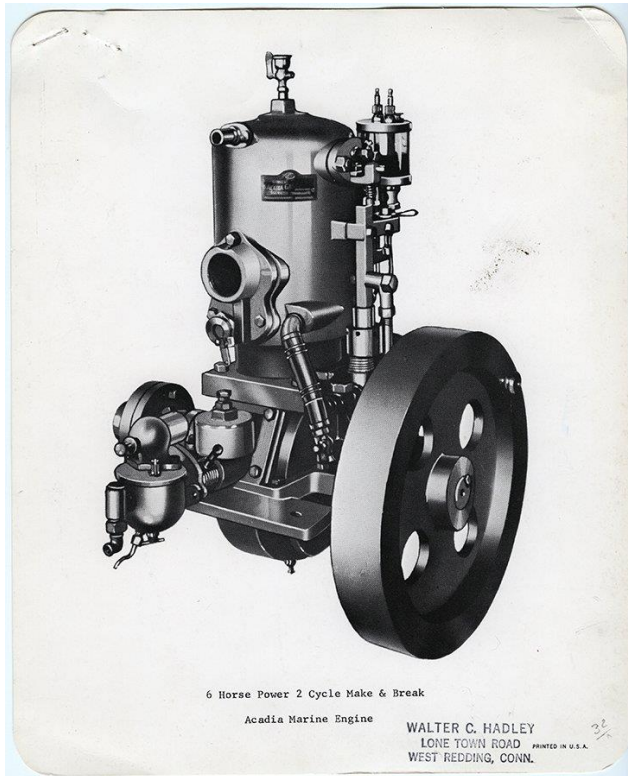


PENOBSCOT MARINE MUSEUM

Marine Engines Effect on Lobsterboat Design

By Cipperly Good, Richard Saltonstall Jr. Curator of Maritime History

The marine engine was the “single most important innovation in the history of lobsterboat design.” This bold statement was made by Professor C. Richard K. Lunt in his 1975 dissertation on “Lobsterboat Building on the Eastern Coast of Maine: A Comparative Study.” The marine engine allowed lobstermen to go farther afield, faster, and with more ease. The hull design has adapted over the years based on the engine’s size, weight, and effects on hull performance.



*Acadia Make and Break Engine
National Fisherman Collection, LB2012.15.215.*

While engines powered by steam and naphtha had been in use since the 1880s and 1890s, the size and expense of these engines had limited their use in commercial fisheries. It was the advent of gasoline engines in the early 1900s that caught the lobstermen’s attention. While lobstermen were suspicious of the gas engine’s reliability—they kept the oars and sails at the ready—they were slowly won over by the advantages of going out in calm weather and not having to tend to sails and oars. Make-and-breaks were the first engines adopted more widely. These single-cylinder, two-cycle mechanical ignition engines were simple and economical. The self-sufficient lobsterman could install, maintain, and repair the engines themselves. The make-and-breaks were heavy in relation to their horsepower – 100 pounds per horsepower. However, they had the advantage of being powerful at low speeds; these 2-5 horsepower engines could drive the average 20' boat.

Both the make-and-breaks and the next innovation, the twin cylinder engine, had direct drive to the propellers, so the engine had no reverse or idle and had to be stopped at each trap and restarted with a heavy flywheel. Since this engine made operation complicated and time-consuming, it would often be used to get the lobsterboat out to the fishing grounds, and then two additional engines would be used for lobstering. A smaller engine, running at 2-3 knots, would be used for tending the gear, and a third steam-powered winch, called a donkey engine, was used for hauling the traps.



*Yawl boat powered with a Red Wing Marine Engine with a Model A Block.
Donald L. Merchant Collection, LB2013.13.14.1.*

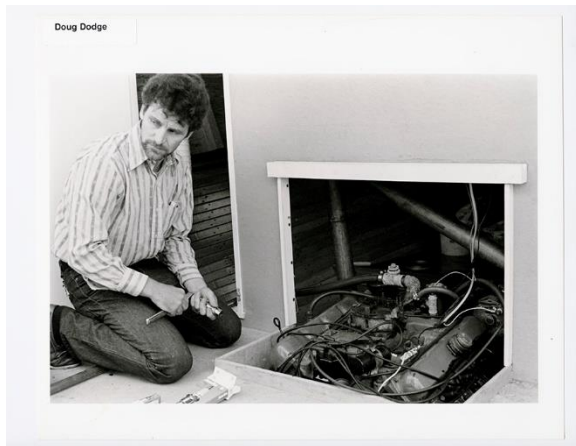
World War I brought the next evolution in the marine engine. Four-cylinder, four-cycle marine engines with transmissions to take a boat in and out of gear came on the market in the mid-1920s. The transmissions now had reverse, which unlike a car engine, ran at half the forward gear's ratio. The engines were cooled in one of three ways—water-cooled in a special engine jacket, with water pumped through them, or through dry exhaust with pipes sticking up out of the deck. As the oil-filled crankcase could not be tilted more than 15-degrees from level and still be able to lubricate, the engine was placed at mid-hull to accommodate the angle of the propeller shaft. This layout allowed the lobsterman to run the trap hauler directly off the main engine with a 90-degree rear axle differential from an automobile. The marine engines increased their horsepower to 20-40 horsepower but weighed less than a make-and-break. The more complex engines required service at auto dealerships, making the lobsterman reliant on a third party, especially after World War II when automobile engines were

marinized. The increased boat speed overpowered the adaptations of rowing and sailing double-ender and dory designs, and favored semi-planing hulls, such as pumpkinseed hulls with wider sterns and the classic hull designs like the Hampton and Reach boats with their sharp bows and flat runs at the sterns. The design evolution of the early purpose-built motorized lobsterboats continued to favor semi-planing, flat-bottomed hulls ranging in length from the 25-35-feet.



*Buda Marine Diesel Engine, a similar engine was installed on a 38' boat in 1940.
National Fisherman Collection, LB2012.15.17591.*

Diesel engines, which ran more economically and posed a smaller fire risk than gasoline engines, came on the market in the 1930s. The tradeoffs with gas engines were that diesels were heavier and more expensive, so those who preferred speed and initial lower costs stayed with gas engines.



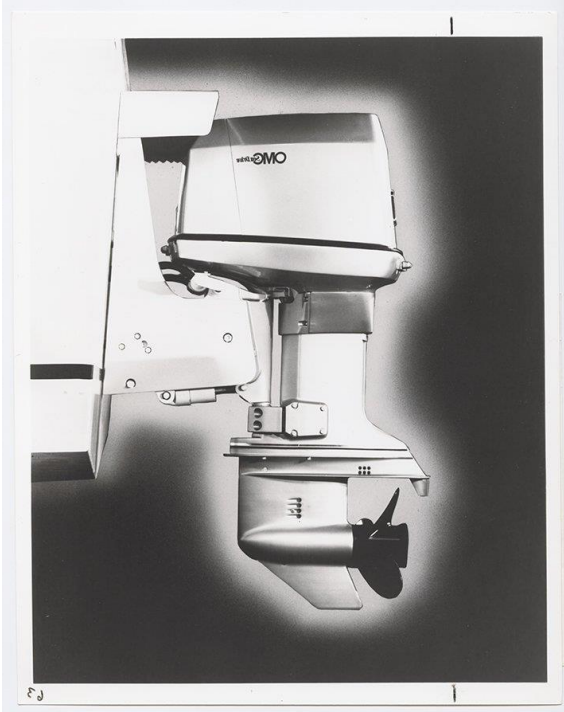
*Doug Dodge, a Beals Island, Maine boatbuilder and engine mechanic installs an Oldsmobile 455 V8 gasoline engine into a 36' lobsterboat.
National Fisherman Collection, LB2012.15.7342*

In the 1950s, V8 gasoline engines (eight-cylinder engines arranged in a V formation) made the transition from automobiles to boats in the 30–40-foot range. The V8s replaced the straight sixes automobile engines, which had been marinized after World War II. The V8 engines peaked in the 1970s at 465 horsepower. These larger engines were bought from auto-wreckers and installed with dry exhaust pipes sticking straight out of the engine box, which unlike wet or water-cooled exhaust engines will not freeze in the winter.



*The Caterpillar 3406 could be used for marine or on-highway use, with a few external cosmetic differences.
National Fisherman Collection, LB2012.15.5416*

Those preferring diesel engines bought new engines from the likes of Detroit Diesel and Caterpillar in the 1960s, and later John Deere in the 1980s. These industrial engine dealers in the construction and agricultural markets had found new buyers.



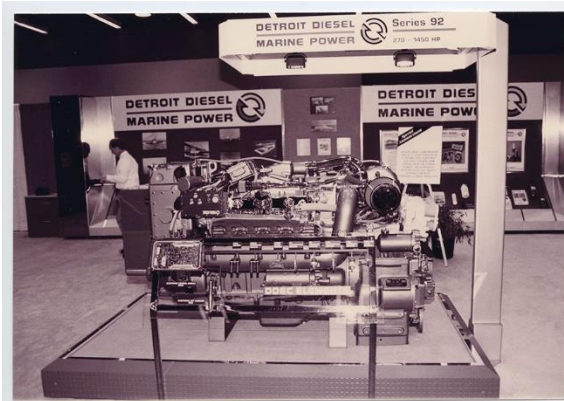
*OMC Sea Drive outboard motor.
National Fisherman Collection, LB2012.15.6567.*

Another type of engine made inroads into the lobsterboat market in the 1970s: outboard motors. The outboards were best suited to smaller boats. Early outboards were two strokes on 20' boats, while today's boats have 250-300 hp on 25' boats.

Whereas engines in the 1970s had equal power, as in, the horsepower listed on the engine was the actual horsepower produced, today's electronic diesel engines can be programmed, or tuned-up, to higher horsepower. Dedicated engine mechanics are required to service the engines, an echo of other industries who have lost the ability to repair their own engines.

By the 1970s, the offshore lobstering industry had taken off, and the need for engines to get lobstermen out to the fishing grounds throughout the whole year resulted in larger, wider boats.

This trend of bigger engines and bigger boats in the 40–50-foot range continues to this day. Today's engines can reach 1000+ horsepower, and specialized engine manufacturers have found a dedicated marine industry market.



*Detroit Diesel Series 92 Marine engine. A Detroit Diesel 6V-92 rated at 550 horsepower was installed in a 38' lobsterboat in 1995.
National Fisherman Collection, LB2012.15.4670.*

The ketch-rigged 15' Reach Boat with its 5-horsepower engine had grown to 46' lobsterboat with its thousand horsepower engine.

Innovations in engine design, speed, and power have translated into innovations in boat design to accommodate the new mode of propulsion. As the lobsters move farther north and further out to sea in search of cooler waters, the designs of lobsterboats and their engines will continue to evolve to get to the catch first and back to the dock as quickly as possible.