

## **Dry Bilges in an old wooden boat, it can be done.**

Traditional boat building relies upon the swelling of wood to create a watertight seam. This has been the method used for ages and is still in use today. The use of seam compound (caulk) is to retard the flow of water and provide extra plugging of the space between the planks.

The heyday of wooden yacht construction was in the first half of the 20<sup>th</sup> century. During this time lumber was available in the quantity and quality needed for yacht construction. Wealthy individuals had yachts constructed and spared no expense in doing so. The great yacht designers of the time were using the latest materials and construction techniques of that era. Even the finest built yachts were not expected to survive for more than twenty years without major rework. These boats were sold off before the major work was needed. The wealthy were then on to better and newer yachts. At this time the not so wealthy was able to own these yachts. Some did the necessary rework although most just patched things up.

Here we are in the beginning of the 21st century and quite a few of these yachts are still surviving. Most have been destroyed. Surviving wooden boats are seeing a new resurgence of interest. Again the wealthy are buying up boats with a prestigious history and are spending big money to restore them. The not so wealthy are taking on project boats to restore and use.

Many of these boats have the original planking. The planking is not as good as it originally was. Repeated drying and swelling (due to dry storage) puts a strain on fastenings and seams. The wood fibers surrounding fasteners tend to crush and the hole becomes oblong. Water enters this space and follows the open-end grain. The same happens along the edges of the seam. Over time the planks lose their ability to swell back to the tightness they once had. These planks are softer and less dense after being immersed in water for half a century. They do not seem to be rotted but are porous. Salt in the water pickles the wood and retards decay. What is lost is density due to decay of the living part of wood cell. Salt crystals in the bilge above the bilge water line can often identify waterlogged wood. Sweating of the planks often causes water in the bilge as much as leaky seams can.

The widespread repair method of this situation is the wholesale replacement of the planking. Once again deep pockets are needed for this adventure. There is an alternative: stopping water from entering the planks in the first place. This will allow stabilization of the wood and eliminate the need for swelling. Modern coating technology allows us to breathe new life into old boats.

### **Procedure**

First and foremost remove all paint from the wood. For this operation I suggest using Aqua Strip or Ultra Strip for fast paint removal. These products are manufactured by Back to Nature Products and feature no solvents or caustics, no flammability, and are non-toxic. Best of all they are easily washed off with water, leave no residue and will not damage wood or gelcoat. Ultra Strip works faster but is more expensive. If you have the time the Aqua Strip will work fine. Both products soften all of the paint layers in one pass for easy removal.

Once all of the paint has been removed, reef the caulk out from the seams between the planks. It is not necessary to remove the cotton. A screwdriver with the blade bent 90° can make a reefing hook tool. The blade is pulled (or tapped) along the seam. Heat the rod red hot before bending. The best screwdriver for this purpose has the metal incorporated as part of the handle. These screwdrivers are becoming rare.

Remove a few fasteners in different parts of the hull and check for overall condition. This is the best time for refastening the hull if it has not been refastened in the last 20 years. Should the fasteners indicate deterioration, replace.

At this point the seams are open and the wood is bare. It is time for restoration. Use sandpaper on the seams to clean out any remaining caulking compound. Taper a paint stirrer along its long edge and cover with sticky back sand paper to make a seam-sanding tool. Slide along the inside of the seam and change paper often. If any caulking cotton has come out replace. Once the seams are clean, brush in enough Clear Penetrating Epoxy Sealer™ (CPES™) to soak the wood inside the seam. Allow this to dry overnight. The CPES will condition the wood so as to hold the new caulking material.

The use of CPES replaces red lead paint. Traditionally red lead was very useful due to the lead acting as an astringent on the wood surface. This poisoning of the wood retarded wood decay. CPES does this a different way. The ability to prevent rot is due to the fact that CPES coats the cell walls without clogging the tubular structure of the wood cell. This microscopically porous surface is fine enough to

prevent bacteria from entering the wood while allowing the much smaller water molecules (moisture) to transport in and out of the wood. Any bacteria or mold spores in the wood are encapsulated by the epoxy and rendered incapable of growing. The wood is indigestible therefore rot cannot progress. Insects or marine borers cannot eat it either.

Another benefit of the use of CPES is its ability to "glue" the paint to the wood. When paint is applied to semi-cured CPES, a molecular bond is created when the CPES fully cures under the paint layer. Old dried out lumber will absorb a lot of CPES much the same way it will absorb water. This allows restoration of old and mildly decayed wood. In this instance CPES is being used to bond the seam material to the wood as well as paint.

Now is the time to pay the seams with polyurethane caulking compound. I advise against using 3M-5200 for seams. It is way too adhesive. The whole idea of this procedure is to enable future maintenance. When used in planking seams, the 5200 will glue the wood together so well that destruction of the plank is necessary for removal. Filling the seam to stop water flow is the only necessity and so low adhesive polysurethane caulk is preferred. We sell the Sitka 201LOT caulk for this purpose. When replacing a plank (in the future) slicing the caulk with a razor knife is all that is needed to allow reefing.

At this point the seams are caulked and allowed to fully cure. Where there are minor divots or missing wood, coat with CPES and follow with Fill-it to bring flush. Sand the entire hull until smooth. Once sanded apply a minimum of two coats of CPES to the bare wood. Keep applying the CPES until the will not soak up any more. CPES will restore the density of the wood and allow top coatings to adhere to the wood.

The main desire is the prevention of water entering the wood. If water does not enter the wood, than the wood cannot become water logged. CPES will not by itself stop moisture penetration. High Build Epoxy Paint will stop moisture. After allowing the solvents to evaporate from the CPES (usually overnight) apply three coats of High Build Epoxy Paint to a final thickness of 10 mils. Follow manufacturers' instructions as to recoat time. As an indicator that the antifouling paint has worn off chose an epoxy paint color that is contrasting to the color of your antifouling paint.

Finish off with Epaint brand of environmentally friendly antifouling paint or any antifouling paint of your choice. Follow the instructions for coating epoxy surfaces.

In the bilge, coat with CPES and a few coats of bilge paint. The use of bilge paint is recommended since it will allow moisture in the wood to evaporate out and prevent any fuel or oil from entering the wood. The use of epoxy paint in bilges is not recommended since moisture will be trapped in the wood.

The net result of this paint schedule is to align the moisture content of the wood with the air instead of the water. The lower the moisture content of the wood, the more rot resistance wood has. The use of polysulfide caulk and epoxy paint eliminates the necessity of the planks to swell creating a watertight seal. By eliminating the swell / dry cycle there will be much less stress on the fasteners and ribs and the wood will last longer.

The difference of this method over fiberglassing is the ability to rework. The paint can be stripped off and planking replaced or refastened every 20 years or when necessary. Once fiberglass is on the wood surface, it is practically impossible to repair any problems in the wood underneath. Additionally if the fiberglass is insufficiently thick, play in the boat (guaranteed to happen) will induce cracking along the seams allowing water into the wood underneath. I call this the Tupperware syndrome. When food in Tupperware is placed into a refrigerator and left there long enough, the food will rot. A boat fiberglassed on the outside is exactly the same thing.

*The author, Steve Ray, is President of Star Distributing and has over 10 years of experience in classic boat restoration.*

CPES™, Fill-It™, Sitka 291LOT, High Build Epoxy Paint™ and Back to Nature® Marine products listed in this restoration guide are available from:



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