

8 JUL 1960

# Report on Steam Turbine Machinery. No. 15215

Rpt. 4a.

Received at London Office  
 Date of writing Report 8th June 19 60 When handed in at Local Office 19 Port of TRIESTE  
 No. in Survey held at Monfalcone & Trieste Date, First Survey                      Last Survey                      19                       
 Reg. Book                      (Number of Visits                     )  
41932 on the Single Screw Vessel "ESSO DUBLIN" Tons {Gross 23720  
                   Double                      {Net 12752  
                   Quadruple                       
 Built at Monfalcone By whom built C.R.D. Adriatico Yard No. 1849 When built 1960  
 Engines made at Trieste By whom made -do- Engine No. 330/331 When made 1960  
 Boilers made at Glasgow & Trieste By whom made Babcock & Wilcox & C.R.D.A. Boiler No. 2066/2067 When made 1959  
 Shaft Horse Power {Maximum 17600 Owners Esso Petroleum Co., Ltd. Port belonging to London  
                           Service 16000  
 I.N. as per Rule 3520 Is Refrigerating Machinery fitted for cargo purposes no Is Electric Light fitted yes  
 Trade for which Vessel is intended carrying petroleum in bulk

## STEAM TURBINE ENGINES, &c.—Description of Engines Two De Laval type steam turbines DR geared to single screwshaft

No. of Turbines Ahead 2 single reduction geared to 1 propelling shafts. No. of primary pinions to each set of reduction gearing 2  
Astern 1 double reduction geared  
 direct coupled to { Alternating Current Generator phase                      periods per second                      rated                      Kilowatts                      Volts at                      revolutions per minute;  
                           Direct Current Generator 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.  |
|------------------|---|-----------|-------|----------|----------|
| Impulse Blading  | No. of rows <u>11</u>                                 | <u>11</u> |       | <u>8</u> | <u>3</u> |
| Reaction Blading | No. of stages <u>11</u>                               | <u>11</u> |       | <u>8</u> | <u>2</u> |
|                  | No. of rows in each stage <u>                    </u> |           |       |          |          |

Shaft Horse Power at each turbine { H.P. 8800 I.P. 8800 L.P. 8800 HP 289.539 HP 2290.913 I.P. 3309 1st reduction wheel 712.5  
 Rotor Shaft diameter at journals { H.P. 150 mm I.P. 165 mm L.P. 165 mm Pitch Circle Diameter 457.167 1st pinion 457.167 1st reduction wheel 2x257.5 mm  
 Distance between centres of pinion and wheel faces and the centre of the adjacent bearings { 1st pinion 385 mm 1st reduction wheel 397 mm  
 Flexible Pinion Shafts, diameter { 1st HP 178 mm 2nd LP 200 mm Pinion Shafts, diameter at bearings { External 177.57 Internal 63 mm 2nd 305 mm diameter at bottom of pinion teeth 1st HP 276.076 mm  
 Wheel Shafts, diameter at bearings { 1st 304.6 mm 2nd 609.4 mm diameter at wheel shroud { 1st 361.08 mm 2nd 721.77-737 Generator Shaft, diameter at bearings { 1st 443.704 mm 2nd 599.4 mm  
 Intermediate Shafts, diameter { as per rule as appd. as fitted 537 mm Thrust Shaft, diameter at collars { as per rule as appd. as fitted 488.8  
 Tube Shaft, diameter { as per rule as appd. as fitted 565 mm Screw Shaft, diameter { as per rule as appd. as fitted 565 mm at coupling 565 mm shaft fitted with a continuous liner { yes  
 Bronze Liners, thickness in way of bushes { as per rule 32.5 & 32 mm as fitted 32.5 & 32 mm Thickness between bushes { as per rule as appd. as fitted 32.5 & 32 mm Is the after end of the liner made watertight in the propeller boss yes If the liner is in more than one length are the junctions made by fusion through the whole thickness of the liner one length  
 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 2745 mm  
 Propeller, diameter 6500 mm Pitch 4860/5910 No. of Blades 4 State whether Moveable fixed Total Developed Surface 17.29 square feet                      sq. Mts.  
 If Single Screw, are arrangements made so that steam can be led direct to the L.P. Turbine yes Can the H.P. and L.P. Turbines exhaust direct to the Condenser yes No. of Turbines fitted with astern wheels one Feed Pumps { No. and size 3 at 108 T/hr. How driven Independent steam turbine  
 Pumps connected to the Main Bilge Line { No. and size 1 at 136 T/hr. 1 at 91 T/hr. 1 at 227 T/hr. 1 at 157 T/hr. fwd. pump room  
 How driven Steam recip. Electrical Steam Turbine Steam  
 Ballast Pumps, No. and size 1 at 136 T/hr. 1 at 227 T/hr. Lubricating Oil Pumps, including Spare Pump, No. and size 2 at 110 T/hr (elect.)  
 Are two independent means arranged for circulating water through the Oil Cooler yes Branch Bilge Suctions, No. and size In Engine  
 and Boiler Rooms 11 at 90 mm (3 in aft eng. room) In Pump Room 1 at 80 mm aft P.R. 2 at 100 mm  
 In Holds, &c. Dry hold 2 at 80 mm Bos. Store 2 at 50 mm Chain lock 1 at 65 mm Cofferdam 2 at 80 mm 1 at 65 mm  
 Main Water Circulating Pump Direct Bilge Suctions, No. and size 1 at 500 mm Direct Bilge Suctions to the Engine and/or Boiler Room  
 Bilges, No. and size 3 at 125 mm (2 in MER) Are all the Bilge Suction pipes in Holds and Tunnel Well fitted with strum-boxes as required 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 boxes Are they fitted with Valves or Cocks both  
 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                      What pipes pass through the bunkers none How are they protected                       
 What pipes pass through the deep tanks none 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 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 none Is it fitted with a watertight door                      worked from                     

BOILERS, &c.—Total Heating Surface of Boilers 19,836 sq.ft. (8750x2) + (1168x2)  
 Is Forced Draught fitted yes No. and Description of Boilers 2: Two drum B & W water tube Working Pressure 945 P.S.I.  
 Is a Report on Main Boilers now forwarded? yes Design 965 Supt. 935 lbs.

012861-012867-0060 1/4



Is { a Donkey Boiler fitted? no 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 14.9.56 Main Boilers 31.25.56 Glasgow  
(If not, state date of approval) 8.3.60 Auxiliary Boilers - Donkey Boilers -  
Superheaters 17.10.56 Glasgow General Pumping Arrangements yes Oil Fuel Burning Arrangements 26.6.57  
Geared turbines situated aft. Have torsional vibration characteristics of system been approved yes Date of approval 14.11.57

### SPARE GEAR.

Has the spare gear required by the Rules been supplied. yes 360 U 30/7/57 18/7/60  
State the principal additional spare gear supplied.  
SPEED RESTRICTION:- Please see Trieste letter dated 23.5.60 and Head Office reply dated (NOT TO HAND)  
The main machinery not to be operated between 495-55 R.P.M. of the screwshaft  
A notice board has been fitted at the machinery platform and the tachometer marked accordingly.

The foregoing is a correct description. CANTIERI RIUNITI DELL'ADRIATICO  
Fabbrica Macchine S. Andrea Manufacturer

Dates of Examination of principal parts - Casings. Various dated in 1959-1960 After trials  
During progress of work in shops - - - - -  
During erection on board vessel - - - - - See separate sheet  
Total No. of visits  
Wheel shaft Thrust shaft 8/1/60 Intermediate shafts 8/1/60 Tube shaft 5.8.59 Screw shaft 5.8.59  
Propeller 6.8.59 Stern tube 29.7.59 Engine and boiler seatings 1.2.60 Engine holding down bolts 1.2.60  
Completion of fitting sea connections. 1.10.59 Completion of pumping arrangements. 2.5.60 Boilers fixed. 1.2.60 Engines tried under steam. 9.5.60 (See  
Main boiler safety valves adjusted 29.4.60 Thickness of adjusting washers Starbd: Sat. frd. 32 Aft 30.9 Supt. 32.3  
Rotor shaft, Material and tensile strength. See separate sheet Identification Mark. 29.9 31.3 31.4  
Flexible Pinion Shaft, Material and tensile strength. do Identification Mark.  
Pinion shaft, Material and tensile strength. do Identification Mark.  
; Chemical analysis. do

If Pinion Shafts are made of special steel state date of approval of chemical analyses, physical properties and heat treatment.  
1st Reduction Wheel Shaft, Material and tensile strength. See separate sheet Identification Mark.  
Wheel shaft, Material. Identification Mark. do Thrust shaft, Material. Identification Mark.  
Intermediate shafts, Material. Identification Marks. do Tube shaft, Material. Identification Marks.  
Screw shaft, Material. Identification Marks. do Steam Pipes, Material. X-rayed Test pressure. 148 kg/cm<sup>2</sup>  
Date of test. Various dates Nov. 1959 - April 1960 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  
Full description of Fire Extinguishing Apparatus fitted in machinery spaces fixed CO<sub>2</sub> installation, steam smothering, portable extinguishers  
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. yes  
If the notation for ice strengthening is desired, state whether the requirements in this respect have been complied with. no  
Is this machinery a duplicate of a previous case? 2nd reduction gearing. If so, state name of vessel. "ESSO WINDSOR" - "ESSO LIVERPOOL".

General Remarks. (State quality of workmanship, opinions as to class, &c.) The main and auxiliary machinery of this vessel has been constructed under special survey of tested materials, in accordance with the Secretary's letters, approved plans and to Rule requirements. The materials and workmanship are good.  
The main and auxiliary machinery has been efficiently installed aboard this vessel and on completion tried at sea under full load conditions with satisfactory results. The machinery of this vessel, in our opinion, is eligible to be classed with the following notations :-

+LMC - 5,60 Screwshaft CL  
2 Steam turbines D.R. geared to single screwshaft  
2 W.T. boilers 965 P.S.I. (Supt.) 935 P.S.I.  
H.S. 19,836 sq.ft.  
F.D. Fitted for oil fuel F.P. above 150°F. - 5,60

Construction of Machinery  
The amount of Entry Fee £ 346. 6. 0 When applied for  
Special Surtax of Machinery (15%) £ 295. 14. 0 Thru London

Donkey Boiler Fee £ - : : When received  
Travelling Expenses (if any) £ See Rpt. 1. 19

Committee's Minute. FRIDAY 26 AUG 1960  
Assigned. See Rpt. 1.

Account Rendered

2 10/11/1960

From LONDON Engineer Surveyor to Lloyd's Register of Shipping.

Rpt. 9a- Conts. Sheet

Port of TRIESTE

Continuation of Ship/Mchy. Report No. 15215 dated 23.6.1960  
Continuation of Report No. on the

ESSO DUBLIN

on the S.S./M.S. C.R.D.3A. YARD N°. 1849 TURBINES N°. 330/331

| PARTS                        | MATERIAL           | MIN. TENSILE STRENGTH KG/MM <sup>2</sup> | IDENTIFICATION MARKS | PORT & N°. OF CERTIFICATE      |
|------------------------------|--------------------|--|----------------------|--------------------------------|
| 1st reduction HP pinion      | E.F.S. Ni. Cr. Mo  | 97.5                                     | LR. NAP. 3311        | NAPLES 2580 ✓                  |
| 1st reduction LP pinion      | E.F.S. Ni. Cr. Mo  | 97.5                                     | LR. NAP. 3477        | NAPLES 2581 ✓                  |
| H.P. flexible coupling       | E.F.S.             | 68.0                                     | LR. GEN. 58          | GENOA F. 26419 ✓               |
| H.P. flexible coupling       | E.F.S.             | 93.2                                     | LR. GEN. 28          | GENOA F. 26418 ✓               |
| L.P. flexible coupling       |                    | 98.1                                     | RI. AB. V. 1002      | +                              |
| L.P. flexible coupling       |                    | 70.7                                     | RI. AB. V. 886       | +                              |
| 1st reduction HP wheel rim   | Mn. V. E.F.S.      | 70.8                                     | LR. NAP. 3673        | NAPLES 2945 ✓                  |
| 1st reduction HP wheel shaft | E.F.S.             | 57.1                                     | LR. NAP. 3467        | NAPLES 2577 ✓                  |
| 1st reduction HP wheel discs | E.F.S.             |  | LR. GEN. 2546        | GENOA 28.8.57 ✓                |
| 1st reduction HP wheel hub   | E.F.S.             | 49.3                                     | LR. GEN. SS. 5955    | GENOA F. 24743 ✓               |
| 1st reduction HP Wheel nut   |                    |  | 94233-2              |                                |
| 1st reduction LP wheel rim   | Mn. V. E.F.S.      | 70.2                                     | LR. NAP. 3672        | NAPLES 2945 ✓                  |
| 1st reduction LP wheel shaft | E.F.S.             | 57.1                                     | LR. NAP. 3468        | NAPLES 2577 ✓                  |
| 1st reduction LP wheel discs | E.F.S.             |  | LR. TRI. 2798        | TRIESTE 272 ✓                  |
| 1st reduction LP wheel hub   | E.F.S.             | 51.5                                     | LR. GEN. SS. 5497    | GENOA F. 23653 ✓               |
| 1st reduction LP wheel nut   |                    |  | 94233-2              |                                |
| H.P. quill shaft             | E.F.S.             | 76.5                                     | LR. NAP. 2829        | NAPLES 2127 ✓                  |
| L.P. quill shaft             | E.F.S.             | 76.0                                     | LR. NAP. 2828        | NAPLES 2126 ✓                  |
| 2nd reduction HP pinion      | Ni. Cr. Mo. E.F.S. | 96.8                                     | RI AB PG 842         | ++ ✓                           |
| 2nd reduction LP pinion      | Ni. Cr. Mo. E.F.S. | 95.6                                     | RI AB PG 843         | ++ ✓                           |
| H.P. flexible coupling       | Ni. Cr. Mo. E.F.S. | 65.6 / 90.8                              | LR. GEN. P.40/P.30   | GENOA F. 25698 ✓<br>F. 25700 ✓ |
| H.P. flexible coupling       | Ni. Cr. Mo. E.F.S. | 76.4 / 76.0                              | LR. GEN. P.25/P.48   | GENOA F. 25697 ✓<br>F. 25703 ✓ |
| L.P. flexible coupling       | Ni. Cr. Mo. E.F.S. | 65.6 / 90.8                              | LR. GEN. P.40/P.30   | GENOA F. 25698 ✓<br>F. 25700 ✓ |
| L.P. flexible coupling       | Ni. Cr. Mo. E.F.S. | 76.4 / 76.0                              | LR. GEN. P.25/P.48   | GENOA F. 25697 ✓<br>F. 25703 ✓ |
| Main Gear wheel rim          | Mn. V. E.F.S.      | 62.4                                     | LR. NAP. 3659        | NAPLES 2944 ✓                  |
| Main gear wheel shaft        | E.F.S.             | 54.0                                     | LR. NAP. 3147        | NAPLES 2576 ✓                  |
| Main gear wheel discs        | E.F.S.             |  | LR. GEN 24322 24062  | GENOA 4.1.58 31.12.57 ✓        |
| Main gear wheel hub          | E.F.S.             | 46.8                                     | LR. GEN. SS. 6046    | GENOA 24920 ✓                  |
| Main gear wheel nut          |                    |  | 94233-3              |                                |

\* See RI Certificates N°. 591.639 and 591.571

Fine tooth coupling tested by R.I. and A.B. Check tests as per Secretary's letter 'ENG' dated 8th March 1960 confirmed results shown on certificates.

\*\* See A.B. Certificate N°. 59-BRI0165-600 dated 28.4.59

Two 2nd reduction pinions tested by A.B. Check tests as per Secretary's letter 'ENG' dated 8th March 1960 Results shown on test certificate confirmed.



ESSO DUBLIN  
on the S.S./M.S. C.R.D.A. YARD N°.1849 C.R.D.A. TURBINES 330/331

| P A R T S                       | MATERIAL                 | MIN. TENSILE<br>STRENGTH KG/MM <sup>2</sup> | IDENTIFICATION<br>MARKS   | PORT AND<br>N°. OF CERTIFICATE |
|---------------------------------|--------------------------|---|---------------------------|--------------------------------|
| Propeller (fitted)              | Nikalium                 | 44.2 Tons/MM <sup>2</sup>                   | LR 4327                   | LIVERPOOL C.2286 ✓             |
| Screwshaft (fitted)             | E.F.S.                   | 49.3 Kg/mm <sup>2</sup>                     | LR. MI. IL.2315           | MILAN F.3963 ✓                 |
| Intermediate shaft              | E.F.S.                   | 48.1  | LR.MI. IL. 2316           | MILAN F.3964 ✓                 |
| Intermediate shaft              | E.F.S.                   | 47.5  | LR. MI. IL.2317           | MILAN F.4036 ✓                 |
| Intermediate shaft              | E.F.S.                   | 48.5  | LR. MI. IL 2318           | MILAN F.2844 ✓                 |
| Thrust shaft collar             | E.F.S.                   | 56.2  | LR. MI. <del>IL</del> 109 | MILAN M. 628 ✓                 |
| T U R B I N E S                 |                          |   |                           |                                |
| H.P. rotor                      | Mo.Ni.V<br>E.F.S.        | 77.2  | LR. GEN. SS 6574          | GENOA F.25734 ✓                |
| H.P. upper & lower              | E.F.S.                   | 58.2  | LR. GEN. P. 126           | GENOA C.17169 ✓                |
| Casings                         | E.F.S.                   | 61.7  | LR. GEN. P. 151           | GENOA C.17170 ✓                |
| H.P. Turbine supports           | E.F.S.                   | 61.7 / 57.3                                 | LR. TRI. 4531-4546        | TRIESTE 4246/4348              |
| H.P. thrust                     |                          |   | L.R. PHL. 8830-3          |                                |
| Flexible coupling               | E.F.S.                   | 69.3  | LR. GEN. 59               | GENOA F.26420 ✓                |
| L.P. rotor                      | E.F.S.                   | 76.0  | LR. GEN. SS.7390          | GENOA F.27177 ✓                |
| L.P. rotor disc                 | Cr. Mo. Ni.V<br>E.F.S.   | 86.6  | LR. MI. 958               | MILAN F.3416 ✓                 |
| L.P. rotor disc                 | Cr. Mo. Ni. V<br>E.F.S.  | 91.0  | LR. MI. P. 882            | GENOA F.3213 ✓                 |
| L.P. rotor disc                 | Cr. Mo. Ni. V.<br>E.F.S. | 91.4  | LR. MI. 919               | MILAN F.2845 ✓                 |
| L.P. rotor disc                 | Cr. Mo. Ni. V.<br>E.F.S. | 90.5  | LR. MI. 961               | MILAN F.3563 ✓                 |
| L.P. rotor disc                 | Cr. Mo. Ni. V<br>E.F.S.  | 93.3  | LR. MI. 885               | MILAN F. 3568 ✓                |
| L.P. rotor disc                 | Cr. Mo. Ni. V<br>E.F.S.  | 90.0  | LR. MI. 886               | MILAN F.3565 ✓                 |
| L.P. astern disc                | Cr. Mo. Ni. V.<br>E.F.S. | 91.1  | LR. MI. 964               | MILAN F.3561 ✓                 |
| A.H.D. LP upper & lower casings | E.F.S.                   | 48.7  | LR. GEN. P.153            | GENOA C.17172 ✓                |
| Lower casings                   | E.F.S.                   | 47.6  | LR. GEN. P. 144           | GENOA C.17171 ✓                |
| A.S.T. LP Upper & Lower casings | E.F.S.                   | 68.7  | LR. TRI. 0123             | TRIESTE 4277 ✓                 |
|                                 | E.F.S.                   | 57.3  | LR. TRI. 0122             | TRIESTE 4277                   |
| L.P. turbine thrust             |                          |   | LR. PHL. 8830/3           |                                |
| L.P. turbine chest              | E.F.S.                   | 57.6 / 53.6                                 | LR. GEN.9.116 P.136       | GENOA C.17165-C.17166          |
| Flexible coupling               | E.F.S.                   | 97.5  | RI. A.B. V.1001           | +                              |
| Coupling flange                 | E.F.S.                   | 55.6  | LR. MI. 30                | MILAN M.380 ✓                  |
| L.P. turbine supports           | E.F.S.                   | 43.0  | LR. GEN. P.45             | GENOA M.4097 ✓                 |
| L.P. turbine supports           | E.F.S.                   | 51.0  | LR. GEN. P. 164           | GENOA M.4097 ✓                 |

+ See A.B. test Cert. 60-GE 38485 - 650 dated 30.12.59

Fine tooth coupling tested by A.B. & RI. Check tests as per Secretary's letter 'ENG.' dated 8th March 1960 confirmed results shown on test certificate.



8 JUL 1960

Rpt. 9a- Conts. Sheet

Continuation of ~~835~~ / Mch. Report No. **15215**  
Continuation of Report No. dated 23.6.1960

Port of TRIESTE

on the

on the S.S./M.S. ESSO DUBLIN

with the approved plans and the Rule requirements.

The materials and workmanship are good.

The boilers and superheaters have been examined under full steaming conditions and their safety valves adjusted to the pressures stated above.

Satisfactory accumulation tests have been carried out.

The boilers are eligible, in our opinion, for the highest classification and to have the notation

2 W.T. boilers 965 PSI Suph. 935 PSI

F.D. O.F. heating surface 19,836 sq.ft.

*John M.*



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Lloyd's Register  
Foundation

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