

# REPORT ON MACHINERY.

Mdb. Rpt. No. 21487

Port of Sunderland

Received at London Office 1903

No. in Survey held at Sunderland

Date, first Survey 27 April 03 Last Survey September 29 1903

Reg. Book.

118 on the Steel S.S. "Zambezia"

(Number of Visits 30)

Tons { Gross 1173.74  
Net 737.48  
When built 1903

Master C. J. de Faria Built at Middlesbro By whom built Sir A. Dixon & Co (501)

Engines made at Sunderland By whom made No. Eastern Mar. Eng. Co. Ld. when made 1903

Boilers made at Sunderland By whom made - Ditto - when made 1903

Registered Horse Power \_\_\_\_\_ Owners Empresa Nacional &c. Port belonging to Lisbon

Nom. Horse Power as per Section 28 133 Is Refrigerating Machinery fitted no Is Electric Light fitted yes

**ENGINES, &c.**—Description of Engines Tri Compound No. of Cylinders 3 No. of Cranks 3

Dia. of Cylinders 17' 27' 45" Length of Stroke 33" Revs. per minute 91 Dia. of Screw shaft 9" Material of screw shaft Wrot. Iron

Is the screw shaft fitted with a continuous liner the whole length of the stern tube Yes Is the after end of the liner made water tight in the propeller boss Yes If the liner is in more than one length are the joints burned ✓ 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 ✓ Length of stern bush 3' 4"

Dia. of Tunnel shaft 8.59" Dia. of Crank shaft journals 9" Dia. of Crank pin 9 Size of Crank webs 13 1/2 x 5 5/8 Dia. of thrust shaft under collars 9 Dia. of screw 11-3" Pitch of screw 13'-0" No. of blades 4 State whether moveable no Total surface 38 sq ft

No. of Feed pumps 2 Diameter of ditto 2 3/4" Stroke 1'-6" Can one be overhauled while the other is at work Yes

No. of Bilge pumps 2 Diameter of ditto 3" Stroke 1'-6" Can one be overhauled while the other is at work Yes

No. of Donkey Engines 2 Sizes of Pumps 6 x 7 x 9 - 5 x 3 x 4 1/2 No. and size of Suctions connected to both Bilge and Donkey pumps In Engine Room 1 of 3" & 2 of 2" In Holds, &c. 2 of 2" in fore hold; 2 in aft hold

No. of bilge injections 1 sizes 3 1/2" Connected to condenser, or to circulating pump Yes Is a separate donkey suction fitted in Engine room & size Yes - 2"

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 Yes

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 New ship Is the screw shaft tunnel watertight Yes

Is it fitted with a watertight door Yes worked from main decks

**BOILERS, &c.**— (Letter for record S) Total Heating Surface of Boilers 2165 Is forced draft fitted no

No. and Description of Boilers 1 Cylindrical Multitubular Working Pressure 180 Tested by hydraulic pressure to 360

Date of test 8/7/03 Can each boiler be worked separately ✓ Area of fire grate in each boiler 62.5 No. and Description of safety valves to each boiler 2 Spring direct loaded Area of each valve 4.0684 Pressure to which they are adjusted 180 Are they fitted with easing gear Yes

Smallest distance between boilers or uptakes and bunkers or woodwork 13 1/2" Mean dia. of boilers 15'-1 1/2" Length 10'-6" Material of shell plates Stl

Thickness 1 1/32" Range of tensile strength 29-32 Are they welded or flanged ✓ Descrip. of riveting: cir. seams Dr. lap long. seams 2 x d. 6

Diameter of rivet holes in long. seams 1 3/8" Pitch of rivets 9 Lap of plates or width of butt straps 1'-7 7/8"

Per centages of strength of longitudinal joint rivets 91.31 Working pressure of shell by rules 203.8 Size of manhole in shell 1.4 x 1.0

Size of compensating ring flanged No. and Description of Furnaces in each boiler 3 Deighton's Material Stl Outside diameter 3'-11 1/2"

Length of plain part top ✓ bottom ✓ Thickness of plates crown 19/32" bottom ✓ Description of longitudinal joint ✓ No. of strengthening rings ✓

Working pressure of furnace by the rules 198.77 Combustion chamber plates: Material Stl Thickness: Sides 11/16 Back 33/32 Top 11/16 Bottom 18

Pitch of stays to ditto: Sides 9 1/2 x 9 Back 9 5/8 x 9 1/4 Top 9' x 9" If stays are fitted with nuts or riveted heads nuts Working pressure by rules 190.7

Material of stays Stl Diameter at smallest part 1.79 Area supported by each stay 89 Working pressure by rules 180.9 End plates in steam space: Material Stl Thickness 1 1/32 Pitch of stays 20 1/2 x 18 3/4 How are stays secured dbl. nuts washers Working pressure by rules 242 Material of stays Stl

Diameter at smallest part 8.48 Area supported by each stay 384.75 Working pressure by rules 221 Material of Front plates at bottom Stl

Thickness 27/32 Material of Lower back plate Stl Thickness 29/32 Greatest pitch of stays 14 3/4 x 9 5/8 Working pressure of plate by rules 183

Diameter of tubes 3 1/4" Pitch of tubes 4 1/2 x 4 1/2 Material of tube plates Stl Thickness: Front 27/32 Back 27/32 Mean pitch of stays 9' x 9"

Pitch across wide water spaces 14 1/2" x 9" Working pressures by rules 266 Girders to Chamber tops: Material Stl Depth and thickness of girder at centre 8 1/2" x 2" Length as per rule 30 Distance apart 9" Number and pitch of Stays in each 2 of 9"

Working pressure by rules 252.3 Superheater or Steam chest; how connected to boiler \_\_\_\_\_ 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 \_\_\_\_\_

Pitch of rivets \_\_\_\_\_ Working pressure of shell by rules \_\_\_\_\_ Diameter of flue \_\_\_\_\_ Material of flue plates \_\_\_\_\_ Thickness \_\_\_\_\_

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. *One* Description *Cyl. mult<sup>e</sup> 2 plain furnaces, dry back.*  
 Made at *Stockton* By whom made *J. Sudron & Co. Ltd.* When made *4.8.03* Where fixed *on deck.*  
 Working pressure *90 lbs* tested by hydraulic pressure to *180 lbs* No. of Certificate *3045* Fire grate area Description of safety valves *direct spring*  
 No. of safety valves *2* Area of each *3.14* Pressure to which they are adjusted *90 lbs* If fitted with casing gear *yes* If steam from main boilers can enter the donkey boiler *no* Dia. of donkey boiler *8'-0"* Length *6'-0"* Material of shell plates *Steel* Thickness *1/2"* Range of tensile strength *27/32* Descrip. of riveting long. seams *Tree riv lap* Dia. of rivet holes *13/16"* Whether punched or drilled *drilled* Pitch of rivets *3 1/2"*  
 Lap of plating *6"* Per centage of strength of joint Rivets *80.2* Thickness of shell crown plates *4/16"* Radius of do. Pitch No. of Stays to do. *16 x 12 1/2"*  
 Dia. of stays *2 1/16"* Diameter of furnace Top *2'-4"* Bottom *✓* Length of furnace *6'-0"* Thickness of furnace plates *1/16"* Description of joint *welded* Thickness of furnace crown plates *✓* Stayed by *✓* Working pressure of shell by rules *92.3*  
 Working pressure of furnace by rules *102 lbs* Diameter of uptake *tubes 3"* Thickness of uptake plates *4/16"* Thickness of *stay* tubes *5/16"*

**SPARE GEAR.** State the articles supplied:— *2 top end & 2 botm. end bolts & nuts; 2 main bearing & 1 set of coupling bolts & nuts; 2 feed pump & 2 bilge pump valves & seats; 1/2 cwt. iron plate; 1/2 cwt. iron bars; 100 assorted bolts & nuts; 1 spare 1/3 crank shft. 1 spare tail shaft; 1 set packg. rings for each cyl; 2 valve spindles; 1 air pump head valve seat & guard; 1 eccentric strap liner; 1 spare propeller; 8 other usual spare gear.*  
 The foregoing is a correct description, *✓*

*W. & A. Scott & Co. Ltd.* Manufacturer.

Dates of Survey while building  
 During progress of work in shops - - -  
 During erection on board vessel - - -  
 Total No. of visits  
*1903 - April 27. May 1. 14. June 4. 16. 17. 26. July 6. 8. 18. 28. August 20. 21. 25. Mtd. 1903. July 13. 24. 28. Aug. 13. 28. Sept. 1. 4. 8. 12. 15. 18. 23. 25. 26. 29.*  
 Is the approved plan of main boiler forwarded herewith *Yes*  
 " " " donkey " " " *Yes*

**General Remarks** (State quality of workmanship, opinions as to class, &c.) *The machinery of this vessel has been built under Special Survey. The material & workmanship sound and good. Boilers & Steam pipes tested by hydraulic pressure to double the working pressure. The Engines worked well. The safety valves of the main boiler adjusted as above.*

*The vessel is eligible in my opinion to have the notation in the Register Book of + L.M.C. 9,03*

*The electric light report will be forwarded as soon as received back from the Shipbuilders.*

It is submitted that this vessel is eligible for THE RECORD. + L.M.C. 9.03. ELECTRIC LIGHT

*R.S.*  
 8.10.03

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

The amount of Entry Fee. . . . .	£ 2 : . . . .	When applied for, . . . . .
Special . . . . .	£ 19 : 19 : . . . . .	12. 9. 1903
Donkey Boiler Fee . . . . .	£ : : . . . . .	When received, . . . . .
Travelling Expenses (if any) £ . . . . .	: : . . . . .	14. 9. 1903

*Pat. Salmon R.D. Shilston*  
 Engineer Surveyor to Lloyd's Register of British & Foreign Shipping.

Committee's Minute *FRI. 9 OCT 1903*  
 Assigned *+ L.M.C. 9,03*

MACHINERY CERTIFICATE

