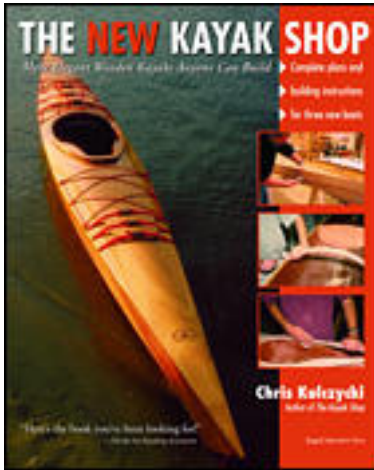


Stitch and Glue Kayak Scratch Build by Scottacus

For the last year I've considered building a kayak and figured that constructing a model would be good practice before building a full scale boat. One of the techniques that is used to build these boats is called "Stitch and Glue." I thought that I'd try this technique out to see if it could be used on a scale model.

The stitch and glue technique for a full scale boat starts with precisely cutting out the panels that make up the hull of the kayak. These panels have a series of small holes drilled around perimeter. These panels are then joined to one another by wires that are threaded through the holes and twisted together. Because the side panels are carefully shaped, the hull pulls itself into the proper conformation without the use of any internal supports! The panel joints are then epoxied and reinforced with fiberglass. Once the sides of the hull are complete, the entire kayak is sheathed in fiberglass. Bulkheads are added and a deck is secured to the top of the hull.



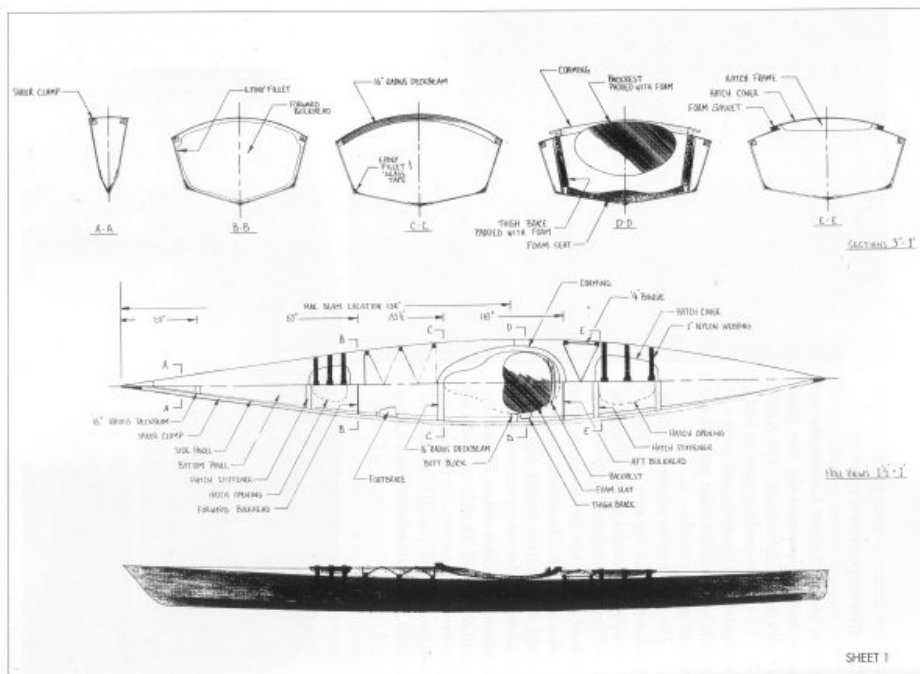
My thought was to use fine copper wire to stitch together a 1:12 model of a Chesapeake 16 kayak and then use CA glue to hold these panels in place. The plans for this craft are from the book "The New Kayak Shop" by Chris Kulczycki.

This book details the building process for a number of different kayaks that are sold in kit or plan form from Chesapeake Light Craft. You can see some of these at their web site <http://www.clcboats.com/>.

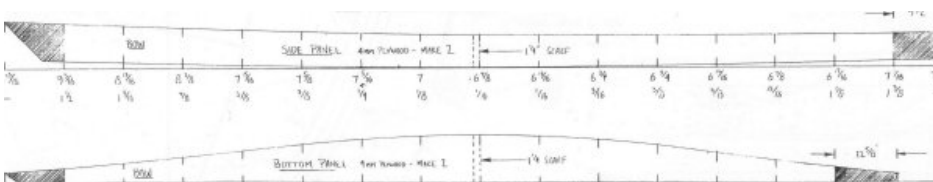
This model started out by resizing a set of plans from the book. I originally scaled them up to 1:12 but found that I would end up wasting the least holly if I ended up with a slightly smaller scale so that the 16 foot kayak ended up at a little over 15 inches. This flexibility is one of the beauties that I've found in my limited experience with scratch building.

The Plans

This is what the plans look like.



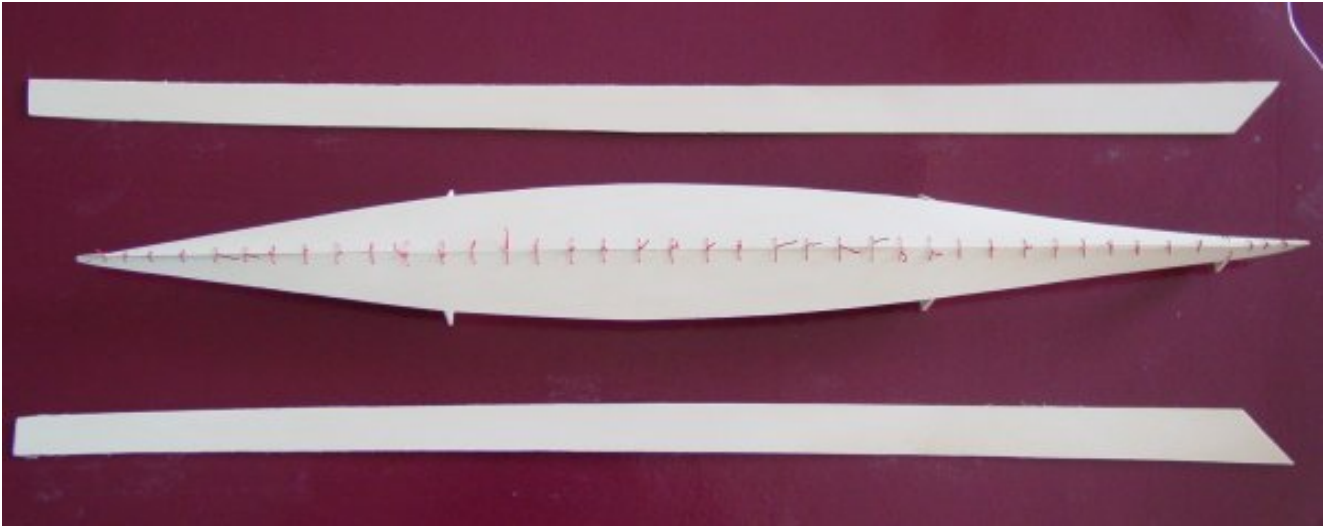
These are the plans for the four panels that make up the hull of the kayak.



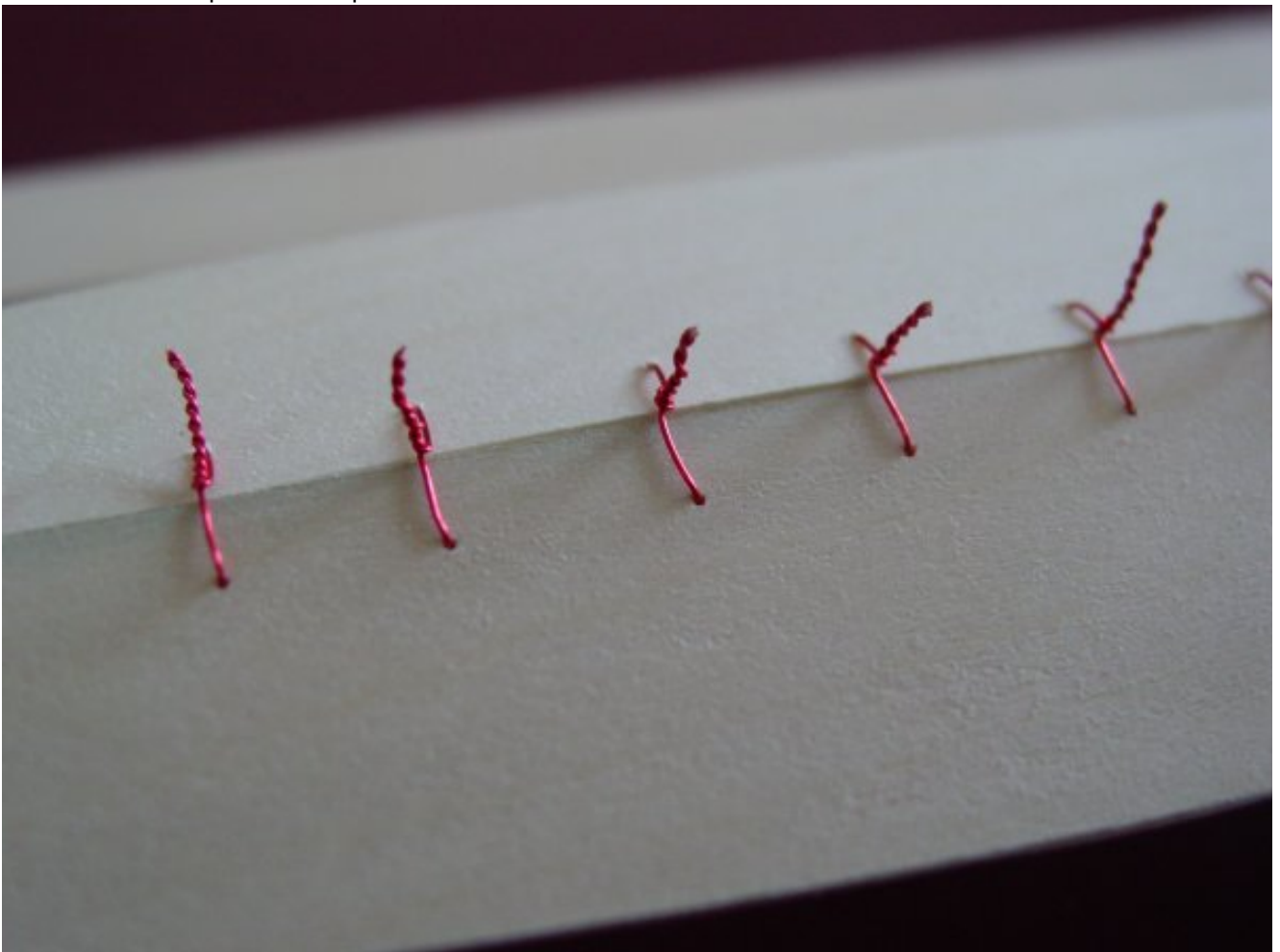
The holly was ripped to about 1 to 1.5 mm thickness for making the side panels. These were cut out using an exacto knife.

I chose holly as the wood species for this build. Although this wood is usually used for decking it has excellent properties for building hulls using this technique. It is easy to work and bends very well without chipping or stressing.

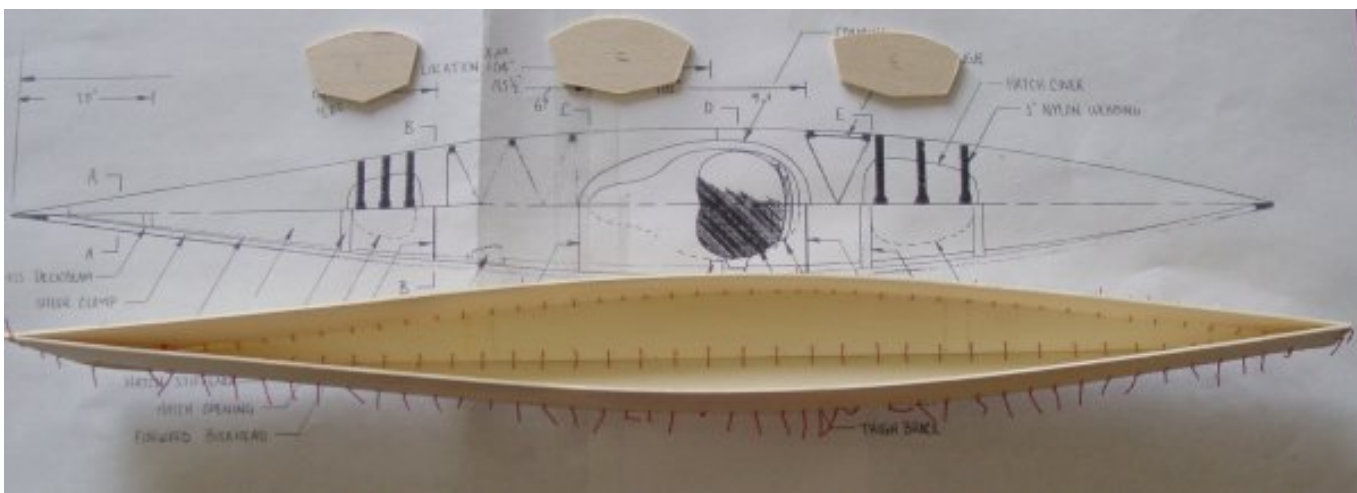
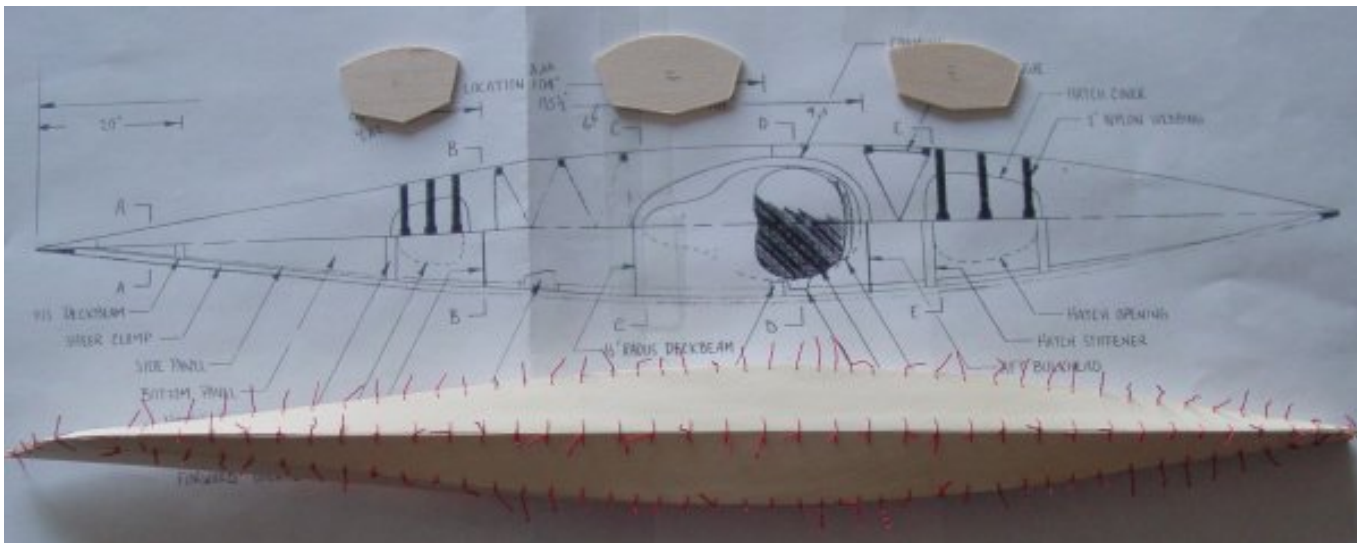
The bottom panels were made from 1.5 mm thick holly. The panels were placed back to back and drilled around the keel perimeter for the joining wires. The edges of the keel were bevelled to make a clean joint. This is something that the full sized kayak doesn't require since its side panels are made from 4mm oakum plywood and fibreglass covers the joint. Copper wire (28 Ga) was used to join the pieces together as shown below.



Here is a detailed photo of the process.



The side panels were joined at the bow with wire and then were placed on top of the keel pieces. A series of holes drilled starting at the bow to allow them to be joined together. A series of four holes were made opposite each other on both the port and starboard sides. Wires were placed through these, tightened up and then the process was repeated all the way back to the stern. It was very cool to see the hull magically warp into the proper configuration where these panels were joined!



CA glue was placed between the wires on all of the joints and the wires were cut and removed. Once the wires were out CA was placed in the spots where the wires were. This is what the result looked like. Very cool 😊



Now to sand, bondo, prime, sand, bondo, prime, wet sand, prime... You get the idea :wink:

Once the hull panels were joined, the bulkheads and cross brace were installed. These spread out the gunwale a little to give the hull some tumblehome.



The cockpit posed a bit of a problem. Getting an automotive style finish on the outside is one thing but getting that clean of a finish on interior joints especially this three surfaces meeting in a corner was another. Trying to fill and sand clean the wire holes looked like it would be more trouble than it was worth. I decided to plank the interior with basswood to show that the hull was wooden.



Seat and foot stops

I wanted to make and install the cockpit details before putting the deck on the kayak. I had a couple of options for the foot rests. I could make plain wooden blocks or I could make adjustable yakama style rests. I experimented with bending light gauge aluminum for the rails but wasn't pleased with the results so I made them out of basswood instead. Here is how they turned out.

I carved the seat out of basswood and covered it with some old sail material. I used CA glue with a needle for the applicator and it worked out very well. When you upholster a seat you use staples or tacks to hold the cloth as you work your way around the seat. This can't be done in miniature but the CA comes close. All you have to do is press down with the needle tip over the spot to be tacked and the glue flows through the material and acts as a chemical tack. Here is the seat and back rest after painting with black and overcoating with dullcote. They actually look flat black I don't know how my photography messed this one up 😊.



The Deck

Next up was making the deck for the kayak. I ripped out two pieces of holly and joined them to make a piece wide enough to cover the deck area. I double side taped them to the top of a true piece of lumber and ran them through my 12 inch planer. I was able to get them down to 1.5 mm and finish sanded them. The bad news was when I tried to bend them to meet the camber of the deck they split along the glue line. I guess it was too much stress for a butt joint of such thin material.

I then pulled out a sheet of 1/16th inch basswood and cut out the deck about 1/8 inch over sized. The deck was test fitted with multiple rubber bands and then glued in place with carpenters glue as shown below.

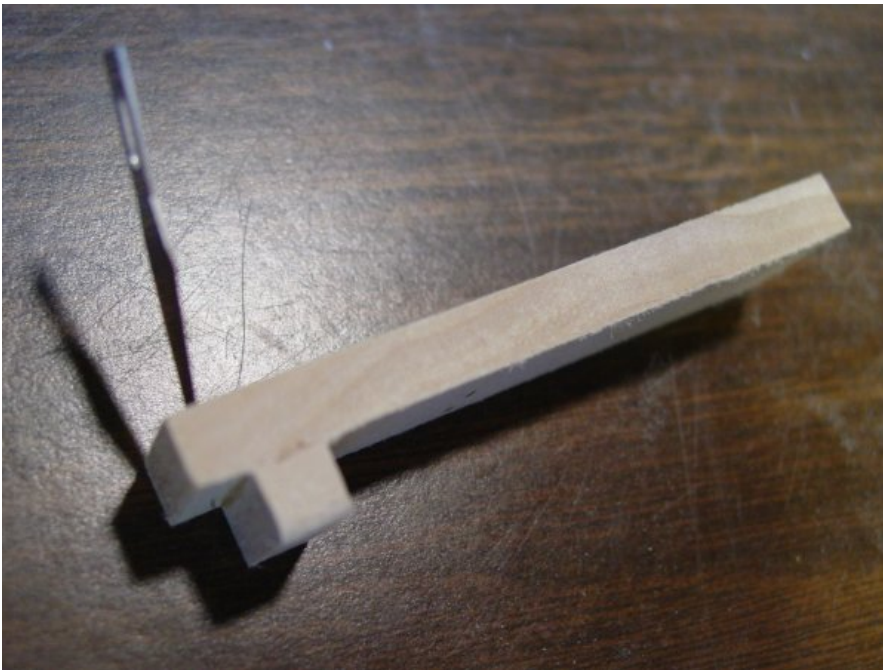




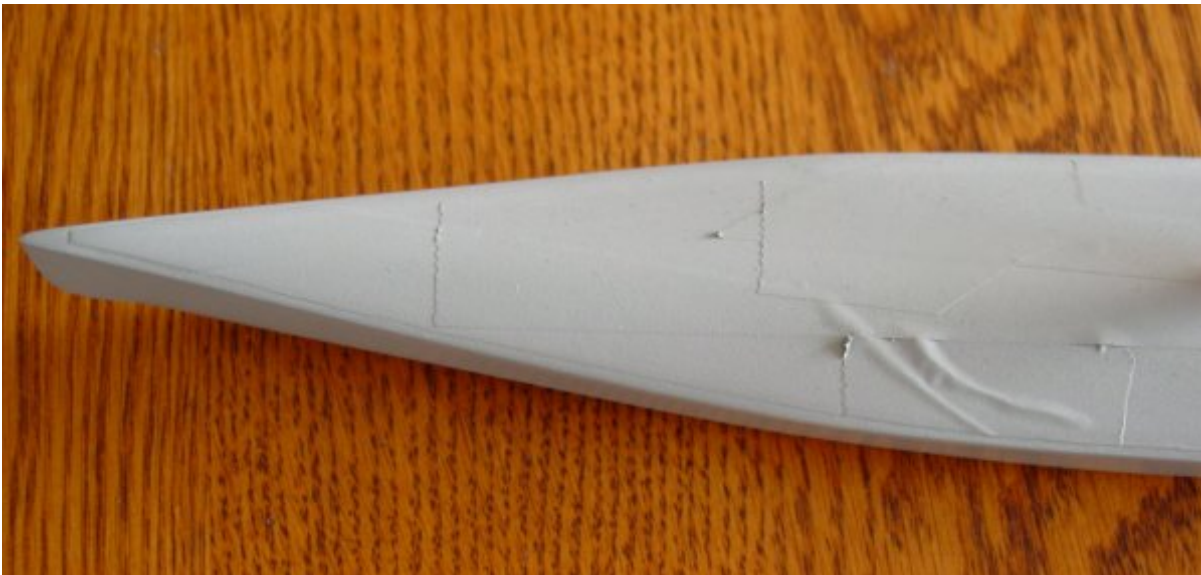
Next up was removing the rubber bands and hoping that the deck didn't release from the hull. It would have been difficult to soak and bend the deck into the proper conformation. All went well and the deck was trimmed to be even with the sides of the hull. Because the deck is way too thick to scale I had to make sure that the edge of it was clean and would blend in to become the uppermost portion of the hull. Here is how it turned out after a bit of sanding as you can see from the lack of primer on some portions of the hull.



Once the deck was trimmed to shape I used scotch magic tape to mask off the top of the deck. On a full sized Chesapeake, the deck is nailed or screwed down to reinforcers in the hull. Often these fasteners are hidden by a band of paint that runs around the perimeter of the deck. The question was how to do this in 1:12 scale? My solution was to build a scoring tool as shown below.



This is a basswood block with a wood guide that sets against the hull and an embedded #11 blade to score the masking tape. It did a great job of scoring the tape and left a very even band of unmasked deck around the perimeter. The hull and deck edge were then primed and sanded until they looked like a single unit.



A dowel was placed through the deck where the cockpit cutout will be to facilitate handling of the kayak during painting. I call it kayak-on-a-stick.



The hull is now a nice smooth green and the deck a clear basswood.



The cockpit combing was made from a two layer laminate of 1/16th inch basswood. This was glued to the deck and once dry, the opening was cut into the deck. Here is a side view to show the lip that was made with the combing to allow the attachment of a spray skirt.



The hatches were glued onto the deck and held in place with rubber bands while the glue set.



Here is a close up of the combing and hatches that shows the stripe of green on the deck as well as the gloss finish of the deck.



A wire harness was constructed to hold the seat back. This was attached to a block that was glued to the underside of the deck to hold the seat back in the proper location. It didn't seem right to make a stitch and glue kayak without using some epoxy so the seat was glued into the hull using 5 minute epoxy.



The foot rests had been glued into the hull prior to attaching the deck. Here they are in their glued location as a testimony as to why this was done before the deck went on.

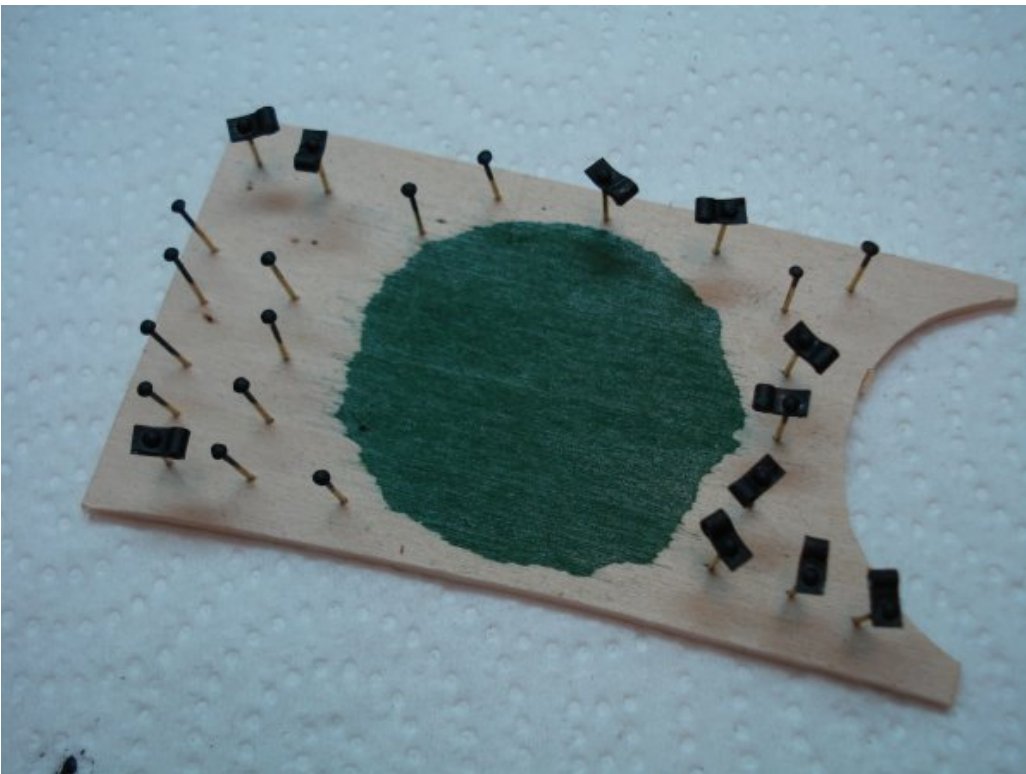


Here is the kayak at this point in the build.



Last up for construction of the kayak itself was making and attaching deck hardware. This turned out to be the most fiddly part of the entire process. I used .01" polystyrene for the bungee retainers. This material was held around a small brad and heated with a flame till shaped. These were then painted and dullcoated. The buckles for the hatch hold downs were very tough to make. I tried metal, wood, polystyrene and finally made them out of some thicker plastic that I cut out of a hand soap refill bottle from the recycling bin. A series of four 1mm x 4mm slots had to be cut into these buckles and five buckles had to be made. I know it doesn't sound like much but it took almost as long to make these as it did to cut and stitch the hull.

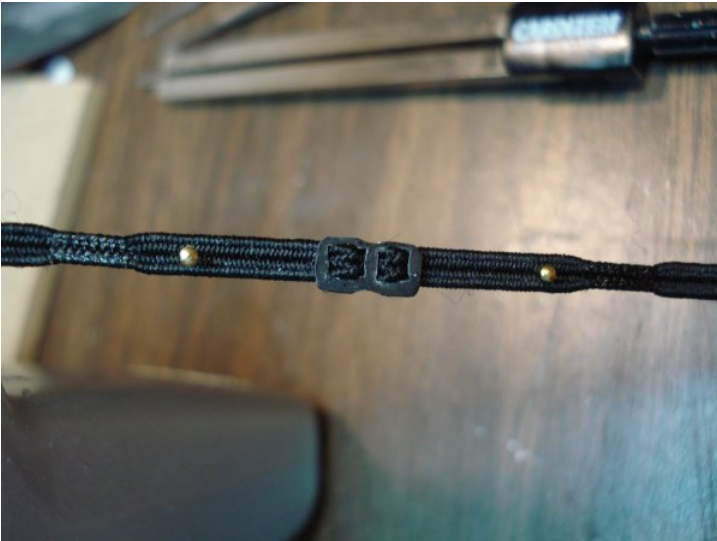
Here is a photo of the plastic hold down hardware plus some extra pins for the hatch covers being painted up.



Here is a little trick that I came up with for working with elastic cord and banding. If you need to thread it into anything, clamp it in a vise and stretch it. Next apply a little CA glue to it and wait till the glue sets.



I dabbed it to get any extra off. Once the tension is released, the cord retains its tensioned shape and will more easily pass through buckles and holes



Here is the hull with the deck hardware on it. We are nearly done!



Here she is after the champagne dried on the bow. I re-did the deck bungees because the knots (which were the correct ones for this purpose) looked way out of scale.





A couple of closing thoughts. I was reading the chapter about wood species characteristics in my copy of Ship Modeller's Shop Notes last weekend. I am convinced that the choice of Holly as the wood species for the hull was one of the main reasons why the stitch and glue technique worked for this model. Holly is amazing in that it bends well and yet is very strong. When these kayaks are built in full size, they use plywood for the hulls. Because the plywood has bias in all directions, it can stand up to being stitched. Holly is probably one of the only woods that will stand up to this kind of stress without splintering. I don't know if basswood would have worked.

I hope that you've enjoyed the build. What to do next 🤔.