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Rpt. 4a.

REPORT ON STEAM TURBINE MACHINERY.

No. 17701.
No. 18542

Date of writing Report 2/5/1044 When handed in at Local Office 2/5/1044 Port of W. Hartlepool Received at London Office MAY 1944 6 SEP 1944

No. in Survey held at Hartlepool Date, First Survey 24-5-43 Last Survey 26-4-1944
Reg. Book. on the s/s - EMPIRE PALADIN (Number of Visits 74) Tons Gross 8141 Net 4604

Built at Hamerton Hill By whom built James S.B. Co. Yard No. 359 When built 1944
Engines made at Hartlepool By whom made Richardson, West & Co. Engine No. 2445 When made "
Boilers made at " By whom made " " " Boiler No. 2445 When made "
Shaft Horse Power at Full Power 6800 Owners Ministry of War Transport Port belonging to Huddersfield
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 1210

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;
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.	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				7/8"	39 3/4	3	Rotor 4	49 1/2	1
2ND "	1.52	18.04	7				1.324	Cyl.	1	" 7	52 3/4	1
3RD "	1.68	18.36	6				1.896	Dome	1	" 9	55	1
4TH "	2.07	19.14	6				2.468	Tapped	1			
5TH "	2.58	20.16	6				3.109	between	1			
6TH "	above blading preceded by 2 rows impulse wheel as per particulars below						3.824	first	1			
7TH "							4.539	"	1			
8TH "							5.3	twelfth	1			
9TH "	4.15	30.47	1				6.13	expansion	1			
10TH "	1.68	31.69	1				7.047		1			
11TH "							8.185		1			
12TH "							9	56	1			

Shaft Horse Power at each turbine { H.P. 3500 ✓ I.P. ✓ L.P. 3300 ✓ } Revolutions per minute, at full power, of each Turbine Shaft { H.P. 3969 I.P. 1st reduction wheel 731 ✓ L.P. 2863 ✓ main shaft 116 ✓ }
Rotor Shaft diameter at journals { H.P. 5" ✓ I.P. ✓ L.P. 4" ✓ } Pitch Circle Diameter { 1st pinion 13.068" ✓ 1st reduction wheel 51.204" ✓ 2nd pinion 19.789" ✓ main wheel 124.647" ✓ } Width of Face { 1st reduction wheel 20 1/2 + 13 9/16 ✓ main wheel 39 + 24 1/2 ✓ }

Distance between centres of pinion and wheel faces and the centre of the adjacent bearings { 1st pinion 10 1/8" ✓ 1st reduction wheel 2'-8 1/2" ✓ 2nd pinion 16 3/4" ✓ main wheel 20" ✓ }

Flexible Pinion Shafts, diameter { 1st ✓ 2nd ✓ } Pinion Shafts, diameter at bearings External 1st 6" 1 1/2" ✓ 2nd 12" 2 1/2" ✓ Internal 1st 5" ✓ 2nd 5" ✓ diameter at bottom of pinion teeth { 1st 8 9/16, 12.552 ✓ 2nd 18.941 ✓ }
Wheel Shafts, diameter at bearings { 1st 11" ✓ main 17 1/2" ✓ diameter at wheel shroud, { 1st 3'-11" ✓ Generator Shaft, diameter at bearings ✓ main 9'-11 1/2" ✓ Propelling Motor Shaft, diameter at bearings ✓ }
Intermediate Shafts, diameter as per rule 15.54" ✓ as fitted 16" ✓ Thrust Shaft, diameter at collars as per rule 17.04" ✓ as fitted 17 3/4" ✓

Tube Shaft, diameter as per rule ✓ as fitted ✓ Screw Shaft, diameter as per rule 17.04" ✓ as fitted 17 3/4" ✓ Is the screw shaft fitted with a continuous liner Yes ✓
Bronze Liners, thickness in way of bushes as per rule .821" ✓ as fitted 7/8" ✓ Thickness between bushes as per rule .615" ✓ as fitted 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 ✓

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 ✓ If so, state type ✓ Length of Bearing in Stern Bush next to and supporting propeller 5'-10" ✓
Propeller, diameter 18'-0" ✓ Pitch Varying ✓ No. of Blades 4 ✓ State whether Moveable 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. Turbine exhaust direct to the Condenser Yes ✓ No. of Turbines fitted with astern wheels 1 ✓ 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" Fore & Bilge, 1-10" x 9" x 10" Ballast ✓ How driven Steam ✓ }
Ballast 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" ✓
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 4-3 1/2" E. & B. Space, 2-2 1/2" E. & B. Space, 1-2 1/2" Tunnel Well In Pump Room ✓
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" ✓ 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 None ✓ How are they protected ✓
What pipes pass through the deep tanks ✓ 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 ✓ Is it fitted with a watertight door worked from ✓

BOILERS, &c.—(Letter for record 5) 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 LB. / sq. in.

Is a Report on Main Boilers now forwarded?

Is a Donkey Boiler fitted? Ys If so, is a report now forwarded? NO

Is the donkey boiler intended to be used for domestic purposes only

Plans. Are approved plans forwarded herewith for Shafting 25.6.42 Main Boilers 18.6.42 Auxiliary Boilers Donkey Boilers

Superheaters 22.7.42 General Pumping Arrangements 30.9.43 Oil Fuel Burning Arrangements 13.9.43

SPARE GEAR.

Has the spare gear required by the Rules been supplied

State the principal additional spare gear supplied

For RICHARDSONS, WESTGARTH & Co. LIMITED.

W. J. Mesinger
DIRECTOR Manufacturer.

The foregoing is a correct description,

Dates of Survey while building
During progress of work in shops --
During erection on board vessel ---
Total No. of visits

Dates of Examination of principal parts—Casings 28/10/43 Rotors 9/11/43 Blading 20/11/43 Gearing 13/1/44

Wheel shaft 13/1/44 Thrust shaft 11/1/44 Intermediate shafts 4/2/44 Tube shaft Screw shaft 19/1/44

Propeller Stern tube 24/1/44 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 Identification Mark 55821 WH

Flexible Pinion Shaft, Material and tensile strength steel, stars 28/32, sleeves 34/38 Identification Mark J2427, S5858

Pinion shaft, Material and tensile strength nickel steel 40 Identification Mark 1092 T.T.

1st Reduction Wheel Shaft, Material and tensile strength nickel steel 40 Identification Mark 56705, S7186 U.

Wheel shaft, Material steel Identification Mark 6500 WH. Thrust shaft, Material steel Identification Mark J2436, J2437 F.

Intermediate shafts, Material steel Identification Marks 11382, 12888 H.A.I. Tube shaft, Material Identification Marks 8110 C.P.

Screw shaft, Material steel Identification Marks 8 A.E.C. Steam Pipes, Material steel Test pressure 1290 LB. / sq. in.

Date of test 31/3/44 Is an installation fitted for burning oil fuel

Is the flash point of the oil to be used over 150°F. 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 Ys If so, state name of vessel RW 2740/1/12

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 & material have been found good.

The machinery has been forwarded to Haverton Hill for fitting on board Messrs. Furness P.B. Co's Yard No 359.

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 2748 has been allocated to this vessel & has now been re-numbered 2745

The amount of Entry Fee ... £ 6 : - : - When applied for,

Special 4 L.M.C. fees £ 102 : 4 : 7 2/1 1944

Donkey Boiler Fee ... £ : : : When received,

Supervision £ 28 : 13 : 8 19

Travelling Expenses (if any) £ : : : 19

Committee's Minute

Assigned see minute on F.B. Rpt.

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



Certificate (if required) to be sent to...

19 SEP 1944