

REPORT ON MACHINERY.

Port of **MIDDLESBROUGH-ON-TEES.**

Received at London Office **MUN 9 JAN 1899**

No. in Survey held at **Middlesbro' on Tees.** Date, first Survey **11th May 1898** Last Survey **24th Nov 1898**
 Reg. Book. **1111** on the **Steel screw steamer "Candlehoe"** (Number of Visits **1898**)
 Master **Chamberlain** Built at **W. Hartlepool** By whom built **Furness, Withy & Coy Ltd** When built **1898**
 Engines made at **Middlesbro'** By whom made **Furness, Westgarth & Coy** when made **1898**
 Boilers made at **6** By whom made **6** when made **1898**
 Registered Horse Power **304** Owners **Bennetts & Co** Port belonging to **Grimsby**
 Nom. Horse Power as per Section 28 **304** Is Electric Light fitted **No**

ENGINES, &c.—Description of Engines **Inverted Triple expansion** No. of Cylinders **3** No. of Cranks **3**
 Diameter of Cylinders **25", 40", 66"** Length of Stroke **45** Revolutions per minute **60** Diameter of Screw shaft **13.5"**
 Diameter of Tunnel shaft **11.26"** as fitted **11.26"** Diameter of Crank shaft journals **13.4"** Diameter of Crank pin **13.4"** Size of Crank webs **18x8.5 built.**
 Diameter of screw **14.6"** Pitch of screw **16.3"** No. of blades **4** State whether moveable **Solid** Total surface **85 sq feet.**
 No. of Feed pumps **2** Diameter of ditto **3.4"** Stroke **25.5"** Can one be overhauled while the other is at work **Yes.**
 No. of Bilge pumps **2** Diameter of ditto **4"** Stroke **25.5"** Can one be overhauled while the other is at work **Yes.**
 No. of Donkey Engines **2** Sizes of Pumps **Ballast 8" x 4" x 10"** No. and size of Suctions connected to both Bilge and Donkey pumps
 In Engine Room **3** One centre **3.5" dia**, 2 wings **3.5" dia**. In Holds, &c. **Sip. One 2.5" dia to Fore Peak, One 3.5" dia to Well in fore hold, One 3.5" dia to Well in No. 2 hold, One 3.5" dia to Well in No. 4 hold, One 2.5" dia to aft peak with con. to well.**
 No. of bilge injections **1** sizes **6"** Connected to condenser, or to circulating pump **C. P.** Is a separate donkey suction fitted in Engine room of size **Yes: 5"**
 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
 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 **Yes** Is the screw shaft tunnel watertight **Yes**
 Is it fitted with a watertight door **Yes** worked from **Upper platform.**

BOILERS, &c.— (Letter for record **(7)**) Total Heating Surface of Boilers **4833 sq ft.** Is forced draft fitted **no.**
 No. and Description of Boilers **Two, cylindrical multi-ported single ended** Working Pressure **160.** Tested by hydraulic pressure to **320.**
 Date of test **20.10.98** Can each boiler be worked separately **Yes.** Area of fire grate in each boiler **64.14 sq ft** No. and Description of safety valves to
 each boiler **Two direct spring.** Area of each valve **11.04 sq in** Pressure to which they are adjusted **165 lbs.** Are they fitted
 with easing gear **Yes.** Smallest distance between boilers or uptakes and bunkers or woodwork **about 12"** Mean diameter of boilers **15.5"**
 Length **10.6"** Material of shell plates **Steel.** Thickness **1.76"** Description of riveting: circum. seams **D.R. lap.** long. seams **dbl. straps.**
 Diameter of rivet holes in long. seams **1.76"** Pitch of rivets **8"** Lap of plates or width of butt straps **14.5" x 1.32" thick.**
 Percentages of strength of longitudinal joint **86.9** Working pressure of shell by rules **164.1** Size of manhole in shell **16" x 12"**
 Size of compensating ring **3.42 x 2.42 x 1.76** No. and Description of Furnaces in each boiler **1 Adams type** Material **S.** Outside diameter **46.4"**
 Length of plain part **4.2"** Thickness of plates **3.25"** Description of longitudinal joint **welded.** No. of strengthening rings **one.**
 Working pressure of furnace by the rules **184.4** Combustion chamber plates: Material **S.** Thickness: Sides **1.76"** Back **1.76"** Top **1.76"** Bottom **1.76"**
 Pitch of stays to ditto: Sides **8" x 8"** Back **9.5" x 8.5"** Top **9" x 8"** If stays are fitted with nuts or riveted heads **nuts.** Working pressure by rules **162.**
 Material of stays **Steel** Diameter at smallest part **1.76"** Area supported by each stay **83.2 sq in** Working pressure by rules **143.** End plates in steam space:
 Material **S.** Thickness **1.76"** Pitch of stays **16" x 16"** How are stays secured **d. n + l w** Working pressure by rules **162.5** Material of stays **S. 24 tons min.**
 Diameter at smallest part **2.76"** Area supported by each stay **256 sq in** Working pressure by rules **164.** Material of Front plates at bottom **S.**
 Thickness **3.4"** Material of Lower back plate **S.** Thickness **3.25"** Greatest pitch of stays **12" x 8.5"** Working pressure of plate by rules **220.**
 Diameter of tubes **3.5"** Pitch of tubes **4.4" x 4.4"** Material of tube plates **S.** Thickness: Front **1.76"** Back **1.76"** Mean pitch of stays **9.5"**
 Pitch across wide water spaces **14.5"** Working pressures by rules **142.32233** Girders to Chamber tops: Material **S.** Depth and
 thickness of girder at centre **8.5" x 12"** Length as per rule **30"** Distance apart **9"** Number and pitch of Stays in each **Two: 8"**
 Working pressure by rules **180.4** 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— Description *Horizontal multitubular, 2 plain furnaces.*
 Made at *Socotron* By whom made *J. Sedron & Coy.* When made *22.4.98* Where fixed *In Sotekhold.*
 Working pressure *80* tested by hydraulic pressure to *160* No. of Certificate *1683* Fire grate area *24.7* Description of safety valves *Spring direct*
 No. of safety valves *2* Area of each *5.94* Pressure to which they are adjusted *82 lbs* If fitted with easing gear *Yes* If steam from main boilers can enter the donkey boiler *No* Diameter of donkey boiler *9' 0"* Length *9' 0"* Material of shell plates *steel.* Thickness *1/2"*
 Description of riveting long seams *D.B.S. double.* Diameter of rivet holes *13/16"* Whether punched or drilled *drilled* Pitch of rivets *3 1/2"*
 Lap of plating *8 1/2"* Per centage of strength of joint *88.* Rivets *88.* Thickness of *top end* plates *3/4"* Radius of do. *✓* *pitch* No. of Stays to do. *14 1/2 x 13*
 Dia. of stays *2" diam.* Diameter of furnace *top 2' 10" Bottom 1' 6"* Length of furnace *6' 0"* Thickness of furnace plates *1/6" + 1/2"* Description of joint *D.B.S. single* Thickness of *top 15/32" Bottom 9/32"* Stays by *1 1/4" + 1 1/2" stays, nutted* *pitch 9 x 9* Working pressure of shell by rules *85 lbs*
 Working pressure of furnace by rules *84 lbs* Diameter of *tubes 3"* Thickness of *tubes 3/4"* *plates 1/8"* Thickness of *stay tubes 5/16"*

SPARE GEAR. State the articles supplied:— *1 propeller & shaft complete, 2 top & 2 bottom end bolts & nuts, 2 main bearing & 1 set coupling bolts & nuts, 1 set each Air & Circ. pump valves, 1 set each feed & bilge pump valves, 1 set double pump valves, 1 main & 1 donkey feed check valve, 2 piston & valve rings, 1 set springs & P. piston, 1 escape valve spring each size, 1 safety valve spring, bolts & nuts assorted & iron of various sizes.*
 The foregoing is a correct description,

FOR SIR CHRISTOPHER FURNESS, WESTGARTH & CO., LD. Manufacturers of main Engines & Boilers.

A. Jackson
 During progress of work in shop *1898. May. 11. 14. 17. 23. 26 June 1. 11. 14. 17. 22. 24 July. 1. 11. 14. 21. 25. 26. 28 Aug. 4. 9. 11. 22. 25. 29. Sep. 1. 5. 7. 9. 10. 12. 14. 16. 21. 23. 27. 29 Oct. 3. 7. 11. 14. 15. 19. 20. 21. 25. 27. 31. Nov. 1. 2. 9. 12. 15. 17. 18. 21. 24*
 During erection on board vessel *5. 7. 9. 10. 12. 14. 16. 21. 23. 27. 29 Oct. 3. 7. 11. 14. 15. 19. 20. 21. 25. 27. 31. Nov. 1. 2. 9. 12. 15. 17. 18. 21. 24*
 Total No. of visits *Fifty-eight* / *10. Apr. 1898. Dec. 1. 21. 23. 29. 1899. Jan. 4. - 5 visits*

General Remarks (State quality of workmanship, opinions as to class, &c. *The Engines and Boilers of this vessel, have been built under Special Survey, and in accordance with the Rule requirements. The materials, and workmanship, are good & efficient. When completed, and 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 have **L.M.C. 1.99** recorded in the Society's Register Book.*

On going through the docks at West Hartlepool on the 28th of Dec. 1898, this vessel collided with the Quay, and broke 3-6" off one propeller blade. Vessel afterwards placed in dry dock, propeller shaft drawn, examined in lathe and found true & sound. Shaft afterwards replaced and spare propeller fitted.

It is submitted that this vessel is eligible for THE RECORD. **L.M.C. 1.99.**

A.C.H.
9.1.99

The amount of Entry Fee... £ 3 : 0 :
 Special ... £ 35 : 4 :
 Donkey Boiler Fee ... £ : :
 Travelling Expenses (if any) £ : :
 When applied for, *4.1.1899*
 When received, *4.1.1899*

Wm. Dickey-Towell
 Engineer Surveyor to Lloyd's Register of British & Foreign Shipping.

Committee's Minute **TUES, 10 JAN 1899**
 Assigned *+ L.M.C. 1.99*



Certificate (if required) to be sent to WEST HARTLEPOOL

The Surveyors are requested not to write on or below the space for Committee's Minute.