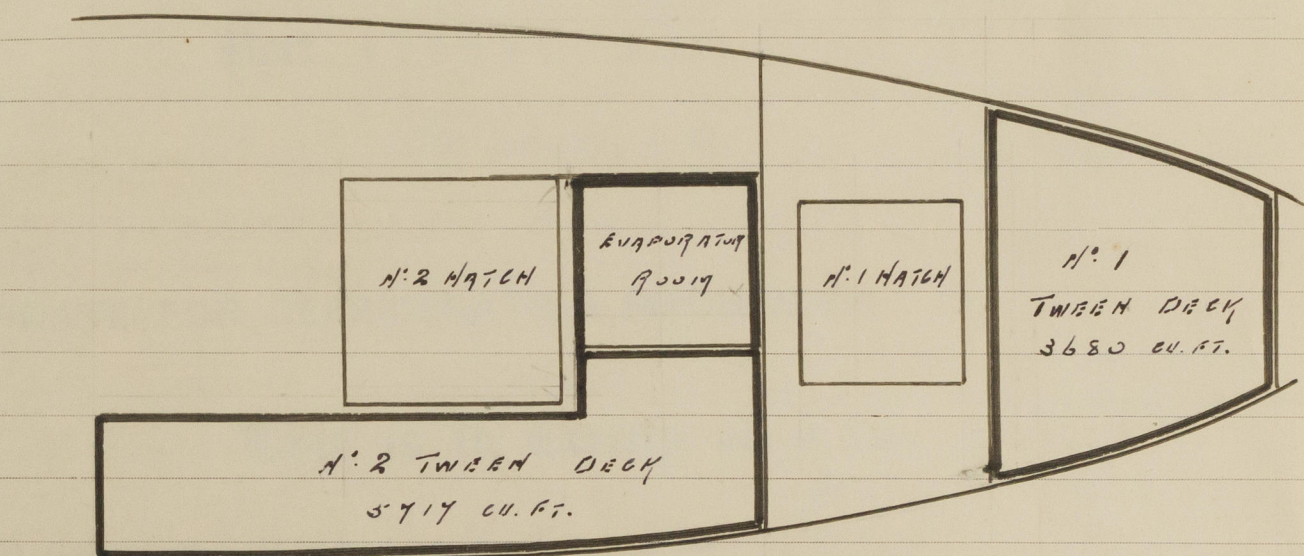
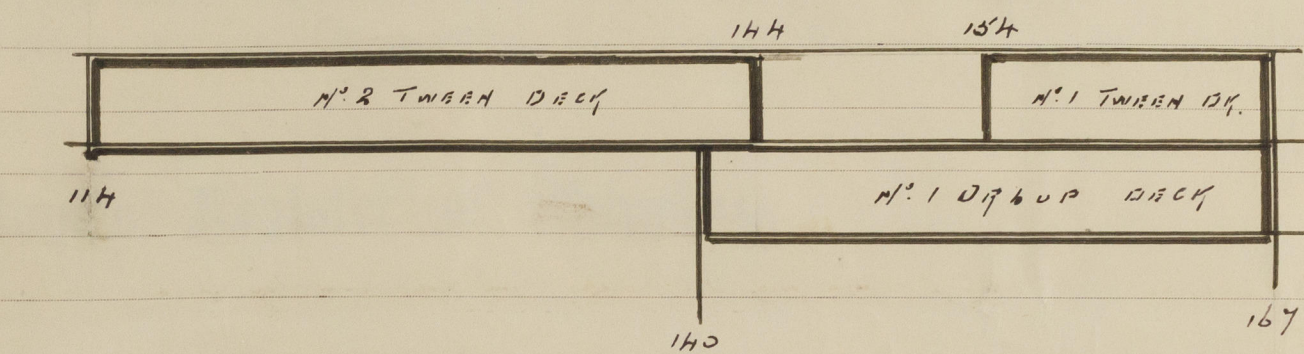
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Committee's Minute

Assigned

See Syd. Rpt. 17454

## REFRIGERATING MACHINERY AND APPLIANCES OF S.S. "MONTORO"



Jas. C. E. Skene