

REPORT ON MACHINERY

No. 331

Received at London Office 17 NOV 1921

Date of writing Report 26th Sept. 21 When handed in at Local Office 26th Sept. 21 Port of NAGASAKI.

No. in Survey held at NAGASAKI. Date, First Survey 19th March '20 Last Survey 17th Sept 1921

on the Steel Twin Screw Steamer "BAIKAL MARU" (Number of Visits 112)

Master Y. Ezoye. Built at Nagasaki. By whom built Mitsubishi Zosen Kaisha, Ltd. When built 1921.

Engines made at Nagasaki. By whom made Mitsubishi Zosen Kaisha, Ltd., when made 1921.

Boilers made at Nagasaki. By whom made Mitsubishi Zosen Kaisha, Ltd., when made 1921.

Registered Horse Power 1009 N.H.P. Owners Osaka Shosen Kaisha, Ltd., Port belonging to Osaka.

Shaft Horse Power at Full Power 6189.24 Is Refrigerating Machinery fitted for cargo purposes No Is Electric Light fitted Yes

TURBINE ENGINES, &c.—Description of Engines Twin Screw Single Reduction. Gear Turbines. No. of Turbines 4

Diameter of Rotor Shaft Journals, H.P. 4 1/2" L.P. 6 1/2" Diameter of Pinion Shaft H.P. 4 3/4" L.P. 4 3/4"

Diameter of Journals H.P. & L.P. 4 3/4" Distance between Centres of Bearings 2'-2 1/4" Diameter of Pitch Circle H.P. 5.35607" L.P. 5.78456"

Diameter of Wheel Shaft 12 5/8" Distance between Centres of Bearings 4'-11 1/2" Diameter of Pitch Circle of Wheel 122.5469"

Width of Face 15" Diameter of Thrust Shaft under Collars 12 5/8" Diameter of Tunnel Shaft as per rule 11.8" as fitted 12"

No. of Screw Shafts 2 Diameter of same as per rule 12.7" as fitted 13 1/4" Diameter of Propeller 13'-9" Pitch of Propeller 16'-0"

No. of Blades 4 State whether Moveable Moveable Total Surface 55.8 sq. ft. Diameter of Rotor Drum, H.P. 18" L.P. 2'-11" Astern 1'-11"

Thickness at Bottom of Groove, H.P. 1 1/4" L.P. 3 1/4" Astern 1 3/8" Revs. per Minute at Full Power, Turbine Mean 2600 Propeller Mean 118

PARTICULARS OF BLADING.

	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.
Expansion	1"	1'-8"	12	1 1/16"	3'-1 1/8"	2	3/8"	2'-0 1/4"	4
1st	1 7/16"	1'-8 7/8"	12	1 5/16"	3'-1 5/8"	2	1 1/4"	2'-1 1/2"	4
2nd	2"	1'-10"	12	1 5/8"	3'-2 1/4"	2	2 1/2"	2'-4"	4
3rd	2 3/4"	1'-11 1/2"	12	2"	3'-3"	2	2 1/2"	2'-4"	4
4th				2 1/2"	3'-4"	2			
5th				3 3/8"	3'-5 1/2"	2			
6th	11/16" impulse blade			3 7/8"	3'-6 3/4"	2	11/16" impulse blade		
7th	1 1/16"			4 3/4"	3'-8 1/2"	2	1 1/16"		
8th	1 1/2" & 1/32" impulse blade			6"	3'-11"	2	1 1/2" & 1/32" impulse blade		
9th				8"	3'-11"	1			
10th				6"	3'-11"	1			

and size of Feed pumps Main 2, 12 1/2" x 9" x 24"

and size of Bilge pumps 4, 4 1/2" x 12" stroke.

and size of Bilge suction in Engine Room 2'-3 1/2" from wings, 2'-3 1/2" from thrust recers hat.

In Holds, &c. No. 1, 2'-3 1/2" No. 2, 2'-3 1/2" No. 3, 2'-3 1/2" Cross

ker 2'-3 1/2" No. 4, 2'-3 1/2" Bilge hat 1'-3 1/2" No. 5, 2'-3 1/2" Bilge hat 1'-3 1/2" Tunnel bilge hat 4'-3"

of Bilge Injections 2 sizes 10" Connected to ~~condensers~~ to circulating pump yes Is a separate Donkey Suction fitted in Engine Room & size yes 3 1/2"

all the bilge suction pipes fitted with roses yes Are the roses in Engine room always accessible yes

all connections with the sea direct on the skin of the ship yes Are they Valves or Cocks both

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

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

all pipes are carried through the bunkers bilge pipes How are they protected wood ceiling

all Pipes, Cocks, Valves, and Pumps in connection with the machinery and all boiler mountings accessible at all times yes

the Bilge Suction Pipes, Cocks, and Valves arranged so as to prevent any communication between the sea and the bilges yes

Screw Shaft Tunnel watertight yes Is it fitted with a watertight door yes worked from yes

Boilers, &c.—(Letter for record S.) Manufacturers of Steel The Steel Co of Scotland, Ltd.

total Heating Surface of Boilers 10627.6 sq. ft. Forced Draft fitted yes No. and Description of Boilers 4 single end cylindrical.

Working Pressure 200 lbs Tested by hydraulic pressure to 400 lbs Date of test 8th Feb. '21. No. of Certificate 109.

each boiler be worked separately yes Area of fire grate in each boiler 66.12 sq. ft. No. and Description of Safety Valves to boiler 2 spring loaded Area of each valve 9.62 Pressure to which they are adjusted 200 lbs Are they fitted with easing gear yes

least distance between boilers or uptakes and bunkers or woodwork 9" Mean dia. of boilers 15'-0" Length 12'-0" Material of shell plates steel

Thickness 1 7/16" Range of tensile strength 28 to 32 tons Are the shell plates welded or flanged No Descrip. of riveting: cir. seams Double riveting

seams treble riveting Diameter of rivet holes in long. seams 1 1/2" Pitch of rivets 10" Lap of plates or width of butt straps 1'-10"

Percentages of strength of longitudinal joint rivets 91.4 plates 85.0 Working pressure of shell by rules 217.8 lbs Size of manhole in shell 12" x 16"

of compensating ring 36 1/2" x 32 1/2" x 1 1/16" No. and Description of Furnaces in each Boiler 3 Morison Material steel Outside diameter 4'-0 3/4"

Thickness of plates top 23" crown 21" bottom 32" Description of longitudinal joint welded No. of strengthening rings None

Working pressure of furnace by the rules 219 lbs Combustion chamber plates: Material steel Thickness: Sides 11/16" Back 11/16" Top 11/16" Bottom 15/16"

of stays to ditto: Sides 9 1/8" x 7 1/2" Back 9" x 8 1/2" Top 8 1/2" x 8 3/4" If stays are fitted with nuts or riveted heads Nuts Working pressure by rules 213.5 lbs

Material of stays steel Diameter at smallest part 2.02 Area supported by each stay 76.5 sq. in Working pressure by rules 238 lbs End plates in steam space

Material steel Thickness 1 9/32" Pitch of stays 18" x 19 3/4" How are stays secured D. Nuts & Washers Working pressure by rules 218 lbs Material of stays steel

Diameter at smallest part 7.6" Area supported by each stay 356 sq. in Working pressure by rules 224 lbs Material of Front plates at bottom steel

Thickness 3/4" Material of Lower back plate steel Thickness 3/4" 9/16" Greatest pitch of stays (15 1/4") Working pressure of plate by rules 227.7 lbs

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

Working pressures by rules 206.8 lbs Girders to Chamber tops: Material steel Depth and

Thickness of girder at centre 10 1/2" x 7/8" double Length as per rule 2'-11 5/16" Distance apart 8 3/4" Number and pitch of stays in each 3 @ 8 1/2"

Working pressure by rules 248 lbs Steam dome: description of joint to shell / % of strength of joint / Diameter /

Material / Description of longitudinal joint / Diameter of rivet holes / Pitch of rivets /

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

009182-009191-0302



SUPERHEATER. Type Esaky's Date of Approval of Plan 18 - 5 - 15. Tested by Hydraulic Pressure to 1000 lbs
 Date of Test 30 - 5 - 21. Is a Safety Valve fitted to each Section of the Superheater which can be shut off from the Boiler yes
 Diameter of Safety Valve 2 Pressure to which each is adjusted 210 lbs Is Easing Gear fitted No

IS A DONKEY BOILER FITTED? No If so, is a report now forwarded? /

SPARE GEAR. State the articles supplied:— As per rule, and in addition, 1 of each size of escape valve springs, 1 Tail shaft with nut and feather complete, 2 each of manganese bronze propeller blade for both engines, etc.,

The foregoing is a correct description,

NAGASAKI WORKS, MITSUBISHI ZEN KAISHA, LTD. Hamaguchi Manufacturer.

Dates of Survey while building
 During progress of work in shops -- 1920. Mar. 19, 23, 26, Apr. 16, May 4, 11, 15, June 1, 22, 24, 26, 28, July 3, 7, 27, Aug. 3, 11, 13, Sept. 1, 9, 15, 25, 28, 29, 30, Oct. 2, 12, 16, 19, 23, 25, 28, 29, Nov. 6, 10, 11, 18, 26, 30
 During erection on board vessel --- Dec. 2, 6, 10, 13, 16, 17, 18, 19, 21, Jan. 10, 15, 22, 24, 25, 26, Feb. 1, 8, 12, 22, 28, Mar. 1, 2, 12, 29, 30, Apr. 2, 5, 11, 13, 15, 20, 21, 23, 26, 27, May 3, 6, 9, 10, 12, 13, 14, 17, 19, 24, 26, 30, June 1, 2, 4, 6, 10, 13, 15, 23, 29, July 1, 8, 13, 20, 21, 22, Aug. 11, 15, 24, 27, Sep. 1, 5, 6, 10
 Total No. of visits 112. Is the approved plan of main boiler forwarded herewith yes

Dates of Examination of principal parts—Casing P.H.P. 10-12-20. S.L.P. 22-7-21 " Only P. 26-7-21 " No
 Rotor shaft 13-6-20 & Thrust shafts 26-11-20 Tunnel shafts 25-10-20 to Screw shaft 18-11-20 Propeller 1-7-21.
 Stern tube 6-5-21. Steam pipes tested 25-8-21 Engine and boiler seatings 10-5-21 Engines holding down bolts 10-8-21
 Completion of pumping arrangements 25-8-21 Boilers fixed 15-6-21 Engines tried under steam 27-8-21. 17-9-21.
 Main boiler safety valves adjusted 24-8-21. Thickness of adjusting washers Lock Nuts.

Material and tensile strength of Rotor shaft Mild steel P.H.P. 36 tons S.H.P. 36.8 tons Identification Mark on Do. 179 W.B.
 Material and tensile strength of Pinion shaft Nickel stl. P.H.P. 41.2 tons S.H.P. 41.6 tons Identification Mark on Do. 179 W.B.

Material of Wheel shaft Mild stl Identification Mark on Do. 179 W.B. Material of Thrust shaft Mild stl Identification Mark on Do. 179 W.B.
 Material of Tunnel shafts Mild stl Identification Marks on Do. 179 W.B. Material of Screw shafts Mild stl Identification Marks on Do. 179 W.B.

Material of Steam Pipes Steel and Copper. Test pressure 600 lbs & 400 lbs.

Is an installation fitted for burning oil fuel No Is the flash point of the oil to be used over 150°F. /

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

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. Propeller shafts fitted with continuous liners,

The Boilers have been fitted with Esaky's Superheaters in accordance with the Society's requirements

These Engines and Boilers have been constructed under Special Survey in accordance with the Rules,

and of good material and workmanships, They have been securely fitted on board, and have been

satisfactorily tried under steam.

The machinery of this vessel is eligible, in my opinion, for the record of LMC 9.21 in the Register Book.

Mean Speed on trial 17.282 knots.

It is submitted that this vessel is eligible for THE RECORD. F.L.M.C. - 9.21.

F.D. C.L. 1009 N.H.P.

4 steam turbines geared to 2 screw shafts

L.J. 29/1/21

W. Boylan
 Engineer Surveyor to Lloyd's Register of Shipping.

The amount of Entry Fee ... £. 60:00 : When applied for,
 Special ... £. 1229:00 : 19-9 19.21
 Donkey Boiler Fee ... £ : : When received,
 Travelling Expenses (if any) £ : : 26 -9 19.21

Committee's Minute FRI. 2 DEC. 1921

Assigned + L.M.C. 9.21
F.D. C.L.

CERTIFICATE WRITTEN



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Certificate (if required) to be sent to
 (The Surveyors are requested not to write on or below the space for Committee's Minute.)