

## REPORT ON MACHINERY

No. 34

FRI. 13 JAN. 1921

Received at London Office

Date of writing Report 16th Nov. 21 When handed in at Local Office 16th Nov. 21 Port of NAGASAKI,  
 No. in Survey held at NAGASAKI, Date, First Survey 18th Aug. 1920, Last Survey 4th Novr. 19 21  
 Reg. Book. on the Steel Twin Screw Steamer "HAKONE MARU" (Number of Visits 120)  
 Master T. Sekine.. 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 / 1510 N.H.P. Owners Nippon Yusen Kabushiki Kaisha, Port belonging to Tokyo,  
 Shaft Horse Power at Full Power 8,178.3 Is Refrigerating Machinery fitted for cargo purposes yes Is Electric Light fitted yes

**TURBINE ENGINES, &c.**—Description of Engines Twin Screw Double Reduction Geared Turbines 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. 10½" 2nd Reduction 1'-3½"  
 Diameter of Journals H.P. 4½" L.P. 5" Distance between Centres of Bearings L.P. 2'-8" Diameter of Pitch Circle H.P. 8.432" L.P. 11.458"  
 Diameter of Wheel Shaft 1'-4" Distance between Centres of Bearings 2nd Red. 6' 1 7/8" + 3'-5½" Diameter of Pitch Circle of Wheel H.P. & L.P. 68.967"  
 Width of Face 1st Red. 18" + 3" 2nd " 41" + 22" Diameter of Thrust Shaft under Collars 1'-3 7/8" Diameter of Tunnel Shaft as per rule 14.9" as fitted 1'-3½"  
 No. of Screw Shafts 2 as per rule 15.9" Diameter of same as fitted 1'-4 7/8" Diameter of Propeller 17'-9" Pitch of Propeller 20'-0"  
 No. of Blades 4 State whether Moveable yes Total Surface 93.6 sq. ft. I.P. 25½" H.P. 28 7/8" L.P. 40½" astern  
 Thickness at Bottom of Groove, H.P. / L.P. / Astern / Revs. per Minute at Full Power, Turbine H.P. 3112 L.P. 2400 Propeller 86.5

## 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 <sup>3</sup> / <sub>8</sub> "	8	2 <sup>3</sup> / <sub>8</sub> "	2'-8 <sup>1</sup> / <sub>2</sub> "	4	1 5/16"	2'-11 <sup>1</sup> / <sub>8</sub> "	1
2nd	7/8"	1'-6 5/8"	7	3 1/16"	2'-9 5/8"	4	1 7/8"	3'-0 <sup>1</sup> / <sub>8</sub> "	1
3rd	1 3/16"	1'-8 <sup>1</sup> / <sub>8</sub> "	6	4"	2'-11 <sup>1</sup> / <sub>2</sub> "	4	2 5/8"	3'-1 <sup>1</sup> / <sub>4</sub> "	1
4th	1"	1'-10"	5	4 <sup>1</sup> / <sub>2</sub> "	3'-10"	2	2 5/8"	"	1
5th				3 <sup>1</sup> / <sub>2</sub> "	3'-11 <sup>1</sup> / <sub>2</sub> "	2	2 5/8"	3'-1 <sup>3</sup> / <sub>8</sub> "	1
6th		I. P.		4"	4'-0 <sup>1</sup> / <sub>2</sub> "	1	1 7/16" (Impulse blades)		1
7th	1 <sup>1</sup> / <sub>2</sub> "	1'-8 5/8"	6	4 <sup>3</sup> / <sub>4</sub> "	4'-2"	1	2 <sup>5</sup> / <sub>8</sub> " (Impulse blades)		1
8th	1 5/8"	1'-10 5/8"	5	5 5/8"	4'-3 <sup>3</sup> / <sub>4</sub> "	1			
9th	1 <sup>3</sup> / <sub>4</sub> "	2'-1 <sup>1</sup> / <sub>4</sub> "	4	6 <sup>3</sup> / <sub>4</sub> "	4'-6"	1			
10th	1 <sup>3</sup> / <sub>4</sub> "	2'-4 <sup>3</sup> / <sub>4</sub> "	3	6 <sup>3</sup> / <sub>4</sub> "	4'-6"	1			
11th				6 <sup>3</sup> / <sub>4</sub> "	4'-6"	1			

No. and size of Feed pumps 3 sets 16"x 12"x 27" stroke, Donkey feed, 1 set 10½"x 8"x 24" stroke.  
 No. and size of Bilge pumps 4, 5"x 24" stroke (Driven by main Eng) & 1, 110 tons Drysdale's emergency bilge pump.  
 No. and size of Bilge suction in Engine Room 4, 3½" dia from wings, 2, 3½" from hat, 1, 2" from No. 4 cofferdam.  
 In Holds, &c. No. 1, 2 - 3½", No. 1 cofferdam 1 - 2", No. 2 Hold 2 - 3½", No. 2 cofferdam 1 - 2", No. 3 H. 2 - 3½", No. 3 cofferdam 1 - 2", Cross bunker 2 - 3½", B.R. 4 - 3½", No. 4 H. 2 - 3½", No. 5 cofferdam 1 - 2", No. 5 H. 2 - 3½", No. 6 cofferdam 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. P. Is a separate Donkey Suction fitted in Engine Room & size yes 3-5½"  
 Are all the bilge suction pipes fitted with roses roses & 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. upper Dk grating & bridge.

**BOILERS, &c.**—(Letter for record S. Manufacturers of Steel William Beardmore Co.,  
 Total Heating Surface of Boilers 18027.1 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 13-7-1921 No. of Certificate No. 110.  
 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. Pressure to which they are adjusted 200 lbs Are they fitted with easing gear yes  
 Smallest distance between boilers 20" Mean dia. of boilers 15'-0" Length 12'-0" Material of shell plates steel  
 Thickness 1 7/16" Range of tensile strength 28 ton - 32 ton 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 % Working pressure of shell by rules 217.8 lbs Size of manhole in shell 12"x 16"  
 plates 85.0 %  
 Size of compensating ring 36"x 33"x 1 7/16" No. and Description of Furnaces in each Boiler 3 Morison Material steel Outside diameter 4'-0 3/4"  
 Length of plain part top / crown 5" + 1" Description of longitudinal joint welded No. of strengthening rings none  
 bottom 7 Thickness of plates 8" + 3/32"  
 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 1/2"x 7 3/4" 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 2.03 sq. in. Area supported by each stay 74 sq. in. Working pressure by rules 246.9 lbs and 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 217.7 lbs Material of stays steel  
 Diameter at smallest part 3 1/8" 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" doubling Greatest pitch of stays 13"x 14.25" Working pressure of plate by rules 256 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" + 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 211 lbs Girders to Chamber tops: Material steel Depth and  
 thickness of girder at centre 10x7/8" double Length as per rule 2'-11 5/16" Distance apart 8 1/2" Number and pitch of stays in each 3 @ 8 1/2"  
 Working pressure by rules 248.3 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 /



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

Date of Test 2nd September, 1921. 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 yes

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

SPARE GEAR. State the articles supplied:— As per Rules & in addition, :- 10 sets of H.P. & L.P. flexible coupling bolts & nuts, 8 sets of shaft coupling bolts & nuts, 18 sets carbon packing rings with springs & pins, 12 main thrust block pads & pivots, 12 each size of I.P. & L.P. adjusting block pads 12 halves each size of I.P. & L.P. adjusting block liner, 2 off each port & starboard propeller blade 2 propeller shafts, 2 stern tube bushes complete with lignum vitae, 1 each of air pump rod, 1 set of air pump valves & water piston packing, 1 cir pump impeller & shaft, 24 boiler plain tubes, 6 boiler stay tubes, 175 main condenser tubes, 523 main condenser ferrules, 85 oil cooler tubes, 255 oil cooler ferrules, 3 sets main feed check valves & seats, 1 set aux. feed check valve & seat, 7 boiler safety valves springs.  
The foregoing is a correct description,

NAGASAKI WORKS, MITSUBISHI ZOSEN KAISHA, LTD.

Manufacturer.

GENERAL MANAGER.

1920. Aug. 18, 23, Sept. 21, Oct. 12, 19, 22, 25, 28, 29, 30, Nov. 8, 11, 16, 17, 18, 22, 29, Dec. 6, 7, 8, 16, 17, 18, 20, 27, 29, 1921. Jan. 6, 10, 11, 17, 24, 25, Feb. 7, 22, 23, 28, Mar. 2, 11, 17, 21, 23, Apr. 7, 8, 13, 14, 16, 20, 21, 26, 27, 28, May. 5, 9, 10, 13, 17, 19, 20, 23, June. 2, 13, 21, 22, 23, 28, July. 2, 4, 6, 12, 13, 18, 21, 22, 23, 25, 26, 28, Aug. 1, 8, 13, 15, 20, 22, 23, 24, 25, 28, Sept. 1, 2, 3, 5, 6, 7, 10, 12, 13, 16, 17, 19, 23, 26, 27, 28, 29, 30, Oct. 3, 4, 5, 6, 13, 14, 19, 21, 25, 26, 27, 28, No. 2, 4. Is the approved plan of main boiler forwarded herewith yes  
Total No. of visits, 123.

Dates of Examination of principal parts—Casings 23-8-'21 to 3-9-1921. Rotors 13-6-'21 to 28-8-'21. Blading 23-8-'21 to 3-9-'21. Gearing 22-8-'21 to 2-9-'21.

Rotor shaft 13-6-'21 to 23-8-'21. Thrust shaft 17-3-'21 to 23-3-'21. Tunnel shafts 29-12-'20 to 28-7-1921. Screw shaft 17-5-'21 to 21-6-'21. Propeller 13-6-'21

Stern tube 13-6-'21 Steam pipes tested 6-10-'21 to 25-10-'21. Engine and boiler seatings 23-8-'21 Engines holding down bolts 5-10-'21

Completion of pumping arrangements 14-10-'21 Boilers fired 30-9-'21 Engines tried under steam 18-10-'21

Main boiler safety valves adjusted 13-10-21. Thickness of adjusting washers Lock nuts.

Material and tensile strength of Rotor shafts 34 tons to 38 tons, (Forged steel) Identification Mark on Do. No. 187 W.B.

Material and tensile strength of Pinion shafts 40 tons to 45 tons. (Nickel steel) Identification Mark on Do. No. 187 W.B.

Material of Wheel shaft steel Identification Mark on Do. 187 W.B. Material of Thrust shaft steel Identification Mark on Do. 187 W.B.

Material of Tunnel shafts steel Identification Marks on Do. 187 W.B. Material of Screw shafts steel Identification Marks on Do. 187 W.B.

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 No If so, state name of vessel /

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 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 LMO // 2/ in the Register Book.

Mean Speed on trial 16.282 Knots, Half load.

The amount of Entry Fee ... £. 60:00 When applied for, 17 - 11.1921  
Special ... £. 2065:00  
Donkey Boiler Fee ... £ : When received, 23. 11.1921  
Travelling Expenses (if any) £ :

Engineer Surveyor to Lloyd's Register of Shipping.

Committee's Minute

Assigned

L.M.B. 11.21. F.D.

CERTIFICATE WRITTEN

THU. 13 APR. 1922

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