

## REPORT ON MACHINERY.

Port of Glasgow.Received at London Office JAN 13 1903No. in Survey held at Glasgow.  
Reg. Book.Date, first Survey 9<sup>th</sup> Sept 01 Last Survey 20<sup>th</sup> Dec 1902(Number of Visits 77)on the T.S. "Panfa"

Master

Built at GlasgowBy whom built J. & W. Henderson & Co.Tons { Gross  
NetWhen built 1902.Engines made at GlasgowBy whom made Do.when made 1902.Boilers made at Do.By whom made Do.when made 1902.Registered Horse Power 820Owners China Mutual S. N. C.Port belonging to Liverpool.Nom. Horse Power as per Section 28 820Is Refrigerating Machinery fitted No.Is Electric Light fitted Yes.ENGINES, &c.—Description of Engines Twin screw triple expansionNo. of Cylinders 6No. of Cranks 6Dia. of Cylinders 23' 39 1/2"Length of Stroke 48"Revs. per minute 90Dia. of Screw shaft 13' 9"as per rule 13' 9"Lgth. of stern bush 4' 10"Dia. of Tunnel shaft 13' 9"as fitted 13' 9"Dia. of Crank shaft journals 14"as fitted 14"Dia. of Crank pin 14"Size of Crank webs 19' 1/2" x 8' 1/2"

Dia. of thrust shaft under

collars 14"Dia. of screw 16' 9"Pitch of screw 18' 0"No. of blades 4 eachState whether moveable YesTotal surface 80 sq each prop.No. of Feed pumps 2Diameter of ditto 4' 1/4"Stroke 24"Can one be overhauled while the other is at work Yes.No. of Bilge pumps 2Diameter of ditto 4' 1/4"Stroke 24"Can one be overhauled while the other is at work Yes.No. of Donkey Engines 4

SIZES OF PUMPS

No. and size of Suctions connected to both Bilge and Donkey pumps

In Engine Room 3 - 3 1/2"In Holds, &c. 8 ford and 4 aft. 3 1/2" dia.No. of bilge injections 2sizes 8"Connected to condenser, or to circulating pump Yes.Is a separate donkey suction fitted in Engine room & size Yes. 3 1/2"Are all the bilge suction pipes fitted with roses Yes.Are the roses in Engine room always accessible Yes.Are the staves 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 Forward bilge pipesAre 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

Is the screw shaft tunnel watertight Yes.Is it fitted with a watertight door Yes.worked from Upper deck.

BOILERS, &amp;c.—

(Letter for record S)Total Heating Surface of Boilers 11025 sqIs forced draft fitted HorizontalNo. and Description of Boilers 3 D.E. cyl. multitubularWorking Pressure 210 lb.Tested by hydraulic pressure to 400 lb.Date of test 21-10-02Can each boiler be worked separately Yes.Area of fire grate in each boiler 100 sq

No. and Description of safety valves to

each boiler 3 spring loadedArea of each valve 12.56 sqPressure to which they are adjusted 205 lb.Are they fitted with easing gear Yes.Smallest distance between boilers or uptakes and bunkers or woodwork abt. 2 ft.Mean dia. of boilers 14' 0"Length 19' 0"Material of shell plates SteelThickness 1 7/16"Range of tensile strength 28/32Are they welded or flanged No.Descrip. of riveting: cir. seams DR & TRlong. seams DB shapeDiameter of rivet holes in long. seams 1 7/16"Pitch of rivets 9 1/2"Lap of plates or width of butt straps 20 3/8"Percentage of strength of longitudinal joint 84.8Working pressure of shell by rules 231 lb.Size of manhole in shell 16" x 12"Size of compensating ring 2' 8" x 2' 4" x 1 1/2"No. and Description of Furnaces in each boiler 6 BrownMaterial SteelOutside diameter 44 1/4"Length of plain part 3' 1/2"Thickness of plates 1 1/2"Description of longitudinal joint weldedNo. of strengthening rings ✓Working pressure of furnace by the rules 212Combustion chamber plates: Material SteelThickness: Sides 1 1/2"Back 1 1/2"Top 1 1/2"Bottom 1"Pitch of stays to ditto: Sides 9 1/4" x 8 1/8"Back 9 1/4" x 8 1/8"Top 9 1/4" x 8 1/8"If stays are fitted with nuts or riveted heads Nuts usedMaterial of stays SteelDiameter at smallest part 1.98Area supported by each stay 82 sqWorking pressure by rules 200

End plates in steam space:

Material SteelThickness 1 1/4"Pitch of stays 18 1/2" x 15"How are stays secured Drunk nutWorking pressure by rules 260 lb.Material of stays SteelDiameter at smallest part 6.33Area supported by each stay 272Working pressure by rules 230Material of Front plates at bottom SteelThickness 29/32"Material of Lower back plate SteelThickness ✓Greatest pitch of stays ✓Working pressure of plate by rules ✓Diameter of tubes 2 1/2"Pitch of tubes 37 1/8" x 3 3/4"Material of tube plates SteelThickness: Front 1"Back 3/32"Mean pitch of stays 9 1/8"Pitch across wide water spaces 13 1/2"Working pressures by rules 200 lb.Girders to Chamber tops: Material Steel

Depth and

Thickness of girder at centre (11 x 1 1/8) 2Length as per rule 46 1/16"Distance apart 8 1/8"Number and pitch of Stays in each 4 - 9 1/4"Working pressure by rules 218 lb.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. 1 Description Cylindrical Multitube  
Made at Glasgow. By whom made D. W. Henderson & Co. When made 1902 Where fixed Upper deck.  
Working pressure 100 tested by hydraulic pressure to 200 No. of Certificate 6483 Fire grate area 466 Description of safety valves Spring loaded.  
No. of safety valves 2 Area of each 9.6 Pressure to which they are adjusted 102 lb. If fitted with easing gear Yes. If steam from main boilers can enter the donkey boiler No. Dia. of donkey boiler 12'-6" Length 10'-6" Material of shell plates Steel Thickness 25/32" Range of tensile strength 2832 Descrip. of riveting long. seams T & R lap. Dia. of rivet holes 1 1/16" Whether punched or drilled drilled. Pitch of rivets 3 3/8"  
Lap of plating 7 1/4" Per centage of strength of joint Rivets 74.7 Thickness of shell crown plates Plates 72.5 Radius of do. ✓ No. of Stays to do. ✓  
Dia. of stays. ✓ Diameter of furnace Top 38 1/4" Bottom Length of furnace 6'-6" Thickness of furnace plates 5/16" B. & S. Description of joint Welded. Thickness of furnace crown plates ✓ Stayed by ✓ Working pressure of shell by rules 102 lb.  
Working pressure of furnace by rules 100 lbs. Diameter of uptake ✓ Thickness of uptake plates ✓ Thickness of water tubes ✓

**SPARE GEAR.** State the articles supplied:— 2 propeller shafts, 1/3" crank shaft, 4 prop. blades, 2 springs for M.B. safety valves, pair crank pin bushes, pair crosshead bushes, air pump rod, 2 air pump guards & studs, air pump head valves, 2 slide valve spindles, 1 steel thrust shaft, set piston springs etc. & gear reqd. by Rules.

The foregoing is a correct description,  
DAVID & WILLIAM HENDERSON & CO., LIMITED. Manufacturer.  
D. W. Henderson Director

Dates of Survey while building  
During progress of work in shops— 1901' Sep 9, 10, 17, 18, 21, 24, 30 Oct 29, 15, 25 Nov 4, 12, 20, 21, 25 Dec 2, 4, 10, 12, 13, 26, 28, 30 1902' Jan 9, 10, 13, 22, 29  
During erection on board vessel— Feb 12, 17, 24, 26 Mar 11, 14, 18, 19, 28 Apr 7, 15, 21 May 2, 6, 13, 27 Jun 13, 28 Jul 29 Aug 5, 22, 23, 26, 27, 28 Sep 19, 24 Oct 1, 10, 21, 23  
Total No. of visits 77 Is the approved plan of main boiler forwarded herewith  
" " " donkey " " "

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

Material of screw shaft 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 on length  
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 —

The engines and boilers have been built under Special Survey. The materials and workmanship are of good description. When completed the boilers were tested by hydraulic pressure to double the working pressure & were found tight and sound in every respect. The engines were tried on trial trip and worked satisfactorily. In my opinion they are eligible for record.

**LMC 12-02**

*[Signature]*

It is submitted that this vessel is eligible for **THE RECORD** **LMC 12-02: FD: Elca light**

The amount of Entry Fee. £ 3 : : When applied for, 27/12/1902  
Special .. .. £ 61 : :  
Donkey Boiler Fee .. .. £ : : When received, 31/12/1902  
Travelling Expenses (if any) £ : : 19.02

*[Signature]* **Jos. M. Buchanan.**  
Engineer Surveyor to Lloyd's Register of British & Foreign Shipping.

Committee's Minute **Glasgow, 12 JAN. 1903**

Assigned **+ d.m.b. 12.02.**

(Subject to Classification of hull)

MACHINERY CERTIFICATE  
WRITTEN. 5-2-03