

Sealing the cap rail joint on Westsails

[Westsail #91 S/V Resolve](#) Jim Harrison
[Westsail #207 S/V Tortuga](#) -Randy Leasure
[Westsail # 567 S/V Pygmalion](#) – Jay Bietz

Comments from Bud Taplin

By Jay Bietz
6/2/2022

Disclaimer: This is a description of how I and other vessel owners have worked on several Westsails to seal up the cap rail joint. Every boat was different requiring slightly different fixes. Please use these ideas as a suggestion to assist you with this project.

Special thanks to [Dave King who was one of the first to document](#) the sealing of the cap rail joint. See <https://photos.app.goo.gl/tAifrcWR9uL6qfieA> for the work on Konami W32.

The purpose of this document is to detail the sealing of the different Westsail 28,32,42,43 (and probably Kendall) cap rail joint (the hull to deck joint). The design of this joint changed during the Westsail production and slightly different techniques to seal up the joint will be needed.

Why seal your boat cap rail joint? The cap rail joint joins the hull and deck mold together. After 40 + years the sealant used to seal the joint has hardened and cracked allowing water to leak into the vessel. Owners will notice the water in the areas below the bulwarks during rain events or when heeled over.

The fix: I have tried several times to seal the cap rail joint on hull 567 by removing the teak cap rail and filling the area with sealant/caulking. The sealant/caulk failed after about 5 years and began to leak. The only fix that is worth the time and effort is to install layers of thickened epoxy and fiberglass to join the deck and hull together.

Sealing the cap rail joint will involve removing hardware on or near the bulwarks, removing jib sheet tracks, teak cap rails, chain plates and possibly the bowsprit and stern pulpit. Many owners also remove the haws pipes so they can be resealed. Of course, all these items will need to be cleaned up/repared/replaced before reinstallation. Plan on a lot of surface prep and repairs in the joint areas. **In short, lot of sanding will be needed.**

When complete the top of the bulwarks/cap rail will be a solid, flat, and horizontal surface ready for either paint and anti-skid or the reinstall of the original teak cap rails.

Depending on the project staffing, weather (temperature, rain), vessel location (on the hard or in the slip), mast up or removed, and the extent of the repairs needed - the project may take between 2 weeks and 1-2 months. Since you will be working on the whole boat above and below deck – other items will be found that need replacement or repair.

If you wish to do the project smaller segments – you can redo parts of the deck/hull joint in sections. Many of the leaks on #567 were along the port and stbd sides. Later when I had the bow sprit off, I sealed up the deck/hull joint in this area.

Suggested tools & supplies beyond the usual hand tools:

Drill motors and impact drivers for removing and installing fasteners with appropriate bits.

Oscillating / Multi-tool to cut off fasteners and sand in the tight spots.

Random orbital sander 3" - 6" diameter with vacuum port and 40, 60, 80 grit sanding discs and vacuum for dust control. The Festool Rotex models have a grinder (along with random orbital) mode that works well to remove gel coat and most

of the dust was contained. Regular grinders were not used as they throw a lot of dust into the surrounding environment but will be the fastest way to remove the paint and gel coat.

A contour scraper also works great to remove old filler in the corners.

Long board sanders with 60-80 grit sandpaper, rags, paper towels, mixing containers, acetone, cleaners like Total Boat Dewaxer & Surface Prep Solvent Wash, epoxy like West Systems 105 resin and 205 fast/206 slow hardener plus fillers like 404, 406, 407, 410 etc.

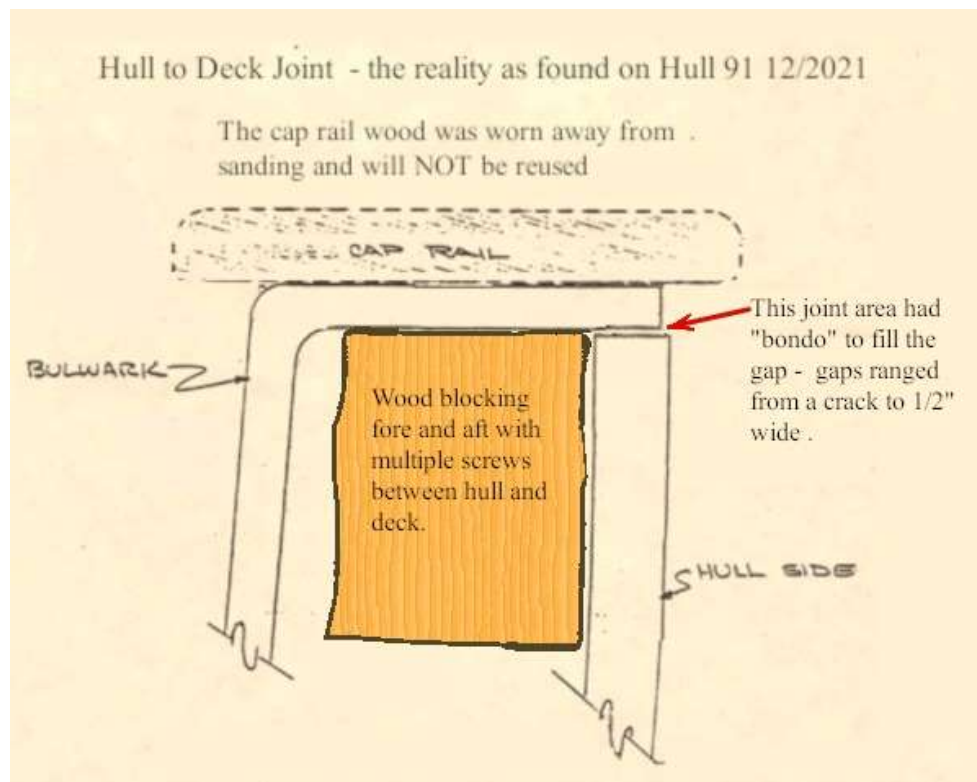
Using premixed epoxy-based fairing like Total Boat Total Fair saved us from the mixing of epoxy and fillers in small batches.

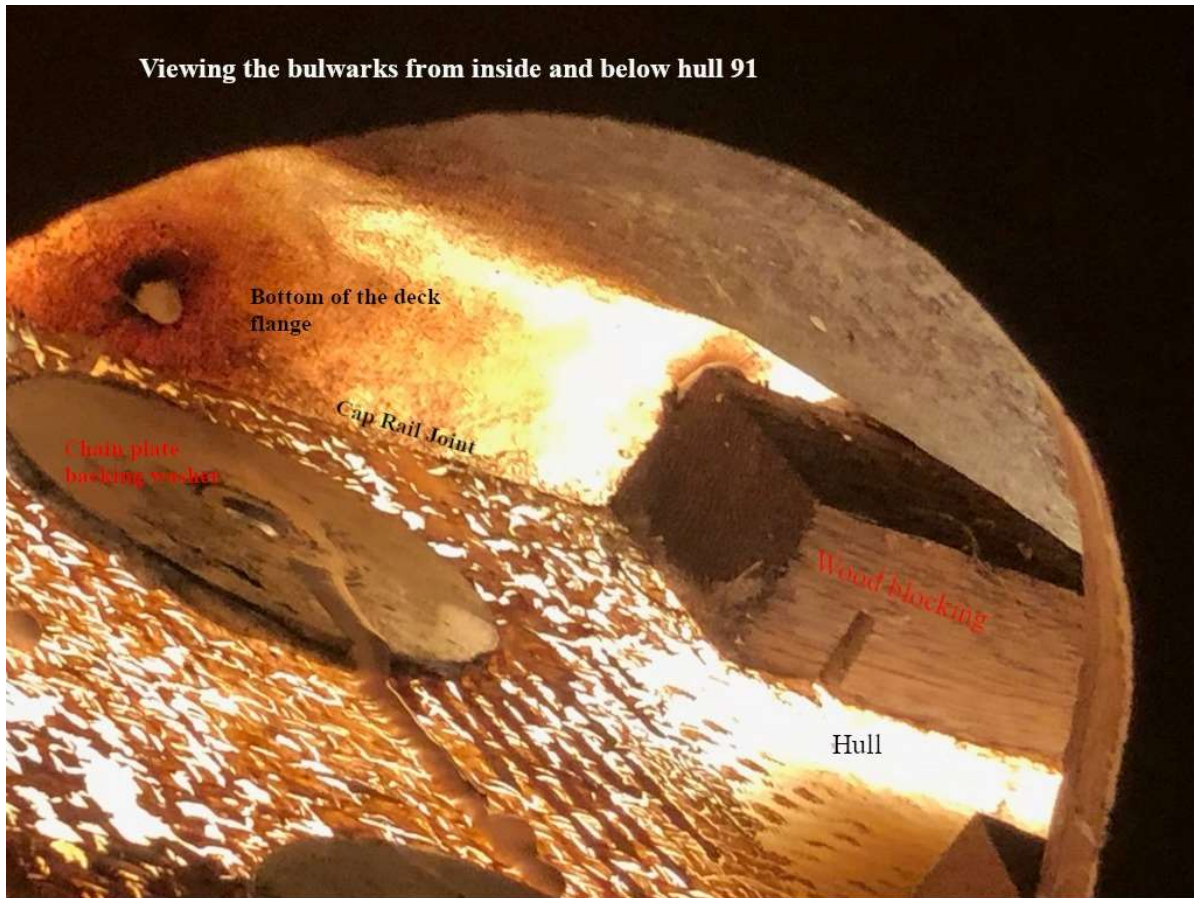
Personal protective equipment for sanding and epoxy handling.

Hull Deck Joint

The **early vessels** are likely to have a hull deck joint as seen below. Stainless steel wood screws are installed down thru bulwark deck flange and horizontally thru the hull into the wood blocking. Smaller screws secure the cap rail to the top of the bulwarks, and large SS 5/16" lags are used to secure the jib track to the bulwark.

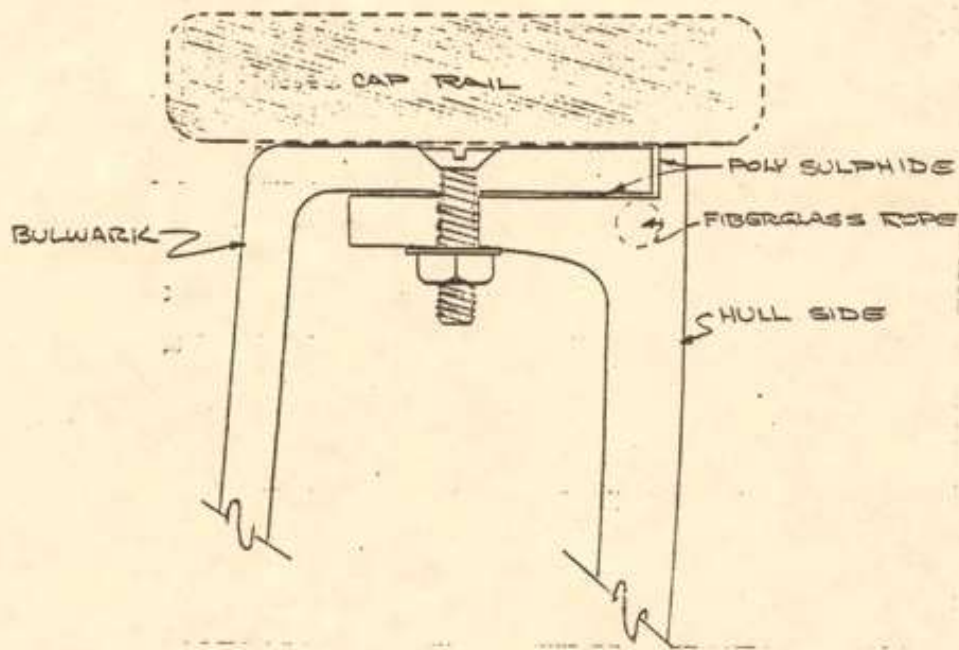
The leaks will occur thru the joint as well the many screws. Often water will run under the teak cap rail until a crack in the sealant is found.



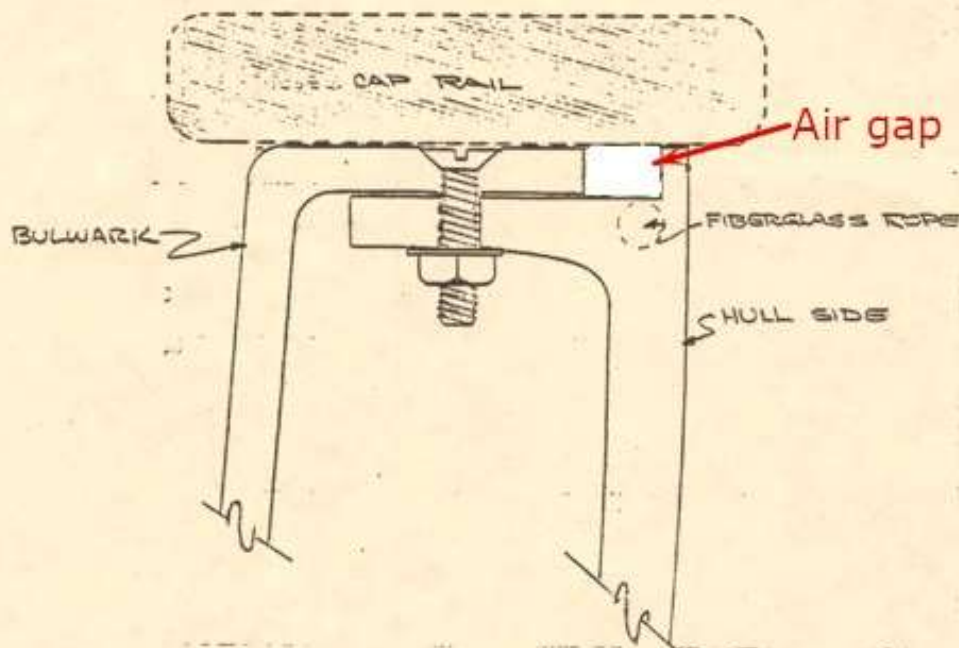


For comparison, the joint in newer vessel (#567) is like the image below.

Hull to Deck Joint - the dream



Hull to Deck Joint - Later model vessels



The water comes thru the cracks between the cap rail and top of the bulwark, collects in the **air gap** and then runs downhill to the low point in the hull/deck joint and into the interior of the boat.

Of course, the screws to fasten the cap rail down can also leak and there are > 200 of these screws.

The joint area configuration changes over the length of the boat – sometimes the hull mold is ½” to 1” short of the bulwark flange and in other places the deck flange is NOT horizontal – in other words the top of the cap rail slopes in or out.

Teak cap rails

Depending on the amount of sanding and refinishing on the cap rails or if the teak is untreated, the cap rails maybe worn thin that reusing the teak as cap rails isn't a long-term solution. Below you can see the teak is in poor condition and getting thin.



If the existing teak is unusable – then the choices are to replace the teak with new teak or other product that would survive the elements or finishing the top of the bulwark with epoxy/paint/non-skid.

If the teak cap rail will NOT be reinstalled– then plan to add a riser of fiberglass about ½” thick under the jib track to provide working area and more support to the jib track.



Above is hull 207 during installation of the ½" track riser. The screws are holding the riser down and in position during the epoxy cure and are removed when curing is complete.

The cap rail joint fix in rough order.

Removing the hardware

Most of the hardware on and around the cap rail will remove easily. The jib track on #91 used 5/16" SS flat slot head lag screws. Vessels #207 and #567 used 5/16" NC SS flat head machine bolt with washer and nut fastened from below. For the 5/16" bolts where the nut was unreachable or to save time, the head of the bolt can be drilled off.

Removing the bow sprit and boomkins – if needed

Each of these devices support the mast – if the mast is not removed for this project, secure the mast as needed with halyards. This should be enough mast support assuming you have light winds.

Remove the heavy items by using a line and winch to take the weight. Bowsprit/bow pulpit/wiring and the teak planks can be disassembled and removed making handling easier.

Removing the teak cap rail

Remove the teak cap rail by removing the teak plugs, cleaning up the slot in the screw head and removing the screw. If the screw will not backout then a hack saw / sawzall can slip a blade between the teak cap rail and bulwark flange to cut the screw in half or drill off the head of the screw.

Each splice/joint in the cap rail and rub rail is glued together and most have 4 horizontal SS screws with plugs to hold the joint together.

I've found that ~ 10% of the screws under teak plugs will not back out and had to be cut in half.



Removing the chain plates and rub rail

If the mast is on the boat, plan the repair job in stages so the mast is always supported fore/aft and port/starboard. Usually, the rigging can be loosened and replaced with halyards assuming you have light winds.

The chain plates are usually fastened with 4- 3/8" SS carriage bolts, each with a SS backing washer and a nut. You will probably have to remove parts of the interior trim to access and remove the nut. A ratcheting end wrench and long arms will make the removal of the chain plates less annoying. If you are in the slip, secure the chain plate with a small rope to keep them on board.

Often the rub rail covers one of the carriage bolts requiring the removal of the cap rail or cutting away the section of the rub rail over the chain plates.

Bud Taplin says "... what I usually recommend is to use a Japanese hand saw and cut the rub rail on either side of the chainplate, take the small piece off and mark and save it. Then after the chainplates have been replaced, use a little brown caulking and stick the piece back on."

Consider removing the rub rail and refinished it to match the other teak on the boat. Watch lower screws in the rub rail as we've found missing screws behind the teak plugs which leave a hidden and unfilled hole into the boat.

Another rub rail observation is that the rub rail on most W32 are not thick enough to protect the cap rail teak from damage. Some owners have doubled the thickness of the rub rail to be more effective protection for the cap rail teak.

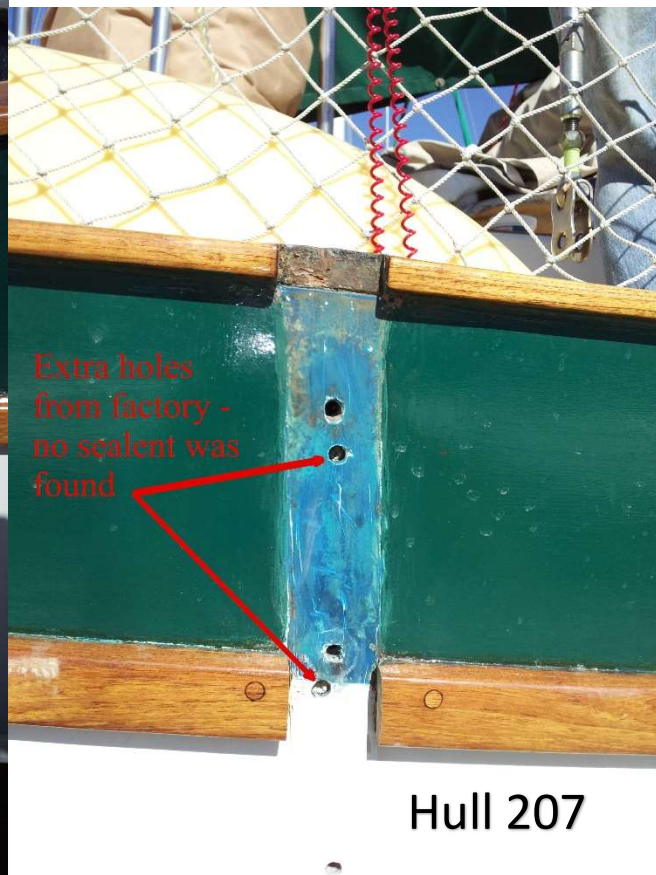
Below notice that the area behind the rub rail has collected stuff over time and has bubbled the jell coat. These loose bubbles should be sanded smooth, faired and painted before the rub rail is reinstalled.



Below are two ways to manage the chain plate and rub rail. Another thought is to slope the exposed ends of the rub rail.

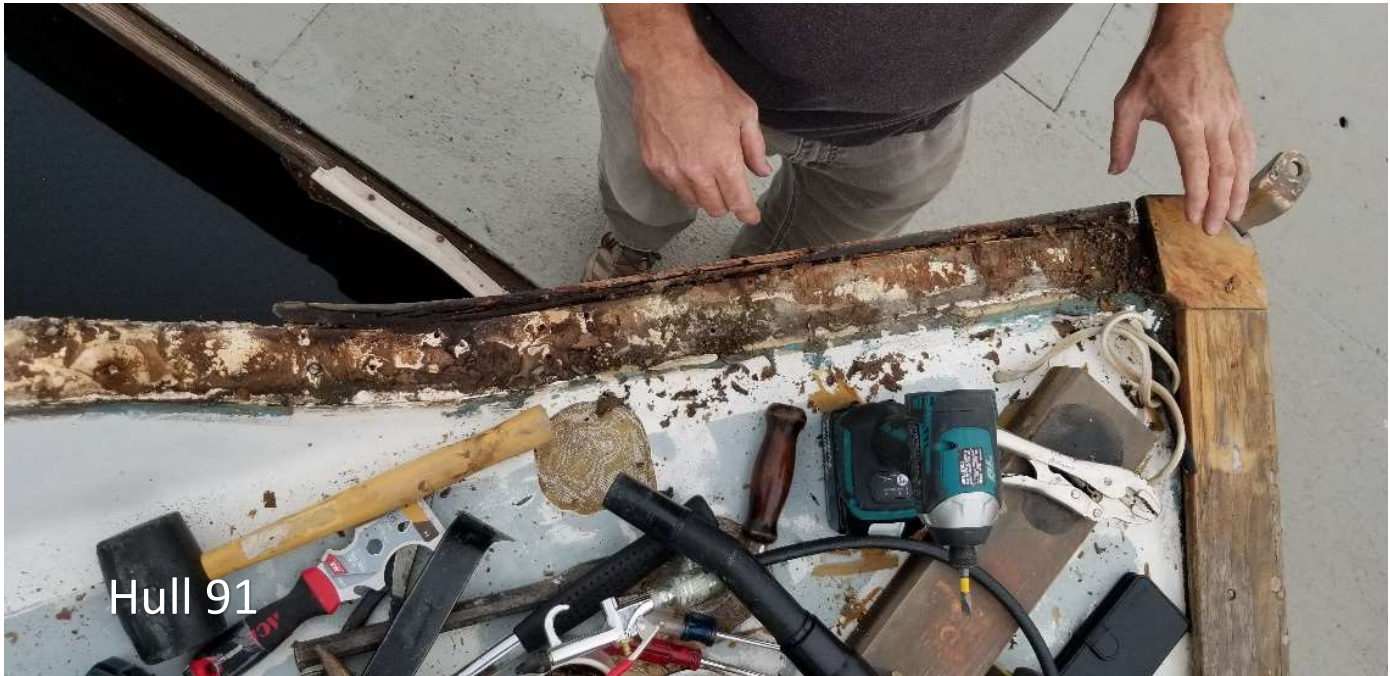


Below you see 2 extra holes were drilled thru the hull in error and hidden by the chain plate and the factory never sealed these holes. The extra holes should be cleaned up and sealed with thickened epoxy.



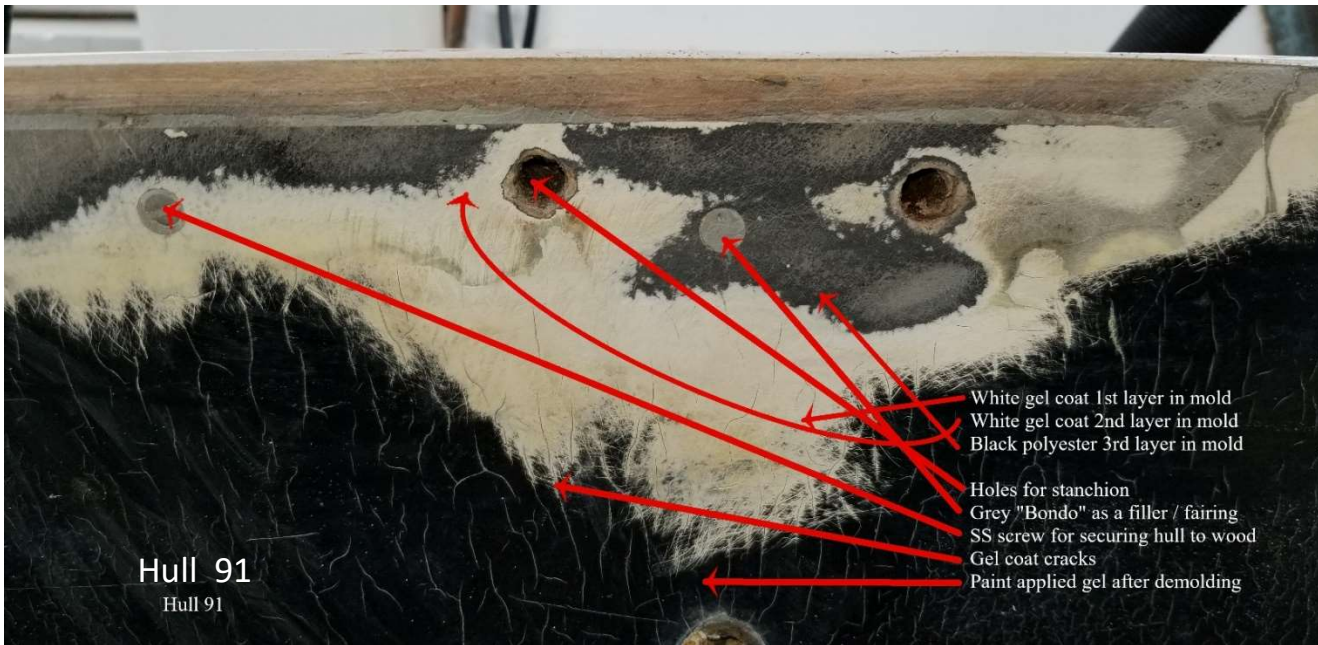
Repairing the cap rail joint and rub rail area.

Joint area: After removing the cap rail, the joint area on the top is exposed and you can see the issues with the old sealant. The whole area needs to be cleaned of old material and sanded down to remove the gel coat and expose the fiberglass/resin. The SS screws that hold the deck and hull joint together need to be flush with the fiberglass, so the epoxy and fiberglass will lay down flat as possible.

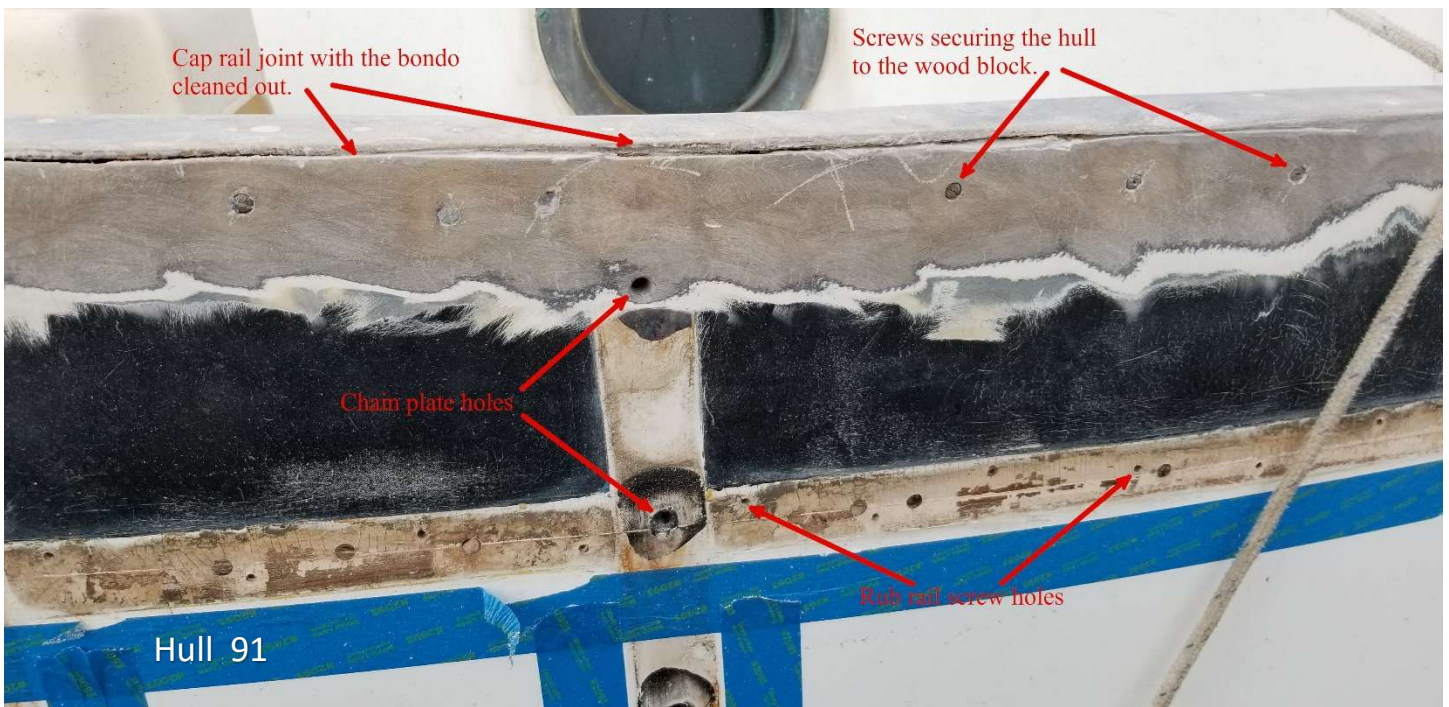




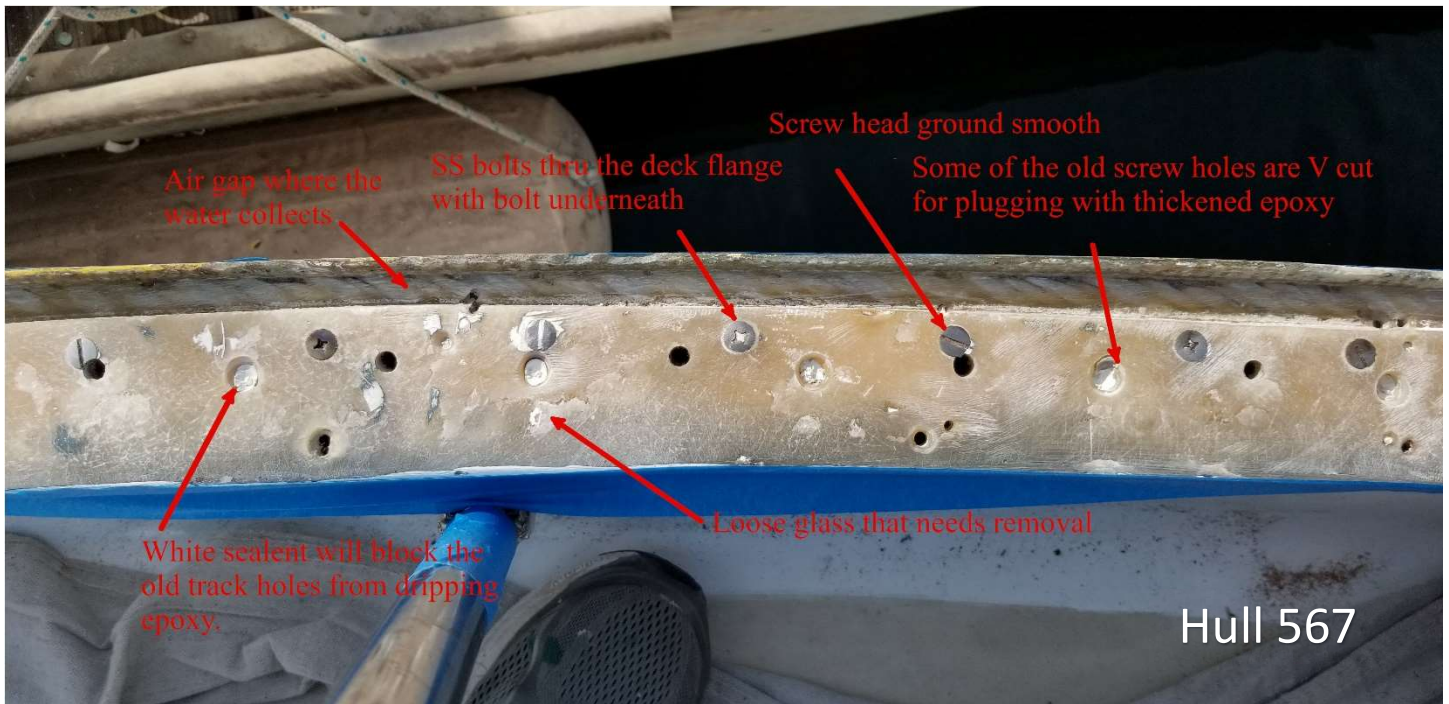
The older style of cap rail joint may/will require more work. Below is seen the large area where filler filled the gaping cracks and holes. Further, the hull side of the bulwarks needed heavy sanding to remove the cracking paint and gel coat.



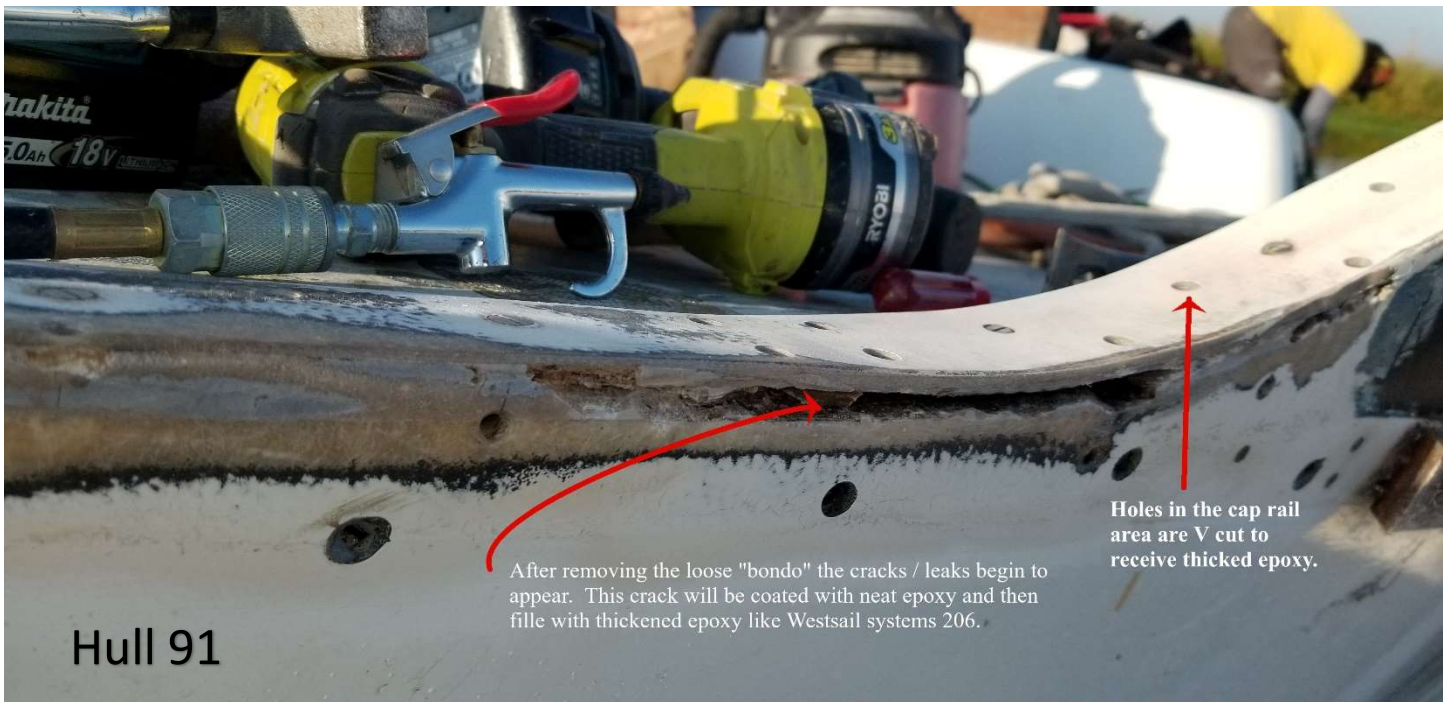
As the bulwark is sanded down to the raw fiberglass, layers of assorted colors can be seen. Remove any loose fiberglass or filler.



Hull #567 with the air gap marked – almost ready for epoxy and glass. First sand the cap rail smooth so the layers of fiberglass lay down well. The “clear” areas are fiberglass with the gel coat removed.



Repairs to the area can begin when all the holes are beveled, and all the loose fiberglass has been removed.



We will be coating the beveled holes in the cap rail and rub rail area, cracks, and gaps with a coat of neat epoxy and while the neat epoxy is tacky the thickened epoxy will be used to fill the screw/bolt holes. You may need to tape up the bottom of the holes as the epoxy may drip.

When cured, sand the area to shape/smooth and use a 3/8" or slightly larger round over bit and a router to round over the outside corner. The fiberglass tape/epoxy will now turn the corner over the edge without bubbles.

Early joint design - installing the epoxy/glass

With the early design of the cap rail, the 3" fiberglass tape is applied $\frac{1}{2}$ on the top and down the side of the bulwarks. You do need to tend the corner area while the epoxy cures as the glass will try flattening out and form an air pocket.



After the epoxy has cured, remove the "blush" by washing with water and/or cleaners and sand the glass tape edges smooth.

The second layer of epoxy and 3" fiberglass tape is installed off set from the first layer and will overlap further down on the outside.



The 3rd and last layer will use 6" to 8" wide fiberglass tape and wrap from the inside edge of the cap rail to the rub rail area. Watch and remove any bubbles as the epoxy cures on each layer.

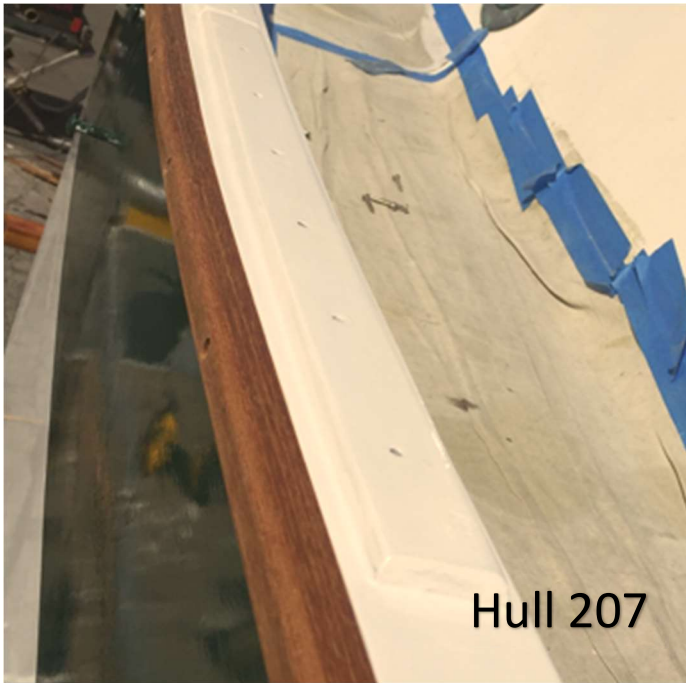


After the 3rd layer of glass, Total Boat Totalfair was used to fair the bulwarks using larger plastic epoxy spreaders. When cured longboard sanders will be used to fair the top and sides as needed.

A second/third coat of fairing will probably be needed to bring the surface to a flat and smooth surface.



If an eyebrow will be installed, then the outside edge should be curved smooth, and the corner squared off so the eyebrow will be tight against the edge of the joint.



Later joint design fiberglass/epoxy install

The epoxy in the first layer of fiberglass should be kept thin for a good bond with the deck and hull fiberglass. Be sure to sand to about 80 grit or lower and remove all dust by vacuum and wiping with acetone/cleaner. Use neat epoxy and coat the surfaces with a thin coat, lay in the 3" fiberglass starting at the inside corner and following the contour with the excess on the outside edge. Add thickened epoxy to complete the first layer and remove air bubbles as needed.



Prep for the second layer by sanding off the high spots and removing the epoxy "blush" by sanding then cleaner/acetone.

The second layer of fiber glass and more thickened epoxy will fill in the uneven areas from the first layer and you want to leave the surface flat and horizontal. Owners may want to add a 3rd lay of epoxy/glass for additional strength.



If the teak cap rail is **not** to be reinstalled, the final coat of epoxy must be smooth and flat. The final epoxy will have fairing thickeners added for a smooth sanded finish.

To support the jib track, a .5" thick piece of epoxy/glass or G10 will be epoxied to the cap rail. Find the position the for the track forward or back at least 1 inch from the original position. Predrilling the holes in the jig track riser is not recommended as drilling and tapping the holes will be done with the jib track as a template.

Another consideration is to plan for a gap in the track support in the lowest area of the cap rail so standing water can drain seaward.

I also recommend that the track bolts be SS Phillips flat head for ease of power tightening the bolts.



Install the track riser and drill/tap for the jib track bolts

After the track riser is positioned and adjusted for the total length of the track (include the track end caps), use epoxy and small screws secure the track riser into the final position.

Start the track installation at the aft end. The aft track bolt hole should be centered on the track riser and about a 1" forward or aft of the original track position. This will cause the new bolt holes to NOT match the original track bolt holes.

When the epoxy is cured from installing the track riser, drill and tap the aft most bolt for the track. I used a drill motor to drill the hole and use a second drill motor with a 5/16" tap. The tap used was a 2 fluted tap as a standard 4 fluted breaks easier when power tapping.

After the first hole is drilled, tapped, and the aft track bolt is snug, reposition the track in the center and drill, tap and bolt the second hole. Continue drilling and tapping the remaining holes by bending the track to fit to the center of the track riser and cap rail.

When finished, remove the jib track, clean the area, and plug with thickened epoxy any of the small holes needed to position the track riser.

Before the jib track is installed, apply the anti-skid/paint to the cap rail and track riser as desired.



Reinstalling the teak rail and drill/tap for the track bolts

As an experiment, I have installed the teak cap rails on # 567 without any screws and using SitaFlex 291 as an adhesive. If the experiment fails, I'll use screws and teak plugs to secure the cap rail teak. These screws will need a hole in the cap rail and a teak plug to hide the screw. The teak plug will require more sanding and finishing of the teak cap rail.

Start installing the teak from the aft end and position each piece all the way forward checking the fit. Refinishing of the teak rail often causes the pieces to grow slightly. Trim the joints until a good fit is found and reseal the ends. Consider shortening one side of each joint by $\frac{1}{4}$ " or so and later filling each joint with black sealant – much like a teak deck.

The old jib track bolt holes are epoxied over and the holes in the teak have been plugged. Choose the location of the new track holes about an inch forward or aft of the now plugged track holes. You can pre-drill and tap these holes using the track as a template and slowly bending the track to be on center of the teak cap rail and drill/tapping the next bolt hole.

Remove the track and clean the area. Apply your sealant/adhesive to the top of the cap rail and install the teak cap rails and secure into position with the track bolts. Firmly tighten the bolts.

The forward teak cap rails are installed with your sealant/adhesive and held in place with water buckets and/or sandbags. Each joint is sealed with UV resistant sealant.



Hull 567



Hull 567

Final install of the jib track

Install the jib track after the cap rail paint is cured or the teak is reinstalled. Use sealent under the track and around the head of the track bolt. The idea is to seal the track and track bolt to the track support as well as insulating the SS bolt from the aluminum of the jig track to prevent electrolysis corrosion.

I found that by using longer then required bolts and partially installing the bolts, I could add in the sealent with the track bent to the curve of the boat.



If the jib track bolts do not tighten (the threads are damaged) add a washer and nut from the inside.

Repairing the teak cap rail for reinstall

The repair of the teak cap rail will consist of removing the finish on both sides. If there are pieces of teak broken off during removal, epoxy back in place.

Since the track will be installed about an inch forward or aft of the original position the large bolt holes will need to be plugged with teak plugs and epoxied in place. The existing 3/8" holes for the screws holding down the teak may also need to be plugged. Sometimes the plug area was damaged from removing the plug and screws. Use a larger teak plug to repair the area.

Consider enlarging the slots in the teak for the chain plates and any semi-circles for the stanchions. Enlarging these area makes installation easier and there is room to add sealant to keep water from standing in the cracks.



Epoxying a 3" fiberglass tape to the back of the teak will strengthen the teak. The bottom is also refinished with the same finish as the top.



I've given up with getting the joints to be as tight as the joints done by the factory. I found that the water would gather in the crack and begin to undermine the finish.

Below I've beveled the top edges of the joint and used black UV resistant sealant to fill the bevel. Another idea is to trim off 1/4" of teak from one side of the joint and fill the whole gap with the same sealant.



There are many finishes for teak each with pros and cons – here is Sitka Cetol Natural with 3 coats for the under coat and the topcoats with Sitka Cetol gloss. A second gloss coat will complete the finish.

Here are a few pics of finished cap rail repairs.



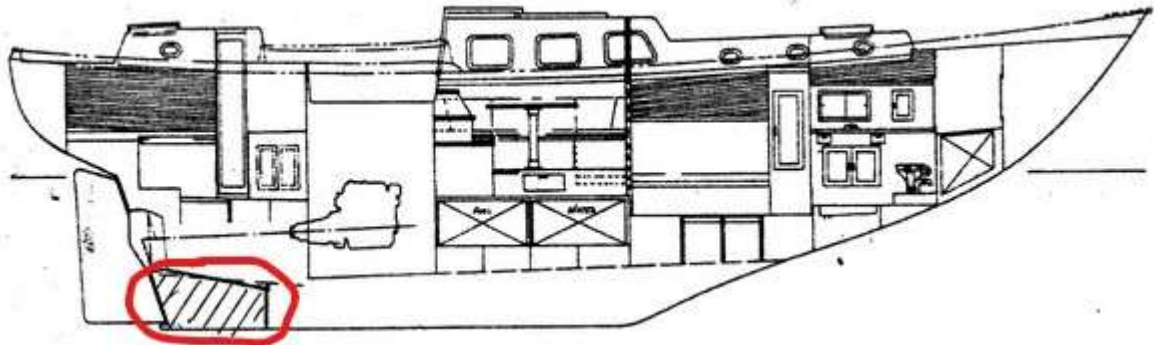
Special case fixes.

Bow and stern joint repair for cracking gel coat and checking the factory joint.

Bud's comments on W32 and W42/43 hull construction 5/31/2022 via email.

"The majority of the W32 hulls were two pieces when Westsail was at the Placentia St. factory (in Costa Mesa) and at the Wrightsville Beach factory (on the ICW and Greenville Sound Road, Wrightsville NC 28480). When Westsail moved to the new plant in Irvine, it had a high ceiling, they made the last set of molds with a one-piece hull mold because they could turn it easily hung in straps on an overhead railway system. They turned the hull mold to make the major portion of it horizontal for laminating, then rolled it over to do the same with the other side. They also made the new deck mold with more crown, flush lazarette hatch, port set locker, and skylight on the cabin top. They also faired in the prop aperture, and some other fairing of the hull shape. This was done on about hulls after #625 or so."

"The W42 and W43 hulls were molded in three pieces, then bonded together. We knew that to reach down to try to center bond the hulls down at the lower end of the keel, it would be practically impossible. So, we made a small third mold of the aft end of the keel and attached it part way up the keel where it could be reached. The joint line can be seen if the bottom paint is removed from the aft end of the keel. It was done so that the center bonding was along the keel where it could be reached, instead of down deep on the centerline where it was doubtful the laminator could get a decent bond line. I thought I had a picture of that but could not find one. The piece went about 4 to 5 feet forward along the bottom, about 3 feet or so up the keel. I have attached a sketch of about what that third piece looked like (circled in red), to the best of my recollection."



On #567 the upper part of the bow joint between the 2 hull halves was poorly bonded. A screwdriver was easily pushed vertically thru the soft filler and into the interior of the boat.

All this filler was cleaned out with scrapers and 40 - 80 grit abrasives. Epoxy and fiberglass were used to re-bond the joint.



The bow and stern joint will often show a gel coat crack due to the soft fillers used.

In 2018, #567 was hauled out and the bow was cleaned down the joint to the water line. Remove the filler, clean the area and layer in thickened epoxy and fiberglass, fair and paint (not shown).





Hull 91

Hull sides lower than the deck flange

Some boats have a “low” area that was filled with filler at the factory to obtain a horizontal surface. Remove the filler and make tape dam which will be filled with thickened epoxy to achieve a horizontal surface.



Removing the hawse pipes

The hawse pipes are made of two pieces of cast bronze (#91 & #207) or spun brass (#567). The water leaks can be in the center where the hawse pipe halves join or from the flange and fasteners. The removal can be difficult if the fasteners become stuck. The area between the hull and bulwark can be a void or filled with filler and/or foam. By this time, the filler/foam has deteriorated and cracked.



To support horn style hawse pipes, #207 used three stacked pieces of $\frac{3}{4}$ " plywood – soaked with thin epoxy to make watertight.



Some of the blocks needed special shapes to fit into the very tight spaces.





Dry fit and then epoxied into place



