

# REPORT ON STEAM TURBINE MACHINERY.

Mo. 177310  
No. 18568

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of writing Report 24 July 1944 When handed in at Local Office 26 July 1944 Port of W Hartlepool  
in Survey held at Hartlepool Date, First Survey April 1943 Last Survey 14 July 1944  
Book. on the S/S "EMPIRE PROTECTOR" (Number of Visits 89)  
Gross 8148  
Net 4609  
Tons  
It at Haverton Hill By whom built Furness S.B. Co Yard No. 360 When built  
ines made at Hartlepool By whom made Richardsons Westgarth & Co Engine No. 2746 When made 1944  
ers made at " By whom made " " " Boiler No. 2746 When made "  
ft Horse Power at Full Power 6800 Owners Ministry of War Transport Port belonging to Inland Navigation  
Horse Power as per Rule 1215 Is Refrigerating Machinery fitted for cargo purposes No Is Electric Light fitted Yes  
de for which Vessel is intended

## AM TURBINE ENGINES, &c.—Description of Engines Double Reduction Geared Turbines

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  
coupled to Alternating Current Generator phase periods per second rated Kilowatts Volts at revolutions per minute;  
Direct Current Generator  
applying power for driving Propelling Motors, Type  
Kilowatts Volts at revolutions per minute. Direct coupled, single or double reduction geared to propelling shafts.

	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.
EXPANSION	1.23	17.46	7				1.875	39.75	3	Rotor 4	49.5	1
"	1.52	18.04	7				1.324	Cyl.	1	" 7	52.75	1
"	1.68	18.36	6				1.896	None	1	" 9	55	1
"	2.07	19.14	6				2.468	Tapered	1	Impulse Blading		
"	2.58	20.16	6				3.109	between	1			
"	Above blading proceeded by 2 Row Impulse wheel as per particulars below						3.824	first	1			
"							4.539	and	1			
"							5.31	twelfth	1			
"	7.15	30.47	1				6.13	expansion	1			
"	1.68	31.69	1				7.047		1			
"							8.185		1			
"							9	56	1			

NOTE—All dimensions in inches

H.P. 3500  
I.P. 3300  
L.P. 3300  
Revolutions per minute, at full power, of each Turbine Shaft  
H.P. 3969  
I.P. 2863  
L.P. 2863  
1st reduction wheel 731  
main shaft 116  
Pitch Circle Diameter { 1st pinion 13.068 LP 1st reduction wheel 51.204  
2nd pinion 19.789 main wheel 124.647  
Width of Face { 1st reduction wheel 20 1/2 + 3 9/16  
main wheel 39 1/4 + 2 1/2  
Pitch Circle Diameter { 1st pinion 10 1/8 1st reduction wheel 2'-8 1/8  
2nd pinion 16 3/4 main wheel 20  
Pinion Shafts, diameter at bearings External 1st 6 1/2 2nd 11  
Internal 1st 1 1/2 2nd 5  
diameter at bottom of pinion teeth { 1st 8 9/16 12.552  
2nd 18.941  
Generator Shaft, diameter at bearings 1st 3'-11  
main 9'-11 3/4  
Propelling Motor Shaft, diameter at bearings 1st 16.31  
main 17  
Tube Shaft, diameter as per rule 16.31  
as fitted 17  
Thrust Shaft, diameter at collars as per rule 16.31  
as fitted 17  
Bronze Liners, thickness in way of bushes as per rule 8.21  
as fitted 7/8  
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 junctions 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 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 her appliance fitted at the after end of the tube shaft Yes  
Length of Bearing in Stern Bush next to and supporting propeller 5'-10"  
Pitch Varying No. of Blades 4 State whether Moveable No Total Developed Surface 121 square feet.  
Single Screw, are arrangements made so that steam can be led direct to the L.P. Turbine Yes  
Can the H.P. or I.P. Turbine exhaust direct to the condenser Yes  
No. of Turbines fitted with astern wheels one Feed Pumps No. and size 2-3" Turbo Feed Pumps (Weirs)  
How driven Steam  
Pumps connected to the Main Bilge Line No. and size 1-10" x 9" x 10" Fire & Bilge + 1-10" x 9" x 10" Ballast  
How driven Steam  
Last Pumps, No. and size 1-10" x 9" x 10" Lubricating Oil Pumps, including Spare Pump, No. and size 2-9" x 8" x 18"  
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 4-3 1/2" + 2-2 1/2" E. & S. Space, 1-2 1/2" Tunnel Well  
Folds, &c.

Water Circulating Pump Direct Bilge Suctions, No. and size 1-13 1/2"  
Independent Power Pump Direct Suctions to the Engine Room  
No. and size 1-5" Ballast Pump  
Are all the Bilge Suction pipes in Holds and Tunnel Well fitted with strum-boxes Yes  
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  
All Sea Connections fitted direct on the skin of the ship Yes  
Are they fitted with Valves or Cocks Both  
Are the Overboard Discharges above or below the deep water line below  
Are the Blow Off Cocks fitted with a spigot and brass covering plate Yes  
How are they protected  
Have they been tested as per rule  
Pipes pass through the bunkers none  
Pipes pass through the deep tanks  
All Pipes, Cocks, Valves, and Pumps in connection with the machinery and all boiler mountings accessible at all times Yes  
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 worked from

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BOILERS, &c.—(Letter for record *S*) Total Heating Surface of Boilers *6840 Sq. ft.*  
Is Forced Draft fitted *Ys* No. and Description of Boilers *2 Foster Wheeler "D" Type* Working Pressure *480*  
Is a Report on Main Boilers ~~forwarded~~ *Ys* *Letter to Mtd. 16/6/44* Increased to *490 lb.*  
Is ~~a Donkey~~ *an Auxiliary* Boiler fitted? *Ys* If so, is a report now forwarded? *NO*  
Plans. Are approved plans forwarded herewith for Shafting *25/6/42* Main Boilers *18/6/42* Auxiliary Boilers *25/6/42* Donkey Boilers *25/6/42*  
(If not state date of approval)  
Superheaters *22.7.42* General Pumping Arrangements *30.9.43* Oil Fuel Burning Arrangements *13.9.43*  
Spare Gear. State the articles supplied:—

For RICHARDSONS, WESTGARTH & Co. LIMITED.

*W. E. Forrester*  
Director

The foregoing is a correct description,

Dates of Survey while building  
During progress of work in shops -- *1943 April 1. 2. 24. 28. July 14. Aug. 30. Oct. 28. Dec. 3. 14. 21. 22. 24. 1944 Jan. 4. 7. 8. 11. 13. 20. 24. 28. Feb. 10. 11. 12. 14. 21. 22. 24. 28. Mar. 1. 2. 6. 7. 13. 14. 16. 17. 21. 23. 25. 31. April 3. 5. 12. 15. 17. 19. 20. 21. 22. 28. 29. 30. May 1. 2. 3. 4. 5. 6. 7. 8. 9. 12. 13. 15. 16. 20. 22. 23. 26. 28. 30. June 3. 5. 10. 11. 13. 14. 19. 20. 23. 24. 25. 26. June 1. 5. 6. 7. 8. 9. 12. 13. 15. 16. 20. 22. 23. 26. 28. 30. July 3. 5. 10. 11. 13. 14.*  
During erection on board vessel ---  
Total No. of visits *89*

Dates of Examination of principal parts—Casings *28/10/43* Rotors *26/11/43* Blading *24/1/44* Gearing *24/1/44*  
Wheel shaft *1/2/44* Thrust shaft *8/2/44* Intermediate shafts *13/7/44* Tube shaft *8/6/44* Screw shaft *8/6/44*  
Propeller *6/7/44* Stern tube *6/7/44* Engine and boiler seatings *6/7/44* Engine holding down bolts *6/7/44*  
Completion of pumping arrangements *See Mtd. 17/3/44* Boilers fired *17/3/44* Engines tried under steam *17/3/44*  
Main boiler safety valves adjusted *17/3/44* Thickness of adjusting washers *17/3/44*

Rotor shaft, Material and tensile strength *Steel 34/38* Identification Mark *HP2423 J*  
Couplings *Steel, stars 28/32, sleeves 34/38* Identification Mark *LPS6170, J*  
Pinion shaft, Material and tensile strength *nickel steel 40* Identification Mark *1403/4 C*  
1st Reduction Wheel Shaft, Material and tensile strength *nickel steel 40* Identification Mark *6706*  
Wheel shaft, Material *steel* Identification Mark *6501 W.H.* Thrust shaft, Material *steel* Identification Mark *8596*  
Intermediate shafts, Material *steel* Identification Marks *12888 HAT* Tube shaft, Material *steel* Identification Marks *INTER SHAFT 8211 C.P.*  
Screw shaft, Material *steel* Identification Marks *12934 HAT* Steam Pipes, Material *steel* Identification Marks *INTER SHAFT 12934*  
Date of test *1/5/44* Is an installation fitted for burning oil fuel *Ys* Test pressure *1290*  
Is the flash point of the oil to be used over 150°F. *Yes* Have the requirements of the Rules for carrying and burning oil fuel been complied with *Ys*

Is this machinery a duplicate of a previous case *Ys* If so, state name of vessel *R.W. 2745*

General Remarks (State quality of workmanship, opinions as to class, &c.) *The engine & 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 Haverton Hill for fitting on board Messrs Furness & Co's Yard No 360.*

*The machinery of this vessel will be eligible, in my opinion, to have a certificate of + L.M.C. - with date - on completion.*

NOTE - See London Ltr. 12/6/43 to Mtd. regarding thrust shaft for R.W. 2744 which has been fitted to this ship.

The amount of Entry Fee ... £ *6* : - : - When applied for,  
Special *1/2 LMC fees* ... £ *102* : *4* : *7* 25/7/1944  
*2 drums*  
Donkey Boiler Fee ... £ : : : When received,  
Supervision  
Travelling Expenses (if any) £ *28* : *13* : *8*

*Clive Bell*

Engineer Surveyor to Lloyd's Register of Shipping.

Committee's Minute *FRI. 17 NOV 1944*

Assigned *see minute on JERpt*



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