

# REPORT ON MACHINERY.

No. 15719

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1a.

Date of writing Report 22 July 1920 When handed in at Local Office 27/1 1920 Port of West Hartlepool  
 in Survey held at Hartlepool Date, First Survey 27<sup>th</sup> June 18 Last Survey 19<sup>th</sup> Jan<sup>y</sup> 1920  
 on the (N1) Turbines No T189 (Number of Visits 60)

Registered Horse Power \_\_\_\_\_ Tons } Gross  
 Shaft Horse Power at Full Power 2900 Tons } Net  
 Built at \_\_\_\_\_ By whom built \_\_\_\_\_ When built \_\_\_\_\_  
 Engines made at Hartlepool By whom made Richardsons, Westgate & Co. Ltd (T189) when made 1920  
 Owners \_\_\_\_\_ when made \_\_\_\_\_  
 Is Refrigerating Machinery fitted for cargo purposes \_\_\_\_\_ Port belonging to \_\_\_\_\_  
 Is Electric Light fitted \_\_\_\_\_

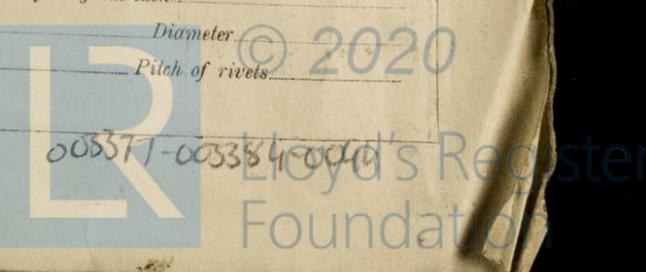
**TURBINE ENGINES, &c.**—Description of Engines Double reduction Geared Turbines No. of Turbines Two  
 Diameter of Rotor Shaft Journals, H.P. 4 1/2 L.P. 5 3/4 Diameter of Pinion Shaft { 1<sup>st</sup> Pinion 5 3/4 between Holes  
 Distance between Centres of Bearings { 1<sup>st</sup> Pinion 12 1/2 between Holes  
 Diameter of Pitch Circle { 1<sup>st</sup> Pinion 6.302  
 Diameter of Pitch Circle of Wheel { 2<sup>nd</sup> Pinion 13.379  
 Diameter of Thrust Shaft under Collar 1 1/4 Diameter of Tunnel Shaft as per rule 1.2.1.25  
 Diameter of Propeller \_\_\_\_\_ Pitch of Propeller \_\_\_\_\_  
 Revs. per Minute at Full Power, Turbine 3500 L.P. 2 1/2 Astern 4 } H.P. 28 1/2  
 Normal 3187 Propeller 78 } L.P. 36

**DETAILS OF BLADING.**

EXPANSION	H.P. P.C.D. 24			L.P. P.C.D. 36			ASTERN. } H.P. P.C.D. 30 L.P. P.C.D. 39		
	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.
.....	3 1/4 and 1 1/4	24 13/16 and 25 1/16	2	2 3/4	38 3/4	1	4 1/2 + 1 1/2 + 2 1/2 + 2 3/4	20 5/8 + 3 1/2 + 3 1/2 + 3 1/2	4 one of each length for LP
.....	1 1/2	24 15/16 and 25 1/16	2	3 1/8	39	1	(i.e. four rows of buckets on one disc)		
.....	1 3/4	25 1/2	1	4 3/4	39 7/8	1			
.....	2	25 3/4	1	6 1/8	40 3/4	1			
.....	2 5/8	26	1	7 1/4	42 1/8	1	1 5/8 + 3 7/16 + 4 1/16	40 15/16 + 42 1/16 + 43 1/16	3
.....	2 1/2	26 1/2	1	7 1/2	43 1/4	1	(i.e. three rows of buckets on one disc)		one of each length for LP
.....	2 1/4	26 1/4	1	7 3/4	43 1/2	1			
.....				7 3/4	43 3/4	1			

and size of Feed pumps \_\_\_\_\_  
 and size of Bilge pumps \_\_\_\_\_  
 and size of Bilge suction in Engine Room \_\_\_\_\_  
 In Holds, &c. \_\_\_\_\_  
 of Bilge Injections sizes \_\_\_\_\_ Connected to condenser, or to circulating pump \_\_\_\_\_ Is a separate Donkey Suction fitted in Engine Room & size \_\_\_\_\_  
 all the bilge suction pipes fitted with roses \_\_\_\_\_ Are the roses in Engine room always accessible \_\_\_\_\_  
 all connections with the sea direct on the skin of the ship \_\_\_\_\_ Are they Valves or Cocks \_\_\_\_\_  
 they fixed sufficiently high on the ship's side to be seen without using the stokehold plates \_\_\_\_\_ Are the Discharge Pipes above or below the deep water line \_\_\_\_\_  
 they each fitted with a Discharge Valve always accessible on the passing of the vessel \_\_\_\_\_ Are the Blow Off Cocks fitted with a spigot and brass covering plate \_\_\_\_\_  
 pipes are carried through the bunkers \_\_\_\_\_ How are they protected \_\_\_\_\_  
 all Pipes, Cocks, Valves, and Pumps in connection with the machinery and all boiler mountings accessible at all times \_\_\_\_\_  
 the Bilge Suction Pipes, Cocks, and Valves arranged so as to prevent any communication between the sea and the bilges \_\_\_\_\_  
 the Screw Shaft Tunnel watertight \_\_\_\_\_ Is it fitted with a watertight door \_\_\_\_\_ worked from \_\_\_\_\_

**BOILERS, &c.**—(Letter for record \_\_\_\_\_) Manufacturers of Steel \_\_\_\_\_  
 Heating Surface of Boilers \_\_\_\_\_ Is Forced Draft fitted \_\_\_\_\_ No. and Description of Boilers \_\_\_\_\_  
 Working Pressure 190 lbs Tested by hydraulic pressure to \_\_\_\_\_ Date of test \_\_\_\_\_ No. of Certificate \_\_\_\_\_  
 each boiler be worked separately \_\_\_\_\_ Area of fire grate in each boiler \_\_\_\_\_ No. and Description of Safety Valves to \_\_\_\_\_  
 boiler \_\_\_\_\_ Area of each valve \_\_\_\_\_ Pressure to which they are adjusted \_\_\_\_\_ Are they fitted with easing gear \_\_\_\_\_  
 least distance between boilers or uptakes and bunkers or woodwork \_\_\_\_\_ Mean dia. of boilers \_\_\_\_\_ Length \_\_\_\_\_ Material of shell plates \_\_\_\_\_  
 thickness \_\_\_\_\_ Range of tensile strength \_\_\_\_\_ Are the shell plates welded or flanged \_\_\_\_\_ Descrip. of riveting: cir. seams \_\_\_\_\_  
 seams \_\_\_\_\_ Diameter of rivet holes in long. seams \_\_\_\_\_ Pitch of rivets \_\_\_\_\_ Lap of plates or width of butt straps \_\_\_\_\_  
 percentages of strength of longitudinal joint \_\_\_\_\_ Working pressure of shell by rules \_\_\_\_\_ Size of manhole in shell \_\_\_\_\_  
 of compensating ring \_\_\_\_\_ No. and Description of Furnaces in each Boiler \_\_\_\_\_ Material \_\_\_\_\_ Outside diameter \_\_\_\_\_  
 length of plain part \_\_\_\_\_ Thickness of plates \_\_\_\_\_ Description of longitudinal joint \_\_\_\_\_ No. of strengthening rings \_\_\_\_\_  
 working pressure of furnace by the rules \_\_\_\_\_ Combustion chamber plates: Material \_\_\_\_\_ Thickness: Sides \_\_\_\_\_ Back \_\_\_\_\_ Top \_\_\_\_\_ Bottom \_\_\_\_\_  
 thickness of stays to ditto: Sides \_\_\_\_\_ Back \_\_\_\_\_ Top \_\_\_\_\_ If stays are fitted with nuts or riveted heads \_\_\_\_\_ Working pressure by rules \_\_\_\_\_  
 material of stays \_\_\_\_\_ Diameter at smallest part \_\_\_\_\_ Area supported by each stay \_\_\_\_\_ Working pressure by rules \_\_\_\_\_ End plates in steam space \_\_\_\_\_  
 material \_\_\_\_\_ Thickness \_\_\_\_\_ Pitch of stays \_\_\_\_\_ How are stays secured \_\_\_\_\_ Working pressure by rules \_\_\_\_\_ Material of stays \_\_\_\_\_  
 diameter at smallest part \_\_\_\_\_ Area supported by each stay \_\_\_\_\_ Working pressure by rules \_\_\_\_\_ Material of Front plates at bottom \_\_\_\_\_  
 thickness \_\_\_\_\_ Material of Lower back plate \_\_\_\_\_ Thickness \_\_\_\_\_ Greatest pitch of stays \_\_\_\_\_ Working pressure of plate by rules \_\_\_\_\_  
 diameter of tubes \_\_\_\_\_ Pitch of tubes \_\_\_\_\_ Material of tube plates \_\_\_\_\_ Thickness: Front \_\_\_\_\_ Back \_\_\_\_\_ Mean pitch of stays \_\_\_\_\_  
 thickness across wide water spaces \_\_\_\_\_ Working pressures by rules \_\_\_\_\_ Girders to Chamber tops: Material \_\_\_\_\_ Depth and \_\_\_\_\_  
 thickness of girder at centre \_\_\_\_\_ Length as per rule \_\_\_\_\_ Distance apart \_\_\_\_\_ Number and pitch of stays in each \_\_\_\_\_  
 working pressure by rules \_\_\_\_\_ Steam dome: description of joint to shell \_\_\_\_\_ % of strength of joint \_\_\_\_\_ Diameter \_\_\_\_\_  
 thickness of shell plates \_\_\_\_\_ Material \_\_\_\_\_ Description of longitudinal joint \_\_\_\_\_ Diameter of rivet holes \_\_\_\_\_ Pitch of rivets \_\_\_\_\_  
 working pressure of shell by rules \_\_\_\_\_ Crown plates: Thickness \_\_\_\_\_ How stayed \_\_\_\_\_



**SUPERHEATER.** Type \_\_\_\_\_ Date of Approval of Plan \_\_\_\_\_ Tested by Hydraulic Pressure to \_\_\_\_\_  
 Date of Test \_\_\_\_\_ Is a Safety Valve fitted to each Section of the Superheater which can be shut off from the Boiler \_\_\_\_\_  
 Diameter of Safety Valve \_\_\_\_\_ Pressure to which each is adjusted \_\_\_\_\_ Is Easing Gear fitted \_\_\_\_\_

**IS A DONKEY BOILER FITTED?** \_\_\_\_\_ If so, is a report now forwarded? \_\_\_\_\_

**SPARE GEAR.** State the articles supplied:—  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

The foregoing is a correct description,  
 For **RICHARDSONS WESTGARTH & Co., LIMITED.**

*W. J. Purdie*  
 \_\_\_\_\_  
 \_\_\_\_\_

Manufacturer.  
 \_\_\_\_\_  
 \_\_\_\_\_

Manager Turbine Dept.

Dates of Survey while building  
 During progress of work in shops --- 1918 June 27, July 5, Aug 16, 26, Sep 6, 11, 13, 19, Oct 7, 14, 16, 18, 22, 25, 26, Nov 7, 27, Dec 2, 9, 16, 1919, Jan 7, 14, 15, 22, 25, 27, Feb 6, 11, 13, 18, 26, March 6, 7, 13, 14, 20, 28, 31, Apr 7, 24, 25, May 1, 6, 12, 19, 22, 26, June 2, 4, 19, 26, Sep 19, Oct 28, Nov 6, 13, Dec 22, 1920, Jan 12  
 During erection on board vessel ---  
 Total No. of visits 60  
 Is the approved plan of main boiler forwarded herewith \_\_\_\_\_

Dates of Examination of principal parts—Casings <sup>27/1/18</sup> to <sup>13/3/19</sup> Rotors <sup>16/8/18</sup> to <sup>25/4/19</sup> Blading <sup>6/9/18</sup> to <sup>25/4/19</sup> Gearing \_\_\_\_\_  
 Rotor shaft <sup>16/8/18</sup> to <sup>25/4/19</sup> Thrust shaft \_\_\_\_\_ Tunnel shafts \_\_\_\_\_ Screw shaft \_\_\_\_\_ Propeller \_\_\_\_\_  
 Stern tube \_\_\_\_\_ Steam pipes tested \_\_\_\_\_ Engine and boiler seatings \_\_\_\_\_ Engines holding down bolts \_\_\_\_\_  
 Completion of pumping arrangements \_\_\_\_\_ Boilers fired \_\_\_\_\_ Engines tried under steam \_\_\_\_\_  
 Main boiler safety valves adjusted \_\_\_\_\_ Thickness of adjusting washers \_\_\_\_\_

Material and tensile strength of Rotor shaft *Steel 32.66 tons* Identification Mark on Do. *HP No. 32, 11*  
 Material and tensile strength of Pinion shaft *See Manchester Report N4413 Liverpool* Identification Mark on Do. \_\_\_\_\_  
 Material of Wheel shaft *steel* Identification Mark on Do. *(L 24495, 108, 7/1919, AC)* Material of Thrust shaft *steel* Identification Mark on Do. *(L 2494, No. 94, 10-18, 54)*  
 Material of Tunnel shafts \_\_\_\_\_ Identification Marks on Do. \_\_\_\_\_ Material of Screw shafts \_\_\_\_\_ Identification Marks on Do. \_\_\_\_\_  
 Material of Steam Pipes \_\_\_\_\_ Test pressure \_\_\_\_\_

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 Section 49 of the Rules been complied with \_\_\_\_\_  
 Is this machinery a duplicate of a previous case? *No.* If so, state name of vessel *(ND) 7187, (ND) 7188,*

**General Remarks** (State quality of workmanship, opinions as to class, &c.)

*These Turbine Engines have been constructed under special survey the workmanship are sound & good. The High Pressure casing has been tested by Hydraulic pressure to 290 lbs, the L.P. casing tested to 40 lbs, all the Education pipes & Expansion pipes between the casing tested to 50 lbs, the H.P. Controlling Valves to 400 lbs, the Steam & Astern separators to 400 lbs, the Nozzle steam pipes to 500 lbs. The Turbines & Reduction gearing were erected & tried at full speed without load, & worked satisfactorily & are eligible in my opinion to have the notation \* LMC with date when installed on board.*

*This Machinery has now been sent to Middlesbrough to fit on board.*

The amount of Entry Fee ... £ : :  
 Special ... £ *24-3-1* } When applied for, *12/9/20 to 1/10/20*  
 Donkey Boiler Fee ... £ : : } When received, *31/8/20*  
 Travelling Expenses (if any) £ : : } *19/8/20*

*W. J. Purdie*  
 \_\_\_\_\_  
 Engineer Surveyor to Lloyd's Register of Shipping.

FRI. AUG. 13 1920

Committee's Minute

Assigned *to Mr. J. E. ... 10/4/23*

Certificate (if required) to be used to ...  
 (The Surveyors are requested not to write on or below the space for Committee's Minute.)

