

# REPORT ON MACHINERY.

No. 1352  
TUE. APR. 11 1922

Received at London Office

Date of writing Report 23rd Feb. 1922 When handed in at Local Office 23rd Feb. 1922 Port of NAGASAKI.  
 No. in Survey held at NAGASAKI. Date, First Survey 24 Aug. 1920. Last Survey 7th Feby. 1922  
 Reg. Book. (Number of Vols. 122)  
 on the Steel Twin Screw Steamer "HARUNA MARU". Tons } Gross 10,421  
 Net 6,311  
 Master T. Kusano. 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  
 Registered Horse Power 1615 NHP. Owners Nippon Yusen Kabushiki Kaisha. Port belonging to Tokio.  
 Shaft Horse Power at Full Power 9318 Is Refrigerating Machinery fitted for cargo purposes Yes Is Electric Light fitted Yes

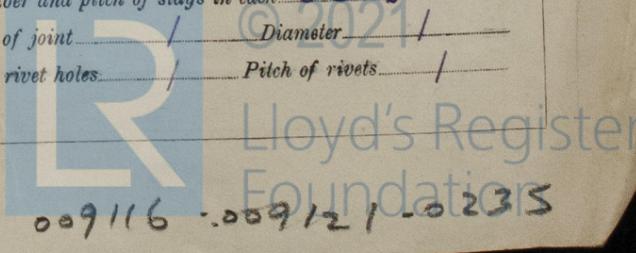
**TURBINE ENGINES, &c.**—Description of Engines Twin Screw Double Reduction Geared Turbine. No. of Turbines 6  
 Diameter of Rotor Shaft Journals, H.P. 4" .I.P. 4 1/2".L.P. 5 1/2" Diameter of Pinion Shaft H.P. 7 1/2", L.P. 10 1/2" 2nd Reduction 1'-3 1/2"  
 Diameter of Journals H.P. 4 1/2" L.P. 5" Distance between Centres of Bearings H.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 3'-1 7/8" + 3'-5 1/4" Diameter of Pitch Circle of Wheel H.P. & L.P. 68.967"  
 2nd Red. 11" 2nd Red. 6'-9" 2nd Red. 21.765" 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 1/2"  
 No. of Screw Shafts 2 Diameter of same as per rule 15.9" Continuous liner. 17'-9" Diameter of Propeller Pitch of Propeller 20'-0"  
 as fitted 16 7/8" I.P. 25 1/4" H.P. 28 7/8"  
 No. of Blades 4 State whether Moveable Yes Total Surface 93.6 sq.ft. Diameter of Rotor Drum, H.P. 20" L.P. 40" Astern LP 39 1/4"  
 Thickness at Bottom of Groove, H.P. / L.P. / Astern / Revs. per Minute at Full Power, Turbine H.P. 3330 Propeller 88.79  
 L.P. 2455

## 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.
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 1/4"	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	2 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 "				4 1/2"	4'-2"	1	2 3/8" (Impulse blades)		1
8th (1st)	1 1/2"	1'-8 5/8"	6	5 5/8"	4'-3 3/4"	1	H. P. Astern.		
9th (2nd)	1 5/8"	1'-10 5/8"	5		4'-6"	1	1" (Impulse blades)		1
10th (3rd)	1 3/4"	2'-1 1/4"	4		4'-6"	1	1 5/8" (Impulse blades)		1
11th (4th)	1 1/2"	2'-4 3/4"	3		4'-6"	1			

No. and size of Feed pumps 3 sets, 16"x 12"x 27" stroke, Donkey feed, 1 set, 10 1/2"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- 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. Cofferdam 1h-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" Gross 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 H. 2'-3 1/2" Tunnel hat 2'-2" Tunnel well 1'-3"  
 No. of Bilge Injections 2 sizes 1 1/2" Connected to condenser, or to circulating pump Yes Air Pump. a separate Donkey Suction fitted in Engine Room & size Yes 3-5 1/2"  
 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 David Colville & Sons, Ltd.,  
 Total Heating Surface of Boilers 18157.31 sq.ft. No. and Description of Boilers 7 Single ended cylindrical.  
 Working Pressure 200 lbs. Tested by hydraulic pressure to 350 lbs. Date of test 20-10-1921. No. of Certificate No.111.  
 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 tons - 32 tons 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 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 92.4 % Working pressure of shell by rules 217.8 lbs Size of manhole in shell 12"x 16"  
 plates 85.0 % Bulb 3 Leeds Forge Material Steel Outside diameter 4'-2 1/4"  
 Size of compensating ring 37" x 33" x 1 1/16" No. and Description of Furnaces in each Boiler 7  
 Length of plain part top / bottom / Thickness of plates crown 5/8" Description of longitudinal joint Welded No. of strengthening rings None  
 bottom / 5/8"  
 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 9 1/8" x 7 3/4" Back 9" x 8 1/2" Top 8 1/2" x 8 1/2" 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 Area supported by each stay 74 sq.in. Working pressure by rules 246.9 lbs End plates in steam space  
 Material Steel Thickness 1 9/32" Pitch of stays 18" x 19 1/2" 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" + 16 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 doubling 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 10 1/2" x 7 7/8" x 2 Length as per rule 2'-11 1/16" 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 8th November, 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 and in addition:- 10 sets of H.P. & L.P. Flexible Coupling bolts & nuts, 8 sets of Shaft coupling bolts & nuts, 18 sets of 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 blades, 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, 532 main condenser ferrules, 85 oil cooler tubes, 255 oil cooler ferrules, 3 sets of main feed check valves & seats, 1 set aux. feed check valve & seat, 7 boiler safety valves springs &c.

The foregoing is a correct description,

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

W. Williams GENERAL MANAGER.

Dates of Survey while building  
 During progress of work in shops -- 1920. Aug. 24, Sept. 21, Oct. 12, 30, Nov. 25, Dec. 8, 18, 27, 28, 1921. Jan. 10, 17, 18, 22, 26, Feb. 8, 15, Mar. 1, 2, 3, 8, 10, 11, 16, 19, 25, 29, Apr. 1, 13, 14, 16, 28, 30, May. 3, 5, 9, 17, 20, 23, June 3, 7, 13, 15, 20, 22, 23, 25, July 1, 2, 4, 11, 12, 13, 19, 21, 22, 26, 28, Aug. 1, 6, 8, 11, 17, 22, 24, 25, Sept. 5, 7, 10, 19, 21, 23, 28, 29, Oct. 4, 6, 12, 14, 17, 19, 20, 21, 24, 26, 28, Nov. 2, 4, 5, 7, 8, 9, 10, 11, 14, 15, 16, 17, 19, 21, 22, 25, 28, 29, Dec. 1, 2, 5, 6, 9, 10, 13, 14, 15, 20, 26.  
 Total No. of visits 122. Is the approved plan of main boiler forwarded herewith Yes.

Dates of Examination of principal parts—Casings 8-11-21 to 17-11-21. Rotors 8-11-21 to 17-11-21. Blading 8-11-21 to 17-11-21. Gearing 7-11-21 to 19-11-21.  
 Rotor shaft 29-9-21 to 12-10-21. Thrust shaft 3-6-21 to 2-7-21. Tunnel shafts 13-4-21 to 8-8-21. Screw shaft 4-10-21 to 21-10-21. Propeller 19-10-1921.  
 Stern tube 26-10-1921. Steam pipes tested 10-11-21 to 20-12-21. Engine and boiler seatings 24-10-1921. Engines holding down bolts 10-12-1921.  
 Completion of pumping arrangements 7-1-1922. Boilers fixed 10-11-1921. Engines tried under steam 14-1-1922.  
 Main boiler safety valves adjusted 7-1-1922. Thickness of adjusting washers Lock nuts.

Material and tensile strength of Rotor shaft (Forged Steel) 34 tons to 38 tons. Identification Mark on Do. No.188, W.B.  
 Material and tensile strength of Pinion shaft (Nickel Steel) 40 tons to 45 tons. Identification Mark on Do. No.188, W.B.  
 Material of Wheel shaft Steel Identification Mark on Do. No.188, W.B. Material of Thrust shaft Steel Identification Mark on Do. No.188, W.B.  
 Material of Tunnel shafts Steel Identification Marks on Do. No.188, W.B. Material of Screw shafts Steel Identification Marks on Do. No.188, 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 / Hakone 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 satisfactory tried under steam.

The Machinery of this vessel is eligible, in my opinion, for the record of LMC 2, '22 in the Register Book.

Mean Speed on trial 16.379 Knots, Half load.

The amount of Entry Fee ...	£. 60:00	When applied for,
Special ...	£. 2103:00	13. 2. 1922
Donkey Boiler Fee ...	£ :	When received,
Travelling Expenses (if any) £ :	:	27. 2. 1922

A.S. Williams  
 Engineer Surveyor to Lloyd's Register of Shipping.

Committee's Minute

FRI. 2 APR. 1922

Assigned

+ LMC 2, 22

MACHINERY DEPT  
 WRITTEN

F.D. C.L.



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Lloyd's Register  
 Foundation

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