Harryproa

Cargo Proa Prototype

Building Blog

NOVEMBER 2020

An interesting week. Finished attaching the topsides and deck to the ww hull. The structure is starting to stiffen up nicely, but some of the panels will need stringers added. Experimented with recycled glass chips from Rob R's swimming pool filter as non slip. Applied them to a piece of fibreglass and wiped my size 11's on them each time I passed. No noticeable damage so we will use it on the tender when we can figure out a reliable application method. The grip is excellent, even when wet, but falling on it will probably draw blood. see pic The areas are reasonably small so this should not be a problem.

We are running out of materials to finish tabbing the ww hull and fine tune the truss beam samples, so started on the toybox. Volunteers prepped and infused the bottom on Wednesday/Thursday, and we're almost ready to infuse the sides on Monday. The bottom looks good, (see pic) we are experimenting with some stringer options on the rest of it. Interesting to compare it with the tender panels we started with. The higher ambient temperature, Rassy scales, leak/bat detector, gauge, catch pot, unlimited amounts of reusable tacky tape and experience with the set up result in a more relaxed approach and accurate result.

I am placing an order, so anyone who wants materials from China at half or less the price from Aus, should let me know this week. We added composite ends to the first full size truss sample so we could test it and Rob R adjusted the holder to suit. We made and split a 50mm dia glass tow sample to assess the straightness of the fibre and toughness. The tow alignment was not perfect, but it took a lot of work with a big hammer and chisel to split it. see picRob R built a neat composite fitting for the tender anchor, including fibreglass roller axles. The simple first one did not allow the anchor to sit flush. I had a fascinating conversation with a group which has developed a

solar panel that produces hydrogen. Not ready for production yet, but they may supply us with some normal panels. We're also having a conversation about a Pacific shipping line using cargo proas.

Rob R and I spent a day at Uni watching some compression tests on truss members we made. They are stronger and have higher fibre resin ratios than expected but lower stiffness, not sure why. Means the beams may bend, but are unlikely to break. We are looking at options including deeper beams, using carbon in the horizontals and better process control. Also had a look around the labs and some interesting projects including sonic testing of composites, producing carbon/carbon laminates with exceptional properties including heat resistance better than steel and a scram jet test tunnel activated by compressed air blowing a 150mm dia hole in a sheet of 3mm thick steel. Highlight was the Maker Space workshop for student use including a dozen 3d printers, lathes, water, laser and router cutters, milling machines, a robot laminator and a bunch of friendly helpful technicians to help and advise. If there is a heaven, I expect it will look something like this. ;-) I am working on getting access. Thanks Martin and John for organising the visit.

The full size truss beam laminate range is narrowing down. Looks like it is going to be smaller than originally expected. We are also reassessing the full size build method so we can infuse as much of it as possible and not have contact with wet resin. Not quite there yet, but each iteration is less messy than the one before it.

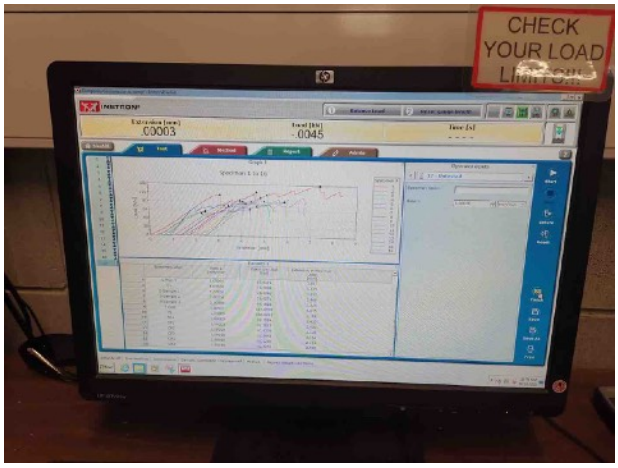
PhD students exploded some fibreglass wrapped concrete rods in the shed. 16 ton end load, and a 4 kg steel projectile fired into it at 80 kph/50 mph. A loud bang, but surprisingly little damage. On one test, the projectile was ~20mm/0.75′ off centre. The impact sheered the 6 x 8mm/0.3″ bolts holding it together. Fortunately, we evacuate the shed for the firing. The little boy in me is waiting for the non wrapped concrete tubes to be impacted. Should be concrete all over the place. 😉

This week; Rob R made an anchor roller for the tender and a f'glass anchor cleat from a test piece offcut, then a neat mould for shelf edges which will jazz up the ww hull interior. I played with edging the ring frames with glass tow then Roan and Sylvia did it better. Put in some offcut windsurfer masts as handholds near the hatch.
We joined the toy box. It looks bigger than I thought (8.5m/28′ x 1m/40″ x 500mm/20″), room for 4 friendly double beds, which increases our visitor potential significantly! I showed Nakul and Teguh how to cove and left them to it. Neater than me. My management skills are still not wonderful, but it is great to be able to stand back and see what is happening and come up with improvements, which does not always happen when I am immersed in doing the job.

The first ring frame took me 30 minutes to install. The last one 2 minutes. Nakul cnc cut the rudder mould supports at the UQ Maker Space (a magnificent set up with a large range of technicians, tools and equipment that the students can use to build things) and attended the latest round of testing. The results show the ultimate compression load of the specimens and the area under the curves indicates their stiffness. The samples are short so that they fail in compression rather than buckling. The civil engineers finally impacted a concrete beam with no fibreglass on it. Smashed it, concrete all over the place. The glass makes a huge difference.

They are now finished and we can move the ww hull outside, turn the tender over to complete and epoxy/copper the bottom and set up individual projects inside. Joining the rudder halves, infusing tow under tension, a model beam that will break in our test jig, stub masts, tube manufacturing and infusing the toybox lid, test bulkheads and the cockpit floor.

Compression sample in machine



Compression sample results

Sample under compression

Windsurfer hand holds

Tow on ring frames

Toybox ring frames