

REPORT ON OIL ENGINE MACHINERY.

No. 10240.

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 No. in Survey held at Copenhagen & Skatshov Date, First Survey 12th June 1936 Last Survey 22nd May 1937
 Reg. Book. Number of Visits 73

on the Single Twin Triple Quadruple Screw vessel "NORDEN" Tons Gross 4700.23
Net 2778.11
 Built at Skatshov By whom built Skatshov Skibsverft Yard No. 78 When built 1937-5 mo
 Engines made at Copenhagen By whom made apt. Burmeister & Wain Engine No. 2613 When made 1937
 Donkey Boilers made at Amman By whom made Cochran & Co. Ltd. Boiler No. 3446 When made 1937
 Brake Horse Power 2 x 1775 Owners 7/5 0/5 Norden Port belonging to Copenhagen
 Nom. Horse Power as per Rule 811 808 Is Refrigerating Machinery fitted for cargo purposes no Is Electric Light fitted yes
 Trade for which vessel is intended General cargo, open sea service

OIL ENGINES, &c.—Type of Engines Vertical Diesel engines, 2 or 4 stroke cycle 2 Single or double acting single
 Maximum pressure in cylinders 49 kg/cm² Diameter of cylinders 500 mm Length of stroke 900 mm No. of cylinders 2 x 6 No. of cranks 2 x 6
 Mean Indicated Pressure 6.8 kg/cm² Span of bearings, adjacent to the Crank, measured from inner edge to inner edge 698 mm Is there a bearing between each crank yes
 Revolutions per minute 135 Flywheel dia. 1400 mm Weight 602480 kg Means of ignition Compression Kind of fuel used crude oil
 Crank Shaft, Solid forged dia. of journals as per Rule 322 mm Crank pin dia. 340 mm Crank Webs Mid. length breadth 850 mm Thickness parallel to axis 208 mm
All built as fitted 340 mm 115 mm ch. hole Mid. length thickness 208 mm Thickness around eyehole 195 mm
 Flywheel Shaft, diameter as per Rule Intermediate Shafts, diameter as per Rule 244 mm Thrust Shaft, diameter at collars as per Rule 256 mm
as fitted as fitted 246 mm as fitted 300 mm 115 ch. hole
 Tube Shaft, diameter as per Rule Screw Shaft, diameter as per Rule 271 mm Is the tube shaft fitted with a continuous liner yes
as fitted as fitted 272 mm Is the screw
 Bronze Liners, thickness in way of bushes as per Rule 15.8 mm Thickness between bushes as per Rule 11.9 mm Is the after end of the liner made watertight in the
as fitted 19 mm as fitted 12 mm 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 yes
 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 yes
 If two liners are fitted, is the shaft lapped or protected between the liners yes Is an approved Oil Gland or other appliance fitted at the after end of the tube
 shaft yes If so, state type yes Length of Bearing in Stern Bush next to and supporting propeller 1400 mm
 Propeller, dia. 3900 mm Pitch 3200 mm No. of blades 3 Material Bronze whether Moveable no Total Developed Surface 44.5 sq. feet
 Method of reversing Engines direct Is a governor or other arrangement fitted to prevent racing of the engine when declutched yes Means of lubrication
forced Thickness of cylinder liners 33.5 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 to funnel
 Cooling Water Pumps, No. 2 off - 175 l/h each 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. 2 Diameter 150 mm Stroke 175 mm Can one be overhauled while the other is at work yes
 Pumps connected to the Main Bilge Line No. and Size 2 engine bilge pumps, 20 l/h each, 1 Ballast pump 200 l/h, 1 bilge pump 20 l/h
How driven electrically
 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 yes
 Ballast Pumps, No. and size 1 off - 200 l/h Power Driven Lubricating Oil Pumps, including Spare Pump, No. and size 2 off 160 l/h, each
 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 4 off 3", 2 off 1 1/2" from oil tanks, 1 off 2 1/2" from tunnel well In Pump Room 1 off 3", 2 off 2"
 In Holds, &c. 1 off 3" I, 2 off 3" II, 2 off 3 1/2" each deep tanks, 1 off 3" III, 3 off 3" IV, 1 off 3" - 2 off 2"
 Independent Power Pump Direct Suctions to the Engine Room Bilges, No. and size 1 off 7" - 1 off 3" + 2 off 3" from engine bilge pumps
 Are all the Bilge Suction pipes in Holds and Tunnel Well fitted with strum-boxes yes Are the Bilge Suctions 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 yes Are they fitted with Valves or Cocks yes
 Are they fixed sufficiently high on the ship's side to be seen without lifting the platform plates yes 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 none How are they protected yes
 What pipes pass through the deep tanks bilge pumps to hold, etc. I & II 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 yes Is it fitted with a watertight door yes worked from upper platform
 If a wood vessel, what means are provided to prevent leakage of either fuel oil or of lubricating oil from saturating the woodwork yes
 Main Air Compressors, No. 2 off - 3 cfm No. of stages 2 Diameters 130 - 115 mm Stroke 120 mm Driven by electromotors
 Auxiliary Air Compressors, No. 1 off No. of stages 2 Diameters 9 mm Stroke 120 mm Driven by electromotors
 Small Auxiliary Air Compressors, No. 2 off each engine Diameter 2 x 80 mm Stroke 120 mm Driven by main engines
 What provision is made for first Charging the Air Receiver's connected to emergency generator set, to start by hand
 Scavenging Air Pumps, No. 2 off each engine Diameter 2 x 80 mm Stroke 120 mm Driven by main engines
 Auxiliary Engines crank shafts, diameter as per Rule 122 mm No. 3 Position Port side of engine room, floor level
as fitted 150 mm Is a report sent herewith yes

AIR RECEIVERS:—Have they been made under survey *yes* Are reports or certificates now forwarded *yes*
 Is each receiver, which can be isolated, fitted with a safety valve as per Rule *yes*
 Can the internal surfaces of the receivers be examined and cleaned *yes* Is a drain fitted at the lowest part of each receiver *yes*
EMERGENCY STARTING
 Injection Air Receivers, No. *1 off* Cubic capacity of each *100 litres* Internal diameter *336 mm* thickness *10 mm*
 Seamless, lap welded or riveted longitudinal joint *lap welded* Material *Sch. Steel* Range of tensile strength *27.374/2* Working pressure by Rules *36.6 kg/cm²*
 Starting Air Receivers, No. *1 off* Total cubic capacity *8 m³* Internal diameter *6'-0"* thickness *1"*
 Seamless, lap welded or riveted longitudinal joint *3/8" rivets* Material *Sch. Steel* Range of tensile strength *28 kg/cm²* Working pressure by Rules *25.7 kg/cm²*
 Actual *25 kg/cm²*

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 *yes*

PLANS. Are approved plans forwarded herewith for Shafting *26-36 & 97-36* Receivers *2/9-36* Separate Fuel Tanks *11/2-37*
 (If not, state date of approval)
 Donkey Boilers *no* General Pumping Arrangements *23/9-36* Pumping Arrangements in Machinery Space *23/9-37*
 Oil Fuel Burning Arrangements *no*

SPARE GEAR.

Has the spare gear required by the Rules been supplied *yes*
 State the principal additional spare gear supplied *For main Engine: - 1 cylinder complete, 1 piston complete, 2 bronze propellers, 1 propeller shaft. For Auxiliary Engine: - 1 crank shaft, 1 cylinder complete, 1 piston complete.*

The foregoing is a correct description.
Burmeister & Wain Maskin- og Skibsbyggeri
AKTIESELSKABET
NASKOV SKIBSVÆRFT
 Manufacturer.

Dates of Survey *During progress of work in shops - 12 July 10 Aug. 3-7-13-15-19-22-25-29-Sept. 3-9-11-15-23-25-26-28-Oct. 17-21-24-26-27-31-Nov. 5-7-9-10-11-13-14-16-17-18*
During erection on board vessel - March 19 April 7-8-9-13-14-16-20-24-28 May 5-7-11-14-19-20-21-22 1937.
 Total No. of visits *73.*

Dates of Examination of principal parts—Cylinders *9/11-17/11-30/11-2/12-34/12-11/1* Pistons *24/12-20/1* Rods *3/19-10/11*
 Crank shaft *29/10-4/11* Flywheel shaft *22/12-27/10-7/11* Intermediate shafts *30/12-11-19/13* Tube shaft *3/19-10/11*
 Screw shaft *2/11-19/13* Propeller *19/13-28/14* Stern tube *7/1-28/14* Engine seatings *19/13-8/14* Engines holding down bolts *14/4-20/4*
 Completion of fitting sea connections *19/13-3/1-28/14* Completion of pumping arrangements *8/4-24/4-11/5-25/5* Engines tried under working conditions *17/12-19/12-21/12-19/13-22/13*
 Crank shaft, Material *Sch. Steel* Identification Mark *C.V. 7-11-36* Flywheel shaft, Material *C.V. 27-10-36* Identification Mark *LLORO'S N° 3384-3385*
 Thrust shaft, Material *Sch. Steel* Identification Mark *LLORO'S N° 3386 & 3415* Intermediate shafts, Material *Sch. Steel* Identification Mark *LLORO'S N° 467-22 & 2602-04 & 1101-03*
 Tube shaft, Material *Sch. Steel* Identification Mark *LLORO'S N° 1104-05 & 06 & 19-3-37*
 Screw shaft, Material *Sch. Steel* Identification Mark *LLORO'S N° 1104-05 & 06 & 19-3-37*

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*
 Is the vessel (not being an oil tanker) fitted for carrying oil as cargo *yes in deep tanks* 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 *no*
 Is this machinery duplicate of a previous case *no* If so, state name of vessel *no*

General Remarks (State quality of workmanship, opinions as to class, &c.) *The above machinery has been constructed and fitted outboard under special survey in accordance with the Rules, the approved plans and the requirements contained in the Secretary's letters E dated 3/6-137-3/9-23/9-1936-15/2-24/3 1937.*

The material used in construction has been tested as required by the Rules and the workmanship is good.

On the final trial trip the whole machinery was tested under working conditions and a speed of ab. 13.5 knots were attained at an IHP of about 3400

Recommend the vessel's machinery to have notation in the Register
Book of "LMC-5.37, OIL ENGINES, C.L., DB 100 lbs

The amount of Entry Fee *£ 134.40* When applied for, *10.6.1937*
 Special *£ 2588.32*
 Shipping receiver *£ 70.56*
 Donkey Boiler Fee *£ 305.00* When received, *28.6.36 & 30/6*
 Travelling Expenses (if any) *£ 30.00* *K2248.74 and 16.8.37 & 16/8*
 Committee's Minute *312828*
 Assigned *+ Lmb. 5.37 oil engine CL DB-100 lbs*
 Engineer Surveyors to Lloyd's Register of Shipping. *P. Langkilde Jensen.*

Rpt. 9a.

Port of *Copenhagen*

Continuation of Report No. 1024 dated *15 June 1937* on the

Trin. Sc. "NORDEN"

List of Auxiliary Machinery.

2 off centrifugal cooling water pumps, 175 lts/hour each
 2 " cog wheel lubricating oil pumps, 160 lts/hour each
 1 " 2 cylinder piston ballast pump, 200 lts/hour
 1 " bilge and sanitary pump, 2 plungers, 2x20 lts/hour
 1 " cog wheel cargo oil pump, 100 lts/hour
 1 " cog wheel oil fuel transfer pump, 50 lts/hour
 1 " centrifugal cooling water pump for auxiliary engine
 1 " centrifugal fresh water pump, 3 lts/hour
 2 " fuel oil separators
 1 " lubricating oil separator
 2 " 3 cyl. 2 stage air compressors, 130-115 mm diam x 120 mm stroke
 1 " 1 cyl. 2 stage emergency air compressor, 9 m³/hour

Electrically driven.

3 off 2 cylinder 2 SC.S.F. Diesel engines each direct coupled to a 50 K.W. generator supplying current for the electric light installation and the following electromotors:—

2 off 50 HP compound wound electromotors for air compressors
 1 " 18 " " " " ballast pumps
 2 " 60 " " " " working water and lub. oil pumps
 1 " 9 " " " " bilge & sanitary pumps
 1 " 40 " " " " cargo oil pumps
 1 " 16 " " " " fuel oil transfer pumps
 1 " 4 " " " " cooling water pumps
 2 " 8 " serie " " turning gears
 3 " 25 " compound " " lub. fuel oil separators
 1 " 3 " " " " emergency air compress.
 1 " 6.5 " " " " "NH₃ compressor (provision)
 1 " 1 " " " " Refrig. & dry cool w. pumps.
 2 " 13 " serie " " steering gear
 1 " 52 " compound " " windlasses
 11 " 33 " " " " deck winches
 1 " 3 " " " " lathe
 1 " 2 " " " " drilling machine
 1 " 1 " " " " fresh water pump.

and a number of smaller electromotors for winches, fans, galley & workshop machinery.

A 5 K.W. generator worked by a 2 cylinder 4 SC.S.F. Diesel engine ("Pelapori" model D22) has been placed on the uppermost platform in the engine room and connected to the light & radio switch board by a change over switch.

The foregoing is a correct description.

Lloyd's Register
NASKOV SKIBSVÆRFT
 Foundation