

REPORT ON MACHINERY

No. 15755

APR 20 1910

Received at London Office

Date of writing Report

19

When handed in at Local Office

5/4/1910 Port of **Greenock**

No. in Survey held at Reg. Book.

Date, First Survey 1st April 1907 Last Survey 4th April 1910

(Number of Visits 90)

on the **SCREW STEAMER "HIGHLAND PRIDE"**

Tons } Gross 7238
Net 4548
When built 1910.

Master Built at **Port Glasgow**. By whom built **Russell 1864**

Engines made at **Greenock** By whom made **Hankin & Blackmore** when made 1910

Boilers made at **Greenock**. By whom made **Hankin & Blackmore** when made 1910.

Registered Horse Power Owners **The Kelvin Line, London, Ltd.** Port belonging to **London**.

Nom. Horse Power as per Section 28 **830**. Is Refrigerating Machinery fitted for cargo purposes **Yes**. Is Electric Light fitted **Yes**.

ENGINES, &c.—Description of Engines **Triple Expansion** No. of Cylinders **Three** No. of Cranks **Three**

Dia. of Cylinders **31-51-86** Length of Stroke **54** Revs. per minute **44** Dia. of Screw shaft **17 1/2** Material of screw shaft **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 **One length** 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** Length of stern bush **6ft**

Dia. of Tunnel shaft as per rule **16.03** Dia. of Crank shaft journals as per rule **16.83** Dia. of Crank pin **17 1/2** Size of Crank webs **11 x 2.8** Dia. of thrust shaft under collars **17 3/8** Dia. of screw **19.0** Pitch of Screw **19.6** No. of Blades **4** State whether moveable **Yes** Total surface **130 Sq. ft.**

No. of Feed pumps **2** Diameter of ditto **9** Stroke **26** Can one be overhauled while the other is at work **Yes**

No. of Bilge pumps **2** Diameter of ditto **4 1/2** Stroke **32** Can one be overhauled while the other is at work **Yes**

No. of Donkey Engines **4** Sizes of Pumps **6 x 4 x 6 (1) 4 x 4 x 5 (1) 6 x 4 x 5 (1) 4 x 4 x 5 (1)** No. and size of Suctions connected to both Bilge and Donkey pumps **3 1/2"**

In Engine Room **Three 3 1/2"** In Holds, &c. **No. 1 Hold: Two 3 1/2" dia. No. 2 Hold: Two 3 1/2" dia. No. 3 Hold: Two 3 1/2" dia. No. 4 Hold: Two 3 1/2" dia. No. 5 Hold: Two 3 1/2" dia. No. 6 Hold: Two 3 1/2" dia. No. 7 Hold: Two 3 1/2" dia. No. 8 Hold: Two 3 1/2" dia. No. 9 Hold: Two 3 1/2" dia. No. 10 Hold: Two 3 1/2" dia. No. 11 Hold: Two 3 1/2" dia. No. 12 Hold: Two 3 1/2" dia. No. 13 Hold: Two 3 1/2" dia. No. 14 Hold: Two 3 1/2" dia. No. 15 Hold: Two 3 1/2" dia. No. 16 Hold: Two 3 1/2" dia. No. 17 Hold: Two 3 1/2" dia. No. 18 Hold: Two 3 1/2" dia. No. 19 Hold: Two 3 1/2" dia. No. 20 Hold: Two 3 1/2" dia. No. 21 Hold: Two 3 1/2" dia. No. 22 Hold: Two 3 1/2" dia. No. 23 Hold: Two 3 1/2" dia. No. 24 Hold: Two 3 1/2" dia. No. 25 Hold: Two 3 1/2" dia. No. 26 Hold: Two 3 1/2" dia. No. 27 Hold: Two 3 1/2" dia. No. 28 Hold: Two 3 1/2" dia. No. 29 Hold: Two 3 1/2" dia. No. 30 Hold: Two 3 1/2" dia. No. 31 Hold: Two 3 1/2" dia. No. 32 Hold: Two 3 1/2" dia. No. 33 Hold: Two 3 1/2" dia. No. 34 Hold: Two 3 1/2" dia. No. 35 Hold: Two 3 1/2" dia. No. 36 Hold: Two 3 1/2" dia. No. 37 Hold: Two 3 1/2" dia. No. 38 Hold: Two 3 1/2" dia. No. 39 Hold: Two 3 1/2" dia. No. 40 Hold: Two 3 1/2" dia. No. 41 Hold: Two 3 1/2" dia. No. 42 Hold: Two 3 1/2" dia. No. 43 Hold: Two 3 1/2" dia. No. 44 Hold: Two 3 1/2" dia. No. 45 Hold: Two 3 1/2" dia. No. 46 Hold: Two 3 1/2" dia. No. 47 Hold: Two 3 1/2" dia. No. 48 Hold: Two 3 1/2" dia. No. 49 Hold: Two 3 1/2" dia. No. 50 Hold: Two 3 1/2" dia. No. 51 Hold: Two 3 1/2" dia. No. 52 Hold: Two 3 1/2" dia. No. 53 Hold: Two 3 1/2" dia. No. 54 Hold: Two 3 1/2" dia. No. 55 Hold: Two 3 1/2" dia. No. 56 Hold: Two 3 1/2" dia. No. 57 Hold: Two 3 1/2" dia. No. 58 Hold: Two 3 1/2" dia. No. 59 Hold: Two 3 1/2" dia. No. 60 Hold: Two 3 1/2" dia. No. 61 Hold: Two 3 1/2" dia. No. 62 Hold: Two 3 1/2" dia. No. 63 Hold: Two 3 1/2" dia. No. 64 Hold: Two 3 1/2" dia. No. 65 Hold: Two 3 1/2" dia. No. 66 Hold: Two 3 1/2" dia. No. 67 Hold: Two 3 1/2" dia. No. 68 Hold: Two 3 1/2" dia. No. 69 Hold: Two 3 1/2" dia. No. 70 Hold: Two 3 1/2" dia. No. 71 Hold: Two 3 1/2" dia. No. 72 Hold: Two 3 1/2" dia. No. 73 Hold: Two 3 1/2" dia. No. 74 Hold: Two 3 1/2" dia. No. 75 Hold: Two 3 1/2" dia. No. 76 Hold: Two 3 1/2" dia. No. 77 Hold: Two 3 1/2" dia. No. 78 Hold: Two 3 1/2" dia. No. 79 Hold: Two 3 1/2" dia. No. 80 Hold: Two 3 1/2" dia. No. 81 Hold: Two 3 1/2" dia. No. 82 Hold: Two 3 1/2" dia. No. 83 Hold: Two 3 1/2" dia. No. 84 Hold: Two 3 1/2" dia. No. 85 Hold: Two 3 1/2" dia. No. 86 Hold: Two 3 1/2" dia. No. 87 Hold: Two 3 1/2" dia. No. 88 Hold: Two 3 1/2" dia. No. 89 Hold: Two 3 1/2" dia. No. 90 Hold: Two 3 1/2" dia.**

No. of Bilge Injections **1** sizes **9 1/2** Connected to condenser, or to circulating pump **C.P.** 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 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 **None**

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 **27/12/09** of Stern Tube **1/12/09** Screw shaft and Propeller **27/12/09**

Is the Screw Shaft Tunnel watertight **Yes**. Is it fitted with a watertight door **Yes** worked from **Upper platform**

BOILERS, &c.—(Letter for record **S**) Manufacturers of Steel **D. Colville & Sons**

Total Heating Surface of Boilers **12438** Is Forced Draft fitted **Yes** No. and Description of Boilers **4: Gylint, 1: S. End, 3: F.D., 1: N.D.**

Working Pressure **210 lb** Tested by hydraulic pressure to **420 lb** Date of test **29/30/12/09** No. of Certificate **985-6**

Particulars of Forced Draught Boilers Can each boiler be worked separately **Yes** Area of fire grate in each boiler **45 Sq. ft.** No. and Description of Safety Valves to each boiler **2: Direct Spring** Area of each valve **12.56** Pressure to which they are adjusted **215 lb** Are they fitted with easing gear **Yes**

Smallest distance between boilers or uptakes and bunkers or woodwork **16'** Mean dia. of boilers **16.6'** Length **12.0'** Material of shell plates **Steel**

Thickness **1 1/2"** Range of tensile strength **30 1/2 to 33 tons** Are the shell plates welded or flanged **No** Descrip. of riveting: cir. seams **Double and triple riveted**

long. seams **Butt Straps** Diameter of rivet holes in long. seams **1 1/2"** Pitch of rivets **10" 5"** Lap of plates or width of butt straps **1.11 1/2"**

Per centages of strength of longitudinal joint rivets **96.4** plate **82.4** Working pressure of shell by rules **228 lb** Size of manhole in shell **16' x 12"**

Size of compensating ring **3 1/4 x 2 3/4 x 1 3/2** No. and Description of Furnaces in each boiler **4: Mouson's** Material **Steel** Outside diameter **44 1/4"**

Length of plain part top **7' 10 1/2"** bottom **7' 10 1/2"** Thickness of plates crown **5"** bottom **8"** Description of longitudinal joint **Weld** No. of strengthening rings **None**

Working pressure of furnace by the rules **228 lb** Combustion chamber plates: Material **Steel** Thickness: Sides **5/8"** Back **5/8"** Top **1"** Bottom **1 1/2"**

Pitch of stays to ditto: Sides **7 1/2 x 8** Back **8 x 7 1/2** Top **10 1/2 x 6** If stays are fitted with nuts or riveted heads **Nuts** Working pressure by rules **218 lb**

Material of stays **Steel** Diameter at smallest part **1 1/2"** Area supported by each stay **63** Working pressure by rules **224 lb** End plates in steam space: Material **Steel** Thickness **1 3/2"** Pitch of stays **17 x 18** How are stays secured **Old nuts and washers** Working pressure by rules **208 lb** Material of stays **Steel**

Diameter at smallest part **3 1/2"** Area supported by each stay **306** Working pressure by rules **247 lb** Material of Front plates at bottom **Steel**

Thickness **2 1/8"** Material of Lower back plate **Steel** Thickness **2 1/8"** Greatest pitch of stays **12 1/2"** Working pressure of plate by rules **208 lb**

Diameter of tubes **2 1/2"** Pitch of tubes **3 1/2 x 3 1/2** Material of tube plates **Steel** Thickness: Front **13"** Back **13"** Mean pitch of stays **8"**

Pitch across wide water spaces **13 1/2"** Working pressures by rules **282 lb** Girders to Chamber tops: Material **Steel** Depth and thickness of girder at centre **11 1/2" x 1 5/8"** Length as per rule **28 9/16** Distance apart **10 1/2"** Number and pitch of stays in each **4: 6"**

Working pressure by rules **376 lb** 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 How stayed

Working pressure of end plates Area of safety valves to superheater Are they fitted with easing gear

Lloyd's Register Foundation
W647-0011

VERTICAL DONKEY BOILER— Manufacturers of Steel

No. _____ Description _____ When made _____ Where fixed _____
 Made at _____ By whom made _____
 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 _____ Rivets _____
 Dia. of rivet holes _____ Whether punched or drilled _____ Pitch of rivets _____ Lap of plating _____ Per centage of strength of joint _____ 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:— 3 Crank shaft, 1 Propeller shaft + 2 C.I. Blades, 2 Iron Plates 12 Brass + 50 Iron Bolts, 1 set Main Bearing Bushes, 1 set Crosshead Bushes, 1 set Crank pin bushes, 1 Section delivery valve of each size, 1 set Spare springs for each piston + all auxiliary pumps & Joint Rivet Bolts, 1 Air Pump bucket and Rod, 2 Connecting Rod Bolts, 1 Centrifugal pump shaft, 2 Crosshead Bolts, 1 Air pump head valve seat & guard, 2 Main Bearing Bolt, 1 set Air pump valves, 1 complete air coupling Bolt, 1 spring of each size for all spring loaded valves, 1 set Feed pump valves for steam & water use, 1 set Relief pump valves, 1 set Berlin tubes 36 Con. man tubes
 The foregoing is a correct description, 100 Bolts assorted sizes etc.
 Manufacturer: Ranken & Macdonald

Dates of Survey while building

During progress of work in shops -	1909. April 1, 19, 21, 27, 30. May 4, 7, 10, 17, 19, 24, 26, 31. June 4, 7, 10, 14, 21, 25, 30. July 13, 21, 24, 27. Aug. 2, 4.
During erection on board vessel -	9, 11, 17, 20, 25, 31. Oct. 6, 7, 9, 15, 17, 21, 27, 30. Nov. 1, 2, 5, 8, 10, 15, 18, 22, 25, 29.
Total No. of visits	40

Is the approved plan of main boilers forwarded herewith Yes.
 " " " donkey " " " Yes.

Dates of Examination of principal parts—Cylinders 2/8/09, Slides 29/11/09, Covers 8/11/09, Pistons 25/11/09, Rods 25/11/09
 Connecting rods 2/8/09, Crank shaft 24/12/09, Thrust shaft 14/12/09, Tunnel shafts 14/12/09, Screw shaft 14/12/09, Propeller 14/12/09
 Stern tube 22/11/09, Steam pipes tested 4-2-10 Glasgow Report, Engine and boiler seatings 22/12/09, Engines holding down bolts 4/2/10
 Completion of pumping arrangements 18/2/10, Boilers fixed 18/2/10, Engines tried under steam 8/3/10
 Main boiler safety valves adjusted 15/2/10, Thickness of adjusting washers 11 3/8" 5 1/2" 11 1/2" 5 1/2" 11 3/8" 5 1/2" 11 3/8" 5 1/2"
 Material of Crank shaft Steel, Identification Mark on Do. 117D, Material of Thrust shaft Steel, Identification Mark on Do. 923
 Material of Tunnel shafts Steel, Identification Marks on Do. 922-965, Material of Screw shafts Steel, Identification Marks on Do. 924
 Material of Steam Pipes Wrot Iron, Test pressure 650, Tested by Glasgow Surveyors

General Remarks (State quality of workmanship, opinions as to class, &c.)
The Engines and Boilers of this vessel have been built under special Survey and the materials and workmanship are good. After completion they were examined while running full power trials in the Firth and found to work satisfactorily. The machinery throughout is now in good and efficient condition and eligible in my opinion to have the record of **LMC 4, 10** marked in the Society's Register Book.

It is submitted that this vessel is eligible to remain as **CLASSED + LMC 4, 10**.

3SB (FD)
1 Aux SB

Wm R. Austin
 Engineer Surveyor to Lloyd's Register of British & Foreign Shipping.

The amount of Entry Fee	£ 3	When applied for,	13/4/1910
Special	£ 61 10	When received,	14/4/1910
Donkey Boiler Fee	£		
Travelling Expenses (if any)	£		

GLASGOW 19 APR 1910

Committee's Minute
 Assigned + LMC 4, 10



Greenock

The Surveys are requested not to write on or below the space for Committee's Minute.