November 2018 Newsletter

Photo Essay: Hull to Deck Joint

Few boat building interfaces are as important as the one that occurs between the hull and deck. The loads imparted to this joint are considerable, especially for vessels that encounter tumultuous conditions, including offshore power and sailing vessels, or those that work in heavy surf. The “shoe box” arrangement like the one shown here can, provided it’s properly designed and built, be strong and resilient. The intersecting surfaces should utilize an adhesive/sealant, and they must be free of gelcoat or paint (coatings can be pulled off the surfaces over which they are applied by aggressive adhesives). Through bolting, as opposed to tapping screws, is a must where maximum strength is sought.

The bolt shown (the tapping screw is used to support the rub rail) in the accompanying image is stout, and there are many of them, and that’s good. However, it relies on a large fender washer, which does not rest squarely on the inside surface of the hull; it is distorted as a result. The fasteners adjacent to it have the same issue. Over time these washers may shift, leading to loose nuts and a compromised structure. Washers and backing plates must always be fully supported on a flat surface. In this case, an oblong backing plate would have proved a better choice.

Ask Steve

Hi Steve,

Fuel guy pumped a mix of gas and diesel into large yacht.

What is the best repair?

Your help appreciated.

Andrew Bate

Andrew:

It’s difficult to provide a definitive answer not knowing the contamination rate, however, assuming the engines haven’t been run, the lowest risk approach in a case like this is to pump the fuel out of the tanks, which will almost certainly call for opening and accessing the tanks to ensure the fuel below the pick-up tube is removed. Depending on the size of the tanks and how much gasoline was added, this may or may not be necessary, as the remaining tank “bottom” will be diluted with new diesel fuel (diesel and gasoline will mix readily). Caution must be used in the clean out/pump out process as the added gasoline will lower the diesel fuel’s flash point, potentially making an otherwise safe fuel vaporize and become explosive at room temperature.

If the tanks aren’t opened to ensure complete removal, and diesel is added, a sample of fuel should be drawn from the tank after refilling and sent to a lab for testing, to determine gasoline content, before engines are run, and fuel should be circulated through fuel supply plumbing to ensure no high concentrations of gasoline exist.

Depending on the dilution rate, the fuel may have to be taken away as contaminated gasoline, which is hazardous waste. After that has been carried out, the tanks should be filled with diesel, and if any fuel plumbing is connected to tank bottoms or is gravity fed, fuel should be circulated through these fuel lines, to ensure no vestiges of gasoline remain.

Dear Steve,

Do you recommend using PEX for water systems on boats? Is it code approved?

If not, what do you recommend, that is code-approved?

Thanks.

Bruce Colglazier Pappas

Bruce:

Polyethylene tubing or PEX is both desirable and commonly used for new vessel construction and refits. It's easy to install, durable and imparts no odor or taste to water, it's suitable for both hot and cold water applications. As far as being "code approved", I can't answer for all PEX plumbing, and not all PEX is approved for potable water applications. However, PEX is commonly used in home construction, where such approvals are mandated. Ultimately, the plumbing you select should carry an NSF 61 or "potable water" rating or approval.

You might find this article on the subject useful in the selection and installation process. http://stevedmarineconsulting.com/potable-water-systems/

Steve,

I have a 1996 48′ ocean super sport. My starboard fuel tank has a leak and will have to be replaced. Have you had any experience with cutting the side of the boat out to replace a fuel tank? The tank is 270 gallons and that is the only way to replace it. I keep the boat on the Bohemia River on the upper Chesapeake Bay and am trying to find a yard that has experience with this. Any advice you could offer would be great.

Thanks,

Matthew Hicken

Mathew:

I’ve replaced scores of fuel tanks in all manner of power and sail vessel in my career. In no case have I ever cut a hole in the hull of a fiberglass vessel to do so, and that’s no accident. While that may have been easier in some cases, the risk it poses of compromising the integrity of the structure, through secondary bonds in a stressed structure that experiences slamming loads, is simply too great. The alternative may require some ingenuity on the part of those undertaking the work. I’ve removed engines, and cut existing tanks into pieces and replaced them with multiple tanks designed to fit through available access. I’ve also cut small holes in cabin tops, through which crane cables were lowered, to lift engines out of the way, and then slide them out on temporary dollies, or poked the boom of a crane into the cabin to lift an engine in that fashion.

Finally, cutting a hole of this size in an FRP hull is not only ill-advised, it may affect your insurance coverage. My strong recommendation would be to find a yard with the experience and expertise needed remove and replace the tanks without compromising the hull.

Hi Steve:

Many thanks for your informative columns in the many boating magazines I read. I have learned a huge amount.

Question: When using caulking I understand it is advisable not to tighten the caulked fitting down all the way. This will squeeze out the caulking material. How much should the fitting being caulked be initially tightened and how long should I wait to do the final tightening? I read that 3M 5200 takes a week to cure. Do ship yards wait a week to launch boats using

this material underwater?

I appreciate your help and information

Sincerely,

Dave Stiller

David:

The simple answer to your question is I don’t recommend waiting until sealant cures to tighten hardware. That approach is, I believe, while often advocated within the marine community by do it yourselfers, flawed, for two reasons. One, if the part is loaded, a cleat, windlass, winch, stanchion etc, then the cured sealant, which isn’t a gasket in the traditional sense, is likely to split when compressed, which then leads to loose fasteners and leaks. Two, few yards are in a position to evaluate the cure time and return to re-torque fasteners at a later date, and thus the risk of improperly tightened fasteners is increases significantly. Sealant is designed to fill voids, and that’s all it needs to do in hardware bedding applications. This article explains the issue in greater detail https://stevedmarineconsulting.com/caulk-and-sealant-selection-and-use/