

Engine essentials

BY JEFF MERRILL

Editor's note: In the October 2013 issue, Jeff Merrill described some vessel-wide ways to "dial in" your power voyaging boat. Here he focuses on optimizing your engine systems.

Familiarity with the heart of your power voyaging boat, your engine, is the best way to enjoy cruising with confidence. Spending thousands of offshore miles training with clients has

terms, require three things — air, cooling, and fuel.

Air: Do you know how your engine room ventilation works to support your engine? Understanding when to change the air filter on your engine and making sure all fans and blowers are operational is the best way to keep the temperature properly regulated and to feed oxygen to your engines.

Cooling: Cooling your engines typically involves four items to monitor: the intake through hull, intake strainer, impeller and water lift muffler. Make sure your seacock is open (you will need to close it to clean out your strainer). Before start up, clean out any marine growth — bring down a bucket and scrub

brush — and when you are putting things back rinse off the strainer with fresh water or use a product like Boeshield T-9 to reduce salt buildup and green crud. Impellers have a limited life, you should date the cover when you replace it and have a spare on board as well as a puller tool. Have a long stiff wire (coat hanger) to ream out the hoses and reclaim the fragments. Your water lift muffler should have a drain

port or screw — which needs to be used to empty the muffler if your start up cranking does not get your engine to turn over. Adding a valve and hose to direct this sooty water into a waste container makes this a less messy chore.

Fuel: Study your fuel system — tanks, manifolds and valves are all connected to provide proper fuel management. You need to know which valves do what and you'll make things much simpler if you have taken the time to label every valve in your system. Most trawler manufacturers do a good job of identifying supply and return valves, but it can get confusing on some of the fuel manifolds where you have both "to" and "from" valves on the same manifold. Remember, you need to "follow the fuel" and make sure that your diesel fuel has a clear path from the tank, through the fuel filters, into the engine and returning back to the tank. A laminated fuel system diagram, displayed in the engine room is fantastic for quick reference.

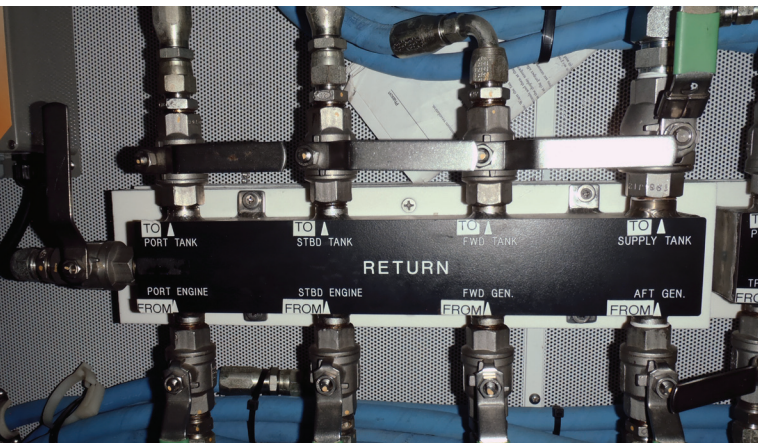
Labeling valves with "to" and "from" is easy. You can make it easier to keep track of things with a roll of blue tape and a permanent marker, (or even better a label maker). I

Labeling the "to" and "from" fuel lines on a fuel manifold can reduce engine room confusion.

helped me outline some key points to focus on so that each owner can "dial-in" the essentials of their engines.

Whether you have a single or twin engines, dry or wet exhaust, are running a fast vessel or a slow trawler, there are some common ingredients that all operators should be aware of while underway.

Diesel engines are incredibly reliable and, in simplest



JeffMerrill

also like to wire tie or Velcro strap those valves that are normally not moved — like the return fuel line from the main engine. If you have Racor Duplex filters you will run on one with the other in reserve, secure the handle so it does not get bumped or incorrectly switched.

Fuel filters should be dated and changed at the manufacturers recommended intervals. Remember you have primary filters (Racors) and secondary filters (on the engine) to look after. The first time you change out any fuel filters be sure to practice at the dock on a calm day and be ready with a bucket and a roll of paper towels and you will quickly figure out

how to do this better the next time.

Operator error (I've done it) may find that you starve an engine of fuel — it's heart stopping when you run it out to a sputtering finale. Closing the wrong valve — like the fuel supply line to the main engine (harder to make this mistake if it is labeled) happens more often than it should. Now what? You need to understand the procedure to bleed your engine and purge the air. There is usually a bleed screw on the top of the fuel filter and a pump lever or plunger to pump fuel manually. Find out where these are and how they work. I like to paint the bleed screw and pump lever with red nail polish so that they stand

out and I can find them quickly.

This is another good item to practice in the comfort of your slip, tied up and secure. Run your engine dry and then re-establish the fuel flow. You will be much more comfortable knowing you have this skill mastered and understand the drill than trying to figure it out on the fly in a rolling sea. (Note: high-pressure common rail engines often come with a special adapter coupling and hose, check with your manufacturer).

I strongly recommend you read a good diesel engine book and keep it in your ship's library as well as taking a diesel mechanics class.

After air, cooling, and fuel, you



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should be primarily concerned with the fluids and moving parts to look after so let's take a brief review:

Coolant: Most engine manufacturers have a recommended type of

coolant to use, many involve glycol products (older diesels use distilled water solutions). Keep some of the correct mix on board as well as a funnel to add coolant. The expan-

sion tank cap is a pressure screw lid that you can open to inspect the coolant level. Some boats have a separate overflow header tank with "add coolant" levels. The Old Salts will open the cap and dip their finger in...you can do this by dunking a wooden T-fitting.

Oil: Lube oil is very important to change at the manufacturers required intervals and you should also use the weight and viscosity they prefer. Built-in oil change systems are pretty common on larger trawlers because this is a project that is carried out every couple hundred hours. Carry spare oil and an empty drum to hold the waste oil. Your engine oil dipstick is a simple built-in quantity reference, but I have found on some builds that the engine installation angle does not allow for an accurate reading (they are bench tested on a flat surface). Next time you have to replace your oil first evacuate the pan, and then carefully pour in the correctly measured amount. Once things settle, take a dipstick reading and using a scribe make a hash mark on your dipstick. This is now the "cool" oil level setting. Once you are underway and warmed up you can also repeat this procedure and inscribe a "hot" oil level setting.

Sight glasses: You may have one or more means of checking your diesel (fuel oil) levels. Sight glasses on the tanks are the most accurate, but there are sounding rods and analog gauges that also work.

Electrical: Your main engine starting battery should be automatically recharged from your alternator. Your alternator belts need to

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be looked after (keep spares and the necessary tools in case one snaps and look for chafe powder indicating the belt is running out of life). Slipping on a new belt can require removing a guard and adjusting the swing mount — practice at the dock.

Pencil zincs: Are fitted in seawater cooled engines. Know where they are, what size spares you need and when to change them out. I like to paint the heads with nail polish and then date them so I know their service intervals.

Exhaust runs: Make sure you have good clean runs with strong hoses and clamps.

Chafe guards: Look at all of your hoses and install chafe guards for protection.

Engine mounts: Should be torqued to the correct load value and then marked with a permanent marker so that you can tell at a glance if they are loosening up.

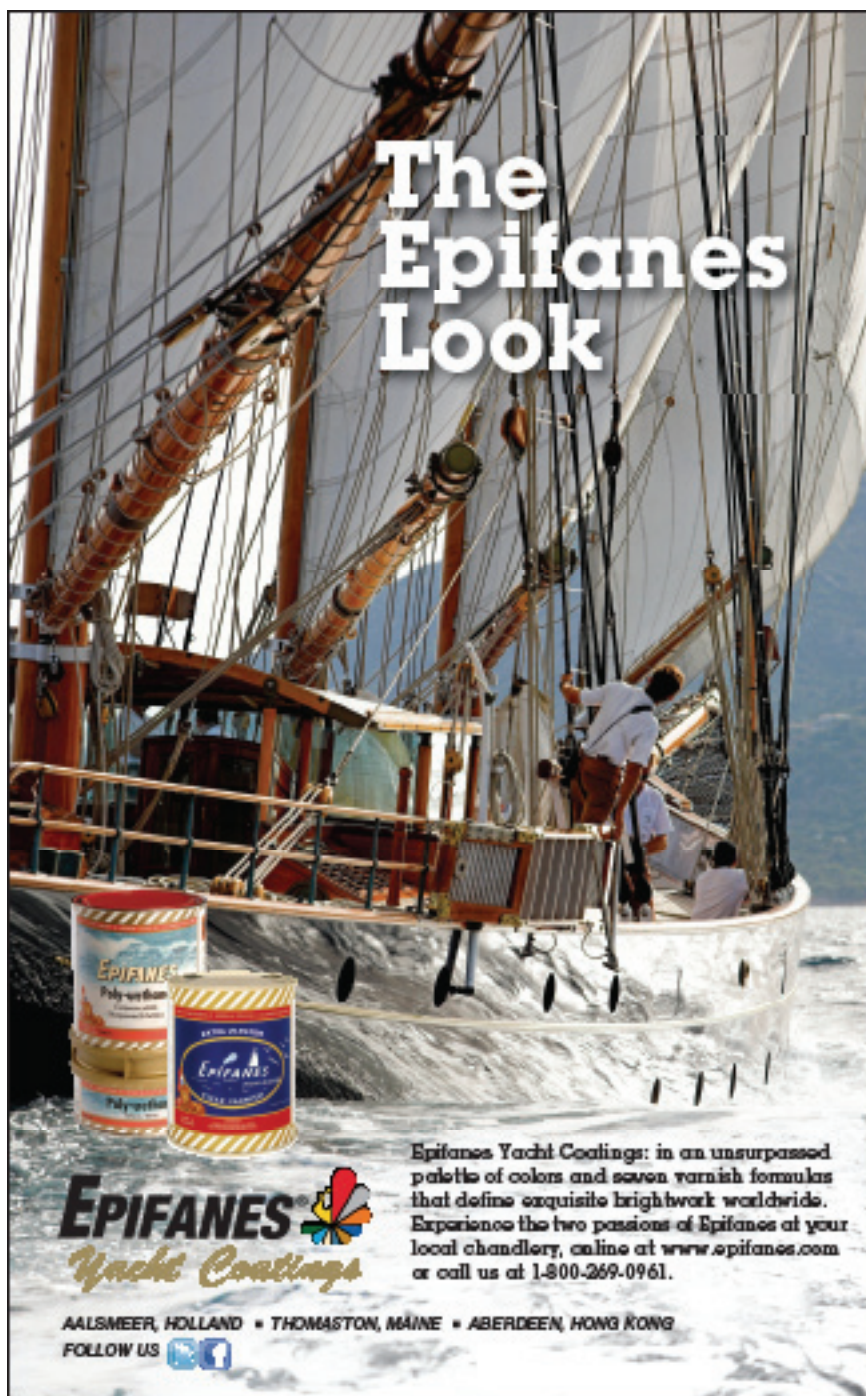
Transmission: The gearbox also has its own oil to monitor (you can do the dipstick hash marks described above) and you want to check the transmission after you are warmed up and underway.

Stuffing box: Your engine is mated to your transmission and turning your propeller shaft. The friction creates heat and you need to keep the stuffing box cool. I like to see a wrench caddy mounted near the box for adjustment and have spare flax packing and a packing puller.

Your diesel engine is a forgiving piece of machinery, but it does take some care and feeding. The details listed above should help keep you running smoothly. ■

Jeff Merrill, CPYB, is a veteran yacht broker specializing in Nordhavns and other fine ocean trawlers. He is a public speaker and writer and enjoys spending time

at sea with clients. He's constantly looking for new ideas to improve and simplify the trawler lifestyle. To make a suggestion e-mail him at: trawlerspecialist@gmail.com.



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