# Rebuilding the Aquasport Classic „Flatback“

The stringers (not original) were laminated to the bottom with what looks like 18 oz roving. In several places it was possible to peel the glass back – see one of the pictures below. The secondary bond of the stringers to the hull was very poor. Also, the glass had separated from the stringer wood in all but a few spots.

We are going to take extra precaution to ensure the shape of the hull doesn't change before we get new stringers and frames installed. Like pulling a brand-new hull from a mold, unless there is some structure in the hull, it could "oil can". The next step is to build a cradle to support the shell and keep her strait and fair. While it looks fine now, a little extra work in building the cradle is worth the peace of mind; especially when you plan to put a lot of work and money into the boat.


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The previous "rebuild" included a bunch of mats laid into the bottom. All this mat and the remaining roving from the stringers (which did not peel off) will be ground out. New heavy biaxial cloth (1708 or 1808), will be laid into the hull using epoxy resin. This will reinforce an almost 30-year-old skin as well and give us a very good base/foundation for the new stringers and frames.

After measuring diagonals from chine to shear to make sure the hull was square, we made a mold for the new transom. It is basically a dam for the new outside skin. The dam is made from Melanine which is secured to a lip of original fiberglass left around the transom. The Melanine is coated with mold release wax and **PVA**. The clamps are only temporary until

The dam is secured with screws. Some small fillets of epoxy/wood flour are laid in followed by a layer of **6 oz cloth**. This acts more like a skin coat and also makes a smoother surface for the **1708** Biaxial cloth.

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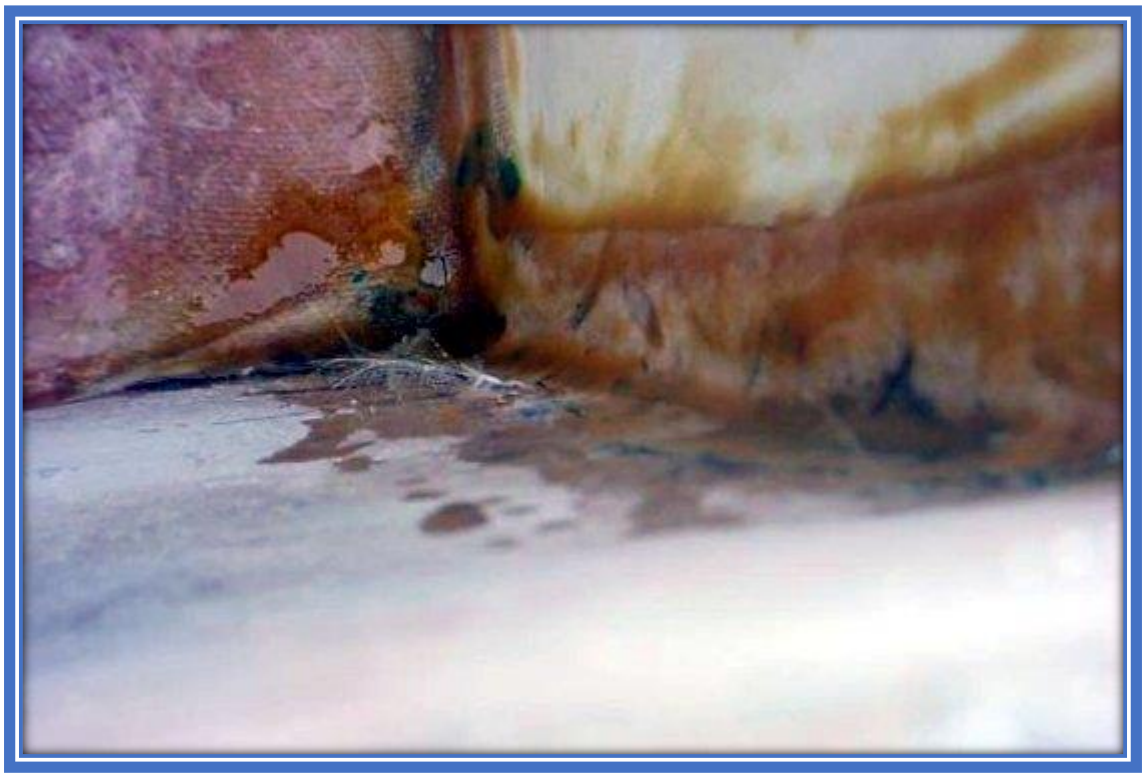

A cardboard template of the inside transom is useful for cutting the 1708 to fit. It will later be used to cut the **2" foam core**.

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The **1708** is cut to fit and laminated into the "mold". Layers overlap 4" progressively. First layer goes 4" up sides and bottom, second goes up 8".

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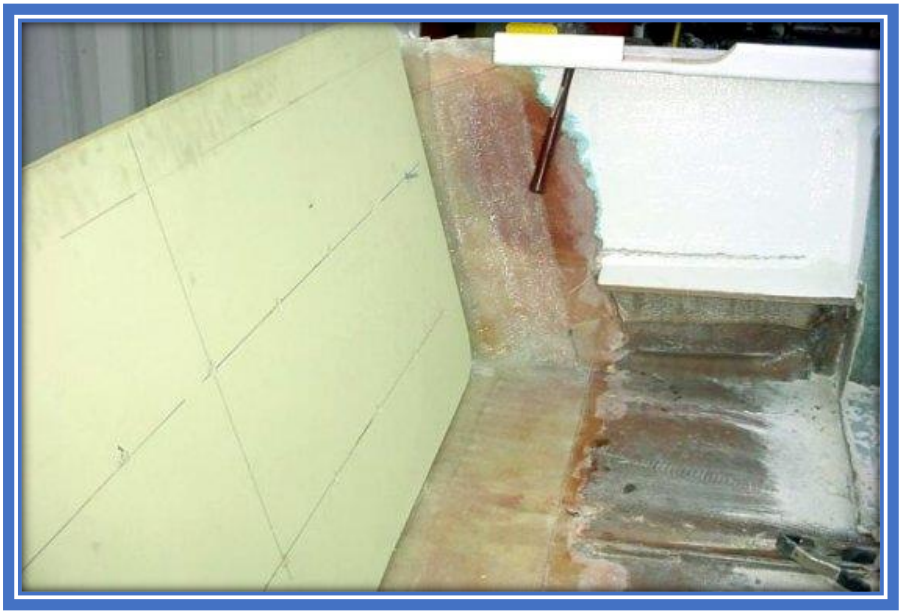
Next, I have one more layer for the outside skin, then the core is bedded in, then the inside skin.
When the transom is complete, we will rest the hull on a cradle the will support it at the chine and keel – then we will put in the new stringers.
*You mention, in your tutorials, that when using epoxy as laminating resin, that it is mostly not necessary to use matt when laying up yet in this situation you are using 1708 which has matt with the biax. Why did you use 1708 and not just straight 17 oz biax cloth?*

*When you tab in the stringers will you also use 1708 or will you just use straight biax cloth for that?*
Excellent question! We want to build some outside thickness for puncture resistance (foam doesn't have much by itself) so the 24 oz total of mat on the outside is just added "bulk". On the inside skin you will see 17 and 12 oz biax without matt, some 45/45 and 0/90 will be used. If we used 1708 on the inside it would be a huge waste of epoxy for no added stiffness.
Just as a rough estimate, there is probably 5 extra pounds (2.25kg) of resin in that mat now - that's about $25 worth of epoxy.
For a wood core and epoxy, no mat. The lamination would be quite different for a wood transom.
Bedding the transom core. The Transom core is **Renicell E240 from DIAB, 2" thickness**. The foam will is bedded in epoxy glue made from regular **Marinepoxy** and **woodflour/silica**
The cardboard template was used to cut the core, then we dry fit it into the boat. The core was trimmed so that it fits flush against the outside skin. This of course leaves gaps around the sides that will be filled with epoxy before the inside glassing begins. It is VERY important to avoid gaps between the core and the skins so make sure the core fits flush. The idea in bedding your core is to apply even pressure all around to squeeze out excess epoxy glue. Epoxy is a great gap filler. Bonds are stronger when you do not squeeze out too much.



We used galvanized bolts to pull the core into the skin. The bolts are spaced at 8". For a plywood core I would recommend more bolts (plywood is much stiffer). Two of the bolts on the top/outside are facing inward, this gives a place to "hang" the glued core, while the other bolts are being put through facing out.

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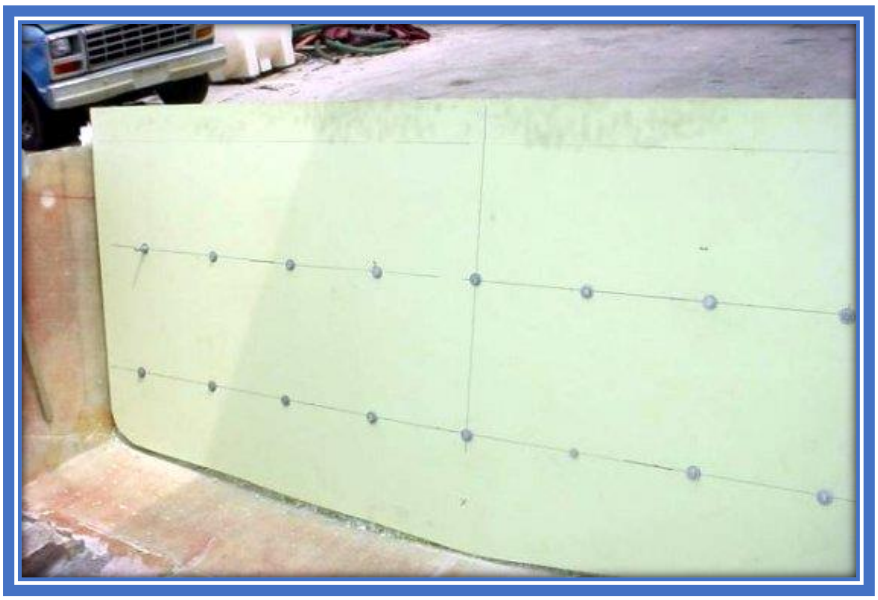

Dry fit and do a test run! We glued this transom (2 people) in less than 20 minutes from the first mixing of epoxy to the last tightening of the bolts. On this day it was at least 90 degrees, so you will not have much time even with a SLOW hardener.

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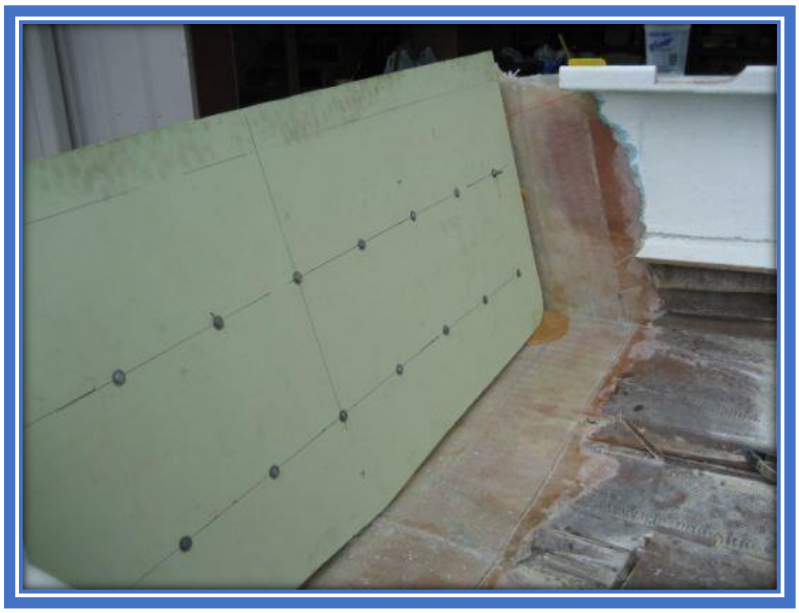

We rolled a coat of unthickened epoxy onto the core and the inside skin before the glue was applied with the notched spreader. Glue was applied to both the core and the skin. The core was "hung" on the skin. Bolts were tightened beginning with the inside and working out. Any material squeezed out was removed.

TIPS:

Have multiple 1-quart mixing cups ready
One person does nothing but mix, the other mixes and spreads.
Store the epoxy in a refrigerator for a few hours before mixing to give a couple extra minutes
Pour, don't pump – pumping takes too long
Use a notched spreader – helps to apply the glue evenly and gives an escape for air

We mixed 5 pots of glue. Each pot was 15 oz of epoxy total (10 resin, 5 oz. hardener) and enough wood four/silica to give us a nice non-sagging constancy. I estimate we put 3 quarts of glue total down and squeezed out 1 pint.
The new outside skin is tied into the hull by overlapping 12" up the sides and bottom. We could not have done this from the outside without a whole lot of grinding and fairing.
Also its nearly impossible to get **1708** to stay on a such an angle above vertical (transom angle) - it would just fall down. Unless we flipped the hull in which case it would work.

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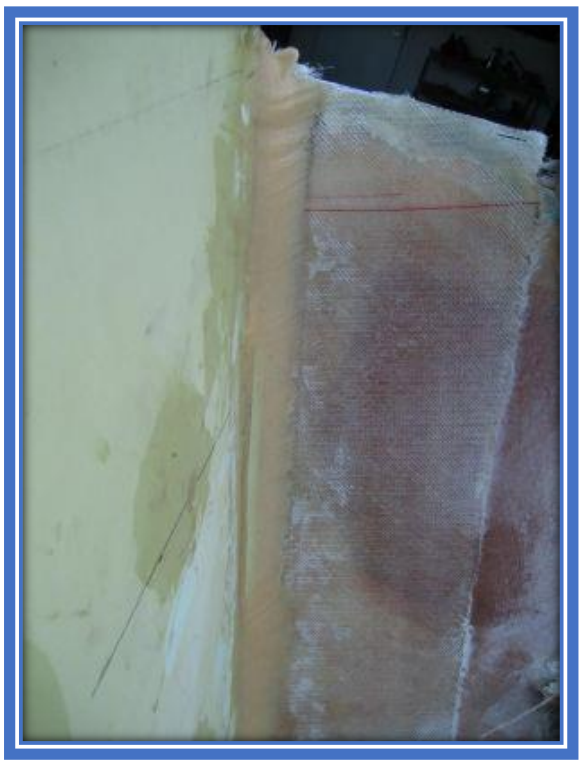
We put in the first 2 layers of inside transom skin. First layer is **1708**, second is **DB1700**. The inside skin will be 4 layers total of **17 oz. Biaxial glass**. The first layer has mat (1708) because the mat helps conform to any uneven spots in the fillet. Subsequent layers will not have mat as it will just use more epoxy and not add strength.

I worked "wet on wet" for the fillets and the first two layers of glass. Using a mix of silica/wood flour and epoxy, the gaps along the sides and bottom of the core had been filled so the filler was level with the core. Using the same mix, we laid fillets along the joint. This fillet is about ½" radius.



After 15 minutes or so, the fillet is firm but not hard. At this point we lay in the pre-wet 1708. Because the fillet is not hard, you will be able to push the glass into the fillet making for a very clean lamination – no air bubbles. A second layer of DB1700 was wet out on top of the 1708. DB1700 (17 oz. without mat) wets out much easier than 1708, so you can do it on the part – no need to wet out the back side before placing it.

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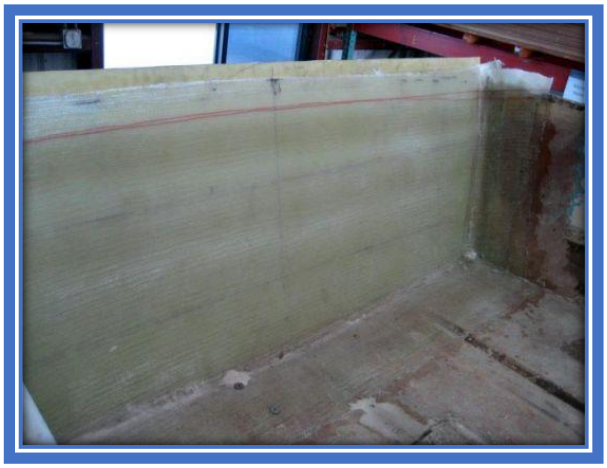
All the inside layers will be overlapped by 3"-4" working up the hull. Working wet on wet saves time and makes for better laminations. In this case we should have gone ahead with the last 2 layers, but time did not permit.

Transom is complete!

Have spent the last couple of days grinding out a path for the new stringers. Unfortunately, it was not just a matter of cleaning a path, but removing 2 layer of roving and matt. Even with a 24-grit grinding disk it took 6 hours total. Results are a clean path for the bond of the new stringers and about 40 pounds of fiber-glass dust in the trash can.



Now I can start taking some measurements for the stringers. I sure wish I could find someone who could give me some measurements of the original sole height...
That PVC pipe is a stiffener put in by the previous rebuilder - I'm leaving it in until I get the new stringers in. Then it comes out and a new center stringer goes in.
If you take all the internal supports out of the hull at once it will deform. That is why we left the gunnel cap and a lip of the sole - it holds things in shape.

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Made templates for stringers. Having a lip of the old sole still in place allowed me to take a straight edge and square to take rough measurements of the stringer depth. Using those rough measurements, I cut out templates from scrap plywood. Make sure when you join the scrap that you maintain a straight edge for the top. I cut the template an inch or so short on the hull side of the stringer, so I could "float" it over the hull in the correct place (over the old stringer location).

Using a block of wood to scribe the contour of the bottom onto the template. Later I will use the same block to transfer that shape onto the stringer material. At this point stringer template height is all the way to the top of the old sole. I am still unsure of how high I want the sole and the thickness of the material I will use. When I decide on these two I will offset the top edge of the template to compensate.

The fiber glassing of the outside of the transom is complete.

Just finished one of the stringers. We have a nice flat/long bench on one of the walls behind the office, this made laminating the multiple layers of **17 ox Biaxial glass** on each side a snap. The stringers are 2 layers of **H80 Divinycell 1/2"** glued together. The stringer probably weighs 40 pounds. It will be tabbed in with **Biax tape** as well as "capped" with several more layers of the **12 oz. Biax tape** .

The hull is on a cradle. The purpose of the cradle is to make sure the hull is straight before glassing in the new stringers. The new stringers are made, they will go in the boat next week. Once they are in, you will see us pick up the pace.

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This is how we took it off the trailer...


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BTW, I found a flatback only a few miles from our office. It was a late 60' model and structurally was all original - got my cockpit depth measurement from him. 20" from sole to cap.

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