

REPORT ON OIL ENGINE MACHINERY.

No. 1928

Dec. 14 1921

Received at London Office

Date of writing Report 2nd Dec. 1921 When handed in at Local Office 13th Dec. 1921 Port of Barrow in FurnessNo. in Survey held at Barrow in Furness Date, First Survey 9th Feb. 1920 Last Survey 5th Dec. 1921
Reg. Book. 30316 on the Single Twin Triple Screw vessels "SCOTTISH MAIDEN" Number of Visits 138Tons Gross 6993.25
Net 4036.14Master ✓ Built at Barrow in Furness By whom built Vickers Ltd Yard No. 581 When built 1921Engines made at Barrow in Furness By whom made Vickers Ltd Engine No. 581 When made 1921
Renfrew + Balcock + WilsonDonkey Boilers made at Barrow in Furness By whom made Vickers Ltd Boiler No. 581 When made 1921Brake Horse Power 2500 Owners Tankers Ltd. Port belonging to LondonNom. Horse Power as per Rule 562 Is Refrigerating Machinery fitted for cargo purposes No Is Electric Light fitted YesOIL ENGINES, &c.—Type of Engines Twin Screw Diesel (Solid Injection type) 2 or 4 stroke cycle 4 Single or double acting SingleMaximum pressure in cylinders 500 lbs per sq. in. No. of cylinders 12 No. of cranks 12 Diameter of cylinders 24 1/2"Length of stroke 39" Revolutions per minute 118 Means of ignition Diesel type of engine Kind of fuel used Diesel oil .868 sp. gr.
Kash point above 150° F.Is there a bearing between each crank yes Span of bearings (Page 92, Section 2, par. 7 of Rules) 35 1/2"Distance between centres of main bearings 4'-3 1/2" Is a flywheel fitted yes on crank shaft coupling Diameter of crank shaft journals as per Rule 14.85"
as fitted 15 1/2"Diameter of crank pins 15 1/2" Breadth of crank webs as per Rule 19.75 Thickness of ditto as per Rule 8.3"
as fitted 21" as fitted 9.55"Diameter of flywheel shaft as per Rule 12.47" Diameter of tunnel shaft as per Rule 13.1"
as fitted 14" as fitted 14"Diameter of screw shaft as per Rule 14" Is the screw shaft fitted with a continuous liner the whole length of the stern tube No
as fitted 14 3/8"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 joints burned ✓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 ✓ If without liners, is the shaft arranged to run in oil yesType of outer gland fitted to stern tube B. Vickers stern tube glands for oil lubricated shafts Length of stern bush 5'-0 3/4" Diameter of propeller 12'-3"Pitch of propeller 11'-3" No. of blades 3 state whether moveable No Total surface 44 square feetMethod of reversing by servo motor Is a governor or other arrangement fitted to prevent racing of the engine when declutched ✓ Thickness of cylinder liners 2 1/2" at topAre the cylinders fitted with safety valves yes Means of lubrication Forced 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 Exhaust led up the funnel or into boiler furnacesNo. of cooling water pumps one Is the sea suction provided with an efficient strainer which can be cleared within the vessel yes No. of bilge pumps fitted to the main engines double acting Diameter of ditto 7 1/2" Stroke 8"Can one be overhauled while the other is at work ✓ No. of auxiliary pumps connected to the main bilge lines two How driven Steam
Ballast: 10" x 14" x 16" Gen. Ser.: 10 1/2" x 8" x 21" 2-3 1/2" in forehold connected to aux. pump in fore pump room onlyNo. and sizes of suction connected to both main bilge pumps and auxiliary bilge pumps:—In engine room 1-6" to aux. pumps
2-3 1/2" Sizes of pumps 10" x 14" x 16"Is the ballast pump fitted with a direct suction from the engine room bilges yes State size 6" Is a separate auxiliary pump suction fitted in Engine Room and size pumps; 7" dia.Are all the bilge suction pipes fitted with roses yes Are the roses in Engine Room always accessible yesAre the sluices on Engine Room bulkheads always accessible None Are all connections with the sea direct on the skin of the ship yesAre they valves or cocks Both Are they fixed sufficiently high on the ship's side to be seen without lifting the floor plates yesAre the discharge pipes above or below the deep water line above Are they each fitted with a discharge valve always accessible on the plating of the vessel yesAre all pipes, cocks, valves and pumps in connection with the machinery accessible at all times yes Are the bilge suction pipes, cocks and valves arranged so as to prevent any communication between the sea and the bilges yesIs the screw shaft tunnel watertight None Is it fitted with a watertight door ✓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 ✓No. of main air compressors two No. of stages 3 Diameters 16 1/2" x 9" x 4 3/4" Stroke 8" Driven by SteamNo. of auxiliary air compressors nil No. of stages ✓ Diameters ✓ Stroke ✓ Driven by ✓No. of small auxiliary air compressors nil No. of stages ✓ Diameters ✓ Stroke ✓ Driven by ✓No. of scavenging air pumps nil Diameter ✓ Stroke ✓ Driven by ✓Diameter of auxiliary Diesel Engine crank shafts as per Rule ✓ Are the air compressors and their coolers made so as to be easy of access yes
as fitted ✓AIR RECEIVERS:—No. of high pressure air receivers nil Internal diameter ✓ Cubic capacity of each ✓material Seamless, lap welded or riveted longitudinal joint Range of tensile strength ✓thickness working pressure by Rules No. of starting air receivers Gen. Ser. Internal diameter 30"Total cubic capacity 500 cub. ft. Material Steel Seamless, lap welded or riveted longitudinal joint Riveted jointRange of tensile strength 28/32 tons thickness 7/8" Working pressure by rules 680 lbs. Is each receiver, which can be isolated, fitted with a safety valve as per Rule with relief valvesCan the internal surfaces of the receivers be examined yes What means are provided for cleaning their inner surfaces Access through 16" x 12" manholeIs there a drain arrangement fitted at the lowest part of each receiver yes

ARE AUXILIARY ~~IS A~~ DONKEY BOILERS FITTED? *yes* If so, is a report now forwarded? *yes* *pls Rpt No 41060*

HYDRAULIC TESTS:-

DESCRIPTION.	DATE OF TEST.	WORKING PRESSURE.	TEST PRESSURE.	STAMPED.	REMARKS.
ENGINE CYLINDERS	13-12-20 to 1-3-21 (14 visits)	500 lbs	1000 lbs	Tested to 1000 lbs J.H.	
" " COVERS	14-1-21 to 11-8-21 (" ")	15 lbs	30 lbs	Tested to 30 lbs J.H.	also tested explosion face of covers to 1000 lbs
" " JACKETS	26-1-21 to 4-4-21 (12 ")	15 lbs	30 lbs	Tested to 30 lbs J.H.	
" " PISTON WATER PASSAGES	22-2-21 to 1-4-21 (12 ")	20 lbs	100 lbs	Tested to 100 lbs J.H.	
MAIN COMPRESSORS—1st STAGE	Made at Peterboro'				
" 2nd "					
" 3rd "					
AIR RECEIVERS—STARTING	21-12-20 to 3-2-21 (6 visits)	600 lbs	800 lbs	LLOYD'S TEST 800 lbs W.P. 600 lbs J.H.	
" INJECTION	✓				
AIR PIPES	16-6-21 to 12-10-21 (5 visits)	600 lbs	1200 lbs	Tested to 1200 lbs J.H.	
FUEL PIPES	21-5-21 to 19-10-21 (5 ")	4000 lbs	6000 lbs	Tested to 6000 lbs J.H.	
FUEL PUMPS	19-4-21 & 27-4-21	4000 lbs	6000 lbs	Tested to 6000 lbs J.H.	
SILENCER	Not jacketed.				
" WATER JACKET					
SEPARATE FUEL TANKS	✓				

PLANS. Are approved plans forwarded herewith for shafting *yes* Receivers *yes* Separate Tanks *✓*

SPARE GEAR 6 Inlet valves, 6 Exhaust Valves, 2 Spray valves, 12 spray valve spindles, 24 spray valve nozzles, one installation of springs for Inlet, Exhaust, Spray, air starting & relief valves, one installation of all other springs fitted, 2 piston complete with skirt & rings, 1 pair of crank shaft bearings with studs & nuts, 2 pairs of crank pin bearings with bolts & nuts, 2 double pairs of crosshead bearings with bolts & nuts, 2 each inlet & exhaust ahead cams, one each inlet & exhaust astern cams, 1 installation of fuel cam to pieces & 2 air starting cams, one installation of fuel oil pump plungers valves, seats, guides & spring one set of bridge pump valves & plungers rings, 1 set of impellers & bushes & one pump spindle for circulating water pumps, 1 installation of piston cooling pipes, 2 pairs crank shaft & three pairs of connecting rod & blades for bearing oil pumps, 6 valves & seats for ditto, 1 set of crank shaft, intermediate shaft, & propeller shaft coupling bolts, 1 set of cyl. cover studs & nuts, 1 installation of ball faces, suitable length of fuel & air delivery pipes & assorted bolts & nuts. Air compressors, 4 main bearing brasses complete & 2 pin brasses complete, 2 sets air inlet & delivery valves, 2 sets air piston rings & 2 sets of steam piston rings

The foregoing is a correct description, *Ballast pumps: 4 each suction & delivery valves & 3 piston rings. O.F. transfer pump: one each suction & delivery valves & 3 piston rings. 4 groups valves & springs, bucket complete & one set piston rings. Pls: 30*
FOR VICKERS LIMITED,
Manufacturer. Spare tubes, 1 feed regulator valve & float, 2 feed check valves & 2 safety valves springs, feed pumps 1 set each & delivery valves & 2 sets each steam & water piston

Dates of Survey while building	During progress of work in shops --	26-1-20, 9, May, 13-14-19-21, June 5-8, July 23, Aug 13-24, Sept. 9, 13-14-28, Oct. 7-18-30, Dec. 6-9, 13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30, Jan. 2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30, Feb. 2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30, Mar. 1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30, Apr. 1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30, May, 4-5-10-11-17-18-24-25-31, June 2-8-9-10-11-14-21-22-23-24-29, Jul. 1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30, Aug. 1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30, Sept. 1-5-6-7-14-15-20-23-29-30, Oct. 5-10-11-12-18-19-27, Nov. 2-5
	During erection on board vessel --	2-4-7-8-9-15-17-22-23-24-25-26-28-30, Dec. 2-5
	Total No. of visits	138

Dates of Examination of principal parts—Cylinders 13/12/20 to 1/3/21 Covers 14/1/21 to 11/8/21 Pistons 22/2/21 to 1/4/21 Rods 2/2/21 Connecting rods 21/2/21 Crank shaft 9/2/21 Thrust shaft 18/5/21 Tunnel shafts 16/6/21 Screw shaft 16/6/21 Propeller 24/4/21 Stern tube 10/6/21 Engine seatings 18/8/21 Engines holding down bolts 2/11/21 Completion of pumping arrangements 24/11/21 Engines tried under working conditions 26/11/21

Completion of fitting sea connections 6/4/21 Stern tube 27/6/21 Screw shaft and propeller 1/4/21
Material of crank shaft *Steel* Identification Mark on Do. *LLOYD'S N°244 J.H.* Material of thrust shaft *Steel* Identification Mark on Do. *LLOYD'S N°244 J.H.*
Material of tunnel shafts *Steel* Identification Marks on Do. *LLOYD'S N°244 J.H.* Material of screw shafts *Steel* Identification Marks on Do. *LLOYD'S N°244 J.H.*

Is the flash point of the oil to be used over 150° F. In Engines, *yes*. The boilers are fitted to burn low flash oil.
Is this machinery duplicate of a previous case *yes*. If so, state name of vessel *M.V. "Scottish Standard"*

General Remarks (State quality of workmanship, opinions as to class, &c.) *The Machinery of this vessel has been constructed under special survey, & in accordance with the Rules & approved plans. The materials of construction have been tested as required & found sound, & the workmanship is good throughout. The cylinder liners & jackets, the cover jackets & piston water passages, the air receivers & air pipes, the fuel pumps, pipes & connections have been tested as required & found tight & sound. The Machinery has been efficiently fitted on board, on completion was tried under full power at sea with satisfactory results. For remarks on the boilers & the low flash oil system see continuation of report.*
The Machinery of this vessel is, in my opinion, eligible to be classed + L.M.C. 12-21 "Fitted for low flash oil fuel, 12-21, for boilers only", subject to the oil engines & water tube boilers being surveyed annually

The amount of Entry Fee ... £ 6 : 0 : 0 When applied for, Special ... £ 103 : 2 : 0 13th Dec. 1921
Donkey Boiler Fee ... £ 35 : 10 : 0 When received, Travelling Expenses (if any) ... £ 8 : 17 : 0 22 Dec 1921
Committee's Minute
Assigned *+ L.M.C. 12.21 subject oil engines*
DB. fitted for low flash oil fuel 12.21
John Houston
Engineer Surveyor to Lloyd's Register of Shipping.
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M.V. Scottish Maiden

The Babcock & Wilcox water tube boilers, detailed in Glasgow Report No. 41060 attached hereto, have been efficiently constructed & fitted on board complete with all mountings etc. They are approved for a working pressure of 200 lbs, & they have been tested by hydraulic pressure to 400 lbs, but their safety valves have been adjusted under steam to 125 lbs only, as all pipe lines & auxiliary machinery are designed for a working pressure of 120 lbs. It is submitted therefore that this constitutes the working pressure. An accumulation test was carried out on the safety valves with satisfactory results, & the thicknesses of the adjusting washers are:- Star. Bls. S.V. $1\frac{1}{32}$ " P.V. $\frac{7}{16}$ " Port. Bls. S.V. $1\frac{1}{32}$ " P.V. $\frac{5}{32}$ ".

The boilers are fitted for burning low flash oil, the oil fuel installation being fitted in an isolated pump room, situated in the Engine Room, complete with air lock, interlocking doors, gas extractor, fan, glass lights for inspection purposes etc. The pump room & air lock was subjected to an air pressure equivalent to 3" head of water, after the doors were fitted in place, & found tight & in order.

The steam for the oil fuel pressure pumps is controlled at the pumps, in the boiler room & also from deck, & all oil fuel suction valves are geared to deck outside the machinery space. Steam fire extinguishing pipes have been fitted in the boiler room with the steam control led to deck.

In my opinion the installation, as fitted, merits the approval of the Committee for the burning of low flash oil.

This applies to the boilers only, as it is not intended to use oil in the Main Engines having a flash point below 150° F. The requirements of Section 49, so far as they apply, have been complied with in that respect.

John Houston.



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