

# REPORT ON MACHINERY.

Received at London Office 29th SEP. 1883.

No. 8505  
 No. in Survey held at Glasgow & Port Glasgow Date, first Survey Sept 1882 Last Survey Sept 25th 1883  
 Reg. Book. on the Lion Screw Steamer "Arenbyse" (Number of Visits 631.34) Tons 383.44  
 Master not appointed Built at Port Glasgow By whom built Murdoch & Murray When built 1883  
 Engines made at Glasgow By whom made David Rowan when made 1883  
 Boilers made at " By whom made " when made 1883  
 Registered Horse Power 120 Owners The Companhia Pernambucana Port belonging to Pernambuco

**ENGINES, &c.** — Screw (Two pairs of Engines)  
 Description of Engines Compound Inverted Direct Acting  
 Diameter of Cylinders 20" & 38" Length of Stroke 27" No. of Rev. per minute 110 Point of Cut off, High Pressure .6 Low Pressure .66  
 Diameter of Screw shaft 4" Diam. of Tunnel shaft 6 3/4" Diam. of Crank shaft journals 4" Diam. of Crank pin 4 1/4" size of Crank webs 5 1/4" x 8"  
 Diameter of screw 4" 3" Pitch of screw 12" 6" No. of blades Three state whether moveable Solid total surface 31.8 sq ft  
 No. of Feed pumps One diameter of ditto 2 1/2" Stroke 14" Can one be overhauled while the other is at work Yes fitted to each  
 No. of Bilge pumps One diameter of ditto 2 1/2" Stroke 14" Can one be overhauled while the other is at work Set of Engines  
 Where do they pump from All Compartments  
 No. of Donkey Engines One Size of Pumps 4 1/2" cyl. 4" x 10" stroke Where do they pump from Sea Bilge & Hotwell

Are all the bilge suction pipes fitted with roses Yes Are the roses always accessible Yes Are the sluices on Engine room bulkheads always accessible Yes  
 No. of bilge injections One and sizes 2 1/2" to each Are they connected to condenser, or to circulating pump To Circulating pumps  
 How are the pumps worked By Levers  
 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 Bilge pipes to Storehold How are they protected By wood casing  
 Are all pipes, cocks, valves, and pumps in connection with the machinery accessible at all times Yes  
 Are the pipes, cocks, and valves arranged so as to prevent an unintentional connection between the sea and the bilges Yes  
 When were stern tube, propeller, screw shaft, and all connections examined in dry dock Dry Dock Greenock  
 Is the screw shaft tunnel watertight Yes and fitted with a sluice door Yes worked from Upper platform

**BOILERS, &c.** —  
 Number of Boilers One Description Round Horizontal Whether Steel or Iron Steel  
 Working Pressure 80 lbs Tested by hydraulic pressure to 160 lbs Date of test 2nd July 1883  
 Description of superheating apparatus or steam chest None  
 Can each boiler be worked separately Yes Can the superheater be shut off and the boiler worked separately Yes  
 No. of square feet of fire grate surface in each boiler 47 sq ft Description of safety valves Direct Spring No. to each boiler Two  
 Area of each valve 21.64" Are they fitted with easing gear Yes No. of safety valves to superheater 1 area of each valve —  
 Are they fitted with easing gear Yes Smallest distance between boilers and bunkers or woodwork 9" Diameter of boilers 12 ft  
 Length of boilers 16 ft description of riveting of shell long. seams Double riveted circum. seams Double riveted Thickness of shell plates 28 1/2"  
 Diameter of rivet holes 1" whether punched or drilled Drilled pitch of rivets 4" 0 1/4" Lap of plating 10" x 9/16"  
 Percentage of strength of longitudinal joint 45% working pressure of shell by rules 80 lbs size of manholes in shell 16" x 12"  
 Size of compensating rings Flat rings No. of Furnaces in each boiler One  
 Outside diameter 3' 5" length, top 6' 6" bottom through furnace thickness of plates 9/16" description of joint Corrugated if rings are fitted Yes  
 Greatest length between rings — working pressure of furnace by the rules 120 lbs combustion chamber plating, thickness, sides 9/16" back — top 9/16"  
 Pitch of stays to ditto, sides 9 1/2" x 8 3/4" back top 9 1/2" x 8" If stays are fitted with nuts or riveted heads Nuts working pressure of plating by rules 80 lbs  
 Diameter of stays at smallest part 1 3/8" working pressure of ditto by rules 10 8/16" end plates in steam space, thickness 23/32"  
 Pitch of stays to ditto 15" x 16" how stays are secured By double nuts working pressure by rules 84 lbs diameter of stays at smallest part 2 1/4" working pressure by rules 99 lbs Front plates at bottom, thickness 9/16" Back plates, thickness —  
 Greatest pitch of stays — working pressure by rules — Diameter of tubes 3 1/2" pitch of tubes 4 3/4" thickness of tube plates, front 1/16" back 1/16" how stayed By tubes pitch of stays 13 1/2" x 9 1/2" width of water spaces 6"  
 Diameter of Superheater or Steam chest 2' 6" length 20' 6" thickness of plates 9/16" description of longitudinal joint Double riveted diameter of rivet holes 3/4"  
 Pitch of rivets 2 3/4" working pressure of shell by rules — diameter of flue — thickness of plates — If stiffened with rings —  
 Distance between rings — working pressure by rules — end plates of superheater, or steam chest; thickness 9/16" how stayed Fitted  
 Superheater or steam chest; how connected to boiler By two neck pieces

**DONKEY BOILER**— Description *Round vertical*  
 Made at *Glasgow* by whom made *Nicholson & Co* when made *1883* where fixed *in Sittell*  
 Working pressure *60 lbs* tested by hydraulic pressure to *120 lbs* No. of Certificate *1096* fire grate area *9 ft<sup>2</sup>* description of safety  
 valves *Direct Spring* No. of safety valves *one* area of each *4"* if fitted with easing gear *yes* if steam from main boilers can  
 enter the donkey boiler *no* diameter of donkey boiler *4' 6"* length *8 ft 1/2* description of riveting *single & double*  
 Thickness of shell plates *3/8" steel* diameter of rivet holes *3/4"* whether punched or drilled *punched* pitch of rivets *1 1/2"* lap of plating *5/8"*  
 per centage of strength of joint *40%* thickness of crown plates *3/16" steel* stayed by *3 stays 2" dia*  
 Diameter of furnace, top *3' 6"* bottom *4 ft* length of furnace *4' 6"* thickness of plates *3/16" steel* description of joint *Lap*  
 Thickness of furnace crown plates *3/16" steel* stayed by *3 stays 2" dia* working pressure of shell by rules *9 1/2 lbs*  
 Working pressure of furnace by rules *62 lbs* diameter of uptake *11"* thickness of plates *3/16" iron* thickness of water tubes *3/16"*

**SPARE GEAR.** State the articles supplied:— *Two Propellers & Connecting Rod bolts with nuts*  
*2 main bearing bolts & nuts & shaft coupling bolts & 1 set of feed & surge pumps valves*  
*with seats, 1 set of rubber valves & boiler tubes 20 Condenser tubes & spring for each*  
*size of escape valves, an assortment of bolts & nuts (iron & brass)*  
 The foregoing is a correct description,  
 J. David Rowan *Manufacturer.*

**General Remarks** (State quality of workmanship, opinions as to class, &c. *These Engines & Boilers are*  
*of good workmanship & materials and are now in good order*  
*and safe working condition and eligible in my opinion to be*  
*noted in the Register Book* ✖ *Lloyd. M.C. 9/83*

*It is submitted that this vessel*  
*is eligible to have the notification*  
*of 2nd. B. G. 43 recorded.*  
 B.G.  
 11083

*(Large blue scribble)*

The amount of Entry Fee .. £ 2 : 0 : 0 received by me,  
 Special .. £ 18 : 0 : 0 Glasgow  
 Donkey Boiler Fee .. £ 0 : 0 : 0  
 Certificate (if required) .. £ 0 : 0 : 0 24/9/1883  
 To be sent as per margin.  
 (Travelling Expenses, if any, £ 15/6)

*James Morrison* 2019  
 Engineer Surveyor to Lloyd's Register of British & Foreign Shipping.  
 Clyde District  
 Lloyd's Register  
 Foundation

Committee's Minute TUESDAY 2 OCTOBER 1883