

No. 1882

THE BRITISH CORPORATION FOR THE SURVEY
AND
REGISTRY OF SHIPPING.

Report No. 1642 No. in Register Book 2901

S.S. "BEN READ" N N "T W 1"

Makers of Engines W^M BEARDMORE & CO^{LTD}

Works No. 589

Makers of Main Boilers W^M BEARDMORE & CO^{LTD}

Works No. 122

Makers of Donkey Boiler —

Works No. —

MACHINERY



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No.

THE BRITISH CORPORATION FOR THE SURVEY
AND
REGISTRY OF SHIPPING.

Report No. *1642* No. in Register Book *2901*

Received at Head Office *4th May 1923*

Surveyor's Report on the New Engines, Boilers, and Auxiliary
Machinery of the ^{Single Triple} ~~Twin Quadruple~~ Screw steamer
"BEN READ"

Official No. *144764* Port of Registry *Bristol*

Registered Owners *National Benzole Co. Ltd*

Wellington House, Buckingham House, London S.W.1

Engines Built by *WM BEARDMORE & CO LTD*

at *CORTBRIDGE SCOTLAND*

Main Boilers Built by *WM BEARDMORE & CO LTD*

at *PARKHEAD GLASGOW*

Donkey "✓"

at ✓

Date of Completion *April 1923*

First Visit *20-11-22* Last Visit *20-4-23* Total Visits *24*

30 miles to Cortbridge, Parkhead



TURBINE ENGINES.

Works No. _____ Type of Turbines _____

No. of H.P. Turbines _____ No. of L.P. _____ No. of L.P. _____ No. of Astern _____

Are the Propeller Shafts driven direct by the Turbines or through Gearing? _____

Is Single or Double Reduction Gear employed? _____

Diar. of 1st Reduction Pinion _____ }
 " 1st " Wheel _____ } Width _____ Pitch of Teeth _____

Estimated Pressure per lineal inch _____

Diar. of 2nd Reduction Pinion _____ }
 " 2nd " Wheel _____ } Width _____ Pitch of Teeth _____

Estimated Pressure per lineal inch _____

Revs. per min. of H.P. Turbines at Full Power _____ S.H.P. _____

" " I.P. " " _____

" " L.P. " " _____

" " 1st Reduction Shaft _____

" " 2nd " _____

" " Propeller Shaft _____

Total Shaft Horse Power _____

Date of Harbour Trial _____

" Trial Trip _____

Trials run at _____

Speed on Trial _____ Knots. Propeller Revs. per min. _____ S.H.P. _____

Turbine Spindles forged by _____

" Wheels forged or cast by _____

Reduction Gear Shafts forged by _____

" Wheels forged or cast by _____

DESCRIPTION OF INSTALLATION.

No. of Turbo-Generators per _____ Capacity of each _____

Type of Turbine employed _____

Description of Generators _____

No. of Motors driving Propeller Shafts _____

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

Is Single or Double Reduction Gear employed? _____

Description of Motors _____

Diar. of 1st Reduction Pinion _____

" 1st " Wheel _____

Estimated Pressure per lineal inch _____

Diar. of 2nd Reduction Pinion _____

" 2nd " Wheel _____

Estimated Pressure per lineal inch _____

Revs. per min. of Generator at Full Power _____

" " " " _____

" " 1st Reduction Shaft _____

" " 2nd " _____

" " Propeller Shaft _____

Total Shaft Horse Power _____

Date of Harbour Trial _____

" Trial Trip _____

Trials run at _____

Speed on Trial _____ Knots. Propeller Revs. per min. _____ S.H.P. _____

Turbine Spindles forged by _____

" Wheels forged or cast by _____

Reduction Gear Shafts forged by _____

" Wheels forged or cast by _____



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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 _____

Diar. of 1st Reduction Pinion _____ } Width _____ Pitch of Teeth _____
" 1st " Wheel _____ }

Estimated Pressure per lineal inch _____

Diar. 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.



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SHAFTING.

Are the Crank Shafts Built or Solid? **BUILT.**

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

Diar. by Rule **7.33.** Actual **7⁵/₈"** In Way of Webs **7³/₄"**

of Crank Pins **7.625.** Length between Webs **7¹/₄"**

Greatest Width of Crank Webs **15"** Thickness **4¹/₂"**

Least " " **12¹/₄"** " " **4¹/₂"**

Diar. of **DOWELS** Keys in Crank Webs **1¹/₄"** Length **3³/₄"** Screwed or Plain **PLAIN.**

of Dowels in Crank Pins **1¹/₄"** Length **3³/₄"** Screwed or Plain **PLAIN.**

No. of Bolts each Coupling **6.** Diar. at Mid Length **1³/₄"** Diar. of Pitch Circle **12"**

Greatest Distance from Edge of Main Bearing to Crank Web **1¹/₄"**

Type of Thrust Blocks **HORSE SHOE TYPE**

No. " Rings **4.**

Diar. of Thrust Shafts at bottom of Collars **7⁵/₈"** No. of Collars **4**

" " Forward Coupling **15³/₄"** At Aft Coupling **7³/₄"**

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 **7.87.** Actual **8¹/₂"** At Couplings **7⁵/₈"**

Are Propeller Shafts fitted with Continuous Brass Liners? **YES.**

Diar. over Liners **9¹/₂"** Length of After Bearings **3'-0"**

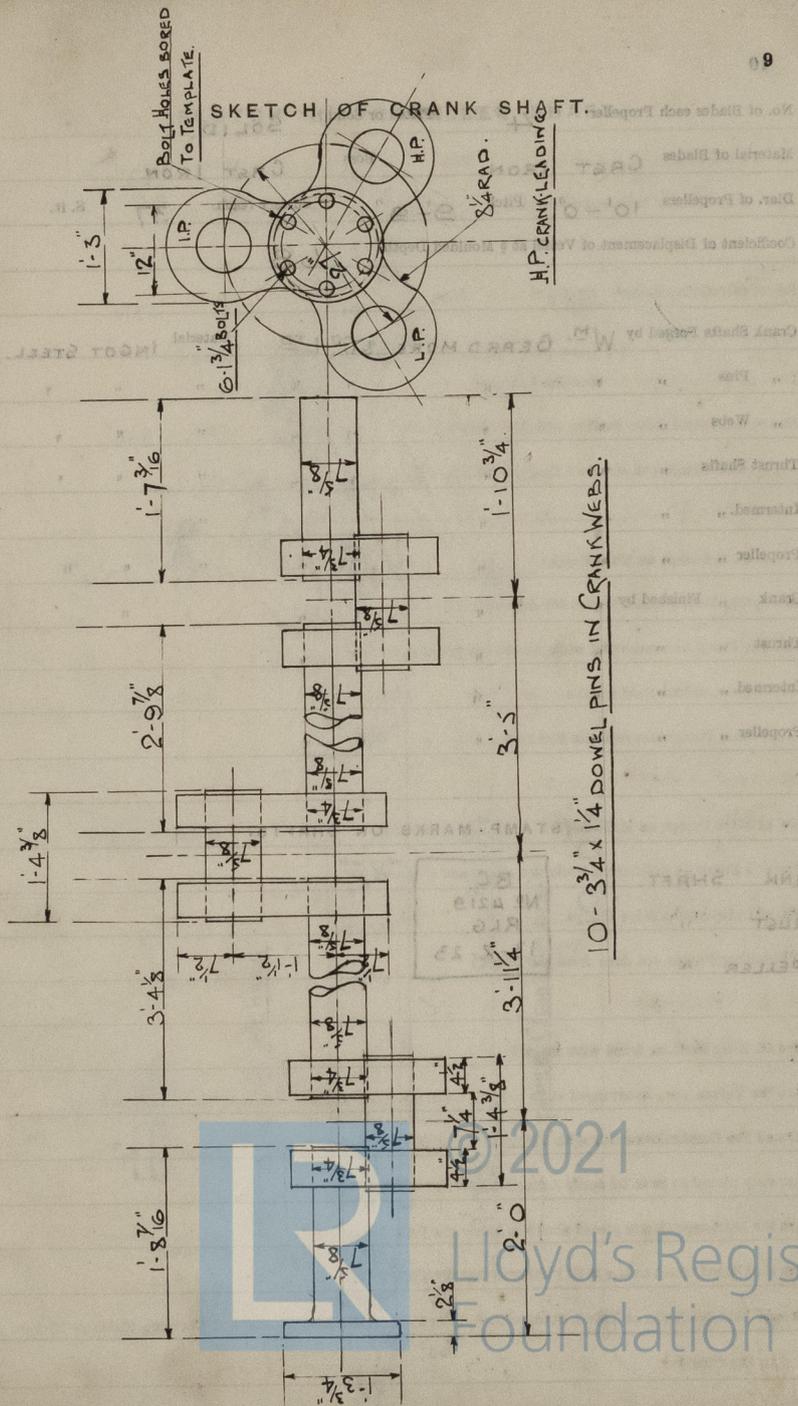
Of what Material are the After Bearings composed? **LIGNUM VITAE.**

Are Means provided for lubricating the After Bearings with Oil? **N^o.**

" " to prevent Sea Water entering the Stern Tubes? **N^o.**

If so, what Type is adopted?

SKETCH OF CRANK SHAFT.



BOILERS.

Works No. 122.

No. of Boilers ONE Type Cylindrical Multitubular, "SCOTCH"

Single or Double-ended SINGLE END FIRING. OIL FUEL.

No. of Furnaces in each THREE.

Type of Furnaces PLAIN.

Date when Plan approved 25-11-22.

Approved Working Pressure 180 lbs.

Hydraulic Test Pressure 320 lbs.

Date of Hydraulic Test 27-2-23

" when Safety Valves set 20-4-23

Pressure at which Valves were set 180 LBS

Date of Accumulation Test 20-4-23

Maximum Pressure under Accumulation Test 180 LBS

System of Draught NATURAL

Can Boilers be worked separately? —

Makers of Plates WM BEARDMORE & CO LTD.

" Stay Bars " " " "

" Rivets " " " "

" Furnaces " " " "

Greatest Internal Diam. of Boilers 14'-0"

" " Length " 10'-4 3/8"

Square Feet of Heating Surface each Boiler 1850 sq

" " Grate " " oil fuel

No. of Safety Valves each Boiler 2 Rule Diam. 3". Actual 3"

Are the Safety Valves fitted with Easing Gear? YES.

No. of Pressure Gauges, each Boiler 1 No. of Water Gauges 1

" Test Cocks " 3 " Sallinometer Cocks 1

Are the Water Gauges fitted direct to the boiler shells or mounted on Flanges? PIPES

Are the Water Gauges fitted direct to the boiler shells or connected by Pipes? PIPES

Are these Pipes connected to Bottom by Cocks or Valves? COCKS

Are Blow-off Cocks or Valves fitted on Boiler Shells? VALVES

No. of Strakes of Shell Plating in each Boiler ONE

Plates in each Strake TWO

Thickness of Shell Plates Approved 1 3/8"

" " in Boilers "

Are the Rivets Iron or Steel? STEEL

Are the Longitudinal Beams Butt or Lap Joints? BUTT STRAPS

Are the Butt Straps Single or Double? DOUBLE

Are the Double Butt Straps of equal width? EQUAL

Thickness of outside Butt Straps 1/2"

" " inside "

Are Longitudinal Beams Hand or Machine Riveted? MACHINE

Are they Single, Double, or Triple Riveted? TRIPLE

No. of Rivets in a Pitch FIVE

Diam. of Rivet Holes 3/8"

No. of Rows of Rivets in Centre Circumferential Beams (TWO) —

Are these Beams Hand or Machine Riveted? —

Diam. of Rivet Holes 1/2"

No. of Rows of Rivets in Front and Circumferential Beams TWO

Are these Beams Hand or Machine riveted? HAND

Diam. of Rivet Holes 1/2"

No. of Rows of Rivets in Back and Circumferential Beams TWO

Are these Beams Hand or Machine Riveted? MACHINE

Diam. of Rivet Holes 1/2"

Are the Rivets in End of Circumferential Beams Hand or Machine Riveted? MACHINE

Diam. of Rivet Holes 1/2"

Dimensions of Compensating Rings 2-5 x 2-5 x 2-5

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Diam. of Screwed Stays Approved $1\frac{3}{4}$ " Threads per Inch 9

" " " in Boilers " "

Material " " STEEL

Thickness of Combustion Chamber Sides Approved $1\frac{1}{16}$ "

" " " " in Boilers "

Pitch of Screwed Stays in C.O. Sides 9" x 10"

Diam. " " Approved $1\frac{3}{4}$ " Threads per Inch 9

" " " in Boilers " "

Material " " STEEL

Thickness of Combustion Chamber Backs Approved $9\frac{1}{16}$ "

" " " " in Boilers "

Pitch of Screwed Stays in C.O. Backs $7\frac{1}{2}$ " x 8"

Diam. " " Approved $1\frac{1}{2}$ " Threads per Inch 9

" " " in Boilers " "

Material " " STEEL

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

Thickness of Combustion Chamber Bottoms $1\frac{1}{16}$ "

No. of Girders over each Wing Chamber 4

" " " Centre " 2

Depth and Thickness of Girders $7\frac{3}{4}$ " x $2\frac{3}{32}$ "

Material of Girders STEEL

No. of Stays in each TWO

No. of Tubes, each Boiler 224 TOTAL

Size of Lower Manholes 15" x 11" MACNEIL

VERTICAL DONKEY BOILERS

No. of Boilers Type

Greatest Inlet Diam. 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 Crown

Diam. of Rivet Holes Pitch

Height of Firebox Crown above Fire Grate

Are Firebox Crowns Flat or Dished?

External Radius of Dished Crowns Thickness of Plates

No. of Crown Stays Diam. Material

External Diam. of Firebox at Top Bottom Thickness of Plates

No. of Water Tubes External Diam. Thickness

Material of Water Tubes

Size of Manhole in Shell

Dimensions of Compensating Ring

Heating surface, each Boiler Grate surface

SUPERHEATERS

Description of Superheaters

Water situated?

Which Boilers are connected to Superheaters?

Can Superheaters be run off while Boilers are working?

No. of Safety Valves on each Superheater

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Pressure on Valves

Date when Safety Valves set



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

ONE
 COPPER
 SEAMLESS
 3 1/2"
 1/2"
 BRAIDED
 2-4-25
 1400 LB



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MAIN STEAM PIPES.

No. of Lengths	ONE		
Material	COPPER.		
Brazed, Welded or Seamless	SEAMLESS.		
Internal Diar.	3 1/2"		
Thickness	7/16"		
How are Flanges secured?	BRAZED		
Date of Hydraulic Test	5-4-23	J.M. Ward	
Test Pressure	400 lbs		
No. of Lengths			
Material			
Brazed, Welded or Seamless			
Internal Diar.			
Thickness			
How are Flanges secured?			
Date of Hydraulic Test			
Test Pressure			
No. of Lengths			
Material			
Brazed, Welded or Seamless			
Internal Diar.			
Thickness			
How are Flanges secured?			
Date of Hydraulic Test			
Test Pressure			

EVAPORATORS

No.	
Type	
Material	
Working Pressure	
Date of Test	
Test Pressure	
Date of Test	
Test Pressure	

FEED WATER HEATERS

No.	
Type	
Material	
Working Pressure	
Date of Test	
Test Pressure	
Date of Test	
Test Pressure	

FEED WATER FILTERS

No.	
Type	
Material	
Working Pressure	
Date of Test	
Test Pressure	
Date of Test	
Test Pressure	



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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 —

*2 dry mounted balls and nuts
 4 pump glasses & washers
 one set valves for donkey pump*

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.
Capacity	20		30	
Current Alterations				
Height of Liquid				
Height of Vacuum				
No. of Cylinders				
Particulars of Test				
Navigation	7	12	5	5
Accommodation	22	16	4	15
Cabin	8	16	4	15
Cargo	4	16	2	15

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



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STANT (No. 101)

Time of day when used	Time required for obtaining the result	Time in use	Time in operation	COMMENTS
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ELECTRIC LIGHTING.

Installation Fitted by *Wm Heill & Sons, Bristol*

No. and Description of Dynamos *One Compound wound*

Makers of Dynamos *The Crypto Electrical Co Ltd, London*

Capacity .. *20* Amperes, at *100* Volts. *450* Revols. per Min.

Current Alternating or Continuous *Continuous*

Single or Double Wire System *double wire*

Position of Dynamos *in Engine room, Starboard side.*

.. Main Switch Board *near dynamo*

No. of Circuits to which Switches are provided on Main Switch Board *4*

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.
<i>Navigation</i>	<i>4</i>	<i>16/32</i>	<i>5.6</i>	<i>3.029</i>	<i>7.8</i> ^{amps}	<i>100%</i>	<i>1250 meg</i>
<i>Accommodation</i>	<i>22</i>	<i>16</i>	<i>4.5</i>	<i>3.026</i>	<i>12.0</i>	"	"
<i>Engine room</i>	<i>8</i>	<i>16</i>	<i>4.5</i>	<i>3.029</i>	<i>7.8</i>	"	"
<i>Cargo</i>	<i>4</i>	<i>16</i>	<i>2.2</i>	<i>3.029</i>	<i>7.8</i>	"	"

Total No. of Lights *41* No. of Motors driving Fans, &c. No. of Heaters Current required for Motors and Heaters

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Positions of Auxiliary Switch Boards, with No. of Switches on each, *no auxiliary*

switch boards.

Are Cut-outs fitted as follows?—

On Main Switch Board, to Cables of Main Circuits

yes

On Aux. " " each Auxiliary Circuit

Wherever a Cable is reduced in size

yes

To each Lamp Circuit

yes

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

yes

Are the Fuses of Standard Sizes?

yes

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

yes

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

yes

Smallest Single Wire used, No. *3'024* cables S.W.G., Largest, No. *7'004c* S.W.G.

How are Conductors in Engine and Boiler Spaces protected? *Lead covered armoured & braided*

" Saloons, State Rooms, &c., " ? *Lead covered.*

What special protection is provided in the following cases?—

(1) Conductors exposed to Heat or Damp *Armoured & galv^d tubes*

(2) " passing through Bunkers or Cargo Spaces *none*

(3) " " Deck Beams or Bulkheads *Lead bushes & W. & glands*

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

is unimpaired? *no joints*

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? *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?

4'000000 Ohms.

Is the Installation supplied with a Voltmeter?

yes

" " " an Ampere Meter?

yes

Date of Trial of complete Installation

18-4-23

Duration of Trial

6 hours

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

yes



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GENERAL CONSTRUCTION.

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

Approved Plans?

YES

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

Surveyor.

Fees—

MAIN BOILERS.

£ s. d.

H.S. Sq. ft. : :

G.S. " : :

DONKEY BOILERS.

H.S. Sq. ft. : :

G.E. " : :

£ : :

ENGINES.

L.P.C. Cub. ft. : :

£ : :

Testing, &c. ... : :

£ : :

Expenses ... : :

Total ... £ : :

It is submitted that this Report be approved,

W. Foster King
Chief Surveyor.

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

23rd May 1923

Fees advised

Fees paid



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Secretary.

In order

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

trustworthy?

YES.

Is the Workmanship throughout thoroughly satisfactory?

YES

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

as ascertained by ^{us} _{me} from personal examination

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

GENERAL CONSTRUCTION

Form

MAIN BOILER	
H.S.	24.12
G.P.	
DOMESTIC BOILER	
H.S.	24.12
G.P.	
ENGINEER	
L.P.C.	24.12
TOTAL	

It is submitted that this Report be approved.

[Handwritten signature]
 Approved by the Committee for the Class of M.E.S. on the 12th day of 1924.

[Handwritten signature]
 Now advised
 Fees paid



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