

# REPORT ON STEAM TURBINE MACHINERY. No. 98002

4a.

Received at London Office 6 NOV 1939

Report of writing Report 2nd Nov. 1939 When handed in at Local Office 2/11/39 Port of NEWCASTLE-ON-TYNE  
 Date, First Survey 26/10/39 Last Survey 1.11.1939  
 in Survey held at Newcastle-on-Tyne (Number of Visits 51)  
 Reg. Book. St. Lanarkshire

on the Greenock By whom built Greenock Dockyard Co. Ltd. Yard No. 437 Tons <sup>Gross</sup> 436 <sub>Net</sub> When built 1939  
 Engines made at Newcastle-on-Tyne By whom made The Parsons Marine Steam Turbine Co. Ltd. Engine No. 328 When made 1939  
 Boilers made at Greenock By whom made J. & K. Kincaid & Co. Ltd. Boiler No. 700 When made 1939  
 Shaft Horse Power at Full Power 9200 Owners The Clan Line Steamers, Ltd. Port belonging to Glasgow  
 Nom. Horse Power as per Rule 1549 Is Refrigerating Machinery fitted for cargo purposes Is Electric Light fitted  
 Trade for which Vessel is intended Coastal

## STEAM TURBINE ENGINES, &c.—Description of Engine Twin Screw S.A. Geared Turbines, Impulse Reaction Type

No. of Turbines 6 Ahead 4 Direct coupled, single reduction geared to 2 propelling shafts. No. of primary pinions to each set of reduction gearing 3  
double reduction geared  
 Direct coupled to Alternating Current Generator — phase — periods per second — rated — Kilowatts — Volts at — revolutions per minute;  
 supplying power for driving — Propelling Motors, Type —  
 Direct coupled, single or double reduction geared to — propelling shafts.

| TURBINE<br>LOADING. | H. P.                |                     |                 | I. P.                |                     |                 | L. P.  |                     |                 | L. P. ASTERN.   |                     |                 |
|---------------------|----------------------|---------------------|-----------------|----------------------|---------------------|-----------------|--|---------------------|-----------------|---|---------------------|-----------------|
|                     | HEIGHT OF<br>BLADES. | DIAMETER<br>AT TIP. | NO. OF<br>ROWS. | HEIGHT OF<br>BLADES. | DIAMETER<br>AT TIP. | NO. OF<br>ROWS. | HEIGHT OF<br>BLADES.   | DIAMETER<br>AT TIP. | NO. OF<br>ROWS. | HEIGHT OF<br>BLADES.  | DIAMETER<br>AT TIP. | NO. OF<br>ROWS. |
| 1st EXPANSION       | 3/4"                 | 17"                 | 11              | 1 1/2"               | 26 1/2"             | 5               | 3 13/16"   | 42 5/8"             | 3               | 1.75"   | 4'-0 3/4"           | 1               |
| 2nd                 | 1 1/16"              | 17 5/8"             | 11              | 2"                   | 27 1/2"             | 5               | 2 1/2"   | 42 5/8"             | 3               | 1.77"   | 4'-1 3/4"           | 1               |
| 3rd                 | 1 3/8"               | 18 1/4"             | 11              | 2 9/16"              | 28 5/8"             | 5               | Expansion - tapered casing with blades increasing from 3 1/16" to 8 1/4" - one blade each expansion. |                     |                 | Reaction  |                     |                 |
| 4th                 | 1 3/4"               | 19"                 | 11              | 3 7/16"              | 30 3/8"             | 5               |  |                     |                 | 2nd Expansion to 11"  |                     |                 |
| 5th                 | 2 1/4"               | 20"                 | 11              | 4 1/2"               | 32 1/2"             | 5               |  |                     |                 | Expansion - tapered casing with blades increasing from 1 7/8" to 4 1/4" - one blade each expansion. |                     |                 |
| 6th                 |                      |                     |                 |                      |                     |                 |  |                     |                 | Reaction  |                     |                 |
| 7th                 |                      |                     |                 |                      |                     |                 |  |                     |                 | 2nd Expansion to 11"  |                     |                 |
| 8th                 |                      |                     |                 |                      |                     |                 |  |                     |                 | Expansion - tapered casing with blades increasing from 1 7/8" to 4 1/4" - one blade each expansion. |                     |                 |
| 9th                 |                      |                     |                 |                      |                     |                 |  |                     |                 | Reaction  |                     |                 |
| 10th                |                      |                     |                 |                      |                     |                 |  |                     |                 | 2nd Expansion to 11"  |                     |                 |
| 11th                |                      |                     |                 |                      |                     |                 |  |                     |                 | Expansion - tapered casing with blades increasing from 1 7/8" to 4 1/4" - one blade each expansion. |                     |                 |
| 12th                |                      |                     |                 |                      |                     |                 |  |                     |                 | Reaction  |                     |                 |
| 13th                |                      |                     |                 |                      |                     |                 |  |                     |                 | 2nd Expansion to 11"  |                     |                 |
| 14th                |                      |                     |                 |                      |                     |                 |  |                     |                 | Expansion - tapered casing with blades increasing from 1 7/8" to 4 1/4" - one blade each expansion. |                     |                 |
| 15th                |                      |                     |                 |                      |                     |                 |  |                     |                 | Reaction  |                     |                 |
| 16th                |                      |                     |                 |                      |                     |                 |  |                     |                 | 2nd Expansion to 11"  |                     |                 |
| 17th                |                      |                     |                 |                      |                     |                 |  |                     |                 | Expansion - tapered casing with blades increasing from 1 7/8" to 4 1/4" - one blade each expansion. |                     |                 |
| 18th                |                      |                     |                 |                      |                     |                 |  |                     |                 | Reaction  |                     |                 |
| 19th                |                      |                     |                 |                      |                     |                 |  |                     |                 | 2nd Expansion to 11"  |                     |                 |
| 20th                |                      |                     |                 |                      |                     |                 |  |                     |                 | Expansion - tapered casing with blades increasing from 1 7/8" to 4 1/4" - one blade each expansion. |                     |                 |

The L.P. Ast. Turbine is incorporated with the L.P. Ahead.

Shaft Horse Power at each turbine { H.P. 1675 ✓  
 I.P. 1465 ✓  
 L.P. 1460 ✓ } Revolutions per minute, at full power, of each Turbine Shaft { H.P. 2710 ✓  
 I.P. 2710 ✓  
 L.P. 2323 ✓ } 1st reduction wheel —  
 main shaft 116 ✓

Rotor Shaft diameter at journals { H.P. 5 1/2" ✓  
 I.P. 6 1/2" ✓  
 L.P. 7 1/2" ✓ } Pitch Circle Diameter { 1st pinion — main wheel 150.1843" ✓  
 2nd pinion — main wheel 150.1843" ✓ } Width of Face { 1st reduction wheel —  
 main wheel 20.16 1/2" ✓

Distance between centres of pinion and wheel faces and the centre of the adjacent bearings { 1st pinion 14 3/8" + 12 1/8" ✓  
 2nd pinion — main wheel 20 1/4" ✓ } 1st reduction wheel —  
 main wheel 20 1/4" ✓

Flexible Pinion Shafts, diameter { 1st — ✓  
 2nd — ✓ } Pinion Shafts, diameter at bearings { External 1st 5 1/2" ✓  
 Internal 1st 1 1/2" ✓ } diameter at bottom of pinion teeth { 1st H.P. I.P. 5-6707 ✓  
 2nd L.P. 6-9219 ✓

Wheel Shafts, diameter at bearings { 1st — ✓  
 main 17" ✓ } diameter at wheel shroud, { 1st — ✓  
 main 145 1/2" ✓ } 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 — } as fitted —

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 { — }  
 { screw } { — }

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 Movable — 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 —

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

BOILERS, &c.—(Letter for record <sup>WT</sup> S ) Total Heating Surface of Boilers 14790  $\square$   
 Is Forced Draft fitted *yes.* No. and Description of Boilers *3 Water Tube - Babcock & Wilcox Working Pressure 250 lbs.*  
 Is a Report on Main-Boilers now forwarded? *no*  
 Is <sup>a Donkey</sup> <sub>an Auxiliary</sub> Boiler fitted?  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 *Gearing - yes* Main Boilers *no* Auxiliary Boilers  Donkey Boilers   
 (If not state date of approval)

Superheaters *no* General Pumping Arrangements *no* Oil Fuel Burning Arrangements

SPARE GEAR.

Has the spare gear required by the Rules been supplied *yes.*  
 State the principal additional spare gear supplied *one relief valve spring for each size fitted; studs and nuts for H.P., I.P. and L.P. rotor bearings; studs and nuts, fitted bolts and nuts, and ordinary bolts and nuts for H.P., I.P. and L.P. turbine horizontal joints; studs and nuts for main gear wheel shaft bearings; collar studs and nuts for pinion bearings; studs, nuts and bolts for gear case joints; gauges, lifting gear and adjusting gear, etc.*

FOR THE PARSONS MARINE STEAM TURBINE CO. LIMITED,

*D. James Brown*  
 Director & Engineering Manager, Manufacture

The foregoing is a correct description,

1938 1939  
 Dates of Survey while building { During progress of work in shops - - Oct. 26. Nov. 15. 22. 24. 29. Dec 8. 22. 23. 1939 Jan 9. 12. 17. 23. 25. Feb. 2. 7. 17. 23. 28. Mar. 1. 9. 14. 15. 21. 27 }  
 { During erection on board vessel - - - Apr. 5. 6. 11. 21. 25. May 2. 10. 12. 26. June 9. July 3. 4. 11. 21. 28. Aug. 8. Sep. 4. 13. 22. 28. Oct. 3. 6. 11 }  
 Total No. of visits *51.*

Dates of Examination of principal parts—Casings *25.1.39 to 11.10.39* Rotors *26.10.38 to 11.10.39* Blading *29.11.38 to 11.10.39* Gearing *7.2.38 to 11.10.39*

Wheel shaft *23.2.38 to 11.10.39* Thrust shaft  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

Rotor shaft, Material and tensile strength *Steel 86/33 tons/10"*

Flexible Pinion Shaft, Material and tensile strength

Pinion shaft, Material and tensile strength *Nickel Steel 40 tons/10"*

1st Reduction Wheel Shaft, Material and tensile strength

Wheel shaft, Material *Steel 81/35 tons/10"* Identification Mark *See attached list* Thrust shaft, Material  Identification Mark

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

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

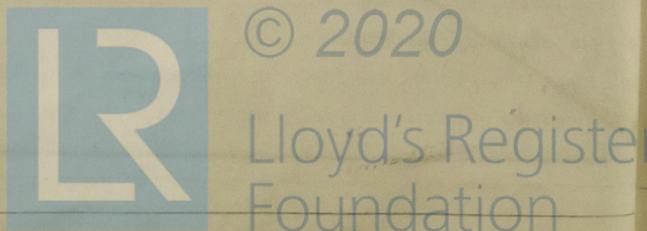
General Remarks (State quality of workmanship, opinions as to class, &c.) *These turbines and gearing have been constructed under special survey; the materials and workmanship are good. The units have been erected and subjected to steam trials on the test bed in the shop with satisfactory results, afterwards dismantled, examined and found satisfactory and forwarded to Greenock for instalment in the vessel.*

The amount of Entry Fee ... £ 6 : 0 : 0 When applied for, **3 NOV 1939**  
*2/5 of £ 138 = 14 = 6* Special ... } £ 55 : 10 : 0  
 Donkey Boiler Fee ... £ : : : When received,  
 Travelling Expenses (if any) £ : : : *22.12.1939*

*H. B. Forster*  
 Engineer Surveyor to Lloyd's Register of Shipping.

Committee's Minute **GLASGOW 16 APR 1940**

Assigned **ACCOMPANYING MACHINERY REPORT.**



Certificate (if required) to be sent to Newcastle-on-Tyne

The Surveyors are requested not to write on or below the space for Committee's Minute.