

REPORT ON OIL ENGINE MACHINERY.

No. 3048

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Date of writing Report 6/2 1952. When handed in at Local Office 8/2 1952. Port of MALMÖ

No. in Survey held at Malmö Date, First Survey 1/6-51 Last Survey 29/1 1952.

Reg. Book. 35903s... on the Twin Triple Quadruple Screw vessel M/T "H A V F R U"

Built at Malmö By whom built Kockums Mek. Verkstads A.-B. Yard No. 319 When built 1952

Engines made at Malmö By whom made Kockums Mek. Verkstads A.-B. Engine No. 417 When made 1952

Donkey Boilers made at Paisley By whom made A.F. Craig & Co. Ltd. Boiler No. 941 942 When made 1950

Brake Horse Power Max. 5500, Serv. 5000 Owners A/S Havtor. Port belonging to OSLO

M.N. Power as per Rule 1556 Is Refrigerating Machinery fitted for cargo purposes No. Is Electric Light fitted Yes

Trade for which vessel is intended

OIL ENGINES, &c.—Type of Engines KMV M.A.N. D8Z 60/110 2 or 4 stroke cycle 2 Single or double acting Double

Maximum pressure in cylinders 50 kg/cm² Diameter of cylinders 600 mm Length of stroke 1100 mm No. of cylinders 8 No. of cranks 8

Mean Indicated Pressure 5.5 kg/cm² Ahead Firing Order in Cylinders 1t, 4b, 3b, 6t, 2t, 5b Span of bearings, adjacent to the crank, measured from inner edge to inner edge 860 mm Is there a bearing between each crank Yes. Revolutions per minute 120

Flywheel dia. 2093 mm Weight 4250 kg Moment of inertia of flywheel (lbs. in² or Kg. cm²) 32.795x10⁶ Means of ignition Compr. Kind of fuel used Heavy oil.

Crank Shaft, Solid forged dia. of journals as fitted 440 mm Crank pin dia. 440 mm Crank webs Mid. length breadth 720 mm Thickness parallel to axis 275 mm
Semi built as fitted 440 mm
All built as fitted 440-385 mm

Flywheel Shaft, diameter as per Rule 440-385 mm Intermediate Shafts, diameter as fitted 367 mm Thrust Shaft, diameter at collars as fitted 385 mm
as fitted 440-385 mm as fitted 410mm dia. in body, 385mm dia. at fwd. end. as fitted 385 mm

Tube Shaft, diameter as per Rule - Screw Shaft, diameter as fitted 410mm dia. in body, 385mm dia. at fwd. end. Is the (tube screw) shaft fitted with a continuous liner Yes

Bronze Liners, thickness in way of bushes as per Rule 20 mm Thickness between bushes as fitted 15 mm Is the after end of the liner made watertight in the propeller boss Yes. If the liner is in more than one length are the junctions made by fusion through the whole thickness of the liner -

If the liner does not fit tightly at the part between the bearings in the stern tube, is the space charged with a plastic material insoluble in water and non-corrosive - If two liners are fitted, is the shaft lapped or protected between the liners - Is an approved Oil Gland or other appliance fitted at the after end of tube shaft No. If so, state type - Length of bearing in Stern Bush next to and supporting propeller 1743 mm

Propeller, dia. 16'-4 7/8" 13'-1 7/8" Pitch - No. of blades 4 Material Bronze whether moveable No. Total developed surface 91.8 sq. feet

Moment of inertia of propeller (lbs. in² or Kg. cm²) 108.891x10⁶ Kind of damper, if fitted -

Method of reversing Engines Direct with compr. air Is a governor or other arrangement fitted to prevent racing of the engine when declutched Yes. Means of lubrication Forced Thickness of cylinder liners 41, 5 mm Are the cylinders fitted with safety valves Yes Are the exhaust pipes and silencers water cooled or lagged with non-conducting material Lagged If the exhaust is led overboard near the waterline, what means are arranged to prevent water from being syphoned back to the engine led to the funnel 1 salt w. of 275 m³/h, 1 fresh w. of 210 m³/h, 1 spare 275 m³/h 1 salt w. of 36 m³/h for aux. oil eng.

Cooling Water Pumps, No. - Is the sea suction provided with an efficient strainer which can be cleared within the vessel Yes.

Bilge Pumps worked from the Main Engines, No. None Diameter - Stroke - Can one be overhauled while the other is at work -

Pumps connected to the Main Bilge Line (No. and size 2-1 of 100 m³/h, 1 of 70 m³/h How driven One steam pump and one el. driven

Is the cooling water led to the bilges No. If so, state what special arrangements are made to deal with this water in addition to the ordinary bilge pumping arrangements -

Ballast Pumps, No. and size 1-100 m³/h Power Driven Lubricating Oil Pumps, including spare pump, No. and size 2-180 m³/h

Are two independent means arranged for circulating water through the Oil Cooler Yes. Suctions, connected to both main bilge pumps and auxiliary bilge pumps, No. and size:—In machinery spaces 3-90 mm, 2-90 mm in aft main cofferdam. In pump room Main: 2-72; Fwd. 1-32

In holds, &c. 2-3 1/2" in dry cargo hold, 2-3 1/2" in fwd main cofferdam.

Independent Power Pump Direct Suctions to the engine room bilges, No. and size 2 - 125 mm.

Are all the bilge suction pipes in holds and tunnel well fitted with strum-boxes Yes. Are the bilge suction in the machinery spaces led from easily accessible mud-boxes, placed above the level of the working floor, with straight tail pipes to the bilges Yes.

Are all Sea Connections fitted direct on the skin of the Ship steel boxes are they fitted with valves or cocks Both Are they fixed sufficiently high on the ship's side to be seen without lifting the platform plates special covers Are the overboard discharges above or below the deep water line Above.

Are they each fitted with a discharge valve always accessible on the plating of the vessel Yes. Are the blow off cocks fitted with a spigot and brass covering plate Yes.

What pipes pass through the bunkers - How are they protected -

What pipes pass through the deep tanks Suctions from aft cofferdam Have they been tested as per Rule Yes.

Are all pipes, cocks, valves and pumps in connection with the machinery and all boiler mountings accessible at all times Yes.

Is the arrangement of valves and their connections such as to prevent the possibility of water passing from the sea or from water tanks into the cargo or machinery spaces, or from one compartment to another Yes. Is the shaft tunnel watertight None Is it fitted with a watertight door - worked from -

If a wood vessel, what means are provided to prevent leakage of either fuel oil or of lubricating oil from saturating the woodwork -

Main Air Compressors, No. None No. of stages - diameters - stroke - driven by -

Auxiliary Air Compressors, No. 2 No. of stages 2 diameters 300mm & 110mm stroke 220mm driven by Aux. oil eng.

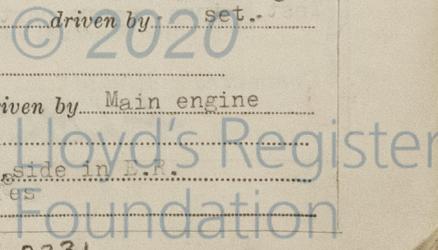
Small Auxiliary Air Compressors, No. 1 No. of stages - diameters No. E273 stroke - driven by Harbour gen. set.

What provision is made for first charging the air receivers Small compressor

Scavenging Air Pumps, No. 2 Tandem diameter 1380 mm stroke 1110 mm driven by Main engine

Auxiliary Engines crank shafts, diameter as per Rule 170 No. 2 Position 1 port and 1 stbd side in E.P. as fitted 170

Have the auxiliary engines been constructed under special survey Yes. Is a report sent herewith Yes



AIR RECEIVERS:—Have they been made under survey... Yes... State No. of report or certificate Nos. 203 & 204

Is each receiver, which can be isolated, fitted with a safety valve as per Rule.

Can the internal surfaces of the receivers be examined and cleaned... Yes... Is a drain fitted at the lowest part of each receiver... Yes.

Injection Air Receivers, No. 1... Spare... Cubic capacity of each 200 lit. Internal diameter 474 mm thickness 13 mm

Seamless, welded or riveted longitudinal joint El. welded Material S.M. Steel Range of tensile strength 49,4-50,3 kg/mm² Working pressure Actual 30,0

Starting Air Receivers, No. 2... Total cubic capacity 12 M³ Internal diameter 1450 mm thickness 25 mm

Seamless, welded or riveted longitudinal joint Riveted Material S.M. Steel Range of tensile strength 49,7-50,7 kg/mm² Working pressure Actual 30,0

IS A DONKEY BOILER FITTED... Yes... If so, is a report now forwarded... Yes

Is the donkey boiler intended to be used for domestic purposes only... No.

PLANS. Are approved plans forwarded herewith for shafting... 7.3.47 Receivers 10.9.1943. Separate fuel tanks

Donkey boilers 7.8.48 General pumping arrangements 15.9.47 Pumping arrangements in machinery space 18.7.51

Oil fuel burning arrangements 18.7.51

Have Torsional Vibration characteristics been approved... Yes... Date of approval 7.3.1947.

SPARE GEAR.

Has the spare gear required by the Rules been supplied... Yes

- State the principal additional spare gear supplied... 1 propeller shaft, 1 bronze propeller, 2 top and 2 bottom cyl. liners, 1 " " " " covers, 2 complete pistons with piston rods, 1 complete fuel injection pump.

The foregoing is a correct description, Manufacturer.

Dates of Survey while building During progress of work in shops - - From 1st June, 1951 to 12th November, 1951.

During erection on board vessel - - From 14th November, 1951 to 29th January, 1952.

Total No. of visits 89.

Dates of examination of principal parts—Cylinders 22/3-7/9 (9 visits) Covers 16/8-8/10 (10 visits) Pistons 21,22/8-51 Rods 31/7,1/8-5 Connecting rods 17.7.51

Crank shaft 8.11.51 after trial in workshop Flywheel shaft 10.8.51 Thrust shaft 2.11.51 Intermediate shafts 2.11.51 Tube shaft

Screw shaft 21.11.50 Propeller 4.6.51 Stern tube 19.10.51 Engine seatings 12.11.51 Engine holding down bolts 19.12.51

Completion of fitting sea connections 26.1.52 Completion of pumping arrangements 24.1.52 Engines tried under working conditions 29.1.52

Crank shaft, material S.M. Steel Identification mark Lloyd s 3356/57/58 Flywheel shaft, material S.M. Steel Identification mark Lloyd s 1221

Thrust shaft, material S.M. Steel Identification mark Lloyd s 108 Intermediate shafts, material S.M. Steel Identification marks Lloyd s 7

Spare screw Lloyd s 608 Tube shaft, material S.M. Steel Identification mark S.B. 21.11.50 Screw shaft, material S.M. Steel Identification mark Lloyd s 6

Identification marks on air receivers Nos. 203 & 204 LLOYD'S TEST 44 kg/cm², W.P. 30 kg/cm², A.B. 28.11.51

Welded receivers, state Makers' Name Avesta Jernverk, Avesta.

Is the flash point of the oil to be used over 150°F... Yes.

Have the requirements of the Rules for oil fuel pipes and tank fittings been complied with... Yes.

Description of fire extinguishing apparatus fitted Steam smothering under boilers and Skum-Trygg, cap. 10 lit. each.

Is the vessel (not being an oil tanker) fitted for carrying oil as cargo Oil tanker. If so, have the requirements of the Rules been complied with... Yes.

If the notation for ice strengthening is desired, state whether the requirements in this respect have been complied with... -

Is this machinery duplicate of a previous case... Yes... If so, state name of vessel M/T "NERVA", Malmö F.E.Rpt.No.2863.

General Remarks (State quality of workmanship, opinions as to class, Speed restrictions, &c.)

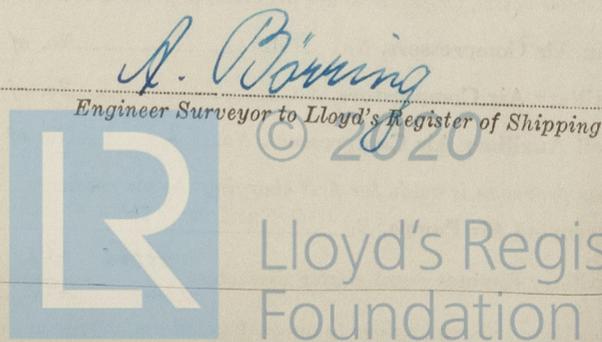
This machinery has been built under Special Survey in accordance with the Rules and approved plans. The workmanship is good and the material fulfil the Rule requirements. Shafting as per forging reports enclosed.

The machinery of this vessel is eligible, in my opinion, to be classed in the Register Book with record of LMC 1.52. Working pressure of donkey boilers 180 lbs/sq and of exhaust gas economiser 171 lbs/sq.

Table with columns for description of items (S.S. of 2 start air rees, Special, Test. of pumps, cond., etc., Donkey Boiler, Test. & insp. spare parts, Travelling Expenses) and amounts in Kr. and £.

Committee's Minute FRI. 29 FEB 1952

Assigned + LMC 1.52 Oil Eng. C.H. 203 180lb



Vertical stamp: Certificate (if required) to be sent to Surveyors Office, Malmö. (The Surveyors are requested not to write on or below the space for Committee's Minute.)