

REPORT ON OIL ENGINE MACHINERY.

No. 33545

3-DEC 1942

Received at London Office

Sunderland

Date of writing Report *19* When handed in at Local Office *25 Nov 1942* Port of *Sunderland*

No. in Survey held at *Sunderland* Date, First Survey *15 Jan* Last Survey *24 Nov 1942*
Reg. Book. Number of Visits *55*

Single
Triple
Quadruple
Screw vessel

"HARPAGUS"

Tons Gross *7271*
Net *5044*

Built at *Sunderland* By whom built *Wm. Leasford & Son L^{td}* Yard No. *695* When built *1942*

Engines made at *Sunderland* By whom made *Stockton Chem. Eng^{rs} & Riley Bros L^{td}* Engine No. *695* When made *1942*

Donkey Boilers made at *Stockton* By whom made *Bocharan & Co (Aman) L^{td}* Boiler No. *6623* When made *1942*

Brake Horse Power *2500* Owners *Bocharan & Co (Aman) L^{td}* Port belonging to *Bocharan & Co (Aman) L^{td}*

Nom. Horse Power as per Rule *516* Is Refrigerating Machinery fitted for cargo purposes *No.* Is Electric Light fitted *Yes.*

Trade for which vessel is intended *23 5/8* *91 5/16*

OIL ENGINES, &c. Type of Engines *Opposed piston airless injection 2 or 4 stroke cycle 2* Single or double acting *Single*

Maximum pressure in cylinders *5 1/2 tons* Diameter of cylinders *600 in.* Length of stroke *Upper 980 in. Lower 1340 in.* No. of cylinders *3* No. of cranks *3 (3 strokes)*

Mean Indicated Pressure *88 lbs/sq. in.* Span of bearings, adjacent to the Crank, measured from inner edge to inner edge *940 in.* Is there a bearing between each crank *Between each 3 strokes*

Revolutions per minute *108* Flywheel dia. *F. 2300 in. A. 2400 in.* Weight *F. 3 3/4 tons. A. 5 1/2 tons.* Means of ignition *Compression* Kind of fuel used *-*

Crank Shaft, *Semi built* dia. of journals *as per Rule 418 in. as fitted 450 in.* Crank pin dia. *450 in.* Crank Webs *Mid. length breadth 650 in. Mid. length thickness 255 in.* Thickness parallel to axis *255 in.* Thickness around eye hole *200 in.*

Flywheel Shaft, diameter *as per Rule 418 in. as fitted 450 in.* Intermediate Shafts, diameter *as per Rule 308 in. as fitted 365 in.* Thrust Shaft, diameter at collars *as per Rule 418 in. as fitted 450 in.*

Tube Shaft, diameter *as per Rule 341 in. as fitted 392 in.* Is the *tube* shaft fitted with a continuous liner *Yes.*

Bronze Liners, thickness in way of bushes *as per Rule 18 in. as fitted 21 1/2 in.* Thickness between bushes *as per Rule 13 1/2 in. as fitted 16 3/4 in.* Is the after end of the liner made watertight in the

propeller boss *Yes.* If the liner is in more than one length are the junctions made by fusion through the whole thickness of the liner *one length.*

If the liner does not fit tightly at the part between the bearings in the stern tube, is the space charged with a plastic material insoluble in water and non-corrosive *-*

If two liners are fitted, is the shaft lapped or protected between the liners *-* Is an approved Oil Gland or other appliance fitted at the after end of the tube *-*

shaft *No.* If so, state type *-* Length of Bearing in Stern Bush next to and supporting propeller *4'-11"*

Propeller, dia. *15'-9"* Pitch *11'-9"* No. of blades *4* Material *Bronze* whether Moveable *No.* Total Developed Surface *90* sq. feet

Method of reversing Engines *Hand lever* Is a governor or other arrangement fitted to prevent racing of the engine when detached *Yes.* Means of lubrication *Hand forced*

Thickness of cylinder liners *25 in.* Are the cylinders fitted with safety valves *Yes.* Are the exhaust pipes and silencers water cooled or lagged with

non-conducting material *Yes.* If the exhaust is led overboard near the waterline, what means are arranged to prevent water from being syphoned back to the engine *-*

Cooling Water Pumps, No. *one engine driven one steam driven* Is the sea suction provided with an efficient strainer which can be cleared within the vessel *(i.e. w. cooling)*

Bilge Pumps worked from the Main Engines, No. *none* Diameter *-* Stroke *-* Can one be overhauled while the other is at work *-*

Pumps connected to the Main Bilge Line *No. and Size 1 @ 5 1/2" x 6" x 15" (Simplex) & Ballast pump.* How driven *Steam*

Is the cooling water led to the bilges *No.* If so, state what special arrangements are made to deal with this water in addition to the ordinary bilge pumping

arrangements *-* Ballast Pumps, No. and size *1 @ 12 1/2" x 14" x 24". Power Driven Lubricating Oil Pumps, including Spare Pump, No. and size*

Are two independent means arranged for circulating water through the Oil Cooler *Yes.* Suctions, connected to both Main Bilge Pumps and Auxiliary Bilge

Pumps, No. and size:—In Machinery Spaces *4 @ 3" in E.R. 1 @ 3" in Tunnel well* In Pump Room *-*

In Holds, &c. *N^o 1. 3 1/2" φ r.s. N^o 2. 4" φ r.s. N^o 3 (keel tank) 4" φ r.s. N^o 4. 3 1/2" φ r.s. N^o 5. 4" φ r.s.*

Independent Power Pump Direct Suctions to the Engine Room Bilges, No. and size *1 @ 8" (Ballast pump) 1 @ 5" & 1 @ 4" Connected to main eng. bilge pump.*

Are all the Bilge Suction pipes in Holds and Tunnel Well fitted with strum-boxes *Yes.* Are the Bilge Suctions in the Machinery Spaces

led from easily accessible mud-boxes, placed above the level of the working floor, with straight tail pipes to the bilges *Yes.*

Are all Sea Connections fitted direct on the skin of the ship *Yes.* Are they fitted with Valves or Cocks *Both*

Are they fixed sufficiently high on the ship's side to be seen without lifting the platform plates *Yes.* Are the Overboard Discharges above or below the deep water line *Below.*

Are they each fitted with a Discharge Valve always accessible on the plating of the vessel *Yes.* Are the Blow Off Cocks fitted with a spigot and brass covering plate *Yes.*

What pipes pass through the bunkers *none* How are they protected *-*

What pipes pass through the deep tanks *In bilge Suctions* Have they been tested as per Rule *Yes.*

Are all Pipes, Cocks, Valves, and Pumps in connection with the machinery and all boiler mountings accessible at all times *Yes.*

Is the arrangement of valves and their connections such as to prevent the possibility of water passing from the sea or from water tanks into the cargo or machinery spaces, or from one

compartment to another *Yes.* Is the Shaft Tunnel watertight *Yes.* Is it fitted with a watertight door *No (Blocked in case)* worked from *-*

If a wood vessel, what means are provided to prevent leakage of either fuel oil or of lubricating oil from saturating the woodwork *-*

Main Air Compressors, No. *Two* No. of stages *3* Diameters *11 1/2", 11 1/2" x 9 1/4", 23 1/4"* Stroke *6 1/2"* Driven by *Steam Engine 11 1/2" x 6 1/2"*

Auxiliary Air Compressors, No. *-* No. of stages *-* Diameters *-* Stroke *-* Driven by *-*

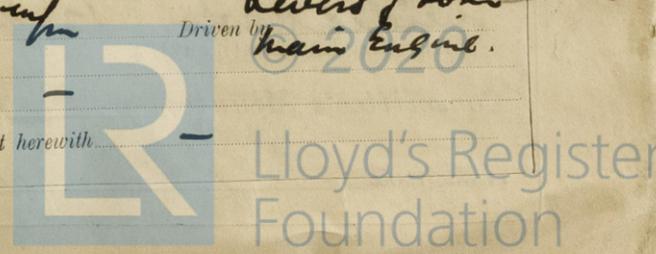
Small Auxiliary Air Compressors, No. *-* No. of stages *-* Diameters *-* Stroke *-* Driven by *-*

What provision is made for first Charging the Air Receivers *(Steam driven Compressors)*

Scavenging Air Pumps, No. *one* Diameter *1400 in.* Stroke *610 in.* Driven by *Lever from main engine.*

Auxiliary Engines crank shafts, diameter *as per Rule -* Position *-*

Have the Auxiliary Engines been constructed under special survey *-* Is a report sent herewith *-*



AIR RECEIVERS: — Have they been made under survey? *Yes* State No. of Report or Certificate *Class. No. 46104.*
 Is each receiver, which can be isolated, fitted with a safety valve as per Rule *Yes* *Single plug fitted. Relief valves on discharge from compressed.*
 Can the internal surfaces of the receivers be examined and cleaned? *Yes* Is a drain fitted at the lowest part of each receiver? *Yes*

Injection Air Receivers, No. — Cubic capacity of each — Internal diameter — thickness —
 Seamless, lap welded or riveted longitudinal joint — Material — Range of tensile strength — Working pressure by Rules — Actual —
Starting Air Receivers, No. *Two* Total cubic capacity *220 cu ft.* Internal diameter *3' 6"* thickness *1"*
 Seamless, lap welded or riveted longitudinal joint *Riveted* Material *M. Steel* Range of tensile strength *28/31* Working pressure by Rules *603* Actual *600*

IS A DONKEY BOILER FITTED? *Yes* If so, is a report now forwarded? *Yes*
 Is the donkey boiler intended to be used for domestic purposes only? *No.*

PLANS. Are approved plans forwarded herewith for Shafting Receivers Separate Fuel Tanks
 (If not, state date of approval)
 Donkey Boilers General Pumping Arrangements Pumping Arrangements in Machinery Space
 Oil Fuel Burning Arrangements

SPARE GEAR.
 Has the spare gear required by the Rules been supplied? *Yes* (except bearings for top & bottom ends of connecting rods).
 State the principal additional spare gear supplied: *1 C.I. Propeller, 1 Cyl. liner & packer Complete, 1 main piston head & 24 rings, 4 fuel valves Complete, 8 spray plug, 2 Side & Centre top & bottom end bearing balls & nuts, 1 N.R. air starting valve, 1 cyl. relief valve complete, 4 senseless pump 1/2 discs, 1 fuel pump body with 1/4" dia. shaft & shell crank lever with valves & tappet, 3 rubber hoses for upper piston cooling water, 6 links of chain for camshaft drive, 3 Michell pads for tail shaft plummer block & 3 for intermediate shaft bearings.*

WILLIAM DOXFORD & SONS, Limited.
 The foregoing is a correct description.

Wm. H. Purdie Director. Manufacturer.

Dates of Survey while building	During progress of work in shops --	1942. Jan. 15, 27, 29, 30. Feb. 5, 11, 13, 14, 17. Mar. 2, 8, 14. May 20, 26, 29. June 1, 2, 3, 15, 17, 25, 29. July 1, 14.
	During erection on board vessel --	20, 23, 29, 30, 31. Aug. 4, 5, 6, 7, 11, 12, 17, 24, 25, 31. Sep. 7, 14. Oct. 13, 20. Nov. 3, 4, 5, 6, 10, 11, 13, 16, 20, 23, 24.
	Total No. of visits	55
Dates of Examination of principal parts	Cylinders	26/5/42, 1/6/42
	Covers	29/5/42
	Pistons	15/6/42
	Rods	20/4/42
	Connecting rods	20/7/42
Crank shaft	1/4/42.	
Flywheel shaft	as crank	
Thrust shaft	as crank.	
Intermediate shafts	13/10/42	
Tube shaft	-	
Screw shaft	14/9/42.	
Propeller	14/9/42	
Stern tube	12/8/42	
Engine seatings (Dank top)	24/11/42	
Engines holding down bolts	13/11/42.	
Completion of filling sea connections	11/8/42	
Completion of pumping arrangements	24/11/42	
Engines tried under working conditions	20/11/42.	
Crank shaft, Material	Ingot Steel	Identification Mark No 695 WHF
Flywheel shaft, Material	as crank	Identification Mark as crank.
Thrust shaft, Material	as crank	Identification Mark as crank.
Intermediate shafts, Material	Ingot Steel	Identification Marks No 8002 (2), 8003, 5413
Tube shaft, Material	-	Identification Marks 8004, 8009, 8010
Screw shaft, Material	Ingot Steel	Identification Mark WHF 13/10/42
Identification Marks on Air Receivers	K 1394/5	
	L.R. 21063.	
	L.C.D. 24/5/42.	
		No 8009 WHF 14/9/42.

Is the flash point of the oil to be used over 150° F. *Yes*
 Have the requirements of the Rules for oil fuel pipes and tank fittings been complied with? *Yes*
 Description of fire extinguishing apparatus fitted: *1 1/2 dia W.I. perforated pipe for steam led around E.R. & B.L.'s 8. 29 gal. Phenol*
 Is the vessel (not being an oil tanker) fitted for carrying oil as cargo? *No.* If so, have the requirements of the Rules been complied with? *Not decided.*
 If the notation for Ice Strengthening is desired, state whether the requirements in this respect have been complied with? *Not decided.*
 Is this machinery duplicate of a previous case? *Yes* If so, state name of vessel: *M/V HAPPALYCE*

General Remarks (State quality of workmanship, opinions as to class, &c.) *This machinery has been built under Special Survey in accordance with the approved plans & the requirements of the Society's rules. The materials & workmanship are good. It has been securely fitted on board the vessel & tried under working conditions alongside quay with satisfactory results. The two donkey boilers have also been securely fixed on board, fitted to burn oil fuel (F.P. above 150° F.) Section 2a of the rules has been complied with & safety valves of boilers adjusted to working pressure in accordance with rule requirements.*

The machinery is reliable in my opinion & have notation *Oil L.M.C. 11. 42 (oil engine), T.S (C.L), 2 DB (120 lbs/sq in).*

The amount of Entry Fee .. £ 6 : : When applied for, 26 NOV 1942
 Special ... £ 100 : 16 : :
 Donkey Boiler Fee ... £ 12 : 12 : : When received,
 Travelling Expenses (if any) £ : : :
 Committee's Minute TUE 15 DEC 1942
 Assigned *2 DB - 120 lb oil eng. ch*

Wm. H. Purdie
 Engineer Surveyor to Lloyd's Register of Shipping.
 Lloyd's Register Foundation

Certificate (if required) to be sent to SUNDERLAND, (The Surveyors are requested not to write on or below the space for Committee's Minute.)