

REPORT ON STEAM TURBINE MACHINERY.

No. 51945

Received at London Office 19 DEC 1931

Date of writing Report 10 When handed in at Local Office 2. 12. 10³¹ Port of Glasgow
No. in Survey held at Glasgow Date, First Survey 1st Oct 1930 Last Survey 26th Nov 1931
Reg. Book. 39723 on the Steel Twin Screw Steamer "Carthage" (Number of Visits 148)
Built at Glasgow By whom built A. Stephen & Sons Ltd. Yard No. 535 When built 1931
Engines made at do. By whom made James Watson & Co. Ltd. Engine No. 535 When made 1931
Boilers made at do. By whom made A. Stephen & Sons Ltd. Boiler No. 635 When made 1931
Shaft Horse Power at Full Power Owners T. & C. Steam Navigation Co. Port belonging to London
Nom. Horse Power as per Rule 2997 Is Refrigerating Machinery fitted for cargo purposes y/no Is Electric Light fitted y/no
Trade for which Vessel is intended China

STEAM TURBINE ENGINES, &c.—Description of Engines Parsons Turbines.

No. of Turbines Ahead 6 ✓ Direct coupled, single reduction geared } to two ✓ propelling shafts. No. of primary pinions to each set of reduction gearing 3 ✓
Astern 4 ✓ double reduction geared }
direct coupled to { Alternating Current Generator — phase — periods per second } rated — Kilowatts — Volts at — revolutions per minute;
for supplying power for driving — Propelling Motors, Type —
rated — Kilowatts — Volts at — revolutions per minute. Direct coupled, single or double reduction geared to — propelling shafts.

TURBINE BLADING.

TURBINE BLADING.	H.P.			I.P.			L.P.			ASTERN.		
	HEIGHT OF BLADES.	DIAMETER AT TIP.	NO. OF ROWS.	HEIGHT OF BLADES.	DIAMETER AT TIP.	NO. OF ROWS.	HEIGHT OF BLADES.	DIAMETER AT TIP.	NO. OF ROWS.	HEIGHT OF BLADES.	DIAMETER AT TIP.	NO. OF ROWS.
1ST EXPANSION	1 1/2"	18 1/2"	15	1 7/16"	23 3/8"	4	1 1/8"	3-1 3/4"	3	1-3 Bucket Impulse		
2ND	3/4"	19"	13	1 9/16"	24 3/8"	1	2 1/16"	3-8 3/8"	3	Wheel 2-10 3/4" P.C.D.		
3RD	1"	19 1/2"	13	1 13/16"	24 3/8"	6	3 1/4"	3-10 1/2"	2			
4TH	1 1/2"	20 1/2"	13	2 3/8"	25 3/8"	6	4"	4-0"	2	LP Astern		
5TH				3 3/8"	24 1/4"	6	5 1/4"	4-2 1/2"	2	1-2 Bucket Impulse		
6TH							1 3/8"	4-6 1/4"	2	Wheel 4-1 1/8" P.C.D.		
7TH							4 3/8"	4-7 3/4"	1	2 3/8"	3-1 3/4"	2
8TH							9 1/4"	4-10 1/2"	1	3 3/8"	3-3 3/4"	2
9TH							9 1/4"	4-10 1/2"	1	4 3/4"	3-6 1/2"	2
10TH							9 1/4"	4-10 1/2"	1	4 3/4"	3-6 1/2"	2
11TH							9 1/4"	4-10 1/2"	1	4 3/4"	3-6 1/2"	2
12TH												
	See Proc Report No. 84358 for Reduction Gears											

Shaft Horse Power at each turbine { H.P. 2220 2285 ✓ I.P. 2260 2100 ✓ L.P. 2420 2615 ✓ }
Revolutions per minute, at full power, of each Turbine Shaft { H.P. 2480 2400 ✓ I.P. 2480 2400 ✓ L.P. 2012 1900 ✓ }
1st reduction wheel 129 MAX. 126 NORMA
main shaft

Rotor Shaft diameter at journals { H.P. 5 1/2" ✓ I.P. 5 1/2" ✓ L.P. 8 1/2" ✓ }
Pitch Circle Diameter { 1st pinion — 1st reduction wheel — Width of Face { 1st reduction wheel — main wheel — }
2nd pinion — main wheel —

Distance between centres of pinion and wheel faces and the centre of the adjacent bearings { 1st pinion — 1st reduction wheel —
2nd pinion — main wheel —

Flexible Pinion Shafts, diameter { 1st — 2nd — }
Pinion Shafts, diameter at bearings { External 1st { 2nd { diameter at bottom of pinion teeth { 1st — 2nd — }
Internal 1st { 2nd {

Wheel Shafts, diameter at bearings { 1st — 2nd — }
diameter at wheel shroud, { 1st — 2nd — }
main — Propelling Motor Shaft, diameter at bearings —

Intermediate Shafts, diameter { as per rule 15.3" ✓ as fitted 16.0" ✓ }
Thrust Shaft, diameter at collars { as per rule 16.06" ✓ as fitted 17.0" ✓ }
Tube Shaft, diameter { as per rule — as fitted — }
Screw Shaft, diameter { as per rule 16.75" ✓ as fitted 17.75" ✓ }
shaft fitted with a continuous liner { y/no ✓ }
Bronze Liners, thickness in way of bushes { as per rule 1 1/2" ✓ as fitted 1" ✓ }

Thickness between bushes { as per rule 3/4" ✓ as fitted 3/4" ✓ }
Is the after end of the liner made watertight in the propeller boss y/no ✓
If the liner is in more than one length are the junctions

made by fusion through the whole thickness of the liner —
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 6-5 3/4" ✓
Propeller, diameter 17-6" Pitch 16-6" No. of Blades 3 ✓ State whether Moveable y/no ✓ Total Developed Surface 88. ✓ square feet.

If Single Screw, are arrangements made so that steam can be led direct to the L.P. Turbine y/no ✓ Can the H.P. or L.P. Turbine exhaust direct to the

Condenser y/no ✓ No. of Turbines fitted with astern wheels 4 ✓ Feed Pumps { No. and size 2 Turbine 70 T/H: 1 duplex 18 1/2" x 24" 2 duplex 18 1/2" x 24" 18" for donkey boiler }
How driven Steam

Pumps connected to the Main Bilge Line { No. and size 3 @ 150 T/H: 1 @ 200 T/H: 1 @ 24" @ 200 T/H. }
How driven Elec. Motors ✓

Ballast Pumps, No. and size 1 @ 200 T/H ✓ Lubricating Oil Pumps, including Spare Pump, No. and size 2 @ 9" x 10" x 24" ✓

Are two independent means arranged for circulating water through the Oil Cooler y/no ✓ Suctions, connected to both Main Bilge Pumps and Auxiliary Bilge Pumps, No. and size:—In Engine and Boiler Room 4 @ 3 1/2": 2 @ 3": 3 @ 4": 6 @ 1 1/2" ✓ In Holds, &c. No. 1-1 @ 3": No. 2-2 @ 2 1/2": No. 3-2 @ 2 1/2": No. 4-2 @ 3": No. 5-1 @ 3": No. 6-2 @ 3"

Main Water Circulating Pump Direct Bilge Suctions, No. and size 2 @ 16" ✓ Independent Power Pump Direct Suctions to the Engine Room Bilges, No. and size 4 @ 6" ✓

Are all the Bilge Suction pipes in Holds and Tunnel Well fitted with strum-boxes y/no ✓

Are the Bilge Suctions in the Machinery Space led from easily accessible mud-boxes, placed above the level of the working floor, with straight tail pipes to the bilges y/no ✓

Are all Sea Connections fitted direct on the skin of the ship y/no ✓ Main injection on Are they fitted with Valves or Cocks B.T.H. ✓

Are they fixed sufficiently high on the ship's side to be seen without lifting the stokehold plates y/no ✓ Are the Overboard Discharges above or below the deep water line Bilge ✓

Are they each fitted with a Discharge Valve always accessible on the plating of the vessel y/no ✓ Are the Blow Off Cocks fitted with a spigot and brass covering plate y/no ✓

What pipes pass through the bunkers None ✓ How are they protected —

What pipes pass through the deep tanks None ✓ Have they been tested as per rule —

Are all Pipes, Cocks, Valves, and Pumps in connection with the machinery and all boiler mountings accessible at all times y/no ✓

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 y/no ✓ Is the Shaft Tunnel watertight y/no ✓ Is it fitted with a watertight door y/no ✓ worked from D. Deck.

Int. Drafting	
47885	47909.
47886	47911.
47887.	47912.
47888.	47913.
47889.	47915.
47891.	47926.
47893.	47907.

FOR
ALEXANDER STEPHEN & SONS, LIMITED.

Dates of Survey while building

During progress of work in shops -- 1930 Oct.: 1-8-15-22 Nov.: 10-21-25 Dec.: 4-15-22-24-29-30 (1931) Jan.: 6-10-19-23 Feb.: 2-10-17-20-23-30
During erection on board vessel --- Mar.: 2-4-6-10-12-13-17-18-19-20-23-25-30-31 Apr.: 2-3-7-8-9-10-13-14-15-17-20-21-22-24-27-28-29-30 May: 1-2-3-4-5-8-9-10-11-12-13-16-17-18-19-22-23-24-25-26-29-30 June: 1-2-3-4-5-8-9-10-11-12-13-16-17-18-19-22-23-24-25-26-29-30 July: 1-2-3-4-5-8-9-10-11-12-13-16-17-18-19-22-23-24-25-26-29-30 Aug: 1-2-3-4-5-8-9-10-11-12-13-16-17-18-19-22-23-24-25-26-29-30 Sept: 1-2-3-4-5-8-9-10-11-12-13-16-17-18-19-22-23-24-25-26-29-30 Oct: 1-2-3-4-5-8-9-10-11-12-13-16-17-18-19-22-23-24-25-26-29-30 Nov: 1-2-3-4-5-8-9-10-11-12-13-16-17-18-19-22-23-24-25-26-29-30 Dec: 1-2-3-4-5-8-9-10-11-12-13-16-17-18-19-22-23-24-25-26-29-30

Total No. of visits - 148 -

Dates of Examination of principal parts-Casings 8.4.31. Rotors 17.8.31. Blading 1.9.31 Gearing

Wheel shaft Thrust shaft 4.6.31. Intermediate shafts 23.6.31. Tube shaft - Screw shaft 30.6.31.

Propeller 7.7.31. Stern tube 11.6.31. Engine and boiler seatings 4.8.31. Engine holding down bolts 22.10.31.

Completion of pumping arrangements 26.11.31 Boilers fired 15.10.31. Engines tried under steam 26.11.31.

Main boiler safety valves adjusted 3.11.31. Thickness of adjusting washers P.F.F. 1/2 : S.F.F. 1/2 : P.A.E. 1/2 : S.A.F. 1/2 : T 1/2 } 3905: 1105
Rotor shaft, Material and tensile strength J.M. Sugot Steel 34.5/36.5 tons Identification Mark 2239: 2340 }
Flexible Pinion Shaft, Material and tensile strength - Identification Mark 3998: 1152 }

Pinion shaft, Material and tensile strength Identification Mark

1st Reduction Wheel Shaft, Material and tensile strength - Identification Mark

Wheel shaft, Material Identification Mark Thrust shaft, Material M. Sugot Steel Identification Mark 48291 }
Intermediate shafts, Material M. Sugot Steel Identification Marks 47916 }
Screw shaft, Material do. Identification Marks 47918 }
Steam Pipes, Material Steel Test pressure 12 1/2 lb

Date of test 26/10/31 Is an installation fitted for burning oil fuel y/o.

General Remarks (State quality of workmanship, opinions as to class, &c.)

The Machinery of this vessel has been built under special Survey and in accordance with the Rules. The Materials and workmanship are good. It has been efficiently secured in position on board and afterwards tried under full working conditions and found in order.

The Machinery of this vessel is eligible, in my opinion to be
 classed in the Register Book with notation of +L.M.C. 11-31. Suits for oil fuel 11-31.
 F.P. above 150°F.

The amount of Entry Fee ... £	6	-	} When applied for, 3/12/31
Special 918780.19.0	104	19	
2 Donkey Boilers Fee ... £	31	4	} When received, 8/12/31
Travelling Expenses (if any) £	:	:	

James Munro
Engineer Surveyor to Lloyd's Register of Shipping.

Committee's Minute GLASGOW 8 - DEC 1931

Assigned + LMC 1131.

Fitted for oil fuel 1131
F.P. above 150°F.



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Foundation