

## REPORT ON MACHINERY.

No. 1419

Received at London Office TUE NOV 27 1923

Date of writing Report 11th Oct. 1923 When handed in at Local Office 11th Oct. 1923 Port of NAGASAKI.

No. in Survey held at NAGASAKI. Date, First Survey 17th Mar. 1922. Last Survey 28th Sept. 1923.

Reg. Book. on the Steel Twin Screw Steamer "HAKUSAN MARU", (Number of Visits 281.)

Gross 10,380.44 Tons Net 6,270.69

Master / Built at Nagasaki. By whom built Mitsubishi Zosen Kaisha, Ltd. When built 1923.

Engines made at Nagasaki. By whom made Mitsubishi Zosen Kaisha, Ltd., when made 1923.

Boilers made at Nagasaki. By whom made Mitsubishi Zosen Kaisha, Ltd., when made 1923.

Registered Horse Power N.H.P. 1607 Owners Nippon Yusen Kabushiki Kaisha. Port belonging to Tokio.

Shaft Horse Power at Full Power 9299.3 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. 4 1/2" L.P. 5 1/2" Diameter of Pinion Shaft H.P. 7 1/2" L.P. 10 1/2" 2nd Red. 1'-3 1/2"

Diameter of Journals H.P. 4 1/2" L.P. 5" 2nd Red. 1 1/2" Distance between Centres of Bearings H.P. 2'-8" L.P. 8.432" 2nd Reduction 21.765"

Diameter of Wheel Shaft 1'-4" Distance between Centres of Bearings 3'-1 7/8" 3'-5 1/2" Diameter of Pitch Circle of Wheel H.P. & L.P. 88.867" 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 15 1/8"

No. of Screw Shafts 2 Diameter of same as per rule 15.9" 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" L.P. 40 1/2" astern L.P. 39 1/2"

Thickness at Bottom of Groove, H.P. / L.P. / Astern / Revs. per Minute at Full Power, Turbine H.P. 3363 L.P. 2476 Propeller 89.5

## PARTICULARS OF BLADING.

H.P.				L.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.
1st EXPANSION	5/8"	1'-5 3/8"	8		2 3/8"	2'-8 1/2"	4		1 5/16"	2'-11 1/8"	1
2nd	7/8"	1'-6 5/8"	7		3 1/16"	2'-9 5/8"	4		1 7/8"	3'-0 1/2"	1
3rd	1 1/16"	1'-8 1/8"	6		4"	2'-11 1/2"	4		2 5/8"	3'-1 1/2"	1
4th	1"	1'-10"	5		4 3/4"	3'-10"	2		2 5/8"	3'-1 1/2"	1
5th					3 1/2"	3'-11 1/2"	2		2 5/8"	3'-1 1/2"	1
6th		I. P.			4"	4'-0 1/2"	1		1 7/16"	(Impulse blades)	1
7th	1 1/2"	1'-8 5/8"	6		4 1/2"	4'-2"	1		1 7/8"	"	1
8th	1 5/8"	1'-10 5/8"	5		5 5/8"	4'-3 3/4"	1		2 1/2"	"	1
9th	1 3/4"	2'-1 1/4"	4		6 3/4"	4'-6"	1			H.P. Astern.	
10th	1 3/4"	2'-4 3/4"	3		6 3/4"	4'-6"	1		1"	(Impulse blades)	1
11th					6 3/4"	4'-6"	1		1 5/8"	"	1

No. and size of Feed pumps 3 sets, 16" x 12" x 27" stroke.

No. and size of Bilge pumps 2 sets, 8" x 9" x 9" stroke, independent. 1 set Drysdale's Emergency Bilge Pump.

No. and size of Bilge suction in Engine Room 4- 3 1/2" dia. from wings, 2- 3 1/2" from hat, 1- 2" from No.4 cofferdam.

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

No. of Bilge Injections 2 sizes 13. Connected to condenser, or to circulating pump. Is a separate Donkey Suction fitted in Engine Room & size Yes, 3-5 1/2"

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 Wm. Beardmore & Co. Ltd.,

Total Heating Surface of Boilers 18,027 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 350 lbs Date of test from 25-4-23 to 4-5-23 No. of Certificate Nos. 115 & 116.

Can each boiler be worked separately Yes, Area of fire grate in each boiler 447.72 sq.ft. No. and Description of Safety Valves to each boiler 2 spring loaded Area of each valve 9.6211 sq.in. Are they fitted with easing gear Yes

Smallest distance between boilers or uptakes and bunkers 21" Mean dia. of boilers 15'-0" Length 12'-0" Material of shell plates Steel

Thickness 1 7/16" Range of tensile strength 29 tons- 31.6 tons the shell plates welded or flanged No Descrip. of riveting: cir. seams Double Rivet.

long. seams T.R.D.B.S. Diameter of rivet holes in long. seams 1 1/2" 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" x 33" x 1 7/16" No. and Description of Furnaces in each Boiler 3 Morison's suspension furnace. Material Steel Outside diameter 4'-0 3/4"

Length of plain part top / bottom / Thickness of plates 5/8" 1/32" 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"

Pitch of stays to ditto: Sides 9 1/4" x 7 3/4" Back 9" x 8 1/2" Top 8 1/4" x 8 1/2" 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 1.75" Area supported by each stay 74 sq.in Working pressure by rules 245 lbs End plates in steam space

Material Steel Thickness 1 1/4" + 1/32" Pitch of stays 18" x 19 3/4" How are stays secured D.Nuts & Washers. Working pressure by rules 236.1 lbs Material of stays Steel

Diameter at smallest part 3 1/8" Area supported by each stay 357 sq.in. Working pressure by rules 239 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 19" Working pressure of plate by rules 222.8 lbs

Diameter of tubes 3 1/4" Pitch of tubes 4 1/2" x 4 3/4" Material of tube plates Stl. Thickness: Front 3/4" + 9/16" Back 3/4" Mean pitch of stays 8 7/8"

Pitch across wide water spaces 1'-1 1/4" Working pressures by rules 228.8 lbs Girders to Chamber tops: Material Steel Depth and thickness of girder at centre 10" x 7 7/8" doub. 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 276.6 lbs Steam dome: description of joint to shell / % of strength of joint / Diameter 4"

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 /



SUPERHEATER. Type Esaky's Date of Approval of Plan 18th May, 1915. Tested by Hydraulic Pressure to 600 lbs  
Date of Test 9th & 15th May 1923. 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 Starboard propeller blades, 2 Propeller shafts, 1 Air pump rod, 1 set of air pump valve spring  
guard and water piston packing, 1 Circulating pump impeller and shaft, 24 Boiler plain tubes and  
6 stay tubes, 175 Main condenser tubes, 523 Main condenser ferrules, 3 sets of main feed check and  
seats, 1 set Aux. feed check valve and seat, 7 Safety valve spring, 1 H.P. pinion shaft, 1 L.P. pinion  
shaft, 10 % of total number of turbine blades of one set &c &c.,

The foregoing is a correct description,

NAGASAKI WORKS, MITSUBISHI ZOSEN KAISHA, LTD.

Manufacturer.

GENERAL MANAGER.

1922. Mar. 17, 20, 22, 23, 29, 31, Apr. 6, 8, 10, 11, 19, 21, 24, 26, 27, 29, May. 2, 3, 5, 6, 10, 19, 22, 26, 29, June. 5, 10, 14,  
19, 22, July. 6, 10, 20, 25, 28, 29, Aug. 2, 3, 14, 21, 25, 30, Sept. 1, 4, 13, 18, 26, 29, Oct. 4, 13, 20, 21, 27, Nov. 2, 4,  
7, 13, 15, 18, 21, 29, Dec. 4, 5, 12, 16, 18, 26, 27, 1923. Jan. 6, 8, 9, 12, 19, 20, 22, 25, 26, 27, 30,  
31, Feb. 1, 5, 7, 8, 9, 12, 15, 17, 20, 21, 22, 28, Mar. 1, 2, 3, 5, 6, 8, 9, 12, 13, 15, 16, 19, 20, 21, 23, 27,  
28, 29, 31, Apr. 4, 5, 6, 10, 14, 16, 18, 19, 21, 23, 24, 25, 26, 28, 30, May. 1, 2, 3, 4, 5, 8, 9, 10, 11, 12,  
15, 16, 17, 19, 21, 22, 23, 24, 25, 26, 28, 29, 30, June 1, 2, 5, 6, 7, 8, 9, 12, 13, 14, 15, 16, 19, 20, 21,  
23, 26, 28, July 2, 6, 9, 10, 12, 18, 19, 23, 24, 27, 28, Aug. 1, 7, 8, 14, Is the approved plan of main boiler forwarded herewith Yes,  
16, 17, 18, 20, 23, 25, 28, Sep. 1, 5, 6, 7, 13, 17, 24, 26, 27, 28. " " " donkey " " " Yes.  
Total No. of visits. No. 201.

Dates of Examination of principal parts—Casing 16 to 26-6-23 Rotors 20-3-23 Blading 1-2-23 to 19-4-23 Gearing 16 to 28-6-23

Rotor shaft 20-3-23 to 20-6-23 Thrust shaft 15-3-23 Tunnel shafts 9-1-23 to 5-4-23 Screw shaft 5-4-23 to 21-5-23 Propeller 12-5-23

Stern tube 1-5-23 Steam pipes tested 17-8-23 Engine and boiler seatings 28-6-23 to 10-7-23 Engines holding down bolts 28-6-23 to 12-7-23

Completion of pumping arrangements 25-8-23 Boilers fixed 19-7-23 Engines tried under steam 1-9-23

Main boiler safety valves adjusted 28-8-23 Thickness of adjusting washers Lock nuts,

Material and tensile strength of Rotor shaft 34 tons to 38 tons (Forged steel) Identification Mark on Do. A.S.W. No. 200.

Material and tensile strength of Pinion shaft 1st Red. 40 tons to 45 tons (Nickel stl) Identification Mark on Do. A.S.W. No. 200.  
2nd Red. 34 tons to 38 tons (Forged stl)

Material of Wheel shaft Steel Identification Mark on Do. ASW. No. 200 Material of Thrust shaft Steel Identification Mark on Do. ASW. No. 200.

Material of Tunnel shafts Steel Identification Marks on Do. ASW. No. 200 Material of Screw shafts Steel Identification Marks on Do. ASW. No. 200

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 "Hakone, Haruna & Hakozaki 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 LMO 9.23. in the Register Book.

Mean Speed on trial 16.526 Knots, Half load.

The amount of Entry Fee	¥ 60:00	When applied for,
Special	¥ 2102:70	11. 10 19 23
Donkey Boiler Fee	£ :	When received,
Travelling Expenses (if any)	£ :	15. 10 19 23

Engineer Surveyor to Lloyd's Register of Shipping.

Committee's Minute FRI. 30 NOV. 1923

Assigned

L.M.O. 9.23  
F.D. C.L.

OR



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Foundation