

REPORT ON STEAM TURBINE MACHINERY.

MOB. 17765

No. 18591

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4a.

Date of writing Report 7th Oct 1944 When handed in at Local Office 9th Oct 1944 Port of West Hartlepool
 Date, First Survey 28th May, 1943 Last Survey 4th Oct 1944
 (Number of Visits 78)

Survey held at West Hartlepool
 on the S/S "WAVE EMPEROR"
 Tons Gross 8196 Net 4566
 built at Haverston Hill By whom built Furness S.B. Co. Yard No. 361 When built 1944
 Engines made at Hartlepool By whom made Richardson Westgarth Engine No. 2448 When made 1944
 Boilers made at " By whom made " Boiler No. 2448 When made 1944
 Shaft Horse Power at Full Power 6800 Owners Admiralty Port belonging to London
 Nom. Horse Power as per Rule 1215 Is Refrigerating Machinery fitted for cargo purposes No. Is Electric Light fitted Yes
 Trade for which Vessel is intended 1226 Admiralty Fleet Order

STEAM TURBINE ENGINES, &c.—Description of Engines Double Reduction geared Turbines

No. of Turbines Ahead 2 Direct coupled, single reduction geared } to 1 propelling shafts. No. of primary pinions to each set of reduction gearing 2
 Astern 1 double reduction geared }
 Direct coupled to Alternating Current Generator phase periods per second } rated: Kilowatts Volts at revolutions per minute:
 Direct Current Generator }
 Propelling Motors, Type
 Direct coupled, single or double reduction geared to propelling shafts.

TURBINE STAGES	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	1.23	17.46	7	1.324	39.75	3	Rotor 4	49.5	1			
2nd "	1.52	18.04	7	1.896	49.5	1	" 7	52.75	1			
3rd "	1.68	18.36	6	2.468	tapered	1	" 9	55	1			
4th "	2.07	19.14	6	3.109	between	1	Impulse Blading					
5th "	2.58	20.16	6	3.824	1st	1						
6th "				4.539	4	1						
7th "				5.3	12th	1						
8th "	1.715	30.47	1	6.13	expansion	1						
9th "	1.68	31.69	1	7.047		1						
10th "				8.185		1						
11th "				9	56	1						

Shaft Horse Power at each turbine { H.P. 3500 } Revolutions per minute, at full power, of each Turbine Shaft { H.P. 3969 } 1st reduction wheel 431
 { I.P. 3300 } { L.P. 2863 } main shaft 116
 { L.P. 5" } Pitch Circle Diameter { 1st pinion 9.426" } 1st reduction wheel 51.204" Width of Face { 1st reduction wheel 20 1/2 + 3" gap }
 { H.P. 5" } { 2nd pinion 19.789" } main wheel 124.647" { main wheel 39 + 2 1/2" }
 { L.P. 7" } { 1st pinion 10 1/8" } 1st reduction wheel 2'-8 1/2"
 { 2nd pinion 16 3/4" } main wheel 20"

Distance between centres of pinion and wheel faces and the centre of the adjacent bearings { 1st pinion 6 1/2" } diameter at bottom of pinion teeth { 1st 8.91, 12.552 }
 { 2nd pinion 11" } { 2nd 18.941 }
 Flexible Pinion Shafts, diameter { 1st 11" } Pinion Shafts, diameter at bearings { External 1st 1 1/2" } diameter at wheel shroud, { 1st 3'-11" } Generator Shaft, diameter at bearings ✓
 { 2nd 15.54" } { Internal 1st 1 1/2" } { 2nd 11" } Propelling Motor Shaft, diameter at bearings ✓
 Wheel Shafts, diameter at bearings { main 17 1/2" } Thrust Shaft, diameter at collars as per rule 16.31" Tube Shaft, diameter as per rule ✓
 { 1st 15.54" } as fitted 17" as fitted ✓
 Intermediate Shafts, diameter as per rule 16" as fitted ✓

Screw Shaft, diameter as per rule 17.04" Is the shaft fitted with a continuous liner { Yes } Bronze Liners, thickness in way of bushes as per rule 8.21" as fitted 7/8"
 as fitted 17 3/4" 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 ✓
 as per rule 16 1/5" as fitted 3/4" 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 ✓

Propeller, diameter 18'-0" Pitch Varying No. of Blades 4 State whether Movable No Total Developed Surface 121 square feet.
 If Single Screw, are arrangements made so that steam can be led direct to the L.P. Turbine { Yes } Can the H.P. or L.P. Turbine exhaust direct to the Condenser { Yes } No. of Turbines fitted with astern wheels one Feed Pumps { 2-3" Turbo Feed Pumps (Wears) }
 No. and size 1-10" x 9" x 10" Fire & Bilge, 1-10" x 9" x 10" Ballast
 How driven Steam

Pumps connected to the Main Bilge Line { No. and size 1-10" x 9" x 10" } Lubricating Oil Pumps, including Spare Pump, No. and size 2-9" x 8" x 18"
 How driven Steam Suctions, connected to both Main Bilge Pumps and Auxiliary Bilge
 Ballast Pumps, No. and size 1-10" x 9" x 10" Oil Cooler { Yes } Are two independent means arranged for circulating water through the Oil Cooler { Yes }
 Pumps, No. and size:—In Engine and Boiler Room 4-3 1/2" + 2-2 1/2" E. & B. Space, 1-2 1/2" Tunnel Well.

In Holds, &c. Main Water Circulating Pump Direct Bilge Suctions, No. and size 1-13 1/2" Independent Power Pump Direct Suctions to the Engine Room
 Bilges, No. and size 1-5" Ballast Pump Are all the Bilge Suction pipes in Holds and Tunnel Well fitted with strum-boxes { Yes }
 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 { 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 stokehold 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 { ✓ } How are they protected { ✓ }
 What pipes pass through the deep tanks { ✓ } 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 { 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 { ✓ } Is it fitted with a watertight door { ✓ } worked from { ✓ }

BOILERS, &c. — (Letter for record **S**) Total Heating Surface of Boilers **6840 sq. ft.**
 Is Forced Draft fitted **Yes** No. and Description of Boilers **2 Foster Wheeler "D" type Working Pressure 480 lb**
 Is a Report on Main Boilers now forwarded? **Yes** If so, is a report now forwarded? **Yes**
 Is **a Donkey** Boiler fitted? **Yes** If so, is a report now forwarded? **Yes**
 Plans. Are approved plans forwarded herewith for Shafting **18/6/42** Main Boilers **18/6/42** Auxiliary Boilers **✓** Donkey Boilers **29/6/42**
 (If not state date of approval)
 Superheaters **22/7/42** General Pumping Arrangements **30/9/43** Oil Fuel Burning Arrangements **1/6/44**
 Spare Gear. State the articles supplied:—

For RICHARDSONS, WESTGATE
W. E. Dromey
 DIRECTOR Manufacturer.

The foregoing is a correct description,

Dates of Survey while building
 During progress of work in shops — **1943 May 28, July 14 Oct 7, 28, 29 Nov 8, 23, 24, Dec 3, 13, 15, 20, 1944 Jan 10, 11, 12, 14, 18, 19, 24, 28, 31, Feb 1, 3, 9, 11, 14, 16, 26, 28, 29, Mar 7, 9, 10, 13, 14, 20, 21, 23, 31, Apr 3, 12, 15, May 3, 4, 12, 18, 19, 23, June 5, 7, 8, 12, 15, 21, 22, 23, 27, July 5, 10, 11, 17, 20, 27, Aug 10, 18, 21, 23, 28, Sept 2, 7, 8, 12, 16, 27, Oct 4**
 During erection on board vessel — **18, 21, 23, 28, Sept 2, 7, 8, 12, 16, 27, Oct 4**
 Total No. of visits **78**

Dates of Examination of principal parts—Casings **7.1.44** Rotors **17.1.44** Blading **3.5.44** Gearing **13.1.44**
 Wheel shaft **13.1.44** Thrust shaft **20.9.44** Intermediate shafts **15.9.44** Tube shaft **✓** Screw shaft **18.8.44**
 Propeller Stern tube **11.9.44** Engine and boiler seatings Engine holding down bolts
 Completion of pumping arrangements Boilers fixed Engines tried under steam

Main boiler safety valves adjusted Thickness of adjusting washers **3/2433 WH**
 Rotor shaft, Material and tensile strength **steel 3/4/38** Identification Mark **56574, 2490**
 Flexible **Couplings** Shaft, Material and tensile strength **steel, stars 28/32, sleeves 3/4/38** Identification Mark **1064 J.L.S., T.T.**
 Pinion shaft, Material and tensile strength **Nickel Steel 40** Identification Mark **56703, 57189 WH**
 1st Reduction Wheel Shaft, Material and tensile strength **Nickel Steel 40** Identification Mark **12884 H.A.I., J.2502**
 Wheel shaft, Material **steel** Identification Mark **7109 WH** Thrust shaft, Material **steel** Identification Mark **12305 HA**
 Intermediate shafts, Material **steel** Identification Marks **3992, 2685 C.P.** Tube shaft, Material **✓** Identification Marks **✓**
 Screw shaft, Material **steel** Identification Marks **51 A.E.G.** Steam Pipes, Material **steel** Test pressure **1290, 1440**

Date of test **18/9/44 & 7/9/44 & 12/9/44** Is an installation fitted for burning oil fuel **Yes**
 Is the flash point of the oil to be used over 150°F. Have the requirements of the Rules for carrying and burning oil fuel been complied with **Yes**

Is this machinery a duplicate of a previous case **Yes** If so, state name of vessel **2746**
 General Remarks (State quality of workmanship, opinions as to class, &c.) **The engines + boilers of this vessel have been constructed under Special Survey + in accordance with the approved plans + specifications. The workmanship + materials have been found good. The machinery has been forwarded to Haverton Hill for fitting on board Messrs. Furness S.B. Co's Yard No 361. The machinery of this vessel will be eligible, in my opinion, to have record of + L.M.C. with date - on completion.**

Note :- Engine No 2747 has been allocated to this vessel + has now been re-numbered.

The amount of Entry Fee	£ 6 : 0 : 0	When applied for,
Special L.M.C.	£ 89 : 14 : 7	9/10/1944
5A drums	£ 28 : 13 : 8	When received,
Donkey Boiler Fee		
Supervision		
Travelling Expenses (if any)	£ : : :	19

Clive Bell
 Engineer Surveyor to Lloyd's Register of Shipping.

Committee's Minute **FRI. 26 JAN 1945**

Assigned **Su F.E. machy rph**