

# EXHAUST REPORT ON STEAM TURBINE MACHINERY. No. 1429.

Rpt. 4a.

Received at London Office 23 JAN 1932

9.11.22  
20 June

Date of writing Report 20<sup>th</sup> Jan 32 When handed in at Local Office BREMEN Port of BREMEN  
 No. in Survey held at BREMEN Date, First Survey 29<sup>th</sup> OCT 31 Last Survey 6<sup>th</sup> JANUARY 1932  
 Reg. Book. HARIMAS YARD No 184 (Number of Visits 10)

Built at KOBE By whom built THE HARIMA SHIPB. & ENG. CO Yard No. 184 When built 1932  
 EXHAUST STEAM TURBINE & GEAR Engines made at BREMEN By whom made DEUTSCHE SCHIFFMACH. A.G. WERK A.G. WESER Engine No. DT. 322 When made 1932  
 Boilers made at EXHAUST STEAM TURBINE By whom made — Boiler No. — When made —  
 Shaft Horse Power at Full Power 1330 Owners — Port belonging to —  
 Nom. Horse Power as per Rule — Is Refrigerating Machinery fitted for cargo purposes — Is Electric Light fitted —  
 Trade for which Vessel is intended —

## STEAM TURBINE ENGINES, &c.—Description of Engines EXHAUST STEAM TURBINE DOUBLE REDUCTION GEARED SYSTEM BAUAR-WACH

No. of Turbines Ahead 1 Direct coupled, single reduction geared } to 1 propelling shafts. No. of primary pinions to each set of reduction gearing 1  
 Astern — double reduction geared } THROUGH AN OIL COUPLING  
 direct coupled to { Alternating Current Generator — phase — periods per second { rated — Kilowatts — Volts at — revolutions per minute;  
 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.           |                  |              |
|---------------------|-------------------|------------------|--------------|-------------------|------------------|--------------|-------------------|-------------------|--------------|-------------------|------------------|--------------|
|                     | 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. | HEIGHT OF BLADES. | DIAMETER AT TIP. | NO. OF ROWS. |
| 1ST EXPANSION ..... |                   |                  |              |                   |                  |              |                   |                   |              |                   |                  |              |
| 2ND " .....         |                   |                  |              |                   |                  |              | 80 <sup>mm</sup>  | 960 <sup>mm</sup> | 1            |                   |                  |              |
| 3RD " .....         |                   |                  |              |                   |                  |              | 99 "              | 998 "             | 1            |                   |                  |              |
| 4TH " .....         |                   |                  |              |                   |                  |              | 118 "             | 1036 "            | 1            |                   |                  |              |
| 5TH " .....         |                   |                  |              |                   |                  |              | 137 "             | 1074 "            | 1            |                   |                  |              |
| 6TH " .....         |                   |                  |              |                   |                  |              | 157 "             | 1114 "            | 1            |                   |                  |              |
| 7TH " .....         |                   |                  |              |                   |                  |              | 184 "             | 1168 "            | 1            |                   |                  |              |
| 8TH " .....         |                   |                  |              |                   |                  |              | 210 "             | 1220 "            | 1            |                   |                  |              |
| 9TH " .....         |                   |                  |              |                   |                  |              |                   |                   |              |                   |                  |              |
| 10TH " .....        |                   |                  |              |                   |                  |              |                   |                   |              |                   |                  |              |
| 11TH " .....        |                   |                  |              |                   |                  |              |                   |                   |              |                   |                  |              |
| 12TH " .....        |                   |                  |              |                   |                  |              |                   |                   |              |                   |                  |              |

Shaft Horse Power at each turbine { H.P. — I.P. — L.P. 1330 } Revolutions per minute, at full power, of each Turbine Shaft { H.P. — I.P. — L.P. 3300 }  
 Rotor Shaft diameter at journals { H.P. — I.P. — L.P. 170<sup>mm</sup> } Pitch Circle Diameter { 1st pinion 225,537<sup>mm</sup> 2nd pinion 407,35<sup>mm</sup> } 1st reduction wheel 1726,05<sup>mm</sup> main wheel 2209,34<sup>mm</sup> } width of Face { 1st reduction wheel 310<sup>mm</sup> main wheel 640<sup>mm</sup> }

Distance between centres of pinion and wheel faces and the centre of the adjacent bearings { 1st pinion 325/285<sup>mm</sup> 2nd pinion 470<sup>mm</sup> } 1st reduction wheel 1765/400<sup>mm</sup> main wheel 580<sup>mm</sup> }

Flexible Pinion Shafts, diameter { 1st — 2nd 115 } Pinion Shafts, diameter at bearings { External 160<sup>mm</sup> Internal 160<sup>mm</sup> } 1st 380<sup>mm</sup> 2nd 315<sup>mm</sup> } diameter at bottom of pinion teeth { 1st 214,537<sup>mm</sup> 2nd 390,85<sup>mm</sup> }

Wheel Shafts, diameter at bearings { 1st 280<sup>mm</sup> main 540<sup>mm</sup> } diameter at wheel shroud, { 1st 1660<sup>mm</sup> main 2110,5<sup>mm</sup> } Generator Shaft, diameter at bearings — Propelling Motor Shaft, diameter at bearings —  
 Intermediate Shafts, diameter as per rule — as fitted — Thrust Shaft, diameter at collars as per rule — as fitted 380<sup>mm</sup> Tube Shaft, diameter as per rule — as fitted —

Screw Shaft, diameter as per rule — as fitted — Is the { tube } 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 — 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 I.P. Turbine exhaust direct to the Condenser —

Condenser 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 — Suctions, connected to both Main Bilge Pumps and Auxiliary Bilge Pumps, No. and size:—In Engine and Boiler Room —

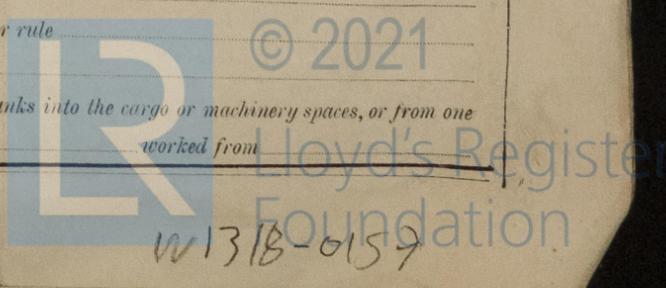
In Holds, &c. — Main Water Circulating Pump Direct Bilge Suctions, No. and size — Independent Power Pump Direct Suctions to the Engine Room Bilges, No. and size — Are all the Bilge Suction pipes in Holds and Tunnel Well fitted with strum-boxes —

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 tankers — 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 —



BOILERS, &c. — (Letter for record ) Total Heating Surface of Boilers

Is Forced Draft fitted  No. and Description of Boilers  Working Pressure

Is a Report on Main Boilers now forwarded?

Is  a Donkey  an Auxiliary Boiler fitted?  If so, is a report now forwarded?

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

Spare Gear. State the articles supplied:—

- 1 set of thrust pads - both for Turbine Thrust bearing
- 1 " " " " " Propeller " " "
- 1 " " " " " Pinion II " " "
- 1 set of bearing frames for Turbine bearings
- 1 " " " " " Pinion " " "
- 1 set of studs & nuts for all bearings

Deutsche Schiff- und Maschinenbau Aktiengesellschaft

*i. v. Schmircke*

Manufacturer

The foregoing is a correct description,

Dates of Survey while building  During progress of work in shops --  During erection on board vessel ---  Total No. of visits

1931 Oct. 29. Nov. 13, 17, 24, 27. Dec. 2, 4, 16, 21. 1932 Jan 6.

Dates of Examination of principal parts—Casings 4. 12. 31 Rotors 13. 11. 31 Blading 12. 11. 31 Gearing 21. 12. 31

Wheel shaft 13. 27/11. 31 Thrust shaft 13. 11. 31 Intermediate shafts  Tube shaft  Screw shaft

Propeller  Stern tube  Engine and boiler seatings  Engine holding down bolts

Completion of pumping arrangements  Boilers fired  Engines tried under steam

Main boiler safety valves adjusted  Thickness of adjusting washers

Rotor shaft, Material and tensile strength *P. M. Steel 34.2 t. prop. inch.* Identification Mark *J.L. 9272. 11. 8. 31*

~~Pinion~~ Pinion Shaft, Material and tensile strength *P. M. Nickel Steel 46.6 t. prop. inch.* Identification Mark *J.L. 9270. 11. 8. 31*

Pinion shaft, Material and tensile strength *P. M. Nickel Steel 47. t. prop. inch.* Identification Mark *F.S. 1332. 30. 7. 31*

1st Reduction Wheel Shaft, Material and tensile strength *P. M. Steel 38.8 t. prop. inch.* Identification Mark *P.C. 4145. 29. 11. 31*

Wheel shaft, Material *P. M. Steel* Identification Mark *M.K. 4148. 19. 8. 31* Thrust shaft, Material *P. M. Steel* Identification Mark *M.K. 4150. 26. 8. 31*

Intermediate shafts, Material *L.M. Steel* Identification Marks *2515 F.K. 3.9. 31* 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

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

Is this machinery a duplicate of a previous case  If so, state name of vessel

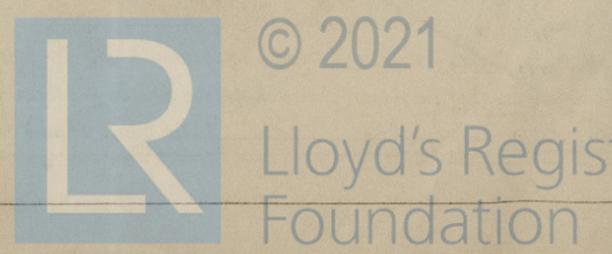
General Remarks (State quality of workmanship, opinions as to class, &c.) *The Exhaust Steam Turbine & Gear 440*

*been constructed under Special Survey in accordance with the apppr. plan, the Secretary's letter and otherwise in conformity with the requirements of the Rules. The Materials used in the construction and the workmanship are good. The Turbine casing and the oil coupling have been hydraulically tested to 2 resp. 8 kg/cm<sup>2</sup> and found tight and sound. This Machinery is eligible in my opinion to be recorded in the Reg. Book with notation of: "E. H.P. Turbine D.R. gearing a hydraulic coupling". When satisfactorily fitted on board and tried under working cond.*

The amount of Entry Fee ... £  : When applied for, *20.1.1932*  
Special ... £ *25* : 0 :  
Donkey Boiler Fee ... £  :  
Travelling Expenses (if any) £ *0* : *10* : *23.2.1932*

*S. Carstensen*  
Engineer Surveyor to Lloyd's Register of Shipping.

Committee's Minute *TUE. 4 OCT 1932*  
Assigned *See Kob. J.E. Rpt 7879*



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