No. 1094

THE BRITISH CORPORATION FOR THE SURVEY

AND

REGISTRY OF SHIPPING.

Report No. 989 No. in Register Book 1556

S.S. "KEYBELL"

Makers of Engines Collingwood S.B. Co. Sd.

Works No. 45

Makers of Main Boilers Collingwood S.B. Co. Sd.

Works No. 124-5.

Makers of Donkey Boiler ✓

Works No. ✓

MACHINERY.

No.

THE BRITISH CORPORATION FOR THE SURVEY AND REGISTRY OF SHIPPING.

Report No. 989 No. in Register Book 1556

Received at Head Office 4th November 1912

Surveyor's Report on the New Engines, Boilers, and Auxiliary Machinery of the S.S. Keybell

Port of Registry Montreal

Registered Owners Keystone Transportation Co. of Canada Ltd.

Surveyor's District Toronto Canada

Date of Completion of Engines

" " " " Main Boilers ~~Oct~~ Aug 30th/12

" " " " Donkey "

Trial Run at Collingwood Date Oct 17th/12

First Visit Last Visit

Total Number of Visits

ENGINES.

Made by Collingwood Shipbldg Co Ltd

" at Collingwood Canada Works No. 46

Description

No. of Cylinders, each Engine 3 Diars. 16" x 26" x 44" Stroke 36"

Cub. feet in each L.P. Cylr. 32 Revols. per Min. 80 I.H.P. 800

Pressure in I.P. Receiver at full Power 2nd I.P. L.P.

Thickness of Metal in H.P. Cylr. 1 3/8" and I.P. " "

" " " " Liner " " "

" " " Valve Chest " "

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

" " " each Receiver?

Number of Bolts / Studs in H.P. Cylr. Cover 16 I.P. 20 2nd I.P. 24 L.P

Eff. Diar. " " " ~~20~~ 7/8" " 1 1/4" " 3/4" "

Pitch " " " ~~24~~ 4" " 4 3/4" " 6 1/4" "

Type of H.P. Valves (Piston or Slide) " " "

" Valve Gear

Diameter of Piston Rods (plain part) 4 1/16" At Bottom of Thread

Makers " Material

Diameter of Connecting Rods (smallest part) Material

Makers " "

Diar. of Crosshead Gudgeons Length of Bearing Material

No. of Top End Bolts (each Rod) 1 Effective Diar. Material

" Bot. " " " "

" Main Bearings Lengths

" Bolts in each Effective Diar. Material

No. of Holding Down Bolts, each Engine 30 No. of Metal Chocks

Eff. Diar. " " " 1" Average Pitch 12"

Are the Engines bolted directly to the Tank Top? yes —

Are the Bolts tapped through the Tank Top and fitted with Nuts inside yes

Date of Test of Tank by Water Pressure with Holding Down Bolts in place Oct. 11th/12

SKETCHES.

SKETCHES.

SHAFTING.

Are Crank Shafts Built? yes No. of Lengths in each Two Angle of Cranks

Diar. of Crank Shafts by Rule Actual Diar. in Way of Webs

Makers of " Steel Co of Canada Material Forged Steel

Diar. of Crank Pins 9½" Diar. in Way of Web 9½"

Makers of " Canada Steel Co Material Forged Steel

Width across Crank Webs at Centre of Shaft Thickness

" " " " Crank Pins "

" " " Narrowest part "

Makers of Crank Webs C W M Kennedy & Sons Material Cast Steel

Diar. or Breadth of Keys in Crank Webs Length

" of Dowel Pins in Crank Pins Length Screwed or Plain

No. of Bolts in each Coupling 8 Diar. at Mid Length Diar. of Pitch Circle

Material of Coupling Bolts

Crank Shafts Finished by Collingwood Shipbldg Co

Greatest Distance from edge of Main Bearing to Crank Web

Description of Thrust Blocks Forced brouches Collars adjustable

Number " " Rings None

Diar. of Thrust Shafts by Rule Actual (at bot. of Collars) 9" Over Collars

" " at Forward Coupling 9" After Coupling 9"

No. of Thrust Collars Thickness Distance apart

Thrust Shafts Forged by Material

" Finished by

Diar. of Intermediate Shafting by Rule Actual

No. of Lengths, each Engine No. of Tunnel Bearings

Diar. of Bearings Length Distance apart

No. of Bolts, each Coupling Diar. at Mid Length Diar. of Pitch Circle

Intermediate Shafts Forged by Material

,, ,, Finished by

Diar. of Propeller Shafts by Rule 10" Actual 10 1/8" At Couplings 10 1/8"

Are Propeller Shafts fitted with Continuous Brass Liners? yes

Diar. over Liners 11 1/2" Length of After Bearings 3' about

Of what Material are the After Bearings composed? Brass Bush lined Lignum Vitae

Distance from After Bearing in Stern Tube to nearest Tunnel Bearing

Are the After Bearings lubricated with Oil or Sea Water? Water

What means are adopted to prevent Sea Water entering the Stern Tubes? Stern tube filled with tallow above gland

Propeller Shafts Forged by Material

,, ,, Finished by

No. of Propellers One Diar. 12' Pitch 13'

,, Blades, each Propeller Four Fitted or Solid Fitted

Material of Blades Cast Iron Boss Cast Iron

Surface, each Propeller 55 Sq ft Diar. of Propeller 12'

Rule Diar. of Crank Shaft=

Coefficient of Displacement of Vessel at ⅔ Moulded Depth

SKETCHES.

TURBINE ENGINES.

Type

No. of H.P. Turbines — No. of L.P. Turbines

No. of Astern ,, — How arranged

Revols. per Min. — Horse Power

Diar. of H.P. Turbine Drums — MATERIAL — THICKNESS OF METAL

Material of H.P. Turbine Casings — ,, ,,

Lengths of Blades in H.P. Turbines

No. of Rows of Blades of each Length

Pitch of ,, ,, ,,

Diar. of L.P. Turbine Drums — MATERIAL — THICKNESS OF METAL.

Material of L.P. Turbine Casings — ,, ,,

Lengths of Blades in L.P. Turbines

No. of Rows of Blades of each Length

Pitch of ,, ,, ,,

Diar. of Astern Turbine Drums — MATERIAL — THICKNESS OF METAL

Material of Astern Turbine Casings — ,, ,,

Lengths of Blades in Astern Turbines

No. of Rows of Blades of each Length

Pitch of ,, ,, ,,

Diar. of Turbine Spindles — Length of Bearing

No. of Thrust Collars on each Spindle — Thickness — Distance apart

Diar. of Spindles at Bottom of Collars — Diar. over Collars

Spindles Forged by — Material

,, Finished by

SKETCHES.

PUMPS, ETC.

No. of Air Pumps One Diar. 14" Stroke 22"

Type of „ Edwards vertical

Diar. of Air Pump Rod 2¼ Material – Tobin Bronze

How are Air Pumps Worked? Direct connected

No. of Centrifugal Circulating Pumps Maker

„ Reciprocating „ „ One Diar. 2-10" Stroke 10"

Diar. of Circulating Pump Rods Material

How are Circulating Pumps Worked? Independent Steam Pumps.

Diar. of Circulating Pump Suction from Sea 8

Has each Circulating Pump a Bilge Suction with Non-return Valve? Yes Diar. 8"

No. of Feed Pumps on each Engine 2 – Diar. 3" Stroke 22"

Where do they pump from? Hot-Well

„ „ discharge to? Boilers

Are Spring-loaded Relief Valves fitted to each Pump? yes

Can one Pump be overhauled while the others are at work? "

No. of Bilge Pumps on each Engine ~~Two~~ One Diar. 3" Stroke 22"

Where do they pump from? All Bilges

„ „ discharge to? Overboard

Can one Pump be overhauled while the others are at work?

No. of Bilge Injections connected to Condensers One Diar. 8"

Are all Bilge Suctions fitted with Roses? yes

Are the Valves, Cocks, and Pipes so arranged as to prevent unintentional connection between Sea and Bilges? yes

Are all Sea Connections made with Valves or Cocks fitted direct to the Hull Plating? Yes

Are they placed so as to be easily seen and accessible? yes

Are the Discharge Chests placed above the Deep Load Line? yes

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

BOILERS.

Boilers made by	Collingwood Shipbldg Co
,, at	Collingwood Canada
Works No.	124 and 125
Date when Plan approved	
Boiler Plates, Iron or Steel	Steel,
Makers of Shell Plates	Wm Brothers Catasauqua PA,
,, Internal Plates	,, ,,
,, Furnaces	Morison Suspension Wm Beardmore Glasgow
,, Stay Bars	
,, Rivets	Steel Co of Canada.
Material tested by (B.C., B.T., etc.)	yes,
No. of Boilers	Two
Single or Double-ended	Single
No. of Furnaces, each Boiler	Two
Type of Furnaces	Morison Suspension
Approved Working Pressure	180# per sq in
Hydraulic Test Pressure	270# ,, ,, ,,
Date of Hydraulic Test	~~Sept~~ Aug. 30th 1912
,, when Safety Valves set	Oct. 9th 1912
Pressure on Valves	180#
Date of Steam Accumulation Test	October 11th 1912
Max. Pressure under Accumulation Test	185#
System of Draught	Howden Pyle Forced Draft,
Can Boilers be worked separately ?	yes
Greatest inside Diar. of Boilers	11' 6"
,, ,, Length ,,	10' 6" over Heads
Square Feet of Heating Surface, each Boiler	1310 sq ft
,, Grate ,, ,,	33 " ft

No. of Safety Valves, each Boiler — One Twin Type on Each Boiler

Diar. „ „ „ — $2\frac{1}{2}$" Escape Pipe $3\frac{1}{2}$"

Area „ „ „ 4,908 Twin Type.

Are the Valves fitted with Easing Gear? No

No. of Pressure Gauges, each Boiler — Two

„ Water „ „ — One

„ Test Cocks, — Three,

„ Salinometer Cocks, „ —

Are Water Gauge Pillars attached by Pipes to Steam and Water Spaces? Yes

Are these Pipes connected to Boilers by Cocks or Valves? Yes,

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

No. of Strakes of Shell Plating in each Boiler — ~~Two~~ One

„ Plates in each Strake — Two —

Thickness of Shell Plates by Rule — 1.26

„ „ Approved

„ „ in Boilers

Are the Rivet Holes Punched or Drilled? Drilled

Are Rivets Iron or Steel? Steel,

Are the Longitudinal Seams Butt or Lap Joints? Butt J.

Are the Double Butt Straps of equal width? Yes,

Thickness of outside Butt Straps — $1\frac{1}{32}$" Inside - $\frac{7}{8}$" Outside

„ inside „

Are Longitudinal Seams Hand or Machine Riveted? Machine Riveted

Are they Single, Double, or Treble Riveted? Treble

Diar. of Rivet Holes — $1\frac{3}{16}$"

Pitch „ — 8"

Width of Overlap

Percentage of Strength in Longitudinal Seams

No. of Rows of Rivets in Centre Circumferential Seams — None. —

Are these Seams Hand or Machine Riveted? ~~Machined~~

Diar. of Rivet Holes

Pitch ,,

Width of Overlap

No. of Rows of Rivets in End Circumferential Seams One

Are these Seams Hand or Machine Riveted? Machine

Diar. of Rivet Holes $1\frac{1}{8}$"

Pitch ,, 3"

Width of Overlap $1\frac{7}{8}$"

Size of Manholes in Shell 12" X 16" thus ⬭

Dimensions of Compensating Rings $31\frac{1}{2}$" X $34\frac{1}{2}$" X 1.125

Thickness of End Plates in Steam Space by Rule .7

,, ,, ,, ,, ,, Approved

,, ,, ,, ,, ,, in Boilers

Pitch of Steam Space Stays 14" X $17\frac{1}{2}$"

Eff. Diar. ,, ,, ,, by Rule

,, ,, ,, ,, ,, Approved

,, ,, ,, ,, ,, in Boilers

Material of ,, ,, ,, Steel.

How are Stays Secured? Screwed into Boiler plates & Nutted

Diar. and Thickness of Loose Washers on End Plates

,, ,, Riveted ,, ,, ,, No rivets

Width ,, ,, Doubling Strips ,, ,,

Thickness of Middle Back End Plate by Rule

,, ,, ,, ,, ,, Approved

,, ,, ,, ,, ,, in Boilers

Thickness of Doublings in Wide Spaces between Fireboxes 11/16"

Pitch of Stays at " " " " 13½" x 5½"

Eff. Diar. of Stays by Rule

" " " Approved

" " " in Boilers

Material "

Are Stays fitted with Nuts outside? yes

Thickness of Back End Plates at Bottom by Rule 17/32

" " " " " Approved

" " " " " in Boilers

Pitch of Stays at Wide Spaces between Fireboxes 13½"

Thickness of Doublings in " " 11/16"

Thickness of Front End Plates at Bottom by Rule

" " " " " Approved

" " " " " in Boilers

No. of Long Stays in Spaces between Furnaces

Eff. Diar. of Stays by Rule

" " " " Approved

" " " " in Boilers

Material of "

Thickness of Front Tube Plates by Rule

" " " " Approved

" " " " in Boilers

Pitch of Stay Tubes at Spaces between Stacks of Tubes 8" x 7⅝"

Thickness of Doublings in " " "

" Stay Tubes at " " "

Are Stay Tubes fitted with Nuts at Front End? No – Screwed

Thickness of Back Tube Plates by Rule 5/8"

" " " Approved

" " " in Boilers

Pitch of Stay Tubes in Back Tube Plates 8" x 7 5/8"

" Plain " 4" x 3 13/16"

Thickness of Stay Tubes 1/4" #9 B.W.G.

" Plain "

External Diar. of Tubes 2 3/4" outside

Material " " Steel.

Thickness of Furnace Plates by Rule 9/16"

" " " Approved

" " " in Boilers

Smallest outside Diar. of Furnaces 40 7/8"

Length between Tube Plates 7' 3"

Width of Combustion Chambers (Front to Back) 29"

Thickness of " " Tops, by Rule 17/32"

" " " " Approved

" " " " in Boilers

Pitch of Screwed Stays in C.C. Tops 5 7/8" x 7"

Eff. Diar. " " by Rule 1 3/8"

" " " Approved

" " " in Boilers

Material " "

Thickness of Combustion Chamber Sides by Rule 17/32"

Thickness of Combustion Chamber Sides Approved	17/32"
" " " " in Boilers	
Pitch of Screwed Stays in C.C. Sides	6¼" x 6"
Eff. Diar. " " by Rule	1½" Screw Stay
" " " Approved	
" " " in Boilers	
Material " "	Steel,
Thickness of Combustion Chamber Backs by Rule	½"
" " " " Approved	
" " " " in Boilers	
Pitch of Screwed Stays in C.C. Backs	5½" x 5¾"
Eff. Diar. " " by Rule	
" " " Approved	
" " " in Boilers	
Material " "	Steel,
Are all Screwed Stays fitted with Nuts inside C.C.?	B.C. Crown and
Thickness of Combustion Chamber Bottoms	17/32" Rounding row,
No. of Girders over each Wing Chamber	six
" " " Centre "	
Depth and Thickness of Girders	9" x 9/16"
Material of Girders	Steel
No. of Stays in each	Three
No. of Stay Tubes, each Boiler	68
" " Plain " " "	136
Size of Lower Manholes	11" x 15" ⬭

VERTICAL DONKEY BOILERS.

If the Donkey Boilers are Vertical the following particulars should be stated in addition to those on previous Pages applicable to such Boilers:—

Type of Boilers

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 Effective Diar. Material

External Diar. of Firebox at Top Bottom Thickness of Plates

No. of Water Tubes Int. Diar. ,, ,,

Material of Water Tubes

No. of Screwed Stays in Firebox Sides Eff. Diar. Material

Are they fitted with Nuts inside ? Outside ?

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 Superheaters. Diar. Area

Are ,, ,, fitted with Easing Gear ?

Date of Hydraulic Test Test Pressure

Date when Safety Valves set Pressure on Valves

SKETCHES.

MAIN STEAM PIPES.

No. of Lengths	Three				
Material	Wrought Iron				
Brazed, Welded, or Seamless	Lap welded				
Internal Diar.	7" at engine 5" each Boiler				
Thickness	Extra Heavy Wt Iron Pipe				
How are Flanges Secured ?	Riveted				
Date of Hydraulic Test	Oct-7th/12				
Test Pressure	270 lb				

REFRIGERATORS.

No. of Machines Makers

Description

When any part of the Vessel is to be used for the Carriage of Refrigerated Cargo the following particulars should be stated:—

Total Cubic Capacity of Refrigerated Spaces

Nature, Construction, Thickness, &c., of Insulation

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

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

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

Are Sluice Valves fitted on any of the Bulkheads of Insulated Spaces ?

Are these fitted with Brass Non-return Valves ?

Are they always accessible ?

Are the Bilges and Bilge Rose Boxes always accessible ?

Are the Steam Suctions to Bilges fitted with Non-return Valves ?

Is the Machine Room effectively separated from Insulated Spaces ?

" " properly Ventilated and Drained ?

No. of Steam Cylinders, each Machine Diars.

" Compressors, " "

Diar. of Crank Shafts No. of Cranks

Give particulars of Pumps in connection with Refrigerating Plant, and state whether worked by Refrigerating Machines or independently

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

Date of Test under Working Conditions

Fall of Temperature in Insulated Spaces

Time required to obtain this Result

Articles of Spare Gear for Refrigerating Plant carried on board

SKETCHES.

ELECTRIC LIGHTING.

Installation Fitted by Collingwood Shipbldg Co —

No. and Description of Dynamos One - # 12974 on of Engine

Makers of Dynamos J.H. Holmes & Co Newcastle on Tyne # 12974

Capacity ,, Amperes, at 66 Volts. 110 Revols. per Min. 375

Current Alternating or Continuous — Continuous —

Position of Dynamos On Half Deck in Main Engine Room

,, Main Switch Board Do —

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

Particulars of these Circuits:—

No. of Circuit.	Name of Circuit.	Number of Lights.	Candle Power.	Current Required. Amps.	Size of Conductor.	Current Density.	Conductivity of Conductor.	Insulation Resistance per Mile.

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

Current required for Motors and Heaters

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

Are Cut-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. S.W.G., Largest, No. 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

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

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 ? Ohms.

Is the Installation supplied with a Voltmeter ?

,, ,, ,, an Ampere Meter ?

Date of Trial of complete Installation Duration of Trial

EVAPORATORS.

No. Type Tons per Day

Makers

Working Pressure Test Pressure Date of Test

Date of Test of Safety Valves under Steam

FEED WATER HEATERS.

No. Type

Makers

Working Pressure Test Pressure Date of Test

DONKEY

No. of Donkeys

Type ,,

Makers ,,

Single or Duplex

,, Double-Acting

Diar. of Steam Cylinders

,, Pumps

Stroke of ,,

Where do they pump from?

Where do they discharge to?

Capacity, Tons per Hour of Ballast Donkey Diar. of Pipe required by Rule for

FEED WATER FILTERS.

No. Type Size

Makers

Working Pressure Test Pressure Date of Test

FORCED DRAUGHT FANS.

No. of Fans. One Diar. 60" Revols. per min. about 400

How are Fans driven? By Direct Connected Engine

PUMPS.

largest Ballast Tank Velocity of Water in Pipe

SPARE GEAR.

No. of Top End Bolts	No. of Bot. End Bolts
,, Main Bearing Bolts	,, Coupling Bolts
,, Cylr. Cover Bolts / Studs	,, Valve Chest Cover Bolts / Studs
,, Feed Pump Valves	,, Bilge Pump Valves
,, Safety Valve Springs	,, Fire Bars
,, Piston Rings	,, Junk Ring Bolts / Studs
,, Piston Rods	,, Connecting Rods
,, Valve Spindles	,, Air Pump ,,
,, Air Pump Valves	,, ,, ,, Buckets
,, Crank Pin Bushes	,, Crosshead Bushes
,, Crank Shafts	,, Propeller Shafts
,, Propellers	,, ,, Blades
,, Boiler Tubes	,, Condenser Tubes

OTHER ARTICLES OF SPARE GEAR:—

GENERAL CONSTRUCTION.

Have all the Requirements under Sections 31 and 32 of the Rules been complied with?

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

Engines & Boilers and other machinery space all arranged aft.

Are the Steam Pumping Arrangements in accordance with the approved Plan? Yes

If not, state in what respects they differ and when such differences were sanctioned by the Chief Surveyor

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. Kayadd

as ascertained by us / me from personal examination

James B. Foote

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

Fees—

		£	s	d.
MAIN BOILERS.				
H.S.	Sq. ft.		:	:
G.S.	"		:	:
DONKEY BOILERS.				
H.S.	Sq. ft.		:	:
G.S.	"		:	:
		£	:	:
ENGINES.				
L.P.C.	Cub. ft.		:	:
		£	:	:
Testing, &c.			:	:
		£	:	:
Expenses			:	:
	Total ...	£	:	:

It is submitted that this Report be approved,

J. Lester King

Chief Surveyor.

Approved by the Committee, for the Class of M.B.S.* on the 13th Novr., 1912.

Fees applied for

Fees paid

Robert Fleming

Secretary.