

4 JAN 1960

Report on Steam Turbine Machinery. No. 15093

Rpt. 4a.

Date of writing Report 16th Dec. 1959 When handed in at Local Office 27/12 1959 Port of TRIESTE
No. in Survey held at Monfalcone Date, First Survey 22.7.1958 Last Survey 9.11.1959
Reg. Book (Number of Visits 124)

40931 on the ~~Monfalcone~~ ~~Trieste~~ ~~Gardoglio~~ Screw Vessel Steam Tanker "ESSO LIVERPOOL" Tons (Gross) Net
Built at Monfalcone By whom built C.R.D. Adriatico Yard No. 1841 When built 1959
Engines made at Trieste By whom made ~~Adriatico~~ Engine No. 320/321 When made 1959
Boilers made at Glasgow & Trieste By whom made Babcock & Wilcox and C.R.D. Adriatico Boiler No. 2056/2057 When made 1959
Shaft Horse Power Maximum 17,600 Owners Esso Petroleum Co., Ltd. Port belonging to London
Service 16,000
M.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 ~~Propeller~~ ~~Double reduction geared~~ to one propelling shaft No. of primary pinions to each set of reduction gearing 2
Aster 1
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 Direct Current Generator
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 11		8	3
Reaction Blading	No. of stages 11		8	2
	No. of rows in each stage			

Shaft Horse Power at each turbine H.P. 8800 I.P. 8800 L.P. 8800
Revolutions per minute, at full power, of each Turbine Shaft H.P. 5637 I.P. 3309 L.P. 3309
Motor Shaft diameter at journals H.P. 150 mm I.P. 150 mm L.P. 165 mm
Pitch Circle Diameter 1st pinion 289.539 mm 2nd pinion 618.049 mm
1st reduction wheel 2123.285 mm main wheel 4267.081 mm
Face 1st reduction wheel 2 x 257.5 mm main wheel 2 x 508 mm
Distance between centres of pinion and wheel faces and the centre of the adjacent bearings 1st pinion 385 mm 2nd pinion 721 mm
1st reduction wheel 397 mm main wheel 835 mm

Flexible Pinion Shafts, diameter at bearings 2nd HP 178 mm 2nd LP 200 mm
Pinion Shafts, diameter at bearings External 1st 177.57 mm 2nd 456.54 mm
Internal 1st 63 mm 2nd 305 mm
Generator Shaft, diameter at bearings 2nd 595.799 mm
Wheel Shafts, diameter at bearings 1st 304.6 mm main 609.4 mm
Propelling Motor Shaft, diameter at bearings 488.8 mm
Intermediate Shafts, diameter as per rule as appd. Thrust Shaft, diameter at collars as per rule as appd.

Tube Shaft, diameter as per rule as appd. Screw Shaft, diameter as per rule as appd.
as fitted 537 mm
Is the tube shaft fitted with a continuous liner yes
Bronze Liners, thickness in way of bushes as per rule as appd. to 565 mm at coupling as fitted 32.5 & 32 mm
Is the after end of the liner made watertight in the one length

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
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
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
aft no If so, state type Length of Bearing in Stern Bush next to and supporting propeller 2745 mm
Propeller, diameter 6700 mm Pitch 5715 mm No. of Blades 4 State whether Moveable fixed Total Developed Surface 18.45 square metres.

Single Screw, are arrangements made so that steam can be led direct to the L.P. Turbine yes Can the H.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 turb. steam
Lubricating Oil Pumps, including Spare Pump, No. and size 2 at 110 T/hr (Elect).
Two independent means arranged for circulating water through the Oil Cooler yes Branch Bilge Suctions, No. and size: In Engine
1 at 90 mm. (3 in aft eng. room) F.P.B.: 1 at 80 mm A.P.R.: 2 at 190 mm
In Pump Room 1 at 65 mm

Holds, &c Dry hold: 2 at 80 mm Bos. Stores: 2 at 50 mm. Chainlockers: 1 at 65 mm. Cofferdams: 2 at 80 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
Suctions, No. and size 3 at 125 mm (2 in M.E.R.) Are all the Bilge Suction pipes in the bilge space 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 or fabricated boxes yes 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
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

working 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 yes
Are all Pipes, Cocks, Valves and Pumps in connection with the machinery and all boiler mountings accessible at all times yes
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

OILERS, &c.—Total Heating Surface of Boilers 19,836 sq.ft. (8750 x 2) + (1168 x 2)
Forced Draught fitted yes No. and Description of Boilers 2 : Two drum B & W water tube Working Pressure 945 PSI
Design 965 PSI
Supt. 935 PSI
A Report on Main Boilers now forwarded? YES

1/1200-88E110-1E1210

Is a Donkey Boiler fitted? no If so, is a report now forwarded? no
Is the donkey boiler intended to be used for domestic purposes only no
Plans. Are approved plans forwarded herewith for Shafting 14.9.56 Main Boilers 31.5.56 Glasgow
(If not, state date of approval) 13.3.57 Auxiliary Boilers 13.10.56 Donkey Boilers 16.4.57
Superheaters 17.10.56 Gls. 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
State the principal additional spare gear supplied 48/59 360
Speed Restriction: See Trieste letter dated 25/11/59 and Head Office reply dated 4/8/59
The main machinery not to be operated between 48 and 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
CANTIERE NAUTICO MONFALCONE

Manufacturer

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

Dates of Examination of principal parts - Casings January - 9 Rotors May - Blading 1959 Gearing 9.11.59 After trials 14.5.59
Wheel shaft Thrust shaft 29.7.59 Intermediate shafts 29.7.59 Tube shaft - Screw shaft 31.9.59
Propeller 14.5.59 Stern tube 30.4.59 Engine and boiler seatings 17.6.59 Engine holding down bolts 31.9.59

Completion of fitting sea connections 21.4.59 Completion of pumping arrangements 28.10.59 Boilers fixed 16.7.59 Engines tried under steam 5.11.59
Main boiler safety valves adjusted 29.10.59 Thickness of adjusting washers Port. Blr. forwd. 32.4mm Aft 31.8mm Supt. 31.6mm
Std. Blr. forwd. 31.7mm Aft 32.2mm Supt. 31.8mm

Rotor shaft, Material and tensile strength See separate sheet Identification Mark See separate sheet
Flexible Pinion Shaft, Material and tensile strength See separate sheet Identification Mark See separate sheet
Pinion shaft, Material and tensile strength See separate sheet Identification Mark See separate sheet

Chemical analysis See separate sheet
If Pinion Shafts are made of special steel state date of approval of chemical analyses, physical properties and heat treatment See separate sheet

1st Reduction Wheel Shaft, Material and tensile strength See separate sheet Identification Mark See separate sheet
Wheel shaft, Material See separate sheet Identification Mark See separate sheet
Intermediate shafts, Material See separate sheet Identification Mark See separate sheet

Screw shaft, Material See separate sheet Identification Mark See separate sheet
Date of test Various dates. July 1959 - October 1959 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
Fixed CO₂ installation Steam smothering. Portable extinguishers. Water hoses. Sand.

Full description of Fire Extinguishing Apparatus fitted in machinery spaces See separate sheet
Is the vessel (not being an oil tanker) fitted for carrying oil as cargo no If so, have the requirements of the Rules been complied with no
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 no If so, state name of vessel ESSO WINDSOR - ESSO SOUTHAMPTON

General Remarks. (State quality of workmanship, opinions as to class, etc.) 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:-

HMC - 11,59 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 - 11,59

Travelling Expenses (if any) See Rpt 1
The Committee's Minute FRIDAY 12 FEB 1960
Assigned See Rpt 1

Cost of Machinery 346.6.0 When applied for 30.12.1959
The amount of Entry Fee 285.9.0
Cost of Plans 295.14.0
Special 295.14.0
Install. of Machinery 347.12.0
Donkey Boiler Fee 10

Engineer Surveyor to Lloyd's Register of Shipping.

Rpt. Contn. Sheet

Port of TRIESTE

Continuation of SSS Mch. Report No. 15093 dated

on the S.S./M.S. ESSO LIVERPOOL - C.R.D.A. Yard N° 1841 Turbines 320/321

PARTS	MATERIAL	Min. Tensile Strength Kg/mm ²	Identification Marks	Port and N° of Certificate
Propeller (fitted)	Nikalium	44 tons/sq. in	LR 4763	Liverpool C.4562
Screwshaft (fitted)	E.F.S.	48.1 kg/mm ²	LR.GEN.7405	GENOA F.27183
Intermediate Shaft	E.F.S.	45.8	LR.GEN.7404	GENOA F.27182
Intermediate Shaft	E.F.S.	45.8	LR.GEN.7075	GENOA F.26594
Intermediate Shaft	E.F.S.	47.5	LR.GEN.7078	GENOA F.26595
Thrust Shaft Collar	E.F.S.	56.2	LR.MI.109	MILAN M.628
TURBINES				
HP Rotor	Mo. Ni. V. E.F.S.	73.4	LR.NAP.3514	NAPLES 2564
HP Upper & Lower Casings	Cr. Mo. E.F.S.	61.4	LR.GEN. P.111	GENOA C.17219
" " "	Cr. Mo. E.F.S.	58.9	LR.GEN. -.118	GENOA C.17220
HP Turbine Supports	E.F.S.	56.7 / 56.7	LR.TRI.4351-0120	TRIESTE 4043-4342
HP Thrust	-	-	LR. PHL. 8681	PHILADELPHIA 12.5.59
Flexible Coupling	E.F.S.	93.9	LR.GEN. P.38	GENOA F.26481
LP Rotor	Mo. Ni. V. E.F.S.	74.3	LR.GEN.SS.7135	GENOA F.26758
LP Rotor Disc	Cr. Mo. Ni. V. E.F.S.	88.8	LR.MI. P.917	MILAN F.3417
LP Rotor Disc	Cr. Mo. Ni. V. E.F.S.	89.2	LR. MI. P.918	MILAN F.3214
LP Rotor Disc	Cr. Mo. Ni. V. E.F.S.	91.4	LR.MI. P.960	MILAN F.3204
LP Rotor Disc	Cr. Mo. Ni. V. E.F.S.	94.5	LR. MI. P.884	MILAN F.3567
LP Rotor disc	Cr. Mo. Ni. V. E.F.S.	93.3	LR. MI. P.8962	MILAN F.3564
LP Rotor Disc	Cr. Mo. Ni. V. E.F.S.	90.5	LR. MI. P.963	MILAN F.3562
LP Astern Disc	Cr. Mo. Ni. V. E.F.S.	90.5	LR. MI. P.923	MILAN F.3570
AHD. LP. UPPER & LOWER CASINGS	E.F.S.	45.7	LR.GEN. P.112	GENOA C.17217
" " " "	E.F.S.	46.0	LR. GEN. P.121	GENOA C.17218
AST. LP Upper & Lower Casings	E.F.S.	67.5	LR.TRI. 0121	TRIESTE 4246
" " " "	E.F.S.	54.8	LR.TRI. 4531	TRIESTE 4100
LP Turbine Chest	E.F.S.	54.4 / 52.0	LR.GEN. 114 - 88	GENOA C.17214-C.16682
LP Turbine Thrust	-	-	LR.PHL.8748/3	PHILADELPHIA 3.7.58
Flexible Coupling	E.F.S.	93.5	LR.GEN. P.39	GENOA F.26482
Coupling Flange	E.F.S.	57.2	LR. MI. 26	MILAN M.241
LP Turbine Supports	E.F.S.	46.3	LR.GEN. P.43	GENOA C.17216
LP Turbine Supports	E.F.S.	48.9	LR.GEN. P.120	GENOA C.17215

20m.11.57. T. (MADE AND PRINTED IN ENGLAND)

4 JAN 1960

Port of TRIESTE

Continuation of ~~SSP~~/Mchy. Report No. 15093 dated

on the S.S./M.S.

ESSO LIVERPOOL C.R.D.A. YARD N°.1841 TURBINES N°.320/321

GEARING

p a r t	Material	Min. Tensile Strength Kg/mm ²	Identification Marks	Port & N°. of Certificate
1st Reduction HP Pinion	Ni Cr Mo E.F.S.	100.0	LR. NAP. 2889 ✓	NAPLES 2469
1st Reduction LP Pinion	Ni Cr Mo E.F.S.	91.7	LR. NAP. 3237 ✓	NAPLES 2467
HP Flexible Coupling	E.F.S.	93.9	LR. GEN. P.38	GENOA F.26481
HP Flexible Coupling	E.F.S.	68.0	LR. GEN. P.58	GENOA F.26419
LP Flexible Coupling	E.F.S.	93.5	LR. GEN. P.39	GENOA F.26482
LP Flexible Coupling	E.F.S.	69.3	LR. GEN. P.59	GENOA F.26420
1st Reduction HP Wheel Rim	M.N.V. E.F.S.	61.3	LR. GEN. SS.6966 ✓	GENOA F.26496
1st Reduction HP Wheel Shaft	E.F.S.	57.2	LR. NAP. 3132 ✓	NAPLES 2337
1st Reduction HP Wheel Discs	S.M.S.	-	LR. TRI. 2798	TRIESTE 272
1st Reduction HP Wheel Hub	E.F.S.	48.0	LR. GEN. 5949 ✓	GENOA F.24746
1st Reduction HP Wheel Nut	E.F.S.		LR. MI. IL545	MILAN M. 152
1st Reduction LP Wheel Rim	M.N.V. E.F.S.	66.9	LR. GEN. SS. 6682 ✓	GENOA F.26016
1st Reduction LP Wheel Shaft	E.F.S.	57.2	LR. NAP. 3133 ✓	NAPLES 2337
1st Reduction LP Wheel Discs	S.M.S.		LR. TRI. 1173	TRIESTE 405
1st Reduction LP Wheel Hub	E.F.S.	48.7	LR. GEN. 5948 ✓	GENOA F.24745
1st Reduction LP Wheel Nut	E.F.S.		LR. MI. IL.545	MILAN M. 152
HP Quill Shaft	E.F.S.	76.7	LR. NAP. 3046 ✓	NAPLES 2271
LP Quill Shaft	E.F.S.	84.5	LR. NAP. 3318 ✓	NAPLES 2473
2nd Reduction HP Pinion	Ni Cr Mo E.F.S.	92.8	LR. MI. IL.731	MILAN F.3682
2nd Reduction LP Pinion	Ni Cr Mo E.F.S.	91.4	LR. MI. IL.732	MILAN F.3683
HP Flexible Coupling	Ni Cr Mo E.F.S.	75.9	LR. GEN. P.49	GENOA F.25704
HP Flexible Coupling	Ni Cr Mo E.F.S.	65.0 / 79.5	LR. GEN. P.35 P.23	GENOA F.25702 F.25694
LP Flexible Coupling	Ni Cr Mo E.F.S.	75.9	LR. GEN. P.49A	GENOA F.25704
LP Flexible Coupling	Ni Cr Mo E.F.S.	65.0 / 76.4	LR. GEN. P.34 P.25	GENOA F.25701 F.25697
Main Gear Wheel Rim	Mn V E.F.S.	64.7	LR. GEN. SS. 7156	GENOA F.26919
Main Gear Wheel Shaft	E.F.S.	56.6	LR. MI. IL 710/AB	MILAN F.2954
Main Gear Wheel Discs	S.M.S.		LR. GEN. 2493	GENOA 3775
Main Gear Wheel Hub	E.F.S.	49.8	LR. GEN. SS. 5537	GENOA F.23696
Main Gear Wheel Nut	E.F.S.	44.1	LR. MI. IL.546	MILAN M.152



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