REPLACING ROUND BAILERS WITH ANDERSON BAILERS

So you want to replace the original round Chrysler bailers with Anderson bailers (originally Elvestrom type)? Not a bad idea. This upgrade will reduce sheet snagging. The Andersons do a good job of sucking water out at speeds starting around 3-4 knots. They also have a built-in check valve to reduce water intake when speed drops below suck-out speed. This upgrade project will take 10-15 hours total working time. There will be lots of time spent between work steps while resin is curing.

Note, I did this upgrade on my Buccaneer. The work is essentially the same for a Mutineer. Before beginning work, first decide where you want to place the new bailers. I installed the back end of the bailers 13.5 inches in front of the rear edge of the CB trunk at the cockpit floor level. I suggest you level the boat on the trailer, then pour a bucket of water into the cockpit to determine the low point, fore and aft. Next you have to choose where to locate the bailers side-to-side. This depends on what your priorities are. I choose to locate them quite close to the sides of the seats so that when the boat is healing the bailer is at the low point. This means while beating to windward water coming on board from splashing over the bow and running down the foredeck into the cockpit or water coming over the leeward rail will be sucked out while the crew is hiking to windward. In heavy winds both bailers could be left open during the entire windward leg. The downside of this bailer location is that the bailers are not at the low point when the boat is on the trailer or when you are running downwind. My decision was based strictly on racing considerations. If I was only going to be using the bailers for daysailing I would have only mounted a single bailer (as Chrysler did as standard equipment on its 1979-81 Mutts and Bucs). The single bailer on my Mutt drains a half-filled cockpit (half-way up the CB trunk) dry in about 5 minutes at 4-5 knot boat speed. I would also have located the bailer closer to the CB trunk so that it would drain water better when on the trailer and when there is little heal on the boat.

Step 1

Remove the boat from the trailer and put it on a level piece of grass. Install the mast to use as a lever for putting the boat up on its side. Put two thick old sofa cushions under one of the rubrails (to prevent cracking the very weak fiberglass on the Chrysler rubrail flanges), then tip the boat on its side by hauling on the main halyard while the either end of the halyard is fixed. To keep the boat on its side, I put a piece of old carpet over the masthead with a concrete block on top of the carpet. Having the boat on its side will allow you to work on both sides of the bailer installation (bottom of hull and inside of cockpit) without having to move the boat.

Remove the old round bailers by undoing the nuts/bolts attaching them to the hull. Once the bailers are out you will find that the fiberglass is very thick in this area, at least 1/2" thick. See PHOTO 1 below.

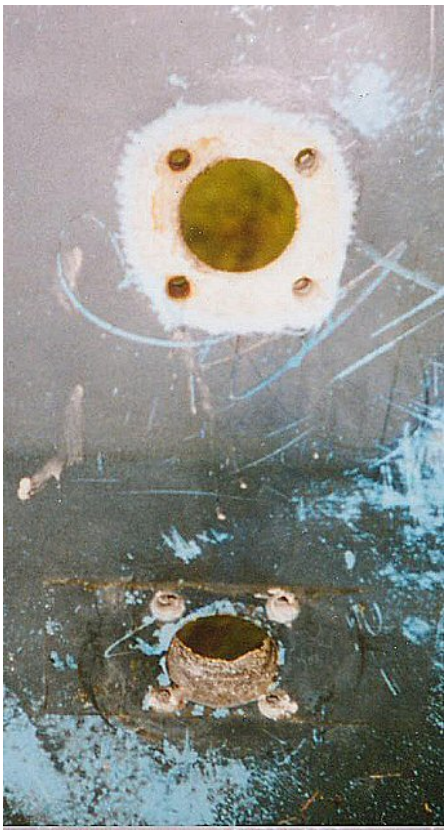

Photo 1

The holes penetrate both the cockpit/deck piece and the hull piece. There may be voids where these two pieces are joined where the old bailer holes were. If so, fill the voids with a paste made of epoxy with hard filler. I used West System epoxy with West colloidal silica filler. Other brand names of epoxy will also work fine. I like the colloidal silica filler because it is reasonably strong and hard, but it can be filed, rasped, and sanded easier than a harder filler such as West High Density filler or Marinetex. While filling any voids, also fill the bolt holes with the filler so that the holes are completely filled from top to bottom. Wait for the epoxy to cure.

Step 2

In this step you will plug the old bailer holes. To get a strong bond between old fiberglass and new glass when you are butting the new glass to the old glass end to end, you need to "scarf" the ends together. This is the same concept as scarfing pieces of plywood together. There needs to be a large bonding surface area to achieve a strong bond. For structural fiberglass scarfing you need a scarfing ratio of 15:1 to get the same strength as the original fiberglass. This means that if the fiberglass is 1/4" thick you need to have the edges bonded over a length of 3 & 3/4". If you are willing to accept a minor reduction in strength you can use a scarf ratio of 12:1.

There are a few reasons that these high ratios are not required to fill the bailer holes. First, if the Mutt had been built in a single piece, the fiberglass thickness in this area would probably only be 1/8-3/16". Second, the bailer holes are so small in diameter, that the hull was not seriously weakened when the holes were made. Even so, to ensure a permanent bond of new glass to old

glass, I suggest there be some scarf. I used a scarf ratio of about 1.5:1. Since the thickness of glass was about 1/2" this means I had to cut a bevel about 3/4-1" wide all around each hole. I did the bevel from the bottom side since there is much more room for working the tools then from the cockpit side. I used the curved side of a wood rasp to cut this bevel. There is no need to make it particularly smooth. The rougher the cut, the more surface area for the resin to bond to. See PHOTO 2.

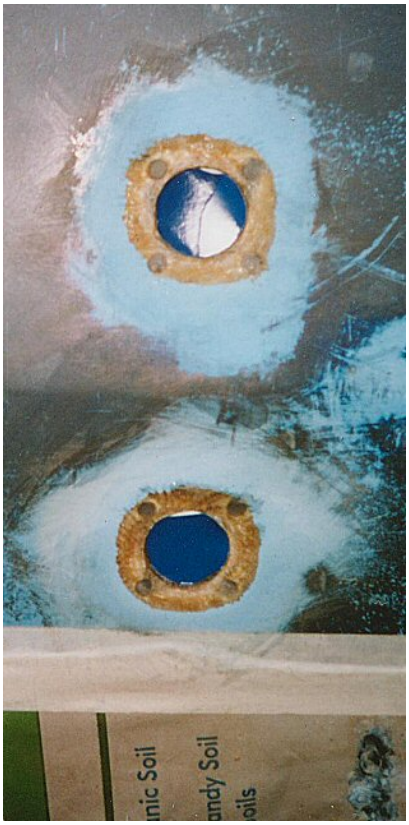

Photo 2

Note, the boltholes have been filled with resin paste which appears dark brown. The light brown is the beveled fiberglass. The light blue is the gelcoat. The dark blue is 1/16" thick polyethylene cut to fit the old bailer hole at the cockpit end of the now beveled hole. Polyethylene is used since polyester resin will not stick to it. The idea is to fill the hole from the bottom leaving a 1/16-1/8" thick indentation on the floor of the cockpit. This will allow you to fill this indentation with gelcoat later to match the gelcoat of the cockpit floor. If you don't want to spend this effort gelcoating, just cover the hole flush and paint the fiberglass. Note, to make this plug you can use anything that is relatively stiff such as plywood. Just cover it with a layer of supermarket plastic bag (polyethylene) and hold it in place with duct tape. In PHOTO 2 note that I've taped a piece of plastic bag to the hull beneath the holes. This is to catch running polyester resin so it does not run all the way down the hull to the gunwale.

Gear up for fiberglassing. You're going to need around 20 layers of fiberglass to fill each hole. It would be nice if you could use thick woven roving for this, since it would cut down on the number of layers. However, woven roving can not be cut into such small pieces without falling apart. So, use matt and cloth (8-10 ounce) alternately. Use polyester resin to wet the cloth. Cut

each layer of cloth slightly larger in diameter than the previous layer. You can apply a maximum of about 4 layers at a time. When you get near the bottom level leave a 1/16-1/8" depression to provide room for gelcoat to match the hull. Again, you could glass right up to the bottom and apply paint instead of gelcoat.

After the last layers of fiberglass have hardened sand the outside edges smooth with the cockpit floor on the inside and with the hull on the outside. Finish this part of the job by gelcoating or painting both inside and outside. PHOTO 8 shows the original bailer holes filled with fiberglass, but before gelcoating.

Photo 8

PHOTO 9 shows the same area after gelcoating. The stuff covering the new gelcoating is just loose construction debris, not flaws in the gelcoat.

Photo 9

Step 3

I suggest using Anderson New Large bailers (APS $63.75 each). You've already determined the bailer location prior to starting step 1. The floor has non-skid pattern in the center areas and a smooth strip approximately 2 inches wide all around the seat sides and the CB trunk. Whether you locate the bailers close to the seat side or close to the CB trunk, I suggest not locating the edge of the new bailer hole any closer than 1 inch from transition line between non-skid and smooth surface (See PHOTO 5).

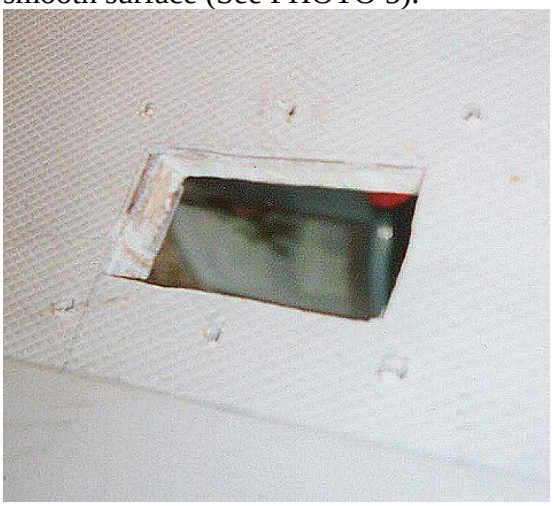

Photo 5

Use the cardboard template that comes with the bailer to mark the outline for the main hole plus the boltholes on the cockpit floor. Drill pilot (guiding) holes for the bolts with a 1/16" diameter drill bit through the hull from the cockpit side. Adjust the angle of the drill so that the holes on the bottom of the hull line up with the boltholes on the template. After the boltholes on both the cockpit side and hull sides line up with the template, use the template to mark the main hole on the hull side. I used a good quality jigsaw to make the bailer hole. First drill a 1/2" diameter hole in the center of the bailer hole area to allow the jigsaw blade to enter. Then use the jigsaw to make this rectangular hole. Take your time and try to get a tight fit between the bailer and the fiberglass. Use a wood rasp for finetuning the hole. When you are satisfied with the fit check to see if there are any voids in the fiberglass where the deck and hull pieces meet. If so, fill them with epoxy paste as you did in the first step in filling the old round bailer holes. Next, drill the boltholes with the correct size drill bit for the holes. I suggest making the boltholes slightly oversized so that the bolt thread will pass through the holes without you needing to turn the bolts. This will make bailer installation and removal easier, plus it allows you a little margin for error in locating the boltholes. PHOTO 5 shows the bailer hole cut, the voids filled with epoxy paste and the boltholes drilled. Note the nearest edge of the bailer hole is just slightly more than one inch from the smooth part of the gelcoat next to the seat side.

Step 4

The next step is to cut out a recess in the hull side to accept the flat flange of the bailer so that the bottom of the bailer will be flush with the bottom of the hull. This is analogous to installing a hinge on a door. A depression is cut into the edge of the door to accept the hinge so that the hinge top is flush with the edge of the door.

Insert the bailer from the hull side into the hole until it hits the gelcoat. Trace the outline of the bailer flange onto the gelcoat in pencil. Every part of the gelcoat within this outline will need to be removed and possibly a bit of fiberglass as well. This will depend on how thick the gelcoat is relative to the thickness of the bailer flange.

For the first bailer I used a Dremel tool with the router collar and the fiberglass-cutting bit to remove the gelcoat plus a bit of fiberglass. This method had been recommended method by one of the Buc owners. I used duct tape to attach a paint stirrer to the hull to act as a guide for the router collar on the Dremel tool. This method gives very good control of the straightness of the line that is cut and also of the depth of the cut. But, it takes forever. The Dremel has very little power and fiberglass is tough stuff to cut. Even though the diameter of the fiberglass cutting bit is only about 1/8" and the depth of cut was only a little over 1/16", the going was extremely slow. It took about two hours to make all the cuts. PHOTO 3 shows the paint stirrer, two horizontal cuts along the bottom, two vertical cuts and the entire top band already removed using a series of horizontal cuts.

Photo 3

After finally finishing the cutting on the first bailer hole, I wised up for the second hole. I still used the Dremel tool to cut all of the outside lines (two horizontal and two vertical). Once these lines were cut, I than removed the gelcoat/fiberglass from within this outline with a hammer and sharp wood chisel. This took about 1/4 the time of removing all the material just with the Dremel tool. If you don't have access to a Dremel tool, I suggest you score deeply through the gelcoat using a utility knife against a straight edge all around the outline to give a good sharp edge to the evacuation. Then use a sharp chisel to remove all the material from the outlined area.

Next, there are depressions at the backside of the flange where the boltholes in the flange are countersunk. You will need to countersink the boltholes in the hull to accept these depressions. Otherwise, the flange will not sit flush with the hull bottom. Use a wood 1/2" diameter countersink to make the countersinks in the fiberglass. PHOTO 4 shows the gelcoat and fiberglass removed and the countersunk holes made around each bolthole.

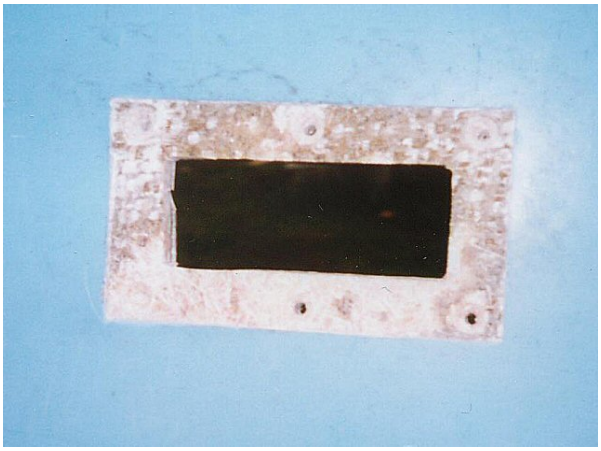

Photo 4

To complete the surface preparation for the new bailer, I then applied a layer of clear epoxy resin to all of the cut fiberglass. This was to provide a smooth, hard surface which will allow me to cleanly remove all of the caulk when it is time to maintain or replace a bailer. After the epoxy cured, I sanded the surface with 80 grit sandpaper to provide some "teeth" for the caulking to adhere to.

Step 5

The machine screws holding the bailer to the hull will penetrate the cockpit floor, ending in nuts. If you intend to sail barefoot in the warmer weather these screw ends and nuts will tear your soles up nicely. To avoid this problem and to make bailer removal and reinstallation easier, I decided to countersink the nuts below the cockpit floor and make them "captive". I did this by drilling holes over the boltholes slightly larger in diameter than the #10 SS nuts that came with the bailers. This required a 1/2" diameter drill bit. You want to make these countersink holes about 1/4" deep. I suggest using a drill stop to avoid accidentally drilling all the way through the hull. Place all of the machine screws in a can with enough lubricating oil to cover all the screws. Then drain the oil and drop the screws onto a paper towel to drain. The idea is to have the oil drain off, leaving just a thin coating on all of the screw surface. Do not brush the oil off the threads with the paper towel. Just let gravity do the work. The reason for the oil is to prevent the screws from being glued by the epoxy. Do not oil the nuts since you want the epoxy to glue the nuts. To epoxy the nuts in place mix up a stiff paste of epoxy and hard filler. Strength is critical here, so I suggest using either West Hard Filler or Marinetex. Next, fill the bottom of one of the countersunk holes (on the cockpit side) with the epoxy paste. Put a screw through the bolthole from the hull side and through the glob of epoxy paste. You will want a helper for the next step. Have your helper hold the machine screw firmly against the hull with a screwdriver. This will prevent the epoxy paste from squeezing out of the bottom of the bolthole. Thread a nut onto the end of the machine screw from the cockpit side and hold it from the end with needle-nosed pliers to prevent it from turning. Hold this nut firmly to prevent rotation while your helper turns the screw while also holding the head of the screw firmly against the bottom of the hull. As the screw is turned the nut will sink into the countersunk hole. Once the nut is slightly below the surface of the cockpit floor (about 1/16") stop tightening the screw. You want this 1/16" margin to allow the machine screw to be slightly too long, but still not protrude above the cockpit floor.

Add additional epoxy paste around the nut so that the countersunk hole is completely full of paste, the nut is covered with paste and only the end of the machine screw can be seen projecting slightly out of the paste. Move on to the other machine screws and repeat the same procedure. Then let the epoxy cure. I've found that it's best to let the epoxy cure to almost full cure, but not quite, before removing the screws. This usually takes about 2 hours at 70-80 F. You can tell you are at this point because the epoxy will not "indent" if you apply light pressure on it with the tip of a screwdriver. At this point remove the machine screws. You will have to apply a moderate amount of force to the screwdriver to free the screw. As you apply this force and you are starting to wonder "Am I about to break the nut free from the epoxy?" the screw will suddenly break lose with a loud crack. You will quickly run around to the cockpit side to see if you have cracked the nut loose. Of the twelve machine screws on the two bailers I installed, one nut did crack loose and needed to be redone. The other eleven were fine the first time. Remove all the machine screws, then rasp and sand the epoxy down so that it is flush with the cockpit floor at each nut. PHOTOS 6 & 7 show the bailer hole finished with the nuts epoxied in place.

Photo 6

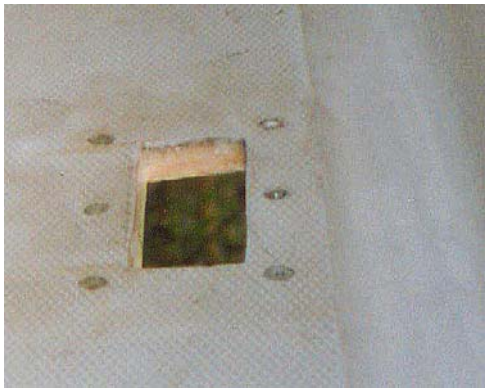

Photo 7

Note the hole in the middle of each epoxy plug where the machine screw projected beyond the nut.

Step 6

Next you need to cut each machine screw to the correct length. Install the bailer and tighten each machine screw moderately. On my Buc three screws on each bailer needed no adjustment. They were just long enough to fully catch the nut, but not project above the cockpit floor. The other 6 needed to be cut. Measure how much each machine screw needs to be cut so that it is slightly below the cockpit floor (1/32" to 1/16"). Remove the screws. Cut them to length by first putting a nut onto the screw, placing the nut all the way up the threaded shaft to the head. Then put the end of the screw in a vice and cut it using a bimetallic hacksaw blade. After cutting, file the end flush, then slightly bevel the edges of this cut end, also with a file. The reason the nut was installed before cutting is that it now acts as a die to recut the threads as you remove the nut from the screw.

Step 7

Next, install the bailers to the hull. You need to caulk the boltholes and the fiberglass behind the bailer flange to prevent leaks into the cockpit. Make sure the caulking completely covers all of the fiberglass beneath the flange. Then install the bailer and tighten all the machine screws to a moderate degree only. Overtightening will cause too much caulk to squeeze from the flange, risking a leak, and also could crack the nut loose from the epoxy. The nuts provided by Anderson have slotted heads. A truly hardcore racer will align the slot so that it is fore-and-aft to minimize drag. I suggest not using either 3M 5200 or 4200 for caulking the bailers since both of these caulks are pretty tenacious. You will need to remove the bailers at some point either to renew the caulking or repair or replace a bent bailer. If you have used 4200 or 5200 you will curse yourself when removal time has come. I suggest using 3M Marine Sealant 101 or BoatLife Life Caulk (one part) for this service. Both will give good watertight sealing yet will be removable when needed. I screwed up and forgot to take a photo of the finished bailer job. PHOTO 10 shows the CB area of the cockpit.

A portion of the starboard bailer can be seen.

Step 8

Step back, open a cool one and admire your work. You'll grow to love these bailers once you realize they actually suck water out as opposed to the old round ones.