

No. 1937

THE BRITISH CORPORATION FOR THE SURVEY
AND
REGISTRY OF SHIPPING.

Report No. *1445* No. in Register Book *3032*

S.S. *Lady Alexandra*
Makers of Engines *Bow W. & Co. Paisley*

Works No. *354-5*

Makers of Main Boilers *Bow W. & Co. Paisley*

Works No. *1017-18*

Makers of Donkey Boiler *—*

Works No. *—*

MACHINERY.



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No.

THE BRITISH CORPORATION FOR THE SURVEY

AND

REGISTRY OF SHIPPING.

Report No. 1445 No. in Register Book 3032

Received at Head Office

20th May 1924

Machinery ex Caerleon
Surveyor's Report on the New Engines, Boilers, and Auxiliary

Machinery of the *Single-Triple* *Scotch* *Steamer*
Quadruple

Lady Alexandra

Official No.

Port of Registry

Vancouver

Registered Owners

Union Steamship Company
of British Columbia Ltd

Engines Built by

Bow W. Lachlan

at

Paisley

Main Boilers Built by

Bow W. Lachlan

at

Paisley

Donkey " "

None

at

Date of Completion

6th May 1924

First Visit

21st Sept 1923

Last Visit

6th May 1924

Total Visits *30*

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RECIPROCATING ENGINES.

Works No. **3564-5** No. of Sets **2** Description **Inverted****Triple Expansion**No. of Cylinders each Engine **3** No. of Cranks **3**
Diars. of Cylinders **13 1/4" - 21 1/4" - 34"** Stroke **21"**
Cubic feet in each L.P. Cylinder **11-03**
Are Spring-loaded Relief Valves fitted to Top and Bottom of each Cylr. **Yes**" " " each Receiver? **Yes**Type of H.P. Valves, **Piston**

" 1st I.P. " "

" 2nd I.P. " "

" L.P. " **Andrews & Cameron**" Valve Gear **open type**" Condenser **Steel 3 flow.** Cooling Surface **1300** sq. ft. **Cash.**Diameter of Piston Rods (plain part) **3 1/2"** Screwed part (bottom of thread) **2 3/8"**Material " **Forged Steel**Diar. of Connecting Rods (smallest part) **3 1/4"** Material **Steel Forged.**" Crosshead Gudgeons **4 1/4"** Length of Bearing **8"** Material **Steel**No. of Crosshead Bolts (each) **2** Diar. over Thrd. **2 1/4"** Thrds. per inch **4** Material **Forged Steel**" Crank Pin " " **2** " **2 1/4"** " **4** " " "" Main Bearings **2** Lengths **17 3/4"**" Bolts in each **2 & 4** Diar. over Thread **1 3/4"** Threads per inch **4** Material **Steel**" Holding Down Bolts, each Engine **40** Diar. **7/8"** No. of Metal Chocks **40**Are the Engines bolted to the Tank Top or to a Built Seat? **To Built Seat**

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

If not, how are they fitted? **By means of fitted bolts fitted****thro Top plate of Built Steel**

Connecting Rods, Forged by

Piston " "

Crossheads,

Connecting Rods, Finished by

Piston " "

Crossheads,

Date of Harbour Trial

" Trial Trip

Trials run at

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

If so, what was the I.H.P.?

Pressure in 1st I.P. Receiver, **175** lbs., 2nd I.P., **76** lbs., L.P., **14** lbs., Vacuum, **23** ins.Speed on Trial **14.23**

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

data:—

Builders' estimated I.H.P.

Estimated Speed

The Engines & Boilers have been
taken ex S.S. "Caerleon"



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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 Turbine

" 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.



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SHAFTING.

Are the Crank Shafts Built or Solid? *Solid*

No. of Lengths in each *One* Angle of Cranks *120°*

Diar. by Rule *6.56*. Actual *7 1/4* Pin In Way of Webs *7"*

" of Crank Pins *7 1/4"* Length between Webs *8 3/4"*

Greatest Width of Crank Webs *8 3/4"* Thickness *6 1/4"*

Least " " *5 1/2"* " " *4 5/8"*

Diar. of Keys in Crank Webs *Solid* Length *Solid*

" Dowels in Crank Pins - Length - Screwed or Plain *SW*

No. of Bolts each Coupling *6* Diar. at Mid Length *1 3/4"* Diar. of Pitch Circle *11 3/4"*

Greatest Distance from Edge of Main Bearing to Crank Web *1/2"*

Type of Thrust Blocks *Horse Shoe*

No. " Rings *7*

Diar. of Thrust Shafts at bottom of Collars *7"* No. of Collars *6*

" " Forward Coupling *7"* At Aft Coupling *7"*

Diar. of Intermediate Shafting by Rule *6.23*. Actual *6 3/4"* No. of Lengths *3*

No. of Bolts, each Coupling *6* Diar. at Mid Length *1 3/4"* Diar. of Pitch Circle *11 3/4"*

Diar. of Propeller Shafts by Rule *6.75*. Actual *7 1/4* At Couplings *7 1/4"*

Are Propeller Shafts fitted with Continuous Brass Liners? *No.*

Diar. over Liners *8 3/8 & 8 1/2"* Length of After Bearings *3'-0"*

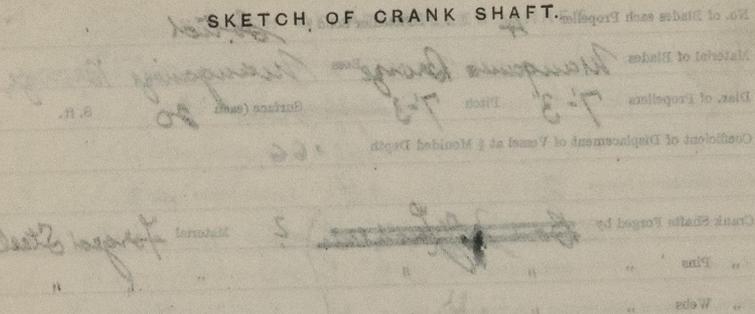
Of what Material are the After Bearings composed? *Lignum Vitae*

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.



*Crank Shaft similar to
Twin Screw Mine Sweepers.
See J.S.S. barrels.*

STAMP MARKS ON SHAFTS

Handwritten notes and markings, including 'H140 CM 17718' and 'H140 CM 17719'.



No. of Blades each Propeller **4** Fitted or Solid? **Solid**
 Material of Blades **Manganese Bronze** Boss **Manganese Bronze**
 Diam. of Propellers **7'-3"** Pitch **7'-3"** Surface (each **20** S. ft.
 Coefficient of Displacement of Vessel at $\frac{1}{2}$ Moulded Depth **.66**

Crank Shafts Forged by ~~Bow No. 1~~ ? Material **Forged Steel**
 „ Pins „ „ „ „ „ „
 „ Webs „ „ „ „ „ „ „
 Thrust Shafts „ „ „ „ „ „ „
 Intermed. „ „ „ „ „ „ „
 Propeller „ **Not Available** „ „ „ „ „ „ „
 Crank „ Finished by **Bow No. 2** ?
 Thrust „ „ „ „ „ „ „
 Intermed. „ „ „ „ „ „ „
 Propeller „ „ „ „ „ „ „

STAMP MARKS ON SHAFTS.

Sail Shaft: Port. **Lloyds 4740 CM 17/7 18**
 „ „ Starb. „ **4740 CM 17/7 18**
 Intermediate Shafting **Lloyds 3564-5, 12-11-17 W.G.M. F.F.F.**
 Crank Shaft Port **Lloyds W.G.M. 12-2-18 3564.**
 „ „ Starb. „ „ **12-2-18 3565.**

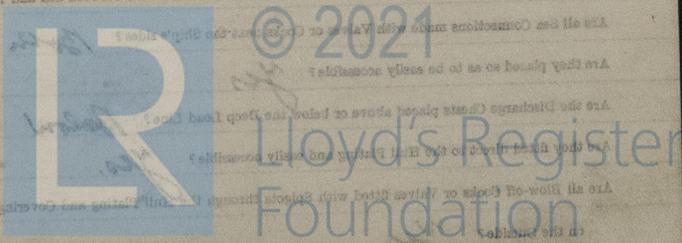
1 Crank. Shaft: 1 Thrust 3 Linnel. and.
 1 Sail Shaft: MARKER B.C. N^o 5629 T.L. 27-11-23

SKETCH OF PROPELLER SHAFT.

[Faint, mostly illegible handwritten notes and sketches related to the propeller shaft design.]

Similar to Twin Screw Win. Shafts.

[Extensive handwritten notes and diagrams, including a large 'R' logo, describing technical details of the propeller shaft and its components.]



PUMPS, ETC.

No. of Air Pumps **2** Diar. **9½" x 17"** Stroke **12"**
 Worked by Main or Independent Engines? **Independent**

No. of Circulating Pumps **2** Diar. **5½"** Stroke **4½"**
 Type of " **Drysdale Open Type.**
 Diar. of " Suction from Sea **8½"**

Has each Pump a Bilge Suction with Non-return Valve? **Yes** Diar. **8"**
 What other Pumps can circulate through Condenser? **None**

No. of Feed Pumps on Main Engine **None** Diar. **-** Stroke **-**
 Are Spring-loaded Relief Valves fitted to each Pump? **-**
 Can one Pump be overhauled while the others are at work? **-**

No. of Independent Feed Pumps **3** Diar. **7¾" x 5½"** Stroke **12"**
 What other Pumps can feed the Boilers? **No other**

No. of Bilge Pumps on Main Engine **None** Diar. **-** Stroke **-**
 Can one Pump be overhauled while the others are at work? **Yes**

No. of Independent Bilge Pumps **2**
 What other Pumps can draw from the Bilges? **Downer Pump**

Are all Bilge Suctions fitted with Roses? **Yes**
 Are the Valves, etc., so arranged as to prevent unintentional connection between Sea and Bilges? **Yes**
 Are all Sea Connections made with Valves or Cocks next the Ship's sides? **Both**
 Are they placed so as to be easily accessible? **Yes**
 Are the Discharge Chests placed above or below the Deep Load Line? **Below**
 Are they fitted direct to the Hull Plating and easily accessible? **Yes**
 Are all Blow-off Cocks or Valves fitted with Spigots through the Hull Plating and Covering Plates or Flanges on the Outside? **Yes**

2 - Weir Air Pumps
1 Bilge & Sanitary Pump. Weir's
1 Bilge & Ballast " "
2 Centrifugal Pump Open type Drysdale
3 Weirs Feed Pumps.
1 Gravitation Filter Carrickher's
1 Feed Heater Kerr's
1 Evaporator
1 Fresh Water Pump
2 - Oil Fuel Pumps with 40 gal. Wallend



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BOILERS.

Works No. 1017 - 1018

No. of Boilers 2 Type Yarrow Water Tube

Single or Double ended Single

No. of Furnaces in each 3

Type of Furnaces Common, Wallsend Howden

Date when Plan approved System of Oil Fuel

Approved Working Pressure 200 lbs

Hydraulic Test Pressure 350 "

✓ Date of Hydraulic Test 9/4/24

✓ " when Safety Valves set 28-4-24

Pressure at which Valves were set 200 lbs.

✓ Date of Accumulation Test 28/4/24

Maximum Pressure under Accumulation Test 2 lbs. = 202 lbs.

System of Draught Howden's Forced.

Can Boilers be worked separately? yes.

Makers of Plates

" Stay Bars not available

" Rivets

" Furnaces

Greatest Internal Diam. of Boilers Steam Drum 4'-2" dia. Water Drums 2'6"

" " Length " 10'-11"

Square Feet of Heating Surface each Boiler 3500.

" " Grate " "

No. of Safety Valves each Boiler 2 Rule Diam. ~~2 1/4~~ 3 1/4 = 2/3 of the area required for ordinary lift valves. Actual 3" HIGH LIFT.

Are the Safety Valves fitted with Easing Gear? yes.

No. of Pressure Gauges, each Boiler 2 No. of Water Gauges 2

" Test Cocks " " Salinometer Cocks 3/8 bore.

BOILER TEST MARK.

B. C. TEST.
 No. 3240
 T.P. 350
 W.P. 200
 T.L. 3
 9-4-24

ON 2 MAIN BOILERS

These boilers are fitted for burning Oil Fuel by the Wallsend Howden system.



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

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

Are these Pipes connected to Boilers by Cocks or Valves?

Are Blow-off Cocks or Valves fitted on Boiler Shells? *yes.*

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? *Steel*

Are the Longitudinal Seams Butt or Lap Joints? *Butt*

Are the Butt Straps Single or Double? *Double*

Are the Double Butt Straps of equal width? *yes*

Thickness of outside Butt Straps

1/2"

inside

1/2"

Are Longitudinal Seams Hand or Machine Riveted?

Are they Single, Double, or Treble Riveted?

No. of Rivets in a Pitch

5

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 *Steam Drum 2 Water 1.*

Are these Seams Hand or Machine riveted? *Hand.*

Diar. of Rivet Holes

Pitch

No. of Rows of Rivets in Back End Circumferential Seams *as above*

Are these Seams Hand or Machine Riveted? *Hand.*

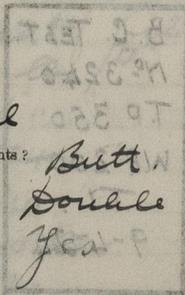
Diar. of Rivet Holes

Pitch

Size of Manholes in Shell

18 x 14

Dimensions of Compensating Rings



Thickness of End Plates in Steam Space Approved

in Boilers

Pitch of Steam Space Straps

Diar. of Straps per Inch

Approved

in Boilers

Material of

How are Straps Secured?

Diar. and Thickness of Loose Washers on End Plates

Riveted

Width of Doubling Straps

Thickness of Middle Back End Plates Approved

in Boilers

Thickness of Doublings in Wide Spaces between Fireboxes

Pitch of Straps at

Diar. of Straps Approved

in Boilers

Material

Are Straps Bolted with Nuts outside?

Thickness of Back End Plates at Bottom Approved

in Boilers

Pitch of Straps in Wide Spaces between Fireboxes

Thickness of Doublings in

Thickness of Front End Plates at Bottom Approved

in Boilers

No. of Longitudinal Straps in Spaces 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



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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 Furnaces

Length between Tube Plates

Width of Combustion Chambers (Front to Back)

Thickness of " " Tops Approved

" " " " in Boilers

Pitch of Screwed Stays in C.O. Tops



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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

VERTICAL DONKEY BOILERS

No. of Boilers
Type
Greatest Int. Diam.
Height of Boiler Crown above Fire Grate
Are Boiler Crowns Flat or Dished?
Internal Radius of Dished Boilers
Description of Beams in Boiler Crowns
Diar. of Rivet Holes
Height of Firebox Crown above Fire Grate
Are Firebox Crowns Flat or Dished?
External Radius of Dished Crowns
No. of Crown Stays
Diar.
Material
Internal Diam. of Firebox at Top
Thickness of Plates
Bottom
No. of Water Tubes
Int. Diam.
Thickness
Material of Water Tubes
Size of Manhole in Shell
Description of Combustion Grate
Height surface each boiler
Grate Surface

SUPERHEATERS

Description of Superheaters
Where situated?
Which boilers are connected to superheaters?
Can superheaters be used on other boilers?
No. of Safety Valves on each superheater
Are they fitted with Friction Rings?
Date of Hydraulic Test
Pressure on Valves
Date when Safety Valves set



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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
 Height, Width or Diameter
 Internal Diar.
 Thickness
 How are Joints secured?
 Date of Hydraulic Test
 Test Pressure
 Total H.P. of STEEL L.W. PIPES



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MAIN STEAM PIPES.

No. of Lengths	86	2	2
Material	Steel	St. Pipe.	Steel
Brazed, Welded or Seamless	Lap Welded	Seamless	Lap Welded.
Internal Diam.	5"	4 1/2"	4 1/2"
Thickness	1/4"		1/4"
How are Flanges secured?	Screwed & Expanded		
Date of Hydraulic Test	16-4-24	8-4-24	18-4-24.
Test Pressure	600	700	600

TOTAL NO. 8 STEEL. L.W. PIPES.

No. of Lengths
Material
Brazed, Welded or Seamless
Internal Diam.
Thickness
How are Flanges secured?
Date of Hydraulic Test
Test Pressure

SUPERHEATERS

No. of Lengths
Material
Brazed, Welded or Seamless
Internal Diam.
Thickness
How are Flanges secured?
Date of Hydraulic Test
Test Pressure

STEAM EVAPORATORS

No. 1
Type Horizontal
Material
Working Pressure
Date of Test of Safety Valves under Steam
Date of Test
No. 1
Type Horizontal
Material
Working Pressure
Date of Test of Safety Valves under Steam
Date of Test

FEED WATER HEATERS

FEED WATER FILTERS

No. 1
Type Horizontal
Material
Working Pressure
Date of Test



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Positions of Auxiliary Switch Boards, with No. of Switches on each (1) Aft Engine Room Bulkhead

- above main deck Star Side (2) Aft End wheel house 12
 (3) Aft End wheel house B (4) Star Side midship Entrance
 upper deck 10 (5) Port Side midship Entrance upper
 deck 10 (6) Starboard Passage outside Engine Room 6
 Starboard Passage Forward 7 (7) Port Passage
 outside Sullay B
 Fuses have separate fuses & starters at
 side of main switch board.

No. of Circuits to which switches are provided on Main Switch Board

Position of these Circuits

Position of these Circuits

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 Out-outs constructed of Non-inflammable Material?

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

Smallest Single Wire used, No. 18 S.W.G., Largest, No. 16 S.W.G.

How are Conductors in Engine and Boiler Spaces protected Armoured & Braided

" Saloons, State Rooms, &c., " Lead Covered run on Surface

What special protection is provided in the following cases?—

- (1) Conductors exposed to Heat or Damp Perforated tray on Wood Grommets
 (2) " " passing through Bunkers or Cargo Spaces Armoured & Braided
 (3) " " Deck Beams or Bulkheads W.T. deck tubes, glands & Lead lashed holes

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

is unimpaired? Yes

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

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? Yes

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

Has the Insulation Resistance over the whole system been tested? Yes

What does the Resistance amount to? Ohms,

Is the Installation supplied with a Voltmeter? 2 Voltmeters

" " " an Ampere Meter? 2 Ampere meters.

Date of Trial of complete Installation 2nd May 24 Duration of Trial 6 hours.

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

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

approved by the Committee for the purpose of the examination?

Approved by the Committee for the purpose of the examination?

The above correctly describes the machinery and fittings of the vessel and is certified by the

Surveyors and Engineers of the Lloyd's Register of Shipping.

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