

Keeping your engine cool

I always enjoy those days when I meet a boat handling student for the first time, especially when they have a new boat to learn to drive. Today is a typical spring 2011 day in the delta; windy, rain is threatening, and it's cold. But we don't let a little sour weather prevent us from having some fun driving around the marina in a nearly new boat. We are on a three year old 42 foot Motoryacht with only 240 hours on the clock that has been recently surveyed and found to have very few repairs needed. And those that were suggested by the surveyor have been completed.

In case you haven't noticed, almost every boat is different and each seems to have its own set of special instructions for proper operation. Being my first time on this boat it is usual for us to start our first session with a complete walk through the vessel and operate all of the systems so that we both know what we have and how everything operates. The interior looks new and the engine room is so clean you would think it was just delivered from the manufacturer. The engines are clean, there are no obnoxious smells, and there are no fluids in places they don't belong. We finish the engine room check, start her up, and get ready to take her out for the first time. As usual after we start the main engines, we take one last look in the engine room and then take a look at the water flow out the exhaust. Here again, every boat is different. Some have a torrent of water, some have water that comes in spurts, and some have a steady trickle. This boat has underwater exhausts so we don't expect to see a lot of water flow. And this is what we see, not a lot of water flow and we make the assumption that this is normal for this particular boat.

With everything looking good we take the boat out of the slip and practice a few dockings in the slip and then venture out into the marina and practice making close quarter turns, twists, backing straight down the fairway, and dockings in empty slips. Did I mention that it's windy? Being midweek and not a pleasant weather day, we have the marina pretty much to ourselves and have plenty of room to practice. We have been maneuvering around the marina for approximately 45 minutes when all of a sudden we get an engine alarm. A quick glance at the gauges and we see that the starboard engine is overheating. Apparently, even when kept at idle speeds the engine is not getting enough cooling and has activated the alarm. The purpose of the alarm is to warn the operator, before the engine gets so hot that damage occurs, that something is not right with the cooling system and the engine needs immediate attention. The best course of action is to shut down the starboard engine, make our way back through the marina, and return to the slip. Did I mention that it's windy? Since we are not far enough into our session where we practice one engine docking, with a 15kt wind on the beam, into a slip that if you miss you will end up on the riprap, I suggest to the owner that I be allowed the pleasure of this one. For some reason he didn't hesitate long before he agreed to let me dock her and that he would go put out a few more fenders.

I think that we can all agree that a fender lying in the cockpit is not going to be of much help, but if we deploy it somewhere along the boat, it may be of help. We put our fenders on the port side since this is the downwind side and most likely where they will do the most good. Now if I had to choose to have only one working engine on a twin engine boat, in this instance it would have been the port engine. The boat is docked bow in to the slip, and

since the wind will be on our starboard side, the port engine will afford us the most control. I guess good fortune is looking down on us today.

Now that we have the boat back into the slip and secured, we take a look in the engine room to see if there is anything obvious. We see nothing but an extra warm engine. After checking all the easy things, clogged strainer, fully open seacock, coolant in the recovery tank, (all things we checked earlier) we decide to take a look at the raw water impeller. As I pretzel up and crawl down between the engines and remove the cover plate on the raw water pump, I notice that it is kind of warm down



here. Probably better to do this when the engines are cool, but hey, I'm curious. Fortunately the pump on the starboard engine is somewhat accessible and the cover plate comes off easily. What I see tells me that I have found the problem with the cooling system. An impeller with most of the vanes missing will not pump water effectively!

Just about every engine manufacturer recommends replacing the impeller every 200 hours or 12 months. From the looks of this one, it is probably the original from three years ago and way past need of replacement. After I get the impeller out of the pump housing I can clearly see that most of the vanes are missing. Those broken rubber pieces are now inside

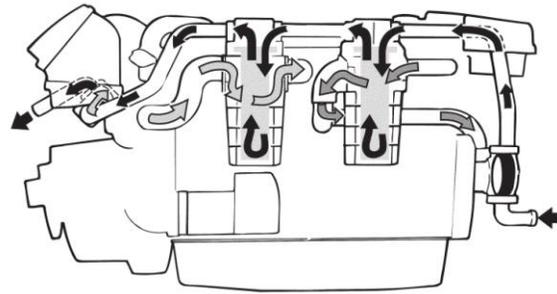


the cooling system somewhere and need to come out. Unfortunately it is now time to have the mechanic do some disassembly and find the broken pieces, dig them out, and then install a new impeller. What would have been a straight forward task for the owner or mechanic to replace the impeller, will now take more than an hour of a mechanics time. Every marine engine has a raw water pump and every pump has a rubber impeller and every one of those will wear out. Only you can

decide your maintenance strategy. Do preventative maintenance per the manufacturer's recommendation or wait for the part to fail and then replace it. Waiting for failure is usually more expensive, and generally, involves some level of inconvenience.

How important is the raw water pump? Here is a thumbnail description of the raw water cooling system of a typical marine diesel engine. The pump pulls sea water from the thru-hull, past the seacock, thru the strainer, and then pushes the cool water into various spaces in the engine. Usually the cool sea water goes into a heat exchanger first (similar to the radiator in a car) and removes heat from the engine coolant. Then the water can take several paths to cool the oil, intake air, shaft bearings, and is then exits the engine via the exhaust. If there is good flow of water out the exhaust, then the pump is usually doing its job. If there is steam with the water, that usually indicates a low water flow and potential

engine overheating. The raw water pump is a critical part of the engine and its failure can lead to damage of very expensive components.



I know you're thinking, I have gas engines and these pumps are on diesels. You would be wrong. Gas engines have raw water pumps also, they do a similar job, but are different in that the parts are usually more expensive and the pump is more difficult to get to. But they wear out just the same and need to be replaced.



All this Reminds me of another story. A good friend, we will call him Paul to protect his identity, believes in the absolute immortality of all rubber parts on his boat. In fact, his belief is so strong that he doesn't even keep spare parts on board just in case one of the aging rubber parts fails. We put his belief to the test when we were out for a sunset cigar and port cruise one summer evening, when, without warning, the port engine over temperature alarm sounded. A look back towards the engine room revealed a lot of white steam billowing from the vents, a sure sign of a cooling system failure. After we

shut down the engine and open the engine room covers, we see that a cooling hose has blown and all of the coolant is now sprayed into the bilge. This is not a good situation as its interrupting my cigar, but easy to fix by either replacing the defective hose or making a temporary repair and then adding water to the system. Looking up from the engine room to Paul standing overhead, I asked if he had any spare hoses on board. All I see is this incredulous look as though he cannot believe that a 7 year old cooling hose would let him down like this. Of course there are no spares because these things last forever. Next best thing, I inquire if he has any duct tape. Same look. OK, so how about something we can use to patch the hose? A roll of 10 year old electrical tape appears from somewhere and we tape the hose as best as we can and then decide to make our way back to the marina on one engine, wait until the last minute or so when we are docking to start the engine, and hope the tape holds. It all worked out per plan and we even had time for another cigar and glass of port on the way back. Once we are settled back in the slip, Paul mumbled something to affect that it was all my fault. The hose wouldn't have failed if I hadn't been there to drum up business and somehow I made it fail. All I can say is it worked. The next day we replaced all of the hoses along with the pump impellers on his boat. I wish that I had taken pictures of the parts we removed.

So what have learned from this? Rubber parts are not immortal. They do wear out and do need to be replaced. It is less costly and less inconvenient to replace these parts before they fail. There is a reason that the engine manufacturers have kindly provided us recommended intervals for replacement and service of key components and systems. As I

said, it's your choice as to your maintenance strategy. It is a good idea to keep spares on board just in case the worst happens. And things are not always as they appear. A sparkling clean engine and engine room does not necessarily mean that the engines have been properly maintained.

Did I forget the part about bringing the boat back into the slip? It was actually quite straight forward. Just bring the bow to the windward side of the slip at a steep angle, hard left rudder, port engine forward, and let the wind bring the stern around. Work the throttle to bring the boat into the slip as the wind helps us straighten out the boat. Remember the wind can be your friend and this time we didn't even need the extra fenders. After we get the boat into the slip I ask the owner if he would like to try it, I would be happy to back the boat out and talk him through the docking.



For some reason he declines and mumbles something about perhaps after a few more lessons. Fair enough we have an impeller to change.



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