

REPORT ON OIL ENGINE MACHINERY.

No 33265

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Date of writing Report 19 1941 When handed in at Local Office 1st Dec 19 41 Port of Sunderland
No. in Survey held at Sunderland Date, First Survey Apr 29 Last Survey Nov 29 19 41
Reg. Book. Number of Visits 67

on the Single Screw vessel "EMPIRE GRENFELL" Tons: Gross 7238 Net 5099
Built at Sunderland By whom built Wm. Leyford & Sons L^{td} Yard No. 648 When built 1941
Engines made at Sunderland By whom made Wm. Leyford & Sons L^{td} Engine No. 648 When made 1941
Donkey Boilers made at Stockton By whom made Stockton Chem. Eng^g & Riley Bhs L^{td} Boiler No. 15009 When made 1941
Brake Horse Power 2500 Owners McKean & Co (Aunan) L^{td} Port belonging to Sunderland
Nom. Horse Power as per Rule 516 Is Refrigerating Machinery fitted for cargo purposes No. Is Electric Light fitted Yes.

OIL ENGINES, &c. Type of Engines Opposed piston airless injection or 1/2 stroke cycle 2 Single or double acting Single
Maximum pressure in cylinders 34 1/2 lbf/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 lbf/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 A. 2400 mm Weight F 534 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 mm as fitted 450 mm Crank pin dia. 450 mm Crank Webs Mid. length breadth 308 mm Mid. length thickness 365 mm Thickness parallel to axis 255 mm Thickness around eye-hole 200 mm
Flywheel Shaft, diameter as per Rule 418 mm as fitted 450 mm Intermediate Shafts, diameter as per Rule 308 mm as fitted 365 mm Thrust Shaft, diameter at collars as per Rule 418 mm as fitted 450 mm
Tube Shaft, diameter as per Rule as fitted — Screw Shaft, diameter as per Rule 341 mm as fitted 392 mm Is the inter screw shaft fitted with a continuous liner Yes.
Bronze Liners, thickness in way of bushes as per Rule 18 mm as fitted 2 1/2 mm Thickness between bushes as per Rule 13 1/2 mm as fitted 16 3/4 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. 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 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 one steam 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 @ 10 1/2 x 12 x 24" Power Driven Lubricating Oil Pumps, including Spare Pump, No. and size one engine driven 8 1/2 x 6 1/2" one steam driven 5 1/2 x 6 x 15"
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" W.E.R. 1 @ 3" in Tunnel well. In Pump Room —
In Holds, &c. N^o 1. 3" φ rs. N^o 2. 3 1/2" φ rs. N^o 3 (Deep Tank) 3 1/2" φ rs. N^o 4. 3" φ rs. N^o 5. 3 1/2" (aft).

Independent Power Pump Direct Suctions to the Engine Room Bilges, No. and size 1 @ 8" (Ballast pump), 1 @ 5"
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.
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 hold 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 one compartment to another Yes. Is the Shaft Tunnel watertight Yes. Is it fitted with a watertight door No (Bulkhead) 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 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 mm Stroke 610 mm Driven by Levers from Main Engine.
Auxiliary Engines crank shafts, diameter as per Rule as fitted — No. — Position —
Have the Auxiliary Engines been constructed under special survey — Is a report sent herewith —



AIR RECEIVERS: - Have they been made under survey? *Yls.* State No. of Report or Certificate *Yls. Ser. 43745.*
 Is each receiver, which can be isolated, fitted with a safety valve as per Rule *Yls.* *Special safe plugs. Relief valves on disch. from compression*
 Can the internal surfaces of the receivers be examined and cleaned? *Yls.* Is a drain fitted at the lowest part of each receiver? *Yls.*

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 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 Actual *603*
600.

IS A DONKEY BOILER FITTED? *Yls.* If so, is a report now forwarded? *Yls.*
 Is the donkey boiler intended to be used for domestic purposes only?

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? *Yls. (except bearings for top & bottom ends of Conn. Rods.)*
 State the principal additional spare gear supplied *1 C.I. Propeller, 1 cyl. liner & jacket complete, 1 main piston head, 2 main piston rings, 4 fuel valves complete, 8 spray plugs, 2 side & centre top & bottom end bearing bolts & nuts, 1 N.R. Starting valve, 1 Cyl. relief valve complete, 4 Scavenge pump 1/2 discs, 1 fuel pump body with & w/d, Strut & shell crank lever with valves slapper, 6 rubber hoses for upper piston cooling water, 1 roller chain for camshaft drive.*

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

Director	
Dates of Survey while building	During progress of work in shops - 1941. Apr. 29. May 2, 22 June 2, 4, 6, 9, 10, 11, 12, 13, 16, 17, 23, 25. July 2, 3, 17, 18, 21, 22, 23, 24, 28, 29, 30, 31. During erection on board vessel - Aug. 1, 5, 6, 7, 11, 12, 13, 15, 18, 19, 20, 21, 25, 26, 27, 28, 29. Sep. 1, 2, 3, 7, 5, 8, 9, 10, 11, 16, 17, 18, 23. Oct. 6, 7, 13, 14, 21, 27, 31. Nov. 5, 19, 29 Total No. of visits 67
Dates of Examination of principal parts - Cylinders	18/7/41 24/7/41 28/7/41 Covers 30/7/41 30/7/41 18/8/41 18/8/41 20/8/41 20/8/41 26/8/41
Crank shaft	19/8/41 Flywheel shaft <i>as crank</i> Thrust shaft <i>as crank</i> Intermediate shafts 16/9/41 Tube shaft ✓
Screw shaft	28/7/41 Propeller 21/7/41 Stern tube 11/6/41, 14/6/41 Engine seatings (<i>Bank top</i>) Engines holding down bolts 21/10/41
Completion of fitting sea connections	12/6/41 Completion of pumping arrangements 19/11/41 Engines tried under working conditions 5/11/41
Crank shaft, Material	<i>Ingot Steel & Cast Steel</i> Identification Mark <i>N° 648 W.H.F.</i> Flywheel shaft, Material <i>Ingot Steel</i> Identification Mark <i>as crank.</i>
Thrust shaft, Material	<i>Ingot Steel</i> Identification Mark <i>as crank.</i> Intermediate shafts, Material <i>Ingot Steel</i> Identification Marks <i>N°s 5210, 5198, 5222</i>
Tube shaft, Material	- Identification Mark - Screw shaft, Material <i>Ingot Steel</i> Identification Mark <i>5204, 5196, 5221</i>
Identification Marks on Air Receivers	<i>K 1221/2.</i> <i>N° 20825</i> <i>L.C.D.</i> <i>14.8.41.</i> <i>N° 5223</i> <i>W.H.F. 28/7/41</i>

Is the flash point of the oil to be used over 150° F. *Yls.*
 Have the requirements of the Rules for oil fuel pipes and tank fittings been complied with? *Yls.*
 Description of fire extinguishing apparatus fitted *1 1/2 dia w.l. perforated pipes for steam led around E.R. & Bk. main 8-29 all "Phonemant" Containers*
 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? *Yls.* If so, state name of vessel *M/V "EMPIRE DAWN" etc.*

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, Specification, Secretary's letters & the requirements of the rules of the Society. The materials & workmanship are good. The Steel Castings used in the crankshaft are, so far as can be seen, sound. The machinery 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, fitted to burn oil fuel (F.P. above 150° F) Section 20 of the rules has been complied with & safety valves adjusted to working pressure in accordance with rule requirements. The machinery is eligible in my opinion to have notation of 100 L.M.C. 11. 41 (oil Eng.)*
T.S. (CL), 2 DB 120 lbs.

The amount of Entry Fee .. £ 6 : : When applied for, *1 DEC 1941*
 Special .. £ 100 : 16 : :
 Welded Const. .. £ 12 : 12 : :
 Donkey Boiler Fee .. £ .. : .. : :
 Specification .. £ 25 : 4 : :
 Travelling Expenses (if any) £ .. : .. : :
 Committee's Minute *FRI. 19 DEC 1941*
 Assigned *+ L.M.C. 11. 41*
2 DB - 120 lbs
oil Eng.

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



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