Rpt. 9.

REPORT OF SURVEY FOR REPAIRS, &c., OF ENGINES & BOILERS

No. 7062

(Received at London Office 25 FEB 1943)

Date of writing Report 3 · 10 · 1942 When handed in at Local Office 3 · 10 · 1942 Port of BOMBAY.

No. in Book. Survey held at BOMBAY. Date. First Survey 25·10·41 Last Survey 21 · 9 · 1942 (No. of Visits 44)

~~Wood, Iron or~~ Steel on the Machinery of the T.S.S. LEONARDO DA VINCI.

Tonnage { Gross 7515 / Net 4205 }

Nominal Horse Power

No. of Main Boilers

No. of Donkey Boilers

Steam Pressure—Main Boilers

Donkey Boilers

Vessel built at Spezia By whom Ansaldo San Giorgio When 1925 (Year. Month.)

Engines made at do. By whom Ansaldo Sampierdarena When 1925

Boilers, when made (Main) (Donkey)

Owners Ministry of War Transport Owners' Address (If not already recorded in Appendix to Register Book.)

Managers ~~City Line~~ Ltd. Port Mombasa Voyage U.S.A.

If Surveyed Afloat or in Dry Dock Hughes. (State name of Dock.)

Last Report No. Port

Particulars of Examination and Repairs (if any) Gen. Ex. 13.5.42 T.S.

(Periodical Surveys, when held, must be reported in detail and seriatim in the terms of the Rules.) State clearly the cause of Repairs, if any, and, in detail, the nature and extent of Examinations and subsequent Repairs. Repairs on account of Damage (the cause of which must be stated) should be separated from Repairs due to other causes; and besides being detailed in the body of the report, should be briefly summarised at the end of the report. State also the dates and initials of any letters respecting this case.

In Damage cases where the Surveyor has not made a special damage report he is required to state whether he was offered his services for this purpose, and why they were declined ✓

Was a damage report made by anyone else? If so, by whom? ✓

Did the Surveyor personally go inside each Main Boiler separately and make a thorough examination at this time? Yes.

" " ~~Donkey~~ Aux. " " " Yes.

If this was not done, state for what reasons ✓

(a) what parts of the Boilers could not be thus thoroughly examined? ✓

(b) what special means, in the absence of internal examination, were adopted by the Surveyor to assure himself of the thorough efficiency of those parts of each Boiler? ✓

(c) latest date of internal examination of each boiler 29/4 & 6 28/5/1942

Present condition of funnel (s) Good.

Did the Surveyor examine the Safety Valves of the Main Boiler? Yes. To what pressure were they afterwards adjusted under steam? 200 lbs 0".

Did the Surveyor examine the Safety Valves of ~~Donkey~~ Aux. Boiler? Yes. To what pressure were they afterwards adjusted under steam? 200 lbs 0".

Did the Surveyor examine all the manholes, doors and their fastenings of the Main Boilers? Yes. , and of the Aux. Boilers? Yes.

Did the Surveyor examine the drain plugs of the Main Boilers? ✓ , and of the " Boilers? ✓

Did the Surveyor examine all the mountings of the Main Boilers? Yes. , and of the " Boilers? Yes

Has the screw shaft now been drawn and examined? Yes. Is it fitted with continuous liner? No Is an approved appliance fitted at the after end of the shaft to permit of it being efficiently lubricated? No.

Is screw shaft now been changed? No. If so, state reasons ✓.

Is the shaft now fitted been previously used? ✓ Has it a continuous liner? ✓ Is an approved appliance fitted at the after end of the shaft to permit of it being efficiently lubricated? ✓

(d) date of examination of Screw Shaft 17·7·42 State the distance between lignum vitae ~~bearings~~ of stern bush and top of after bearing of screw shaft Renewed.

(The parts, when referred to by numbers, should be counted from forward.)

Is electric light ~~motive power~~ fitted? Yes.

(e) did the Surveyor examine the generators, motors, switchgear, cables and fuses? Yes. Part circuits tested & repaired

Was the insulation resistance of the generators, circuits and apparatus been tested and found to be not less than 100,000 ohms? See below.

If the Survey is not complete, state what arrangements have been made for its completion and what remains to be done.

When this vessel arrived from Mombasa in October 1941 it was decided by the owners and the M.W.T. that the minimum repairs necessary should be carried out to enable her to proceed to Hong Kong for permanent repairs and a complete overhaul.

All the turbine blading was badly damaged, due to the engines having been run to a stand still without lubricating oil when the vessel was captured. The damaged bearings and thrusts were remetalled at Mombasa, and the remains of the blading were patched up and repaired by wiring and hard soldering to enable the vessel to reach Bombay.

The vessel has 4 Yarrow-type main boilers and two S-furnace Scotch Auxiliary boilers. The Yarrow boilers are not fitted with automatic feed regulators. As these were not available here, it was arranged that certificated engineers should maintain watches in each

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Character. *for Special Survey Date of last Survey and of Periodical Surveys.	Years assigned now expired.	Machinery and Boiler Surveys (including date of N.B., if any)
Fitted for Oil Fuel		

Insert Character of Ship and Machinery precisely as in the Register Book.

General Observations, Opinion, and Recommendation :—

(State clearly what alteration, if any, is suggested to be made in the existing classification of the vessel's machinery in the Register Book, consequent upon this survey, and also any alteration required to be made in the records of the vessel's machinery, boilers, working pressures, &c.; thus, for example, B.S. 9,11, B.&M.S. 9,11, *L.M.C. 9,11, or *L.M.C. 140 lb., F.D., &c.)

CS 3,34.

The machinery of this vessel, so far as now seen, is eligible in my opinion to be assigned the record of "Examined - Bom.9.42 for voyage to repair port" and T.S.- 7 .42, subject to all main turbines being re-bladed and overhauled, to automatic feed regulators being fitted to all 4 water tube boilers, to the two auxiliary boilers being retubed and their safety valve chests renewed, and to the remaining electric wiring etc. being tested and made good.

Is a Certificate required? If so, to be sent to

002184-002493-005114

Gen. Exam. Rs 100/-
New Fee (per Section 29) B.S., T.S. & Shg. Rs 635/-
Electrical Installation Rs 75/-
Special Damage ~~or~~ Repair Fee (if any) (per Section 29) Repairs - - - - Rs 650/-
Travelling expenses (if chargeable) & Launch hire Rs 180/-
Sunday fees 19/7 + 30/8/42 Rs 94/-

Fees applied for 3 · 10 · 1942

Received by me, 19

Committee's Minute

Assigned As now

TUES. 16 MAR 1943

H. Southwell

Engineer Surveyor to Lloyd's Register of Shipping.

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stokehold for the purpose of feed regulation on the voyage to Hong Kong.

The vessel was not granted priority for repairs or a berth, and lay well out in the harbour until April 22nd, when she was berthed alongside and given priority. During the vessel's time in the harbour the machinery was opened up by the ship's staff and surveyed, and parts for repairs were sent ashore. By this time Hong Kong having been captured by the enemy, it had been decided to send the vessel to New York for rebladng and permanent repairs. The work of renewing a large number of fire-row tubes in the W.T. boilers commenced when the vessel came alongside, as well as a lot of other major repairs which were necessary.

NOW DONE:- Main and auxiliary machinery opened up and examined throughout. Turbine blading found badly damaged and a large portion of the blades missing. So fas as possible all damaged blades had been faired and repaired at Mombasa and the vessel left that port at a speed of 10 knots but without astern power. The blading when examined here was found to be still in the same condition, the repairs having stood up well. It was agreed that they were in safe condition for a voyage to a port of repair.

The Starbd.M.P.rotor, however, was in such condition that it had to be removed and the turbine casing blanked off. This was done at Mombasa and the vessel left here in the same condition.

All pumps and auxiliary machinery overhauled, repaired and adjusted as necessary. All bearings examined and adjusted and spare main bearings made and put on board. All sea connections & discharges examined & overhauled. Propellers & outside fastenings examined

The 4 main boilers - Yarrow-type - examined throughout with mountings and tested at 350 lbs About 240 plugged and leaking tubes were renewed in the 4 boilers. All steam pipes were examined and most of them were stripped of lagging. Selected lengths were removed and tested to 600 lbs and found sound and in good condition.

The 2 Scotch-type auxiliary boilers were examined throughout with their mountings. The tubes were generally badly pitted and a large number of stoppers were fitted as no new tubes were available. Boilers tested to 350 lbs. and made tight, but further tubes gave out under steam.

All steam and feed valves throughout the vessel were opened up and overhauled. All bilge, sea and fresh water valve boxes, valves and connections were opened up and overhauled.

The electrical system was tested throughout in accordance with the Rules and all wiring and connections on the circuits used in navigating the vessel and in the engine and boiler rooms, offices and crews quarters and in other places where light was required for the voyage, were renewed as necessary. All other circuits in passenger spaces, about the decks &etc. were taken off the board.

The 4 turbo-generators were opened up and overhauled and adjusted and the dynamos were tested and repaired as necessary. It will be necessary to make some alterations in these turbine exhaust pipes, as ~~the~~ they rise after leaving the turbine, with the result that condensate runs back into the turbine. The Chief Engineer is taking this matter up on arrival in the U.S.A.

This vessel's steam pipe arrangement was not well laid-out, and the

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Port of Bombay Continuation of Report No. 7062 dated 3.10.'42 on the

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drainage arrangements and isolation arrangements were not adequate for all purposes, particularly when both main and auxiliary boilers were in use, and others were being opened up. It was agreed, however, that they were efficient for the voyage and that there was no danger to the engine room staff. A short time before the vessel was ready to sail 3 engineers were badly scalded while grinding in bulkhead stop valves on the main and auxiliary ranges in the engine room. Despite the most careful examination and investigation carried out by Engineer Surveyor to the Government of India, the Chief and Second Engineers and myself, no reason could be found for the accident. Two of the engineers subsequently died of their injuries, but on the basis of the report issued by the Government Surveyor, the Principal Surveyor apparently decided that no useful purpose could be served by holding an official inquiry.

The accident consisted of a sudden rush of about a gallon of boiling water out of the auxiliary range, about half an hour after the range had been opened to the atmosphere. The stop valve, which was being ground in at the time, was thrown about 15 feet away, and 3 engineers, who were working on the top platform in a confined space, were all badly scalded.

Consequent upon this, new drains were fitted, additional to the existing trap and drains already there, and at the same time, isolation valves were fitted on each main steam branch line,and between the two stokeholds on the main and auxiliary steam ranges. This required the cutting of a number of main and auxiliary steam pipes and the casting of a new 4-way piece for the auxiliary steam range in the forward boiler room. All these fittings and pipes were tested in accordance with the rules before being fitted in place.

The 4 main boilers and the two auxiliary boilers were afterwards examined under steam and their safety valves and the main boiler superheater safety valves adjusted at 200 lbs. Full power trials were carried out in the harbour and all machinery was found to be working satisfactorily. Owing to the poor condition of the tubes in the auxiliary boilers, it was not proposed to use them on the voyage.

REPAIRS:- All turbines and gearing opened up, except the starbd.M.P.which is blanked off. Temporary repairs to the damaged blading examined and found in efficient condition after the voyage from Mombasa.

A full set of spare main bearings supplied for all working turbines.

Forced lubrication system examined and tested throughout and 2 lengths of pipe renewed. Both main condensers and the auxiliary condenser opened up, cleaned, examined and tested. Lubricating oil coolers, cleaned, examined and tested. Both air pumps and coolers, opened up, overhauled and adjusted.

Both main circulating pumps and their engine opened up and examined throughout. The engine bearings and bottom ends remetalled and spares supplied. The same was done to the auxiliary circulating pump. The ballast pumps, general service pumps, feed pumps, main and auxiliary, fresh water pumps, lubricating oil pumps, sanitary pumps and their valves and connections were all opened up, overhauled, fitted with minor renewals and made good.

The evaporator was fitted with an overboard below-down valve. This new valve was tested and satisfactorily fitted to the shell plating.

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BOILERS:- 84 tubes renewed in the after port main boiler and some seams recaulked and made tight on starbd.water drum. 60 tubes renewed in the forward port main boiler, and 2 rivets renewed in the starbd.water drum circumferential seam, and the longitudinal seams and butt straps recaulked as necessary. 68 tubes renewed in the forward starboard main boiler and the seams and butt straps of both water drums caulked and made tight. 20 tubes renewed in the after starboard main boiler and the water drum seams caulked and made tight.

The brick work in all main boiler furnaces was largely renewed. The steam and water drums were exposed during the hydraulic tests and afterwards relagged.

The boiler air casings, lagging and uptakes was overhauled. The oil fuel burning installation, the heaters and transfer pumps & connections was examined throughout, cleaned and tested and generally overhauled.

The steam fire extinguishing connections were overhauled and tested. This vessel has no central foam-fire extinguishing apparatus, but over 20 portable foam cylinders were tested and recharged and placed in the machinery and boiler rooms.

The few available plain and stay tubes were used in the auxiliary boilers, and several which subsequently failed under test or under steam had to be fitted with stoppers. It is recommended that all the remaining old plain and stay tubes in these 2 boilers be renewed in U.S.A. A circumferential fracture in the starboard furnace of the starboard boiler was cut out and made good by electric welding. [redacted]

The furnace front pipes to the oil burners are of copper and it was recommended that they be replaced by S.D.steel pipes at the first opportunity.

No drawings of these boilers were available on board and it was not possible to have any made here. The donkey boiler safety valve chests are not of the standard pattern and new ones have been recommended to be fitted at the first opportunity. Both screw shafts drawn in and examined. In each case the liners are in 4 lengths. All 3 joints on the port shaft and 1 one the starboard shaft are filled in with zinc. The other 2 joints on the starboard shaft are brazed.

The refrigerating machinery was overhauled for domestic purposes and 3 of the 7 chambers were re-insulated. The brine pipes for these chambers, running from the plant at the after end of the engine room, along the tunnel and up to the chambers were all renewed. The pipes for the other chambers are in bad condition.

Data:- Diameter of screw shaft at top of taper is 13¾". Main gear wheel shafts are 14.3/16".

Twin screws - H.P. L.P. T.M.P. Turbines each side, D.R. Gearing.

Max. R.P.M. 116

Working pressure. - 200

Speed (Max.) - 15.65 knots on trials

B.H.P. - 6,800 max.

The machinery of this vessel is in efficient condition for a voyage overseas for permanent repairs. It is recommended that the main turbines be completely re-bladed and overhauled, that automatic feed regulators be fitted to all 4 water tube boilers, that the two auxiliary boilers be retubed and their safety valve chests be renewed and that the remaining electric wiring be tested and made good.

H.E.Cauthwell

Machinery partly examined & repairs effected to enable the vessel to proceed to Baltimore where she is now under survey.
Repairs are required to main turbines, boilers & in view of this it is submitted the posting of the examined record be deferred.

FrMB.
Both S7.42 (fitted with jointed C.L.)

[illegible]
12/3/47