

Getting a Fresh Start

Don Casey describes the steps he takes when commissioning his diesel for the sailing season

» Newton's first law of motion states that an object at rest tends to remain at rest. My corollary to this received wisdom holds that the longer something is at rest, the more obstinate it is about wanting to stay that way. This observation won't get me knighted, but it has served me well when trying to reawaken my diesel auxiliary at the start of the sailing season.

Many sailors like the three-finger strategy; you cross two fingers and punch the engine's starter button with the third. The problem with this method is that even if it works, you run the risk of stressing your engine. That's why I always like to coax a slumbering engine into motion, rather than suddenly wrenching it into action.

The first thing I do is remove the foam plug I pushed into the exhaust outlet when the boat was decommissioned; the plug keeps vermin from entering the boat via the exhaust and also keeps damp air from reaching the cylinders (Photo 1). I also check the fuel-tank vent and the raw-water inlet to be sure wasps or other critters have not set up housekeeping. When decommissioning

I protect these orifices by closing the raw-water seacock and wrapping a couple of turns of plastic tape around the tank-vent fitting to close the opening. To keep pressure from building up in the tank, I pierce the plastic tape with a pin.

INSPECT FIRST

Next I open all the access panels into my engine compartment, which is painted white, and turn on two permanently installed fluorescent lights. I dust off the engine, which I also wiped clean when I put it to sleep in the fall. I carry a box of clean rags and a bright light to help me spot things that might become problems; chafed hoses, loose wires, leaking fluids, and belt dust are all things to watch out for. A clean environment makes new problems more visible and avoids the seeming aversion to maintenance suggested by a grimy engine. If I've stored the boat in a cold climate during the off-season, I look for rust, which could signal a distorted freeze plug or even a cracked casting.

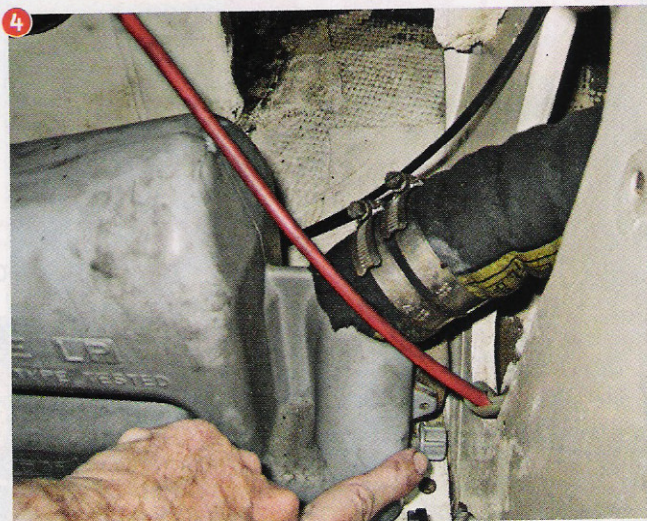
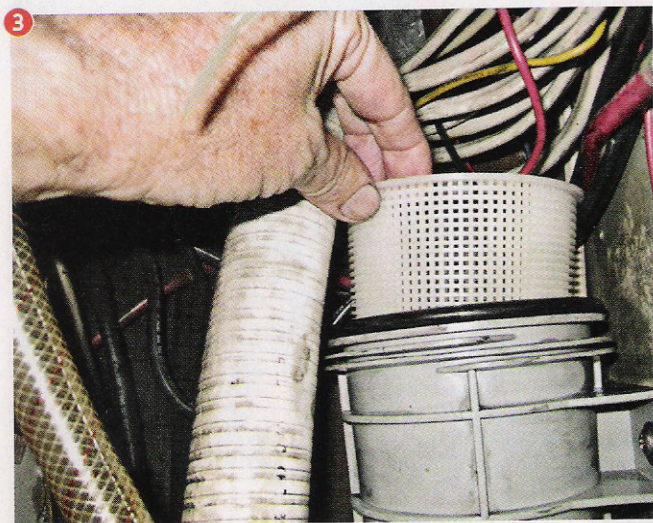
Then I unsnap the air-cleaner cover

1. Remember to remove whatever you used to plug the exhaust outlet
2. Start the season with a clean air filter

and replace the filter element (Photo 2). I also open the lid on the raw-water filter and extract the basket to make sure it is as squeaky clean as it was when I hauled. Putting fresh petroleum jelly on the seal ensures that the lid won't leak air when water begins flowing through the filter (Photo 3).

I move on to the raw-water seacock, exercise it a bit, and leave it open. On my boat I leave the raw-water pump loosely attached because I remove the impeller at haulout to keep it from taking a permanent set in the intervening months. I remove the cover and reinstall the old impeller. If I see that the impeller is less than perfect, I usually fit a new one. I lubricate the O-ring seal and close and tighten the cover. I also smear a little Teflon or silicone grease on the both sides of the impeller and on the vane tips before I install it so it can spin dry without getting hurt until the raw-water circuit takes a prime.

Next I squirm into the aft quarterberth and check my water-lift muffler. The muffler has a drain cock I leave open in the off-season to reduce humidity in the air passing into the engine via the exhaust manifold. Now it needs to be closed (Photo 4). A de-



tailed checklist I made when decommissioning the boat helps me remember all these details. Had I been in the northern part of the country instead of Florida or the Caribbean, I would also have noted on my checklist that all the engine drain cocks needed to be closed. I bring a wrench with me so I can check the tightness of the rear engine mounts before I back out of the quarterberth. When I've wriggled clear, I also put the wrench on the

bolts securing the front engine mounts.

Checking belt tension is the next item. Applying firm pressure with the thumb in the middle of a belt's longest span should deflect the belt about 1/2 inch. I also test belt tightness by rotating the alternator pulley. I put a wrench on the pulley's center bolt and turn it; if that fails to turn the engine pulley, I know the belt needs to be tightened.

3. Clean the raw-water strainer

4. If you drained your muffler, be sure the draincock is closed

» NINE TIPS FOR GOOD ENGINE PERFORMANCE

- » **HEALTHY BATTERY** The faster a diesel turns, the more dependably it will start.
- » **CLEAN FUEL** I pump every ounce of diesel fuel through a water-separating filter before it gets to the tank. That, along with triple filtration and fuel sampling each year, has kept my engine free from fuel-related problems for nearly 10 years.
- » **LOTS OF AIR** A diesel engine ingests around nine dump-truck loads of air for every gallon of fuel it consumes. Anything that restricts air intake will degrade performance, so you need to have a clean air filter and plenty of ventilation into the engine compartment.
- » **UNRESTRICTED EXHAUST** The engine must be able to exhale freely, and the injection elbow on the exhaust can be subject to carbon blockage. If you start to see black exhaust at high throttle settings, look here first.
- » **CLEAN BOTTOM** An overloaded engine will produce black exhaust smoke, and nothing makes an engine work harder than having to push a boat with a foul bottom.
- » **CORRECT PROP** A propeller with the wrong diameter or an incorrect pitch will hinder good engine performance. Over time, an incorrectly sized prop may actually harm an engine.
- » **HEALTHY INJECTORS** For a diesel to perform to capacity, the injectors must spray the right amount of fuel in just the right pattern at exactly the right time. This is a tall order for injector nozzles that are being hammered by combustion 3,000 times a minute. That is why you must service your injectors at the intervals recommended by the manufacturer. Do it sooner if you suspect a problem.
- » **FUNCTIONING THERMOSTAT** Diesels require hot operating temperatures for complete combustion. Never remove the thermostat except temporarily in an overheating emergency.
- » **FRESH OIL** A diesel might not perform better with fresh oil, but it will perform well for a longer period of time.

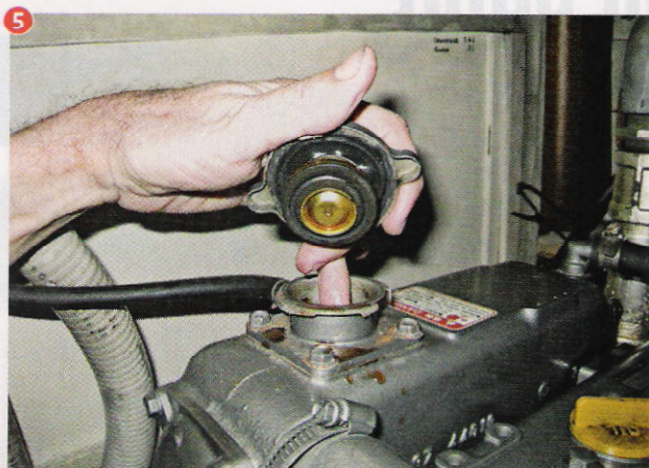
OIL CHANGE

I changed fluids when I hauled the boat to reduce the chance that acids and other contaminants would damage the idle engine. I check the dipstick, and, if the oil is still clean, I run the engine for a few hours and then change the oil again. This way I start the season with oil I know is absolutely clean.

I changed the transmission oil when I hauled out, so all I need to do now is pull the transmission dipstick to confirm the fill level. Because there are no combustion by-products in transmission oil, assuming the transmission is lubricated separately, the transmission oil won't need be changed until I've reached the engine hours noted in the manual.

My engine doesn't have a separate oil reservoir (some engines do). Because oil can become contaminated by fuel leaking past the pump pistons, I change it at least annually; my checklist confirms that I made the change at haulout. Now I simply check the oil level and top it up if necessary.

Antifreeze not only keeps an engine from being damaged by freezing temperatures, it also prevents corrosion. But the corrosion inhibitors do wear out, I'd rather buy fresh coolant (\$10) than a new engine (\$10,000). I change my antifreeze at haulout because it gives the passages in the cooling system maximum corrosion pro-



tection during the off-season. In the spring I open the cap and make sure the coolant is topped off. Just checking the level in the recovery tank is not adequate (Photo 5).

CLEAN FUEL

Ninety percent of all diesel-engine failures are caused by contaminated fuel; you can

reduce your chances of trouble by that amount just by making sure only unadulterated fuel reaches the engine. Fuel filters can be overwhelmed, so I like to draw a fuel sample from the bottom of the tank at the beginning of each season. Sampling fuel is easier when the boat is on land.

Here's how to do it: Feed a long length



5. A glance at the coolant level in the recovery tank is not sufficient

6. Be sure the start battery is fully charged before pressing the button

of small-diameter vinyl hose down the fuel fill until you feel the end of the hose bump against the bottom of the tank. Take the other end of the hose to a point lower than the

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» COMMISSIONING: ENGINES

tank bottom, and create suction in the line with either a hand pump or an outboard squeeze bulb. Siphon out a quart or more of fuel into a clean glass container and let it sit for at least 30 minutes; then examine it carefully in sunlight. If you see solid debris or water in the fuel, you need to polish the fuel in the tank before feeding it to your engine. If it's dirty enough, you may have to clean the tank.

If your fuel sample is clean, pour it back into the tank. The next step is to open the fuel shutoff valve between the tank and the primary filter and hold a bright light behind the filter bowl to make sure no water is trapped in the filter. I don't expect to find any water here because I drained the bowl when I hauled the boat. Because I monitor my primary filter element with a vacuum gauge, I don't automatically change the fuel filter every spring. But I do watch it closely for several hours after starting the engine. If the vacuum gauge needle climbs only as far as the yellow zone, I change the element.

COUNT DOWN

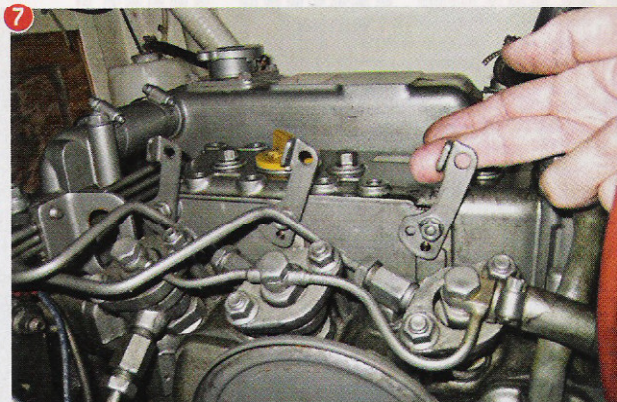
A diesel engine needs compression to fire, and since compression levels are related to piston speed, I want maximum voltage reaching my starter motor when I finally hit the ignition switch. That's why I first clean and service the cable connections at the battery and the engine/starter and then test the start-battery voltage (Photo 6).

Finally, I limber up the "locked" joints inside my long-idle engine by spinning the engine first without trying to start it. This is like stretching a bit before you begin to ex-

ercise. Spinning an engine involves opening the compression releases, if your engine has them, and pulling out the kill lever all the way. Bump the starter button a couple of times, and then hold it down for about 5 seconds. The engine should spin quite fast without protesting (Photo 7).

You can wait until the boat is in the water before you actually start your engine, but I like to know mine is working correctly before I launch my boat. All you need to run an engine on shore is a continuous supply of fresh water. I've tried a dozen ways to do this, and the easiest by far is to use a short length of hose that can slip loosely through the intake through-hull and plumb the end with a common hose-shutoff valve. A reliable assistant on the ground holds the hose inside the through-hull and cracks the valve open enough so that water begins to run back out of the skin fitting. When the engine starts, the assistant should adjust the water flow to keep a constant trickle running out the fitting. This assures there's enough water to supply the water pump, but not so much pressure that the engine might be damaged.

Make sure the engine's compression levers are closed, the kill lever is retracted, and water is running into the intake from the hose. Then hit the start button. If all is well, the engine will fire immediately, rat-



7. Releasing cylinder compression reduces otherwise destructive loads for the seconds required for oil to initially reach bearing surfaces

tle and clatter for a moment, and then settle down into a satisfying hum.

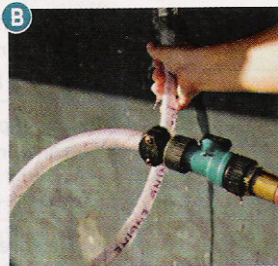
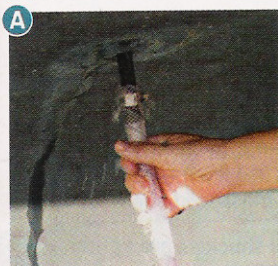
Because the water-lift muffler is empty, you won't get any water spraying from the exhaust until enough water has been injected into the exhaust to fill the canister above the outlet. Ask your assistant to watch for this and let you know if the exhaust outlet remains dry for more than a couple of minutes.

If the engine won't start, don't keep leaning on the button. Because a starter motor has no way to cool down, cranking it continuously for 15 seconds or longer might be enough to burn it up.

It's also quite common for a fuel system to require bleeding if the engine hasn't run for a while. After the water has been turned off, you can proceed to bleed the fuel system. When you know you have a solid column of fuel all the way up to the injectors, ask your assistant turn the water back on and press the start button. If the battery is fully charged and your fuel is clean, your engine should start and will be ready to take you through the sailing season. ▲

Don Casey's current office is located aboard the 30-foot Allied Seawind that he and his wife, Olga, have cruised for 35 years. Don is presently sailing in the Windward Islands, where he is putting the finishing touches on a new edition of his classic refit and maintenance guide, *This Old Boat*, to be published this summer by International Marine.

» OUTSIDE WATER SUPPLIES



To get water to a land-bound engine, insert a small length of hose into the intake through-hull (A). Turn on the water and press the start button (B). Once the engine is running, make sure water is coming out of the exhaust (C)