

REPORT ON MACHINERY.

No. 24374

Port of *Glasgow*

No. in Survey held at *Glasgow*

Reg. Book.

on the

S.S. "Arrano"

Date, first Survey *11 Oct 05*

Received at London Office

TUES. 4 SEP 1906

Last Survey *14 Aug 1906*
(Number of Visits)

Master

Built at *Glasgow*

By whom built *D.W. Henderson & Co. Ltd.*

Tons }
Gross }
Net }

Engines made at *Glasgow*

By whom made *D.W. Henderson & Co. Ltd.*

When built *1906*

Boilers made at *Glasgow*

By whom made *D.W. Henderson & Co. Ltd.*

when made *1906*

Registered Horse Power *485*

Owners *Central and South Shipping Co.*

when made *1906*

Nom. Horse Power as per Section 28 *485*

Is Refrigerating Machinery fitted for cargo purposes *No*

Port belonging to *London*

Is Electric Light fitted *Yes*

ENGINES, &c.—Description of Engines

Triple compound

No. of Cylinders *3*

No. of Cranks *3*

Dia. of Cylinders *20" 44" 73"*

Length of Stroke *48"*

Revs. per minute *70*

Dia. of Screw shaft

as per rule *14.9*

Material of

as fitted *Steel*

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 length *Yes*
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 *Yes*
If two liners are fitted, is the shaft lapped or protected between the liners *Yes*

Dia. of Tunnel shaft

as per rule *13.5*

as fitted *14.75*

Dia. of Crank shaft journals

as per rule *14.2*

as fitted *14.34*

Dia. of Crank pin *15"*

Size of Crank webs *19" x 9"*

Dia. of thrust shaft under collars *14 3/4"*

Dia. of screw *8"-0"*

Pitch of Screw *17' 9"*

No. of Blades *4*

State whether moveable *Yes*

Total surface *96 sq ft*

No. of Feed pumps *2*

Diameter of ditto *4 1/4"*

Stroke *27"*

Can one be overhauled while the other is at work *Yes*

No. of Bilge pumps *2*

Diameter of ditto *4 1/4"*

Stroke *27"*

Can one be overhauled while the other is at work *Yes*

No. of Donkey Engines *4*

Sizes of Pumps *(1) 10 1/2 x 8 x 18 (2) 9 x 11 x 10 (3) 10 1/2 x 8 x 18 (4) 5 x 3 1/2 x 6"*

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

In Engine Room Two 3 1/2"

In Holds, &c. Forward 2 in each hold 3 1/2"

No. of Bilge Injections *1*

sizes *7 1/2"*

Connected to condenser, or to circulating pump *Yes*

Is a separate Donkey Suction fitted in Engine room of 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 sluices on Engine room bulkheads always accessible *Yes*

Are they Valves or Cocks *Both*

Are all connections with the sea direct on the skin of the ship *Yes*

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 *Two Bilge Suctions*

How are they protected *Wood casing*

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*

Dates of examination of completion of fitting of Sea Connections *25/6/06*

of Stern Tube *25/6/06*

Screw shaft and Propeller *25/6/06*

Is the Screw Shaft Tunnel watertight *Apparently*

Is it fitted with a watertight door *Yes*

worked from *Upper platform*

BOILERS, &c.—(Letter for record *S H*)

Manufacturers of Steel *Wm. Beardmore Steel Co. of Scotland & Lanarkshire Steel Co.*

Total Heating Surface of Boilers *6627 sq ft*

Is Forced Draft fitted *Yes*

No. and Description of Boilers *3 single ended cylindrical*

Working Pressure *200 lbs*

Tested by hydraulic pressure to *400 lbs*

Date of test *1/6/06*

No. of Certificate *18140*

Can each boiler be worked separately *Yes*

Area of fire grate in each boiler *57 3/4 sq ft*

No. and Description of Safety Valves to each boiler *1 in air duct spring*

Area of each valve *11.07*

Pressure to which they are adjusted *205 lbs*

Are they fitted with easing gear *Yes*

Smallest distance between boilers or uptakes and bunkers or woodwork *10"*

Mean dia. of boilers *14.9*

Length *11.0*

Material of shell plates *Steel*

Thickness *1 1/2"*

Range of tensile strength *296-32*

Are the shell plates welded or flanged *No*

Descrip. of riveting: cir. seams *Cap double*

long. seams *Butt with*

Diameter of rivet holes in long. seams *1 1/2"*

Pitch of rivets *10"*

Lap of plates or width of butt straps *21 3/4"*

Per centages of strength of longitudinal joint

rivets *87.6*

plate *85.0*

Working pressure of shell by rules *230 lbs*

Size of manhole in shell *16 x 12"*

Size of compensating ring *32" x 28"*

No. and Description of Furnaces in each boiler *3 Deighton*

Material *Steel*

Outside diameter *3-10 9/16"*

Length of plain part

top *21"*

bottom *32"*

Thickness of plates

Description of longitudinal joint *Welded*

No. of strengthening rings *1*

Working pressure of furnace by the rules *230 lbs*

Combustion chamber plates: Material *Steel*

Thickness: Sides *7/8"*

Back *7/8"*

Top *7/8"*

Bottom *7/8"*

Pitch of stays to ditto: Sides *7 3/4" x 7 1/2"*

Back *7 3/4" x 7 1/2"*

Top *7 1/2" x 7 3/4"*

Bottom *7 1/2" x 7 3/4"*

If stays are fitted with nuts or riveted heads *Nuts*

Working pressure by rules *224*

Material of stays *Steel*

Diameter at smallest part *1.69"*

Area supported by each stay *60 sq in*

Working pressure by rules *228 lbs*

End plates in steam space: Material *Steel*

Thickness *1 3/32"*

Pitch of stays *16 1/2" x 15 1/2"*

How are stays secured *2 rivets*

Working pressure by rules *235 lbs*

Material of stays *Steel*

Diameter at smallest part *5.99"*

Area supported by each stay *240 sq in*

Working pressure by rules *261*

Material of Front plates at bottom *Steel*

Thickness *1 1/16"*

Material of Lower back plate *Steel*

Thickness *3/32"*

Greatest pitch of stays *13"*

Working pressure of plate by rules *267 1/2*

Diameter of tubes *2 1/2"*

Pitch of tubes *3 1/16" x 3 7/8"*

Material of tube plates *Steel*

Thickness: Front *1 5/32" x 1 1/16"*

Back *1 3/16"*

Mean pitch of stays *8 3/4"*

Pitch across wide water spaces *16"*

Working pressures by rules *335 & 216 lbs*

Girders to Chamber tops: Material *Steel*

Depth and thickness of girder at centre *7 1/2" x 1 1/16"*

Length as per rule *36"*

Distance apart *7 3/4"*

Number and pitch of stays in each *(3) 7 1/2"*

Working pressure by rules *218*

Superheater or Steam chest; how connected to boiler *None*

Can the superheater be shut off and the boiler worked separately *Yes*

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

Working pressure of end plates

Area of safety valves to superheater

Working pressure by rules

End plates: Thickness

How stayed

Are they fitted with easing gear

VERTICAL DONKEY BOILER— Manufacturers of Steel

No. _____ Description _____

Made at _____ By whom made _____ When made _____ Where fixed _____

Working pressure tested by hydraulic pressure to _____ Date of test _____ No. of Certificate _____ Fire grate area _____ Description of Safety _____

Valves _____ No. of Safety Valves _____ Area of each _____ Pressure to which they are adjusted _____ Date of adjustment _____

If fitted with easing gear _____ If steam from main boilers can enter the donkey boiler _____ Dia. of donkey boiler _____ Length _____

Material of shell plates _____ Thickness _____ Range of tensile strength _____ Descrip. of riveting long. seams _____

Dia. of rivet holes _____ Whether punched or drilled _____ Pitch of rivets _____ Lap of plating _____ Per centage of strength of joint _____ Rivets _____ Plates _____

Working pressure of shell by rules _____ Thickness of shell crown plates _____ Radius of do. _____ No. of stays to do. _____ Dia. of stays _____

Diameter of furnace Top _____ Bottom _____ Length of furnace _____ Thickness of furnace plates _____ Description of joint _____

Working pressure of furnace by rules _____ Thickness of furnace crown plates _____ Stayed by _____

Diameter of uptake _____ Thickness of uptake plates _____ Thickness of water tubes _____ Dates of survey _____

SPARE GEAR. State the articles supplied:— 2 top end bolts & nuts 2 bottom end bolts & nuts
 2 main bearing bolts & nuts, 6 coupling bolts & nuts, 1 set each fuel & bilge pump valves & seats, bolts, nuts & iron mounted, 1 propeller shaft, & 4 blades, 1 piece of crank shaft.

The foregoing is a correct description, **DAVID & WILLIAM HENDERSON & CO., LIMITED**
A. J. Henderson Armstrong
 Manufacturer.

Dates of Survey while building	During progress of work in shops—	1906 Oct 11, 1906 Jan 16, 24, Feb 7, 20, 21, Mar 7, 16, 21, Apr 27, May 10, 14, 21, 23, Jun 1, 5, 8, 12, 15
	During erection on board vessel—	20, 25, 26, 27, 30, Jul 4, 11, 12, 24, 26, 31, Aug 1, 6, 9, 14
	Total No. of visits	24

Is the approved plan of main boiler forwarded herewith *Yes*

Dates of Examination of principal parts—Cylinders ^{27/4/06} 10/1/06 etc Slides ^{27/4/06} 16/1/06 etc Covers ^{27/4/06} 16/1/06 Pistons ^{27/4/06} 24/1/06 etc Rods ^{27/4/06} 24/1/06 etc

Connecting rods 20/2/06 Crank shaft 16/1/06 Thrust shaft 20/2/06 Tunnel shafts 20/2/06 Screw shaft 7/3/06 Propeller 7/3/06 etc

Stern tube 8/6/06 Steam pipes tested ^{11/8/06} 30/6/06, 31/7/06 Engine and boiler seatings 4/7/06 Engines holding down bolts 24/7/07

Completion of pumping arrangements 9/8/06 Boilers fixed 26/7/06 Engines tried under steam 14.8.06

Main boiler safety valves adjusted 20; Thickness of adjusting washers Port & Star Bottom 7/16 Centre 3/8

Material of Crank shaft *Steel* Identification Mark on Do. 1249-60. Material of Thrust shaft *Steel* Identification Mark on Do. 1627 A.H.

Material of Tunnel shafts *Steel* Identification Marks on Do. *see reports* Material of Screw shafts *Steel* Identification Marks on Do. *AM 9/8/06*

Material of Steam Pipes *Lap welded iron* Test pressure 600 lbs.

General Remarks (State quality of workmanship, opinions as to class, &c.)
 These engines and boilers have been built under special survey the materials and workmanship are of good description, they have been well fitted on board and tried under steam.
 In our opinion the machinery of this vessel is eligible to have notification of **L.M.C. 806** in the Register Book.

It is submitted that this vessel is eligible for **THE RECORD L.M.C. 806. F.D. ELEC. LIGHT.**

The amount of Entry Fee... £ 3 : :
 Special ... £ 44 : :
 Donkey Boiler Fee ... £ : :
 Travelling Expenses (if any) £ : :
 Glasgow 3 - SEP 1906
 Assigned **L.M.C. 806**

When applied for, 3-SEP-1906
 When received, 5-SEP-1906
A. M. McLeod & Wm Gordon Muirhead
 Engineer Surveyor to Lloyd's Register of British & Foreign Shipping.

Certificate (if required) to be sent to
 (The Surveyors are requested not to write on or below the space for Committee's Minute.)

