

Allen,

As I've mentioned before, I'm passing Eagle Borne on to my sons while I "graduate" to a blue water cruiser. The transition will take a few years as I am giving them fractional "shares" in the boat each year until they own all of the shares. My older son, Grady, is 24 and has an income to support his desire to own her. Spencer is 20, and will find an income after he graduates from college. Both sailed with me on Eagle Borne through the learning years and I hope they were paying attention. Their goal is to sail her down to the lower 48 as soon as possible, possibly in 2011, where they can keep a closer eye on her and use her regularly. Although they currently live in Colorado, Puget Sound is a likely destination for both their boat and their careers. Stay tuned!

I truly fell in love with my L-36 *Eagle Borne*. As a tinkerer and DIYer I found (or made up?) more new and exciting projects than a mad scientist in a chemistry store. In an effort to make her more seaworthy, safe, comfortable, and beautiful, I worked on her continuously. Projects sometimes overtook my coveted sailing time, as in the case of the engine failures and the hole in her bottom. Everything took twice as long as I initially figured, and many of the projects were twice as expensive. Nevertheless, I doggedly continued until I conquered them all. There are still some projects that I once had intended to do first that never were done at all. Priorities change. Still, I think she's undergone enough of an overhaul that the burden of continued maintenance will subside to an easier pace.

Wooden boats are a joy to own. They can be worked on by just about anyone who understands wood, which includes amateur carpenters like me. They feel like a work of art and definitely impart warmth to their owners. They can surprise, too: In 2009 after beating against a steep, 15 foot chop for about 8 hours, a seep developed in the hull under the V-berth. It made about 5 gallons per day. I expected that I'd have to pull the water tank and find the leak, but it simply swelled shut over the winter. In 2010 I inspected the hull exterior in this location, and could not see as much as a hairline crack. In her present state sitting in the harbor, she makes less than a gallon of water a week.

Here is a list of the upgrades and repairs I made on Eagle Borne since buying her in 2004. Not everything was done to master shipwright standards, but everything was done – and done with my own two hands. There are many smaller repairs and upgrades, like caulk and some minor rewiring, that did not make this list.



*The Next Generation – Spencer (L) and Grady (R) Heins*

**Hull refinishing.** I scraped and sanded from the toe rails down to the keel foot and refinished her bottom and topsides. This has been written about in my earlier posting, but summarily I prepped and faired with West System epoxy, gave her bottom two coats of Kirby red lead and three coats of West Marine Bottom Kote Gold, and I gave her topsides with three coats of Interlux Toplac. I was very proud of the transformation. She's a beautiful Largo Blue with white accent stripes and a red boot stripe. I also made a laminated wood-grain name-board for the transom.



*Hull condition in April, 2004.  
Getting started, February 2005*



*The hull refinishing project -  
stripped bare*



*Hull condition in May, 2005*



*Hull revisited, June, 2010.*



*Laminated name board, pre-curved to fit transom.*



*Finished name board.*

**Hull Repair.** During the refinishing I discovered a soft rotten spot on the port side, below the engine, near the garboard. The initial soft spot felt about football sized and shaped. I hacked and dug out all soft wood, and then cut a scarf joint with my worm-drive skill saw. The new hole was about 1'x4'. Using 1"x1-1/4" mahogany strips I laminated a dutchman with thickened West System epoxy. It looked like a laminated butcher board. The edges were hand-formed to mate with the scarf joint and sprung into place. The dutchman was proud by about 1/8" which allowed me to belt sand her fair. I laid white oak backer boards cross-grain under the engine to reinforce the attachment points. It all was screwed with silicon-bronze screws and glued with West System epoxy, then faired, sealed, and painted. I'll bet you can't see the repair from the outside.

The rot occurred under a little puddle of rainwater that developed where a limber hole had gotten plugged. Plugged limber holes have been a consistent challenge. Somewhere in Eagle Borne's history her bilge was painted white. Now these paint flakes form little dams over the limber holes. Rainwater is especially harmful in a wooden bilge due to bacterial growth and rot. See the sections on *New Dodger* and *New Winter Cover* for a brief description on keeping rainwater out.



*The original hole hacked away with a claw hammer*



*As the rot was removed the hole got bigger. Saw lines in solid wood are visible around the hole.*



*The finished hole with scarf joint all around*



*Mating dutchman with scarf joint all around*



*Dutchman sprung into place, screwed and glued.*



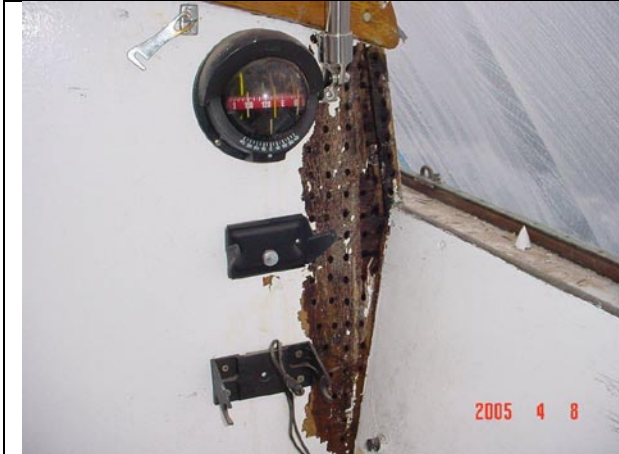
*Curvature of the dutchman when sprung.*



*The dutchman after fairing to match surroundings. These joints are nearly imperceptible under the paint. Inspection in 2010 showed no loss of integrity.*

**Deck refinishing.** Sanding and repainting the deck not only gave her a new look but improved the nonskid. The first step was to chase down several pesky leaks with Gluvit™. I added Petit non-skid sand to Interlux Briteside and coated the decks twice. The coach roof got three coats of unsanded Briteside and the companionway hatch cover got sanded and about ten coats of varnish.

Some rot was discovered on the starboard bulkhead between cockpit and cabin. This was from water working under the paint, finding a coachroof joint, and running down the joint to the bulkhead. This is rainwater – again. I perforated the bulkhead with a ¼” drill and soaked it full of Git Rot™. Then I refilled the perforations with thickened epoxy.



*Perforations for Git Rot infusion.*



*Coachroof joint that the water ran along to soak the bulkhead.*

**Cabin refinishing.** A coat of glossy white Briteside on the headliner and bulkheads made a great difference. Add to that some bright work, and she now has a nice, cared-for, salty look.



*If you mask the edges, you can spray several coats. For cleanup, just rip down the plastic wrap.*

**Clubfoot refinishing.** The clubfoot jib is delightfully self-tending but the original mahogany clubfoot was in disrepair. I disassembled all of the hardware at both ends, finding considerable corrosion on the through-bolts. I fashioned a few reinforcements, reassembled all components, and re-bolted it all. Then I sanded and varnished the pole, and filled some cracks and checks with thickened epoxy. She's a beauty now, with most of the original hardware, and she works like a charm.

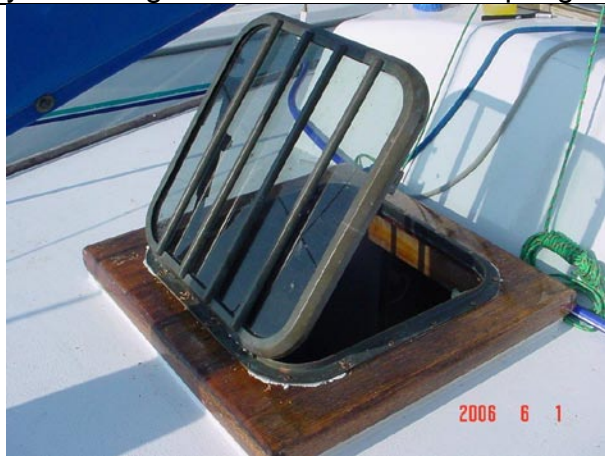


*Clubfoot hardware just prior to disassembly.*

*Iron bolts had corroded and stained the bronze fittings.*

**Foredeck Hatch upgrade.** The foredeck hatch had a laminated mahogany, lift-off cover, about two foot square. Underneath, the V-berth was dark. I cut an 18"x18" hole in the cover and fitted a classic, bronze-framed, hinged, glass deck hatch. I then hinged the original cover. The glass hatch is mounted with the hinge forward, so she can take a little spray when open. We find that in a headwind, this arrangement draws air in the companionway and exhausts it out the hatch. The wooden frame is mounted with the hinge abaft, so it scoops air.

This hatch provides an escape for the V-berth. It also allows the captain to keep an eye on things forward without interrupting the crew on watch.



*Hinge forward bronze-framed light installed in foredeck hatch.*



*The Foredeck hatch mounted with hinges aft.*

**Going aloft.** We rewired the anchor light and VHF radio antenna, painted the spar, and aligned the mainsail track. We also added a windex on a custom mount. It eventually failed. Eagles routinely perch on masts in Seward and they're too heavy.



*Eagle perched on someone's windex.*



*A jump and a wingbeat...*



*It's always risky aloft. Hang on tight.*



*View from aloft.*

**Boom repairs.** The boom had a bout of delamination-itis in about 2006-7. I cleaned and sanded the entire spar, drilled and countersunk holes for silicon bronze reinforcing screws, and injected Gorilla Glue into the cracks formed by the delamination. After clamping the spar, the screws were driven home. The countersunk holes were then plugged, faired, and the whole thing painted with multiple coats of Brightside. I had to do this on two successive years for a total of about 15-20 feet of delamination in several different joints.

I often use my camera to document the area I'm working in and existing conditions such as wiring configuration or physical dimensions. There are times, though, that I finish a project and cast off, eager to get sailing again. Alas, in one of those times, I forgot to take photos of the boom repairs.

**New Mainsheet Traveler.** I replaced the original mainsheet traveler with a new SS model by Garhauer. The new traveler has 4:1 ball-bearing blocks with lines for positioning the ball-bearing-wheeled car (port – starboard) with a separate main sheet for hauling in – or out the mainsail. The old traveler had a simple bronze car on a mating slide. Friction prevented repositioning under load. The new traveler can be repositioned under load, and its travel is about 50% more than before.



*New Garhauer mainsheet traveler. You can also see the edge of the prototype cockpit cover.*

**Port Light rebedding.** All of the port lights were leaking. We removed each one, cleaned the mating surfaces, formed a gasket of 1/8” resilient foam weather-stripping on the cabin side, ran a bead of caulk on the weather side of the glass, and reassembled them using square drive, silicon bronze screws. Each port light has about 25 screws, and there are eight lights. (Eagle Borne doesn’t have the two forward-facing “eyeballs” on the coachroof). In order to get good purchase with new screws in old holes, we stuffed each hole with toothpicks and then injected a bit of Gorilla Glue. We left the screws lightly snug until the caulk had cured, and then drove them home about one more full turn. Not one has leaked since.



*Spencer’s friend cleaning the portlight frame with a chisel.*



*Spencer’s friend installing cleaned and prepped portlight*

**New Canvas.** Spencer and I ripped her mainsail on the last day of the first season. Since all of the sails onboard appeared to be the same vintage (1968) from Sausalito, I

guess it was inevitable. I had our local sailmaker, Mike Leech at Marine Fabric Crafters build a new main with two reefs out of 8oz Dacron. Her foot came up a couple inches short (who did the measuring?!?!?) so I spent quite a while finding a long shackle to fit the gooseneck and a comparable arrangement where the outhaul attaches to the clew. Thanks to a second-hand shop in Port Townsend all is fine. We have 5 headsails, four of which hank on to the forestay. The fifth is an inner staysail which has its own padeye and 3/4-rigged halyard.



*Old mainsail before Spencer and I drove her too hard.*



*New mainsail with L 36 insignia. New main sail can drive Eagle Borne hard upwind.*

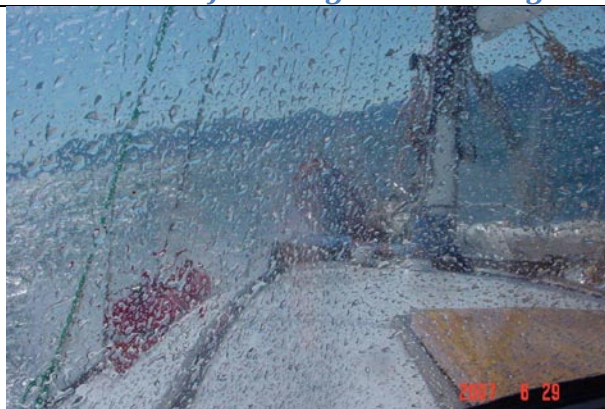
**New Dodger.** In Alaska I can't imagine sailing without some protection from the weather. I had Marine Fabric Crafters design and build a dodger which we love. I added a yoke to bridge over the companionway hatch track to which the dodger attaches. The trailing edge of the dodger is also the attachment point for a reinforced visqueen cockpit cover. This provides a "greenhouse" in which to enjoy morning coffee, a rain cover for the helm when motoring, and protection from wet and rot in the cockpit. It rolls up in a minute on nice days and stows easily in a small package when sailing. I was planning to have a proper one made of more durable materials, but I guess that can be Grady's and Spencer's project someday.



*A custom yoke formed a bridge over the hatch for dodger mounting.*



*New dodger. Capt'n Walt at the helm on a sunny day.*



*Protection in foul weather.*



*Windbreak in fair weather.*

**New Winter cover.** In Seward, Alaska, the winter can bring heavy snows, hard rains, deep freezes, and hurricane winds. I again enlisted Marine Fabric Crafters to make a full-length cover. It uses the boom and clubfoot as ridgepoles and hangs over the toe rails with zip-off sandbags and nylon tie-downs. It has a zipper door abaft the cockpit. The winter cover protects the entire vessel from wet and rot.

Since previous tarps that I had used gave the cabin a cave-like feel in winter, I asked Mike to sew in a couple windows. I often stay overnight when I go to Seward to check on Eagle Borne, and at least with the windows I can tell if it is day or night.



*Winter cover made to protect through an Alaskan winter.*



*Rear zipper entry.*



*Typical tie-down and reinforced hole for stanchion.*



*Cover had windows aligned with port lights so the cabin wouldn't seem like a cave.*

**New Composting Head.** I replaced the marine head with an AirHead™ in about 2006. The old head did not have a holding tank and the necessary carpentry and plumbing to install one seemed an overly large and complex project. The Airhead has no water or discharge connections, so I was able to permanently close two thru-hulls below the water line. It's a wonderful addition, which works year round and requires no winterizing. It has a small 12 volt ventilating fan (about the size of the cooling fan on a PC computer) that draws a fraction of an amp. It sucks air from the bilge, through the composting bin, and blows it out a deck fitting. I let it run 24/7/365. The battery bank is virtually unaffected by this tiny load.

I'm impressed how well this head works. There is no odor unless it gets overloaded. For a couple, a week's cruise is easily accommodated. Given a few weeks' time between cruises, the composting bin will dry out and be ready for use without emptying.

For weekending, the intervening week is enough time for the bin to dry. I once went over a year without emptying the bin.



*Composting AirHead.  
In Alaska's cool weather I  
sometimes leave a 40 watt light on  
the bin to accelerate the compost  
action.*

**New Battery Bank.** Beneath the forward saloon seat, I added two, six-volt golf-cart batteries in series for the house bank giving us 200 amp-hours. I also carry a 12 volt starting battery and one spare 12 volt battery. I added a master selector switch which allows either bank or both banks to discharge or charge. I also added a Deltran™ smart trickle charger for each bank. These 2 amp chargers (about the size of a deck of cards) are potted (waterproof), solid-state devices safe for the marine environment and automatically switch between three charging stages: constant voltage (14.2v), constant amperage, and intermittent maintenance. I can keep them plugged in all winter without overheating or drying the batteries out.



*Dual 6 volt batteries in series.*



*Smart Battery Charger.*

**New High Output Alternator.** When the original alternator failed, I replaced it with a 135 amp Balmar model. Although it was slightly larger diameter than the OEM alternator, it fit on the OEM brackets. Additional modifications were needed once we added the fresh water cooling kit



*High output alternator on the new engine. The alternator just barely fit over the fresh water pump belt and required a custom belt tensioner.*

**New Saloon Lighting.** I added three Sailor Solutions reading lamps with their dimmable LED Sensibulb™ in the saloon and one four-foot LED bar light over the galley. These provide better light than before and hardly draw down the batteries at all.

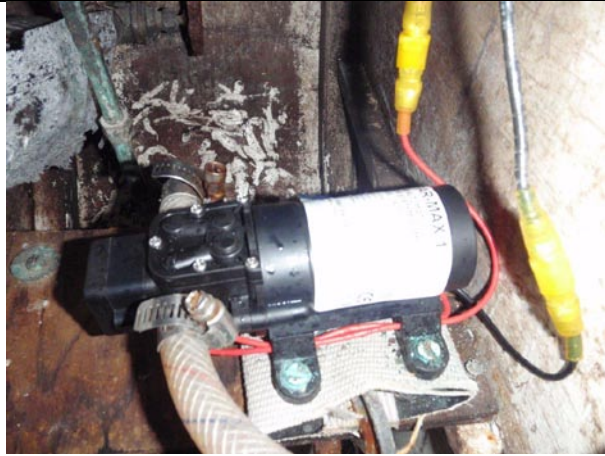


*LED light can be aimed and is dimmable.*

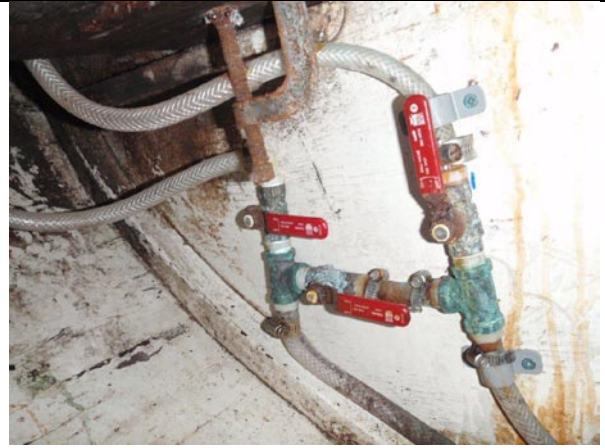


*One of three LED saloon lights*

**New Galley Pump and Sea Water Bypass Valves.** I replaced the old 12 volt galley water pump with a new Jabsco pressure activated galley pump and rewired its main power switch. It is quieter and more reliable. By adding a few valves and a bypass between the seawater intake and the freshwater tank I can select whether I want the pump to pump sea or fresh water. This is useful while cruising to conserve water. The hand pump over the galley requires “work”, so we connect it to the precious fresh water. The electric pump is “easy” so we connect it to the free seawater. In the harbor, where we have unlimited supply of fresh water, we switch the electric pump to the fresh for ease and convenience.



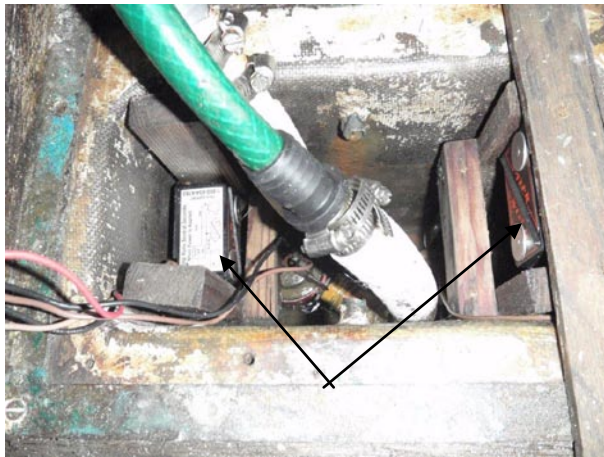
*Galley water pump on flexible mounts*



*Fresh / Salt water bypass valves.*

**New Bilge Pumps.** I built a frame to mount two, 2000 GPH Johnson bilge pumps in the bottom of the keel well. At the top of the frame, I installed two Water Witch™ electronic switches about 4 inches apart in elevation. These switches have an off-delay that allows the pump to run until the keel well is pumped down to the bottom. This means that water never rises above the keel well. When the pump does run, water drops about 12 inches. The pump is sucking air on the bottom of the well before it shuts off.

The frame is held down in the well with a retainer, but can be lifted out in one piece for inspection and service. The duplex arrangement allows one pump to serve as back-up in case of failure of the primary, or in case of overload of the primary. The two outlet hoses wye together with a vacuum breaker and discharge overboard.



*Dual bilge pumps in the keel well with dual Water Witch switches mounted about 4" apart vertically to give primary/backup operation.*



*The old float switch allowed about an inch of water to stay in the bilge. It would switch off after water receded about ½ inch.*

**New Ground Tackle and Electric Windlass.** After losing my anchor to Neptune, I decided to upgrade my whole ground tackle system. In our deep south central Alaskan waters, we routinely anchor in ten to twenty fathoms with little room to swing towards shore. Anchor scope of 4:1 is a downright luxury, and we sometimes have to settle for 2:1. The safe solution is to use heavy gear and long chain. I went with a 35 pound Delta anchor, 150 feet of 5/16" proof chain, and 600 feet of 5/8 nylon braid. The weight of this tackle was too much for me, so I added a Lewmar V2 electric windlass. The windlass mounts on a new, 3-inch thick, laminated, white oak "apron" over the foredeck at the stem. A Garhauer anchor roller sits on this apron and extends beyond the stem about 6 inches. Due to the thick, tough oak, this was some of the most difficult carpentry I've done on Eagle Borne, but she looks salty and is very sturdy.

Using 000 copper conductors, I strung the power from a bulkhead mounted 100-amp breaker under the aft saloon seat to the windlass motor in the chain locker. This cable is heavy and stiff. We routed it under the port saloon seat, under the lavatory, and under the V-berth to port of the water tank. Each bulkhead required a 3" diameter hole for the two conductors. In retrospect, I would use locomotive cable next time. Its fine copper strands are much more flexible than the standard cable and installation would

have been easier. I cored two holes in the deck and installed foot switches adjacent to the windlass. We now are more likely to anchor in safer, deeper waters without concern for retrieving our ground tackle.



*White oak apron with windlass hardware. In these photos, the anchor has been led back to the foredeck for the winter and multiple winter dock lines criss-cross the apron. In the sailing season the 35# Delta anchor rests in the Garhauer bow roller.*

**New Galley Stove and Oven.** The original Shipmate kerosene range with Primus burners was wonderful on a good day and horrible on a bad one. Unfortunately, I never got the knack of it so we had many smoky, polluted, bad days. I ditched the unit and its pressure fuel tank in favor of a Wallas *SafeFlame*<sup>™</sup> combination diesel oven and stove. This marine unit has sealed combustion, computerized ignition, and fan-powered exhaust. I mounted the stove on custom-made gimbals in the position of the original stove. There is no exposed flame anywhere, thus the name. The burner creates a hot plate on the top. Over the top is a stainless steel lid with a mercury-switched blower. Whenever the top is down, it blows air over the hot top and into the cabin. Did I say I was also able to remove a bulkhead-mounted Primus cabin heater? The Wallas unit could not heat the cabin one winter day (10 degrees F) in the harbor but it is fine in 40 degree weather.

I supply fuel to the stove from a simple dip-tube in the sight glass. The dip tube stops 5 gallons from the bottom, so we can't run the tank dry with cooking or cabin heating. We have started the unit and let it run continuously for several days. In Alaska, it's nice to have a little dry heat in the cabin all the time, and we like this little gem. It is not very power hungry, using only a little diaphragm pump to deliver the 1/10 GPH, a 0.2 amp fan for the exhaust. The fan-lid uses about 0.4 amps. The igniter uses 8 amps and runs for about 8 minutes.

The exhaust is plumbed through 2" diameter, flexible, stainless steel exhaust piping that I got from an auto supply store. The exhaust terminates at a specially made tailpipe in the transom. This is about 15 feet of pipe for each exhaust (stove and oven), but by using the 2" size there is no restriction to exhaust flow and the unit runs perfectly. I have insulated the exhaust pipe with a removable blanket, and I drain the low points.

I had a little trouble with condensation in the exhaust pipes which initially blocked the exhaust and extinguished the burner. I found that a tiny drain hose with a p-trap fitted to a low point in the exhaust pipe would allow the condensation to drip into the bilge where it is pumped out with other water. The condensation rate is miniscule. It never accumulates now, and the burners can run smoothly for days on end.



*Galley Range with stovetop cover "down" for cabin heating.*



*Galley Range with stovetop cover "up" for cooking*



*Galley Range with burner controls.*



*Galley Range with oven door open.*



*Galley range exhaust pipes led aft under the starboard quarterberth.*



*Galley range exhaust pipes terminate on transom. Burner fumes are removed from the cabin.*

**Repower the Auxiliary.** Her old Volvo MD11C was smoking and coughing when I bought her, so I had it rebuilt for about \$5000 and put it back in myself. I lined the engine compartment with a Sailor Solutions Soundproofing tiles. The rebuilt engine ran well and served all purposes. She would cruise at 6 kts with a 15Lx11 prop while sipping .3/4 GPH of diesel.

However, the raw water cooled engine developed a cooling blockage which allowed one cylinder to overheat. The engine would slowly grind to a halt after running fine for a while. All suggestions pointed to fuel train and a clog or failed pump, so the correct diagnosis came slow. By then the second cylinder must have gotten scored and she ran rough. I'm a DIY boat owner, so I looked around for a simple option to repower once again. A brand new engine would have been the most reliable, and I found that a Beta would fit in nicely, but I did not want the additional work of reconfiguring the motor mounts, drive shaft, fuel, throttle, shifter, and electrical harnesses. I found a rebuilt Volvo MD11C for about \$5000 which had been upgraded to fresh water cooling with the Volvo heat exchanger kit, and I installed it in 2010. The only modification needed was some carpentry on the companionway stairs to make a little room for the heat exchanger and fresh water pump. We are optimistic that this will last us a whole generation.

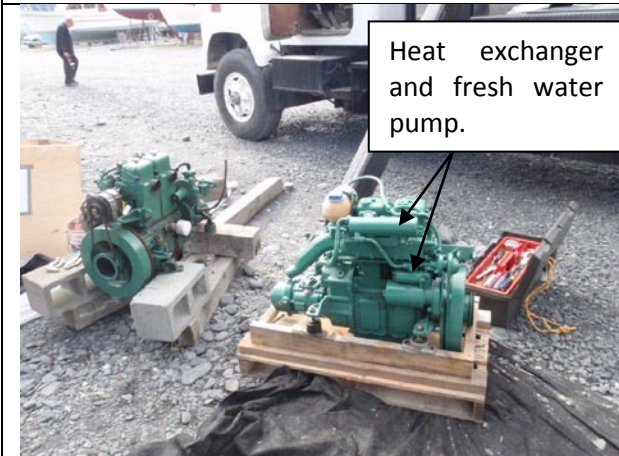
I have a word of caution about Internet vendors. I found this engine by posting a want ad in BoatDiesel.com. This is a very good website that I recommend. The seller was a marine diesel mechanic from Bayfield, Wisconsin, named Schooner Bay Imported Motors. I think they sent me a well-reconditioned motor. However, they were months late with delivery and then reneged on refunding \$600 for returning my old engine core as promised. They also sent the reconditioned engine without the alternator mounting bracket. This is a Volvo part needed for the fresh water cooling kit. As a result, I had to customize the original mounting bracket, the drive belt tensioner, and the drive sheave mounting bolts on the flywheel. Once Alfred from Schooner Bay had my money, his interest in servicing what he sold me was definitely "long-distance". Anyone who does business on the Internet should retain some means of recourse for cases like mine.



*Old engine rigged for lifting*



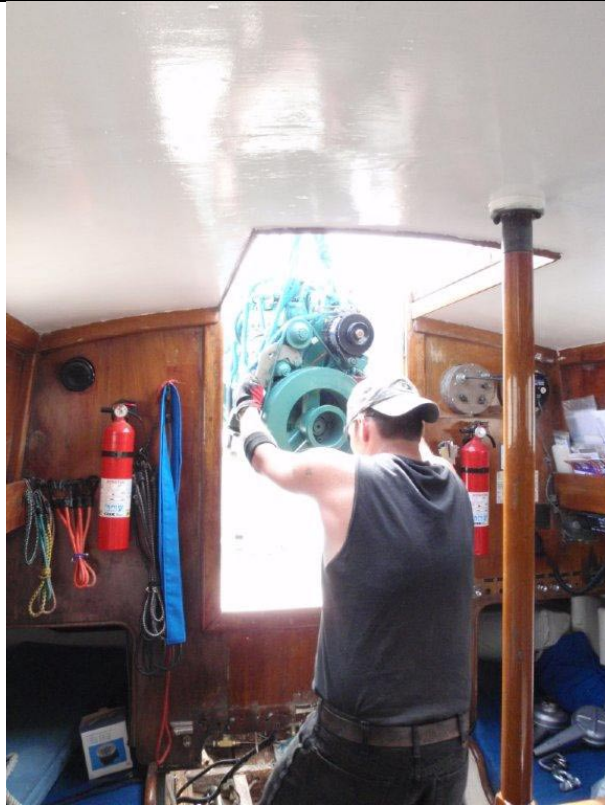
*Out with the old...*



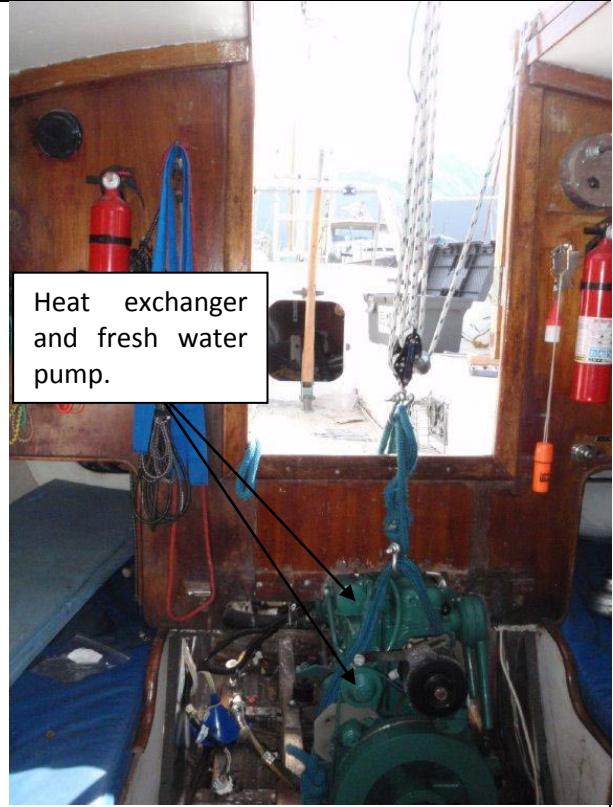
*The old engine on the left, new engine on right.*



*Lift her on up here...*



*Come on in, little baby... all 500 pounds of you.*



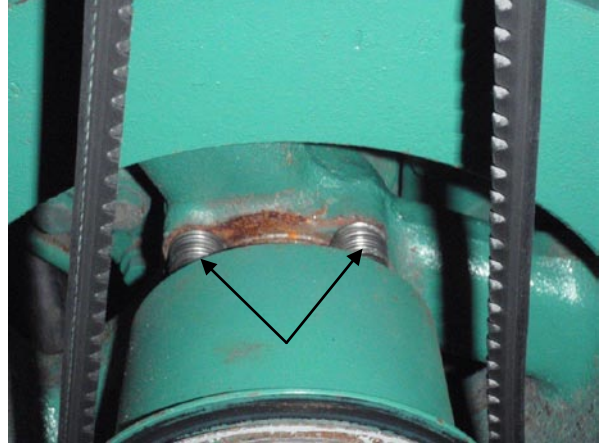
*New engine in place*



*Positioning the engine took delicate handling and some muscle.  
The route goes like this:  
1) forward into the companionway,  
2) down into the cabin, and  
3) back onto her motor mounts with only one inch to spare.*

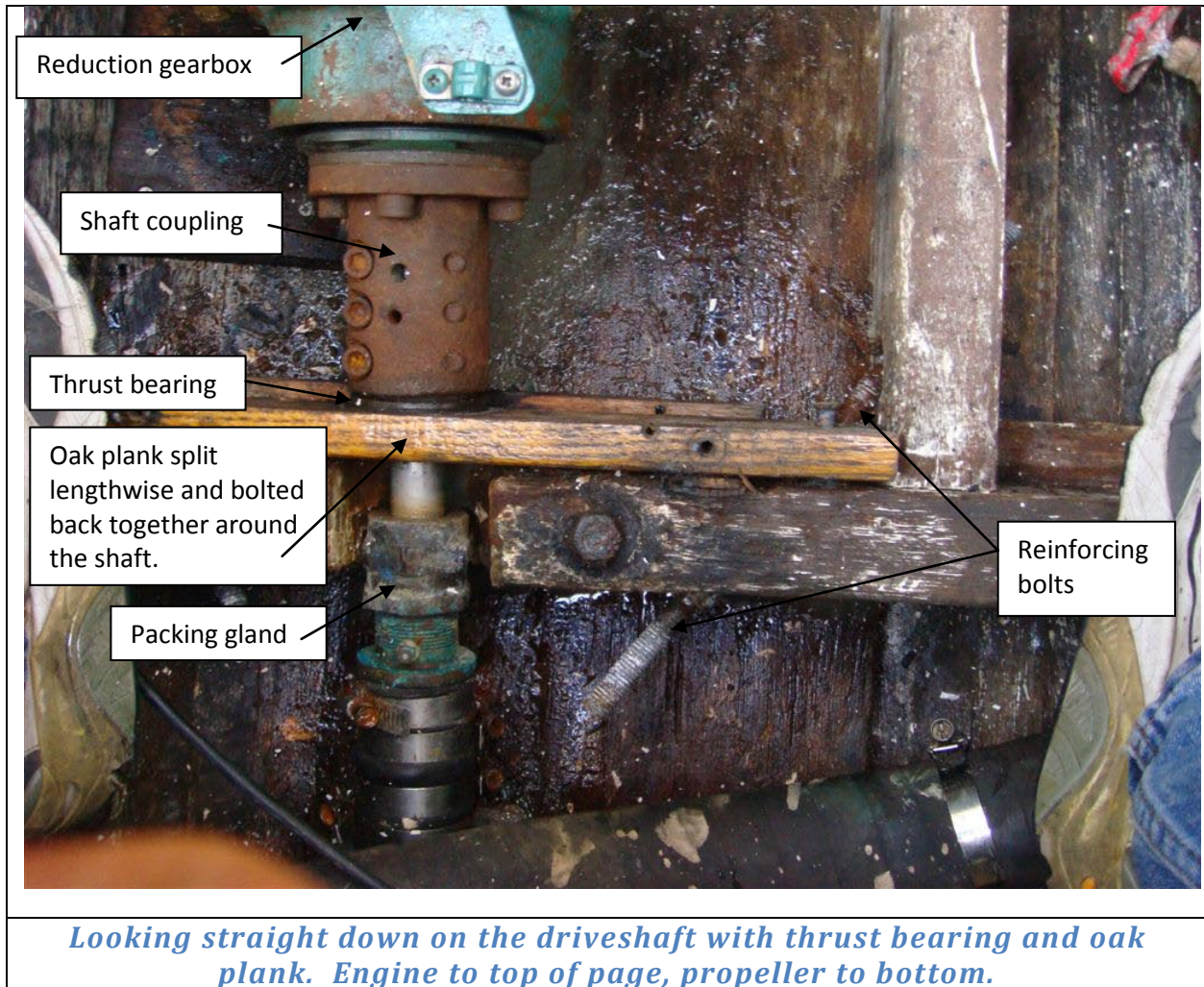


*Water pump belt runs under the alternator. A custom mounting bracket was required to tension the alternator belt.*



*Extended mounting bolts and spacers (washers) were needed to extend the alternator belt drive sheave out in alignment with the alternator.*

**Drive Train Reduction Gear repair.** We had a real problem with the Volvo reduction gearbox. There is a spline gear in the mechanism that can pull apart in reverse. Volvo has designed a small casting which acts as a keeper to hold the spline together. On our unit, the casting broke and the spline pulled part. At sea. Without another good option before us, we disassembled the gearbox and diagnosed the problem. All we had to do was keep the drive shaft from pulling backwards in reverse. Using some spare oak lumber, we made a block behind the shaft coupling (a heavy 3" diameter casting) on which the coupling would catch if the shaft moved 1/8" abaft. In reverse the wood would smoke, so we only ran reverse in short bursts and kept the fire extinguisher handy. In forward, they didn't even touch. Later, I made a thrust bearing between the coupling and the block by alternating six layers of 2-1/2" bronze washers and greased leather. This ran much cooler, but the whole repair was abandoned with the 2010 rebuilt engine.



**New Fuel train and filters.** After repowering the first time, I added a two-stage parallel fuel filter bank. Fuel can now enter either of a pair of 10 micron, Racor filter/water separators. These are selectable in parallel and the elements can be changed with the engine running. Fuel then passes to a single 2 micron Racor filter/seperator before passing to the Volvo internal 2 micron filter. All of the new (Racor) filters have valved bypasses. The new Sailor's Solutions VGO1 vacuum gauge with drag pointer on the fuel bank indicates only about two inches Hg. restriction on the 10 micron bank, while Eagle Borne's original fuel vacuum gauge still registers less than three in. Hg restriction for the entire bank. The engine runs fine with these restrictions.

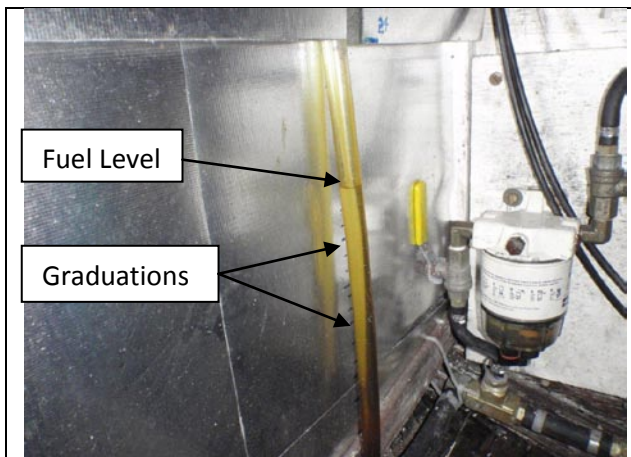
The filter bank was shop-mounted on a sheet of plywood. I then mounted the panel on the aft bulkhead of the engine compartment. On the fuel line there is a tee before any of the filters. This connects to a graduated sight glass which indicates the main fuel tank level. There is also a low-point drain. We have a 24 gallon galvanized iron tank.

I would do this entire system a little differently next time. First, if I were to build it from scratch I would buy smaller bronze cocks and angle valves which would reduce its size considerably. Second, I would consider a commercially made dual-filter product with bypasses and gauges built in. These are very compact and can be gotten with options such as an auxiliary fuel pump for about \$1000. I spent nearly that much for the filters,

valves, and brass fittings. Third, I would use reinforced black fuel hose exclusively. I used two types of fuel hose. The reinforced black hose is standard fuel line rated for this service. The clear hose is also fuel-rated and was meant to give a visual indication of sediment. Aside from the sight glass, I don't look at the fuel through the hose. The Racor filters have a polycarbonate bowl that provides a visual indication of sediment accumulation. Despite these lessons learned, my filter bank is exceptional and works exactly as I planned.



*Duplex two-stage filter bank with bypasses. Filters were assembled on a mounting board in the shop. Arrows show fuel flow direction.*



Fuel Level

Graduations

*Dip tube showing fuel level.  
Graduations are barely visible in  
this view.*



*Filter bank mounted on the engine  
compartment aft bulkhead.*