

These Engines removed 1929 and new turbines with single reduction gear fitted 8.29

REPORT ON MACHINERY.

No. 41917

Received at London Office

Date of writing Report 8.5.22 When handed in at Local Office 8.5.22 Port of Glasgow

No. in Survey held at Glasgow Date, First Survey 19th May 1919 Last Survey 2nd May 1922

Reg. Book. T/S/S Empress of Canada (Number of Visits 188)

on the

Master Built at Glasgow By whom built Fairfield & Co Ltd (1922) When built 1922

Engines made at Glasgow By whom made Fairfield & Co Ltd (1922) when made 1922

Boilers made at Gtts By whom made Gtts 1922 when made 1922

Horse Power 4081 Owners The Canadian Pacific Steamships Ltd Port belonging to London

Shaft Horse Power at Full Power 21250 Is Refrigerating Machinery fitted for cargo purposes Yes Is Electric Light fitted Yes

TURBINE ENGINES, &c. — Description of Engines 8 Turbine geared to 2840 R.P.M. No. of Turbines 8

Diameter of Rotor Shaft Journals, H.P. 6" 1/2 L.P. 9" 1/4 Diameter of Pinion Shaft 14" 1/4

Diameter of Journals 9" 1/2 Distance between Centres of Bearings 4-7" 1/4 Diameter of Pitch Circle MAIN 35.73 - 15.38

Diameter of Wheel Shaft 23 Distance between Centres of Bearings 12-4" 3/4 Diameter of Pitch Circle of Wheel 40.36 MAIN 19.62

Width of Face 1" 3/4 Diameter of Thrust Shaft under Collars 2" 3/4 as per rule 20.526

No. of Screw Shafts 2 Diameter of same as fitted 22" 1/2 Diameter of Propeller 19-0 as fitted 20" 3/4

Pitch of Propeller 21-0

No. of Blades 4 State whether Moveable Yes Total Surface 143 ft Diameter of Rotor Drum, H.P. — L.P. — Astern —

Thickness at Bottom of Groove, H.P. — L.P. — Astern Revs. per Minute at Full Power, Turbine 1990 Propeller 112

ARTICULARS OF BLADING. Brown Boveri

	H.P.			L.P.			ASTERN.		
	HEIGHT OF BLADES.	DIAMETER AT TIP.	NO. OF ROWS.	HEIGHT OF BLADES.	DIAMETER AT TIP.	NO. OF ROWS.	HEIGHT OF BLADES.	DIAMETER AT TIP.	NO. OF ROWS.
ST EXPANSION									
1st									
2nd									
3rd									
4th									
5th									
6th									
7th									
8th									

No. and size of Feed pumps 5. WEIRS (4. 18 1/2" x 13" x 27") 1 COND WEIRS 11" x 8" x 18"

No. and size of Bilge pumps 4 (2-10" x 12" x 12") 2 MOTOR driven 100 Ton per hour each General 15" x 11 1/2" x 15" Ball 12" x 16" x 12"

No. and size of Bilge suction in Engine Room 4 3 1/2" Ruler Room 4 3 1/2" Tunnel 2. 3 in each

In Holds, &c. 3. 3 1/2"

No. of Bilge Injections 2 sizes 17" Connected to engine room or to circulating pump pump Is a separate Donkey Suction fitted in Engine Room & size 2.7"

Are all the bilge suction pipes fitted with roses Yes Are the roses in Engine room 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 Both

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

Are the pipes carried through the bunkers Oil Suction (Fuel) No Oil Fuel Suction only fitted

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

Is the Screw Shaft Tunnel watertight Yes Is it fitted with a watertight door Yes worked from 4 ER Platforms

MANUFACTURERS OF STEEL D. Colville Son & Co, Glasgow, Son & Co, Glasgow, Son & Co, Glasgow

Total Heating Surface of Boilers 39456 sq. ft. Forced Draft fitted Yes No. and Description of Boilers 8 Double ended

Working Pressure 210 Tested by hydraulic pressure to 380 Date of test 12.12.20 No. of Certificate 15103, 15236, 15237, 15238, 15239, 15240, 15241, 15242

Is each boiler worked separately Yes Area of fire grate in each boiler 125 sq. ft. No. and Description of Safety Valves to 8

Is each boiler worked separately Yes Area of each valve 11.743 Pressure to which they are adjusted 215 Are they fitted with easing gear Yes

Is the distance between boilers or uptakes and bunkers or woodwork 12" Mean dia. of boilers 14.9 Length 27-0 Material of shell plates S

Thickness 1 1/32 Range of tensile strength 30-34 Are the shell plates welded or flanged No Descrip. of riveting: cir. seams TIDRL

g. seams TR.DBS Diameter of rivet holes in long. seams 1 1/32 Pitch of rivets 9 1/16 width of butt straps 20 1/8

Percentages of strength of longitudinal joint plates 85.758 Working pressure of shell by rules 212 Size of manhole in shell 16 1/2

Is the compensating ring 33" x 29" x 1 1/2" No. and Description of Furnaces in each Boiler 6 blowers Material S Outside diameter 47 1/4

Length of plain part top Thickness of plates crown 2 1/32 Description of longitudinal joint welded No. of strengthening rings 1

Working pressure of furnace by the rules 226 Combustion chamber plates: Material S Thickness: Sides 5/8 Back 5/8 Top 5/8 Bottom 7/8

Is the thickness of stays to ditto: Sides 7/8 x 1 1/8 Back 7/8 x 1 1/8 Top 8 1/8 x 7 3/4 If stays are fitted with nuts or riveted heads Yes Working pressure by rules 214

Material of stays Iron Area at smallest part 176 Area supported by each stay 63.9 Working pressure by rules 210 End plates in steam space S

Thickness 1 1/32 Pitch of stays 15 x 15 How are stays secured DN Working pressure by rules 211 Material of stays S

Is the area at smallest part 5268 Area supported by each stay 225 Working pressure by rules 243 Material of Front plates at bottom S

Thickness 1" Material of Lower back plate Thickness Greatest pitch of stays Working pressure of plate by rules

Diameter of tubes 2 1/2 Pitch of tubes 33 1/4 x 33 1/4 Material of tube plates S Thickness: Front 1" Back 3/4 Mean pitch of stays 93 1/8

Is the thickness across wide water spaces 13 1/2 Working pressures by rules 210 Girders to Chamber tops: Material S Depth and

Thickness of girder at centre 8 7/8 x 3 1/4 Length as per rule 2.8 Distance apart 43 1/4 Number and pitch of stays in each 3 at 8 1/8

Working pressure by rules 210 Steam dome: description of joint to shell 1/10 of strength of joint Diameter

Thickness of shell plates Material Description of longitudinal joint Diameter of rivet holes Pitch of rivets

Working pressure of shell by rules Crown plates: Thickness How stayed

W166-0018 (1/2)

SUPERHEATER.

Type

None

Date of Approval of Plan

Tested by Hydraulic Pressure to

Date of Test

Is a Safety Valve fitted to each Section of the Superheater which can be shut off from the Boiler

Diameter of Safety Valve

Pressure to which each is adjusted

Is Easing Gear fitted

IS A DONKEY BOILER FITTED?

No

If so, is a report now forwarded?

SPARE GEAR.

State the articles supplied:

2 Bolt nuts for each one of Rotor Bearing, 2 Bolt Nuts for Main gear Wheel Bearing.
of total No. of bolt nuts for each gear case joint: 1/20 of total No. for each Turbine casing joint.
Set of Bearing bushes for one gear wheel shaft. ditto for Rotor ditto for Pinion shafts 1/2 Set of Packing Rings for each gland of Rotor shaft so fitted 1/2 the number of springs fitted Sufficient pads for one face of Mitchell main thrust block. Turbine thrust adjusting bushes with Rings complete. 1 Set of Lamin for adjusting block of different thrust. 1 Set of Feed bridge valves 1 Set of valves for Lubricating oil pump 1 Bucket rod for Lubricating oil pump. 1 Set of valves for each one fitted a quantity of worked lbf. studs nuts Bars & plates of iron & steel. 1 Propeller Blade 1 Propeller shaft 1 Reducing Pinion

The foregoing is a correct description,

AND ENGINEERING CO., LTD.

Manufacturer.

R. Shachan

ASSISTANT MANAGER.

1919 May 19 27 Jun 5 13 20 Aug 7 12 Sept 5 11 17 23 25 Oct 29 13 14 22 27 Nov 4 7 10 19 21 27 Dec 2 4 11 12 17 24 26 29 30 1920 Jan 14 19 20 22 24 27 28 30
Dates of Survey while building
During progress of work in shops - 17 18 19 22 24 27 Mar 1 3 8 11 16 17 22 23 28 29 Apr 7 12 15 21 26 May 3 4 5 9 12 26 27 28 Jun 15 28 29 July 28 29 30 Aug 3 9 12 27 Sept 15 Oct 1 5 7 18 22 25
During erection on board vessel - 6 15 23 29 30 Sep 2 13 Oct 3 11 Nov 9 22 24 29 Dec 6 7 9 10 15 16 21 23 26 30 1921 Jan 12 20 24 Feb 3 10 15 21 28 May 2 5 18 19 24 27 Jun 1 7 9 10 15 21 July 27 28
Total No. of visits 188.

Is the approved plan of main boiler forwarded herewith

Dates of Examination of principal parts—Casings 23-12-20 Rotors 27-10-20 Blading 12-4-20 Gearing 9-2-20

Rotor shaft 21-4-20 Thrust shaft 12-12-19 Tunnel shafts 12-12-19 Screw shaft 16-3-20 Propeller 16-3-20

Stern tube 24-5-20 Steam pipes tested 19-6-21 Engine and boiler seatings 27-5-20 Engines holding down bolts 27-5-20

Completion of pumping arrangements 21-6-21 Boilers fired 15-11-20 Engines tried under steam 2-5-22

Main boiler safety valves adjusted 10-12-21 Thickness of adjusting washers see Rtd attached

Material and tensile strength of Rotor shaft 34/38 Identification Mark on Do. LLOYDS W.G.M. 532

Material and tensile strength of Pinion shaft 40/45 Identification Mark on Do. LLOYDS W.G.M. 532

Material of Wheel shaft S Identification Mark on Do. LLOYDS W.G.M. 532 Material of Thrust shaft S Identification Mark on Do. LLOYDS W.G.M. 532

Material of Tunnel shafts S Identification Marks on Do. LLOYDS W.G.M. 532 Material of Screw shafts S Identification Marks on Do. LLOYDS W.G.M. 532

Material of Steam Pipes Steel Test pressure 63 lbf

Is an installation fitted for burning oil fuel Yes Is the flash point of the oil to be used over 150°F. Yes

Have the requirements of Section 49 of the Rules been complied with Yes

Is this machinery a duplicate of a previous case No If so, state name of vessel

General Remarks (State quality of workmanship, opinions as to class, &c.) These Engrin Boilers have

been built under Special Survey in accordance with the
Approved plans & the workmanship & material are of good
quality & they have now been securely fitted on board
& tried under steam & found satisfactory

The Machinery is eligible in my opinion for the record

✱ LMC 522 fitted for oil fuel 5-22, FP above 150

Note The Machinery of this vessel is fitted with the
Nodal Drive

The amount of Entry Fee ... £ 6 : -

Special ... £ 202 : 0 : 6

Damage. ... £ 57 : 15

Travelling Expenses (if any) £ 11 : 4

When applied for,

9.5.22

When received,

1/6/22

W. Gordon-Murkin

Engineer Surveyor to Lloyd's Register of Shipping.

Committee's Minute

GLASGOW

9 MAY 1922

Assigned

+ LMC 522

Fitted for oil fuel 5.22 F.P. above 150°F



© 2020

Lloyd's Register
Foundation

S/S Empress of Canada

Damage stated to have been caused by the
Lignum vitae in the Stem Bearer of Propeller
Shaft's swelling

Star. Port. Propeller Shaft. liners found black
now renewed

Stem Bearer. Lignum vitae cut & broken
now renewed

Teeth of 1st Reduction Pinions & 2nd Reduction Pinions & 1st
Reduction Wheel of both Engines found distorted
Wheels. Pinions recent & afterwards the 1st Reduction
Pinion renewed & new shaft fitted to first reduction
wheels

Damage caused by the Star Propeller striking
the tug Flying Falcon when entering the Fairfield
Basin on March 29th 1932

4 Blades of Star Propeller.

clipped & broken

Damaged blades repaired by having pieces
built on. Propeller Box taken to the Engine Works
& the Propeller when completed was re-balanced
For further particulars see Copies of Damage
Report attached

Wm. Gordon-Munroe

W166-0018 (2/2)



© 2020

Lloyd's Register
Foundation