

REPORT ON MACHINERY.

No. 1083

Received at London Office

THU. 21 SEP. 1916

Date of writing Report 22nd Aug. 1916 When handed in at Local Office 22nd Aug. 1916 Port of NAGASAKINo. in Survey held at NAGASAKI Date, First Survey 12th April, 1915 Last Survey 16th August 1916
Reg. Book. on the Twin geared turbine s.s. Tokiwa Maru (Number of Visits 152)

Master K. Akamatsu Built at Nagasaki By whom built Mitsubishi Dockyard & Engine Works When built 1916

Engines made at Nagasaki By whom made Mitsubishi Dockyard & Engine Works when made 1916

Boilers made at Nagasaki By whom made Mitsubishi Dockyard & Engine Works when made 1916

Registered Horse Power Owners Nippon Yusen Kaisha Port belonging to Tokio

Nom. Horse Power as per Section 28 816 Is Refrigerating Machinery fitted for cargo purposes No Is Electric Light fitted Yes

ENGINES, &c.—Description of Engines Twin Screw, Parson's Geared Turbine No. of Cylinders 4 No. of Cranks 4
H.P.T. 2534 as per rule 12.53 Material of forged steel
Dia. of Cylinders See next page Length of Stroke Revs. per minute P.T. 23 1/4 Dia. of Screw shaft as fitted 13.5 screw shaft
Is the screw shaft fitted with a continuous liner the whole length of the stern tube Yes Is the after end of the liner made water tight
in the propeller boss Yes If the liner is in more than one length are the joints burned If the liner does not fit tightly at the part
between the bearings in the stern tube, is the space charged with a plastic material insoluble in water and non-corrosive If two
liners are fitted, is the shaft lapped or protected between the liners Length of stern bush 5.2 1/2
Dia. of Tunnel shaft as per rule 11.61 Rotor H.P. 14 1/2 Gear wheel spindle 12 1/2 Dia. of thrust shaft under
as fitted 12 Dia. of Crank shaft journals as per rule 12.53 as fitted 6 3/4 Dia. of Crank pin Size of Crank webs 12 1/2
collars 12 1/2 Dia. of screw 14.6 Pitch of Screw 14.3 No. of Blades 4 State whether moveable Yes Total surface 59.6 sq. ft. each
No. of Feed pumps Simple Diameter of ditto 10 3/4 x 8 Stroke 24 Can one be overhauled while the other is at work Yes
No. of Bilge pumps 2 Diameter of ditto 14 1/2 Stroke 10 3/4 Can one be overhauled while the other is at work Yes
No. of Donkey Engines General Service Sizes of Pumps 8 3/4 x 6 x 9 Duplex No. and size of Suctions connected to both Bilge and Donkey pumps
In Engine Room 3 @ 3 1/2 In Holds, &c. No. 1 Hold 2 @ 3 1/2 No. 2 Hold 2 @ 4 No. 3 Hold 2 @ 3 1/2
No. 4 Hold 2 @ 3 1/2 No. 5 Hold 2 @ 4 Cross Bunker 2 @ 3 1/2 Deep tank 2 @ 3 1/2 Tunnel well 1 @ 3 1/2 Tunnel 1 @ 3 1/2
No. of Bilge Injections 2 sizes 7 Connected to condenser, or to circulating pump Pump Is a separate Donkey Suction fitted in Engine room & size 2 @ 3 1/2
Are all the bilge suction pipes fitted with roses Yes Are the roses in Engine room always accessible Yes Are the sluices on Engine room bulkheads always accessible None
Are all connections with the sea direct on the skin of the ship Yes Are they Valves or Cocks Both 3 above
Are 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 3 Below
Are 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
What pipes are carried through the bunkers Bilge pipes How are they protected With steel plates
Are all Pipes, Cocks, Valves, and Pumps in connection with the machinery and all boiler mountings accessible at all times Yes
Are the Bilge Suction Pipes, Cocks, and Valves arranged so as to prevent any communication between the sea and the bilges Yes
Is the Screw Shaft Tunnel watertight Yes Is it fitted with a watertight door Yes worked from Bridge deck
BOILERS, &c.—(Letter for record S) Manufacturers of Steel Steel Coy. of Scotland Ltd.

Total Heating Surface of Boilers 8903.4 Is Forced Draft fitted Yes No. and Description of Boilers 4 Cylindrical, Single ended

Working Pressure 200 lbs. Tested by hydraulic pressure to 400 lbs. Date of test 27. 12. 15 No. of Certificate 644

Can each boiler be worked separately Yes Area of fire grate in each boiler 56.2 sq. ft. No. and Description of Safety Valves to

each boiler 2 Spring loaded Area of each valve 9.62 sq. in Pressure to which they are adjusted 205 lbs. Are they fitted with easing gear Yes

Smallest distance between boilers or uptakes and bunkers or woodwork 18" Mean dia. of boilers 14.3" Length 11.6" Material of shell plates Steel

Thickness 1 5/16" Range of tensile strength 28 to 32 tons Are the shell plates welded or flanged No. Descrip. of riveting: cir. seams riveted lap.

long. seams double butt strap Diameter of rivet holes in long. seams 1 3/8" Pitch of rivets 9 1/2" x 4 1/2" Lap of plates or width of butt straps 20 1/2"

Per centages of strength of longitudinal joint rivets 88.6% plate 88.5% Working pressure of shell by rules 209 lbs. Size of manhole in shell 12" x 16"

Size of compensating ring 31" x 35" x 1 7/8" No. and Description of Furnaces in each boiler 3 Morrison Material Steel Outside diameter 45 3/4"

Length of plain part top 5" Thickness of plates crown 5" bottom 8" Description of longitudinal joint welded No. of strengthening rings 1

Working pressure of furnace by the rules 224 lbs. Combustion chamber plates: Material Steel Thickness: Sides 11/16" Back 11/16" Top 11/16" Bottom 15/16"

Pitch of stays to ditto: Sides 8" x 9" Back 8 3/4" x 9" Top 8 1/2" x 9" If stays are fitted with nuts or riveted heads Nuts Working pressure by rules 212 lbs.

Material of stays Steel Area at smallest part 2.02" Area supported by each stay 76.5 sq. in Working pressure by rules 237 lbs. End plates in steam space:

Material Steel Thickness 1 7/32" Pitch of stays 19 1/2" x 16 1/2" How are stays secured washers Working pressure by rules 216 lbs. Material of stays Steel

Area at smallest part 7.07" Area supported by each stay 321.7 sq. in Working pressure by rules 229 lbs. Material of Front plates at bottom Steel

Thickness 3/4" Material of Lower back plate Steel Thickness 1 1/16" Greatest pitch of stays 7 1/2" x 15" Working pressure of plate by rules 216 lbs.

Diameter of tubes 3 1/4" Pitch of tubes 4 1/2" x 4 3/8" Material of tube plates Steel Thickness: Front 3/4" Back 3/4" Mean pitch of stays 8 7/8"

Pitch across wide water spaces 13 3/4" Working pressures by rules 216 lbs. Girders to Chamber tops: Material Steel Depth and

thickness of girder at centre 10" x 3 1/2" double Length as per rule 29 5/8" Distance apart 8 1/4" Number and pitch of stays in each 2 @ 9"

Working pressure by rules 325 lbs. Steam dome: description of joint to shell % of strength of joint

Diameter Thickness of shell plates Material Description of longitudinal joint Diam. of rivet holes

Pitch of rivets Working pressure of shell by rules Crown plates Thickness How stayed

SUPERHEATER. Type Esaky's Date of Approval of Plan 18/5/15 & 15/7/15 Tested by Hydraulic Pressure to 1000 lbs.Date of Test 24th Dec. 1915 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 205 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 one propeller shaft, 4 propeller blades, one complete set of main bearing brasses for one set of turbines and gear wheel, one H.P. pinion shaft, one L.P. pinion shaft, 60 condenser tubes, 12 boiler tubes, 4 safety valve springs, one L.P. turbine relief valve spring &c, and spare parts for auxiliary engines, pumps &c.

The foregoing is a correct description,

MITSUBISHI DOCKYARD & ENGINE WORKS.

Central Manager.

Manufacturer.

Dates of Survey while building
During progress of work in shops -- 1915 Apr. 12, 14, 20, 26, May 15, 19, 20, June 4, 5, 12, 14, 17, 18, 19, 22, 24, 26, 28, 29, 30, July 2, 3, 5, 6, 7, 8, 9, 10, 13, 17, 22, 24, 26, 28, 29, 31, Aug. 3, 4, 5, 7, 11, 12, 13, 14, 18, 20, 23, 24, 25, 26, 27, 28, 30, Sept. 1, 2, 6, 10, 11, 13, 14, 17, 20, 25, 29, 30, Oct. 5, 11, 15, 20, 26, 29, 30.
During erection on board vessel -- 1916 Jan. 5, 7, 9, 11, 12, 17, 20, 22, 26, Feb. 1, 3, 7, 26, Mar. 1, 10, 29, 31, Apr. 1, 11, 18, 18, 21, May 3, 5, 20, 26, 31, June 1, 5, 7, 16, 17, 19, 27, 30, July 3, 7, 11, 12, 13, 17, 18, 20, 21, 22, 27, Aug. 3, 5, 8, 10, 16.
Total No. of visits 152

Is the approved plan of main boiler forwarded herewith Yes.

Dates of Examination of principal parts: Turbine casings 8.12.24/25/15, Rotors 9.6.16, Slides 9.6.16, Covers 9.6.16, donkey 20.8.15, Gear wheel spindle 20.8.15, Pistons 20.8.15, Rods 20.8.15

Connecting rods ✓ Crank shaft ✓ Thrust shaft 20.8.15 Tunnel shafts 13.11.15 Screw shaft 22.12.15 Propeller 1.4.16

Stern tube 25.12.15 Steam pipes tested 21.7.16 Engine and boiler seatings 7.7.16 Engines holding down bolts 18.7.16

Completion of pumping arrangements 27.7.16 Boilers fixed 10.3.16 Engines tried under steam 3.8.16

Completion of fitting sea connections 7.1.16 Stern tube 5.1.16 Screw shaft and propeller 22.7.16

Main boiler safety valves adjusted 27.7.16 Thickness of adjusting washers No washers, brass joint nuts

Material of Crank shaft Identification Mark on Do. No. 118 Material of Thrust shaft Forged steel Identification Mark on Do. No. 118

Material of Tunnel shafts Forged steel Identification Marks on Do. A.S.W. Material of Screw shafts Forged steel Identification Marks on Do. A.S.W.

Material of Steam Pipes Lap welded wrought iron rolled down steel Test pressure 600 lbs.

Is an installation fitted for burning oil fuel ✓ 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 duplicate of a previous case? Yes. If so, state name of vessel "Suruga Maru". Machinery somewhat similar to "Tokyo Maru" & "Yokama Maru".

General Remarks (State quality of workmanship, opinions as to class, &c. The Boilers have been fitted with Easyp's)

Superheaters in accordance with the Society's requirements, amount of superheat 98°.

The Engines and Boilers have been constructed under Special Survey in accordance with the Rules, and of good materials and workmanship. They have been securely fitted on board, and have been satisfactorily tried under full steam. All rotor casings have been subjected to the prescribed hydraulic tests, and found sound and good.

The Machinery of this vessel is eligible, in my opinion, for the record of LMC 8.16 in the Register Book.

Mean speed of turns on trial when Half Loaded = 114.69 Knots.

H.P. Rotor 18" dia. with 3 rows of Impulse blading 30" dia. Casing 19 3/4" to 23" and at Impulse blades 2' 7 1/2" to 2' 7 1/2"

L.P. Rotor 35" dia. Do. 37 1/8" to 46 1/2"

Astern Rotor 23" dia. " " " " " 36" Do. 24 1/2" to 28" " " " 3' 1/2" to 3' 1/2"

The Astern turbines are incorporated with the L.P. Turbines.

The amount of Entry Fee ... £ 3 : 0 : 0 When applied for, 22nd Aug. 1916

Special ... £ 91 : 4 : 4 When received, 22nd Aug. 1916

Donkey Boiler Fee ... £ : : : When received, 22nd Aug. 1916

Travelling Expenses (if any) £ : : : When received, 22nd Aug. 1916

Committee's Minute FRI. SEP. 29. 1916

Assigned + LMC 8.16

THE RECORD + LMC 8.16. F.D. 4 Steam Turbines geared to 2 screw shafts. a. Williamson

Engine Surveyor to Lloyd's Register of Shipping.

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