

Some Lessons Learned In Repowering

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BLACKBIRD is Alden 309Q, a centerboard schooner built in 1930 and was last repowered in the late 1960s with a Westerbeke 4-107 with a Paragon P-24L hydraulic transmission with a 2.5:1 reduction gear. The propeller was a narrow three bladed sailing prop that appears to be the same as the one on the boat when it was relaunched after the 1938 Hurricane. The original motor was a 60 HP Scripps F-4 that would have had a Zenith carburetor, Delco Remy six-volt electrical system, and transmission with reverse.



The old 4-107 was a reliable friend, it always started and ran, never quit but was simply underpowered to effectively push the boat against a heavy sea when winds were over 30 knots. Both the 4-107 engine and transmission are in fine working order and can be had for a reasonable offer.



This article is less about selecting a specific type of motor or gear and more about some practical considerations in installing what you select with a little 20-20 hindsight. Like oysters and rum, most schooner sailors have an opinion on motors so no need to go there. Repowering is pretty easy to do yourself to save on the cost and this article is geared toward that audience. You will of course need to hire the boom truck at the yard to pull your old motor and drop in the new one, and if you are installing a brand new motor (the kind with zero hours) you must have a qualified individual certify the installation for warranty purposes. In our case we had the yard do the electrical hook-up once everything was in place.

I would recommend you build off the research and opinions of others that have gone down this path before you. In our case this was Jim on Malabar II who couldn't say enough about his Cummins diesel so we talked to TAD (Trans Atlantic Diesel) on the motor only to find it was no longer available. Their next best recommendation was a Volvo Penta and after careful review of the engine specifications, dimen-



sions and other items settled on the D2-60. Again everyone has an opinion, so this is not a recommendation. We have always liked Perkins block motors. Some people like Kubota's. We really liked that the color which is green did not clash with the green cushions down below in the main salon. That was likely the deciding factor. Most new engines in a specific horse power range are pretty close pricewise so we did not consider price as part of the decision. There are a number of very good dependable motors out there. Just be sure to put a little more horsepower in than you need.

Props and Apertures

Once you think you know what engine you want, then start with the prop. We really only looked at two very sturdy feathering props, the time honored Luke and a Veriprop GP (grand performance). Again Malabar II admitted to having a 4 blade Veriprop GP and gaining an easy 1/2 knot in speed. Since we get tired of looking at Malabar II's transom we matched the selection in a three blade configuration. It's a lifetime prop, very well engineered and manufactured in Bremerhaven Germany and easily adjusted for pitch if the original estimate is not dead on the money. We waited until right before Christmas to get the Christmas special which saved about a thousand dollars. The prop was nearly half the cost of the motor, but its a keeper.



The prop must be sized to the aperture allowing sufficient area around the tips and a laminar flow from the hull to the blades. Once you determine acceptable



diameter, pitch can be estimated based on vessel displacement. In our case, the corners of the sternpost in the aperture were square and needed to be rounded and faired back. This eliminated the harmonic vibration we had with the 4-107 (pressure waves reflecting back as the blade swings through the aperture).

Build a Good Model

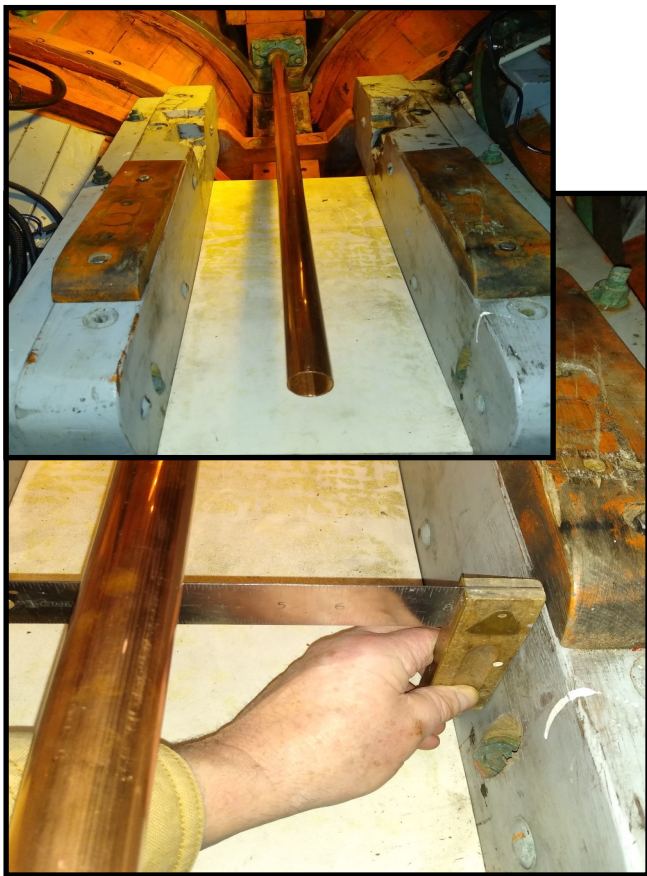
Once you have settled on the motor get an accurate set of drawings go ahead and build an accurate model. Do this before you buy the motor. Make sure you can actually get the motor in the boat and make sure your engine beds can be recut or redone so that the motor will fit with enough room below it, around



it, and allow the output shaft to line up with your shaft log. On the 4-107 the output shaft was 1.25 inches above the design height of the engine mounts. On the D2-60 the output shaft sits 1.5 inches below the height of the engine mounts. Our engine beds had to come down almost three inches. Make sure you have enough room before you buy the motor!

To get the right height on the engine beds we used a simple trick. We slid a very straight piece of copper pipe over the old Aquamet shaft extending that to full length of the beds and with a square spiled a line on the inside of the beds to then measure where the

beds needed to be cut. Really the most important but simplest of operations.



Clean The Bilge

The old 4-107 did have an oil leak one year due to failure of the brass nipple for the pressure sensor switch that was tapped into the high pressure oil rail. So we had a little engine oil in the bilge. Once this was cleaned up we melted and poured pine pitch into the gap between the keel structure and the garboard so crap could never get in there again. Something worth considering.

Exhaust System

We are all familiar with the typical configurations of exhaust systems and water mufflers. When you select an engine make sure you look at the exhaust diameter in comparison to what is in the boat. Some motors are 100% naturally aspirated and others have turbo chargers. Turbos can just be one more thing that goes wrong but they can enhance motor performance and can be checked as part of normal annual maintenance. The D2-60 is the middle engine of a three engine series built on the same block (50 hp, 60 hp & 70 hp) and delivers high torque at low RPM which never hurts in maneuvering at low speeds.

Horsepower differences in the series are due to addition of a turbo and increased fuel injection. As the hp increases so does the exhaust diameter. Turbo's are sensitive to backpressure so the exhaust system is larger and needs to be sized accordingly. We had intended to buy a D2-50 but at the last minute went up to the 60 recalling a suggestion to have a little more hp compared to what you need. That decision meant a new exhaust system. Our old exhaust would have worked fine for the D2-50.

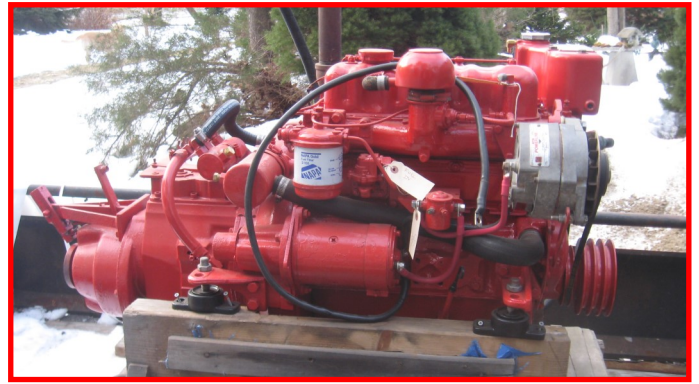
Going up 10 hp required a substantially larger diameter exhaust which meant it was time to face that small space between the deck beams and the big stern floor timbers up under the afterdeck by the transom. Crawling back there will put a frown on your day. In our case with the cockpit opened up one could crawl back in and but not reach within 18 inches of the transom. The exhaust system had to be pre-assembled and fed from the under the cockpit back to and through the transom.

We had a local machine shop fabricate the through transom fitting to which we screwed on a 90 street elbow and a pipe to hose fitting. Without too much difficulty, the exhaust hose and fitting were fed under the afterdeck and through the inside of the transom and secured from outside with a round nut. The fitting is basically a piece of threaded Al bronze pipe with an inner and outer flange. The inner flange is locked





have a deal for you.



with a set screw so its highly adjustable. Set it so the pipe goes through the transom the right distance to allow the outer flange (more like a big washer) and round nut to be adjusted flush with the end of the pipe. Done. Good idea to pay close attention to that part of the installation before the engine is in.



For a water lift muffler we used an off-the shelf system; a Vetus that has adjustable angles for the inlet and outlets. Works well, but the storage volume needs to be increased, so eventually we'll have a custom one built.

Overall I think most boat owners could do most if not all of the work to repower if their preference was to reduce costs and really understand how that motor was installed. Hope some of these musings are helpful to someone who might be looking at upgrading a motor. If a dependable older motor is of interest we