

REPORT ON OIL ENGINE MACHINERY.

No 33488

21 SEP 1942

Received at London Office

Date of writing Report 19 21 When handed in at Local Office / 4 Sep. 19 42 Port of Sunderland

No. in Survey held at Reg. Book. Sunderland Date, First Survey 17 Sep 41 Last Survey 3rd Sept 1942 Number of Visits 63

on the Single Twin Triple Quadruple Screw vessel "HARDINGHAM" Tons Gross 7269 Net 5041

Built at Sunderland By whom built Wm. Leyford & Sons L^{td} Yard No. 692 When built 1942
Engines made at Sunderland By whom made Wm. Leyford & Sons L^{td} Engine No. 692 When made 1942
Donkey Boilers made at Stockton By whom made Stockton Chem. Engrs. & Reley Bros L^{td} Boiler No. 15387 When made 1942
Brake Horse Power 2500 Owners J. C. Harrison & Co L^{td} Port belonging to London

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 5/8"

II ENGINES, &c. Type of Engines Approved Quaternary airless injection or 4 stroke cycle 2 Single or double acting Single
Maximum pressure in cylinders 5 1/2 lbs/sq. in. Diameter of cylinders 600 mm Length of stroke Upper 980 mm Lower 1340 mm No. of cylinders 3 No. of cranks 3 (3 throws)
Mean Indicated Pressure 88 lbs/sq. in. Span of bearings, adjacent to the Crank, measured from inner edge to inner edge 940 mm Is there a bearing between each crank Between each 3 throws.

Revolutions per minute 108 Flywheel dia. F. 2300 mm Weight F. 5 3/4 tons Means of ignition Compression Kind of fuel used -
Crank Shaft, Solid forged dia. of journals as fitted 418 mm Crank pin dia. 450 mm Crank Webs Mid. length breadth 650 mm Thickness parallel to axis 255 mm
All built as fitted 450 mm as fitted 308 mm Mid. length thickness 255 mm Thickness around eye hole 200 mm

Flywheel Shaft, diameter as per Rule 418 mm Intermediate Shafts, diameter as fitted 308 mm Thrust Shaft, diameter at collars as fitted 450 mm
Tube Shaft, diameter as per Rule 341 mm Screw Shaft, diameter as fitted 392 mm Is the tube screw shaft fitted with a continuous liner Yes.

Bronze Liners, thickness in way of bushes as per Rule 18 mm Thickness between bushes as fitted 2 1/2 mm 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. 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 Yes. Means of lubrication and forced

Thickness of cylinder liners 25 mm 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 Is the sea suction provided with an efficient strainer which can be cleared within the vessel (F.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 one engine driven 85 mm x 610 mm
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 in E.R. at 3" 1 @ 3" in Tunnel well. In Pump Room -

In Holds, &c. N^o 1. 3 1/2" φ vs. N^o 2. 4" φ vs. N^o 3. (Keel Tank) 4" φ vs. N^o 4. 3 1/2" φ vs. N^o 5. 4" (aft).
Independent Power Pump Direct Suctions to the Engine Room Bilges, No. and size 1 @ 8" Ballast pump, 1 @ 5", and 1 @ 4" connected to main Eng. Circ. Pump. Are the Bilge Suctions in the Machinery Spaces Yes.

Are all the Bilge Suction pipes in Holds and Tunnel Well fitted with strum-boxes Yes. Are the Bilge Suctions in the Machinery Spaces Yes.
led from easily accessible mud-boxes, placed above the level of the working floor, with straight tail pipes to the bilges Yes. Are they fitted with Valves or Cocks Both

Are all Sea Connections fitted direct on the skin of the ship Yes. Are they fixed sufficiently high on the ship's side to be seen without lifting the platform plies 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.

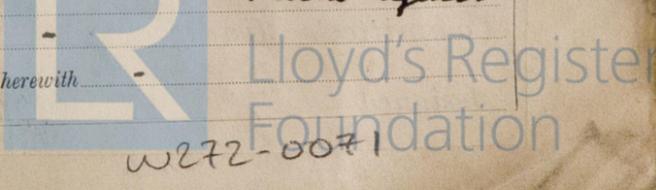
What pipes pass through the bunkers none How are they protected -
What pipes pass through the deep tanks In: hold bilge suction Have they been tested as per rule Yes.

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 (Behind) intact. 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 1/2-9 1/4, 2 3/4 Stroke 6 1/2 Driven by Steam Eng. 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 mm Stroke 610 mm Driven by Querns from main engines

Auxiliary Engines crank shafts, diameter as per Rule - No. - Position -
Have the Auxiliary Engines been constructed under special survey - Is a report sent herewith -



W272-0071

AIR RECEIVERS: - Have they been made under survey? *Yes.*
 Is each receiver, which can be isolated, fitted with a safety valve as per Rules? *Yes.*
 Can the internal surfaces of the receivers be examined and cleaned? *Yes.*
 Injection Air Receivers, No. *Two* Cubic capacity of each *220 cuft.* Internal diameter *3'-6"* thickness *1"*
 Seamless, lap welded or riveted longitudinal joint *Riveted* Material *M. Steel* Range of tensile strength *28/32* 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 *Yes.* Receivers *Yes.* Separate Fuel Tanks *Yes.*
 Donkey Boilers *Yes.* General Pumping Arrangements *Yes.* Pumping Arrangements in Machinery Space *Yes.*
 Oil Fuel Burning Arrangements *Yes.*

SPARE GEAR.

Has the spare gear required by the Rules been supplied? *Yes.* (Except bearings for top & bottom ends of connecting rod).
 State the principal additional spare gear supplied: *1 C.I. Propeller, 1 cyl. liner & jacket Complete, 1 main piston head, 24 piston rings, 4 fuel valves Complete, 8 spray pumps, 2 Side & center top & bottom end bearing bolts & nuts, 1 v.R. air starting valve, 1 cyl. relief valve Complete, 4 Scavenge Pump 1/2 discs, 1 fuel pump body with x.Hd, Shud. & hull crank liners with valves & clapper, 3 rubber hoses for upper piston cooling water, 6 links of roller chain for camshaft drive, 3 michell pads for tail shaft bearings & 3 ditto for intermediate shaft bearings.*

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

Wm. H. Purdie Director.

Dates of Survey while building: During progress of work in shops - 1941. Sep. 17, 19. Oct. 1, 2, 9, 31. Nov. 10, 11, 21, 25, 26, 28, Dec. 5, 1942. Mar. 12, 13, 14, 18, 24, 25, 29. Apr. 1, 2, 3, 7, 8, 9.
 During erection on board vessel - 13, 14, 15, 16, 17, 20, 21, 22, 23, 24, 27, 28, 29, 30. May. 1, 4, 6, 19, 22, 26. June 5, 8, 11. July 2, 27. Aug. 4, 17, 18, 21, 24, 25, 26, Sep. 3.
 Total No. of visits *62*

Dates of Examination of principal parts - Cylinders *12/3/42, 13/3/42* Covers *✓* Pistons *29/3/42, 29/3/42* Rods *4/4/42* Connecting rods *17/4/42*
 Crank shaft *14/4/42* Flywheel shaft *as crank* Thrust shaft *as crank* Intermediate shafts *4/8/42* Tube shaft *-*
 Screw shaft *4/8/42* Propeller *4/8/42* Stern tube *26/5/42* Engine seating (Bank top) *24/8/42* Engines holding down bolts *3/9/42*
 Completion of fitting sea connections *19/5/42* Completion of pumping arrangements *3/9/42* Engines tried under working conditions *3/9/42*
 Crank shaft, Material *Ingot Steel* Identification Mark *N° 692 WHF. 14/4/42* 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 *WH.F. 4/8/42*
 Tube shaft, Material *-* Identification Mark *-* Screw shaft, Material *Ingot Steel* Identification Mark *N° 11261. Test N° 390 WHF 4/8/42.*
 Identification Marks on Air Receivers *K 1388/9, L.R. N° 21034, L.C.D. 21/4/42.*

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. n.l. perforated pipe for steam led around E.R. & S.R. 8-2 gall. Phenolic Cabinet*
 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? *-*
 If the notation for Ice Strengthening is desired, state whether the requirements in this respect have been complied with? *Not desired.*
 Is this machinery duplicate of a previous case? *Yes.* If so, state name of vessel: *(Standard 600hp).*

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 fixed 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 20 of the rules has been Complied with & safety valves of boilers adjusted to working pressure in accordance with rule requirements.*

The machinery is eligible in my opinion to have notation LMC 9.42 (oil Eng.), T.S. (CL) 2 DB 120hp.

The amount of Entry Fee .. £ *6* : : When applied for, *17 SEP 1942*
 Special £ *100* : *16* :
 Donkey Boiler Fee *Welded bolts.* £ *12* : *12* : When received,
 Travelling Expenses (if any) £ : : 19.

J. H. Haswell
 Engineer Surveyor to Lloyd's Register of Shipping.

Committee's Minute *+ LMC 9.42*
 Assigned *2 L.S. - 120hp*
oil Eng. Ch.



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