

Rpt. 4b

Date of writing report 25th February, 1962

Survey held at MITSUBISHI, HIROSHIMA

Received London

In shops 155
No. of visits
On vessel 25

Port SHIMONOSEKI

23rd Jan., 1961

First date 16th Oct., 1961 Last date

No. FE-1960

9th Nov., 1961

23rd Feb., 1962

FIRST ENTRY REPORT ON INTERNAL COMBUSTION MACHINERY

No. in R.B. Name Motor Tanker "LUGANSK"

Gross tons 22,262.48

V/O "SUDOIMPORT"

Managers

Port of Registry

Odessa

Built at Hiroshima, Japan

By Mitsubishi Shipbuilding & Engineering Co., Ltd., Hiroshima Works

Yard No.

S-145

Year Month

When 2 - 1962

Engines made at Hiroshima, Japan

By Mitsubishi Shipbuilding & Engineering Co., Ltd., Hiroshima Works

Eng. No.

21

When 11 - 1961

Ring made at

By

By Mitsubishi Shipbuilding & Engineering Co., Ltd., Hiroshima Works

Blr. Nos.

88 & 87

When 2 - 1962

Key boilers made at Hiroshima, Japan

Machinery installed at Hiroshima, Japan

By Mitsubishi Shipbuilding & Engineering Co., Ltd. Hiroshima works

When 2 - 1962

Particulars of restricted service of ship, if limited for classification

Particulars of vegetable or similar cargo oil notation, if required

Ship to be classed for navigation in ice? Yes, Class 3

Is ship intended to carry petroleum in bulk? Yes

Refrigerating machinery fitted? Yes

If so, is it for cargo purposes? No (ship use)

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 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

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-charged cross-head type

No. of cylinders per engine 9

Dia. of cylinders

900 mm

stroke(s)

1,550 mm

2 or 4 stroke cycle 2

Single or double acting Single

Maximum approved BHP per engine

18,000

at

119

RPM of engine and

119

RPM of propeller.

Responding MIP 8.5 Kg/cm²

(For DA engines give MIP top & bottom)

Maximum cylinder pressure

69 Kg/cm²

Machinery numeral 3,600

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? Port in cylinder

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

line and how driven 9 - Piston underside scavenging type

No. of exhaust gas driven scavenge blowers per engine 3

Where exhaust gas driven blowers only are fitted, can the engine operate with one blower out of action? Yes

stand-by or emergency pump or blower is fitted, state how driven

None

No. of scavenge air coolers 3

Scavenge air pressure at full

aver 0.66 Kg/cm²

Are scavenge manifold explosion relief valves fitted? Yes

THREE STROKE ENGINES.

Is the engine supercharged?

Are the undersides of the pistons arranged as supercharge pumps?

No. of exhaust gas driven blowers per

line

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? Crosshead

Total internal volume of crankcase 193.3 m³

No. and total area of explosion relief

ces 9 - 18,540 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

haul 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? Yes

If not, how is reversing obtained?

Has the engine been tested working in the shop? Yes

How long at full power? 2 hrs.

CRANK & FLYWHEEL SHAFTING. Date of approval of torsional vibration characteristics of the propelling machinery system 25-5-1961

State barred speed range(s), if imposed

Working propeller None

For spare propeller None

Is a governor fitted? Yes

Is a torsional vibration damper or detuner fitted to the shafting? No

Are the propellers

Type

No. of main bearings 11

Are main bearings of ball or roller

No

Distance between inner edges of bearings in way of crank(s) 1,200 mm

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

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

Semi-built.

Diameter of journals 650 mm

Diameter of crankpins

Centre 650 mm

Breadth of webs at mid-throw 1,058 mm

Axial thickness of webs 405 mm

Crank, radial thickness around eyeholes 287.5 mm

Are dowel pins fitted? None

Crankshaft material Journals Forged steel

Minimum 50 Kg/mm²

Webs Forged steel

Approved 50 Kg/mm²

Diameter of flywheel 2,558 mm

Weight 1,900 Kg

Are balance weights fitted? Yes

Total weight 2,277 Kg

Radius of gyration 970 mm

Diameter of flywheel shaft

Material

Minimum approved tensile strength

Crankshaft: 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. 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 _____
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
minute at full power _____ Gas delivery pressure _____ Gas delivery temperature _____ Have the turbines and attached equipment been tested work
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
journals _____ Are the wheels of welded construction? _____ Is gearcase of welded construction? _____ Has the wheel/gearcase been heat treated on complet
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 b
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/mm²
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/mm² Diameter of screwshaft cone at large end 625 mm Is screwshaft fitted with a continuous liner? Yes
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
bearings 30 mm Thickness between bearings 29 mm Material of screw/tube shaft Forged Steel Minimum approved tensile strength 45
Is an approved oil gland fitted? No If so, state type _____ Length of bearing next to and supporting propeller 2,630mm + 800mm
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 betw
liners readily visible in dry dock? _____

PROPELLER. Diameter of propeller 6,100 mm Pitch 4,800 mm Built up or solid Solid Total developed surface 19.00 m²
No. of blades 5 Blade thickness at top of root fillet 305.5 mm Blade material Manganese Bronze Moment of inertia of dry propeller 461,811 Kg
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 468,971 Kg cm²

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 - 348 m³/h x 30 Kg/cm²,
inner & outer, portside in engine room (Yokohama M-7540); 1 Emergency - 9 m³/h x 30 Kg/cm², diesel engine dri
in engine room (Yokohama M-7556); 1 Ship Service - 100 m³/h x 8.5 Kg/cm², motor driven, port partial deck in
(Yokohama M-7568); 1 Control - 70 m³/h x 8.5 Kg/cm², motor driven, starb'd partial deck in engine room (Yokoh
engine

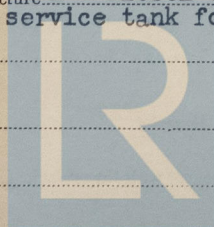
No. of starting air receivers. (Main and Aux. State capacity of each, position in ship and Port and No. of Certificate) Main - 2 x 17 m³, in. & out. port 2
room (Kobe AR-72950); Aux. - 1 x 0.32m³, port lower floor in engine room (Kobe AR-74112); Control Air Bottle
1 x 0.8m³, starb'd aft partial deck in engine room (Kobe AR-75258); Ship Service Air Bottle - 1 x 1 m³, port
partia deck in engine room (Kobe AR-75258)

How are receivers first charged? By emergency air compressor Maximum working pressure of starting air system 30 Kg/cm² Are the safety device
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 cooler 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
service tank - starboard 2nd deck in engine room: 1 - Diesel oil service tank for emergency generator oil eng
- in emergency generator room on boat deck

MAIN ENGINE DRIVEN PUMPS (No. and Purpose) 9 - Oil fuel pumps



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shaft

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	Overboard
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Material

ble strokes

tested work

e?

Wheel s

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/mm²

el

Yes

2-Jacket cooling F.W. pump (E) port (F & A) in E.R.															
2-Piston cooling F.W. pump (E) port (F & A) in E.R.															
2-Fuel valve cooling F.W. pump (E) port (in & out) in E.R.															
2-Cooling salt water pump (E) starb'd (F & A) in E.R. 1100 m ³ /h x 20m															
1-Bilge & ballast pump (S) starb'd in E.R. 150 m ³ /h x 3.5 Kg/cm ²	x	x	x												
2-Fire pump (E) starb'd (in & out) in E.R.															
1-Bilge pump (E) starb'd aft in E.R. 30 m ³ /h x 2.5 Kg/cm ²	x	x													
1-Bilge & G.S. pump (E) starb'd in E.R. 150m ³ /h x 3.5 Kg/cm ²	x	x	x												
2-L.O. pump (E) starb'd (F & A) in E.R.															
1-L.O. transfer pump (E) starb'd in E.R.															
2-F.O. booster pump (E) port (in & out) in E.R.															
2-F.O. burning pump (E) port (in & out) in B.R.															
1-F.O. transfer pump (E) port for'd in E.R.															
1-Diesel oil transfer pump (E) port for'd in E.R.															
2-Feed pump (S) starb'd (in & out) aftmost in E.R.															
Aux. feed pump (E) starb'd aftmost in E.R.															
Boiler filling pump (E) starb'd aftmost in E.R.															
Boiler water cir. pump (E) port (in & out) in B.R.															
Condensate pump (E) starb'd for'd in E.R.															
Bilge & ballast pump (S) in aux. pump room 100 m ³ /h x 3.5 Kg/cm ²	x	x													
F.O. transfer pump (S) in aux. pump room															
Emergency fire pump (oil E) in emergency fire pump room															
Make-up F.W. pump (E) port in E.R.															

secondary boiler

econ'r

Part and No. of Rpt. or Cncl.

Yokohama
4-7/83

x

E Electric Motor

S Steam Driven

Emergency Generator
room on Boat Deck

Kubota 50Z Diesel
Engine

Kubota Iron
Work

Kobe 0-74469

A.C. Generator 95 kVA

0187 2/3

termost
E.R.

t For'd

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INDEPENDENT PUMPS
Name below essential pumps, state position and how driven. Give capacity of bilge pumps.
2-Jacket cooling F.W. pump (E) port (F & A) in E.R.

Table with columns: SUCTION (Bilge Main, Bilge Direct, Ballast Main, Oil Fuel, Fresh Water Cooling, Sea, Feed Tanks, Lub. Oil) and DELIVERY (Boiler Feed, Salt Water Cooling, Fresh Water Cooling, Oil Fuel Tanks, Fire Main, Lub. Oil, Piston Cooling, Overboard). Rows include various pump types like Jacket cooling, Main engine, etc.

BILGE SUCTIONS. No. and size in each hold, deep tank or pump room
Dry cargo space 2 - 50mm; Main pump room 3 - 50mm; Fore pump room 1 - 50mm
For Compartment - 1 - 50mm (Stbd For'd); 4 - 90mm (For'd P & S, Aft P & S)
o. and size connected to main bilge line in main engine room 1 - 70mm (E. R. Coffo); 1 - 70mm (Cool. F. W. Tank)
In tunnel 2 - 70mm Aftermost in E.R.
Size and position of direct bilge suction in machinery spaces 1 - 160mm, Port For'd
Size and position of emergency bilge suction in machinery spaces 1 - 400mm, Stbd For'd
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, or are they classified for navigation in ice? Yes

STEAM & OIL ENGINE AUXILIARIES
Table with columns: Position of each, Type, Made by, Port and No. of Rpt. or Cert., Driven Machinery (For electric generators, state output). Rows include No.1 Port in E.R., No.2 Starb'd For'd in E.R., No.3 Starb'd For'd in E.R., Emergency Generator Room on Boat Deck.

Electric current used for essential services at sea? Yes
1 set, 320 kW
If so, state the minimum No. and capacity of generators required in order that the ship may operate
Is an electric generator driven by Main Engine? No
Secondary 16 Kg/cm2 Mitsubishi Hiroshima Double Evaporation
Primary 55 Kg/cm2 type Water Tube Boiler
superheater fitted? No
Are these boilers also heated by exhaust gas? No
No. of donkey boilers heated by exhaust gas only? One W.P. 19 kg/cm2
U tube with header type
Position In Funnel
Can the exhaust heated boilers deliver steam directly to the engine? Yes
Can the exhaust heated boilers deliver steam directly to the auxiliary boiler? Yes
Primary I-11798 I-11800
Secondary I-11797 I-11799
Steel Pipe
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 diameter? 2
For oil fired boilers is the arrangement of pipes, valves, controls, etc., in accordance with the Rules? Yes
No. of oil burning pressure 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) 2 sets Mitsubishi Standard Model D-80
rams 4 cylinders electro-hydraulic 2 janney pumps with 26 kW electric motors
Brief description of arrangements Water service comprising 2 fire pumps in E.R. & E.R., B.R. Main & aux. pump room & cargo oil tanks. CO2 fire extinguishing system in E.R. & B.R. Steam smothering system 2-290 liter sand box in machinery space. 2-3 liter foam bottles, 2-45 liter bottles, 2-3 liter monochloro fire ext. in emergency generator room. Air foam fire extinguisher system in cargo oil tanks, F.O. deep tanks & main & aux. pump rooms. Automatic sprinkler system in living quarter comprising 1 sprinkler pump in E.R.
Has all the machinery been tried under full working conditions and found satisfactory? Yes
Date and duration of full sea trials of main engines 8th & 10th Feb. 1962, 5 hrs
Does this machinery installation contain any features of a novel or experimental nature? (Give particulars)
Electric distance reading thermometers fitted to main engine crank journal bearings. Main engine piston and jacket cooling water temperatures automatically controlled.
 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).

S. Iwasaki
Seiichi Iwasaki
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 conditions during comprehensive shop and sea trials and found satisfactory.

In our opinion the machinery of this ship is worthy to have records of + LMC 2.62, ABS 2.62 (primary 782 lb/in² secondary 228 lb/in² exhaust gas economiser 284 lb/in²) TS (CL) 2.62 and SPS 2.62.

19kg 270

Peter Munn
K. Tabuchi

J. Nonomura
K. Yamazaki

W. A. Cook

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.)
Piston rod - Lloyd's SMK Y-15833-A,B, Y-15845-A,B, Y-15846-A,B, Y-16888, Y-16889, Y-16890 KOI LR 24-7-61
RODS Connecting rod - Lloyd's SMK Y-15840-A,B, Y-16883, Y-16884, Y-16886, Y-16887, Y-16891, Y-16904, Y-16913
K.T. LR. 12 & 15-9-61

CRANKSHAFT ~~OR ROTOR SHAFT~~ Lloyd's Kob No. KT-CK 461 EI LR 6-7-61

~~WINDMILL SHAFT~~

THRUSTSHAFT Lloyd's Kob No. KT-F1665 EI LR 6-7-61

GEARING

INTERMEDIATE SHAFTS Lloyd's SMK NAG No. 4695 JN B 17-10-61
Lloyd's SMK NAG No. 4694 JN B 17-10-61

SCREW ~~AND TUBE~~ SHAFTS Lloyd's KOB No. KT-F1681 EI LR 31-7-61

PROPELLERS Lloyd's SMK No. 11621 JN B 9-10-61
Spare Lloyd's SMK No. 11881 KOI LR 31-1-62

OTHER IMPORTANT ITEMS

Cylinder cover; Lloyd's Test SMK No. 11617-1 to 10 WTP 105 & 6 KG KT 8, 10, 15 & 18-9-61 L.R.
YK 8 & 10-1-62 LR.

Piston crown; Lloyd's Test SMK No. 11616-1 to 10 W.T.P. 20 KGS KOI 4-9-61, K.T. 7, 5, 18 & 21-9-61
YK 17-1-62 LR

Crosshead pin; Lloyd's SMK Y-15830-A,B, Y-15831-A,B, Y-15832-A,B, Y-15843-A,B,
Y-15844 KOI LR 13 & 24-7-61

Is the installation a duplicate of a previous case? None If so, state name of vessel

Date of approval of plans for crankshaft 20th June, 1961 Straight shafting 5th Apr., 1961 Gearing

Separate oil fuel tanks 6th November, 1961 Pumping arrangements 23rd August, 1961, 25

Cargo oil pumping arrangements 22nd Apr., 1961, 7th July, 1961 Air receivers 8th & 27th Sept., 1961

Dates of examination of principal parts:-

Fitting of stern tube 16th Oct., 1961 18th Oct., 1961 27th Oct., 1961

Alignment of crankshaft in main bearings 12th

Engine chocks & bolts 14th Dec., 1961 Alignment of gearing - Alignment of straight shafting 14th Dec., 1961

Oil fuel lines 8th & 10th Feb., 1962 5th Oct., 1961 Steering machinery 10th Feb., 1962 Windlass 10th Feb., 1962

Date of Committee FRIDAY 27 APR 1962

Decision + LMC ES

ABS

TS (CL)

SPS

2.62

Special Survey Fee

Construction £740
Installation £392

Expenses

£15,000

Date when A/c rendered