Tech Tip #16

Written by Vice Commodore Bill Whitney

During the last several months I've had the opportunity to witness a few vessel surveys and overhear the surveyor's comments as they went through the major systems of the boats. It got me thinking about some of the things I've seen over the years but never completely considered the ramifications of what I saw. One of these is the way we connect the thru-hulls and seacocks to the systems inside the boat. Maybe its self-preservation or just that I'm a cheap Yankee but I don't like holes in my boat. They let the water outside become water inside unless you spend a lot of money putting the right stuff in the holes. Thru-hulls, seacocks, nipples, hoses, packing glands, dripless seals and in some cases rudder seals are the more common things you find plugging the holes in your boat. You could also have the occasional wooden plug or bung, but hopefully not many of them.

The principle concerns voiced during many surveys center around basic safety (as it should), mixed metals, and poor design layout of many of these thru-hull and seacock installations. I was surprised to discover a few problems with my own boat over the years but these were minor and I suspect added during "upgrades" to the boat. And I have to admit, some of them were installed by me.

As I was preparing this article my Jan.2012 issue of WoodenBoat magazine arrived in the mail and I was glad to see the piece that Steve D'Antonio did on seacocks and thru-hulls. It is a very good read and on a subject that everyone with a boat should review. The essence of the article is that, just because the seacocks or thru-hulls are already installed in your boat it may not be done "correctly" or with the right materials. I put "correctly" in quotes because there are no steadfast rules governing recreational craft as there are with government mil-spec or commercial craft. The ABYC (American Boat and Yacht Council) has widely accepted standards for pleasure craft, but there are no "boat police" to enforce these standards. And many of our boats were built well before the ABYC, or their standards, even existed! So while the boat is laid up, and as you go thru her greasing the seacocks, it may be prudent to look over their installation and see if anything needs to be done to avoid letting the water outside from becoming the water inside.

The ABYC standards recommend seacocks, such as the one pictured on the right, on any fitting penetrating the hull that may be submerged when the vessel is heeled under maximum design load. Since our Friendships sail with the rail at or under water on a stiff beam reach, it follows that nearly all the thru-hulls should have seacocks. Guess what! My cockpit drains, which are submerged even at the mooring, had no valves until I installed them about 15 years ago. From what I've seen on other Dictator and Pemaquid glass hulls I'll bet there are more thru-hulls out there with no seacocks.

A sampling of some of these "less than ideal" installations occurred last year when a recently purchased Pemaquid came to the yard and the new owner started going through the boat, correcting these problems. On his boat there were no seacocks fitted on the cockpit scupper thru-hulls; instead gate valves were used, the kind with the round blue handles you see on household garden hoses. Inasmuch as the thru-hull mushroom has straight threads as shown in the picture, and the gate valve has tapered pipe threads, there was only about 2 turns of thread holding back the ocean. Gate valves, of course are a no go for boats as you cannot see if it is open or closed and it could get stuck open with something blocking the gate closure.

The bilge pump was attached to the port cockpit scupper thru-hull with some brass nipples and bronze street fittings. There was no vented loop (or any loop for that matter) in the bilge hose – it ran straight downhill to the bilge. The only thing keeping the submerged scupper thru-hull from siphoning the ocean in was the backflow preventer at the pump. A piece of dirt, hair, lint or the run-away lime pulp from your last gin and tonic stuck in the valve of the backflow preventer could result in a sinking.

Another common problem is the seacock-to-hose connection. On the Pemaquid there was a complete lack of "pipe to hose connectors", i.e. a fitting with a male threaded end and a hose barb end. Instead every hose seemed to be fastened to the threaded end of a pipe with a single hose clamp, which was all that the limited surface area allowed. In some cases the threaded pipe was not bronze pipe, but brass. In many cases the pipe is not threaded where the hose is attached which doesn't give the hose much of a surface to grip.

Although not in the same safety category as a thru-hull, I ran into this same problem with my raw water pump. The input and output connections were smooth pipe. Thankfully they were long enough to position two hose clamps on the hose over the solid surface of the pipe to get a good seal. But it would not have taken much back-pressure to blow the hose off the smooth pipe. There was also a mix of metals; stainless on one end and bronze on the other. Not a show stopper, but I would rather see bronze hose barb fittings on both ends. Hose barbs are superior to threaded fittings because the threads cut the interior surface of the hose, especially when compressed by a clamp.

On the Pemaquid, the cockpit scupper drains in the aft end of the cockpit on both sides had street connection fittings fiber

glassed into the sole, and the threaded end was used for the hose connection. The reinforcement wires in the hose were rusted from the bronze threads cutting into the hose. A simple twist of the hose resulted in the hose just tearing away. The other end, at the gate valves, also had the hoses connected to male pipe threads.

As with most boats, these fittings are buried deep in the aft lockers or under floorboards and are not very accessible, either for inspection or for servicing. In this case, the bilge pump hose was connected to a male pipe thread at the port cockpit scupper thru-hull under the quarter berth. You have to ask yourself: "How accessible are these valves if something happens and they need to be closed?" Does your storage plan allow you to get to all your valves? Do you have tapered wooden plugs to drive into a broken thru-hull or fitting that fails?

The engine cooling water seacock had a street fitting on it and the Groco seawater strainer had a brass nipple inserted with the result of having two male threaded ends to which the hose was connected. The raw water hose at the exhaust elbow was the wrong type of hose. Someone had installed soft, unreinforced, rubber automotive hose that was kinked because it could not sustain the bend required. A 90 degree pipe to hose connector would provide a better hose path.

The fuel filling hose was attached to a male threaded fitting at the tank with the result that the seal was not tight, allowing fuel to leak out of the hose/thread joint.

Another common problem, as pointed out in the WoodenBoat article, is the stress that can be put on the seacocks and thru-hulls by any tight radius hose bends or heavy pipe that are attached to them. Ideally you should only use seacocks. They have wide bases that support the mass of the valve and distribute the load imposed by hoses. Thru-hulls with separate valves attached to them have to rely on the mushroom head and backing nut to support the side load imposed by hoses or other pipe fittings attached to them. Either can be used, but carefully assess the installation to see if any excessive side loads will be present.

Care also has to be taken when storing gear and equipment to prevent damage to your seacocks and thru-hulls. A 30 pound anchor sliding across the stern locker can do a lot of damage! Plan your storage and secure any heavy loads so they can't move around in a heavy sea.

Hamilton Marine and Jamestown Distributors have a good stock of these seacocks and barbed tail pieces. So if you find that your installation leaves something to be desired, now might be the best time to upgrade.

Note: Special thanks to Bill Lundquist for providing input to this article.