

Day Seven

Sanding and coating the outside of the hull

Steps:

- Check surfaces for fairness
- Sand hull outside
- Align the hull on the sawhorses
- Coat hull outside with fibreglass cloth and epoxy

Tools and Materials:

- Abrasive material
- Two sawhorses
- Two roof battens
- Fibreglass cloth
- Epoxy, mixing cups, wooden spatula
- Wide plastic scraper or Japan spatula
- Clamps

This is a long day! The outside of the hull is sanded and then coated with fibreglass cloth and epoxy.

The day is long because the lamination is best done in one piece. I apply two, sometimes three layers of epoxy wet-in-wet **without intermediate sanding**.

Check Surfaces for Fairness

Now it's time to check that the flat spline lies everywhere flush on the hull planks. Especially on the keel line, there may be small camel's humps.



These are straightened with a planer and sander.

Sand Hull Outside

The sanding is done in three steps.

- First, I sand only the plank **faces**; with coarse paper - 60s or 80s.

- Then I gently round the **edges**.

- Finally, I sand the whole **surface** silky smooth - with 120 or 180 grain.

A boatbuilder will take great care now to ensure that the chines are not wavy. He will spend a lot of time sanding until the chine lines are perfectly straight. However, wavy chines are a cosmetic issue only without affecting performance.

The work of sanding the faces can be reduced by using an orbital sander. If you do not own one, use the sanding board. Because of the dust load, I prefer to sand outdoors. The lowest plank is sanded smooth ...



..., the upper planks (which are varnished later) clean and smooth.



If you want to varnish the upper planks, it is important to not quite sand away the top veneer. At this edge the veneer of the inner layer is visible. This does not look very nice when it is varnished.



On the prototype sanding the surfaces was done with the machine after about 90 minutes.

At the bow, it was somewhat more difficult to join the planks edge to edge. Here some stronger sanding was required. Fortunately, the veneer layer of the top two planks remained intact (which will be varnished on this boat later):



Rounding the edges I basically do by hand, with sandpaper on a small block.



Then the machine comes back for the final sanding, this time with 120 or 180er sandpaper. At this stage I sand the entire surface silky smooth.

Beautiful. The hull already looks a lot better than yesterday

What a hassle! When sanding this seam went open again. There is only one thing to do: Drill holes, wire and glue once more:



Align the Hull on the Sawhorses

Next, the hull is inverted and accurately fixed horizontally on the sawhorses. Some space should remain between the sawhorses and the gunwale, since the glass cloth needs to fall cleanly over the coaming. Clamp the frames A and E on the sawhorses...



..., and check again with the two battens, clamped to the coaming, whether they are exactly parallel:



In the middle the 1.20 m long 9 x 18 mm batten under mould C ensures a good fairness of the bottom section:



Apply Glass Strip

Lay a thin 2 m long glass strip over the front part of the keel line. It is cut from the 2,20 m long supplied glass strip (the other 2 x 10 cm will be used for the leeboard bracket). It should start just where the 3 mm glass chord ends, and reaches up to the widest part of the bottom. In the picture below the glass strip was laminated in a later building phase. But that was an additional working step, which made building not as efficient as it could be. Save time by laying this glass strip onto the hull right now and laminate it together with the glass fabric.



Apply Glass Fabric

The 155 cm wide glass cloth is draped without creases on the hull. Small pleats at the bow and stern disappear when the tissue there is pinned along the centre line.



At the coaming, the glass cloth is cut about 10 cm from the edge. The remains of glass fabric are not thrown away! We will need them later for the deck reinforcements!

Coat Outside with Epoxy

The entire hull is epoxied in one go. At least two layers of epoxy are applied one after the other - because between the first and the second coat one cannot sand. Sanding the first layer would damage the glass fabric layer, which ensures the strength of the hull.

This “wet on wet” application creates a chemical bond between the two epoxy coats without any need of sanding between them. It is important to apply within 12 – 24 hours after the first coat (depending on the specification of your epoxy) and actually gives a stronger bond than on a sanded surface.

Sheathing with epoxy resin works best if you always epoxy coat small areas at a time. Begin on one side approximately in the centre of the boat. A small amount of epoxy should be enough for an area of about 50 cm square. Brush this one area. You could work faster with a hard

lambswool roller with very short nap. Apply only, do not rub in (which would only result in more bubbles) ...



..., do not worry about bubbles, peaks and puddles, just keep working. After a few minutes the tissue and the underlying wood is wet. The epoxy is soaking into the glass and the wood. Now apply some more epoxy and brush or roll the last air bubbles away:



Then continue on the other side of the boat. Afterwards, brush an area in front of that, then an area behind that. Work your way systematically and slowly, to the back and to the bow.

At the bow and stern the tissue has been pulled up and pinned along the keel seam, so that it can be draped smoothly over the planks:



The fabric is cut a few inches before the skeg along the centre line so that the edge can lay flat on the hull.

After the first application, when the epoxy begins to thicken, squeegee the surface with little pressure (and very flat) with the wide Japan blade or plastic spatula:



The fabric should look slightly dull and leathery. It must not be white, if it is, too much epoxy has been removed!

Work with a wide spatula gradually around the boat, in the same sequence you used for epoxying.

Apply the next layer of epoxy, when the first layer is still elastic, but does not adhere to the finger. The second layer can be applied efficiently with a small hard lambswool roller. Immediately after application, use a brush over the area to get a smooth, glossy surface.

Typically, two applications of epoxy are enough to fill the tissue and build up a thin epoxy layer on top of that which you can sand away later.

The epoxy layer above the fabric should be thick enough that you can sand it later, carefully without damage to the tissue. This goal is achieved when one can not see the fabric structure when backlit any more.

If the second application forms peaks or runs, squeegee it again with a wide spatula (this time with a little more pressure and a bit steeper) and try a third paint-like smooth epoxy application if the second layer is bonded gel-like.

Cut the extending glass weave in the bow and stern area, as long as it is still green:



Now, the hull will look like this:



Building Instructions ARTEMIS Sailing Canoe
Werkstatt und Werkzeug

Version 0.1

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You have now manufactured a hull that basically would float, and even though there will be another week to sheathe the interior and build the deck, it is a good time to **pat yourself on the back** and look

at the shiny surfaces with the satisfaction of having born a sailing canoe hull that will be part of your future adventures. A good amount of the tedious work is done now.