

Rpt. 4b

Date of writing report 6th July, 1960

Received London

Port Gothenburg

No. 26015

Survey held at Trollhättan

No. of visits

In shops 7
On vessel ---

First date

20th May

Last date

14th June, 1960

FIRST ENTRY REPORT ON INTERNAL COMBUSTION MACHINERY

No. in R.B. 44424 Name "M A N D O" Gross tons 772
Owners Grecomar Shipping Agency Managers Port of Registry Piraeus
Hull built at Stockholm By A-B. Finnboda Varv Yard No. 312 Year Month
When 1930 - 5
Main Engines made at Trollhättan By Nydqvist & Holm A-B. Eng. No. 1605 When 1960 - 6
Gearing made at --- By ---
Donkey boilers made at --- By --- Blr. Nos. --- When ---
Machinery installed at --- By --- When ---
Particulars of restricted service of ship, if limited for classification
Particulars of vegetable or similar cargo oil notation, if required

Is ship to be classed for navigation in ice? --- Is ship intended to carry petroleum in bulk? No-
Is refrigerating machinery fitted? No- If so, is it for cargo purposes? --- Type of refrigerant ---
Is the refrigerating machinery compartment isolated from the propelling machinery space? --- Is the refrigerated cargo installation intended to be classed? ---

The following particulars should be given as fully and as clearly as possible. Where the answer is "No" or "None", say so! Ticks and other signs of doubtful meaning are not to be used. Where the wording is not applicable to the installation, a black line may be inserted. If the main engines have been constructed at another port and are covered by a separate report, the particulars given in that report need not be repeated below, but the port and report number should be stated.

No. of main engines 1 No. of propellers 1 Brief description of propulsion system Main Engine, straight shafting and ordinary prop.

MAIN RECIPROCATING ENGINES. Licence Name and Type No. Nohab Type ML - 5

No. of cylinders per engine 5 ✓ Dia. of cylinders 345 mm ✓ stroke(s) 580 mm ✓ 2 or 4 stroke cycle 2 ✓ Single or double acting Single ✓

Maximum approved BHP per engine 840 ✓ at 280 ✓ RPM of engine and 280 ✓ RPM of propeller.

Corresponding MIP 6.23 kg/cm² (For DA engines give MIP top & bottom) Maximum cylinder pressure 50 kg/cm² Machinery numeral 168 ✓

Are the cylinders arranged in Vee or other special formation? No If so, number of crankshafts per engine ---

TWO STROKE ENGINES. Is the engine of opposed piston type? No If so, how are upper pistons connected to crankshaft? ---

Is the exhaust discharged through ports in the cylinders or through valve(s) in the cylinder covers? Through ports No. and type of mechanically driven scavenge pumps or blowers per engine and how driven 1 - D.A. piston type

No. of exhaust gas driven scavenge blowers per engine --- Where exhaust gas driven blowers only are fitted, can the engine operate with one blower out of action? ---

If a stand-by or emergency pump or blower is fitted, state how driven --- No. of scavenge air coolers --- Scavenge air pressure at full power --- Are scavenge manifold explosion relief valves fitted? Yes

FOUR STROKE ENGINES. Is the engine supercharged? --- Are the undersides of the pistons arranged as supercharge pumps? --- No. of exhaust gas driven blowers per engine --- No. of supercharge air coolers per engine --- Supercharge air pressure --- Can engine operate without supercharger? ---

TWO & FOUR STROKE ENGINES-GENERAL. No. of valves per cylinder: Fuel 1 Inlet --- Exhaust --- Starting 1 Safety 1 ✓

Material of cylinder covers Cast Iron Material of piston crowns Cast Iron Is the engine equipped to operate on heavy fuel oil? No

Cooling medium for :-Cylinders Water Pistons Oil Fuel valves None Overall diameter of piston rod for double acting engines ---

Is the rod fitted with a sleeve? --- Is welded construction employed for: Bedplate? No Frames? No Entablature? No Is the crankcase separated from the underside of pistons? No Is the engine of crosshead or trunk piston type? Trunk Total internal volume of crankcase 4.515 M³ ✓ No. and total area of explosion relief devices 5 - 550 cm² ✓

Are flame guards or traps fitted to relief devices? --- Is the crankcase readily accessible? Yes If not, must the engine be removed for overhaul of bearings, etc? --- Is the engine secured directly to the tank top or to a built-up seating? --- How is the engine started? By compressed air

Can the engine be directly reversed? Yes If not, how is reversing obtained? ---

Has the engine been tested working in the shop? Yes How long at full power? 6 hours

CRANK & FLYWHEEL SHAFTING. Date of approval of torsional vibration characteristics of the propelling machinery system 4.7.1960 ✓ State barred speed range(s), if imposed 479 N.

for working propeller 138-164 r.p.m. spare propeller 138-164 r.p.m. Is a governor fitted? Yes Is a torsional vibration damper or detuner fitted to the shafting? No

Where positioned? --- Type --- No. of main bearings 7 Are main bearings of ball or roller type? No

Distance between inner edges of bearings in way of crank(s) 504 mm ✓ Distance between centre lines of side cranks or eccentrics of opposed piston engines ---

Crankshaft type: Built, semi-built, solid. (State which) Solid

Diameter of journals 230 mm ✓ Diameter of crankpins Centre 230 mm ✓ Side 230 mm ✓ Breadth of webs at mid-throw 310 mm ✓ Axial thickness of webs 124 mm ✓

If shrunk, radial thickness around eyeholes --- Are dowel pins fitted? --- Crankshaft material Journals S.M. Steel Minimum As per Rule

Webs S.M. Steel Approved As per Rule Tensile strength As per Rule

Diameter of flywheel 1320 mm ✓ Weight 620 kgs. ✓ Are balance weights fitted? No Total weight --- Radius of gyration ---

Diameter of flywheel shaft None Material --- Minimum approved tensile strength ---

Flywheel shaft: separate, integral with crankshaft, integral with thrustshaft. (State which) Flywheel fitted between crank- and thrust shafts

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MAIN GAS TURBINES. Name and Type No.

No. of sets of turbines _____ Open or closed cycle _____ BHP per set _____ at _____ RPM of output shaft _____

How is drive transmitted to propeller shaft? _____

ARRANGEMENT OF TURBINES. HP drives _____ at _____ RPM HP gas inlet temperature _____ pressure _____

(A small diagram should be attached showing gas cycle.) IP drives _____ at _____ RPM IP gas inlet temperature _____ pressure _____

LP drives _____ at _____ RPM LP gas inlet temperature _____ pressure _____

No. of air compressors per set _____ Centrifugal or axial flow type? _____ Material of turbine blades _____ Material of compressor blades _____

No. of air coolers per set _____ No. of heat exchangers per set _____ How are turbines started? _____

How is reversing effected? _____ Are the turbines operated in conjunction with free piston gas generators? _____

Total No. of free piston gas generators _____ Diameter of working pistons _____ Diameter of compressor pistons _____ No. of double strokes per minute at full power _____

Gas delivery pressure _____ Gas delivery temperature _____ Have the turbines and attached equipment been tested working in the shop? _____ How long at full power? _____

ELECTRIC PROPULSION (Reciprocating engines or gas turbines. Electrical particulars to be reported on Form 4d.)

No. of generators _____ KW per generator _____ at _____ RPM AC or DC? _____ Position _____

No. of propulsion motors _____ SHP per motor _____ at _____ RPM Position _____

How is power obtained for excitation of generators? _____ Motors? _____

REDUCTION GEARING (Reciprocating engines or gas turbines. A small line sketch should be attached showing arrangement of gearing.)

Is gearing of single or double helical type? _____ If single, position of gear thrust bearing _____ Is gearing of epicyclic type? _____

PCD of pinions: First reduction _____ Second reduction _____ PCD of wheels: First reduction _____ Main _____

Material of pinions _____ Tensile strength _____ Material of wheel rims _____ Tensile strength _____

Are gear teeth surface hardened? _____ How are teeth finished? _____ Diameter of pinion journals _____ Wheel shaft _____

journals _____ Are the wheels of welded construction? _____ Is gearcase of welded construction? _____ Has the wheel/gearcase been heat treated on completion of welding? _____ Where is the propeller thrust bearing located? _____ Are gear bearings of ball or roller type? _____

CLUTCHES, FLEXIBLE COUPLINGS, ETC. If a clutch or other flexible connection is fitted between engine/turbine and gearing or between engine and line shafting give brief description and, for clutches, state how operated.

Can the main engine be used for purposes other than propulsion when declutched? _____ If so, what? _____

STRAIGHT SHAFTING. Diameter of thrustshaft _____ Material _____ Minimum approved tensile strength _____

Shaft separate or integral with crank or wheel shaft? _____ Diameter of intermediate shaft _____ Material _____

Minimum approved tensile strength _____ Diameter of screwshaft cone at large end _____ Is screwshaft fitted with a continuous liner? _____

Diameter of tube shaft. (If these are separate shafts) _____ Is tube shaft fitted with a continuous liner in way of stern tube _____ Thickness of screw/tube shaft liner at bearings _____

Thickness between bearings _____ Material of screw/tube shaft _____ Minimum approved tensile strength _____

Is an approved oil gland fitted? _____ If so, state type _____ Length of bearing next to and supporting propeller _____

Material of bearing _____ In multiple screw vessels is the liner between stern tube and A bracket continuous? _____ If not, is the exposed length of shafting between liners readily visible in dry dock? _____

PROPELLER. Diameter of propeller _____ Pitch _____ Built up or solid _____ Total developed surface _____

No. of blades _____ Blade thickness at top of root fillet _____ Blade material _____ Moment of inertia of dry propeller _____

If propeller is of special design, state type _____ Is propeller of reversible pitch type? _____ If so, is it of approved design? _____

State method of control _____ Material of spare propeller _____ Moment of inertia _____

AIR COMPRESSORS & RECEIVERS. No. of main engine driven compressors per engine 1 Can they be declutched? No

No. of independently driven air compressors. (State capacity, prime mover, position in ship, and Port and No. of certificate) _____

No. of starting air receivers. (Main and Aux. State capacity of each, position in ship and Port and No. of Certificate) 1 - 800 litres, Stockholm No. 6954

1 - 1000 litres, Gothenburg Certificate No. 27710

How are receivers first charged? _____ Maximum working pressure of starting air system 25 kg/cm² Are the safety devices in accordance with the Rules? Yes Has the starting of the main engines been tested and found satisfactory? Yes

COOLERS. No. of main engine fresh water coolers 0 No. of main engine lubricating oil coolers 1

OIL FUEL TANKS. No. and position of oil fuel settling or service tanks not forming part of hull structure _____

MAIN ENGINE DRIVEN PUMPS (No. and Purpose) 1 bilge- and 1 water-, and 2 lubricating oil pumps

GENERAL REMARKS

State if the machinery has been constructed and/or installed under special survey in accordance with the Rules, approved plans and Secretary's letters. State quality of materials and workmanship and give recommendations for classification, including any special notation to be assigned. Where existing machinery is submitted for classification the circumstances should be explained as fully as possible.

This machinery has been built under Special Survey in accordance with the Rules and approved plans.

The workmanship and material used are good. Test sheet in respect of crank shaft, connecting rods, and air receivers are attached.

The engine has been tried under full load and overload conditions and found to work satisfactorily.

The engine is eligible, in my opinion, to be classed +LMC when securely fitted on board the ship under the inspection and to the satisfaction of the Society's Surveyors.

The engine is not to be operated continuously between 138 and 164 r.p.m. A notice board has been fitted at the control station intimating this, and the engine tachometer has been marked accordingly.

The engine has been despatched to Piraeus.

Cur. Scoring

Engineer Surveyor to Lloyd's Register of Shipping.

PARTICULARS OF IDENTIFICATION MARKS (Including Port of origin) of important Forgings and Castings. (Copies of certificates should be forwarded with report.)

RODS LLOYD'S GOT. No. 1643 OS 12.4.57

CRANKSHAFT ~~XEROX~~ LLOYD'S No. 288 OS 10.7.53

FLYWHEEL SHAFT

THRUST SHAFT

GEARING

INTERMEDIATE SHAFTS

SCREW AND TUBE SHAFTS

PROPELLERS

OTHER IMPORTANT ITEMS 1 - 800 Litres Air Receiver

No. 619
LLOYD'S TEST 50 KGS.
WP 25 KGS.
SA 2.11.49

1 - 1000 Litres Air Receiver

No. 3040
LLOYD'S TEST 41 KGS.
WP 25 KGS.
OS 25.3.60

Is the installation a duplicate of a previous case? _____

If so, state name of vessel _____

Date of approval of plans for crankshaft 29.6.1960 Straight shafting 29.6.1960 Gearing --- Clutch ---

Separate oil fuel tanks --- Pumping arrangements --- Oil fuel arrangements ---

Cargo oil pumping arrangements --- Air receivers 29.6.1960 Donkey boilers ---

Dates of examination of principal parts:—

Fitting of stern tube --- Fitting of propeller --- Completion of sea connections --- Alignment of crankshaft in main bearings 13.6.1960

Engine chocks & bolts --- Alignment of gearing --- Alignment of straight shafting --- Testing of pumping arrangements ---

Oil fuel lines --- Donkey boiler supports --- Steering machinery --- Windlass ---

Date of Committee _____ Special Survey Fee Kronor 1030:00, (dur.constr.)

Decision _____

Expenses Kronor 200:00.

Date when A/c rendered 22nd July, 1960.

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[illegible]

special requirements for ships carrying petroleum in bulk, cargo oil or classed for navigation in ice? (~~strike out words not applicable~~).

[illegible]

STEERING GEAR (State No. and Type of Steam Engines, Electric Motors, Hydraulic Pumps and other particulars)

Does this machinery installation contain any features of a novel or experimental nature? (Give particulars)

The foregoing description of the main engine and installation is correct and the particulars are as approved for torsional vibration characteristics (~~strike out words not applicable~~).

8. JULI