

Report on Steam Turbine Machinery.

No. 668-A

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No. in Survey held at Tokyo and Yokosuka, Japan Date, First Survey 13th May 1950 Last Survey 26th November 1951

Reg. Book on the S.S. "HIKOSAN MARU" (Number of Visits 44)

Tons { Gross 6362.68
Net 3637.26

Built at Yokohama, Japan By whom built Uraga Dock Co. Ltd Yard No. 632 When built 11-51

Engines made at Tokyo, Japan By whom made Isolikawajima Heavy Industry Co., Ltd. Engine No. IT2166 When made 7-51

Boilers made at Maizuru Japan By whom made Iino Sangyo Maizuru Waks Boiler No. 8109 When made 8-51

Shaft Horse Power at Full Power 4800 (metric) Owners Nakano Kisen Co., Ltd. Port belonging to Tokyo

Nom. Horse Power as per Rule 4289.60 Is Refrigerating Machinery fitted for cargo purposes no Is Electric Light fitted yes

Trade for which Vessel is intended

STEAM TURBINE ENGINES, &c.—Description of Engines

Impulse type with HP and LP Turbine

No. of Turbines 2 Direct coupled, single reduction geared to Main propelling shafts. No. of primary pinions to each set of reduction gearing 2

Ahead 2 Astern 2 double reduction geared

direct coupled to { Alternating Current Generator — phase — periods per second } rated — Kilowatts — Volts at — revolutions per minute;
Direct Current Generator }

for supplying power for driving — Propelling Motors, Type —

rated — Kilowatts — Volts at — revolutions per minute. Direct coupled, single or double reduction geared to — propelling shafts.

TURBINE BLADING.

	H. P.	I. P.	L. P.	ASTERN.
Impulse Blading { No. of rows	<u>8</u>	—	<u>6</u>	<u>2 (HP)</u> <u>2 (LP)</u>
Reaction Blading { No. of stages	—	—	—	
No. of rows in each stage	—	—	—	

Shaft Horse Power at each turbine { H.P. 2400 I.P. — L.P. 2400 } Revolutions per minute, at full power, of each Turbine Shaft { H.P. 5260 I.P. — L.P. 4311 }

1st reduction wheel HP 859 main shaft 128

Rotor Shaft diameter at journals { H.P. 140 I.P. — L.P. 180 } Pitch Circle Diameter { 1st pinion LP 245.95 2nd pinion LP 411.46 } 1st reduction wheel HP 1272.21 main wheel 2761.66 Width of Face { 1st reduction wheel 165 x 2 main wheel 350 x 2

Distance between centres of pinion and wheel faces and the centre of the adjacent bearings { 1st pinion HP 290 2nd pinion HP 575 } 1st reduction wheel LP 295 main wheel 635

Flexible Pinion Shafts, diameter { 1st — 2nd 120 } Pinion Shafts, diameter at bearings { External { 1st HP 110 2nd 240 } Internal { 1st HP 120 2nd 145 } } diameter at bottom of pinion teeth { 1st HP 197.09 2nd 395.36

Wheel Shafts, diameter at bearings { 1st 240 main 385 } diameter at wheel shroud, { main 2630 } Generator Shaft, diameter at bearings — Propelling Motor Shaft, diameter at bearings —

Intermediate Shafts, diameter { as per rule 341 as fitted 355 } Thrust Shaft, diameter at collars { as per rule 358 as fitted 384.5

Tube Shaft, diameter { as per rule — as fitted — } Screw Shaft, diameter { as per rule 374 as fitted 390 } Is the { tube } shaft fitted with a continuous liner { screw } yes

Bronze Liners, thickness in way of bushes { as per rule 19.1 as fitted 23 } Thickness between bushes { as per rule 14.3 as fitted 20 } Is the after end of the liner made watertight in the propeller boss yes If the liner is in more than one length are the junctions made by fusion through the whole thickness of the liner —

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 — Is an approved Oil Gland or other appliance fitted at the after end of the tube shaft — If so, state type — Length of Bearing in Stern Bush next to and supporting propeller —

Propeller, diameter 4900 Pitch 3480 No. of Blades 4 State whether Movable Movable Total Developed Surface 84.3352 square feet.

If Single Screw, are arrangements made so that steam can be led direct to the L.P. Turbine yes Can the H.P. or I.P. Turbines exhaust direct to the Condenser yes No. of Turbines fitted with astern wheels 2 Feed Pumps { No. and size 2 x 33 m³/h x 280 m, 2 x 20 m³/h x 280 m How driven Steam turbine steam (weir's)

Pumps connected to the Main Bilge Line { No. and size 1 x 200 m³/h x 20 m, 1 x 35 m³/h x 25 m, 1 x 170 m³/h x 30 m How driven Steam Steam motor } main shaft driven

Ballast Pumps, No. and size 1 x 200 m³/h x 20 m, 1 x 170 m³/h x 30 m Lubricating Oil Pumps, including Spare Pump, No. and size 2 x 100 m³/h x 35 m

Are two independent means arranged for circulating water through the Oil Cooler yes Suctions, connected both to Main Bilge Pumps and Auxiliary Bilge Pumps, No. and size In Engine and Boiler Room 4 x 3" In Pump Room —

In Holds, &c. 2 x 3 1/2", 12 x 3"

Main Water Circulating Pump Direct Bilge Suctions, No. and size 1 x 340 Independent Power Pump Direct Suctions to the Engine Room Bilges, No. and size 1 x 5", 1 x 3" Are all the Bilge Suction pipes in Holds and Tunnel Well fitted with strum-boxes yes

Are the Bilge Suctions in the Machinery Space led from easily accessible mud-boxes, placed above the level of the working floor, with straight tail pipes to the bilges. yes

Are all Sea Connections fitted direct on the skin of the ship yes Are they fitted with Valves or Cocks both

Are they fixed sufficiently high on the ship's side to be seen without lifting the stokehold plates yes Are the Overboard Discharges above or below the deep water line above 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 pass through the bunkers — How are they protected —

What pipes pass through the deep tanks — Have they been tested as per rule —

Are all Pipes, Cocks, Valves and Pumps in connection with the machinery and all boiler mountings accessible at all times yes

Is the arrangement of valves and their connections such as to prevent the possibility of water passing from the sea or from water tanks into the cargo or machinery spaces, or from one compartment to another yes Is the Shaft Tunnel watertight yes Is it fitted with a watertight door yes worked from upper deck

OILERS, &c.—(Letter for record —) Total Heating Surface of Boilers 441 m² x 2 = 882 m²

Is Forced Draft fitted yes No. and Description of Boilers 2-three drum type water tube boiler Working Pressure 20 kg/cm²

Is a Report on Main Boilers now forwarded? yes

008773-008777-0042

Is { a Donkey } Boiler fitted? NO If so, is a report now forwarded? —
{ an Auxiliary }
Is the donkey boiler intended to be used for domestic purposes only? —
Plans. Are approved plans forwarded herewith for Shafting 5-5-51 Main Boilers 25-5-51 Auxiliary Boilers — Donkey Boilers —
(If not, state date of approval)
Superheaters 25-5-51 ^{revised} 29-6-51 (Kobe) General Pumping Arrangements 23-9-51 Oil Fuel Burning Arrangements 11-9-51
Geared turbines situated aft. Have torsional vibration characteristics of system been approved? NO Date of approval —

SPARE GEAR.

Has the spare gear required by the Rules been supplied? yes
State the principal additional spare gear supplied 1 set of complete bearing bush for 1st pinion and main wheel shaft HP and LP
rotor shaft. 1 set of complete bearing bush for 2nd pinion shaft. 1 set of packing rings for rotor shaft.
1 set of liners for adjusting block. Studs and nuts for one propeller blade. 1 set of coupling bolts & nuts.

The foregoing is a correct description,

Takao Nawano Manufacture

Dates of Survey while building
During progress of work in shops - 1950:- MAY. 13, 21, JUN. 17, 15, 21, 24, 28, JUL. 3, 7, AUG. 18.
1951:- JAN. 20, 27, FEB. 16, MAR. 16, 20, APR. 12, 28, MAY. 7, 15, 19, 31, JUN. 7, 20, 23, 28, JUL. 5, 10, 14, 18,
23, 28, 31
During erection on board vessel - 1951:- AUG. 30, SEPT. 10, 12, OCT. 5, NOV. 16, 19, 21, 22, 24, 26
Total No. of visits 34.
10
44

Dates of Examination of principal parts—Casings HP 18-7-51 Rotors HP 12-3-51 Blading 9-7-51 Gearing 1st 18-7-51
LP 20-3-51 LP 27-1-51 2nd 23-7-51

Wheel shaft 8-3-51 Thrust shaft 8-3-51 Intermediate shafts 10-9-51 Tube shaft — Screw shaft 4-9-51

Propeller 31-7-51 Stern tube 7-9-51 Engine and boiler seatings 30-8-51 Engine holding down bolts 30-8-51

Completion of fitting sea connections 12-9-51 Completion of pumping arrangements 5-10-51 Boilers fixed 10-7-51 Engines tried under steam 22-11-51

Main boiler safety valves adjusted 16-11-51 Thickness of adjusting washers 6 mm

Rotor shaft, Material and tensile strength Ni-Cr-Steel HP 44.5 ~ 46.1 1/2" Identification Mark HP Y1963-A
LP 44.1 ~ 44.9 1/2" LP Y1963-B

Flexible Pinion Shaft, Material and tensile strength Ni-Cr-Steel HP 52.3 1/2" Identification Mark HP Y975
LP 53.5 1/2" LP Y976

Pinion shaft, Material and tensile strength Ni-Steel 1st pinion Rim HP 42.7-42.8 1/2" Identification Mark HP Y1961-A
2nd pinion HP 43.9-45.4 1/2" LP 45.8-46.2 1/2" 1st LP Y1961-B

2nd HP Y929 LP Y930; Chemical analysis. 1st Pinion Ni C P S 3.49 0.25 0.019 0.028 2nd HP 3.74 0.29 0.015 0.021
LP 3.70 0.27 0.013 0.020

If Pinion Shafts are made of special steel state date of approval of chemical analyses, physical properties and heat treatment —

1st Reduction Wheel Shaft, Material and tensile strength O.H. Steel 34.3 1/2" 32.2 1/2" Identification Mark HP Y1962-A
LP Y1962-B

Wheel shaft, Material O.H. Steel Identification Mark Y1959 Thrust shaft, Material O.H. Steel Identification Mark Y1960

Intermediate shafts, Material O.H. Steel Identification Marks Y1141-A Y1141-B Tube shaft, Material — Identification Marks —
Y1141-C Y1141-D Y1548

Screw shaft, Material O.H. Steel Identification Marks Y1142 Steam Pipes, Material O.H. Steel Test pressure 60 kg/cm²

Date of test Main Steam pipe 5-11-51 Cond. Steam pipe 9-11-51 Is an installation fitted for burning oil fuel? yes

Is the flash point of the oil to be used over 150°F? yes Have the requirements of the Rules for the use of oil as fuel been complied with? yes

Is the vessel (not being an oil tanker) fitted for carrying oil as cargo? NO If so, have the requirements of the Rules been complied with? —

If the notation for ice strengthening is desired, state whether the requirements in this respect have 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 Machinery of this vessel has been constructed under the Supervision of the Society's

Surveyors in accordance with Approved plans and the Rules.

The materials and workmanship has been found satisfactory.

The Machinery has been satisfactorily installed in the vessel in accordance with the Rules

tested under working condition and found satisfactory.

It is submitted that the Machinery of this vessel is eligible to be classed with the

Society with the notation of \pm LMC 11.51, Fitted for oil fuel 11.51 P.F. over 150°F

and TSCL 11.51

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