

# REPORT ON STEAM TURBINE MACHINERY. No. 18409

-7 MAY 1943

Rpt. 4a. Date of writing Report 6-5-1943 When handed in at Local Office 6-5-1943 Port of W. Hartlepool  
 No. in Survey held at Hartlepool Date, First Survey 18th March, 1942 Last Survey 4th May, 1943  
 on the EMPIRE VICEROY (Number of Visits 115)  
 Built at Barnrow By whom built Vickers Armstrong Yard No. 858 When built 1943  
 Engines made at Hartlepool By whom made Richardsons Westgarth & Co. Engine No. 2734 When made 1943  
 Boilers made at " By whom made " Boiler No. 2734 When made 1943  
 Shaft Horse Power at Full Power 8000 Owners " Port belonging to "  
 Nom. Horse Power as per Rule 1415 Is Refrigerating Machinery fitted for cargo purposes " Is Electric Light fitted Yes  
 Trade for which Vessel is intended "

STEAM TURBINE ENGINES, &c.—Description of Engines Three cylinder double reduction geared turbines  
 No. of Turbines Ahead three Direct coupled, single reduction geared to one propelling shafts. No. of primary pinions to each set of reduction gearing 3  
 Astern two double reduction geared

Direct coupled to { Alternating Current Generator phase periods per second }  
 Direct Current Generator } 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 one propelling shafts.

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	.75"	16.5"	8	1.05"	21.1"	3	2"	4.4"	1	.94" ROTOR	28.44"	1
2ND	.88"	16.76"	8	1.35"	21.4"	3	2.439" ROTOR	Cap.	1	1.9"	29.65"	1
3RD	1.10"	17.2"	8	1.8"	22.6"	3	3.135"	60"	1	5"	33"	1
4TH	1.40"	17.8"	8	2.6"	24.2"	3	3.835"	tapered	1			
5TH				3.2"	25.4"	2	4.534"	between	1			
6TH							5.334"	first	1	2.75" ROTOR	55.25"	1
7TH							6.144"	"	1	1.7"	57.45"	1
8TH							7.07"	"	1	6"	59"	1
9TH							8.04"	"	1			
10TH							9.2"	"	1			
11TH							10		1			
12TH								60"	1			

Shaft Horse Power at each turbine { H.P. 2667 ✓ I.P. " ✓ L.P. " ✓ }  
 Revolutions per minute, at full power, of each Turbine Shaft { H.P. 4467 ✓ I.P. " ✓ L.P. 2395 ✓ }  
 Rotor Shaft diameter at journals { H.P. 5" ✓ I.P. 5" ✓ L.P. 8" ✓ }  
 Pitch Circle Diameter { 1st pinion 14.782" ✓ L.P. 1st reduction wheel 49.918" ✓ }  
 { 2nd pinion 19.018" ✓ main wheel 134.928" ✓ }  
 Width of Face { 1st reduction wheel 21+3" gap ✓ }  
 { main wheel 33 1/2 + 25" gap ✓ }

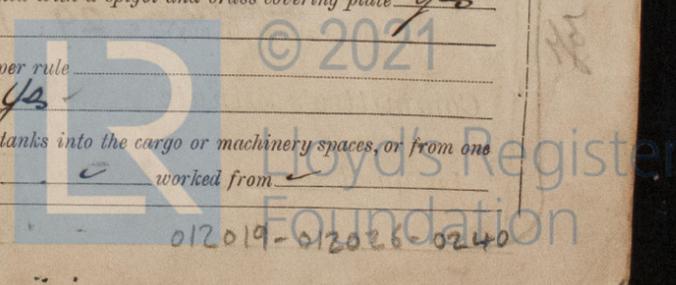
Distance between centres of pinion and wheel faces and the centre of the adjacent bearings { 1st pinion 10" ✓ }  
 { 2nd pinion 16 3/8" ✓ }  
 { 1st reduction wheel 2'-6 1/2" ✓ }  
 { main wheel 19 1/8" ✓ }  
 Flexible Pinion Shafts, diameter { 1st 11" ✓ }  
 { 2nd 11" ✓ }  
 Pinion Shafts, diameter at bearings External { 1st 5 1/2 + 1/4" ✓ }  
 Internal { 1st 1 1/2 + 1/2" ✓ 2nd 2 1/2" ✓ }  
 diameter at bottom of pinion teeth { 1st 7.41", 14.266" ✓ }  
 { 2nd 18.17" ✓ }

Wheel Shafts, diameter at bearings { 1st 11" ✓ }  
 { main 19" ✓ }  
 diameter at wheel shroud, { 1st 3'-9 1/4" ✓ }  
 { main 10'-9 3/4" ✓ }  
 Intermediate Shafts, diameter as per rule 17.38" ✓  
 as fitted 17.38" ✓  
 Thrust Shaft, diameter at collars as per rule 18.82" ✓  
 as fitted 18 1/8" ✓  
 Tube Shaft, diameter as per rule 18.82" ✓  
 as fitted 19 1/4" ✓  
 Screw Shaft, diameter as per rule 18.82" ✓  
 as fitted 19 1/4" ✓  
 Is the screw shaft fitted with a continuous liner Yes ✓

Bronze Liners, thickness in way of bushes as per rule .874" ✓  
 as fitted 15/16" ✓  
 Thickness between bushes as per rule .657" ✓  
 as fitted 13/16" ✓  
 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 Yes ✓  
 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 Yes ✓  
 If two liners are fitted, is the shaft lapped or protected between the liners Yes ✓  
 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 1/2" ✓  
 Propeller, diameter 19'-0" ✓ Pitch 18'-6" ✓ No. of Blades 4 ✓ State whether Moveable NO ✓ Total Developed Surface 125 square feet. ✓  
 If Single Screw, are arrangements made so that steam can be led direct to the L.P. Turbine Yes ✓  
 Condenser I.P. Yes ✓ No. of Turbines fitted with astern wheels 2 ✓ Feed Pumps { No. and size 2-3 1/2" Turb. Feed Pumps (Wrights) ✓ }  
 { How driven Steam ✓ }

Pumps connected to the Main Bilge Line { No. and size 1-5" Fire & Bilge (Drysdale) ✓ }  
 { How driven Electric ✓ }  
 { No. and size 1-8" Ballast (Drysdale) ✓ }  
 { How driven Electric ✓ }  
 Ballast Pumps, No. and size 1-8" Drysdale electric ✓ Lubricating Oil Pumps, including Spare Pump, No. and size 2-5" Drysdale electric ✓  
 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 Engine and Boiler Room 3 1/2" E.R. h & S. ✓  
3 1/2" after well ✓  
 In Holds, &c. 3 1/2" Nos 1 2 & 3 Holds h & S. ✓  
3 1/2" Cofferdam E.R. fwd. ✓  
3" Cofferdam E.R. aft. ✓  
 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 S. ✓  
 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 Ballast, Bilge & fuel oil from all forward ✓ How are they protected " ✓  
 What pipes pass through the deep tanks DB Tanks, Peak & Holds ✓ 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 Yes ✓  
 worked from " ✓



8262  
 BOILERS, &c.—(Letter for record 8) Total Heating Surface of Boilers 9074 Sq. ft.  
 Is Forced Draft fitted Yes No. and Description of Boilers 2 Foster Wheeler D Type Working Pressure 450  
 Is a Report on Main Boilers now forwarded? Yes Previously  
 Is a Donkey Boiler fitted? Yes If so, is a report now forwarded?  
 Is the donkey boiler intended to be used for domestic purposes only No  
 Plans. Are approved plans forwarded herewith for Shafting 20/4/42 Main Boilers 16/4/42 Auxiliary Boilers Donkey Boilers  
 Superheaters 16/4/42 General Pumping Arrangements Oil Fuel Burning Arrangements

SPARE GEAR.

Has the spare gear required by the Rules been supplied  
 State the principal additional spare gear supplied

The foregoing is a correct description,

For RICHARDSONS, WESTGARTH & Co. LIMITED.

1942. Mar. 18. May 5. 21. 27. June 16. July 6. 8. 15. 17. 22. Aug 4. 5. 8. 10. 11. 13. 20  
 Dates of Survey while building  
 During progress of work in shops -- 25. 27. 31. Sept 6. 7. 11. 14. 24. 25. 28. Oct 2. 6. 7. 8. 9. 12. 13. 14. 15. 19. 20. 21. 23. 26. 27. 28. Nov 2. 3. 5. 9. 11. 12. 17. 19. 20. 23. DIRECTOR  
 During erection on board vessel --- 11. 12. 13. 14. 17. 19. 19. 25. 26. 29. 30. 31. April 6. 7. 10. 12. 14. May 4  
 Total No. of visits 115

Dates of Examination of principal parts—Casings 17/11/42 Rotors 17/11/42 Blading 15/12/42 Gearing 14/1/43  
 Wheel shaft 8/7/42 Thrust shaft 21/10/42 Intermediate shafts 15/2/43 Tube shaft ✓ Screw shaft 15/2/43  
 Propeller Stern tube 15/2/43 Engine and boiler seatings Engine holding down bolts  
 Completion of fitting sea connections Completion of pumping arrangements Boilers fixed Engines tried under steam

Main boiler safety valves adjusted Thickness of adjusting washers  
 Rotor shaft, Material and tensile strength Steel 34/38 tms/□" Identification Mark S5244, S4918, S55303 WH  
 Flexible Pinion Shaft, Material and tensile strength Star 38/45 Sleeve 34/38 Steel Identification Mark S5977, S5973, S5946, S5405, S5406 WH  
 Pinion shaft, Material and tensile strength Nickel Steel 40 tms/□" Identification Mark S5273, S5274, S5553 WH  
 1st Reduction Wheel Shaft, Material and tensile strength Nickel Steel 40 tms/□" Identification Mark S5192, S5191, S5179 WH  
 Wheel shaft, Material Steel Identification Mark S5743 WH Thrust shaft, Material Steel Identification Mark S5361 WH  
 Intermediate shafts, Material steel Identification Marks S5029, S5342 WH, S4957 BW Tube shaft, Material ✓ Identification Marks ✓  
 Screw shaft, Material steel Identification Marks S5305 WH Steam Pipes, Material steel Test pressure 1380 LB  
 Date of test 18/3/43 Main Pipes Supplied at Barrow Is an installation fitted for burning oil fuel Yes  
 Is the flash point of the oil to be used over 150°F. Yes Have the requirements of the Rules for the use of oil as fuel been complied with  
 Is the vessel (not being an oil tanker) fitted for carrying oil as cargo 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

Is this machinery a duplicate of a previous case If so, state name of vessel  
 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 & Specification. The workmanship & materials have been found good. The machinery has been forwarded to Barrow to be fitted on board of by Messrs Vickers Armstrong in their Yard No 858

The amount of Entry Fee ... £ 6 : 0 : 0 When applied for,  
 Special 4 LMC + 26% of £ £ 119 : 2 : 7 15. 1943  
 Donkey Boiler Fee ... £ : : : When received,  
 Travelling Expenses (if any) £ 29 : 15 : 8 19...

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

Committee's Minute TUES. 14 SEP 1943

Assigned see minute on Bms 26. Rph

