1)

Report on Steam Turbine Machinery. No. 19132

Form 4a.

Date of writing Report 29/12/52 19 When handed in at Local Office 25-1-1953 Port of GENOA Received at London Office 6 FEB 1953

Survey held at GENOA Date, First Survey 14-12-50 Last Survey 22-DECEM. 1952

Book 27 on the STEEL TWIN Sc. "ANDREA DORIA" (Number of Visits 210)

Tons { Gross 29082 / Net 15788

Built at GENOVA-SESTRI By whom built S.A. ANSALDO-CANTIERI NAVALI Yard No. 918 When built 1952

Engines made at GENOA-SAMPIERDARENA By whom made S.A. ANSALDO-STABIL. MECCANICO Engines No. 1427, 1432 When made 1952

Boilers made at GENOA-SAMPIERDARENA By whom made S.A. ANSALDO-STABIL. MECCANICO Boilers No. 5172, 5173, 5174, 5175 When made 1952

Total Horse Power at Full Power 50'000 @ 161 R.P.M. Owners "ITALIA" Soc. per AZIONI di NAVIGAZIONE Port belonging to GENOA
SERVICE S.H.P. 35300 @ 143 R.P.M.

Nom. Horse Power as per Rule 10'000 Is Refrigerating Machinery fitted for cargo purposes YES Is Electric Light fitted YES

Trade for which Vessel is intended PASSEGERS AND GENERAL CARGO

STEAM TURBINE ENGINES, &c.—Description of Engines TWO SETS, EACH ONE CONSISTING OF THREE STEAM TURBINES - H.P. TURBINE D.R. GEARED, I.P. & L.P. TURBINE S.R. GEARED TO PROPELLING SHAFT.

Arrangement of Turbines Ahead SIX Astern FOUR ~~Direct coupled~~, I.P. & L.P. single reduction geared, H.P. double reduction geared } to TWO propelling shafts. No. of primary pinions to each set of reduction gearing THREE

Generators coupled to { Alternating Current Generator ✓ phase ✓ periods per second / Direct Current Generator } rated ✓ Kilowatts ✓ Volts at ✓ revolutions per minute;

Steam supplying power for driving ✓ Propelling Motors, Type ✓

✓ Kilowatts ✓ Volts at ✓ revolutions per minute. Direct coupled, single or double reduction geared to ✓ propelling shafts.

TURBINE GEARING.	H. P.	I. P.	L. P.	ASTERN.
No. of rows	TWO	✓	✓	IN I.P. TURBINE: THREE
No. of stages	THREE	SEVEN	DOUBLE FLOW TEN IN EACH FLOW	IN L.P. TURBINE: THREE.
No. of rows in each stage	6 - 7 - 6	4-4-5-7-6-4-4	2-2-2-2-1-1-1-1-1-3	✓

Horse Power at each turbine { H.P. 6800 / I.P. 11800 / L.P. 11800 } **Revolutions** per minute, at full power, of each Turbine Shaft { H.P. 4200 HP TURBINE 1st reduction wheel 1965 / I.P. 1965 / L.P. 1965 main shaft 167 }

Shaft diameter at journals { H.P. 180 m/m / I.P. 275 m/m / L.P. 275 m/m } **Pitch Circle Diameter** { 1st pinion { H.P. 288.675 m/m, I.P. & L.P. 371,691 m/m } 1st reduction wheel for H.P. 617.765 m/m / 2nd pinion for H.P. 371,691 m/m main wheel 4258,286 m/m. } **Width of Face** { 1st reduction wheel for H.P. 2 x 570 m/m. / main wheel 2 x 730 m/m. }

Distance between centres of pinion and wheel faces and the centre of the adjacent bearings { 1st pinion { H.P. 390 & 475 m/m, I.P. & L.P. 555 x 650 m/m } 1st reduction wheel for H.P. 465 x 475 m/m. / 2nd pinion for H.P. 555 x 650 m/m main wheel 1440 m/m. }
(helix ... provided with centre bearing).

Pinion diameter { 1st ✓ / 2nd ✓ } **Pinion Shafts**, diameter at bearings External ✓ Internal { 1st { H.P. 180 m/m, I.P. & L.P. 275 m/m } 2nd { for H.P. only 275 m/m. } diameter at bottom of pinion teeth 1st { H.P. 274,495 m/m, I.P. & L.P. 353,43 m/m } 2nd for H.P. 352,430 m/m.

Shafts, diameter at bearings { 1st for H.P. 275 m/m / main 690 m/m } diameter at wheel shroud, { 1st for H.P.: SOLID / main 4410 m/m } **Generator Shaft**, diameter at bearings ✓

Intermediate Shafts, diameter as per rule as approved / as fitted 530 m/m. ✓ **Propelling Motor Shaft**, diameter at bearings ✓

Thrust Shaft, diameter at collars as per rule as approved / as fitted 555 m/m.

Main Shaft, diameter as per rule ✓ / as fitted ✓ **Screw Shaft**, diameter as per rule as approved / as fitted 570 m/m. ✓ Is the { ~~tube~~ / screw } shaft fitted with a continuous liner { ✓ / YES }

Liners, thickness in way of bushes as per rule as approved / as fitted 28 m/m. Thickness between bushes as per rule as approved / as fitted 21 m/m. Is the after end of the liner made watertight in the after boss YES. If the liner is in more than one length are the junctions made by fusion through the whole thickness of the liner ✓

Where 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 ✓

Where 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 No ✓ If so, state type ✓ Length of Bearing in **Stern Bush** next to and supporting propeller 3070 m/m.

Propeller, diameter 5800 m/m Pitch 5650 m/m No. of Blades THREE State whether Moveable SOLID Total Developed Surface 14.4 square ~~feet~~ m.

Where ~~Screw~~ are arrangements made so that steam can be led direct to the ~~H.P.~~ I.P. **Turbine** AHEAD & L.P. TURBINE ASTERN Can the **H.P. or I.P. Turbines** exhaust direct to the Condenser YES ✓ No. of Turbines fitted with astern wheels FOUR **Feed Pumps** { No. and size FOUR @ 130 Ton/h. / How driven STEAM TURBINE }

Pumps connected to the **Main Bilge Line** { No. and size FOUR @ 180 Ton/h. ✓ / How driven ELECTRICALLY. }

Bilge Pumps, No. and size TWO @ 180 Ton/h - TWO @ 100 Ton/h **Lubricating Oil Pumps**, including Spare Pump, No. and size THREE @ 145 Ton/h - ELECTRIC. DRIVEN.

Are Independent means arranged for circulating water through the **Oil Cooler** YES **Suctions**, connected both to Main Bilge Pumps and Auxiliary Pumps, No. and size;—In Engine and Boiler Room: IN E.R: TWO ϕ80 m/m TWO ϕ50 m/m IN B.R: FOUR ϕ80 m/m - IN AUX E.R TWO ϕ80 + ONE ϕ50 In TUNNEL: 2 ϕ80 + 8 ϕ50 + 3 ϕ150 In ~~Pump Room~~ &c. N°1 HOLD: 2 ϕ80 - N°2 HOLD: 2 ϕ80 - N°3 HOLD: 1 ϕ150 + 1 ϕ80 - N°4 HOLD: 1 ϕ150 + 1 ϕ80 - N°5 HOLD: 2 ϕ80 + 1 ϕ150

Water Circulating Pump Direct Bilge Suctions, No. and size TWO: ϕ 570 m/m **Independent Power Pump Direct Suctions** to the Engine Room No. and size IN ER: 2 ϕ175 - IN B.R: 2 ϕ175. IN AUX E.R: 2 ϕ175 Are all the Bilge Suction pipes in Holds and Tunnel Well fitted with strum-boxes 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 the **Sea Connections** fitted direct on the skin of the ship ON STOOLS WELDED TO SHELL. Are they fitted with Valves or Cocks VALVES

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 ✓ 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 through plate YES 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 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 YES Is it fitted with a watertight door YES worked from ABOVE BULKHEAD DECK

BOILERS, &c.—(Letter for record S) Total Heating Surface of Boilers (AS PER RULES) 75304 sq. feet.

Is Forced Draft fitted YES No. and Description of Boilers FOUR, THREE DRUMS CONTROLLED SUPERHEAT FOSTER WHEELER Working Pressure 46 Kg/cm²

Report on Main Boilers now forwarded? YES

2)

Rpt. 9a.

Port of

Is { a Donkey / ~~an Auxiliary~~ } Boiler fitted? YES ✓ If so, is a report now forwarded? YES ✓

Is the donkey boiler intended to be used for domestic purposes ~~only~~ and ESSENTIAL SERVICES

Plans. Are approved plans forwarded herewith for Shafting {24-2-50 / 29-6-50 / 14-2-51} Main Boilers {13-4-50 / 13-6-50 / 18-9-50 / 21-3-51} Auxiliary Boilers ✓ Donkey Boilers 6-12

(If not, state date of approval)

Superheaters 13-7-50 General Pumping Arrangements 4/7/50 - 20-7-50 / 15-9-50 / 22-3-51 Oil Fuel Burning Arrangements 4-7-50, 14-6-

27-3-51 / 10-5-51 / 24-5-51 / 14-6-51 / 31-7-51

Geared turbines / ~~situated aft~~. Have torsional vibration characteristics of system been approved ✓ Date of approval ✓

SPARE GEAR.

Has the spare gear required by the Rules been supplied YES ✓

State the principal additional spare gear supplied: 1 HP 1st. reduction pinion shaft

1 IP×LP pinion shaft

ANSALDO S. A.
STABILIMENTO MECCANICO

The foregoing is a correct description, Manuf

Dates of Survey while building

During progress of work in shops - - FROM 14-12-50 To 28-7-52

During erection on board vessel - - - FROM 7-4-51 To 22-12-52

Total No. of visits 210

Dates of Examination of principal parts—Casings FROM 9-7-51 To 14-1-52 Rotors FROM 2-4-51 To 28-2-52 Blading FROM 25-6-51 To 28-2-52 Gearing FROM 18- To 7-4-

Wheel shaft ✓ Thrust shaft 26-7-51 / 27-3-52 Intermediate shafts 22-4-52 / 27-6-52 Tube shaft ✓ Screw shaft 29-5-51 / 3-11-5

Propellers 3-11-52 Stern tube 5-5-51 - 8-5-51 Engine and boiler seatings 7-4-51 Engine holding down bolts 29-4-52, 26-8-

Completion of fitting sea connections 29-5-51 Completion of pumping arrangements 1-11-52 Boilers fixed 30-10-51 Engines tried under steam at full power.

Main boiler safety valves adjusted 25-11-52 & 27-11-52 Thickness of adjusting washers SEE SEPARATE SHEET.

Rotor shaft, Material and tensile strength {HP: Ni-CR-Mo STEEL - U.T.S. 63/75 Kg/mm² / IP×LP: Ni. VA. STEEL - U.T.S. 53/60 Kg/mm²} Identification Mark SEE SEPARATE S

Flexible Pinion Shaft, Material and tensile strength ✓ Identification Mark ✓

Pinion shaft, Material and tensile strength Ni-VA. STEEL - U.T.S. > 75 Kg/mm² Identification Mark SEE SEPARATE S

; Chemical analysis of pinion shafts: C: 0,24÷0.35 - Ni: 3,25÷3,75 - VA: 0,15 - S < 0,035 - P

If Pinion Shafts are made of special steel state date of approval of chemical analyses, physical properties and heat treatment 22-6-50

1st Reduction Wheel Shaft for HP TURBINE Material and tensile strength CARBON STEEL: U.T.S. 49/55 Kg/mm² Identification Mark SEE SEPARATE S

Wheel shaft, Material S.H. STEEL: U.T.S. 49/53 Kg/mm² Identification Marks SEE SEPARATE SHEET Thrust shaft, Material S.H. STEEL U.T.S. 49/55 Kg/mm² Identification Mark SEPARA

Intermediate shafts, Material S.M. STEEL Identification Marks SEE SEPARATE SHEET Tube shaft, Material ✓ Identification Marks ✓

Screw shaft, Material S.H. STEEL Identification Marks SEE SEPARATE SHEET Steam Pipes, Material Ni. Cr. Mo. STEEL. Test pressure 92

Date of test FROM 7-7-52 To 16-10-52 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 ✓

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 ✓

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.) THE MACHINERY OF THIS VESSEL HAS BE CONSTRUCTED UNDER SPECIAL SURVEY OF TESTED MATERIALS AND IS IN ACCORDANC WITH THE APPROVED PLANS, SECRETARY'S LETTERS AND RULE REQUIREMENTS. TH MATERIALS AND WORKMANSHIP ARE GOOD. THE COMPLETE INSTALLATION HAS TRIED UNDER WORKING CONDITION AT FULL POWER AND FOUND SATISFACTORY. AFTERWARDS THE FABRICATED TURBINE AND GEAR CASES HAVE BEEN SPECIALL EXAMINED AND FOUND, SO FAR AS COULD BE SEEN, SOUND AND FREE FROM DEFEC THIS VESSEL IS WORTHY TO BE CLASSED IN THE SOCIETY'S REGISTER BOOK WITH NOTATION: + L.M.C. 12-52, C.L, FITTED FOR OIL FUEL F.P. ABOVE 150°F, "STEAM TURBINES: H.P. S.R. GEARED, I.P. AND L.P. S.R. GEARED TO PROPELLER SHAFTS.

GENOA Office.

Certificate (if required) to be sent to

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

F.E. FEE DURING CONSTRUCTION AND INSTALLATION: Lit. 2584.200 + Lit 25% = 1.938.150

The amount of ~~Entry~~ Fee ... £ : :

~~Special~~ ... ... £ : :

CAR FUND ~~Donkey Boiler Fee~~ ... £ 58.145 :

Travelling Expenses (if any) £ 243.805 :

REV. TAX. ----- £ 67.203 :

When applied for 3/2/1953

When received 19

Engineer Surveyor to Lloyd's Register of Shipping.

Committee's Minute TUES. 24 FEB 1953

Assigned +LMC 12.52

FITTED FOR OIL FUEL 12,52 FLASH POINT ABOVE 150°F. FD CL 4WTB 668/16 (Spl 633/16) 2DB (WT) 142/16.

Rpt. 9a.

Port of GENOA Continuation of Report No. 19132 dated 29/12/52 on the S/S ANDREA DORIA.

IDENTIFICATION MARKS

		PORT	STARBOARD.
H.P. TURBINE ROTOR		LLOYD'S 269 A.G. 12-11-51	LLOYD'S 268 A.G. 15-11-51
I.P. TURBINE	ASTERN IMPULSE WHEEL	LLOYD'S 334 A.G. 31-1-52	LLOYD'S 335 A.G. 11-2-52
	FORW. SECTION OF ROTOR	LLOYD'S S.S. 1149 A.G. 21-1-52	LLOYD'S S.S 1150 A.G. 11-2-52
	AFTER SECTION OF ROTOR	LLOYD'S S.S. 1230 A.G. 21-1-52	LLOYD'S S.S. 1235 A.G. 11-2-52
L.P. TURBINE	FORW. SECTION OF ROTOR	LLOYD'S S.S. 1314 A.G. 17-1-52	LLOYD'S S.S. 1236 A.G. 28-2-52
	AFTER SECTION OF ROTOR	LLOYD'S S.S. 1336 A.G. 17-1-52	LLOYD'S S.S. 1347 A.G. 28-2-52
H.P. TURBINE	1st. REDUCTION PINION.	LLOYD'S S.S. 1189 A.G. 17-1-52	LLOYD'S S.S. 1138 A.G. 7-4-52
	1st. REDUCTION GEAR WHEEL	LLOYD'S 166/2 A.G. 17-1-52	LLOYD'S 165/1 A.G. 7-4-52
	2nd. REDUCTION PINION	LLOYD'S S.S. 1143 A.G. 17-1-52	LLOYD'S S.S. 1138 A.G. 7-4-52
I.P. TURBINE - PINION SHAFT.		LLOYD'S S.S. 1137 A.G. 17-1-52	LLOYD'S S.S. 1144 A.G. 7-4-52
L.P. TURBINE - PINION SHAFT		LLOYD'S S.S. 1146 A.G. 17-1-52	LLOYD'S S.S. 1145 A.G. 7-4-52
MAIN GEAR WHEEL	SHAFT & THRUST SHAFT	LLOYD'S S.S. 1082 A.G. 21-1-52	LLOYD'S S.S. 1018 A.G. 27-3-52
	FORW. RIM.	LLOYD'S 163/4 A.G. 21-1-52	LLOYD'S 162/2 A.G. 27-3-52
	AFTER RIM.	LLOYD'S 155/3 A.G. 21-1-52	LLOYD'S 154/1 A.G. 27-3-52
INTERMEDIATE SHAFT.		LLOYD'S 210 A.A. 8-3-51	LLOYD'S S.S. 990 A.G. 24-2-51
INTERMEDIATE SHAFT		LLOYD'S 211 A.A. 8-3-51	LLOYD'S S.S. 998 A.G. 24-2-51
INTERMEDIATE SHAFT		LLOYD'S 212 A.A. 8-3-51	LLOYD'S S.S. 1061 A.G. 24-2-51
INTERMEDIATE SHAFT		LLOYD'S 213 A.A. 8-3-51	LLOYD'S S.S. 1062 A.G. 24-2-51
INTERMEDIATE SHAFT		LLOYD'S 214 A.A. 8-3-51	LLOYD'S S.S. 991 A.G. 24-2-51
INTERMEDIATE SHAFT		LLOYD'S 215 A.A. 8-3-51	LLOYD'S S.S. 1126 A.G. 24-2-51
SCREW SHAFT		LLOYD'S 22154-2338 H.A.I. 6-4-51	LLOYD'S 22154-2339 H.A.I. 24-5-51
PROPELLER		LLOYD'S 491 G.M. 19-2-52	LLOYD'S 818 G.M. 21-10-52

MAIN W.T. BOILERS: THICKNESS OF ADJUSTING WASHERS OF SAFETY VALVES:

	for saturated steam.		for superheated steam.	
PORT. FORN. BOILER:	PORT. 9.5 m/m	STARB. 10.5 m/m	FORN. 11,2 m/m	AFT 11.8 m/m.
STARB. FORN. BOILER	" 11 m/m	" 9.5	" 11,7	" 11.3
PORT AFT. BOILER	" 10.5	" 9.5	" 11,6	" 10.2
STARB. AFT BOILER	" 11	" 9.5	" 12	" 10.6

A.G.