T34C CENTER BOARD REPAIR

When I bought my T34C the centerboard was seriously drooping like a dog's tongue in August. When I disconnected the cabling I could move the arm through nearly 30 degrees without the board moving. The good news would have been that the pin needed replacing, while the bad news would be that the hole in the board was worn round. Well you can guess which was true. When the pin was extracted it was perfectly square, so I was left with the conclusion that the hole in the board was worn. This was later confirmed after I had the boat lifted and the board dropped out.

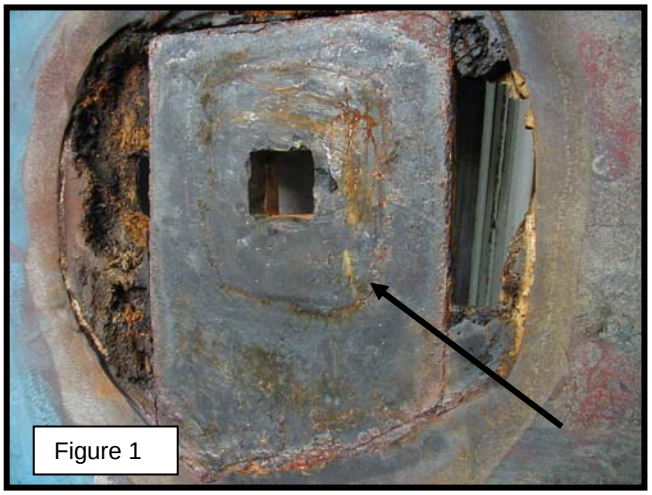
Figure 1

The Fix: I then attacked the board with the rotor tool that was set to a depth to remove the FRP from around the hole for about 8 inches in diameter. This was done on both sides (see figure 1). As is see in the picture, the board is constructed of a central steel plate about 6 inches wide, ½ thick and goes most of the length of the board. This steel blank is covered with FRP to give the eventual airfoil shape of the board. In the case of hull #57 the hole in the board that accepts the pin is a bronze or brass investment (see arrow) with what looked to be a diameter of 3-4 inches. Thus, the hard stainless pin was bearing on a relatively soft metal (brass or bronze) which was only ½ inch wide, a recipe for wear if I ever saw one. In a discussion with George Duffie, he told me that he had repaired his board by first adding material back to the hole and filing it back to the original square dimension. This he followed with welding ½ inch square bar stock around the perimeter of the hole to increase the thickness of the bearing surface to 1 inch. It is my guess that his board did not have the brass/bronze investment but was likely all steel.

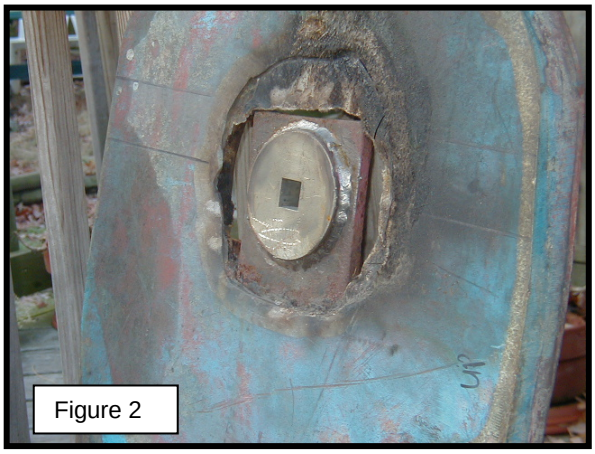
Figure 2

When I took this remedy to my welder he suggested that we cut out the brass/bronze investment and replace it by welding in a 1 inch thick stainless steel donut with a square hole cut in the center dimensioned to fit the pin. This he did taking great care to not heat the steel blank so hot that it significantly charred the surrounding FRP (see Figures 2 & 3). The donut was position such that its flat surface was below the plane of the board so that when I re-constructed the FRP in this area (see below) the SS donut would be below the surface. Now it was time to repair the hole I had cut in the

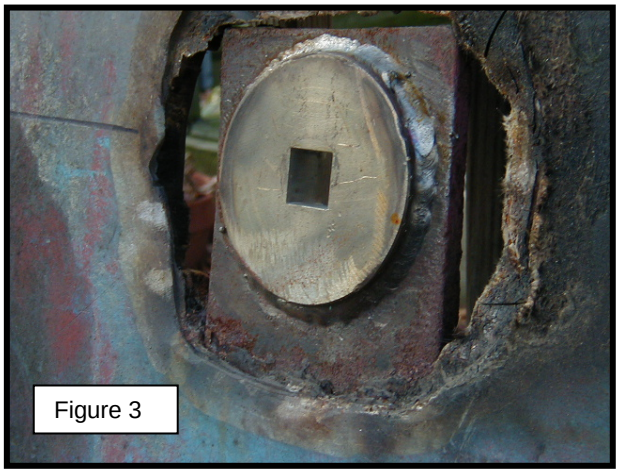
Figure 3

FRP to gain access to the steel core. I first cut and fitted pieces of ½ inch plywood to fill in the empty sections adjacent to the steel core and after sealing them with epoxy they were epoxyed in place (see figure 4 & 5, the arrows indicate the plywood filler pieces). I then tapered the edge of the hole I had cut in the board to gain access to the core and laid up fiberglass/epoxy to build up the board to the appropriate thickness. This was done on both sides. Finally I filled and faired the area back to its original thickness.

On sounding the board with a plastic hammer, I found a number of voids. Some were near the hole that I cut and were probably a result of the core material burning out during the welding. Others were further away and likely due to original poor lay up. I fixed these by drilling multiple 1/8th inch holes in the area of the voids and injecting slightly thickened epoxy resin until it oozed out of all holes. As each hole began to ooze I plugged it and continued until all holes were oozing. At the same time I repaired some dings in the leading and trailing edges of the board.

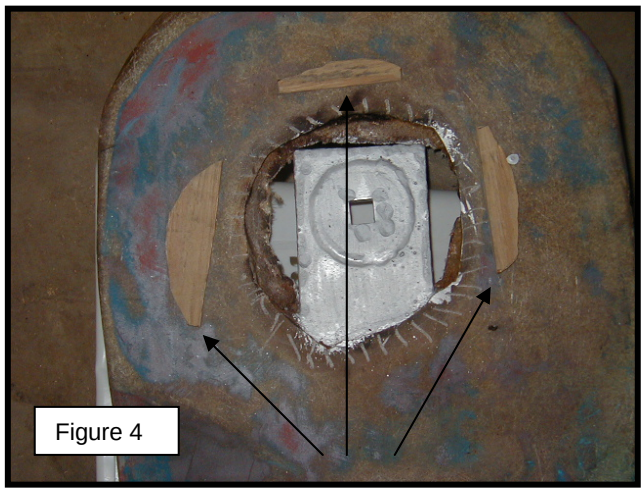
Figure 4

Cost: The welding and the stainless steel donut cost me $375 (YMMV). The epoxy and fiberglass were another $25. All in all it was better than $1500 for a new board.

None of the work was difficult beyond the welding, which was professionally done. The hardest job was to locate a competent welder who was willing and able (emphasis on the last) to do the job.

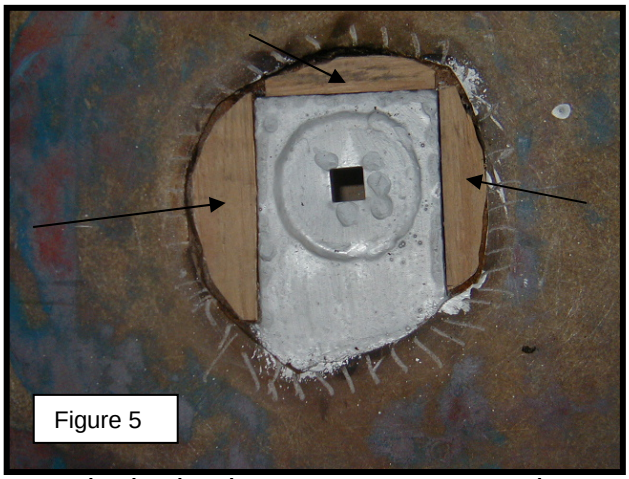
Figure 5

NB: One cautionary tale is to be aware that there is a bushing on the port side of the CB trunk that accepts the small end of the CB pin. At least in my case this bushing was not secured and some time during the period between the removal of the board and it's reinstalling it dropped out and disappeared (did I tell you that I sailed for a whole season without the board while I fixed it?). The unfortunate aspect of this is that it is not a standard size bushing either in the outside or inside diameters. As a result I had to have one custom made. Not expensive ($40) but a pain in the butt because the ID of the hole that receives the bushing is difficult to measure so I gave it the best I could. Well you know it was over sized so I spent a lot of time filing it down to fit. Once it fit I cut grooves around the diameter then bushing was epoxyed in place by lathering the hole in the CB trunk and the outside of the bushing with thickened epoxy then using the pin to locate it into the hole. The pin was generously covered with wax and mold release so that the bushing and pin would come apart after the epoxy had kicked. In my frenzy to get this all back together I forgot to measure the final OD of the bushing, for this I apologize.

Postscript: Am I happy with the results? Well as I said I sail for one year without the board in while I worked on it. During this period I built a deceit set of biceps holding the weather helm that

developed in the tiller when the wind was up. The first time I went out for a sail in about 15 -20 kts of wind my son was at the helm. It was clear that he was using both hands and straining with the helm as we went to weather. I went below, found the CB crank that I had stashed in a draw and gave the CB a crank and a half turn down. My son immediately looked at me a said, “dad what did you just do?” Apparently the heavy pressure on the tiller had vanished and you could virtually steer with your fingers. Now I just have to remember to crank it up when we come back in so that I don’t destroy all my hard work.

Neal Musto
T34C #57
Aeolus