

Rpt. 4b

Date of writing report 12.10.61.

Received London

Port LEITH

-2 NOV. 1961

Survey held at LEITH

No. of visits

In shops

No.

25047

On vessel

31

First date

23.3.61.

Last date

6.10.61.

## FIRST ENTRY REPORT ON INTERNAL COMBUSTION MACHINERY

No. in R.B. 41556.

Name

"TORO"

Gross tons

512.

Owners Union Lighterage Co. Ltd.

Managers

Port of Registry

London

Hull built at Leith

By

Henry Robb Ltd.

Yard No.

481.

Year Month

When 1961.

Main Engines made at Cologne

By

Klockner-Humboldt-Deutz A.G.

Eng. No.

2752055-62

When 1961.

Gearing made at

By

Donkey boilers made at Los Angeles (U.S.A.)

By

Clayton Manufacturing Co.

Blr. Nos.

15393.

When 1961.

Machinery installed at Leith

By

Henry Robb Ltd.

When 1961.

Particulars of restricted service of ship, if limited for classification

"For Service on the River Thames and to Colchester."

Particulars of vegetable or similar cargo oil notation, if required

"Oil Tanker" - F.P. above 150° F.

Is ship to be classed for navigation in ice?

No

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

DIRECT REVERSING OIL ENGINE

MAIN RECIPROCATING ENGINES. Licence Name and Type No.

No. of cylinders per engine

Dia. of cylinders

stroke(s)

2 or 4 stroke cycle

Single or double acting

Maximum approved BHP per engine

at

RPM of engine and

RPM of propeller.

Corresponding MIP

(For DA engines give MIP top &amp; bottom)

Maximum cylinder pressure

Machinery numeral

Are the cylinders arranged in Vee or other special formation?

If so, number of crankshafts per engine

TWO STROKE ENGINES. Is the engine of opposed piston type?

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?

No. and type of mechanically driven scavenge pumps or blowers per engine and how driven

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?

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 &amp; FOUR STROKE ENGINES—GENERAL. No. of valves per cylinder: Fuel

Inlet

Exhaust

Starting

Safety

Material of cylinder covers

Material of piston crowns

Is the engine equipped to operate on heavy fuel oil?

Cooling medium for:—Cylinders Sea Water

Pistons

Fuel valves

Overall diameter of piston rod for double acting engines

Is the rod fitted with a sleeve?

Is welded construction employed for: Bedplate?

Frames?

Entablature?

Is the crankcase separated from the underside of pistons?

Is the engine of crosshead or trunk piston type?

Total internal volume of crankcase

No. and total area of explosion relief devices

Are flame guards or traps fitted to relief devices?

Is the crankcase readily accessible?

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? Built up seating. How is the engine started?

Can the engine be directly reversed?

If not, how is reversing obtained?

Has the engine been tested working in the shop?

How long at full power?

CRANK &amp; FLYWHEEL SHAFTING. Date of approval of torsional vibration characteristics of the propelling machinery system

State barred speed range(s), if imposed for working propeller

For spare propeller

Is a governor fitted?

Is a torsional vibration damper or detuner fitted to the shafting?

Where positioned?

Type

No. of main bearings

Are main bearings of ball or roller type?

Distance between inner edges of bearings in way of crank(s)

Distance between centre lines of side cranks or eccentrics of opposed piston engines

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

Diameter of journals

Diameter of crankpins

Centre

Breadth of webs at mid-throw

Axial thickness of webs

If shrunk, radial thickness around eyeholes

Are dowel pins fitted?

Crankshaft material Journals

Minimum

Webs

Approved

Tensile strength

Diameter of flywheel

Weight

Are balance weights fitted?

Total weight

Radius of gyration

Diameter of flywheel shaft

Material

Minimum approved tensile strength

Flywheel shaft: separate, integral with crankshaft, integral with thrustshaft. (State which)

014887 - 014898 - 0373 1/3



# 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 de-clutched? ..... If so, what? .....

STRAIGHT SHAFTING. Diameter of thrustshaft ..... Material ..... Minimum approved tensile strength .....  
Shaft separate or integral with crank or wheel shaft? Integral with crankshaft. ..... Diameter of intermediate shaft 5" ..... Material Ingot Steel .....  
Minimum approved tensile strength 28 tons. ..... Diameter of screwshaft cone at large end 6" ..... Is screwshaft fitted with a continuous liner? No .....  
Diameter of tube shaft. (If these are separate shafts) None ..... 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 Ingot Steel ..... Minimum approved tensile strength 28 t .....  
Is an approved oil gland fitted? No ✓ If so, state type (Owners Sand excluding gland) Length of bearing next to and supporting propeller 3' 0 1/2" ✓  
Material of bearing White Metal ✓ 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 5' 6" ✓ Pitch 3'-7-8"/2'-11-0 1/4" Built up or solid Solid ✓ Total developed surface 13.1 sq. feet ✓  
No. of blades 4 ✓ Blade thickness at top of root fillet 3" ✓ Blade material Cast Iron ✓ Moment of inertia of dry propeller 224000 lbs/In. ✓  
If propeller is of special design, state type ..... Is propeller of reversible pitch type? No ✓ If so, is it of approved design? .....  
State method of control ..... Material of spare propeller Cast Iron ✓ Moment of inertia 224000 lbs/In. ✓

AIR COMPRESSORS & RECEIVERS. No. of main engine driven compressors per engine 1 Can they be de-clutched? No .....  
No. of independently driven air compressors. (State capacity, prime mover, position in ship, and Port and No. of certificate) 1 at 13 cu. ft. F.A.D., Diesel driven port side, Southampton Certificate No. D.17584 ✓  
No. of starting air receivers. (Main and Aux. State capacity of each, position in ship and Port and No. of Certificate) 3 main, 2 at 17.65 cubic feet and 1 at 8.825 cubic feet, Starboard side aft, Hanover Certificate Nos. 60/73, 60/823, 61/80 ✓  
How are receivers first charged? Hand started Diesel driven air compressor. Maximum working pressure of starting air system 450 Lbs. 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 None 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 1 - Daily O.F. Service tank in Engine Room, top platform (C.L. aft). ✓

MAIN ENGINE DRIVEN PUMPS (No. and Purpose) ..... See Cologne Report No. 630.

Rpt. Contd. Sheet

Port of LEITH

Continuation of Ship/Mchy. Report No. 25047 dated 12th October, 1961.

on the ~~S.S.~~ M.S. "TORO" - Yard No. 481.

The S.W. cooling line to the main engine has a 2 way (Normal and Flushing) distribution cock fitted on the discharge side before the cylinders. As a consequence of this cock being kept in the "Flushing" position during trials at sea on the 23rd August, 1961 it was found necessary to stop the engine in order to avoid overheating. The crankcase inspection that followed on showed a partial seizure of No. 7 piston.

The ship returned to the Builders Yard at which time the following examination and repairs now carried out.

## On examination found :-

No. 1 & 8 cylinder liners and pistons in good condition.

Nos. 2,3 & 4 cylinder liners and pistons lightly marked.

Nos. 5 & 6 cylinder liners and pistons slightly scored.

No. 7 cylinder liner and piston partially seized.

## Permanent Repairs :-

All pistons renewed - All marked 319/75 N4.

Nos. 2,3 & 4 cylinder liners lightly honed.

Nos. 5,6 & 7 cylinder liners renewed also No. 7 connecting rod and bottom end bearing renewed.

No. 5 liner marked:- Lloyd's T.P. 120 Kg/cm<sup>2</sup> H.D. 8.9.61. KLN.

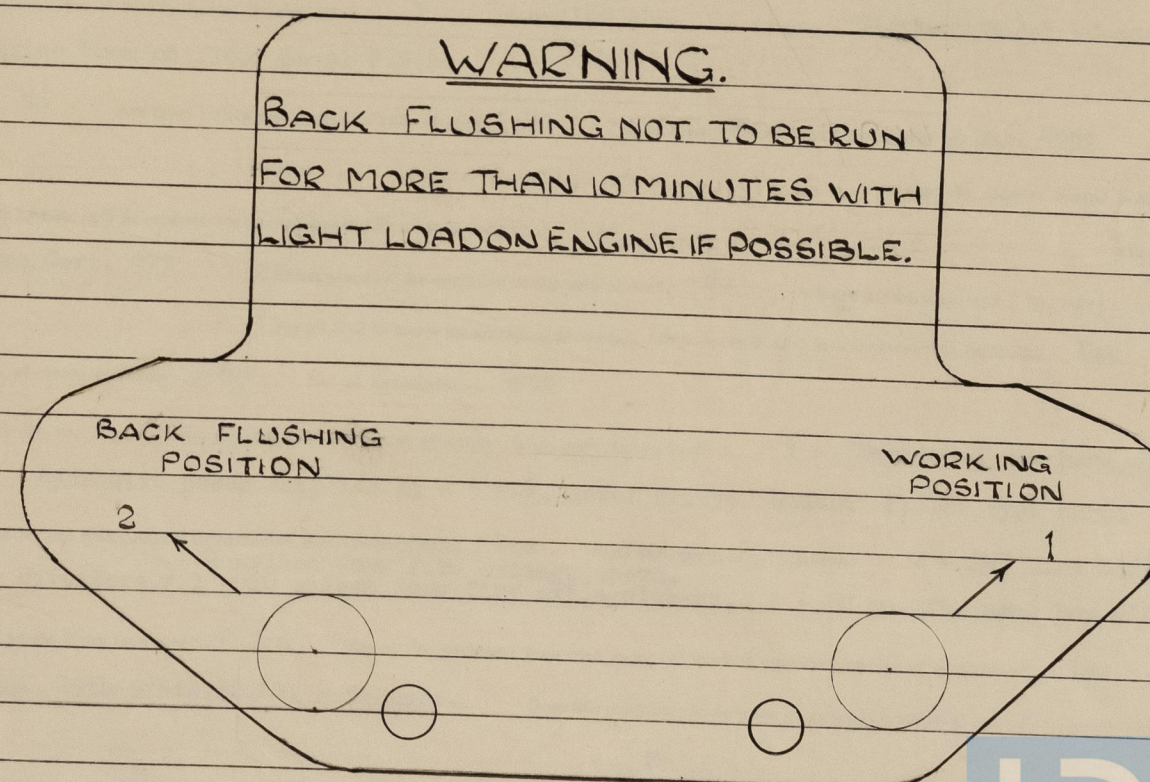
No. 6 liner marked:- Lloyd's T.P. 120 Kg/cm<sup>2</sup> H.D. 8.9.61. KLN.

No. 7 liner marked:- Lloyd's T.P. 120 Kg/cm<sup>2</sup> H.D. 25.8.61. KLN.

No. 7 connecting rod marked Lloyd's KLN. P.14 H.D. 25.8.61.

On completion of the above repairs, engine tested under full working conditions at sea on the 29th September and 4th October, 1961 with satisfactory results. All cylinder liners and pistons examined prior to ship's departure from Leith and all found in good condition.

The following notice plate has now been securely fastened to the 2 way distribution cock. The original notice plate (in German) has been dispensed with.





INDEPENDENT PUMPS Name below essential pumps, state position and how driven. Give capacity of bilge pumps.	Service for which each pump is connected to be marked thus X														
	SUCTION								DELIVERY						
	Bilge Main	Bilge Direct	Ballast Main	Oil Fuel	Fresh Water Cooling	Sea	Feed Tanks	Lub. Oil	Boiler Feed	Salt Water Cooling	Fresh Water Cooling	Oil Fuel Tanks	Fire Main	Lub. Oil	Piston Cooling
Ballast & Gen Sery. Pump P.S. attached to R & N Diesel Generator engine 67 T.P.H.R.	X	X	X			X				X			X		
Bilge & General Sery. Pump S.S. attached to R & N Diesel generator engine 67 T.P.H.R.	X	X	X			X				X			X		
Bilge Pump (In pump room) Motor driven 15 T.P.H.R.	X	X	X										X		
Standby L.O. pump attached to P.S. "DEUTZ" Diesel engine								X							O/Bd X
Oil fuel transfer pump (P.S.) (hand operated)				X										X	
Oil fuel transfer pump (S.S.) (hand operated)				X								X			
"CLAYTON" Boiler feed water transfer pump (P.S.)												X			
FROM F.W. STORAGE TANK TO HOTWELL.															

BILGE SUCTIONS. No. and size in each hold, deep tank or pump room 1 - P & S at 2"

No. and size connected to main bilge line in main engine room 1 at 2" P.&S.F. and 1 at 2" S.S.A. 1-2" from S.G. Compt. In tunnel No Tunnel

Fr'd. C/D In aux. engine room 1 at 2". Nos. 1 & 2 Dry tanks - 1 - 2" P & S Size and position of direct bilge suction in machinery spaces 1 - P & S.F. at 4" and 1 at 2 1/4" C.L. aft. Size and position of emergency bilge suction in machinery spaces (As Direct Suctions above)

Is the bilge or ballast system fitted with means for separating oily water on the overboard discharge side? No Do the piping arrangements comply with the Rules including special requirements for ships carrying petroleum in bulk, cargo oil or closed for navigation in ice? (strike out words not applicable). Yes

STEAM & OIL ENGINE AUXILIARIES

Position of each	Type	Made by	Port and No. of Rpt. or Cert.	Driven Machinery (For electric generators, state output)
Engine Room P.S.F.	Diesel	Russell Newbury	Lon. Cert. D.81093	Ballast & G.S. pump, Cargo Oil Pump.
Engine Room S.S.F.	Diesel	Do.	Lon. Cert. D.81091	1-35 Kw. elec. generator
Engine Room P.S.A.	Diesel	Deutz.	Cologne Cert. 61/158	Bilge & G.S. pump, Cargo Oil Pump. 1-35 Kw. elec. generator Air Compsr. & Stand. L.O. pump 1-10 Kw. elec. generator

Is electric current used for essential services at sea? Yes If so, state the minimum No. and capacity of generators required in order that the ship may operate at sea 1 at 35 Kw.

Is an electric generator driven by Main Engine? No

STEAM INSTALLATION. No. of donkey boilers burning oil fuel 1 W.P. 160 lbs. Type "Clayton" Model W0-50 H.P.

Position In Engine Room on floor level P.S.A.

Is a superheater fitted? No Are these boilers also heated by exhaust gas? No No. of donkey boilers heated by exhaust gas only? None W.P. -

Type - Position - Can the exhaust heated boilers deliver steam directly to the steam range or do they operate only as economisers in conjunction with oil fired boilers?

boilers Los Angeles Cert. 977 Is steam essential for operation of the ship at sea? No Are any steam pipes over 3 ins. bore? No If so, what is their material? -

For oil fired boilers is the arrangement of pipes, valves, controls, etc., in accordance with the Rules? Yes No. of oil burning pressure units One No. of steam condensers None No. of Evaporators None

STEERING GEAR. (State No. and Type of Steam Engines, Electric Motors, Hydraulic Pumps and other particulars) 1 - "Donkin" 2 ram hand electric hydraulic steering gear. Hydraulic power supplied by a 4 H.P. motor driven "Donkin" P.T.P. type pump. Alternative Hand Aft.

Have the Rule Requirements for fire extinguishing arrangements been complied with? Yes Brief description of arrangements 2 - 2 1/2" fire hydrants with canvas hoses and spray directors. 4 - 2 gallon foam fire extinguishers. 1 - 10 gallon foam fire extinguishers. 1 - 10 cu. ft. sand box with scoops.

Has the spare gear required by the Rules been supplied? Yes Has all the machinery been tried under full working conditions and found satisfactory? Yes Date and duration of full-power sea trials of main engines 29th-9/4th. 10.61. - 5 hours. Does this machinery installation contain any features of a novel or experimental nature? (Give particulars) No

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).

HENRY ROBB LIMITED

Henry C. Robb

DIRECTOR

Lloyd's Register Foundation

0373 2/3

20.10.61



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.

The machinery of this ship has been built under Special Survey in accordance with Secretary's letters and has been efficiently installed on board the ship.

The workmanship and materials have been found good and on completion the machinery was examined under full working conditions and found satisfactory.

It is recommended that the machinery of this ship be classed in the Register Book LMC 10,61, T.S., W.T.D.B.S. (160Lbs.), Oil Engine.

Note:- For incorporation in the Appendix to the S.R.L.

(See Glasgow letter dated 20.4.61. and Circular No. 2185 part 2b 1956).

The Owners have been informed that whilst the type of sand excluding gland, now fitted, does not qualify this ship for the notation of "O.G." the screwshaft could be drawn after 3 years service and if found satisfactory a further 3 year period could be granted. (See London letter Reference Eng. dated 17th April, 1961).

Thomas Donaldson.

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

CRANKSHAFT OR ROTORSHAFT

FLYWHEEL SHAFT

THRUSTSHAFT

GEARING

INTERMEDIATE SHAFTS Lloyd's Lth. 3851 W.C. 2.5.61.

SCREW AND TUBE SHAFTS Working :- Lloyd's Lth. 3849 W.C. 2.5.61. Spare:- Lloyd's Lth. 3850 W.C. 9.5.61.

PROPELLERS Working Propeller :- Lloyd's GHM. 8.5.61. (Spare Propeller to be ordered.)

OTHER IMPORTANT ITEMS

Is the installation a duplicate of a previous case? No If so, state name of vessel -

Date of approval of plans for crankshaft 17.2.55. Straight shafting 10.3.61. Gearing - Clutch -

Separate oil fuel tanks 9.8.61. Pumping arrangements 27.1.61. & 16.2.61. Oil fuel arrangements 27.1.61.

Cargo oil pumping arrangements 27.1.61. Air receivers 29.3.56. Donkey boilers -

Dates of examination of principal parts:-

Fitting of stern tube 15.5.61. Fitting of propeller 17.5.61. Completion of sea connections 1.6.61. Alignment of crankshaft in main bearings -

Engine chocks & bolts 22.6.61. Alignment of gearing - Alignment of straight shafting 22.6.61. Testing of pumping arrangements 17.8.

Oil fuel lines 9.8.61. Donkey boiler supports 10.8.61. Steering machinery 29.9.61. Windlass 23.8.61.

Date of Committee GLASGOW 31 OCT 1961 Special Survey Fee £ 35: 0: 0.

Decision Deferred.

Expenses £ 2: 0: 0.