

# Report on Steam Turbine Machinery. No. FE-5803

4a.

Date of writing Report 19th June, 1958 When handed in at Local Office 19 Port of Kobe  
 Date, First Survey 14-2-56 Last Survey 28th May, 1958.  
 (Number of Visits )

on the Single Twin Triple Quadruple Screw Vessel Tons { Gross Net  
 Built at Yokohama, Japan By whom built Mitsubishi Nippon Heavy Ind., Ltd.,  
 Yokohama Shipyard & Engine Works Yard No. 823 When built  
 Engines made at Kobe, Japan By whom made Mitsubishi Heavy Ind., Reorg., Ltd.,  
 Kobe Shipyard & Engine Works Engine No. 153 When made 1958-5  
 Boilers made at By whom made Boiler No. When made  
 Shaft Horse Power { Maximum 17,000 Owners Port belonging to  
 Service 15,000  
 I.N. as per Rule 3,400 Is Refrigerating Machinery fitted for cargo purposes Is Electric Light fitted  
 Trade for which Vessel is intended

STEAM TURBINE ENGINES, &c.—Description of Engines Mitsubishi Westinghouse Marine Steam Turbine

No. of Turbines Ahead 1 HP & 1 LP Astern double reduction geared to One propelling shafts No. of primary pinions to each set of reduction gearing 2  
 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	H. P.	I. P.	L. P.	ASTERN.
BLADING.				
Impulse Blading { No. of rows	Curtis 1 stage (2 Rows)			Curtis 2 stages (4 Rows)
No. of stages	14 stages		10 stages	
Reaction Blading { No. of rows in each stage	2 Rows		2 Rows	

Shaft Horse Power at each turbine { H.P. 8250 I.P. — L.P. 8750  
 Rotor Shaft diameter at journals { H.P. 150 (ft) I.P. 150 (ft) L.P. 200  
 Pitch Circle Diameter { 1st pinion 351.95 (HP & LP) 2nd pinion 598.32 (HP & LP) main wheel 3936.00  
 Distance between centres of pinion and wheel faces and the centre of the adjacent bearings in mm. { 1st pinion 455 (HP & LP) 2nd pinion 905 (HP & LP) main wheel 1020

Flexible Pinion { 1st — 2nd — Pinion Shafts, diameter at bearings { External 1st 180 (HP) 210 (LP) Internal 1st 145 (LP) 2nd 310  
 Wheel Shafts, diameter at bearings in mm. { 1st 410 main 640  
 Intermediate Shafts, diameter as per rule as fitted  
 Tube Shaft, diameter as per rule as fitted  
 Screw Shaft, diameter as per rule as fitted  
 Thrust Shaft, diameter at collars as per rule as fitted

Is the { tube screw } shaft fitted with a continuous liner {  
 Bronze Liners, thickness in way of bushes as per rule as fitted Thickness between bushes as per rule as fitted Is the after end of the liner made watertight in the  
 propeller boss. 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 Pitch No. of Blades State whether Moveable Total Developed Surface square feet.  
 If Single Screw, are arrangements made so that steam can be led direct to the L.P. Turbine Can the H.P. or L.P. Turbines exhaust direct to the  
 Condenser Yes No. of Turbines fitted with astern wheels Feed Pumps { No. and size How driven

Pumps connected to the Main Bilge Line { No. and size How driven  
 Ballast Pumps, No. and size Lubricating Oil Pumps, including Spare Pump, No. and size  
 Are two independent means arranged for circulating water through the Oil Cooler Branch Bilge Suctions, No. and size:—In Engine  
 and Boiler Rooms In Pump Room

In Holds, &c. Main Water Circulating Pump Direct Bilge Suctions, No. and size Direct Bilge Suctions to the Engine and/or Boiler Room  
 Bilges, No. and size Are all the Bilge Suction pipes in Holds and Tunnel Well fitted with strum-boxes  
 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  
 Are all Sea Connections fitted direct on the skin of the ship Are they fitted with Valves or Cocks  
 Are they fixed sufficiently high on the ship's side to be seen without lifting the stokehold plates Are the Overboard Discharges above or below the deep water  
 line Are they each fitted with a Discharge Valve always accessible on the plating of the vessel Are the Blow Off Cocks fitted with a spigot and brass  
 covering plate 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  
 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 Is the Shaft Tunnel watertight Is it fitted with a watertight door worked from

BOILERS, &c.—Total Heating Surface of Boilers  
 Is Forced Draught fitted No. and Description of Boilers Working Pressure  
 Is a Report on Main Boilers now forwarded?



Is { a Donkey } Boiler fitted? 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 Main Boilers Auxiliary Boilers Donkey Boilers  
(If not, state date of approval)  
Superheaters General Pumping Arrangements Oil Fuel Burning Arrangements  
Geared turbines situated aft. Have torsional vibration characteristics of system been approved. Date of approval

SPARE GEAR.

Has the spare gear required by the Rules been supplied. Yes  
State the principal additional spare gear supplied 1. Bearing for HP & LP Turbine Journals & Thrust 1 set for each size  
1. Bearing for reduction gear wheels & pinions 1 set " "  
1. Main thrust bearing pads 1/2 set (8 pieces)  
1. Various sizes of seal rings for HP & LP Turbine 1 set for each size  
1. Reamer Bolts for 1st & 2nd reduction coupling 1 set " "  
1. HP & LP Gear Coupling shafts & sleeves 1 set " "

The foregoing is a correct description.

K. Ogata  
Manager of Inspection Dep't.  
Kobe Shipyard & Engine Works, Mitsubishi  
Heavy Industries Reorganized Ltd. Manufacturer

Dates of Survey while building During progress of work in shops - 1956: Dec. 14, 1957: Jan. 21, 22, Feb. 18, Mar. 2, 6, 7, 11, 18, 25, 30, Apr. 10, 15, 18, 27, May 28, June 10, 11, July 4, 5, Aug. 7, 15, 17, 27, Sept. 4, 12, 28, Oct. 8, 10, 12, 19, 21, 26, 29, 31, Nov. 1, 13, 20, 21, 30, Dec. 2, 4, 6, 16, 17, 26, 1958: Jan. 8, 17, 20, 25, 27, Feb. 7, 8, 12, 14, 18, 24, Mar. 1, 6, 8, 12, 13, 14, 19, 20, 28, 31, Apr. 2, 5, 10, 12, 15, 16, 19, 21, 22, 23, 25, 28, May 10, 20, 24, 26, 28  
During erection on board vessel -  
Total No. of visits 87

Dates of Examination of principal parts - Casings 13-3-58 (HP) 12-3-58 (HP) 12-3-58 (HP) 6-5-58 (1st Re  
14-3-58 (LP) Rotors 2-4-58 (LP) Blading 2-4-58 (LP) Gearing 10-5-58 (1st Re  
22-4-58 (2nd

Wheel shaft 8-4-58 Thrust shaft 13-2-58 Intermediate shafts Tube shaft Screw shaft

Propeller Stern tube Engine and boiler seatings Engine holding down bolts

Completion of fitting sea connections Completion of pumping arrangements Boilers fixed Engines tried under steam

Main boiler safety valves adjusted Thickness of adjusting washers (HP) (LP)

Rotor shaft, Material and tensile strength Ni-Cr-Mo Steel Forging 47.9 - 49.3 T/in<sup>2</sup> (HP), 46.9 - 49.1 T/in<sup>2</sup> (LP) Identification Mark NAG No. 1776 NAG No. 1776

1st Pinion Shaft, Material and tensile strength Ni-Cr-Mo Steel Forging 47.5 - 48.5 T/in<sup>2</sup> (HP), 47.3 - 48.5 T/in<sup>2</sup> (LP) Identification Mark NAG No. MS2382 (HP) NAG No. MS2703 (LP)

2nd Pinion Shaft, Material and tensile strength Ni-Cr-Mo Steel Forging 47.9 - 50.7 T/in<sup>2</sup> (HP), 48.9 - 51.1 T/in<sup>2</sup> (LP) Identification Mark NAG No. 1056-A (HP) NAG No. 1056-B (LP)

Chemical analysis 2nd Pinion HP 0.31 0.21 0.64 0.006 0.009 3.40 0.06 0.39 0.06 LP 0.30 0.26 0.58 0.009 0.006 3.47 0.10 0.46 0.06

If Pinion Shafts are made of special steel state date of approval of chemical analyses, physical properties and heat treatment 36.6 - 37.4 (HP) KOB No. KTF735 (HP)

1st Reduction Wheel Shaft, Material and tensile strength Steel Forging 37.4 - 37.8 T/in<sup>2</sup> (LP) Identification Mark KOB No. KTF742 (LP)

Wheel shaft, Material Steel Forging Identification Mark KOB No. KTF776 Thrust shaft, Material Steel Forging Identification Mark KOB No. KTF864

Intermediate shafts, Material Identification Marks Tube shaft, Material Identification Marks

Screw shaft, Material Identification Marks Steam Pipes, Material Test pressure

Date of test Is an installation fitted for burning oil fuel

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

Full description of Fire Extinguishing Apparatus fitted in machinery spaces

Is the vessel (not being an oil tanker) fitted for carrying oil as cargo 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 steam turbine and gearing as indicated above, intended for Ship No. 823 being built by Mitsubishi Nippon Heavy

Ind., Ltd., Yokohama Shipyard & Engine Works, Yokohama have been constructed under Supervision of the Society's

Surveyors in accordance with the Rules, approved plans and Secretary's letters.

The materials and workmanship are sound and good.

The turbine & gearing have been tested in the shop under no load condition and subsequently opened up, examined

and found in good order.

It is submitted that this engine is in eligible for Classification with the Society's with the Notation of LMC

(with date) when satisfactorily installed on the vessel.

The amount of Entry Fee ... £398.000 When applied for JUL - 4 1958

Special ... £ : : 19

Donkey Boiler Fee ... £ : : When received

Travelling Expenses (if any) £ 2.000 FRIDAY 27 FEB 1959

(The Committee's Minute Assigned See Rpt. 1

Engineer Surveyor to Lloyd's Register of Shipping.  
Lloyd's Register Foundation