

Day Five

Assembly of Planks and Frames

Steps:

- Assembling hull plank with wire
- Install frames
- Align and check keel rocker

Tools and Materials:

- Drill with 2 mm drill
- Mitre saw
- Planer, rasp, file or sandpaper (about P80)
- Wire, about 1 mm in diameter
- Universal pliers, string cutter
- Small plumb bob or large nut on a thread
- Epoxy, scales, mixing cup, spatula, brush
- Painter's tape

A fascinating day. It is always exciting when such a beautiful, rounded hull arises from a few flat planks.

If the plank segments have been glued together exactly to size, then wiring them together will automatically generate a hull that looks exactly as planned by the designer - with the right sailing and paddling properties.

Wiring together the Skeg and Plank 1

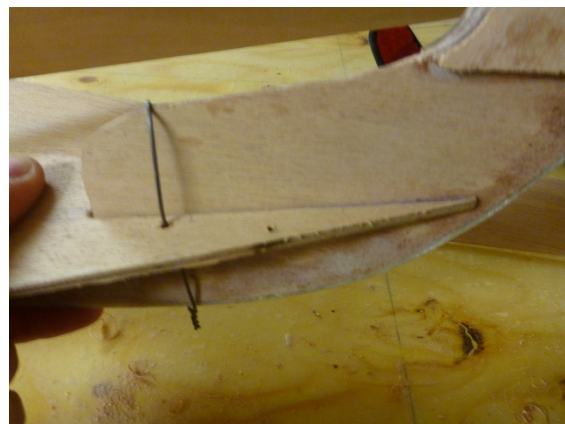
The planks are provisionally assembled with wire before they are glued together. During assembly the planks are pulled together **edge to edge**. They should lie **loose and without tension** against one another. One can only loosely arrange the wires, and then gradually tighten them.

A gap of 1 mm or less is OK. You can control the gap between the planks against the light – is it even? If the gap between the wires is wider than directly under the wires, the plank seams will be wavy - very ugly. In this case, the wire is too tight. You can cut it off and try again with a new wire - or drill two extra holes and insert an additional wire in them.

Most beginners tend to wire the boat too tight, resulting in slightly wavy chines. At first, I tighten the wires to a gap of about 0.5 mm between the planks. At the end, I

spile long and hard with the eye along the plank seams and tighten a few wires somewhat more.

At the rear part of the plank 1, along the centre line, the skeg is first tied into the hull. The rear end of the skeg fits exactly into the 11 cm long slot, which was cut before. Is the skeg sitting as far forward as possible? It should at the back be almost flush with the plank end.



Nip off a piece of wire, bend it into a U shape, feed from the inside out through the holes and then twist with the pliers:



It should look like that: the wire holds the two parts securely fixed to each other but without pressure.

Wiring the Keel Line together

Next, the keel line in the front of the boat is wired together **edge to edge** – at first just loosely, then gradually firmer.

The wiring goes much faster if you cut off a few dozen lengths of wire, bend them into a U shape and lay them out in a tin. Always insert in batches of 6 pieces, each pushed through, then tighten with the pliers.

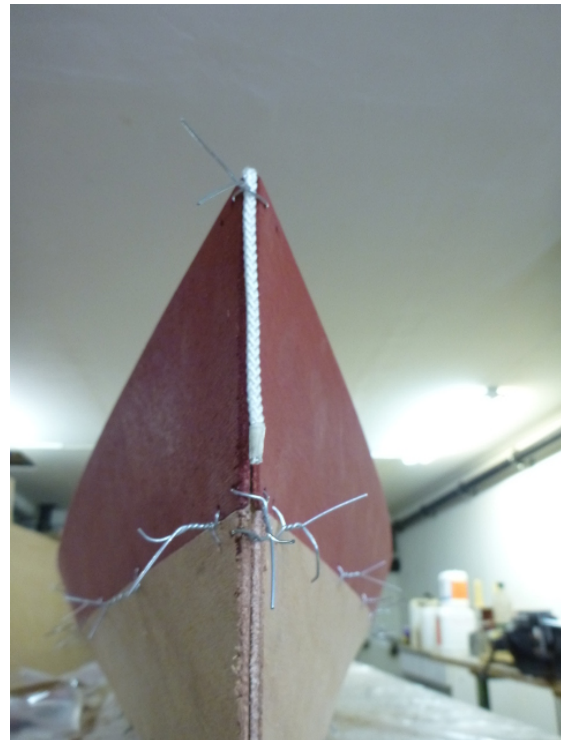
If planks should be varnished later, then you have to be really **very accurate** wiring them together **edge to edge**. Later, the plank edge is sanded. The veneer on the thin plywood planks is only 1 mm thick - and if it is sanded too much, the underlying cross laid veneer layer appears and looks ugly.

Tightening the planks edge to edge needs **care and sensitivity** - and if necessary an **additional wire** here and there can be added between the others ones.

So now see the front part of the keel plank from the inside of the hull:



Angle the insides of the bow planks so much that a piece of glass fibre rope just fits loosely into the gap between the two planks. The figure shows the bow at a later stage:



This is what plank 1 should now look like: At the rear the skeg provides a little rocker, the bow section is rounded and lifted:



Wiring Plank 2

Planks 2-4 are generally assembled from front to back.

Always insert and tighten about 6 wires, twist on one side, then on the other side of the boat - so that the two sides will be exactly similar!

At the rear, the planks are a little longer than necessary. They are cut off when they are wired into place.

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The wiring is easier if you lift up the bow or stern -depending on where you just work - about 10 cm high. A timber offcut or a small (carton) box are very well suited for this. By this jacking up, the boat will find its shape easier.

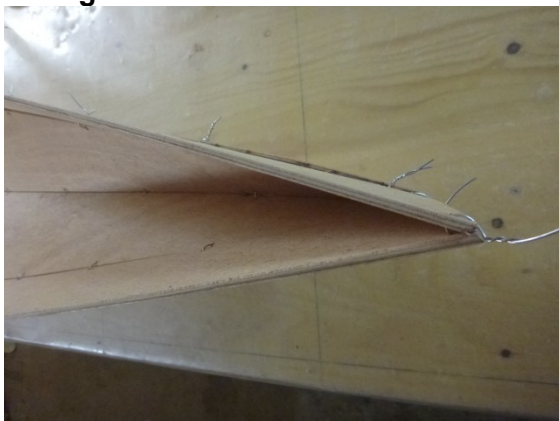
Put wire through the two front holes on the bow of the plank 3, insert the wire and fix it loosely. Now right and left side plank on the bow are loosely connected to each other. Check whether the outer sides of the planks are really facing outward and the splice of the plank are inside. Align one of the planks exactly with the bow. The holes on the bottom of the plank 2 are drilled that they fit exactly with the holes on the plank 1. Pull wires through ...



... and assemble them loosely together. The two planks are fitted exactly **edge to edge**.

Gradually work your way along the two planks towards the back: a few holes drilled, insert a few wires, then twist, continue on the other side.

The most common Mistakes in Wiring:



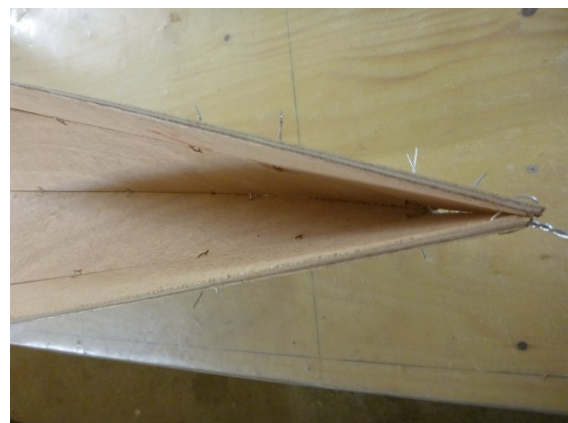
This bow is awry! The starboard side of the second plank has been tied in too over tight to the first plank. On the port side, the planks are not completely fair above each other:



Here two additional holes and an extra wire do help so that the two planks fit **edge to edge** and are exactly one above the other:



... and the bow is straight. Problem solved!

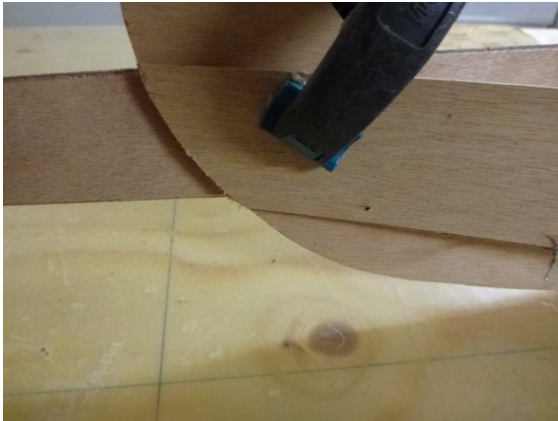


Arriving at the rear, first one plank, then the other, are sawed off flush to the skeg and filed, rasped, sandpaper rounded.

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Day Five

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Then the planks are slightly chamfered inside with a rasp or with the planer:



Wire the rear part of the plank to the skeg. It is important that the skeg is straight, otherwise there will be a crooked tail!

With the bevelling of the planks at the stern, the rear edge should be about 8 mm wide:



This picture shows the boat already with plank. 3

The top two planks were stained mahogany and later varnished. The finished boat looks like this:



The kit is made of Okoume plywood. Unstained and varnished Okoume looks much brighter:



If you want to stain, it is best to do that after sanding, just prior to coating. Because when you sand most of the stain is removed.

Install Bow and Stern Moulds

Now it's time to install the two bulkheads A and E. It is important to respect the inside dimension between the bow or stern to the bulkheads. The mounting positions are specified in *Figure 2* of the kit documentation.

It's easy to mount the bulkheads incorrectly inclined. But if you check the inside dimensions on both sides and true them with a plumb bob (or a big nut on a thread), this will not happen.

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Push the moulds provisionally in place between the planks in their installation position and then check whether they are plumb.



If the mould forces two adjacent planks apart, then it must be shifted somewhat to the middle. If there is, however, a gap between plank and bulkhead, then the bulkhead must be moved somewhat towards the end.



This is an example where the bulkhead forces the plank seam apart – so it sits a little too far forward. Two wires near the centreline and (later) two other wires in the gunwale are enough to hold the bulkheads in place. To avoid holes in the gunwale plank, the holes are drilled through the gunwale stringer only – and far enough apart that I can shift the bulkhead slightly if necessary.



This is what it should look like: The plank 2 is fixed over the entire length of plank 1, two frames are installed:



Wiring Plank 3

The plank 3 is installed exactly the same way like plank 2.

It should look like this now:



Install Moulds B and D

These frames are sitting right at the beginning and at the end of the cockpit. The installation positions are given in *Figure 3* of the kit documentation.

The frames are wired to the planks. It is not important that they fit perfectly. Small gaps between planks and bulkheads do not matter.

Wiring Plank 4

Similar to planks 2 and 3, plank 4 is installed beginning at the bow. The gunwale stringers must be cut with the sharp saw at an angle, so that the planks will fit together at the bow. Take a bearing with the angle over the centre line, then mark and cut.



Wiring of plank 4 is much easier if you temporarily hold the plank with clamps to the frames:

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Day Five

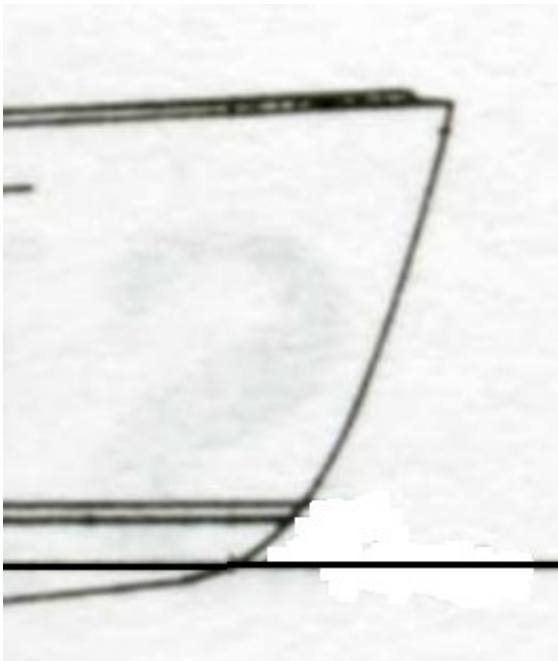
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After fastening the planks at the front you can see the shape of the bow:



Some find the straight Yacht bow too pointed, other bow shapes are possible.



They only change the aesthetics, and do not affect the boat or the sail and paddle properties. No problem to cut the top

planks somewhat back and thereby to change the bow shape. Maybe you would like a slightly curved spoon bow?

Or a straight upright bow, as in the Bufflehead sailing canoe?

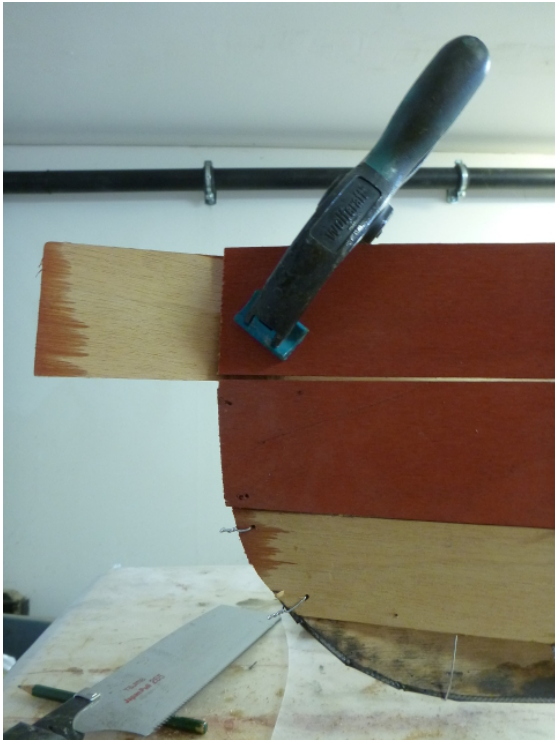


It is important that the new bow form is drawn first and looked at it from a few feet away. If the planks are once shortened, there is no turning back! In order to hold the bow straight, right and left planks must be processed exactly the same.

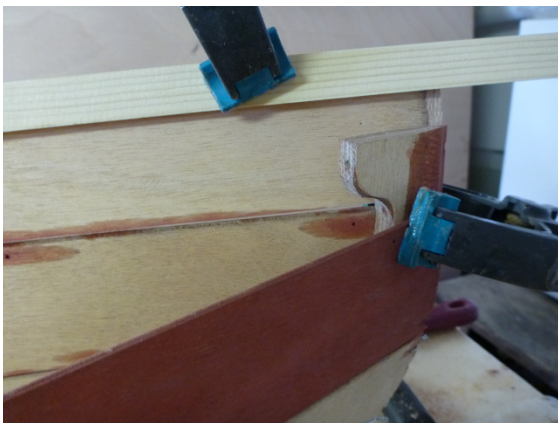
At the rear, the planks are easier to wire when they are temporarily clamped with a screw clamp on the skeg. You should also put some old wood under the skeg - that then takes the tension off the plank during wiring.



This plank, also, is longer than the boat and is cut off at the rear stern.



The inwale is cut off in the same way as at the bow. The plank inner face is then bevelled on the rear edge, so that an approximately 6 mm wide rear edge is created.



It should look like this now:



Install Mould C

The mould C spreads the boat in the middle to its maximum width. The mounting position is specified in the kit documentation. Mould C has a slot at the bottom. In this slot a 1.20 m long 9 x 18 mm batten is tucked in along the keel line. This batten helps to shape the floor and form the perfect bottom strake.



Check Keel Rocker

The keel rocker influences the behaviour of the boat in a critical way. A sailing canoe basically has more rocker than a pure paddle boat, because it needs to

Building Instructions ARTEMIS Sailing Canoe

Day Five

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respond in an agile and flexible way to helm changes and tack without paddle support.

It is therefore important to examine the keel rocker on a flat surface (e.g. a cast concrete floor).

At the bow, the boat is supported so that it measures **8 cm of keel rocker** at the beginning of the bow curve:



At the rear of the boat there is now **8.5 cm (+/- 2 cm) keel rocker**, between floor and keel plank. The depth of the skeg is not considered.



What to do when the keel rocker is not correct?

- Move the bulkheads A and B slightly forward, and the bulkheads D and E slightly a little aft.
- The hull is soft and somewhat flexible as long as it is not coated with fibreglass. Store the boat a couple of nights upright on two sawhorses. Place one saw horse forward under the bow, the second one just in front of the skeg. Because the boat is hanging freely in the middle of the keel, the rocker will slightly increase. Conversely, the keel rocker can be reduced when you store the boat upside down.
- The glass fibre coating needs about 3-5 days to cure completely. During this time, you also could change the keel rocker slightly with storage conditions.