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Rpt. 4a.

## REPORT ON STEAM TURBINE MACHINERY.

Mo.B. 17701.

No. 18542

Date of writing Report 2/5/44 When handed in at Local Office 2/5/44 Port of W. Hartlepool Received at London Office 4 MAY 1944 6 SEP 1944

No. in Survey held at Hartlepool Date, First Survey 24-5-43 Last Survey 26-4-1944

Reg. Book. S/S - EMPIRE PALADIN (Number of Visits 74)

Built at Hawerton Hill By whom built James S.B. Co. Yard No. 359 Tons Gross 8141 Net 4604

Engines made at Hartlepool By whom made Richardson, West & Co. Engine No. 2445 When built 1944

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 Turbine

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 Direct Current Generator

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	Rotor	1	" 9	55	1
4TH	2.07	19.14	6				2.468	tapered	1	Impulse Blading		
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	NOTE: all dimensions in inches			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. 3300 ✓ } Revolutions per minute, at full power, of each Turbine Shaft { H.P. 3969 ✓ I.P. 2863 ✓ }

Rotor Shaft diameter at journals { H.P. 5" ✓ I.P. 4" ✓ } Pitch Circle Diameter { 1st pinion 13.068" 1st reduction wheel 51.204" 2nd pinion 19.789" main wheel 124.647" }

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" 7/8" 2nd 11" Internal 1st 15 1/2" 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" ✓ main 9'-11 3/4" } Generator Shaft, diameter at bearings ✓

Intermediate Shafts, diameter { as per rule 15.54" ✓ as fitted 16" ✓ } Thrust Shaft, diameter at collars { as per rule 16.31" ✓ as fitted 17" ✓ }

Tube Shaft, diameter { as per rule ✓ as fitted ✓ } Screw Shaft, diameter { as per rule 17.04" ✓ as fitted 17 3/4" ✓ } Is the tube screw shaft fitted with a continuous liner Yes ✓

Bronze Liners, thickness in way of bushes { as per rule ✓ as fitted 7/8" ✓ } Thickness between bushes { as per rule 6/15" ✓ 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 ✓

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" Fire & Bilge 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 *S*) Total Heating Surface of Boilers *6840 Sq. ft.*  
Is Forced Draft fitted *Y* No. and Description of Boilers *2 Foster Wheeler D Type* Working Pressure *480 LB.*  
Is a Report on Main Boilers now forwarded?

Is *a Donkey* Boiler fitted? *Y* If so, is a report now forwarded? *NO*  
*as Auxiliary*  
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 *✓*  
(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.*

Has the spare gear required by the Rules been supplied

State the principal additional spare gear supplied

For RICHARDSONS, WESTGARTH & CO. LIMITED.

The foregoing is a correct description,

DIRECTOR Manufacturer.

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

1943: May 26, 28, June 21, July 20, 13, 14, 22, Aug 2, 13, 23, Sept 9, 16, 17, 20, Oct 4, 7, 20, Nov 8, 24, Dec 11, 14, 15, 21, 28, 31, 1944: Jan 4, 5, 6, 7, 10, 11, 13, 14, 15, 17, 18, 20, 24, 25, 27, 28, 31, Feb 3, 4, 8, 9, 10, 11, 12, 14, 21, 28, 29, March 3, 5, 8, 12, 15, 16, 20, 25, 27, 28, 29, 30, 31, April 5, 17, 19, 24, 25, 26

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 *1092 T.T.*

Pinion shaft, Material and tensile strength *nickel steel 40* Identification Mark *56705, 57186 U.*

1st Reduction Wheel Shaft, Material and tensile strength *nickel steel 40* Identification Mark *J2436, J2437 F.*

Wheel shaft, Material *steel* Identification Mark *6500 WH.* Thrust shaft, Material *steel* Identification Mark *8110 C.P.*

Intermediate shafts, Material *steel* Identification Marks *11382, 12888 H.A.I.* Tube shaft, Material *✓* Identification Marks *✓*

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

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 *Y* 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, *3/5/1944*

Special *4 L.M.C. fees* £ *102* : 4 : When received, *1944*

*2 drums*

Donkey Boiler Fee ... £ : : When received, *19*

*Supervision*

Travelling Expenses (if any) £ *28* : 13 : 8

Committee's Minute

Assigned *see minute on F.B. Rpt.*



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