

Rpt. 4b

Date of writing report 15.8.60 Received London \_\_\_\_\_ Port Helsingfors No. 7650 M  
 Survey held at Helsingfors No. of visits \_\_\_\_\_ In shops \_\_\_\_\_ First date 3.2.59 Last date 15.6.60  
 On vessel 68

33 SEP 1960

FIRST ENTRY REPORT ON INTERNAL COMBUSTION MACHINERY

No. in R.B. 22669 Name "MOSKVA" Gross tons 13290  
 Owners U.S.S.R. Managers U.S.S.R. Port of Registry Murmansk  
 Hull built at Helsingfors, Finland By Wärtsilä-koncernen Ab, Sandvikens Skeppsdocka Yard No. 365 Year Month 1960-5  
 Main Engines made at Vasa, Finland By Wärtsilä-koncernen Ab, Wasa Mek. Verkstad Eng. No. 173, 174, 175, 176, 177, 178, 179, 180 When 1958-59  
 Gearing made at \_\_\_\_\_ By \_\_\_\_\_  
 Donkey boilers made at Helsingfors, Finland By Wärtsilä-koncernen Ab, Maskin och Bro Blr. Nos. 2795, 2796 When 1958  
 Machinery installed at Helsingfors, Finland By Wärtsilä-koncernen Ab, Sandvikens Skeppsdocka. When 1958

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? Yes Is ship intended to carry petroleum in bulk? no  
 Is refrigerating machinery fitted? yes If so, is it for cargo purposes? no Type of refrigerant Freon  
 Is the refrigerating machinery compartment isolated from the propelling machinery space? yes 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 8 No. of propellers 3 Brief description of propulsion system Diesel-electric  
 MAIN RECIPROCATING ENGINES. Licence Name and Type No. Sulzer 9MH 51/55, see my Reports Nos. 6577, 6704, 6767, 6793, 6958, 6968, 6992, 7025

No. of cylinders per engine 9 Dia. of cylinders 510 mm strokes 550 2 or 4 stroke cycle 2 Single or double acting single  
 Maximum approved BHP per engine 3250 at 330 RPM of engine and 115/145 RPM of propeller.  
 Corresponding MIP 5.3 (For DA engines give MIP top & bottom) Maximum cylinder pressure 65 Machinery numeral M.H. 4400

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 Each cylinder has a lever driven scavenging pump

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 0.24 ± 0.40 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 one Inlet none Exhaust none Starting one Safety one  
 Material of cylinder covers Cast steel Material of piston crowns cast steel Is the engine equipped to operate on heavy fuel oil? no

Cooling medium for: Cylinders Fresh water Pistons Lub. oil Fuel valves Fresh water 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 8.5 m<sup>3</sup> No. and total area of explosion relief devices 2250 cm<sup>2</sup>  
 Are flame guards or traps fitted to relief devices? no 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? seating How is the engine started? by air

Can the engine be directly reversed? no If not, how is reversing obtained? By reversing the current in the propelling motors.  
 Has the engine been tested working in the shop? yes How long at full power? 8 hours.

CRANK & FLYWHEEL SHAFTING. Date of approval of torsional vibration characteristics of the propelling machinery system 23.4.57 & 15.5.57 State barred speed range(s), if imposed for working propeller none For spare propeller none Is a governor fitted? yes Is a torsional vibration damper or detuner fitted to the shafting? no

Where positioned? \_\_\_\_\_ Type \_\_\_\_\_ No. of main bearings 11 Are main bearings of ball or roller type? no  
 Distance between inner edges of bearings in way of crank(s) 570 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 310 mm Diameter of crankpins Centre 310 mm Breadth of webs at mid-throw 450 mm Axial thickness of webs 163 mm  
 Side \_\_\_\_\_ Pins \_\_\_\_\_ Minimum \_\_\_\_\_

If shrunk, radial thickness around eyeholes \_\_\_\_\_ Are dowel pins fitted? \_\_\_\_\_ Crankshaft material Journals Approved \_\_\_\_\_  
 Webs \_\_\_\_\_ Tensile strength \_\_\_\_\_

Diameter of flywheel 1330 mm Weight 432 kg Are balance weights fitted? yes Total weight 45,8+25,5kg Radius of gyration 273mm+490mm

Diameter of flywheel shaft 310 mm Material \_\_\_\_\_ Minimum approved tensile strength \_\_\_\_\_  
 Flywheel shaft: separate, integral with crankshaft, integral with thrustshaft. (State which) Integral with crankshaft.



012638-012645-0065

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 8 KW per generator 2150 at 330 RPM AC or DC? DC Position Each coupled directly to

No. of propulsion motors 4 SHP per motor 5500 at 115/145 RPM Position 2 side, 2 centre coupled directly

How is power obtained for excitation of generators? Independent exciters Motors? Independent exciters

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 thrust shaft side 470 mm centre 580 mm Material SM steel Minimum approved tensile strength 55 kg/mm<sup>2</sup>

Shaft separate or integral separate Diameter of intermediate shaft side 460 mm centre 560 mm Material SM steel

Minimum approved tensile strength 55 kg/mm<sup>2</sup> Diameter of screwshaft cone at large end side 490 mm centre 615 mm Is screwshaft fitted with a continuous liner? yes

Diameter of tube shaft. (If these are separate shafts) side 24 mm Is tube shaft fitted with a continuous liner in way of stern tube? \_\_\_\_\_ Thickness of screw/tube shaft liner at bearings centre 27,5 mm Material of screw/tube shaft SM steel Minimum approved tensile strength 55 kg/mm<sup>2</sup>

Is an approved oil gland fitted? no If so, state type \_\_\_\_\_ Length of bearing next to and supporting propeller 2175 mm side 2470 mm centre

Material of bearing Tufnol 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 side 4820 mm centre 3860 mm Pitch side 3860 mm centre 4060 mm Built up or solid Built up Total developed surface side 10,0 centre 12,8

No. of blades 4 Blade thickness at top of root fillet side 225 mm centre 273 mm Blade material Cast Steel Moment of inertia of dry propeller side 2,02-10 centre 4,791

If propeller is of special design, state type split hub type Is propeller of reversible pitch type? no If so, is it of approved design? \_\_\_\_\_

State method of control \_\_\_\_\_ Material of spare propeller Cast steel Moment of inertia same as for ordinary propeller

AIR COMPRESSORS & RECEIVERS. No. of main engine driven compressors per engine none Can they be declutched? \_\_\_\_\_

No. of independently driven air compressors. (State capacity, prime mover, position in ship, and Port and No. of certificate) 2 main each 75 m<sup>3</sup>/h Free air, driven by el. motors, situated one in each Main Diesel Room., Cert.No.Hgb.58/2314 A+B.

No. of starting air receivers. (Main and Aux. State capacity of each, position in ship and Port and No. of Certificate) 6 main 3 m<sup>3</sup> each, in main diesel engine rooms, Cert.No.HNO.C/58/1044, 4 Aux.100 litre in main diesel engine rooms, Cert.No.KLN.C.58

How are receivers first charged? By emergency hand pump Maximum working pressure of starting air system 30 kg/cm<sup>2</sup> 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 4 No. of main engine lubricating oil coolers 4

OIL FUEL TANKS. No. and position of oil fuel settling or service tanks not forming part of hull structure 2 service tanks in boiler room.

MAIN ENGINE DRIVEN PUMPS (No. and Purpose) none

| Name below essential pumps, state position and how driven. Give capacity of bilge pumps. All by el. motors. pos. dies. Main engine rooms except as noted | SUCTION      |            |         |          |                     |       |            |          |             |                    | DELIVERY            |                |           |          |                |       |
|--|--------------|------------|---------|----------|---------------------|-------|------------|----------|-------------|--------------------|---------------------|----------------|-----------|----------|----------------|-------|
|  | Bilge Direct | Bilge Main | Ballast | 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 | Sea   |
| 2 Bilge, 15 t/h each   | XX           |            |         |          |                     |       |            |          |             |                    |                     |                |           |          |                | XX    |
| 2 Bilge, 100 t/h each  | XX           | XX         | XX      |          |                     | XX    |            |          |             |                    |                     |                |           |          |                | XX    |
| 2 Ballast, 100 t/h each  | XX           | XX         | XX      |          |                     | XX    |            |          |             |                    |                     |                |           |          |                | XX    |
| 3 Fire   |              |            |         |          |                     | XXX   |            |          |             |                    |                     | XXX            |           |          |                | XXX   |
| 10 Cooling water, for all Eng.   |              | XX         |         |          | XXX                 | XXX   |            |          |             | XXX                | XXX                 |                |           |          |                | XXX   |
| 4 Cooling water, for Aux.  |              | XX         |         |          | XX                  | XX    |            |          |             | XX                 | XX                  |                |           |          |                | XX    |
| 2 Lub.Oil transfers  |              |            |         |          |                     |       |            | XX       |             |                    |                     |                |           |          |                | XX    |
| 5 Lub.oil for M.E.   |              |            |         |          |                     |       |            | XXXXX    |             |                    |                     |                |           |          |                | XXXXX |
| 4 Fuel oil, Boosters for M.E.  |              |            |         |          |                     | XXXXX |            |          |             |                    |                     |                |           |          |                | XXXXX |
| 2 Fuel Oil, Transfer   |              |            |         |          |                     | XX    |            |          |             |                    |                     |                |           |          |                | XX    |
| 2 " " , Trim   |              |            |         |          |                     | XX    |            |          |             |                    |                     |                |           |          |                | XX    |
| 4 Fuel oil, Boosters for Aux E.  |              |            |         |          |                     | XXXXX |            |          |             |                    |                     |                |           |          |                | XXXXX |
| 2 Boiler feed, in boiler r.  |              |            |         |          |                     |       |            | XX       |             | XX                 |                     |                |           |          |                | XX    |
| 1 Injector, in boiler r.   |              |            |         |          |                     |       |            | X        |             | X                  |                     |                |           |          |                | X     |
| 2 Trim, 1000 t/h for peaks from Heeling Tank   |              |            |         |          |                     | XX    |            |          |             | XX                 |                     |                |           |          |                | XX    |
| 4 Heeling to " "   |              |            |         |          |                     |       |            |          |             |                    |                     |                |           |          |                |       |

BILGE SUCTIONS. No. and size in each hold, deep tank or pump room From coff.dams, 2"

No. and size connected to main bilge line in main engine room 2 in each main diesel engine room 3" 2 in side propeller motor room 2 1/2" 2 in centre " " 3" In tunnel 1 " centre " 3" 2 in sidetunnel 2 1/2"

In aux. engine room none Size and position of direct bilge suction in machinery spaces 1 in each diesel engine room 7"

1 in each propeller motor r. 2 1/2" Size and position of emergency bilge suction in machinery spaces 2 from each diesel engine room size 8" (cooling water p.) 2 from each diesel and propeller motor room, size 8" (trimp.)

Is the bilge or ballast system fitted with means for separating oily water on the overboard discharge side? yes Do the piping arrangements comply with the Rules including special requirements for ships not classed for navigation in ice? 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) |
|-----------------------------|-----------|--------------------------|-------------------------------|--|
| Fore engine room lower deck | K 58 E    | Wärtsilä-Vasa            | Hfs.7026 Rpt. ✓               | Generator 385 kVA cos φ 0,8                              |
| " " "                       | K 58 E    | " " "                    | " 7081 " ✓                    | " 385 kVA cos φ 0,8                                      |
| " " "                       | K 58 E    | " " "                    | " 7083 " ✓                    | " 385 kVA cos φ 0,8                                      |
| Aft Engine room lower deck  | K 55 E    | " " "                    | " 7037 " ✓                    | " 213 kVA cos φ 0,8                                      |
| " " "                       | K 58 E    | " " "                    | " 7089 " ✓                    | " 385 kVA cos φ 0,8                                      |
| " " "                       | K 58 E    | " " "                    | " 7095 " ✓                    | " 385 kVA cos φ 0,8                                      |
| " " "                       | K 58 E    | " " "                    | " 7106 " ✓                    | " 385 kVA cos φ 0,8                                      |
| Boat deck, port             | RHS 518 D | süddeutsche Bremsen A.G. | Aug. 985 "                    | " 62,5 kVA cos φ 0,8                                     |

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 4 generators each 385 kVA Is an electric generator driven by Main Engine? 8 Gen. by 8 main engines

STEAM INSTALLATION. No. of donkey boilers burning oil fuel 2 W.P. 10 kg/cm<sup>2</sup> Type Babcock & Wilcox water tube type

Position Upper deck

Is a superheater fitted? no Are these boilers also heated by exhaust gas? no No. of donkey boilers heated by exhaust gas only? \_\_\_\_\_ 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? \_\_\_\_\_

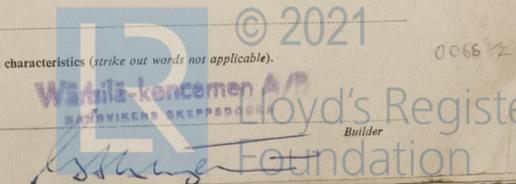
boilers Hfs 6991 and 6996 Is steam essential for operation of the ship at sea? no Are any steam pipes over 3 ins. bore? yes If so, what is their material? steel For oil fired boilers is the arrangement of pipes, valves, controls, etc., in accordance with the Rules? yes No. of oil burning pressure units 2 No. of steam condensers \_\_\_\_\_ No. of Evaporators one

STEERING GEAR. (State No. and Type of Steam Engines, Electric Motors, Hydraulic Pumps and other particulars) Electric-hydraulic with two el. motors each driving oil pump of variable output type

Have the Rule Requirements for fire extinguishing arrangements been complied with? yes Brief description of arrangements CO2 installation and portable foam extinguishers, and steam smothering in the Boiler Room and in the silencers inside the funnel.

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 11.5.60. 8 hours Does this machinery installation contain any features of a novel or experimental nature? no (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).



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 has been constructed and installed under Special Survey in accordance with the Rules, approved plans and Secretary's letters. The quality of the material and workmanship found good.

The Machinery is eligible in my opinion to be classed +LMC.

*A. Martin* *J. H. Jones*

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 SHAFTS (=crank shafts)

THRUSTSHAFTS SHF 16233 15.10.58 H.H. - SHF 16235 5.1.59 H.H. - SHF 16232 5.6.58 H.H.

GEARING

INTERMEDIATE SHAFTS SHF 16228 & 16229 20.10.58/28.1.59 H.H. - SHF 16231/15.7.58, 16222&16223/10.7.

SCREW ~~AXLE~~ SHAFTS SHF 12874/16.7.58, 12873/7.7.58, 12869/19.6.58 H.H.

PROPELLERS 3 Bosses: Abo 613, 614, 615 14.7.58 H.T. - 12 Blades: Abo 616, 617 31.7.58 AI and Abo 618, 619 14.7.58 H.T. and Abo 628, 629, 630, 631 30.7.58 AI and Abo 632, 634, 635, 636 21.

OTHER IMPORTANT ITEMS Spare shaft for Centre Propeller: SHF 12870 22.9.58 H.H. -

Spare shaft for Wing Propellers: SHF 12878 24.3.59 H.H.

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

Date of approval of plans for crankshaft - Straight shafting 29.5.58 Gearing - Clutch -

Separate oil fuel tanks - Pumping arrangements 4.6.58 Oil fuel arrangements 29.1.57

Cargo oil pumping arrangements - Air receivers - Donkey boilers 21.10.57

Dates of examination of principal parts:-

Fitting of stern tube 11.12.58 Fitting of propeller 8.1.59 Completion of sea connections 8.1.59 Alignment of crankshaft in main bearings 5.6.59

Engine chocks & bolts 2.7.59 Alignment of gearing - Alignment of straight shafting 21.8.59 Testing of pumping arrangements 28.4.60

Oil fuel lines 16.9.59 Donkey boiler supports 8.4.60 Steering machinery 11.5.60 Windlass 11.5.60

Date of Committee FRIDAY 14 OCT 1960 Special Survey Fee Rate 436,800 (plus exp with Service)

Decision See Rpt. 1.

*8/13*

