

Vessel Name	LAMMERMUIR		
Builder	John Lewis & Sons Ltd., Aberdeen		
Owner	St. Andrews Steam Fishing Co. Ltd, J. Marr & Sons Ltd. and the West Hartlepool Steam Navigation Co. Ltd.		
Vessel Type	Trawler, side.		
Yard Number	220	Official Number	5171359
Completion Date	1950	Length	185' - 6"
Breadth	32' - 1"	Depth	16' - 10"
GRT	729	NRT	

Engine Details

William Doxford & Sons Ltd., Sunderland
 3 cylinder, 2-stroke, opposed piston, 440mm x 1440mm (combined stroke, 820mm bottom x 620mm top).
 1,100 b.h.p. @ 145 r.p.m. 13¼ knots on trial.
 Total engine weight 85 tons, length over flywheels 20' - 9½", height 21' - 3"

Disposal	Demolished	Date	1973 or 75
Location			

History, Comments & Sources

10.1949 Launch.

15.06.1950 Trials off the River Wear.

1956 Owners P/F Samvinnufelagid A/S, Sandevaag, Faroes, renamed **JEGVAN ELIAS THOMSEN**

1975 (elsewhere 73) Demolished.

[trawlerphotos](#)

Trials report, Glasgow Herald.

<http://news.google.com/newspapers?nid=2507&dat=19500616&id=RkhAAAAIIBAJ&sjid=ZZEMAAAAIIBAJ&pg=4876,3813158>



1/32 Builder's model © Thomson Collection of ship models, Art Gallery of Ontario.



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A DOXFORD OPPOSED-PISTON OIL ENGINE OF SMALL POWER.

RENOWNED the world over for its reliability, durability and economy, the Doxford opposed-piston oil engine has gained the confidence of many shipowners.

The success of the design is reflected in the circumstance that numbers of engine-building firms in this country and abroad have taken out licences under which they are empowered to construct engines of this interesting type, and Doxford engines have, in fact, been installed in more than 500 vessels, including passenger

ships, cargo liners, tramp ships and, of course, oil-carrying vessels.

fully balanced, and it was a pleasure to note its steadiness and smooth performance throughout the entire speed range, despite the circumstance that the holding-down arrangements consisted of only four 1-in. bolts at each side, securing the bedplate to the test-bed foundation. Though this engine is the first of the new version, Messrs. Doxford have previously constructed units whose powers are small in comparison with those of the standardised engines built in recent years. Two decades ago, for example, there was constructed at Sunderland a

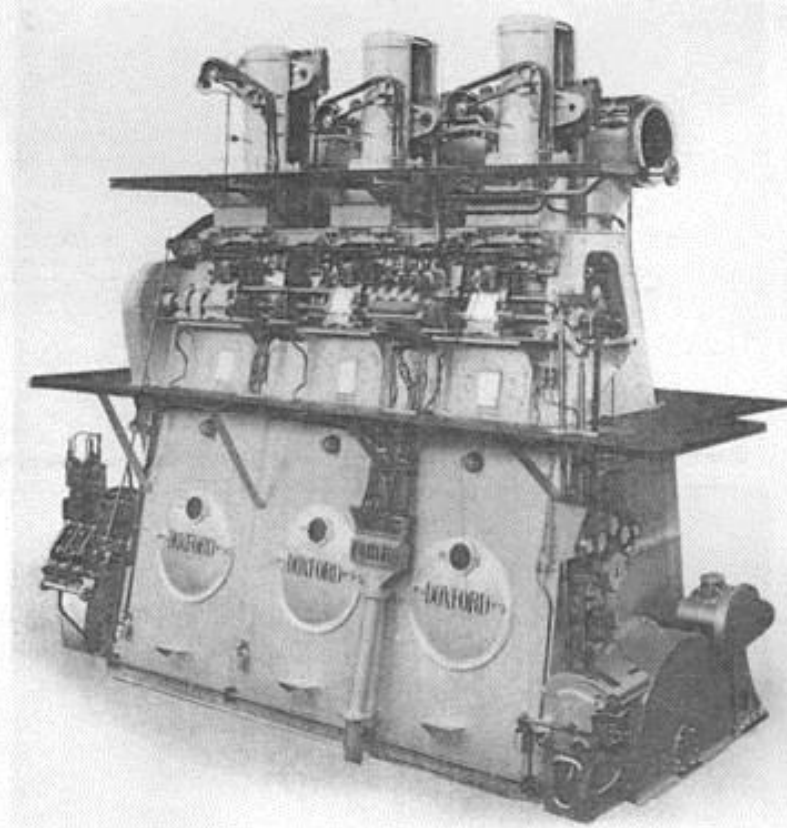


Fig. 1.—Doxford Two-stroke Cycle, Three-cylinder, Opposed-piston Oil Engine for the "Lammermuir."

ships, cargo liners, tramp ships and, of course, oil-carrying vessels.

It is not surprising, therefore, that Messrs. William Doxford & Sons, Ltd., should have turned attention to the development of an engine suitable for the propulsion of smaller craft, e.g., trawlers, coasting ships, colliers and other vessels for short-sea services; and we were recently privileged to witness the test-bed trials of the first engine of the new type at the company's Pallion engine works, Sunderland. During the trials, we were much impressed by the manoeuvrability of the engine, the promptness of its response to adjustments of the controls, the accuracy and efficiency of the governing arrangements and its smoothness at the lowest speed. The engine is beauti-

fully balanced, and it was a pleasure to note its steadiness and smooth performance throughout the entire speed range, despite the circumstance that the holding-down arrangements consisted of only four 1-in. bolts at each side, securing the bedplate to the test-bed foundation. Though this engine is the first of the new version, Messrs. Doxford have previously constructed units whose powers are small in comparison with those of the standardised engines built in recent years. Two decades ago, for example, there was constructed at Sunderland a

three-cylinder opposed-piston oil engine, which was installed in the tank-ship *Freshmoor*. This engine, which had a cylinder diameter of 400 mm. and a combined stroke of 1,300 mm., developed about 220 B.H.P. per cylinder at 130 r.p.m. A similar engine, which was displayed at the North-East Coast Exhibition held at Newcastle-on-Tyne, in 1928, was subsequently installed in the *Lady Wolmer*; and it is noteworthy that both these engines are still in service—a circumstance which is eloquent of the soundness of those early designs, and of the careful craftsmanship devoted to the construction of the engines.

The new engine, a photograph of which is reproduced in Fig. 1, is a two-stroke cycle, three-cylinder, opposed-

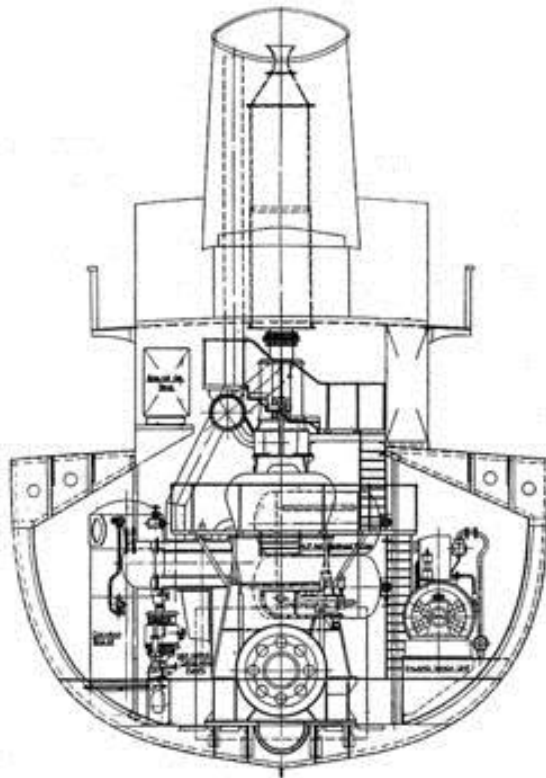


Fig. 3.—Section at Frame 36, looking Forward.

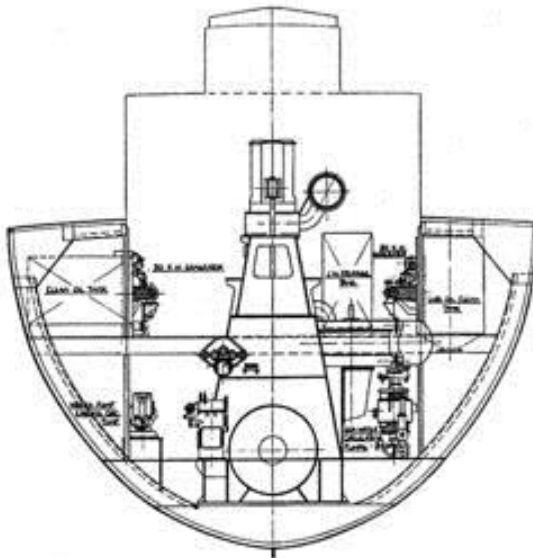


Fig. 4.—Section at Frame 28, looking Aft.

piston unit, the cylinder bore being 440 mm. and the combined stroke 1,440 mm. (lower piston, 820 mm.; upper piston, 620 mm.). It has been designed to develop 1,100 B.H.P. at a service speed of 145 r.p.m., and is, of course, directly coupled to the shafting. The propeller shaft has a gunmetal liner, and rotates in a sterntube lined with lignum vitae. The four-blade propeller is of manganese bronze.

This particular engine, it may be noted, is being installed in the motor trawler *Lammermuir*, a 185-ft. craft built by Messrs. John Lewis & Sons, Ltd., Aberdeen, for the joint ownership of the St. Andrew's Steam Fishing Co., Ltd., Messrs. J. Marr & Son, Ltd., and the West Hartlepool Steam Navigation Co., Ltd. The machinery layout in this vessel is shown by the drawings reproduced in Figs. 2, 3 and 4.

The engine incorporates all the well-known and well-tried features of the Doxford design. Emphasis has been placed on reliability and durability, and the design is robust and sturdy.

Following the now normal practice, the bedplate, columns and entablature are of fabricated construction, in welded steel plate. A large door in each crankcase affords access to the crank chamber, to facilitate inspection and adjustment of the moving parts.

The cooling of the cylinder jackets, and upper and lower pistons, is effected by the circulation of distilled water, the system being that which has proved most satisfactory and reliable since the Doxford engine was introduced to the marine world, in 1921.

Each cylinder has front and rear fuel valves, as in the larger Doxford engines.

The scavenging pump, which is located at the centre of the engine, at the port side, is lever-driven from the crankshaft.

Reference has already been made to the steadiness of the engine; and, in this connection, it may be stated that the flywheels, intermediate shafting and propeller shafting have been proportioned to suppress all "criticals" within the operational speed range of the engine. It may be added that the governing arrangements are such that the fuel supply is interrupted when the engine speed reaches 160 r.p.m.

Due to the fineness of the after body of the trawler, and to the presence of the trawl-winch engine and Hyland hydraulic unit at the starboard side of the engine-room, it was decided to arrange the control gear at the forward end of the engine, as may be seen in the photograph in Fig. 1.

The engine is employed exclusively for propulsion. Power for the trawl winch is provided by the Hyland hydraulic unit, to which reference has been made, while electric current, at 110 volts, is provided by two 50-kw. generators, each driven by a McLaren Diesel engine.

The operational conditions for which the engine has been designed are such that, during trawling, the maximum torque may be required at reduced trawling speed, while, running free, the maximum power and revolutions are needed. The engine has been designed to meet the requirements of both conditions, so that its overall performance represents a compromise between the ideal performance corresponding to each of their conditions.

The test-bed trials were carried out with "Pool" Diesel fuel having a gross calorific value of 18,750 B.Th.U. per lb; the specific fuel consumption returned was between 0.37 and 0.38 lb per B.H.P. per hour, and the engine has a "flat" fuel characteristic over a wide range of speed.

The weight of the engine, including flywheels, thrust block, fuel pump, lever-driven scavenging pump, and all necessary pipes, fittings, ladders and gratings, is 85 tons, i.e., 173 lb per B.H.P. The length of the engine, measured over the flywheels, is 20ft. 9½in., and its height, from the bottom of the bed plate, is 21ft. 3in.

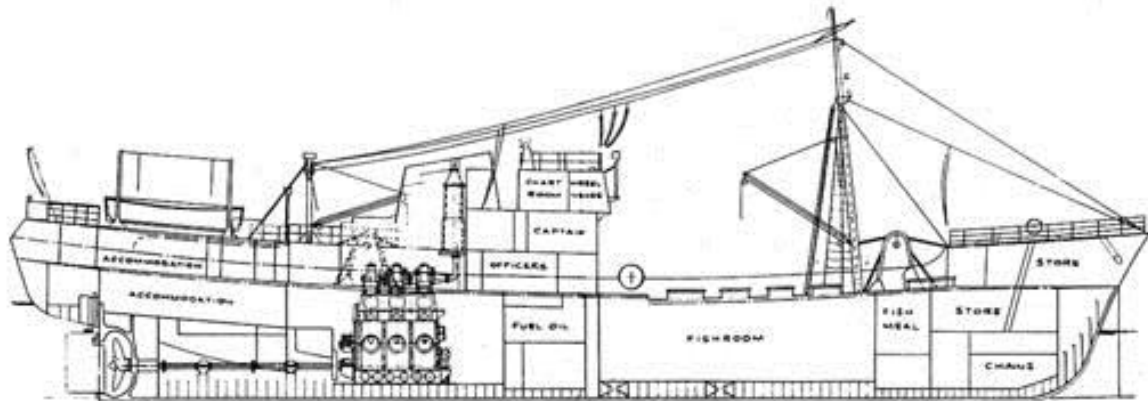


Fig. 5.—Profile of the Motor Trawler "Lammermuir."

Considerable discussion has taken place in regard to the latter dimension; it is, therefore, of interest to mention that the travelling crane installed in the engine-room of the trawler, to facilitate the inspection and overhauling of the main-engine pistons, is accommodated in the height of the engine casing.

For completeness, we give in the accompanying table a list of the auxiliary equipment installed in the engine-room of the trawler.

A profile of the hull of the *Lammermuir*, showing the space occupied by the machinery installation, is given in Fig. 5. The dimensions of the vessel are:—185ft. 0in. B.P., by 32ft. 0in. moulded, by 16ft. 9in. moulded. The vessel is of the raised quarter-deck design (the break being 1ft. in depth); the erections comprise a forecastle and three-tier bridge structure, amidships. The captain and officers are accommodated amidships, while the crew's cabins are arranged below deck aft. The accommodation is spaciouly planned and comfortably furnished and appointed.

Fuel bunkers of sufficient capacity to give the vessel an endurance of 40 days will enable her to undertake voyages to distant fishing grounds, and return without re-fuelling.

The fish hold, which has a capacity of 18,000 cu. ft., is provided with cooling plant, and distant-reading thermometers are fitted to indicate the temperature in the hold.

For trawling operations, a hydraulically-operated winch is installed. This important auxiliary, supplied by Messrs. J. Robertson & Sons, Ltd., of Fleetwood, derives its power from a hydraulic unit in the engine-room. Manufactured by Messrs. Hyland, Ltd., of Wakefield, the hydraulic unit is powered by a 270-H.P. Diesel engine, which drives the associated pump.

The electro-hydraulic steering gear has been manufactured by Messrs. Donkin & Co., Ltd., of Newcastle-on-Tyne.

Much careful thought has gone to the development of the design of the vessel, and she appears to be a prototype of considerable merit. Her performance in service will be watched with great interest by the fishing industry; meantime, the owners are to be complemented on their enterprise in embarking on this interesting project.

AUXILIARY EQUIPMENT IN DOXFORD-ENGINED TRAWLER.

No.	Auxiliary.	Maker.	Remarks.
2	Air compressors	G. & J. Weir, Ltd.	50 cu. ft. per min.
2	Air-storage tanks	Cochran & Co. (Annan), Ltd.	60 cu. ft.; 800 lb per sq. in.
1	Boiler	do.	140 sq. ft. heating surface.
1	Bilge pump	Drysdale & Co., Ltd.	30 tons per hour.
2	De Laval purifiers	Alfa-Laval Co., Ltd.	250 gallons.
1	Distiller	Hocking & Co., Ltd.	1,000 gallons capacity.
1	Feed pump	G. & J. Weir, Ltd.	3 tons capacity at 20 double strokes per min.
1	Forced-draught fan	Alldays & Onions, Ltd.	
1	General-service pump	Drysdale & Co., Ltd.	30 tons per hour.
2	Generators (Diesel)	J. & H. McLaren, Ltd.	50 kW., 110 volts, D.C., at 750 r.p.m.
1	Hyland winch unit	Hyland, Ltd.	282 B.H.P. at 800 r.p.m.
1	Salt-water circulating pump	Pulsometer Engineering Co., Ltd.	For Hyland winch unit.
2	Jacket-water pumps	Drysdale & Co., Ltd.	50 tons capacity against 40 lb pressure.
1	Jacket-water cooler	Serck Radiators, Ltd.	
2	Lubricating-oil pumps	Stocheet & Pitt, Ltd.	10 tons per hour.
1	Lubricating-oil cooler	Serck Radiators, Ltd.	
2	Sea-water pumps	Drysdale & Co., Ltd.	65 tons delivery.
2	Valve cooling-water pumps	Wothington-Simpson, Ltd.	1 ton per hour.
3	Fuel-oil tanks	William Doxford & Sons, Ltd.	Each 1½ tons capacity.
1	Boiler-oil tank	do.	2 tons capacity.
1	Lubricating-oil storage tank	do.	400 gallons.
1	Lubricating-oil cleaning tank	do.	
1	Jacket-water suction tank	do.	2 tons.
1	Jacket-water storage tank	do.	3 tons.
1	Generator fuel-oil tank	do.	
1	Valve cooling-water tank	do.	½ ton capacity.
1	Fuel-oil transfer pump	Mono Pumps, Ltd.	10 tons per hour.
1	Drilling machine		
1	Hand fuel-oil transfer pump	Zwicky, Ltd.	200 gallons per hour.