Rpt. 4b

Date of writing report 10th Oct.,1963. Received London ..... Port Hiroshima No. FE-3008

In shops 192 — First date 24th Sept.,1962 — Last date 27th Sept.,1963

Survey held at Hiroshima, Japan — No. of visits On vessel 23 — First date 9th May,1963 — Last date 4th Oct.,1963

FIRST ENTRY REPORT ON INTERNAL COMBUSTION MACHINERY

No. in R.B. ..... Name Motor Tanker "LIKHOSLAVL" Gross tons 22371.10

Owners V/O "Sudoimprt" U.S.S.R. Managers – Port of Registry Odessa

Hull built at Hiroshima, Japan By Mitsubishi Shipbuilding&Engineering Co.,Ltd.,Hiroshima Works Yard No. 161 When Year 1963 Month 10

Main Engines made at Hiroshima, Japan By Mitsubishi Shipbuilding&Engineering Co.,Ltd.,Hiroshima Works Eng. No. 27 When 1963,7

Gearing made at – By – –

Aux. Donkey boilers made at Hiroshima, Japan By Mitsubishi Shipbuilding&Engineering Co.,Ltd.,Hiroshima Works Blr. Nos. 93 & 94 When 1963,6

Machinery installed at Hiroshima, Japan By Mitsubishi Shipbuilding&Engineering Co.,Ltd., Hiroshima Works When 1963,9

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. - Class III Is ship intended to carry petroleum in bulk? Yes.

Is refrigerating machinery fitted? Yes. If so, is it for cargo purposes? No. Type of refrigerant Freon gas direct expansion type.

Is the refrigerating machinery compartment isolated from the propelling machinery space? No. 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 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 th at 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 Reciprocating oil engine directly coupled to line shaft.

MAIN RECIPROCATING ENGINES. Licence Name and Type No. Mitsubishi Hiroshima Sulzer 9RD90 Cross-scavenging two-cycle single acting exhaust turbo-charger cross-head type.

No. of cylinders per engine 9 Dia. of cylinders 900 mm stroke(s) 1550 mm 2 or 4 stroke cycle 2 Single or double acting Single.

Maximum approved BHP per engine 18000 at 119 RPM of engine and 119 RPM of propeller.

Corresponding MIP 8.5kg/cm2 (*For DA engines give MIP top & bottom*) Maximum cylinder pressure 70kg/cm2 Machinery numeral 3600

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? Ports in the cylinders. No. and type of mechanically driven scavenge pumps or blowers per engine and how driven 9-piston underside scavenging type.

No. of exhaust gas driven scavenge blowers per engine 3 sets. Where exhaust gas driven blowers only are fitted, can the engine operate with one blower out of action? Yes.

If a stand-by or emergency pump or blower is fitted, state how driven None. No. of scavenge air coolers 3 sets. Scavenge air pressure at full power 0.7 kg/cm2 Are scavenge manifold explosion relief valves fitted? Fitted in each cylinder.

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 None. Exhaust None. Starting 1 Safety 1

Material of cylinder covers Cast steel Material of piston crowns Cast steel Is the engine equipped to operate on heavy fuel oil? Yes.

Cooling medium for :—Cylinders Fresh Water Pistons Fresh Water Fuel valves Fresh Water Overall diameter of piston rod for double acting engines –

Is the rod fitted with a sleeve? None. Is welded construction employed for: Bedplate? Yes. Frames? Yes. Entablature? – Is the crankcase separated from the underside of pistons? Yes. Is the engine of crosshead or trunk piston type? Cross-head. Total internal volume of crankcase 193.3 m3 No. and total area of explosion relief devices 9-18540 cm2 Are flame guards or traps fitted to relief devices? Yes. 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? Tank top 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? 3 hrs.

CRANK & FLYWHEEL SHAFTING. Date of approval of torsional vibration characteristics of the propelling machinery system 27th Dec., 1962. 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) 1200 mm Distance between centre lines of side cranks or eccentrics of opposed piston engines –

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

Diameter of journals 650 mm Diameter of crankpins Centre 650 mm Side – Breadth of webs at mid-throw 1058 mm Axial thickness of webs 405 mm

If shrunk, radial thickness around eyeholes 287.5 mm Are dowel pins fitted? None. Crankshaft material Pins Forged steel Minimum 50 kg/cm2 Journals Forged steel Approved 50 kg/cm2 Webs Forged steel Tensile strength 50 kg/cm2

Diameter of flywheel 2558 mm Weight 1900 kg Are balance weights fitted? Yes. Total weight 424 kgs Radius of gyration 905 mm

Diameter of flywheel shaft 650 mm Material Forged steel Minimum approved tensile strength 50 kg/cm2

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

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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. (*A small diagram should be attached showing gas cycle.*)
HP drives – at – RPM HP gas inlet temperature – pressure –
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 650 mm Material Forged steel Minimum approved tensile strength 50 kg/cm2

Shaft separate or integral with crank or wheel shaft? Separate Diameter of intermediate shaft 570 mm Material Forged steel

Minimum approved tensile strength 45 kg/cm2 Diameter of screwshaft cone at large end 625 mm Is screwshaft fitted with a continuous liner? Yes.
(Screw shaft in accordance with C1002)

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 30 mm Thickness between bearings 29 mm Material of screw/tube shaft Forged steel Minimum approved tensile strength 45kg/cm2

Is an approved oil gland fitted? No. If so, state type – Length of bearing next to and supporting propeller 2,630mm

Material of bearing Lignumvitae 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 6,100 mm Pitch 5,000 mm Built up or solid Solid Total developed surface 19.00 M2

No. of blades 5 Blade thickness at top of root fillet 300.0 mm Blade material Manganese Bronze Moment of inertia of dry propeller 437,050 kg-cm-s

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 steel Moment of inertia 456,971kg-cm-sec^2

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-340 m3/hx30kg/cm2 motor driven, inner & outer, Portside in engine room(Yokohama M-9058); 1-Emergency-9m3/hx30kg/cm2,diesel eng. driven, Port in engine R.(Yokohama M-9061); 1-Ship service-100 m3/hx35kg/cm2,Motor driven,port partial deck in engine R, (Yokohama M-9059); 1-Control-70 m3/hx8.5kg/cm2, Motor driven,Stbd. partial deck in engine R.(Yokohama M-9060).

No. of starting air receivers. (*Main and Aux. State capacity of each, position in ship and Port and No. of Certificate*) Main-2x17 m3, inner & outer port 2nd deck in engine R.(Kobe AR-87126); Aux.-1x0.32 m3 port Lower floor in engine R.(Kobe AR-88004); Control air bottle 1x0.8 m3, Stbd.Aft partial deck in engine R.(Kobe AR-86954) Ship service air bottle-1x1 M3, port aft partial deck in engine room (Kobe AR-86953).

How are receivers first charged? by emergency air compressor Maximum working pressure of starting air system 30 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 4 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 1-Diesel oil settling tank & 1-Diesel Oil service tank -Stbd. 2nd deck in engine R.; 1-Diesel oil service tank for emergency generator oil engine- in emergency generator room on boat deck.

MAIN ENGINE DRIVEN PUMPS (*No. and Purpose*) 9-oil fuel Injection pumps.

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	
2-Jacket Cooling F.W. P.(E) port (F&A) in E.R.					X						X					
2-Piston Cooling F.W. P.(E) port (Fwd&Aft) in E.R.					X										X	
2-FuelValveCooling F.W. P.(E) port (in&out) in E.R.					X						X					
2-Cooling salt W. P. (E) stbd.(F&A) in E.R. 1100 M3/h x 20 m.		X				X				X						
1-Bilge&Ballast Pump (S) stbd. in E.R. 150 m3/h x 3.5kg/cm2	X	X	X			X				X						
2-Fire pumps(E) stbd.(in&out) in E.R.						X							X			
1-Bilge pump (E) stbd. aft in E.R. 30 m3/h x 3.5kg/cm2	X	X				X										
1-Bilge & G.S. pump (E) stbd. in E.R. 150 m3/h x 3.5kg/cm2	X	X	X			X										
2-L.O. pump (E) stbd. (F&A) in E.R.								X						X		
1-L.O. Transfer pump (E) stbd. in E.R.								X						X		
2-F.O. Booster pump (E) port (in&out) in E.R.				X								X				
2-F.O. Burning pump (E) port (in&out) in E.R.				X												
1-F.O. Transfer pump (E) port fwd. in E.R.				X								X				
2-Feed pump (S) stbd. (in&out)aftmost inER							X		X							
1-Diesel oil Transfer P.(E) port fwd. in E.R.				X								X				
1-Aux.feed P.(E) stbd. aftmost in E.R.							X		X							
1-Boiler water circ. P.(E) stbd. aftmost in E.R.							X		X							
2-Boiler water circ. P.(E) port (in&out) in E.R.					Secondary boiler		X		X	Economizer						
1-Condensate pump (E) stbd.fwd. in E.R.									X							
1-Bilge & Ballast pump (S) in Aux. pump R.100M3/hx3.5kg/cm2	X	X				X										
1-F.O. Transfer pump (S) in Aux. pump R.				X								X				
1-Emergency fire pump (O.E.) in Emergency fire pump R.						X							X			
1-Make-up F.W. pump (E) port in E.R.					X						X					

(E) ..... Electrical motor (S) ..... Steam driven

material? Steel pipe

For oil fired boilers is the arrangement of pipes, valves, controls, etc., in accordance with the Rules? Yes.

No. of oil burning pressure

(Rpt. 10a.) 3,63 KOB

Dry cargo space 2-50mm; Main pump room 3-50mm; Fore pump room 1-50mm

No. and size connected to main bilge line in main engine room 1-50mm(Stbd.fwd) 4-90mm(Fwd.p&s,Aft p&s) 2-70mm Aftmost in E.R.
1-70mm(E.R.coff.) 1-70mm(Cool F.W. Tank)

In aux. engine room –

Size and position of direct bilge suctions in machinery spaces 1-160mm; P.fwd.

1-90mm; Stbd.fwd; 1-70mm Aftmost in engine room.

Size and position of emergency bilge suctions in machinery spaces 1-400mm; Stbd.fwd.

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 carrying petroleum in bulk, ~~cargo oil~~ or classed 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)
# No.1 Port in E.R.	Yokohama M.A.N Diesel Engine G5V 23/33AL	Yokohama Shipyard & Engine Works Mitsubishi Nippon Heavy Ind.,Ltd.	Yokohama M-9075	A.C.Generator 350 KVA
# No.2 Stbd.Fwd.in E.R.	"	"	"	"
# No.3 Stbd.Fwd.in E.R.	"	"	"	"
Emergency generator room on boat deck	Kubota 5JZ Diesel Engine	Kubota Iron Works	Kobe O-89788	A.C.Generator 95 KVA
# Working platform				

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 2 sets 560 KW.

Is an electric generator driven by Main Engine? No.

STEAM INSTALLATION. No. of ~~donkey~~ Aux. boilers burning oil fuel 2

W.P. Secondary 18kg/cm2 **Type** Mitsubishi Hiroshima Double Evaporation
Primary 55kg/cm2 Type Water Tube Boiler.

Position Port & Starboard in Boiler Room.

Is a superheater fitted? No. **Are these boilers also heated by exhaust gas?** No. **No. of donkey boilers heated by exhaust gas only?** One. **W.P.** 20 kg/cm2

Type U Tube with heater Type **Position** in Funnel **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.(Deliver directly) **Port and No. of report on donkey boilers** Primary SMK B-15115, B-15117
Secondary SMK SG-15116, SG-15118 **Is steam essential for operation of the ship at sea?** Yes. **Are any steam pipes over 3 ins. bore?** Yes. **If so, what is their material?** Steel pipe **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** 1 **No. of Evaporators** 1

STEERING GEAR. (*State No. and Type of Steam Engines, Electric Motors, Hydraulic Pumps and other particulars*) (Including particulars of alternative means of steering) 2 sets
Mitsubishi Standard Model D-80 2 Rams 4 Cylinder Electro-hydraulic 2 Janney pumps with 26KW electric Motors.

Have the Rule Requirements for fire extinguishing arrangements been complied with? Yes. **Brief description of arrangements** Water service comprising 2 fire ps.inE.R., 1.Emergency fire p. in Fwd pump R.,CO2 fire extinguishing system in E.R.& B.R., Steam Smothering system in E.R.,B.R., Main & Aux.p.R. & Cargo oil tanks. 9-9 liter foam bottles, 2-45 liter bottles, 2-½ liter monochloro fire ext. 2-290 liter sand box. in Machinery space. 2-½ monochloro fire ext. in emergency generator R.. Air foam fire ext. system in Cargo oil tanks,4F.O. deep tanks & Main & Aux.p.R. Automatic sprinkler system in living quarter* Compressor

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** 23th & 25th Sept.,1963 5 hrs. **Does this machinery installation contain any features of a novel or experimental nature?** (*Give particulars*)
* 1 Sprinkler pump in E.R.
Electric distance reading thermometers fitted to main engine crank journal bearing, Main engine piston and jacket cooling water temperature automatically controlled.

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*).

Y. Kaneda *Builder*
General Manager, Hiroshima Works,
Mitsubishi Shipbuilding & Engineering Co., Ltd.

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 the Rules, Approved plans and Secretary's letters. The materials and workmanship are sound and good.

The machinery was examined under working condition during comprehensive shop and sea trial and found satisfactory.

In our opinion the machinery of this ship is worthy to have records of +LMC 9/63 ABS 9/63 (Primary 782 lb/in^2 Secondary 256 lb/in2 exhaust gas economizer 284 lb/in2) TS(CL) 9/63 and SPS 9/63.

W.A.Cook J.E.Radcliffe K.Okada

Engineer Surveyor to Lloyd's Register of Shipping.

W.A.Cook, J.E.Radcliffe & K.Okada

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

RODS Piston Rod - LLOYD'S SMK Y-18465-1&2 Y-18516-2&3 Y-18530-1&2 Y-18537-1&2 Y-18746-4 K.O.B 22-4-63 & 28-5-63

Connecting Rod - LLOYD'S HMA Y-18539-2 Y-18613-1,2,3,4,6,& 7. Y-18722-1 Y-18728-3 K.O. & KOI B 3-6-63& 14-6-63

CRANKSHAFT ~~OR ROTORSHAFT~~ LLOYD'S NAG NO.MS-CK5501-F & MS-CK5501-A AI 22-2-63

~~FLYWHEEL SHAFT~~

THRUSTSHAFT LLOYD'S NAG NO.5443 AI 22-2-63

~~GEARING~~

INTERMEDIATE SHAFTS (NO.1) LLOYD'S SMK NAG NO.5446A K.O. LR 16-5-63
(NO.2) LLOYD'S SMK NAG NO.5446B K.O. LR 16-5-63

SCREW AND TUBE SHAFTS LLOYD'S SMK NAG NO.5444 K.O. LR 10-5-63

PROPELLERS Working LLOYD'S SMK NO. NAG 5334 K.O. LR 10-5-63
Spare LLOYD'S NAG NO. 5613 YK 25-7-63

OTHER IMPORTANT ITEMS

LLOYD'S TEST SMK NOS.13096-1to9 W.T.P. 105&6 kg/cm.sq. K.O. LR 17,20,23,25,27,30-4-63
Cylinder Cover; (Spare) LLOYD'S TEST HMA NO.15195 W.T.P. 105 kg/cm2 K.O. LR
(") LLOYD'S TEST HMA NO.15311 W.T.P. 105 kg/cm2 K.O. LR 19,21,23-9-63
Piston Crown ; LLOYD'S SMK NO.13097-1to10 W.T.P. 20 kg/cm.sq. K.O. LR 18,20,22,&23- 5-63
Crosshead Pin ; LLOYD'S SMK NO.5503-A,B,C, & D. K.O. LR 30-4-63
LLOYD'S SMK NO.13098-1,to 5 K.O. LR 23-5-63

Is the installation a duplicate of a previous case? Yes. **If so, state name of vessel** M.V."LUGANSK" & "LEBEDIN"

Date of approval of plans for crankshaft 20th June,1961 **Straight shafting** 5th April,1961 **Gearing** - **Clutch** -

Separate oil fuel tanks 6th November, 1961 **Pumping arrangements** 4th February, 1963 **Oil fuel arrangements** 4th Feb.,1963

Cargo oil pumping arrangements 10th January, 1963 **Air receivers** 8th & 27th Sept 1961 **Donkey boilers** 17th Sept.,1963

Dates of examination of principal parts:—

Fitting of stern tube 9th May,1963 **Fitting of propeller** 14th May,1963 **Completion of sea connections** 5th May,1963 **Alignment of crankshaft in main bearings** 31st Aug.1963

Engine chocks & bolts 31st Aug.1963 **Alignment of gearing** - **Alignment of straight shafting** 31st Aug.1963 **Testing of pumping arrangements** 4th Feb.196 16th Sept.196

Oil fuel lines 14th Aug.,1963 **Donkey boiler supports** 13th Aug.,1963 **Steering machinery** 25th Sept.1963 **Windlass** 25th Sept.,1963

Date of Committee FRIDAY 14 FEB 1964

Special Survey Fee CONST. £812,250
INST. £472,500

Decision +LMC ES
ABS
T(CL) 9.63
SPS

Expenses

Date when A/c rendered