Rpt. 4a.

# REPORT ON MACHINERY. No. 1364

Received at London Office 10 AUG. 1922

Date of writing Report 29th June to 22 When handed in at Local Office 29th June to 22 Port of NAGASAKI.

No. in Reg. Book. Survey held at NAGASAKI, Date, First Survey 23 - 8 - 1920 Last Survey 7th June 1922 (Number of Visits 156)

on the Steel Twin Screw Steamer "HAKOZAKI MARU" Tons Gross 10413. Net 6310.

Master M. Fujio. Built at Nagasaki, By whom built Mitsubishi Zosen Kaisha, Ltd When built 1922

Engines made at Nagasaki By whom made Mitsubishi Zosen Kaisha, Ltd., when made 1922

Boilers made at Nagasaki, By whom made Mitsubishi Zosen Kaisha, Ltd., when made 1922

NOMINAL ~~Registered Horse Power~~ 1590 N.H.P. Owners Nippon Yusen Kabushiki Kaisha. Port belonging to Tokio.

Shaft Horse Power at Full Power 9033 Is Refrigerating Machinery fitted for cargo purposes Yes Is Electric Light fitted Yes

## TURBINE ENGINES, &c.—Description of Engines Twin Screw Double Reduction Geared Turbine. No. of Turbines 6

Diameter of Rotor Shaft Journals, H.P. 4" I.P. 4½" L.P. 5½" Diameter of Pinion Shaft H.P. 7½", L.P. 10¼", 2nd Reduction 1'-3½"

Diameter of Journals HP. 4½" LP. 5 2nd Red. 11" Distance between Centres of Bearings HP. 2'-8" LP. 2'-7" 2nd Red. 6'-9" Diameter of Pitch Circle HP. 8.432" LP. 11.458" 2nd Reduction 21.765"

Diameter of Wheel Shaft 1'-4" Distance between Centres of Bearings 3'-1 7/8" + 3'-5¼" Diameter of Pitch Circle of Wheel HP & LP 68.967" 2nd Red 99.973"

Width of Face 1st Red 18"+3"Gap. 2nd Red 41"+22" Diameter of Thrust Shaft under Collars 1'-3 7/8" Diameter of Tunnel Shaft as per rule 14.9" as fitted 15⅛"

No. of Screw Shafts 2 Diameter of same as per rule 15.9" as fitted 16 7/8" Continuous liner. Diameter of Propeller 17'-9" Pitch of Propeller 20'-0"

No. of Blades 4 State whether Moveable Yes Total Surface 93.6 sq.ft. Diameter of Rotor Drum, H.P. 20" IP 25¼" L.P. 40½" astern HP 28 7/8" astern LP39¼"

Thickness at Bottom of Groove, H.P. / L.P. / Astern / Revs. per Minute at Full Power, Turbine HP 3369 LP 2478 Propeller 89.66

## PARTICULARS OF BLADING.

| | H.P. HEIGHT OF BLADES. | H.P. DIAMETER AT TIP. | H.P. NO. OF ROWS. | L.P. HEIGHT OF BLADES. | L.P. DIAMETER AT TIP. | L.P. NO. OF ROWS. | L.P. ASTERN. HEIGHT OF BLADES. | L.P. ASTERN. DIAMETER AT TIP. | L.P. ASTERN. NO. OF ROWS. |
|---|---|---|---|---|---|---|---|---|---|
| 1st | 5/8" | 1'-5⅜" | 8 | 2⅜" | 2'-8¼" | 4 | 1 5/16" | 2'-11⅛" | 1 |
| 2nd 1ST EXPANSION | 7/8" | 1'-6 5/8" | 7 | 3 1/16" | 2'-9 5/8" | 4 | 1 7/8" | 3'-0¼" | 1 |
| 3rd 2ND " | 15/16" | 1'-8⅛" | 6 | 4" | 2'-11½" | 4 | 2 5/8" | 3'-1¾" | 1 |
| 4th 3RD " | 1" | 1'-10" | 5 | 2¾" | 3'-10" | 2 | 2 5/8" | 3'-1¾" | 1 |
| 5th 4TH " | | I. P. | | 3½" | 3'-11½" | 2 | 2 5/8" | 3'-1¾" | 1 |
| 6th 5TH " 1st | 1½" | 1'-8 5/8" | 6 | 4" | 4'-0½" | 1 | 1 7/16" (Impulse blades) | | 1 |
| 7th 2nd | 1 5/8" | 1'-10 5/8" | 5 | 4¾" | 4'-2" | 1 | 2⅜" (Impulse blades) | | 1 |
| 8th 6TH " 3rd | 1¾" | 2'-1¼" | 4 | 5 5/8" | 4'-3¾" | 1 | H.P. Astern. | | |
| 9th 7TH " 4th | 1⅞" | 2'-4¾" | 3 | 6¾" | 4'-6" | 1 | | | |
| 10th 8TH " | | | | 6¾" | 4'-6" | 1 | 1" (Impulse blades) | | 1 |
| 11th | | | | 6¾" | 4'-6" | 1 | 1 5/8" (Impulse blades) | | 1 |

No. and size of Feed pumps 3 sets, 16"x 12"x 27" stroke, Donkey feed, 1set, 10½"x 8" x 24" stroke.

No. and size of Bilge pumps 4- 5"x24" stroke (Driven by M.Eng) & 1- 110 tons Drysdale's emergency bilge pump.

No. and size of Bilge suctions in Engine Room 4- 3½"dia from wings, 2- 3½" from hat, 1- 2" from No.4 cofferdam.

In Holds &c. No.1 Hold 2'-3½", No.1 Cofferdam 1'-2", No.2 H. 2'-3½" No.2 Coff. 1'-2" No.3 H. 2'-3½". No.3 Coff. 1'-2". Cross bunker 2'-3½". B.R. 4'-3½". No.4 H. 2'-3½". No.5 Coff. 1'-2". No.5 H. 2'-3½". No.6 Coff. 1'-2". No.6 H. 2'-3½". Tunnel hat 2'-2". Tunnel well 1'-3".

No. of Bilge Injections 2 sizes 13" Connected to condenser, or to circulating pump Cir. pump Is a separate Donkey Suction fitted in Engine Room & size Yes 3-5½"

Are all the bilge suction pipes fitted with roses Roses and Mud. Boxes Are the roses in Engine room always accessible Yes

Are all connections with the sea direct on the skin of the ship Yes Are they Valves or Cocks Valves and Cocks

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 Both

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 Wood ceiling

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 E.R.Up.dk grating & bridge

## BOILERS, &c.—(Letter for record S) Manufacturers of Steel Midvale Steel and Ordnance Co.,

Total Heating Surface of Boilers 18,157. sq.ft. Is Forced Draft fitted Yes No. and Description of Boilers 7 Single ended cylindrical

Working Pressure 200 lbs Tested by hydraulic pressure to 400 lbs Date of test 13 & 18 Feb 1922. No. of Certificate Nos.112, 113.

Can each boiler be worked separately Yes Area of fire grate in each boiler 64 ~~447.72~~ sq.ft. No. and Description of Safety Valves to each boiler 2 Spring loaded Area of each valve 9.6211 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 casings~~ 21" Mean dia. of boilers 15'-0" Length 12'-0" Material of shell plates Steel

Thickness 1 7/16" Range of tensile strength 28 tons- 32 tons Are the shell plates welded or flanged No Descrip. of riveting: cir. seams Doub.Rivet long. seams T.R.D.B.S. Diameter of rivet holes in long. seams 1½" Pitch of rivets 10" + 5" Lap of plates or width of butt straps 1'-10"

Per centages of strength of longitudinal joint rivets 91.4 % plates 85.0 % Working pressure of shell by rules 211.5 lbs Size of manhole in shell 12" x 16"

Size of compensating ring 37"x33"x1 7/16" No. and Description of Furnaces in each Boiler 3 Leeds Bulb Forge Material Steel Outside diameter 4'-2¼"

Length of plain part top / bottom / Thickness of plates crown 5/8" bottom 5/8" Description of longitudinal joint Welded No. of strengthening rings None

Working pressure of furnace by the rules 211.8 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 9¼"x7¾" Back 9"x8½" Top 8¾"x8½" If stays are fitted with nuts or riveted heads Nuts Working pressure by rules 215.8 lbs

Material of stays Steel Diameter at smallest part 2¼" Area supported by each stay 146 sq.in Working pressure by rules 222 lbs End plates in steam space

Material Steel Thickness 1¼+1/32" Pitch of stays 18"x19¾" How are stays secured D.Nuts & Washers Working pressure by rules 236.1 lbs Material of stays Steel

Diameter at smallest part 3⅛" Area supported by each stay 357 sq.in Working pressure by rules 239 lbs Material of Front plates at bottom Steel

Thickness ¾" Material of Lower back plate Steel Thickness ¾"+9/16" Doub. Greatest pitch of stays 361 sq.in Working pressure of plate by rules 222.8 lbs

Diameter of tubes 3¼" Pitch of tubes 4½"x4⅜" Material of tube plates Steel Thickness: Front ¾"+9/16" Doubling. Back ¾" Mean pitch of stays 8 7/8"

Pitch across wide water spaces 1'-1¼" Working pressures by rules 228.8 lbs Girders to Chamber tops: Material Steel Depth and thickness of girder at centre 10½"x(2x7/8") Length as per rule 2'-11 5/16" Distance apart 8¾" Number and pitch of stays in each 3" @ 8½"

Working pressure by rules 276.6 lbs Steam dome: description of joint to shell / % of strength of joint / Diameter / Thickness of shell plates / Material / Description of longitudinal joint / Diameter of rivet holes / Pitch of rivets /

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



009116 - 009121 - 0102

*SUPERHEATER.* *Type* Esaky's *Date of Approval of Plan* 18th May, 1915. *Tested by Hydraulic Pressure to* 1000 l

*Date of Test* 7th March, 1922. *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* 200 lbs *Is Easing Gear fitted* Yes

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

*SPARE GEAR.* *State the articles supplied:—* As per Rules and in addition :- 2 Port Propeller Blades, 2 board Propeller Blades, 2 Propeller shafts, 2 Stern tubes bushes complete with lignum vitae, 1 pump rod, 1 set of Air pump valves and water piston packing, 1 circulating pump impeller and sh 24 Boiler plain tubes, 175 Main condenser tubes, 523 Main condenser ferrules, 3 sets of Main fe check valves and seats, 1 set Aux. feed check valves and seats.,7 safty valves springs, 85 Oil ferrules, 18 Carbon packing rings with springs and pins.

*The foregoing is a correct description,*

NAGASAKI WORKS, MITSUBISHI ZOSEN KAISHA, LTD. *Manufacturer.*

GENERAL MANAGER.

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*Dates of Survey while building*

*During progress of work in shops* - - 1920. Aug.23, Sept.21, Oct.12, Nov.25, Dec.8,28, 1921. Jany.17,18,26, Feb.4,15, Mar.1,3,8,11,16,25, Apr.1,7,8,11,15,16,20,21,30, June 3,6,9,10,15,16,23,25, J 4,11,20,28,29, Aug.3,6,8,15,17,19,22,26, Sept.5,15,21,26,27,28, Oct.4,12,19,

*During erection on board vessel* - - 24, Nov.1,3,4,10,15,18,22,25,28,29,30, Dec.1,2,5,6,7,8,9,12,14,15,19,21,24,26, 1922. Jany.5,6,9,10,11,12,13,16,18,19,21,23,24,25,26,28,31, Feb.1,3,7,9,13,14,1

*Total No. of visits* 28, Mar.2,4,7,8,9,10,13,14,15,17,22,25, Mar.27, Apr.1,4,7,8,10,13,14,19,20,24, May 1,4,8,11,16,17,22,25,31, June,1,7. Total No.of visits, 156.

*Is the approved plan of main boiler forwarded herewith* Yes

" " " *donkey* " " " /

*Dates of Examination of principal parts—Casings* 2 to 8-3-'22 *Rotors* 9 to 24-1'22. *Blading* 2 to 8-3-'22 *Gearing* 2 to 8-3-

*Rotor shaft* 9-1-'22 to 3-2-'22. *Thrust shaft* 2-7-1921. *Tunnel shafts* 22-8-'21 to 9-1-1922. *Screw shaft* 26-12-'21 to 3-2-1922. *Propeller* 20-2-1922

*Stern tube* 20-2-1922 *Steam pipes tested* 1-4-1922 *Engine and boiler seatings* 17-2-1922 *Engines holding down bolts* 27-3-1922

*Completion of pumping arrangements* 20-4-1922 *Boilers fixed* 10-4-1922 *Engines tried under steam* 4-5-1922

*Main boiler safety valves adjusted* 1-5-1922 *Thickness of adjusting washers* Lock nuts.

*Material and tensile strength of Rotor shaft* 34 tons to 38 tons (Forged steel) *Identification Mark on Do.* No.189, A.S.

*Material and tensile strength of Pinion shaft* 40 tons to 45 tons (Nickel steel) *Identification Mark on Do.* No.189, A.S.

*Material of Wheel shaft* Steel *Identification Mark on Do.* No.189 W.B *Material of Thrust shaft* Steel *Identification Mark on Do.* No.189

*Material of Tunnel shafts* Steel *Identification Marks on Do.* No.189 W.B & A.S.W. *Material of Screw shafts* Steel *Identification Marks on Do.* No.189

*Material of Steam Pipes* Steel and Copper. *Test pressure* 600 lbs and 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* Yes *If so, state name of vessel* s/s Hakone Maru & Haruna Maru.

*General Remarks* (*State quality of workmanship, opinions as to class, &c.*

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 workmanship. 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 6.22 in the Register Book.

Mean Speed on trial 16.473 Knots, Half load.

Nagasaki Office

*Certificate (if required) to be sent to*

(*The Surveyors are requested not to write on or below the space for Committee's Minute.*)

| | | | |
|---|---|---|---|
| The amount of Entry Fee ... | ¥ | 60:00 | When applied for, 21. 6 1922 |
| Special ... ... | ¥ | 2095:87 | |
| Donkey Boiler Fee ... | £ | : : | When received, 28. 6 1922 |
| Travelling Expenses (if any) | £ | : : | |

a.s.w.

a. S. Williamson
*Engineer Surveyor to Lloyd's Register of Shipping.*

THE 15 AUG. 1922

*Committee's Minute*

*Assigned* MACHINERY CERT. WRITTEN + LMC 6.22 C.L.F.D.