

Rpt. 4b

JAN - 6, 1958

Date of writing report Received London 21 JAN 1958 Port KOBE No. FE-5181
Survey held at Aioi, Japan In shops 101 6th Sept., 1956 30th July, 1957.
No. of visits 30 First date 15th July, 1957 Last date 21st Oct., 1957.

FIRST ENTRY REPORT ON INTERNAL COMBUSTION MACHINERY

No. in R.B. Name M.S. "HOEI MARU" Gross tons 20,257.13
Owners Nitto Shosen K.K. Managers Port of Registry Tokyo
Hull built at Aioi, Japan By Harima S.B. & Eng., Co., Ltd. Yard No. 512 Year Month 1957-10
Main Engines made at Aioi, Japan By Harima S.B. & Eng., Co., Ltd. Eng. No. 142 When 1957-10

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? No 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-direct exp.

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.

No. of main engines 1 No. of propellers 1 Brief description of propulsion system Turbo charged oil engine directly coupled to line shafting.
MAIN RECIPROCATING ENGINES. Licence Name and Type No. Harima-Sulzer 2S.C.S.A. 10 RSAD76 (Supercharged)
No. of cylinders per engine 10 Dia. of cylinders 760mm stroke(s) 1,550mm 2 or 4 stroke cycle 2 Single or double acting Single
Maximum approved BHP per engine 13,000 BHP at 119 RPM of engine and 119 RPM of propeller.
Corresponding MIP 7.77kg/cm2 (For DA engines give MIP top & bottom) Maximum cylinder pressure 60 kg/cm2 Machinery numeral 2,600

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? cylinders No. and type of mechanically driven scavenge pumps or blowers per engine and how driven 2 Single acting dependent scavenge pump
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?
If a stand-by or emergency pump or blower is fitted, state how driven None No. of scavenge air coolers 4 Scavenge air pressure at full power 0.45 Atms gauge Are scavenge manifold explosion relief valves fitted? Yes

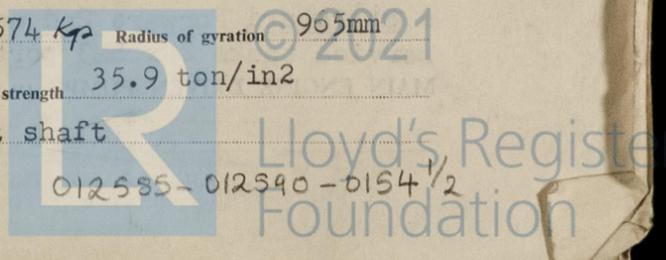
FOUR STROKE ENGINES. Is the engine supercharged? Are the undersides of the pistons arranged as supercharge pumps? No. of exhaust gas driven blowers per engine
No. of supercharge air coolers per engine Supercharge air pressure Can engine operate without supercharger?

TWO & FOUR STROKE ENGINES-GENERAL. No. of valves per cylinder: Fuel 1 Inlet None Exhaust 1 Starting 1 Safety 1 (Rotary)
Material of cylinder covers Cast Steel Material of piston crowns Molybdenum 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? Is welded construction employed for: Bedplate? Yes Frames? Yes Entablature? Yes Is the crankcase separated from the underside of pistons? Yes Is the engine of crosshead or trunk piston type? head Total internal volume of crankcase 135 M3 No. and total area of explosion relief devices 10, 1.5 M2 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? 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 Hr.

CRANK & FLYWHEEL SHAFTING. Date of approval of torsional vibration characteristics of the propelling machinery system 10th April, 1957 State barred speed range(s), if imposed for working propeller 80-90r.p.m. For spare propeller Unknown Is a governor fitted? Yes Is a torsional vibration damper or detuner fitted to the shafting? None
Where positioned? Type No. of main bearings 12 Are main bearings of ball or roller type? No Distance between inner edges of bearings in way of crank(s) 1010mm 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 550mm Diameter of crankpins Centre 550mm Side Breadth of webs at mid-throw 898mm Axial thickness of webs 340mm
If shrunk, radial thickness around eyeholes 252.5mm Are dowel pins fitted? No Crankshaft material Journals Forged Steel Minimum 35.5 Ton/in2 Approved 33 Ton/in2
Diameter of flywheel 2,396.3mm Weight 1520kgs Are balance weights fitted? Yes Total weight 574 kg Radius of gyration 965mm
Diameter of flywheel shaft 550mm Material Siemens Martin Steel Minimum approved tensile strength 35.9 ton/in2
Flywheel shaft: separate, integral with crankshaft, integral with thrustshaft. (State which) integral with thrust shaft

Handwritten signature and date 20/9/57



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 declutched? If so, what?

STRAIGHT SHAFTING. Diameter of thrustshaft 550 Material Forged Steel Minimum approved tensile strength 28 T/in<sup>2</sup>

Shaft separate or integral with crank or wheel shaft? Separate Diameter of intermediate shaft 470mm Material Forged Steel

Minimum approved tensile strength 44.1kg/mm<sup>2</sup> Diameter of screwshaft cone at large end 541mm 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 at bearings 30.5mm Thickness between bearings 24.5mm Material of screw/tube shaft Forged Steel Minimum approved tensile strength 44.1

Is an approved oil gland fitted? No If so, state type - Length of bearing next to and supporting propeller 2500mm

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 6,100mm Pitch 4,300mm Built up or solid Solid Total developed surface 17,126m<sup>2</sup>

No. of blades 4 Blade thickness at top of root fillet 282.7mm Blade material Mn Bronze (HBSC1) Moment of inertia of dry propeller 477100 kg-cm<sup>2</sup>

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 591300 kg-cm<sup>2</sup>

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) Two (2) x 300M<sup>3</sup>/h (Free Air) x 30kg/cm<sup>2</sup> 2 stage, driven Aux. diesel engine, 514 r.p.m. port & starboard (in E.R.) Kobe Cert. No. M-41925, One (1) x 5M<sup>3</sup>/h. (Free air) x 30kg/cm<sup>2</sup>, Kerosene engine driven 2 stage 1000 r.p.m. Starboard in Kobe Cert. No. M-11171

No. of starting air receivers. (Main and Aux. State capacity of each, position in ship and Port and No. of Certificate) /in E.R.  
 Main Air receiver: Two (2) x 14M<sup>3</sup> (494 Ft. 3) x 30kg/cm<sup>2</sup> Starboard (Ford Aft) Kobe Cert. No. AR-43756  
 Aux. Air receiver: One (1) x 0.3M<sup>3</sup> x 30kg/cm<sup>2</sup> Starboard in E.R. Kobe Cert. No. AR-43755

How are receivers first charged? Kerosene driven air compr. Maximum working pressure of starting air system 30kg/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 Jacket 2 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 Oil Fuel settling tanks; Two (2) x 23. & starboard Forward 2nd deck in E.R.; Oil fuel service tank; Two (2) x 10M<sup>3</sup> starboard in E.R.; 2 service tanks 2 x 6M<sup>3</sup> port side 2nd deck in E.R.; Boiler oil settling tanks 2 x 27M<sup>3</sup> on boiler

MAIN ENGINE DRIVEN PUMPS (No. and Purpose) 1 - Lub. oil pump.

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
S.W. Cooling P. (P.s. Motor driv.)		X				X				X					
Bilge P. (S.s. Motor driv.) 15M <sup>3</sup> /h	X					X									
G.S. & Butter W.P. (S.s. steam driv.)		X	X			X							X		
G.S. & Fire P. (S.s. Motor driv.)		X	X			X							X		
F.W. Cool. P. for Piston (P.s. driv.)					X						X				X
" " for jacket ( " )					X						X				
F.W. Supplementary P. ( " )					X		X				X				X
F.W. Cool. P. for nozzle ( " )					X						X				
Feed P. for D. Blr. (S.s. Steam driv.)							X		X						
" " Ex. gas Blr. (S.s. " )							X		X						
Blr. Cir. P. for Exh. gas Blr. (P.s. M.D.)											X				
F.W. pump (P.s. motor driv.)			X								X				
Lub. oil P. (P.s. 1-Main Eng. Driv.)								X						X	
" " ( " 1-Motor Driven)								X						X	
Lub. o. Trs. P. (S.s. Motor driv.)								X						X	
Fuel O. trans. P. ( " )				X								X			
Fuel O. service P. ( " )				X								X			
Fuel O. booster P. ( " )				X								X			
Fuel O. purifier P. ( " )				X								X			
S.W. Cool. P. (Spare FW Cool. P. for jckt. MD)					X	X				X	X				
Fuel O. burning P. (Blr. 1-Mtr. driv.)				X											
" " ( " 1-Mtr. driv.)				X											
Sanitary Pump (Aft Motor driven)							X								
Evaporator Circu. P. (S.s. Motor driv.)							X				X				
Emerg. Fire P. (Steering E. Room Diesel Eng. Driv.)							X								X

BILGE SUCTIONS. No. and size in each hold, deep tank or pump room  
 Main Pump Room 2-3" and Aux. pump room 1x2 1/2"

No. and size connected to main bilge line in main engine room 2-2", 5-4" In tunnel -

In aux. engine room - Size and position of direct bilge suction in machinery spaces 4" port side centre, 6" starboard side centre Size and position of emergency bilge suction in machinery spaces 12" Port side forward

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 ~~fuel oil~~? (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)
Port side and Starboard side (Inboard)	4 S.C.SA Super Charged	Mitsubishi H. I. Ltd. Tokyo Eng. Wks.	Yokohama No. M-4030 No. 1782, No. 1811	Starting air compressor & 330kVA Generator or 445V. AC
Starboard side (Outboard)	4 S.C.SA	Daihatsu Kogyo K.K.	Kobe D-45201	220kVA generator 445V. AC

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 - 165 K.W. Is an electric generator driven by Main Engine? No

STEAM INSTALLATION. No. of donkey boilers burning oil fuel 2 w.p. 22.0kg/cm<sup>2</sup> Type 2 Drum water tube boiler Position Boiler Flat, Aft in E.R. 8.5 " Multitubular cylindrical boiler - dry back

Is a superheater fitted? No Are these boilers also heated by exhaust gas? No No. of economizers heated by exhaust gas only? 1 w.p. 8.5 kg/cm<sup>2</sup>

Type Header & Water tube Position in funnel Can the exhaust heated boilers deliver steam directly to the steam range or do they operate only as economizers in conjunction with oil fired boilers? Only as economizer Port and No. of report on donkey boilers Kobe FE-5181 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 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) Two, electric motor driven, Heleshaw-hydraulic 4 ram Motor HP 35 x 2 type,

Have the Rule Requirements for fire extinguishing arrangements been complied with? Yes (in E.R.) Brief description of arrangements 3 hose nozzles, 2 sand boxes, 2 shovels, 2 x 7Lbs. CO<sub>2</sub> fire extinguishers. 45 litre x 2 and 9 litre x 13 foam extinguishers.

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 10-10-57, 6 hours and 14-10-57 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).

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 in 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 has been examined under full working conditions during shop and comprehensive sea trials and found satisfactory.

Torsiograph readings taken on trials confirmed previous calculations imposing a barred speed range between 76 - 90 r.p.m. and a Notice has been fitted at the control station - "Engine not to be ~~run~~ continuously between 76 and 90 r.p.m." The tachometer has been marked accordingly.

The machinery of this ship is eligible in our opinion to be <sup>14</sup> classed and to have the notation +LMC 10,57, TS(CL) 10,57, s.p.s. 10,57 and DBS 10,57, DBS(WT) 10,57.

*J. G. Johnson* + *H. P. Parnell* Engineer Surveyors 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 No. KF-2441 No. K-F2377-1,2,3 No. F2370-1,2,3,4 No. K-F2390-1,2  
 RODS Rod: MH LR 25-3-57 EI LR 12-1-57 EI LR 29-12-56 EI LR 23-1-57  
 Connecting No. KT-F548, 551, 552 & 566-1 No. KT-F549, 597, 598, 599, 566-2, 3 (No. KT-F566-1  
 EI LR 22-1-57 EI LR 11-2-57 MS LR 2-10-56  
 No. KT-F549, 551, 552 No. KT-F548 No. KT-F566-2, 3 No. KT-F597 No. KT-F598  
 CRANKSHAFT OR RODER SHAFT EI LR 25-8-56 MS LR 23-8-56 EI LR 4-10-56 EI LR 4-10-56 MS LR 27-1-57  
 → No. KT-CK 324 EI LR 16-3-57  
 FLYWHEEL SHAFT  
 THRUSTSHAFT No. KT-F767 EI LR 16-3-57  
 GEARING  
 INTERMEDIATE SHAFTS 1st No. KT-F882 MS LR 1-6-57 2nd No. KT-F873 MS LR 25-5-57  
 SCREW AND TUBE SHAFTS No. KF2505 EI LR 1-7-57  
 PROPELLERS No. 5573 KOI LR 18-4-57 Spare: LLOYD'S SMK 5535 KO 26-7-57  
 OTHER IMPORTANT ITEMS Cylinder Covers:  
 No. HC-832-2-1, 11 No. HC-832-2-2, 9 No. HC-832-3, 7, 8 No. HC-832-2-4, 5, 6, 10  
 KK LR 5-4-57 KK LR 5-4-57 KK LR 8-4-57 KK LR 16-4-57

Is the installation a duplicate of a previous case? No If so, state name of vessel -  
 Date of approval of plans for crankshaft 27-3-56 Straight shafting 17-5-57 Gearing - Clutch -  
 Separate oil fuel tanks 28-3-57 Pumping arrangements 17-5-57 Oil fuel arrangements 1-4-57  
 Cargo oil pumping arrangements 28-3-57 Air receivers 25-3-57 29-10-56, 31-7-56 Donkey boilers 3-6-57  
 5-3-57 20-5-57, 15-10-57  
 Dates of examination of principal parts:-  
 Fitting of stern tube 15-7-57 Fitting of propeller 20-7-57 Completion of sea connections 27-7-57 Alignment of crankshaft in main bearings 13-9-57  
 Engine chocks & bolts 13-9-57 Alignment of gearing - Alignment of straight shafting 13-9-57 Testing of pumping arrangements 27-7-57  
 17-9-57 10-10-57  
 Oil fuel lines 3-9-57 Donkey boiler supports 17-9-57 Steering machinery 10-10-57 Windlass 10-10-57  
 Date of Committee Construction/Installation  
 Decision *See Rpt. 1* Special Survey Fee ¥ 990,000.- *AK*

Expenses See Rpt. 1

Date when A/c rendered

