

# REPORT ON MACHINERY.

RECEIVED  
(Received at London Office)

No. 5603  
 No. in Survey held at Glasgow Date, first Survey November 1880 Last Survey April 29 1882  
 Reg. Book: \_\_\_\_\_ Tons 5328.28  
 on the Screw Steamer "Austral" Tons 3239.23  
 Master J. Murdoch Built at Glasgow When built 1881-2  
 Engines made at Glasgow By whom made John Elder & Co when made 1881-2  
 Boilers made at " By whom made " " " " when made " "  
 Registered Horse Power 1000 Owners Orient Steam Ship Co Port belonging to London

**ENGINES, &c.—**

Description of Engines Compound Inverted Direct Acting Variable  
 Diameter of Cylinders 62 7/8" Length of Stroke 60" No. of Rev. per minute 65 Point of Cut off, High Pressure 65 Low Pressure .5  
 Diameter of Screw shaft 20" Diameter of Tunnel shaft 19" Diameter of Crank shaft journals 20" Diameter of Crank pin 2 1/2" size of Crank webs 1 1/2 x 2 1/2  
 Diameter of screw 22 ft Pitch of screw 30 ft No. of blades Four state whether moveable Yes total surface 134.45 ft  
 No. of Feed pumps Two diameter of ditto 4" Stroke 31" Can one be overhauled while the other is at work Yes  
 No. of Bilge pumps Two diameter of ditto 4" Stroke 31" Can one be overhauled while the other is at work Yes  
 Where do they pump from All Compartments  
 No. of Donkey Engines Three (Double) Size of Pumps (2) = 2 1/2 x 1 1/2 x 1 1/2 (1) = 7 1/2 x 7 1/2 x 9 1/2 Where do they pump from Ballast Tanks & Bilge Sea Pipe & Hot Wells  
Centrifugal pumps (90/12) and Pulsometer (90/5) Ballast Tanks & Bilge  
 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 Four and size Two 1 1/2" Are they connected to condenser, or to circulating pump To Circulating Pump  
 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 Main Steam pipes How are they protected By iron 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 21st April 1882  
 Is the screw shaft tunnel watertight Yes and fitted with a sluice door Yes worked from Upper platform

**BOILERS, &c.**

Number of Boilers Four Description Double ended (Steel)  
 Working Pressure 95 lbs Tested by hydraulic pressure to 190 lbs Date of test Nov 1st 1881 Two Boilers  
 Description of superheating apparatus or steam chest Annular (with single flue) 16" Two Boilers  
 Can each boiler be worked separately Yes Can the superheater be shut off and the boiler worked separately No Dec 12th 1881 Two Superheaters  
 No. of square feet of fire grate surface in each boiler 172 ft Description of safety valves Direct Spring  
 No. to each boiler Two area of each valve 25.96" Are they fitted with easing gear Yes  
 No. of safety valves to superheater One back area of each valve 4" are they fitted with easing gear Yes  
 Smallest distance between boilers and bunkers or woodwork 11"  
 Diameter of boilers 16'-0" Length of boilers 17'-9" description of riveting of shell long. seams Double riveted circum. seams Double  
 Thickness of shell plates 1" diameter of rivet holes 1 1/8" whether punched or drilled Drilled pitch of rivets 5 7/16"  
 Lap of plating 15" x 10 7/16" straps per centage of strength of longitudinal joint 99 & 98% working pressure of shell by rules 10 1/2 lbs  
 Size of manholes in shell 16" x 12" size of compensating rings By forged rings  
 No. of Furnaces in each boiler Six outside diameter 4'-4" length, top 4 ft bottom 3 ft  
 Thickness of plates Straps 9/16" Bottoms 9/16" description of joint Straps fitted if rings are fitted Yes greatest length between rings 3'-6"  
 Working pressure of furnace by the rules 123 lbs  
 Combustion chamber plating, thickness, sides 8/16" back — top 8/16"  
 Pitch of stays to ditto sides 8 1/2" x 8 1/2" back — top 8' x 9 1/2"  
 If stays are fitted with nuts or riveted heads Nuts working pressure of plating by rules 106 lbs  
 Diameter of stays at smallest part 1 1/4" (Steel) working pressure of ditto by rules 136 lbs  
 End plates in steam space, thickness 13/16" pitch of stays to ditto 15" x 15 1/2" how stays are secured By double nuts  
 Working pressure by rules 98 lbs diameter of stays at smallest part 2 3/8" working pressure by rules 110 lbs  
 Front plates at bottom, thickness 10/16" Back plates, thickness — greatest pitch of stays — working pressure by rules —

Form No. 8-3/10, 907 2040.

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Diameter of tubes  $3\frac{1}{2}$ " pitch of tubes  $4\frac{3}{4}$ " thickness of tube plates, front  $1\frac{1}{16}$ " back  $1\frac{1}{16}$ "  
 How stayed by *Luber* pitch of stays  $9\frac{1}{2} \times 11\frac{1}{4}$ " width of water spaces 8"  
 Diameter of Superheater or Steam chest 12 ft length 10 ft  
 Thickness of plates 1" description of longitudinal joint " *Double strapped riveted* diameter of rivet holes  $1\frac{1}{16}$ " pitch of rivets  $1\frac{1}{16}$ "  
 Working pressure of shell by rules 135 lbs Diameter of flue 9 ft thickness of plates  $1\frac{1}{16}$ "  
 If stiffened with rings *Yes* distance between rings *Star plates (4")* Working pressure by rules *---*  
 End plates of superheater, ~~same as above~~; thickness  $1\frac{1}{16}$ " How stayed *---*  
 Superheater ~~same as above~~; how connected to boiler *by Copper pipes*

**DONKEY BOILER**— Description *Round Horizontal*  
 Made at *Glasgow* By whom made *Anderson & Lyall* when made 1881  
 Where fixed *Upper Deck* working pressure 90 lbs Tested by hydraulic pressure to 190 lbs No. of Certificate *542*  
 Fire grate area  $33\frac{1}{2}$  ft<sup>2</sup> Description of safety valves *Direct Spring* No. of safety valves *Two* area of each *.4*  
 If fitted with casing gear *Yes* If steam from main boilers can enter the donkey boiler *Stop valve fitted*  
 Diameter of donkey boiler  $8.6$ " length 9 ft description of riveting *Seble riveted*  
 thickness of shell plates  $1\frac{1}{32}$ " diameter of rivet holes  $1\frac{1}{16}$ " whether punched or drilled *Drilled*  
 pitch of rivets  $3\frac{3}{4}$ " lap of plating 4" per centage of strength of joint  $45\%$   
 thickness of ~~every~~ plates *End  $1\frac{1}{16}$  Steam space stayed by  $2\frac{1}{4}$  stays (iron)  $15 \times 11$  pitch*  
 Diameter of furnace, top  $2.9$ " bottom *---* length of furnace  $6.9$ " over all  
 thickness of plates  $8\frac{1}{16}$ " description of joints *Double butt straps*  
 thickness of furnace crown plates  $1\frac{1}{16}$ " stayed by *Luber  $13\frac{1}{2} \times 9$  pitch*  
 Working pressure of shell by rules 107 lbs working pressure of furnace by rules 105 lbs  
 diameter of uptake *---* thickness of plates  $1\frac{1}{32}$ " *combustion chamber* diameter of water tubes *Large  $1\frac{1}{2}$  dia  $8 \times 8$  pitch*

foregoing is a correct description,



*John Elder & Co* Manufacturer  
*of Glasgow & Douglas*

General Remarks (State quality of workmanship, opinions as to class, &c. *The Engines & Boilers of this vessel are of good workmanship and now in good order & safe working condition eligible in my opinion to be noted in the Register Book* ✖ *Lloyds M.C. 4.82*

*James Morrison*  
 Engineer Surveyor to Lloyd's Register of British & Foreign Ships  
 Clyde District  
 15/5/82  
 Please see letter in record with the Rules submitted from the Glasgow & Douglas M.C. 4.82

The amount of Entry Fee *£ 3 : 0 : 0* received by me,  
 Special *£ 40 : 0 : 0*  
 Certificate (if required) *£ 0 : 0 : 0* 25/4/1882  
 To be sent as per margin. *£ 43 : 0 : 0*  
 (Travelling Expenses, if any, £ )

Committee's Minute Tuesday 2nd May 1882

*J. W. + [Signature]*