

# REPORT ON OIL ENGINE MACHINERY.

Date of writing Report 3rd Jan, 1936 When handed in at Local Office 8th Jan, 1936 Port of Mahar  
 No. in Survey held at Mahar Date, First Survey 5th Jan, 1935 Last Survey 2nd Jan, 1936  
 Number of Visits 153

on the Single Screw vessel "ORION" Tons Gross 8064  
Twin Net 4751  
Triple  
Quadruple  
 Built at Mahar By whom built Kockemms M. V. Aktieb. Yard No. 184 When built 1936  
 Engines made at Mahar By whom made Kockemms M. V. Aktieb. Engine No. 110 When made 1936  
 Donkey Boilers made at Mahar By whom made Kockemms M. V. Aktieb. Boiler No. 929/930 When made 1936  
 Brake Horse Power 3450 Owners Smiths Forensers Sankaradoni P.S. Port belonging to Arundal  
 Nom. Horse Power as per Rule 1167 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 MAN D620 60/110 2 or 4 stroke cycle 2 Single or double acting Double  
 Maximum pressure in cylinders 45 kg. cm<sup>2</sup> Diameter of cylinders 600 mm Length of stroke 1100 mm No. of cylinders 6 No. of cranks 6  
 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 96-100 Flywheel dia. 2093 mm Weight 6300 kg Means of ignition Diesel syst. Kind of fuel used Heavy oil  
 Crank Shaft, dia. of journals as per Rule 397 mm Crank pin dia. 420 mm Crank Webs Mid. length breadth 700 mm Thickness parallel to axis 265 mm  
 as fitted 420 mm Mid. length thickness 265 mm shrunk JOURNAL Thickness around eye-hole 200 mm  
 Flywheel Shaft, diameter as per Rule 397-362 mm Intermediate Shafts, diameter as per Rule 345 mm Thrust Shaft, diameter at collars as per Rule 362 mm  
 as fitted 420-364 mm as fitted 345 mm as fitted 364 mm  
 Tube Shaft, diameter as per Rule ✓ Screw Shaft, diameter as per Rule 381 mm Is the tube shaft fitted with a continuous liner Yes  
 as fitted ✓ as fitted 390 mm Is the screw shaft fitted with a continuous liner Yes  
 Bronze Liners, thickness in way of bushes as per Rule 19.2 mm Thickness between bushes as per rule 14.4 mm Is the after end of the liner made watertight in the  
 as fitted 20 mm as fitted 15 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 ✓

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 the tube shaft No Length of Bearing in Stern Bush next to and supporting propeller 1750 mm  
 Propeller, dia. 5100 mm Pitch 4132 mm No. of blades 4 Material Brass whether Moveable No Total Developed Surface 92.57 sq. feet  
 Method of reversing Engines MAN method Is a governor or other arrangement fitted to prevent racing of the engine when declutched Yes Means of lubrication  
Sourced 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  
 Cooling Water Pumps, No. 2 Each of 190 T/H 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. ✓ Diameter ✓ Stroke ✓ Can one be overhauled while the other is at work ✓  
 Pumps connected to the Main Bilge Line { No. and Size 2 One 7 1/2" x 8" x 10" Duplex of 100 T/H One of 40 T/H One of 30 T/H One of 1.6" x 8" x 6" of 50 T/H One of 1.6" x 6" x 6" of 30 T/H  
 How driven Steam driven elec. driven Steam driven Steam driven

Ballast Pumps, No. and size: 1 7 1/2" x 8" x 10" Duplex of 100 T/H Lubricating Oil Pumps, including Spare Pump, No. and size 2 Each of 100 mi<sup>3</sup>/H  
 Are two independent means arranged for circulating water through the Oil Coolers Yes Suctions, connected to both Main Bilge Pumps and Auxiliary Bilge  
 Pumps, No. and size:—In Machinery Spaces 3-4" 1-4" in the after cofferdam. 3-3 1/2" in the main pump room.  
 In Holds, &c. 2-3 1/2" in the dry cargo hold forward. 1-3 1/2" in the pump room forward. 1-3 1/2" in the forward cofferdam.  
 Independent Power Pump Direct Suctions to the Engine Room Bilges, No. and size 1-5"  
 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 Both  
 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 How are they protected ✓  
 What pipes pass through the deep tanks After cofferdam suction pipe 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 Not fitted 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 Diameter 300-110 mm Stroke 220 mm Driven by Aux. engines  
 Small Auxiliary Air Compressors, No. 1 No. of stages 2 "Beval" T.C.S. 2 of 8 mi<sup>3</sup> per air/hour. Driven by Small generator  
 Scavenging Air Pumps, No. 2 (Sandram) Diameter 1380 mm Stroke 850 mm Driven by Main engine  
 Auxiliary Engines crank shafts, diameter as per Rule 139 mm MARKS: LLOYD'S 9243/4 PK. 28-9-34  
 as fitted 155 mm

**AIR RECEIVERS:**—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 Yes What means are provided for cleaning their inner surfaces ✓  
 Is there a drain arrangement fitted at the lowest part of each receiver Yes  
 Small starting High Pressure Air Receivers, No. 1 Cubic capacity of each 200 litres Internal diameter 438 mm thickness 9.5 mm  
 Seamless, lap welded or riveted longitudinal joint Seamless Material Steel Range of tensile strength 29.25 T/□ Working pressure by Rules 41 kg. cm<sup>2</sup>  
 Starting Air Receivers, No. 1 Total cubic capacity 15 mi<sup>3</sup> Internal diameter 1850 mm thickness 30 mm  
 Seamless, lap welded or riveted longitudinal joint Riveted Material Steel Range of tensile strength 44.8-46.8 kg. cm<sup>2</sup> Working pressure by Rules 30.7 kg. cm<sup>2</sup>

IS A DONKEY BOILER FITTED?

PLANS. Are approved plans forwarded herewith for Shafting (If not, state date of approval) 19/1-1934  
 Donkey Boilers 19/1-1934  
 General Pumping Arrangements 19/2 & 19/4-1934  
 Oil Fuel Burning Arrangements 29/10-1934  
 Receivers 5/4 & 19/4-1934  
 Separate Tanks 29/10-1934

SPARE GEAR. Main engines: 2 top and 3 bottom cylinder covers, 6 complete top and 12 bottom fuel nozzles and 1 set of extra nozzles for the whole motor, 3 lengths of fuel pipes with connections, 2 complete starting air valves, 2 safety valves, 2 indicator valves, 5 sets of plungers, liners, valves and seats for fuel pumps and 1 complete fuel pump, 6 sets of piston rod packings, 12 top and 12 bottom cylinder cover studs and nuts, 1 top and 1 bottom cylinder liner, 2 pistons, 1 piston rod, 4 sets of piston rings for one piston, 6 telescopic pipes with packings for piston cooling, 4 main bearing bolts & nuts and a pair of bearings, 2 crank pin bearing bolts & nuts and a bearing, 1 complete crosshead bearing (4 halves) with bolts, 1 set of coupling bolts for crank and intermediate shafts, 1 propeller shaft, 1 castiron propeller, 2 suction and 2 delivery valves and 1 set of piston rings for the scavange pumps, 1 set of springs for the whole motor, 1/2 set of pads for the thrust bearing. Packings etc.

The foregoing is a correct description.

(Continued on sheet II)

Dates of Survey while building		Dates of Examination of principal parts	
During progress of work in shops -	19/1, 19/2, 19/3, 19/4, 19/5, 19/6, 19/7, 19/8, 19/9, 19/10, 19/11, 19/12, 19/13, 19/14, 19/15, 19/16, 19/17, 19/18, 19/19, 19/20, 19/21, 19/22, 19/23, 19/24, 19/25, 19/26, 19/27, 19/28, 19/29, 19/30, 19/31, 19/32, 19/33, 19/34, 19/35, 19/36, 19/37, 19/38, 19/39, 19/40, 19/41, 19/42, 19/43, 19/44, 19/45, 19/46, 19/47, 19/48, 19/49, 19/50, 19/51, 19/52, 19/53, 19/54, 19/55, 19/56, 19/57, 19/58, 19/59, 19/60, 19/61, 19/62, 19/63, 19/64, 19/65, 19/66, 19/67, 19/68, 19/69, 19/70, 19/71, 19/72, 19/73, 19/74, 19/75, 19/76, 19/77, 19/78, 19/79, 19/80, 19/81, 19/82, 19/83, 19/84, 19/85, 19/86, 19/87, 19/88, 19/89, 19/90, 19/91, 19/92, 19/93, 19/94, 19/95, 19/96, 19/97, 19/98, 19/99, 19/100	Cylinders	19/5, 19/6, 19/7, 19/8, 19/9, 19/10, 19/11, 19/12, 19/13, 19/14, 19/15, 19/16, 19/17, 19/18, 19/19, 19/20, 19/21, 19/22, 19/23, 19/24, 19/25, 19/26, 19/27, 19/28, 19/29, 19/30, 19/31, 19/32, 19/33, 19/34, 19/35, 19/36, 19/37, 19/38, 19/39, 19/40, 19/41, 19/42, 19/43, 19/44, 19/45, 19/46, 19/47, 19/48, 19/49, 19/50, 19/51, 19/52, 19/53, 19/54, 19/55, 19/56, 19/57, 19/58, 19/59, 19/60, 19/61, 19/62, 19/63, 19/64, 19/65, 19/66, 19/67, 19/68, 19/69, 19/70, 19/71, 19/72, 19/73, 19/74, 19/75, 19/76, 19/77, 19/78, 19/79, 19/80, 19/81, 19/82, 19/83, 19/84, 19/85, 19/86, 19/87, 19/88, 19/89, 19/90, 19/91, 19/92, 19/93, 19/94, 19/95, 19/96, 19/97, 19/98, 19/99, 19/100
During erection on board vessel -	19/1, 19/2, 19/3, 19/4, 19/5, 19/6, 19/7, 19/8, 19/9, 19/10, 19/11, 19/12, 19/13, 19/14, 19/15, 19/16, 19/17, 19/18, 19/19, 19/20, 19/21, 19/22, 19/23, 19/24, 19/25, 19/26, 19/27, 19/28, 19/29, 19/30, 19/31, 19/32, 19/33, 19/34, 19/35, 19/36, 19/37, 19/38, 19/39, 19/40, 19/41, 19/42, 19/43, 19/44, 19/45, 19/46, 19/47, 19/48, 19/49, 19/50, 19/51, 19/52, 19/53, 19/54, 19/55, 19/56, 19/57, 19/58, 19/59, 19/60, 19/61, 19/62, 19/63, 19/64, 19/65, 19/66, 19/67, 19/68, 19/69, 19/70, 19/71, 19/72, 19/73, 19/74, 19/75, 19/76, 19/77, 19/78, 19/79, 19/80, 19/81, 19/82, 19/83, 19/84, 19/85, 19/86, 19/87, 19/88, 19/89, 19/90, 19/91, 19/92, 19/93, 19/94, 19/95, 19/96, 19/97, 19/98, 19/99, 19/100	Thrust shaft	19/5, 19/6, 19/7, 19/8, 19/9, 19/10, 19/11, 19/12, 19/13, 19/14, 19/15, 19/16, 19/17, 19/18, 19/19, 19/20, 19/21, 19/22, 19/23, 19/24, 19/25, 19/26, 19/27, 19/28, 19/29, 19/30, 19/31, 19/32, 19/33, 19/34, 19/35, 19/36, 19/37, 19/38, 19/39, 19/40, 19/41, 19/42, 19/43, 19/44, 19/45, 19/46, 19/47, 19/48, 19/49, 19/50, 19/51, 19/52, 19/53, 19/54, 19/55, 19/56, 19/57, 19/58, 19/59, 19/60, 19/61, 19/62, 19/63, 19/64, 19/65, 19/66, 19/67, 19/68, 19/69, 19/70, 19/71, 19/72, 19/73, 19/74, 19/75, 19/76, 19/77, 19/78, 19/79, 19/80, 19/81, 19/82, 19/83, 19/84, 19/85, 19/86, 19/87, 19/88, 19/89, 19/90, 19/91, 19/92, 19/93, 19/94, 19/95, 19/96, 19/97, 19/98, 19/99, 19/100
Total No. of visits	153	Intermediate shafts	19/5, 19/6, 19/7, 19/8, 19/9, 19/10, 19/11, 19/12, 19/13, 19/14, 19/15, 19/16, 19/17, 19/18, 19/19, 19/20, 19/21, 19/22, 19/23, 19/24, 19/25, 19/26, 19/27, 19/28, 19/29, 19/30, 19/31, 19/32, 19/33, 19/34, 19/35, 19/36, 19/37, 19/38, 19/39, 19/40, 19/41, 19/42, 19/43, 19/44, 19/45, 19/46, 19/47, 19/48, 19/49, 19/50, 19/51, 19/52, 19/53, 19/54, 19/55, 19/56, 19/57, 19/58, 19/59, 19/60, 19/61, 19/62, 19/63, 19/64, 19/65, 19/66, 19/67, 19/68, 19/69, 19/70, 19/71, 19/72, 19/73, 19/74, 19/75, 19/76, 19/77, 19/78, 19/79, 19/80, 19/81, 19/82, 19/83, 19/84, 19/85, 19/86, 19/87, 19/88, 19/89, 19/90, 19/91, 19/92, 19/93, 19/94, 19/95, 19/96, 19/97, 19/98, 19/99, 19/100

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

Is this machinery duplicate of a previous case Yes If so, state name of vessel "Sagittifell", Kockums Yard No. 18

General Remarks (State quality of workmanship, opinions as to class, etc.) The auxiliary machinery of this vessel consists of two - 3 cylinder, 4 stroke angle acting heavy oil engines built by Messrs. Kockums M.T. Aktief. of Malmö. The cylinders are 260 mm. in diam., stroke 360 mm. and R.P.M. = 350. The engines are of the compressor type and each is driving a dynamo of 75 K.W. A steam driven dynamo of 15 K.W. is also fitted. The main and auxiliary engines of this vessel have been built under special arrangement in accordance with the Rules and the approved plans. The materials fulfil the Rules requirements and the workmanship is good. The shaftings as per forging reports attached herewith. The main and auxiliary engines and pumps have been tested under full working conditions and found to work satisfactorily. The machinery of this vessel is eligible, in my opinion, to be classed in Register Book of this Society, viz. - L.M.C. 1.36. Working pressure of donkey boilers 17 lbs. per sq. inch.

The amount of Entry Fee	£30. 109.20	When applied for.	8 <sup>th</sup> Jan. 1936
Special	£30. 2350.48		
Donkey Boiler Fee	£30. 318.50	When received.	
Survey of Donkey Boilers	£30. 70.44		
Test & imp. of eng. pumps etc.	£40. 40.00		
Committee's Minute			

Assigned L.M.C. 1.36  
 oil in 2 2/2 17/18

Adunden  
 Engineer Surveyor to Lloyd's Register of Shipping.

M/T "ORION", No. 39508 in the Register Book complement.

Spare gear (cont.):  
 Auxiliary oil engines: 1 cylinder cover, 1 set of studs and nuts for one cylinder cover, 4 complete exhaust valves and 2 extra valves, seats and spindles, 1 complete air inlet valve, 2 complete starting air valves, 1 safety valve, 3 complete fuel nozzles with pipes and 15 extra nozzles, 3 plungers, liners, valves and seats and 1 set of other working parts for fuel pumps, 1 cylinder liner, 2 pistons, 1 gudgeon pin and bush bearing, 6 sets of piston rings for one piston, 1 crank pin bearing with bolts and nuts, 1 main bearing with bolts and nuts, 1 set of springs and 2 sets of packings for one motor, 1 set of rollers for the valve gear, 1 set of spare nuts for the cam shaft drive, 1 wheel for the lubricating oil pumps.

Oil compressors (auxiliary): 1 set of piston rings for the H.P. and L.P. pistons for one compressor, 1 set of suction and pressure valves for each stage for one compressor.

Pumps: 1 set of valves for each type of bilge pumps, 1/2 set of valves for oil fuel transfer and ballast pumps, 1 piston rod (steam and oil end), 1 set of piston rings and 1 set of valves for the cargo pumps.

General: A quantity of assorted nuts and bolts, lengths of pipes for the fuel delivery to the main and auxiliary power cylinders and the air delivery from the auxiliary compressors to the receivers, with unions and flanges.

Donkey boilers: 2 safety valve springs, 2 stay and 6 ordinary tubes, 2 fuel check valves, 1/2 set of fuel pump valves, 1 set of oil burners and 12 extra nozzles for the oil fuel burning arrangement.

In addition to the pumps mentioned above the following are also installed, viz.:-

- In the motor space:-
- 1 cooling water pump for one engine of 50 T/H. Electric driver.
  - 1 auxiliary pump of 20 T/H. " "
  - 1 rotary oil transfer pump of 2 1/2 mi<sup>3</sup>/H. " "
  - 1 duplex " " " 20 mi<sup>3</sup>/H. Steam driver.
  - 1 rotary fresh water pump of 2 T/H. Electric driver.
  - Two units of oil fuel pressure pumps for donkey boilers.
  - Two fuel pumps for donkey boilers 6" x 4" x 6" Duplex.
- In main pump room:-
- 2 cargo pumps 16" x 14" x 18" Duplex. Steam driver.
  - 1 fire-extinguishing pump.
- In pump room forward:-
- 1 oil transfer pump 6" x 6" x 6" Duplex. Steam driver.

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