

Campbell Boat Bulkhead Replacement

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Assisted by

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Our story begins in the late spring of 2012, with the purchase of my 1974 Campbell Cuddy Cabin (CC), from a gentleman in Fillmore Ca. The previous owner (PO) stated that the boat had spent most of its life in or around the lakes of the Central Coast (and had been babied!!!). It was in reasonably good shape and everything appeared to work. After a test ride on beautiful Lake Piru, we closed the deal and I drug her home. Early on I suspected that the main bulkhead was in need of some love but based on the price and our "skills" I was confident that we could handle this "small" job.

One clue there was a problem; as the boat went down the lake, when the hull would encounter wakes or waves, you could literally feel the boat flex. I knew it had something to do with the bulkhead as the front cabin area moved at a different rate than the rear of the boat. The boat just did not have that solid feel to it that I had felt in other boats. On top of that you could see things moving around at or near the bulkhead, which you know should be a secure "fixed" location. The problem is that in most Campbell Cruisers, this area is completely covered in material or carpet and is difficult to inspect.

This was the second CC I had owned and it was the second CC that needed bulkhead work. After lots of research and discussion with the Campbell veterans, it appears to be a common "design flaw" if you will in these boats. Given the combination of hull design, trailer design and bulkhead assembly, that area of the boat is the lowest spot and hence is where water can collect and sit. Other boats have plugs in this area used to drain the low spot of excess water and accumulated oil. Not so in our boats. In addition to this, the main structural support in the boat is a two piece unit, which connects right where the water sits and you now have the right combination for a bulkhead replacement after 39 years of service !!!!

My son, Buddy, is a finish carpenter by trade, and I have limited DIY skills. So while researching this project, never did I think it was beyond the scope of our abilities. We had access to most of the power tools needed and most importantly, a support staff of "Campbell Vets" willing to share their time and knowledge to assist us. On top of that was my lovely bride, who was willing to put up with "boat construction" in the driveway.

The biggest issue for me in moving forward with this project was that it was going to require some amount of upholstery replacement, which was ok in that we had kicked around the idea of changing the color of our boat and the upholstery anyway. The bulkheads are "wrapped" in material and the cabin headliner is sewn into the bulkhead upholstery so that it stays tight. I think Freddie has replaced bulkheads without having to completely replace the headliner, but my boat needed a new headline anyway so it was not a big deal to remove everything.



This is how the bulk head should look on a well taken care of Campbell Cuddy Cabin (ie Strange Brew)

Not like this....







The process is fairly simple; rip or remove everything around the bulkheads. I removed the “tiller” station and labeled everything for future reassembly. All the interior upholstery needs to come off the bulkheads to facilitate further inspection. I initially thought that my front bulkhead, (the smaller one in front of the cabin seats) was fine as it appeared to be ok at the contact point of the bottom hull. Upon further inspection, it was clear what had been going on.



When the main bulkhead failed from water/oil rot, the smaller bulkhead was still trying to hold everything together. Alas, it is the smaller of the two bulkheads and did its best, but ultimately the 40 year old plywood gave up and the bulkhead was actually “ripped” top to bottom on both of the outboard stringers!!!!

Again, not a big deal just more work was required.

The one important piece of information here: Before starting any removal of the bulkheads, measure, measure, measure. We took some basic measurements but, but if I were to do this again, I would take many more measurements before I started cutting stuff out. Simple things like, measuring the distance of the bulkhead at the bottom and at the top from a known location are invaluable so that when the new bulkhead is reinstalled, you could insure that it was true in the boat. When the Campbell's were laid up at the factory, they used $\frac{3}{4}$ inch plywood. The $\frac{3}{4}$ ply is fine and like Brad said, "it would still be in there long after he was dead!!!!" Some have "upgraded" to 1" inch plywood but this comes at a price. Not only is 1 inch ply more expensive to purchase, it is also more difficult to work with. The additional thickness of the bulkhead will create issues with the "fitment" of cabin furniture if the addition of the thicker wood is not incorporated. I went with the thicker 1 inch plywood and handled this problem by moving the forward bulkhead "forward" to accommodate the new wood. Before "locking" down my new bulkheads, I test fit everything in the cabin to insure I had enough room for everything.

We used a (Harbor Freight) oscillating saw to cut the fiberglass around the bulkhead and stringers. Be careful when cutting the old bulkhead out, because it will serve as the pattern for the new bulkheads.

The removal is not really a big deal; simply cut the fiberglass around the stringers and the hull and then pound it out.







Patterns for my new bulkheads !!!!

The biggest and nastiest job (I thought) was grinding out all the old fiberglass and prepping the hull for the new stuff. Goggles, respirator, ear plugs and a tyvek suit are strongly recommended here!!!!





I spent about 2 weeks grinding on the hull and stringers getting them ready for the install. The bulkheads are “tabbed” in place with several layers of fiberglass and resin. Grinding out the old fiberglass and resin was the worst part of this entire job.

The cool part about doing this work myself was that I got to see firsthand, how strong these boats were built. Even with the bulkheads broken, the hull and stringers were in great shape and were still holding things together!!!

Once I had the hull prepped, I focused on building the new bulkheads. Buddy cut the initial pattern for me using Maple Hardwood plywood from our local source. Nothing fancy here, just a jig saw and a belt sander and lots and lots of patience.



I started with the forward bulkhead and worked my way out.



Here you can see where I have moved the new bulkhead forward to accommodate the thicker wood. The grinding marks in the hull show where the original bh was located.



Having never done a job like this, I had to rely on the veterans and experts who were guiding me along. When fitting the bulkheads into place, I would use the belt sander to remove material from the wood and then try to slide it into place. This process went on for days!!!! Trim a little here and then a little more there. The idea is to have a small gap between the sides of the hull and the bulkhead so that the wood is not resting directly on the sides of the hull. This gap is then filled with thickened resin before the “tabbing” process begins. If the bulkhead were fitted too “tight” to the sides of the hull, it is possible that the twisting and “flexing” the bulkhead and stringers experience could be transferred to the hull and end up ultimately producing stress cracks in the gel coat. So there were many trips in the boat and then out again to make adjustments. In addition, referencing the measurements we had taken earlier and then moving everything to adjust for the thicker wood.

Slowly it started to come together.





Here you can see the small gap sides of the hull to allow for the flexing or movement of the bulkhead.

Before “locking” things down, the next step was to test fit everything to see if we were close on our measurements.





Once I was comfortable with where I had located the bulkheads and I was fairly sure everything would fit right, I could move on to securing them into place.

I used counter sunk stainless steel screws in the top of the cabin and then I screwed the bulkhead into the stringer at the bottom.



Brad suggested that I would need about 5 gallons of resin to complete this job. I think I ended up using 6 gallons. Living between two marinas and right in the middle of surf country, I had a great local source for resin and fiberglass (Fiberglass Hawaii in Ventura). I mixed up a batch of “laminating” resin with thickening agent added, to give the resin the consistency of peanut butter. I found it easier to mix up about a quart of resin at a time; anything more and the resin would start to “kick” before I could finish.



I used the thickened resin to make my “fillets” between the bulkhead and the hull.

Having access to guys like Freddie and Brad Riggen was huge for me in making sure I did this job right. The two halves of the main bulkhead are secured together or “sistered” by using pieces of wood on either side to make a “sandwich” if you will.



In my application, I drilled and counter sunk all the holes for stainless steel machine screws and locking nuts. I also used a layer of fiberglass and lots of resin between the “sister” piece and the bulkhead pieces.





As I started to look at “tabbing” in the bulkheads, I learned there were two schools of thought on this. One is to laminate several layers of glass with each layer being slightly larger than the last using at least 3 layers total. The second school of thought, was the way Campbell was doing it just before they shut down production at the factory, according to Freddie. Fiberglass panels come in three distinct styles; cloth, mat, and a combination or hybrid of both called (1708). The hybrid (1708) is newer technology and is supposed to take the best properties of cloth and mat and combine them into one “stronger” product. Freddie said Campbell was using one layer of 1708 to “tab in” their bulkheads, and Pete Giroux of Giroux Boats confirmed that is what he uses when he “tabs in” the bulkheads of the race flat bottoms he builds.

When I bought the 1708, I could have bought just the length I needed or I could buy it by the pound and save some money. I bought it by the pound, trying to save some cash, but ended up needing much less than I thought. But we may change out the bulkhead in Buddy’s boat so it will get used.





The actual job of “tabbing in” is not that big of a deal. I precut my “sections” and had them ready to go when I had my “batch” of resin mixed up. I used lots of small batches, took my time wetting out the cloth, then laying it into position, then wetting it out again. No big secrets here, just trial and error on how much catalyst to use. Bottom line is - use more catalyst when it's cold and less when it's warm. The catalyst is nasty stuff so lots of protection is needed to keep it off and out of you (eyes, ears, throat, skin!!!). I love the smell of resin, some do not, but while I was mixing it up and “tabbing” it stunk up the whole place and I even got comments from the neighbors saying they could tell when I was working with it !!!!

I chose not to use marine grade plywood in part because, before putting any wood in the boat it got several coats of resin. Additionally, once the bulkheads were installed, everything got another coat of resin.

One thing I chose not to do, was to install a drain plug through the bulkhead, which allows any water in the cabin area to drain back into the motor compartment where the bilge pumps are located. This discussion went back and forth several times but ultimately I decided that I did not want water running the other way - from the motor compartment forward into the cabin area, to be possible. I also did not think I could seal the wood of the drain hole sufficiently to keep the wood from being exposed to water and oil (which sort of caused this whole mess to begin with!!!!). If a small amount of water gets into the cabin, I will deal with it. If a large amount gets in, somebody might need a life vest anyway????

In conclusion, bulkhead replacement was a fairly straight forward job that someone with marginal skills could tackle. It made a huge mess of my garage and driveway and took me approximately 2 ½ months to complete, working on it in my spare time. But it was never really a “job” for me, because the way I saw it, I was “boat building” and saving a classic.

I had received informal estimates of \$2-2,500 to have this job done by a professional. Looking back at the work involved, I believe that is a smoking good deal if anyone is considering farming this job out.

Here is a breakdown of my expenses:

Contractor Pricing on 4x8 sheets of 1" MPH (White Maple) 2 @ 78.65	\$169.52
Vinyl Ester laminating resin 5 gallons	182.70
Catalyst for resin (14oz.)	12.15
6 inch 1708 Fiberglass (25 lbs.)	110.36
Aerosol (thickening agent for resin) 1lb	12.95
Miscellaneous supplies (brushes, mixing tubs, respirators, Tyvek suits, sticks) and an additional gallon of resin to finish the job	<u>75.00</u>
	\$562.68 Total

Additional resources

Fiberglass Boat Repairs Illustrated by Roger Marshall