

No. 1969

THE BRITISH CORPORATION FOR THE SURVEY
AND
REGISTRY OF SHIPPING.

Report No. *144* No. in Register Book *3068*

" *LETHBRIDGE* "

S.S. *LETHBRIDGE*

Makers of Engines *Richardsons Westgarth & Co. Ltd.*

Works No. *2646*

Makers of Main Boilers *Richardsons Westgarth & Co. Ltd.*

Works No. *2646*

Makers of Donkey Boiler

Works No.

MACHINERY.

Lloyd's Register
Foundation

No.

THE BRITISH CORPORATION FOR THE SURVEY
AND
REGISTRY OF SHIPPING.

Report No. No. in Register Book

Received at Head Office

28th August 1924

Surveyor's Report on the New Engines, Boilers, and Auxiliary
Machinery of the ^{Single Triple} ~~Crown~~ ^{Screw} Steamer.

"Yellabridge"

Official No.

Port of Registry

London.

Registered Owners

Steamships Ltd. Montreal.

Engines Built by

Richardsons Westgarth & Co. Ltd.

at

Cardiff.

Main Boilers Built by

Richardsons Westgarth & Co. Ltd.

at

Cardiff.

Donkey ..

at

Date of Completion

7-24

First Visit

5-1-24

Last Visit

25-7-24 Total Visits 54

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RECIPROCATING ENGINES.

Works No. *2646* No. of Sets *1* Description *Triple expansion*

S.P. 3000.

No. of Cylinders each Engine *3* No. of Cranks *3*
 Diars of Cylinders *18" 30" 50"* Stroke *36"*

Cubic feet in each L.P. Cylinder *40.9.*

Are Spring-loaded Relief Valves fitted to Top and Bottom of each Cylr? *yes.*

" " each Receiver? *yes.*

Type of H.P. Valves,

" 1st L.P. "

" 2nd L.P. "

" L.P. "

" Valve Gear

" Condenser

Diameter of Piston Rods (plain part) *4 3/4"* Screwed part (bottom of thread) *3.536"*

Material

Diar. of Connecting Rods (smallest part) *5 1/4"* Material *L.P.*

" Crosshead Gudgeons *5 1/2"* Length of Bearing *8"* Material *L.P.*

No. of Crosshead Bolts (each) *2* Diar. over Thrd. *2 3/4"* Threads per inch *6* Material *stud.*

" Crank Pin " *2* " *2 3/4"* " *6* " "

" Main Bearings *6* Lengths *10 1/2"*

" Bolts in each *2* Diar. over Thread *3 1/4"* Threads per inch *6* Material *stud.*

" Holding Down Bolts, each Engine *8 1/4"* Diar. *1 1/4"* No. of Metal Chocks *8 1/4"*

Are the Engines bolted to the Tank Top or to a Built Seat? *Tank top.*

Are the Bolts tapped through the Tank Top and fitted with Nuts Inside? *yes.*

If not, how are they fitted? *-*

Connecting Rods, Forged by *Darlington Forge Eng'g Co. Ltd.*

Piston " " " " " "

Crossheads, " " " " " "

Connecting Rods, Finished by *R.W. Co. N. Hood.*

Piston " " " " " "

Crossheads, " " " " " "

Date of Harbour Trial *16-7-24.*

" Trial Trip *26-7-24*

Trials run at *Lees Bay.*

Were the Engines tested to full power under Sea-going conditions? *yes.*

If so, what was the I.H.P.? *1124* Revols. per min. *110*

Pressure in 1st H.P. Receiver, *182* lbs., 2nd L.P., *65* lbs., L.P., *6.2* lbs., Vacuum, *28* ins.

Speed on Trial *9.5 knots.*

If the Conditions on Trial were such that full power records were not obtained give the following estimated

data:—

Builders' estimated I.H.P. *1000* Revols. per min. *86*

Estimated Speed *9.5 knots.*



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TURBO-ELECTRIC PROPELLING MACHINERY.

No. of Turbo-Generating Sets

Capacity of each

Type of Turbines employed

Description of Generators

No. of Motors driving Propeller Shafting

Are the Propeller Shafts driven direct by the Motors or through Gearing?

Is Single or Double Reduction Gear employed?

Description of Motors

Diam. of 1st Reduction Pinion

}

Width

Pitch of Teeth

" 1st " Wheel

Estimated Pressure per lineal inch

Diam. of 2nd Reduction Pinion

}

Width

Pitch of Teeth

" 2nd " Wheel

Estimated Pressure per lineal inch

Revs. per min. of Generators at Full Power

" Motors "

" 1st Reduction Shaft

" 2nd "

" Propellers at Full Power

Total Shaft Horse Power

Date of Harbour Trial

" Trial Trip

Trials run at

Speed on Trial

Knots. Propeller Revs. per min.

S.H.P.

Makers of Turbines

Generators

Motors

Reduction Gear

Turbine Spindles forged by

" Wheels forged or cast by

Reduction Gear Shafts forged by

" Wheels forged or cast by

DESCRIPTION OF INSTALLATION.

SHAFTING.

Are the Crank Shafts Built or Solid?

built.

No. of Lengths in each

*6*Angle of Cranks *120°*

Diar. by Rule

9.64"

Actual

10"

In Way of Webs

10 1/2"

" of Crank Pins

10 1/2"

Length between Webs

9 3/16"

Greatest Width of Crank Webs

1'-8"

Thickness

6 1/2"

Least

1'-4"

"

6 1/2"

Diar. of Keys in Crank Webs

2 1/4"

Length

5 1/2"

" Dowels in Crank Pins

Length

Screwed or Plain

No. of Bolts each Coupling

6

Diar. at Mid Length

2 1/2"

Diar. of Pitch Circle

14 1/2"

Greatest Distance from Edge of Main Bearing to Crank Web

1/4"

Type of Thrust Blocks

Horseshoe.

No. " Rings

5

Diar. of Thrust Shafts at bottom of Collars

10 7/8"

No. of Collars

5

" " Forward Coupling

10"

At Aft Coupling

10"

Diar. of Intermediate Shafting by Rule

Actual

No. of Lengths

No. of Bolts, each Coupling

Diar. at Mid Length

Diar. of Pitch Circle

Diar. of Propeller Shafts by Rule

10.9"

Actual

11"

At Couplings

10"

Are Propeller Shafts fitted with Continuous Brass Liners?

yes.

Diar. over Liners

12 3/8"

Length of After Bearings

3'-8 1/2" + 1'-0 1/2"

Of what Material are the After Bearings composed?

Gunmetal.

Are Means provided for lubricating the After Bearings with Oil?

no

" " to prevent Sea Water entering the Stern Tubes?

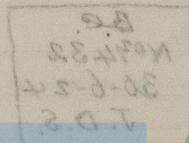
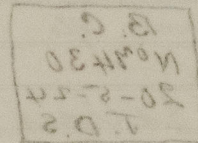
no.

If so, what Type is adopted?

✓

SKETCH OF CRANK SHAFT.

STAMP MARKS ON SHAFTS.



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No. of Blades each Propeller

4

Fitted or Solid?

solid. Fitted.

Material of Blades

C. Iron.

Boss

C.P.

Diam. of Propellers

12'-9"

Pitch

12'-3"

Surface (each

56 sq S. ft.

Coefficient of Displacement of Vessel at $\frac{1}{2}$ Moulded Depth

.832

Crank Shafts Forged by

Darlington Forge.

Material

I.P.

Pins

"

"

"

Webs

"

"

"

Thrust Shafts

"

"

"

Interned. "

"

"

"

Propeller "

"

"

"

Crank

Finished by

R.W.C. Neal

Thrust

"

Interned. "

"

Propeller "

"

STAMP MARKS ON SHAFTS.

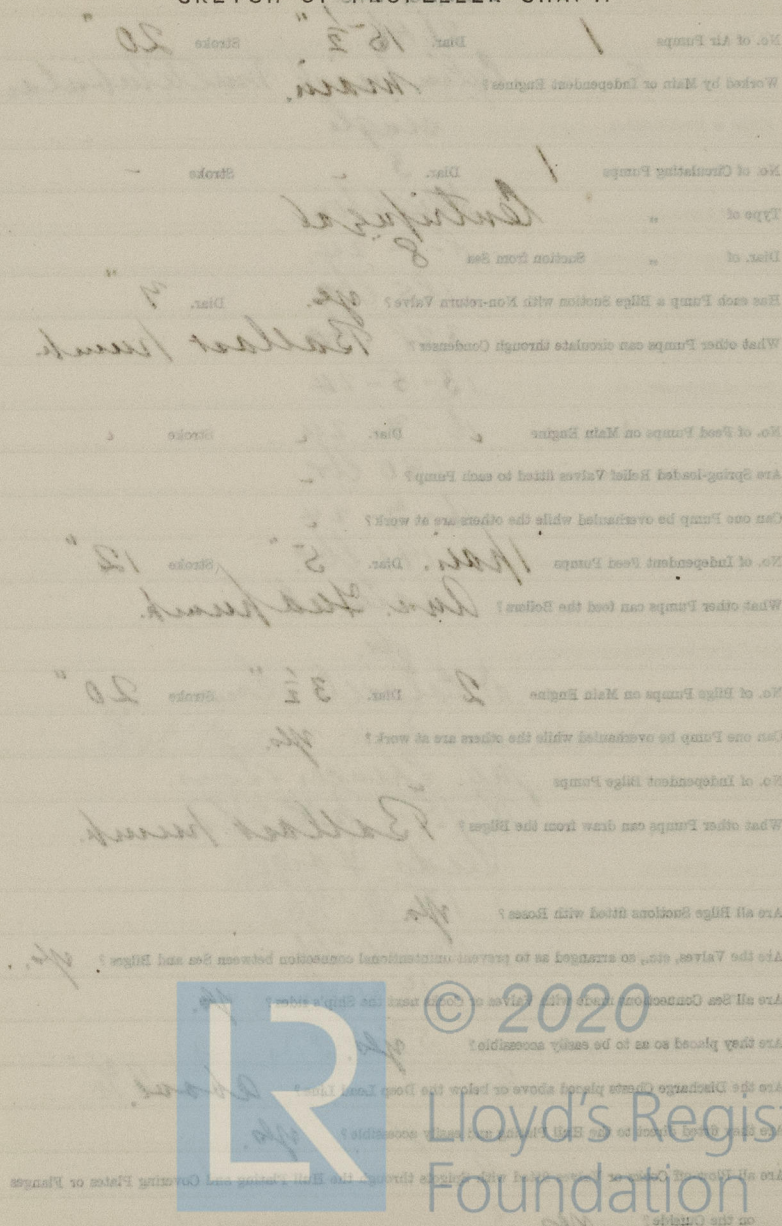
Crank Shaft: —

B. C.
N^o 4430
20-5-24
J. D. S.

Thrust & Tail Shafts: —

B. C.
N^o 4432
30-6-24
J. D. S.

SKETCH OF PROPELLER SHAFT.



Are the Water Gauges fitted direct to the Boiler Shells or mounted on Pillars?

Are the Water Gauge Pillars fitted direct to the Boiler Shells or connected by Pipes?

Are these Pipes connected to Boilers by Cooks or Valves?

Are Blow-off Cooks or Valves fitted on Boiler Shells?

No. of Strakes of Shell Plating in each Boiler

" Plates in each Strake

Thickness of Shell Plates Approved

" " in Boilers

Are the Rivets Iron or Steel?

Are the Longitudinal Seams Butt or Lap Joints?

Are the Butt Straps Single or Double?

Are the Double Butt Straps of equal width?

Thickness of outside Butt Straps

" inside "

Are Longitudinal Seams Hand or Machine Riveted?

Are they Single, Double, or Treble Riveted?

No. of Rivets in a Pitch

Diar. of Rivet Holes Pitch

No. of Rows of Rivets in Centre Circumferential Seams

Are these Seams Hand or Machine Riveted?

Diar. of Rivet Holes Pitch

No. of Rows of Rivets in Front End Circumferential Seams

Are these Seams Hand or Machine riveted?

Diar. of Rivet Holes Pitch

No. of Rows of Rivets in Back End Circumferential Seams

Are these Seams Hand or Machine Riveted?

Diar. of Rivet Holes Pitch

Size of Manholes in Shell

Dimensions of Compensating Rings

Thickness of End Plates in Steam Space Approved

" " in Boilers

Pitch of Steam Space Straps

Diar. " " Approved

" " in Boilers

Material of "

How are Straps Secured?

Diar. and Thickness of Loose Washers on End Plates

Riveted " "

Double Straps " "

Thickness of Middle Jack End Plates Approved

" " in Boilers

Thickness of Doublings in White Space between Fireboxes

Pitch of Straps at

Diar. of Straps Approved

" " in Boilers

Material " "

Are Straps fitted with Nut outside?

Thickness of Jack End Plates at Bottom Approved

" " in Boilers

Pitch of Straps at White Space between Fireboxes

Thickness of Doublings

Thickness of Front End Plates at Bottom Approved

" " in Boilers

No. of Longitudinal Straps in Space between Fireboxes



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Thickness of End Plates in Steam Space Approved

" " " " " in Boilers

Pitch of Steam Space Stays

Diar. " " " " Approved Threads per Inch

" " " " " in Boilers

Material of " " "

How are Stays Secured?

Diar. and Thickness of Loose Washers on End Plates

" " Riveted "

Width " " Doubling Strips "

Thickness of Middle Back End Plates Approved

" " " " " in Boilers

Thickness of Doublings in Wide Spaces between Fireboxes

Pitch of Stays at " " "

Diar. of Stays Approved Threads per Inch

" " in Boilers

Material "

Are Stays fitted with Nuts outside?

Thickness of Back End Plates at Bottom Approved

" " " " " in Boilers

Pitch of Stays at Wide Spaces between Fireboxes

Thickness of Doublings in " "

Thickness of Front End Plates at Bottom Approved

" " " " " in Boilers

No. of Longitudinal Stays in Spaces between Furnaces

Threads per Inch

Dist. of Stays Approved

" " " " " in Boilers

Material "

Thickness of Front End Plates Approved

" " " " " in Boilers

Pitch of Stay Tubes in Spaces between Backs of Tubes

Thickness of Doublings in

" " Stay Tubes at

Are Stay Tubes fitted with Nuts at Front End?

Thickness of Back Tube Plates Approved

" " " " " in Boilers

Pitch of Stay Tubes in Back Tube Plates

" " " " "

Thickness of Stay Tubes

" " " " "

External Diam. of Tubes

Material "

Thickness of Furnace Plates Approved

" " " " " in Boilers

Smallest outside Diam. of Furnaces

Length between Tubes

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Diar. of Stays Approved Threads per Inch

" " in Boilers

Material "

Thickness of Front Tube Plates Approved

" " " " in Boilers

Pitch of Stay Tubes at Spaces between Stacks of Tubes

Thickness of Doublings in " "

" Stay Tubes at " "

Are Stay Tubes fitted with Nuts at Front End?

Thickness of Back Tube Plates Approved

" " " in Boilers

Pitch of Stay Tubes in Back Tube Plates

" Plain "

Thickness of Stay Tubes

" Plain "

External Diar. of Tubes

Material "

Thickness of Furnace Plates Approved

" " " in Boilers

Smallest outside Diar. of Furnace

Length between Tube Plates

Width of Combustion Chambers (Front to Back)

Thickness of " " Tops Approved

" " " in Boilers

Pitch of Screwed Stays in O.O. Tops

Case as sps "Kaulasps"



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Diar. of Screwed Stays Approved

Threads per Inch

" " " in Boilers

Material " "

Thickness of Combustion Chamber Sides Approved

" " " " in Boilers

Pitch of Screwed Stays in C.O. Sides

Diar. " " Approved

Threads per Inch

" " " in Boilers

Material " "

Thickness of Combustion Chamber Backs Approved

" " " " in Boilers

Pitch of Screwed Stays in C.O. Backs

Diar. " " Approved

Threads per Inch

" " " in Boilers

Material " "

Are all Screwed Stays fitted with Nuts inside C.O.?

Thickness of Combustion Chamber Bottoms

No. of Girders over each Wing Chamber

" " " Centre

Depth and Thickness of Girders

Material of Girders

No. of Stays in each

No. of Tubes, each Boiler

Size of Lower Manholes

See as per "Handbook"

VERTICAL DONKEY BOILERS

No. of Tubes
Type
Description of Tubes
Height of Boiler Crown above the Base
Are Boiler Crowns Flat or Dished?
Internal Radius of Dished Boilers
Description of Stays in Boiler Crowns
Diar. of Lower Stays
Height of Firebox Crown above the Base
Are Firebox Crowns Flat or Dished?
Internal Radius of Dished Crowns
No. of Lower Stays
External Diar. of Firebox at Top
No. of Water Tubes
Material of Water Tubes
Size of Manhole in Shell
Dimensions of Compensation Ring
Heating Surface, each Boiler
Gross Surface

SUPERHEATERS

Description of Superheaters
When situated?
Which Boilers are connected to Superheaters?
Can Superheaters be used on other Boilers?
No. of Safety Valves on each Superheater
Diar.
Rate of Evaporation
Pressure on Tubes



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VERTICAL DONKEY BOILERS.

No. of Boilers	Type	
Greatest Int. Diar.	Height	
Height of Boiler Crown above Fire Grate		
Are Boiler Crowns Flat or Dished?		
Internal Radius of Dished Ends	Thickness of Plates	
Description of Seams in Boiler Crowns		
Diar. of Rivet Holes	Pitch	Width of Overlap
Height of Firebox Crowns above Fire Grate		
Are Firebox Crowns Flat or Dished?		
External Radius of Dished Crowns	Thickness of Plates	
No. of Crown Stays	Diar.	Material
External Diar. of Firebox at Top	Bottom	Thickness of Plates
No. of Water Tubes	Ext. Diar.	Thickness
Material of Water Tubes		
Size of Manhole in Shell		
Dimensions of Compensating Ring		
Heating Surface, each Boiler	Grate Surface	

SUPERHEATERS.

Description of Superheaters

Where situated?

Which Boilers are connected to Superheaters?

Can Superheaters be shut off while Boilers are working?

No. of Safety Valves on each Superheater

Diar.

Are " " fitted with Easing Gear?

Date of Hydraulic Test

Test Pressure

Date when Safety Valves set

Pressure on Valves

MAIN STEAM PIPES.

No. of Pipes	
Material	
Branch, Welded or Riveted	
Internal Diar.	
Thickness	
How are Flanges secured?	
Date of Hydraulic Test	
Test Pressure	



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MAIN STEAM PIPES.

No. of Lengths

2

Material

copper.

Brazed, Welded or Seamless

S. D.

Internal Diam.

4 1/2"

Thickness

4 W.S.

How are Flanges secured?

braked.

Date of Hydraulic Test

14-7-24

Test Pressure

400 lbs.

No. of Lengths

Material

Brazed, Welded or Seamless

Internal Diam.

Thickness

How are Flanges secured?

Date of Hydraulic Test

Test Pressure

No. of Lengths

Material

Brazed, Welded or Seamless

Internal Diam.

Thickness

How are Flanges secured?

Date of Hydraulic Test

Test Pressure

LIST OF EVAPORATORS

Ballast pump. 9x10x10" Heavy duty
General. 8x5x8" Thin Laminate
Sailing. 4x2x8"

FEED WATER HEATERS

1. Type: Vertical
Material: Mild Steel
Working Pressure: 180 lbs.
Test Pressure: 220 lbs.
Date of Test: 22-6-24

FEED WATER FILTERS

1. Type: Cascade
Material: Mild Steel
Working Pressure: 180 lbs.
Test Pressure: 220 lbs.
Date of Test: 22-6-24



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EVAPORATORS.

No.	Type	Tons per Day
Makers	<i>copper</i>	
Working Pressure	Test Pressure	Date of Test
Date of Test of Safety Valves under Steam		

FEED WATER HEATERS.

No.	Type	
Makers	<i>Surface.</i>	
Working Pressure	Test Pressure	Date of Test
	<i>R.W. Co. W. Hoal.</i>	<i>23-6-24</i>
	<i>185-lbs.</i>	<i>450</i>

FEED WATER FILTERS.

No.	Type	Size
Makers	<i>Cascade.</i>	<i>Hot.</i>
Working Pressure	Test Pressure	Date of Test
	<i>R.W. Co. W. Hoal.</i>	

LIST OF DONKEY PUMPS.

Ballast pump.	9" x 10" x 10"	Heavy Cast Iron
General.	8" x 5" x 8"	Thos. Lamont.
Sanitary	4" x 2 3/4" x 5"	"



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OTHER ARTICLES OF SPARE GEAR:

Propeller Shafts
Boiler Tubes
ARTICLES OF SPARE GEAR:—
Same as

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REFRIGERATORS.

No. of Machines

Capacity of each

Makers

Description

No. of Steam Cylinders, each Machine

No. of Compressors

No. of Cranks

Particulars of Pumps in connection with Refrigerating Plant and whether worked by Refrigerating Machines or Independently

System of Refrigeration

,, Insulation

Are Brine and other Regulating Valves placed so as to be accessible without entering the Insulated Spaces?

Are all Pipes, Air Trunks, &c., well secured and protected from risk of damage?

Are all Bilge, Sounding, and Air Pipes in Insulated Spaces properly insulated?

Are Thermometer Tubes so arranged that Water cannot enter and freeze in them?

Date of Test under Working Conditions

RESULTS OF TRIALS.

COMPARTMENT.	Temp. at beginning of Trial.	Temp. at end of Trial.	Time required to obtain this Result.	Rise of Temp. after hours.
Machine of Dynamometer				
Capacity	100			
Current Alternating or Continuous				
Single or Double Wire System				
Position of Dynamometer				
Main Switch Board				
No. of Circuits to which Section is connected on Main Switch Board				
Particulars of these Circuits—				
Circuit	Number of Lights	Watts	Volts	Amperes
Engine Room	14	400 6.19	7.026	194° 10' to 600 hours
Lower Deck	22	60 12.2	7.036	1715
Holds	20	40 7.00		

Articles of Spare Gear for Refrigerating Plant carried on board:—

Navigation 47 40 11.37 7-002 437

after 27 20 12.6 7-006 1115

Total No. of Lights

Current required for Motors and Machines



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REGISTERS

No. of Machines
 Time required
 to start
 after
 stoppage
 Time required
 to stop
 after
 running
 Description

No. of Steam Cylinders, each Machine
 Particulars of Pump or Pumps for each Machine
 or Independently

ELECTRIC LIGHTING

Installation Fitted by *Furness E.B. Co. Ltd.*
 No. and Description of Dynamos *One 10 H.P. Compound wound.*
 Makers of Dynamos *Cumberland Forge Eng. Co. Ltd.*
 Capacity *100* Amperes, at *100/110* Volts, *450* Revols. per Min.
 Current Alternating or Continuous *Continuous*
 Single or Double Wire System *double.*
 Position of Dynamos *Port side of Engine Room Lower Deck.*
 Main Switch Board
 No. of Circuits to which Switches are provided on Main Switch Board *Four.*

Particulars of these Circuits:—

Circuit.	Number of Lights.	Candle Power.	Current Required. Amps.	Size of Conductor.	Current Density.	Conductivity of Conductor.	Insulation Resistance per Mile.
Engine Room	3 17	200 40	2.7 6.29	7/0.36	1194	100%	600 meg.
Tween Decks	22	60	12.2	7/0.36	2785		
Holds.	20	40	7.40				
Forward.							
Accommodation	5	60	17.39	19.052	437		
Navigation	47	40					
After.	5	60	2.75	7/0.36	2285		
Accommodation	37	40	13.6				

Total No. of Lights *156* No. of Motors driving Fans, &c. No. of Heaters

Current required for Motors and Heaters

Are all Joints in Cables properly soldered and thoroughly Insulated so that the efficiency of the Cables

is unimpaired? *no*

Are all Joints in accessible positions, none being made in Bunkers or Cargo Spaces?

Are all Hull Connections for Single-Wire Systems made with Screws of large Surface?

Are the Dynamos, Motors, Main and Branch Cables, so placed that the Compasses are not injuriously

affected by them ?

Have Tests been made to prove that this condition has been satisfactorily fulfilled?

Has the Insulation Resistance over the whole system been tested?

What does the Resistance amount to?

Is the Installation supplied with a Voltmeter?

" " " an Ampere Meter?

Date of Trial of complete Installation *25-7-24* Duration of Trial *6 hours*

Have all the requirements of Section 42 been satisfactorily carried out?

Are Out-outs fitted as follows?—

On Main Switch Board, to Cables of Main Circuits

On Aux. " " each Auxiliary Circuit

Wherever a Cable is reduced in size

To each Lamp Circuit

To both Flow and Return Wires of all Circuits when the Double-Wire System is adopted

Are the Fuses of Standard Sizes ?

Are all Switches and Cut-outs constructed of Non-inflammable Material?

Are they placed so as to be always and easily accessible?

Smallest Single Wire used, No. 31.029 S.W.G., Largest, No. 19.083 S.W.G.

How are Conductors in Engine and Boiler Spaces protected?

„ Saloons, State Rooms, &c.,

What special protection is provided in the following cases?—

(1) Conductors exposed to Heat or Damp

(2) passing through Bunkers or Cargo Spaces

(3) " " Deck Beams or Bulkheads

GENERAL CONSTRUCTION.

Have the Machinery and Boilers been constructed in accordance with the requirements of the Rules and the

Approved Plans? *Yls.*

If not, give details of the points of difference, and state when these were sanctioned by the Chief Surveyor.

Have Tests been made to prove that the condition has been satisfactorily fulfilled?

Has the Installation been made over the whole system been tested?

What does the Resistance amount to?

Is the Installation supplied with a Voltmeter?

Has all the requirements of Section 13 been satisfactorily carried out?

Are the Materials used in the Construction of Engines and Boilers, so far as could be seen, sound and

trustworthy? *Yls.*

Is the Workmanship throughout thoroughly satisfactory? *Yls.*

The above correctly describes the Machinery of the S.S.

"LETHBRIDGE"

as ascertained by ^{me} from personal examination

J. D. Stephenson

Engineer Surveyor to the British Corporation for the Survey and Registry of Shipping.

Fees—

MAIN BOILERS.

£ s. d.

H.S. 3460

Sq. ft.

: :

G.S. 115

"

: :

DONKEY BOILERS.

H.S.

Sq. ft.

: :

G.S.

"

: :

£ : :

ENGINES.

L.P.C. 40.9

Cub. ft.

: :

£ : :

Testing, &c.

£ : :

Expenses

£ : :

Total

£

: :

It is submitted that this Report be approved.

J. D. Stephenson

Chief Surveyor.

Approved by the Committee for the Class of M.B.S.* on the

8th October 1914.

Fees advised

Fees paid



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Secretary.

GENERAL CONSTRUCTION

Total

MAIN BUILDING

Ed. B.

H.S. 3460

Ed. B.

H.S. 115

DONKEY BUILDING

Ed. B.

H.S.

Q.S.

BANKING

Ed. B.

L.P.C. 40.9

Total

BANKING

Total

It is suggested that this Report be approved.

John King

Approved by the Committee for the Class of M.E.S. on the 14th October 1944

LETHBRIDGE

Fees of total

Fees paid

John King



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