Ask Dr. Gel

by Dave Weakley

Dave Weakley is the owner of American Boat Restoration and has been keeping boaters afloat in fine trim and good repair for over 40 years.

"Email me or call me with your questions! I'll be happy to help you out"

americanboatrestoration.com / email: boatrepair@aol.com / Office: 413.665.7424 / Cell: 518.577.7799

"On The Rocks"

... not the kind I had in mind.

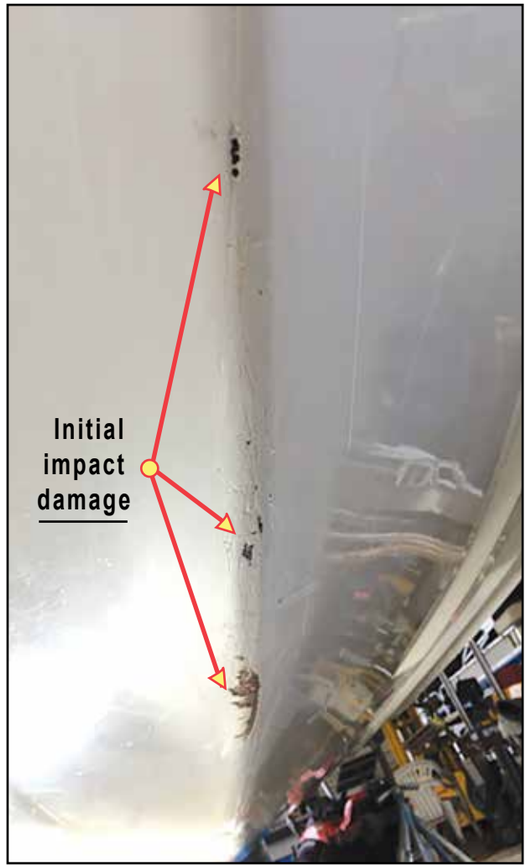
Another one hits the rocks! A boat was brought into my shop last month for hull repairs. The owner was out enjoying a day boating on the lake when suddenly he drove into some rocks. It's always a surprise! He took the boat out of the water and looked at the hull. He thought it didn't look all that bad and could still use it. There was no water coming into the boat, no hole so the owner was not real worried about it. He put it back in the water for another week before he decided to have me look at it.

I could tell as soon as I saw it there were problems. Two areas had multiple cracks and they were dripping water. It remained on the trailer for another week at my shop and continued to drip water during that time. I got the OK from the owner to grind into it to see the extent of the damage. What I discovered was a laminate separation and water had migrated up in between the layers of the laminate. The damage was more serious than the boat owner thought. More problems were created by leaving it in the water. In addition, as I inspected the hull further I discovered that the laminate separations were manufacturing issues. Delaminating caused by poor manufacturing and I have written articles about it. I have seen this occur in other boats during my many years of experience repairing boats. This manufacturing defect is adding more troubles for this owner!

It had a real crappy lay up! It looked like at the techs at the manufacturing plant sprayed the fiberglass chop mixed with resin and waited too long to add subsequent layup layers. Did they decide to go to lunch... The last layer they sprayed in acquired a blush and the subsequent layer added "after lunch" didn't adhere. As a result no adhesion but they kept laying up the hull.

I ground out the damage, and laid it up properly with multiple layers of epoxy resin and mat, ground and sanded it. When that step was completed I prepped and applied epoxy barrier to finish. The layup on this boat was done poorly. It became known due to a breach. It was inevitable the hull was subject to extensive delaminating. This means strips of fiberglass would come loose from the bottom of the boat.

Anytime your boat hits a hard object you should get it checked immediately. If it's below the water line take it out of the water as soon as you can. Have a professional boat repair person take a look at it.



The Deck & Hull of a boat.

If you need boat repairs it's helpful to understand how a gelcoat & fiberglass boat is made. Think about this; when doing a repair the procedure has to be done in reverse of how it was constructed.

Boats today are made using mostly three molds. A deck mold (top), hull mold (bottom) and a pan mold; interior liner, cabin or cockpit furniture.

Darker area is seeping water out of laminate - Note droplet lower left.

The first thing applied in the mold is sealer glaze A.K.A. parting material. Gelcoat is then sprayed to a more or less uniform thickness against the polished surface of sealer glaze. Hopefully this process is done carefully but that's not realistic! Gelcoat should be between 15-20 mils thick. If there are multiple gelcoat colors they are also sprayed in reverse of what they appear on the finished product. The gelcoat is then followed by one or two layers of chop strand fiberglass mat (CSM) mixed together with a resin binder. CSM is the best for ease of molding than other fiberglass material. No longer commonly used in today's production boat building due to environmental hazards the CSM was applied with a chopper gun; a tool that chops continuous strands of fiberglass into predetermined lengths and fires them into the mold along with a fine spray of resin. The chop is coated with resin on the way to the mold.

"Fiberglass (Glass-reinforced plastic or GRP) - Typically used for production boats because of its ability to reuse a female mold as the foundation for the shape of the boat. The resulting structure is strong in tension but often needs to be either laid up with many heavy layers of resin-saturated fiberglass or reinforced with wood or foam in order to provide stiffness. GRP hulls are largely free of corrosion though not normally fireproof. These can be solid fiberglass or of the sandwich (cored) type,

Irregular edge indicates no adhesion between the layers of the laminate - still dripping water.

Epoxy barrier applied to hull

in which a core of balsa, foam or similar material is applied after the outer layer of fiberglass is laid to the mold, but before the inner skin is laid. This is similar to the next type, composite, but is not usually classified as composite, since the core material in this case does not provide much additional strength. It does, however, increase stiffness, which means that less resin and fiberglass cloth can be used in order to save weight. Most fiberglass boats are currently made in an open mold, with fiberglass and resin applied by hand (hand-lay-up method). Some are now constructed by vacuum infusion where the fibers are laid out and resin is pulled into the mold by atmospheric pressure. This can produce stronger parts with more glass and less resin, but takes special materials and more technical knowledge. Older fiberglass boats before 1990 were often not constructed in controlled temperature buildings leading to the widespread problem of fiberglass pox, where seawater seeped through small holes and caused delaminating. The name comes from the multitude of surface pits in the outer gelcoat layer which resembles small pox. Sometimes the problem was caused by atmospheric moisture being trapped in the layup during construction in humid weather." Wikipedia

In doing a repair we don't have the beauty of the mold and care is taken in every step to recreate the original shape and finish. Body lines and curves in the boat are done by hand. What makes our job interesting is that every repair is unique; holes, scratches, delaminating fiberglass, fractures, cracks, air voids, boat pox, holes drilled in the wrong place at the factory, improper plug type repairs, failed previously repairs, tree limbs crashing on the deck, weak winter storage roofs and temporary storage buildings crashing on boats due to heavy snow loads, one boat was sliding on its hull down I87 after it fell off its trailer. It came to a stop on its side in the far left lane. The hull skidded so far that it wore off the fiberglass and gelcoat on the port stern corner to the point of being able to see inside the boat. Yes, it was repaired successfully.

Much thought goes into implementing a plan before our repairs are started to insure that the repair is proper and effectively done.

Have any questions about your boat? Please Email me- I'd be happy to help! boatrepair@aol.com