

Rpt. 4b

Date of writing report 26-1-60. Received London Port Stockholm No. 12386.
Survey held at Gävle No. of visits In shops 6 First date 16.1.59. Last date 21.9.59.
On vessel 15 First date 12.5.59. Last date 28.11.59.

FIRST ENTRY REPORT ON INTERNAL COMBUSTION MACHINERY

No. in R.B. 40860 Name Twin Screw Motorship "ARBAN" Gross tons 1500
Owners U.S.S.R. Managers - Port of Registry Leningrad
Hull built at Gävle By A/B Gävle Varv Yard No. 102 Year Month
Main Engines made at Hamburg By Maschinenfabrik Augsburg-Nürnberg When 1959 11
Gearing made at - By - Eng. No.s 405260&405261 When 1959 3
Donkey boilers made at Sävsjö, Sweden By A/B Vatten och Ånga Blr. Nos. 25308 When 1959
Machinery installed at Gävle By A/B Gävle Varv When 1959 11

Particulars of restricted services of ship, if limited for classification

Particulars of vegetable or similar cargo on board, if required

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

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 report need not be repeated below, but the port and report number should be stated.

No. of main engines 2 No. of propellers 2 Brief description of propulsion system 2 engines - 2 screw shafts - 2 alternating pitch propeller units.

MAIN RECIPROCATING ENGINES. Licence Name and Type No. MAN type GIOV 40/60 (with supercharging)

No. of cylinders per engine - Dia. of cylinders - stroke(s) - 2 or 4 stroke cycle - Single or double acting -
Maximum approved BHP per engine - RPM of engine and - RPM of propeller.

Corresponding MIP - (For DA engines give MIP top & 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 valves 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? -
Is a stand-by or emergency pump or blower 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 & 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 - 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? Tank top How is the engine started? Compressed air~~

~~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 & 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? - Pins - Minimum -~~

~~Crankshaft material Journals - Approved - Webs - 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) -~~

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MAIN GAS TURBINES Name and Type No.

No. of sets of turbines: 2 Open or closed cycle: Open BHP per set: 1000 RPM of output shaft: 1800

How is drive transmitted to propeller shaft? Direct

ARRANGEMENT OF TURBINES: HP drives IP drives LP drives

No. of air compressors per set: 2 Centrifugal or axial flow type? Centrifugal Material of turbine blades: Aluminum Material of compressor blades: Aluminum

No. of air coolers per set: 2 No. of heat exchangers per set: 2 How are turbines started? By electric motor

How is reversing effected? By electric motor Are the turbines operated in conjunction with free piston gas generators? No

Total No. of free piston gas generators: 0 Diameter of working pistons: 100 mm Diameter of compressor pistons: 100 mm No. of double strokes per minute at full power: 1800 Gas delivery pressure: 10 bar Gas delivery temperature: 1000°C Have the turbines and attached equipment been tested working in the shop? Yes How long at full power? 1000 hrs

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

No. of generators: 2 KW per generator: 1000 RPM: 1800 AC or DC? AC Position: Starboard

No. of propulsion motors: 2 SHP per motor: 1000 RPM: 1800 Position: Starboard

How is power obtained for excitation of generators? By electric motor Motors? Yes

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? Double helical If single, position of gear thrust bearing: Starboard Is gearing of epicyclic type? No

PCD of pinions: First reduction: 100 mm Second reduction: 100 mm PCD of wheels: First reduction: 100 mm Main: 100 mm

Material of pinions: Steel Tensile strength: 50 kg/mm² Material of wheel rims: Steel Tensile strength: 50 kg/mm²

Are gear teeth surface hardened? Yes How are teeth finished? By grinding Diameter of pinion journals: 100 mm Wheel shaft: 100 mm

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

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 decoupled? Yes If so, what? For power generation

STRAIGHT SHAFTING. Diameter of thrust shaft: 280 mm Material: S.M.-steel Minimum approved tensile strength: 50 kg/mm²

Shaft separate or integral with crank or wheel shaft? Separate Diameter of intermediate shaft: 210 mm Material: S.M.-steel

Minimum approved tensile strength: 44 kg/mm² Diameter of screw shaft: 240 mm with 80 mm central hole Is screw shaft fitted with a continuous liner? No

Diameter of tube shaft: 240 mm Is tube shaft fitted with a continuous liner in way of stem tube? No Thickness of screw/tube shaft liner: 10 mm

Bearings: Yes Thickness between bearings: 10 mm Material of screw/tube shaft: S.M.-steel Minimum approved tensile strength: 44 kg/mm²

Is an approved oil gland fitted? Yes If so, state type: Cadervall Length of bearing next to and supporting propeller: 1000 mm

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

PROPELLER. Diameter of propeller: 2500 mm Pitch: Variable Built up or solid: Solid Total developed surface: 2720 kgm²

No. of blades: 3 Blade thickness at top of root fillet: 10 mm Blade material: Stainless steel Moment of inertia of dry propeller: 2720 kgm²

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

State method of control: Hydraulic Material of spare propeller blades: Stainless steel Moment of inertia: 2720 kgm²

AIR COMPRESSORS & RECEIVERS. No. of main engine driven compressors per engine: None Can they be decoupled? No

No. of independently driven air compressors. (State capacity, prime mover, position in ship, and Port and No. of certificate) 2 off 56 m³/h; electric motors; port & starb. fwd. in main E.R. Kiel cert. Nos. 58/6729 & 58/2780. 1 off Emergency air compressor, 11.4 m³/h; diesel motor; starb. side fwd. Copenhagen cert. dated 3rd March 1959.

No. of starting air receivers. (Main and Aux. State capacity of each, position in ship and Port and No. of Certificate) 3 off main; 1000 litres each; port, centre & starb. side fwd. in main E.R.; Hamburg cert. No. 58/6732 - 1 off aux.; 55 litres in main E.R.; port side aft Augsburg cert. No. 59/455 - 1 off aux.; 125 litres in aux. eng. room; Aug. cert. No. 59/446.

How are receivers first charged? By one diesel driven emergency compressor. Maximum working pressure of starting air system: 30 kg/cm² Are the safety devices 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: 2 No. of main engine lubricating oil coolers: 2

OIL FUEL TANKS. No. and position of oil fuel settling or service tanks not forming part of hull structure: None

MAIN ENGINE DRIVEN PUMPS (No. and Purpose) See Hamburg report No. 7502.

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	Alt. pitch prop. units	Boiler Feed	Salt Water Cooling	Fresh Water Cooling	Oil Fuel Tanks	Fire Main
Electric driven bilge pump, s.s., 80 m³/h	X	X	X			X								
Electric driven ballast pump, s.s., 100 m³/h	X	X	X	X		X							X	
Electric driven fire pump, s.s.						X								X
Diesel driven emerg. fire pump, steer. gear compart.						X							X	
Electric driven O.F. transfer pump, p.s.				X									X	
Electric driven 2 lub. oil stand by pumps, p.s.								X						X
El. driven 3 main cool. w. pumps (s.w. & fr. w.) port, centre & starb. fwd.					X	X					X	X		
El. driven 2 stand by cool. w. pumps (s.w. & fr. w.) for aux. engs. in ME room, p.s. aft					X	X					X	X		
El. driven 1 stand by cool. w. pump for aux. engs. in aux. E.R.						X					X			
El. driven 2 stand by lub. oil pumps for altern. pitch prop. units, p. & s.											X			
Steam driven Donkey Boiler feed pump, s.s.							X		X					X
El. driven D.B. feed pump, s.s.							X			X				

BILGE SUCTIONS. No. and size in each hold, deep tank or pump room No. 1 hold: 2 off 2" - Provision store: 1 off 2" + 1 off 2"

Compressor room: 2 off 3" - Salv. pump room: 2 off 2" - No. 2 hold: 2 off 2"

No. and size connected to main bilge line in main engine room: 3 off 3" + 2 off 2" Coff. dams: 1 off 3" in each.

In aux. engine room: 2 off 3" Size and position of direct bilge suction in machinery spaces: See direct suction above.

1 off 5" at aft end - 1 off 4" in aux. E.R. Size and position of emergency bilge suction in machinery spaces: See direct suction 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 classed for navigation in ice? (Strike out words not applicable.) Yes

Position of each	Type	Made by	Port and No. of Rpt. or Cert.	Driven Machinery (For electric generators, state output)
Port side aft in ME-room	4 SCSEA Diesel	MAN-AG	Augsburg cert. No. 59/671	One 100 KVA-3 phase alternator
Starb. side aft in ME-room	4 SCSEA Diesel	MAN-AG	Augsburg cert. No. 59/672	One 100 KVA-3 phase alternator
Port side, in aux. eng. room	4 SCSEA Diesel	MAN-AG	Augsburg F.E. rpt. No. 1241	One 200 KVA-3 phase alternator
Centre, in aux. eng. room	4 SCSEA Diesel	MAN-AG	Augsburg F.E. rpt. No. 1241	One 200 KVA-3 phase alternator
Starb. side, in aux. eng. room	4 SCSEA Diesel	MAN-AG	Augsburg F.E. rpt. No. 1241	One 200 KVA-3 phase alternator

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: One generator, 200 KVA

Is an electric generator driven by Main Engine? No

STEAM INSTALLATION. No. of donkey boilers burning oil fuel: 1 W.P. 85 lbs/sq. ins. Type: Single ended multitubular "Univex"

Position: In a separate compartment on starb. side in aux. eng. room.

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. 85 lbs/sq. ins.

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? Yes Port and No. of report on donkey boilers: Gothenburg No. 24772

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? Steel

For oil fired boilers is the arrangement of pipes, valves, controls, etc., in accordance with the Rules? Yes No. of oil burning pressure units: 2 No. of steam condensers: None No. of Evaporators: 1

STEERING GEAR. (State No. and Type of Steam Engines, Electric Motors, Hydraulic Pumps and other particulars) Maker: A/S Svendborg Skibsværft; Type 140/13 LCR4;

1 hydr. pump electr. driven with double pipes to steering gear; 1 hand operated hydr. pump in the steering pedestal on bridge.

Have the Rule Requirements for fire extinguishing arrangements been complied with? Yes Brief description of arrangements: To Lloyd's Rules and U.S.S.R. requirements

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: 13.11.59. - 6 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 fatigue characteristics (strike out words not applicable).

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 vessel has been installed under Special Survey in accordance with the Rules, approved plans and Secretary's letters, and tested under working conditions on trial trip and found satisfactory

The workmanship and materials are good.

The machinery of this vessel is eligible, in my opinion, to be classed in the Register Book with the record of +LMC 11.59 and OG, and with the notation "Strengthened for Navigation in ice," the engines not to be operated continuously between 80 and 100 r.p.m.

J. E. E. E. E.

Engine 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 Hamburg report No. 7502.

CRANKSHAFT OR ROTOR SHAFT Hamburg report No. 7502.

FLYWHEEL SHAFT Port:- LLOYDS DTM J.L. 782 2.9.57. HAM. 10.1.58. H. Ka.

THRUST SHAFT Starb:- LLOYDS DTM HK 858 A 4.11.57. HAM. 10.1.58. H. Ka.

LLOYDS SKM NO. 862 KE 20.5.59 DTM J.L. 4.9.57.

GEARING Port:- LLOYDS GOT. NO. 904 GU. 26.3.59.

LLOYDS SKM NO. 863 KE 20.5.59. DTM J.L. 14.9.57.

INTERMEDIATE SHAFTS Starb:- LLOYDS GOT. NO. 903 GU. 26.3.59.

Port:- LLOYDS GOT. NO. 862 GU. 26.3.59.

SCREW AND TUBE SHAFTS Starb:- LLOYDS GOT. NO. 836 GU 26.3.59.

PROPELLERS Please see Got. cert. No. 2674 attached hereto.

OTHER IMPORTANT ITEMS OK-couplings between screw shafts and intermediate shafts:-

Port side:- LLOYDS SKM NO. 8748 S.W. 23.9.57.

Starb. side:- LLOYDS SKM NO. 8749 S.W. 23.9.57.

Is the installation a duplicate of a previous case? Yes If so, state name of vessel "PAMIR", "ALDAN" and "AGATAN".

Date of approval of plans for crankshaft Ham. rpt. 7502 Straight shafting 18.4.1957. Gearing Church

Separate oil fuel tanks 20.1.58 & 1.3.58. Pumping arrangements 19.10.57. Oil fuel arrangements 19.10.57.

Cargo oil pumping arrangements HAM. cert. No. 58/1732 Air receivers AUG. cert. No. 59/455 Donkey boilers See Got. rpt. No. 24

Dates of examination of principal parts:- 28.4-8.5.59. 9.5-12.5.59. Completion of sea connections 12.5.59. Alignment of crankshaft in main bearings 11.6.59.

Fitting of stern tube Fitting of propeller Completion of sea connections 12.5.59. Alignment of crankshaft in main bearings 11.6.59.

Engine chocks & bolts 5.6.59. Alignment of gearing Alignment of straight shafting 11.6.59. Testing of pumping arrangements 17.11.

Oil fuel lines 17.11.59. Donkey boiler supports 23.6.59. Steering machinery and Windlass working 13.11.59.

Date of Committee FRIDAY 11 MAR 1960 Special Survey Fee 2.530

Decision See Rpt. 1

Expenses 212

Date when A/c rendered 16-12-59

