

## REPORT ON MACHINERY.

Port of MIDDLESBROUGH-ON-TEES.Received at London Office WED 4 JUL 1900No. in Survey held at Middlesbro'-on-Tees Date, first Survey 20<sup>th</sup> March 1899 Last Survey 26<sup>th</sup> June 1900.  
Reg. Book.67<sup>th</sup> S. on the Steel Screw Steamer. Boliviana(Number of Visits 126)Tons { Gross 11574.24  
Net 2963.33Master J. Harrison Built at N. Hartlepool. By whom built Furness, Withy & Co. Ltd When built 1900Engines made at Middlesbro'-on-Tees By whom made Sir C. Furness, Westgarth & Co. Ltd When made 1900.Boilers made at 6 By whom made 6 when made 1900.Registered Horse Power 324 Owners British Maritime Trust Port belonging to West HartlepoolNom. Horse Power as per Section 28 321. Is Refrigerating Machinery fitted No Is Electric Light fitted No

ENGINES, &c.—Description of Engines Inverted Triple Expansion No. of Cylinders 3. No. of Cranks 3.  
 Dia. of Cylinders 25" 40" 68" Length of Stroke 48" Revs. per minute 65. Dia. of Screw shaft as per rule 13.25 Lgth. of stern bush 4' 8"  
 Dia. of Tunnel shaft as per rule 12. Dia. of Crank shaft journals as per rule 12.6 Dia. of Crank pin 13 1/4" Size of Crank webs 21 x 10" Dia. of thrust shaft under collars 13 1/4" Dia. of screw 18' 0" Pitch of screw 16' 3" No. of blades 4. State whether moveable Solid Total surface 90 sq. ft.  
 No. of Feed pumps 2. Diameter of ditto 4" Stroke 24" Can one be overhauled while the other is at work Yes.  
 No. of Bilge pumps 2. Diameter of ditto 4 1/2" Stroke 24" Can one be overhauled while the other is at work Yes.  
 No. of Donkey Engines 2. Sizes of Pumps Feed 1/2 x 5 x 6" Duplex Ballast 8 x 8 x 10" No. and size of Suctions connected to both Bilge and Donkey pumps  
 In Engine Room Three 3 1/2" dia. In Holds, &c. One 2 1/2" in fore peak, one 3 1/2" in the well of each hold, one 2 1/2" in tunnel well and one 2 1/2" in after peak.  
 No. of bilge injections 1 sizes 7" Connected to condenser, or to circulating pump 6. P. Is a separate donkey suction fitted in Engine room & size 6"  
 Are all the bilge suction pipes fitted with roses Yes. Are the roses in Engine room always accessible Yes. Are the sluices on Engine room bulkheads always accessible None.  
 Are all connections with the sea direct on the skin of the ship Yes. Are they 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 discharge pipes above or below the deep water line Above.  
 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 are carried through the bunkers None. How are they protected ✓  
 Are all pipes, cocks, valves, and pumps in connection with the machinery and all boiler mountings accessible at all times Yes.  
 Are the bilge suction pipes, cocks, and valves arranged so as to prevent any communication between the sea and the bilges Yes.  
 When were stern tube, propeller, screw shaft, and all connections examined in dry dock Nov 1899 Is the screw shaft tunnel watertight Yes  
 Is it fitted with a watertight door Yes worked from Upper platform

BOILERS, &c.— (Letter for record (r).) Total Heating Surface of Boilers 4543 sq. ft. Is forced draft fitted No.  
 No. and Description of Boilers 3. Cyl. Mult<sup>l</sup>, Single ended Working Pressure 180 lbs. Tested by hydraulic pressure to 360 lbs.  
 Date of test (1) 28.11.99 Can each boiler be worked separately Yes. Area of fire grate in each boiler 40 sq. ft. No. and Description of safety valves to each boiler 2. Spring loaded. Area of each valve 7.16 sq. in. Pressure to which they are adjusted 185 lbs. Are they fitted with easing gear Yes.  
 Smallest distance between boilers or uptakes and bunkers or woodwork to side bunkers Mean dia. of boilers 13' 7 1/2" Length 10' 3" Material of shell plates S.  
 Thickness 1 1/2" Range of tensile strength 24-32 tons Are they welded or flanged 40 Descrip. of riveting: cir. seams D.P. Lap. long. seams Atl. Straps.  
 Diameter of rivet holes in long. seams 1 3/16" Pitch of rivets 8" Lap of plates or width of butt straps 14 5/8" x 1 1/16" thick.  
 Per centages of strength of longitudinal joint 89.2 Working pressure of shell by rules 182.1 lbs. Size of manhole in shell 16" x 12"  
 Size of compensating ring 34 1/2" x 27 1/2" x 1 1/2" No. and Description of Furnaces in each boiler 2: Horizontal Material S. Outside diameter 52"  
 Length of plain part top 4' 0" bottom 3' 0" Thickness of plates top 39" bottom 64" Description of longitudinal joint Weld. No. of strengthening rings ✓  
 Working pressure of furnace by the rules 181.5 Combustion chamber plates: Material S. Thickness: Sides 9/16" Back 5/8" Top 5/8" Bottom 1 3/32"  
 Pitch of stays to ditto: Sides 8" x 4 1/2" Back 8 1/2" x 8 1/2" Top 8 1/2" x 8" If stays are fitted with nuts or riveted heads Nuts. Working pressure by rules 186.8  
 Material of stays Steel. Diameter at smallest part 1 5/8" dia. Area supported by each stay 42.2 sq. in. Working pressure by rules 24.8 End plates in steam space: Material S. Thickness 1" Pitch of stays 14 1/2" x 13" How are stays secured D.N. & W. Working pressure by rules 199.3 Material of stays S.  
 Diameter at smallest part 2 1/2" Area supported by each stay 227.5 sq. in. Working pressure by rules 25.3 Material of Front plates at bottom S.  
 Thickness 1 3/16" Material of Lower back plate S. Thickness 3 1/2" x 5/8" Doubling Greatest pitch of stays 13' 0" Working pressure of plate by rules 323.5  
 Diameter of tubes 3 1/2" Pitch of tubes 4 3/4" x 4 3/4" Material of tube plates S. Thickness: Front 13/16" x 5/8" Doubling Back 3/4" Mean pitch of stays 9 1/2"  
 Pitch across wide water spaces 14 1/2" Working pressures by rules 215.4 Girders to Chamber tops: Material S. Depth and thickness of girder at centre 8" x 1 1/2" Length as per rule 24" Distance apart 8 1/2" Number and pitch of Stays in each 2: 8"  
 Working pressure by rules 217.9 Superheater or Steam chest; how connected to boiler None Can the superheater be shut off and the boiler worked separately ✓ Diameter ✓ Length ✓ Thickness of shell plates ✓ Material ✓ Description of longitudinal joint ✓ Diam. of rivet holes ✓ Pitch of rivets ✓ Working pressure of shell by rules ✓ Diameter of flue ✓ Material of flue plates ✓ Thickness ✓  
 If stiffened with rings ✓ Distance between rings ✓ Working pressure by rules ✓ End plates: Thickness ✓ How stayed ✓  
 Working pressure of end plates ✓ Area of safety valves to superheater ✓ Are they fitted with easing gear ✓



DONKEY BOILER— No. *Nine*. Description ☒

Made at \_\_\_\_\_ By whom made \_\_\_\_\_ When made \_\_\_\_\_ Where fixed \_\_\_\_\_  
Working pressure \_\_\_\_\_ tested by hydraulic pressure to \_\_\_\_\_ No. of Certificate \_\_\_\_\_ Fire grate area \_\_\_\_\_ Description of safety valves \_\_\_\_\_  
No. of safety valves \_\_\_\_\_ Area of each \_\_\_\_\_ Pressure to which they are adjusted \_\_\_\_\_ If fitted with easing gear \_\_\_\_\_ If steam from main boilers can  
enter the donkey boiler \_\_\_\_\_ Dia. of donkey boiler \_\_\_\_\_ Length \_\_\_\_\_ Material of shell plates \_\_\_\_\_ Thickness \_\_\_\_\_ Range of tensile  
strength \_\_\_\_\_ Descrip. of riveting long. seams \_\_\_\_\_ Rivets \_\_\_\_\_ Thickness of shell crown plates \_\_\_\_\_ Radius of do. \_\_\_\_\_ No. of stays \_\_\_\_\_  
Lap of plating \_\_\_\_\_ Per centage of strength of joint \_\_\_\_\_ Plates \_\_\_\_\_ Dia. of rivet holes \_\_\_\_\_ Whether punched or drilled \_\_\_\_\_ Pitch of rivets \_\_\_\_\_  
Dia. of stays \_\_\_\_\_ Diameter of furnace Top \_\_\_\_\_ Bottom \_\_\_\_\_ Length of furnace \_\_\_\_\_ Thickness of furnace plates \_\_\_\_\_ Description of  
joint \_\_\_\_\_ Thickness of furnace crown plates \_\_\_\_\_ Stayed by \_\_\_\_\_ Working pressure of shell by rules \_\_\_\_\_  
Working pressure of furnace by rules \_\_\_\_\_ Diameter of uptake \_\_\_\_\_ Thickness of uptake plates \_\_\_\_\_ Thickness of water tubes \_\_\_\_\_

SPARE GEAR. State the articles supplied:— 1 propeller; 2 top + 2 bottom end, 2 main bearings;  
1 set Coupling bolts & nuts; 2 set each, Air + Circulating pump valves; 1 set sea  
feed, bilge and donkey pump valves; 1 feed check valve; 2 rings for piston +  
1 set Ramsbottom rings + P. piston; 1 set Springs L. P. piston; 1 Safety valve Spring; 1 Escape drill  
bolts & nuts assorted + iron of various sizes.

For Sir Christopher Furness, Westgarth & Co., Ltd.

Manufacturers of Engines + Main Boilers.

*W. H. Pl.*  
Dates of Survey while building \_\_\_\_\_ During progress of work in shops:— 1899 March 20, 23, 28, 30. April 3, 7, 10, 12, 13, 17, 19, 25, 27, 29. May 1, 2, 11, 16, 19, 25, 29, 31. June 2, 5, 9, 12, 14, 22, 26, 29. July 4, 10, 11, 12, 14, 15, 18  
During erection on board vessel:— 8, 10, 11, 22, 23, 24, 25, 29, 30. Sept. 1, 25, 26, 27. Oct. 2, 3, 9, 11, 14, 17, 19, 25, 27, 30. Nov. 1, 4, 8, 10, 14, 15, 17, 18, 20, 21, 23, 27, 28, 29. Dec. 11, 13, 14, 15, 18  
Total No. of visits (121) W. H. Pl. 1901 Mar. 9, 15, 16. June 21, 26 Is the approved plan of main boiler forwarded herewith *yes*.

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

The Engines and Boilers of this vessel have been built under Special Survey in accordance with Rule requirements. The materials and workmanship are good. When completed, and properly fitted on board, they were tried under steam at Moorings with satisfactory results, and are now in good working order, and in our opinion eligible to the notation *\* L.M.C. 6.00* in the Society's Register Book.

It is submitted that this vessel is eligible for THE RECORD. + L.M.C. 6.00.

*W. H. Pl.*  
4.7.00

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4.7.00

The amount of Entry Fee... £ 3 : 0 :  
Special ... £ 36 : 1 :  
Donkey Boiler Fee ... £ : :  
Travelling Expenses (if any) £ : :

When applied for,

29.6.900

When received,

29.6.900

Committee's Minute

Assigned

FRI. 6 JUL 1900

+ L.M.C. 6.00

*W. H. Pl.*  
*Richard Kier*  
Engineer Surveyor to Lloyd's Register of British & Foreign Shipping.

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