

Rpt. 4a.

## Report on Steam Turbine Machinery.

No. 3525 K O B E

7830 YKA

14 MAY 1956

Date of writing Report 19 When handed in at Local Office 19 Port of YOKOHAMA & KOBÉ Received at London Office 14 MAY 1956  
No. in Survey held at HITACHI & INNOSHIMA, JAPAN Date, First Survey 1st FEB. 1955 Last Survey 23rd FEB 1956  
Reg. Book on the Steel Single Screw Steamer "ALEXANDRA I" (Number of Visits 136)  
Built at INNOSHIMA, JAPAN By whom built HITACHI & INNOSHIMA SHIPYARD Yard No. 3752 When built 2 Mo. 1956  
Engines made at HITACHI, IBARAGI By whom made HITACHI WORKS, HITACHI LTD. Engine No. M-148 When made 2 Mo. 1956  
Boilers made at HITACHI, IBARAGI By whom made HITACHI WORKS, HITACHI LTD. Boiler No. 155450-1 When made 10 Mo. 1955  
Shaft Horse Power at Full Power 15,000 Owners. LIBERIAN TRANSOCEAN NAVIGATION CORPORATION Port belonging to MONROVIA  
Nom. Horse Power as per Rule 3,000 Is Refrigerating Machinery fitted for cargo purposes No Is Electric Light fitted YES  
Trade for which Vessel is intended OCEAN GOING

## STEAM TURBINE ENGINES, &amp;c.—Description of Engines TWO CYLINDERS DOUBLE REDUCTION GEARED, MULTISTAGE IMPULSE TYPE

Ahead 2 Direct coupled, one  
No. of Turbines Astern 1 single reduction geared to MAIN propelling shafts. No. of primary pinions to each set of reduction gearing HP 1  
direct coupled to Alternating Current Generator. phase periods per second  
for supplying power for driving Propelling Motors, Type Direct Current Generator rated Kilowatts Volts at revolutions per minute;  
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 8		8	3
Reaction Blading	No. of stages			
	No. of rows in each stage			

Shaft Horse Power at each turbine H.P. 6,800 I.P. 6,474 L.P. 8,200  
Revolutions per minute, at full power, of each Turbine Shaft 1st reduction wheel 743 main shaft 108.5

Rotor Shaft diameter at journals H.P. 100 mm I.P. 115 mm L.P. 165 mm  
Pitch Circle Diameter 1st pinion 250.23 mm 1st reduction wheel 2068.87 mm 2nd pinion 615.34 mm main wheel 4214.66 mm  
Width of Face 1st reduction wheel 275 mm x 2 main wheel 580 mm x 2

Distance between centres of pinion and wheel faces and the centre of the adjacent bearings 1st pinion 405 mm 1st reduction wheel 405 mm 2nd pinion 775 mm main wheel 855 mm

Flexible Pinion Shafts, diameter 1st L.P. 120 mm HP 160 mm 2nd L.P. 165 mm  
Pinion Shafts, diameter at bearings External 1st L.P. 210 mm HP 2188.57 mm 2nd L.P. 245 mm HP 236.26 mm  
Internal 1st L.P. 136 mm HP 2188.57 mm 2nd L.P. 245 mm HP 236.26 mm  
diameter at bottom of pinion teeth 1st L.P. 245 mm 2nd 593.10 mm

Wheel Shafts, diameter at bearings 1st 240 mm diameter at wheel shroud, main 610 mm REDUCED TO 560 mm DIA. ADJACENT TO COUPLING  
Intermediate Shafts, diameter as per rule As approved as fitted 505 mm  
Tube Shaft, diameter as per rule As approved as fitted 570 mm  
Screw Shaft, diameter as per rule As approved as fitted 570 mm

Thrust Shaft, diameter at collars as per rule 549.5 mm As approved as fitted 560 mm AT COLLAR REDUCED TO 520 mm DIA. AT ADJACENT TO COUPLING

Is the tube screw shaft fitted with a continuous liner Yes

Brönze Liners, thickness in way of bushes as per rule As approved as fitted 3.75 mm  
Thickens between bushes as per rule As approved as fitted 590 mm  
Is the after end of the liner made watertight in the propeller boss Yes

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

Propeller, diameter 6,800 mm Pitch 4,630 mm No. of Blades 5 Length of Bearing in Stern Bush next to and supporting propeller 2,397 mm  
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 1 Feed Pumps No. and size 3 @ 85 mm H. 60 mm 1 @ 35 mm H. 70 mm  
How driven Steam turbine driven E. Motor driven

Pumps connected to the Main Bilge Line No. and size 1 @ 15 mm H. 35 mm 1 @ 160 mm H. 25 mm 1 @ 160 mm H. 35 mm  
How driven Engine room pump room Eleet. Motor driven

Ballast Pumps, No. and size 1 @ 160 mm H. 25 mm 1 @ 160 mm H. 35 mm 1 @ 160 mm H. 85 mm  
Lubricating Oil Pumps, including Spare Pump, No. and size 2 @ 140 mm H. 35 mm

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 Engine room 1 @ 160 mm H. 13-100 mm 3 @ 50 mm In Pump Room 1 @ 100 mm 1 @ 100 mm

In Holds, &c. BOSIN STORE 1-2" DIA. LATER 1-2" COFF. 1/2" 1-2 1/2" 1-2 1/2" 1-2 1/2" GENERAL CARGO SPACE 2-2 1/2" COFF. 5/8" 1-2 1/2" COFF. 29/32" 1-2"

Main Water Circulating Pump Direct Bilge Suctions, No. and size 1-450 mm Independent Power Pump Direct Suctions to the Engine Room Bilges, No. and size FWD 1-4" 1-5" CENTRE 1-4" 1-6" AFT 1-2" 1-4"

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 YES

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 BELOW 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 Have they been tested as per rule YES

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 Is it fitted with a watertight door worked from

Is it fitted with a watertight door worked from 8520 X 2 = 17040 ft<sup>2</sup> 1300 X 2 = 2600 ft<sup>2</sup> 4978 X 2 = 9956 ft<sup>2</sup>  
Total Heating Surface of Boilers 24,684 ft<sup>2</sup>  
s Forced Draft fitted YES No. and Description of Boilers 2 B&W X WILCOX INTEGRAL FURNACE TYPE Working Pressure Sup 600 lb/in<sup>2</sup>

Is a Report on Main Boilers now forwarded? YES



Is ☒ a Donkey ☐ an Auxiliary Boiler fitted? No If so, is a report now forwarded? ✓  
Is the donkey boiler intended to be used for domestic purposes only? ✓  
Plans. Are approved plans forwarded herewith for Shafting Kob 6-7-55 Main Boilers 10-5-55 Auxiliary Boilers ✓ Donkey Boilers ✓  
(If not, state date of approval)  
Superheaters Kob 10-5-55 General Pumping Arrangements Kob 7-9-55 Oil Fuel Burning Arrangements Kob 7-9-55  
Geared turbines situated aft. Have torsional vibration characteristics of system been approved YES Date of approval 25-3-55

### SPARE GEAR.

Has the spare gear required by the Rules been supplied YES  
State the principal additional spare gear supplied BEARING BUSHES FOR EACH REDUCTION GEAR AND EACH ROTOR.  
PADS & LINERS FOR THRUST BEARINGS. EACH TYPE OF LABYRINTH RINGS.  
BOLTS REAMER BOLTS & NUTS FOR TURBINE CASINGS & COUPLINGS.  
CONDENSER TUBES 110 PCS.

The foregoing is a correct description.

S. Akamatsu, Director Yard-Manager Hitachi Shipbuilding & Engr., Co., Ltd.  
Innoshima Shipyard.

VICE MANAGER OF HITACHI WORKS.  
HITACHI LTD.  
Manufacturer.

Dates of Survey while building  
During progress of work in shops - 1955 FEB. 1, 3, 8, 11, 16, 18, 23, 28, MAR. 3, 7, 10, 14, 17, 22, 25, 28, APR. 1, 5, 8, 10, 11, 14, 18, 21, 25, 27, 30, MAY 6, 9, 10, 12, 16, 18, 20, 24, 27, 31, JUN. 2, 4, 7, 9, 11, 14, 16, 18, 21, 23, 25, 28, 30, JUL. 2, 5, 7, 9, 12, 14, 19, 22, 26, 28, AUG. 2, 4, 6, 9, 11, 13, 16, 20, 30, SEP. 3, 6, 13, 15, 17, 20, 23, 27, 29, OCT. 1, 4, 6, 8, 9, 11, 13, 15, 20, NOV. 23  
During erection on board vessel - M.K. 1955 July 2, Aug. 15, 20, 27, Sep. 5, 14, 15, 17, 21, 22, 28, 29, Oct. 1, 13, 14, 15, 22, 24, 28, Nov. 1, 7, 14, 15, 22, 23, 30, Dec. 2, 6, 7, 10, 12, 13, 15, 20, 26, 27, 28, 29  
Y.M. 1956 Jan. 3, 31, Feb. 1, 3, 11, 14, 15, 21, 23  
Total No. of visits 136  
Dates of Examination of principal parts—Casings HP 3-9-55 Rotors 13-8-55 Blading 17-8-55 Gearing 1ST HP 28-9-55  
1ST LP 11-6-55 13-9-55 16-12-55 27-12-55  
Wheel shaft 2ND 20-8-55 Thrust shaft 13-9-55 Intermediate shafts 28-1-55 Tube shaft ✓ Screw shaft 15-10-55  
10-1-56 (SPARE) 5-1-56 (SPARE)  
Propeller 3-10-55 Stern tube 14-10-55 Engine and boiler seatings 5-1-56 Engine holding down bolts 23-1-56  
Completion of fitting sea connections 15-10-55 Completion of pumping arrangements 15-2-56 Boilers fixed 31-1-56 Engines tried under steam 21-2-56  
Main boiler safety valves adjusted 28-1-56 Thickness of adjusting washers DRUM 20mm SUP 11mm  
Rotor shaft, Material and tensile strength HP NiCrMo STEEL TOP L 53.6 T 52.8 R 51.2 BOT L 52.0 R 51.6 T 52.8 Identification Mark HP Y 6489  
LP 1ST NiCrMo STL YIELD POINT 43.5 TEN. STR. 52.6 LP Y 6500  
Flexible Pinion Shaft, Material and tensile strength HP 2ND NiCrMo STL Y.P. TOP 42.1 BOT 42.1 T.S. TOP 51.0 BOT 51.2 Identification Mark Y 6496  
HP NiCrMo STL 51.2 51.4 53.6 2ND HP NiCrMo STL 47.4 46.8 49.0 49.6 Identification Mark Y 6324 A  
Pinion shaft, Material and tensile strength 1ST PINION LP NiCrMo STL 46.8 45.7 47.6 Identification Mark HP Y 6322  
2ND PINION LP NiCrMo STL 48.0 46.0 48.8 48.6 Identification Mark 1ST LP Y 6778 2ND LP Y 6883  
; Chemical analysis 1ST P HP C 0.32 0.33 Mn 0.013 0.011 1.17 1.0 0.27 2ND HP C 0.31 0.31 0.51 0.008 0.007 1.03 1.01 0.35  
LP 0.3 0.34 0.58 0.018 0.012 1.07 1.07 0.38 P LP 0.27 0.30 0.56 0.015 0.009 1.59 1.06 0.30

If Pinion Shafts are made of special steel state date of approval of chemical analyses, physical properties and heat treatment 10-6-55  
1st Reduction Wheel Shaft, Material and tensile strength HP NiCrMo STL TOP 51.0 BOT 51.2 Identification Mark HP Y 6324 A  
ELE. FURNACE LP NiCrMo STL TOP 51.0 BOT 51.4 Identification Mark LP Y 6324 B  
Wheel shaft, Material CARBON STL Identification Mark Y 6316 Thrust shaft, Material CARBON STL Identification Mark Y 6497  
Intermediate shafts, Material Forged Steel Identification Marks Y 6498 Tube shaft, Material ✓ Identification Marks ✓  
Screw shaft, Material Forged Steel Identification Marks Y 6499 (SPARE) Steam Pipes, Material Ca-Moly Steel Tube Test pressure 92.5 kg/cm<sup>2</sup>  
Date of test 27-12-55 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 Yes If so, have the requirements of the Rules been complied with Yes  
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.) This Turbine has been constructed under the supervision of the Society's Surveyors in accordance with the Society's Rules and the Approved Plans. The workmanship and materials have been found satisfactory.  
The turbine has been tested in the shop under no load condition and found in good order. It is submitted that this engine is eligible for classification with this Society with the notation of + LMC when satisfactorily installed in the vessel.

The Boilers and Machinery have been placed on board the ship in accordance with the Rules, Approved Plans and Secretary's Letters. On completion of installation appliances were satisfactorily tried under full working conditions and eligible, in our opinion, for classification with the record of + LMC 2.56

The amount of Entry Fee ... £ 376.000-: When applied for. JAN. 14, 1956 (YK9)  
Special ... £ 70,000-: APR. 14, 1956  
Donkey Boiler Fee ... £ : : When received.  
Travelling Expenses (if any) £ : : 19

Committee's Minute LMC 2.56 (with Tors. Endt.)  
Assigned 2 WTB 700 lb. OF. 2.56.  
CL.



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