

Cargo Proa Prototype

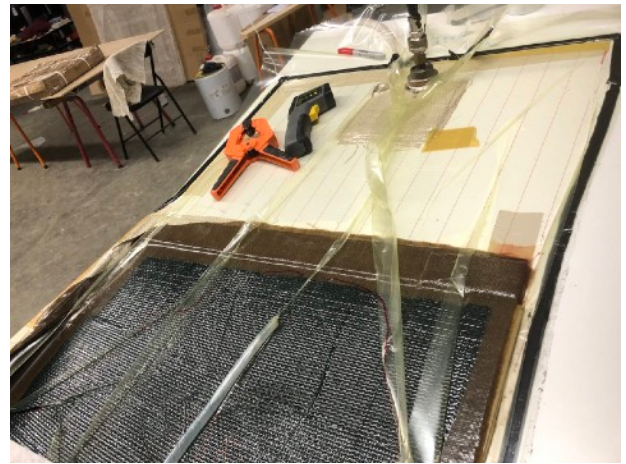
Building Blog



JULY 2020#1

Too cold last night for the resin to cure so spent today repairing a couple of small infusion misses, moving heaters around and making a mould for the beam sample. Infused it just before we left.





Spent the morning driving to the docks to get the material (1 tonne/ton) from China. Unloaded it solo, should sleep well tonight! Have now got the glass tow for the test piece for the beams and the carbon extrusion for the mast sample and the rudders which should stop us getting bored. Got the bag on and infused hull half #2. I had repaired a chip in the melamine with brown tape (stupid!) which leaked, but apart from being frustrating and slowing things down, it did not make any noticeable difference. Used shade cloth and perf plastic and a single feed. Took 3 hours, resin usage numbers tomorrow. Looks good apart from a dry spot on the edges next to where the heater was, presumably too hot, too quick. Easy fix with some resin and a clamped on flat piece. Sorted out the resin measuring/mixing so it is now glove free. Need scales which weigh more than 1 kg at a time before we start on the serious bits.



Rigged some strings from the roof and lifted half hull #1 off the mould and got it outside. Took a bit of effort and a little grinding to get the spacers out due to inadequate taping, but nothing major. Also a small resin puddle where the bag was not applied evenly. Might come out with the peel ply, but grinding is more likely. The secondary infusions look good, a faint line on the peel ply on the outside. Finished cutting the materials for half #2 and got them laid out apart from the bag.



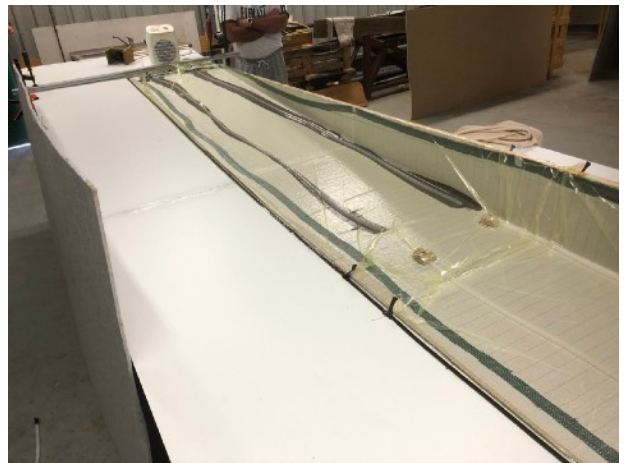
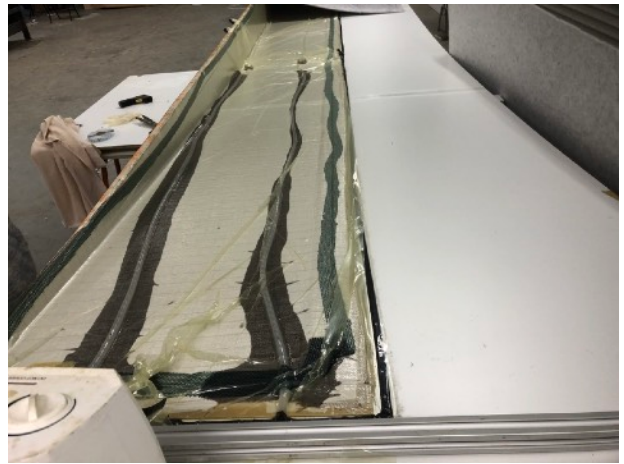


JULY 2020#2

Repaired the dry spots by running a length of spiral across them and infusing. Not perfect but not far off. Photos show the extra length of spiral. Heated it, cut the materials for the next half hull then demoulded it. The plastic mould liner worked well. I should have plastic taped the mould edge but nothing a sharp chisel didn't fix. The vertical looks good, I can't lift it solo to see the horizontal surface.

Infused the first half of the first tender hull. A few dry bits from vacuum close outs which were not a problem on the samples where the resin front spread across the laminate. Solution is a strip of infusion medium down the middle of the mould and one feed line instead of two.

Could have been fixed during the infusion by poking a vacuum source into the dry area, sucking in resin, removing the source and taping the hole. Uncharacteristically I decided not to risk the whole job for a couple of dry spots. Should be easy enough to fix them tomorrow, but it would be a lot better if it wasn't required. The pictures were taken before the resin stopped flowing, the end result was not quite as bad as it looks. The other glitch was the not extending the feed close enough to the vac outlet. The samples infused 300mm/12" across the stack but today only 100mm. Not sure why but suspect the resin cured quicker than expected due to some pretty aggressive heating. Resin used 15.8 kgs, 400g in the lines and buckets. Maybe 2.4 kgs in the spiral peel ply and medium leaving 13 kgs in 8 kgs of flax. I might have to work harder on getting the laminate tight in the corner of the mould.





JULY 2020#3

Beam sample infused (see pics) although far from perfect due to the inlet port losing contact with the spiral and an unexpected (as always) resin raceway developing. Will try a second infusion next week.

Glass tow infuses easier than carbon. Laid out the third half hull. Female joins on both edges which made it finicky. Rob R made a cool set of scales which saves 500 bucks and made weighing much easier. "No glove" measuring and mixing (ie, no contact with the epoxy) is now reality, the resin bench is near(er) pristine and we can look at further fine tuning of the layout, heating and minimising materials.

JULY 2020#4

Infused. Best one so far. Used 16.8 kgs of resin with double the weight of laminate (only one layer of flax, the rest uni glass). Rob R and Roan controlling the measuring and the temperature meant I could spend time watching and worrying. But not fiddling, which often leads to problems. Fun part was using the temperature to control the resin flow. No heater on the part near the vac outlet meant the resin front got to the end of the spiral, then evenly to the end of the laminate. The three of us should be able to produce a 9m/30' panel every two days with time to spare for joining components next week.

JULY 2020#5

Glued the hull together. Remarkably quick and easy. Did some more test pieces, some successfully, some not so much. Prepped the other half hull for joining. Had a meeting with the other partners to discuss samples for testing and meet the engineer who will be doing the FEA stress analysis and laminate details for the beams, mast and hulls. Ordered some samples of an interesting 'eco resin' for testing.



First hull joined





Rassy scale and balance weight. Simple and near idiot proof. One less thing to worry about during an infusion. Thanks Rob R.



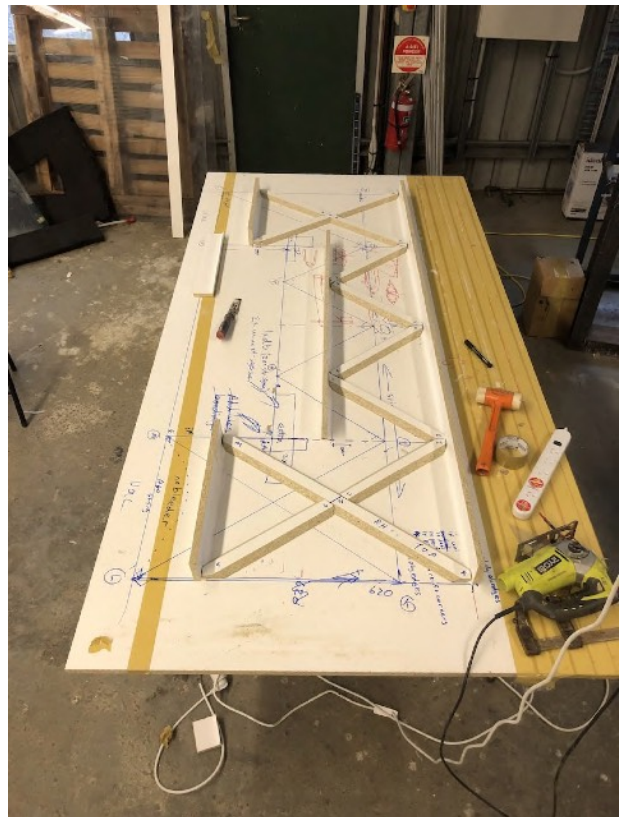
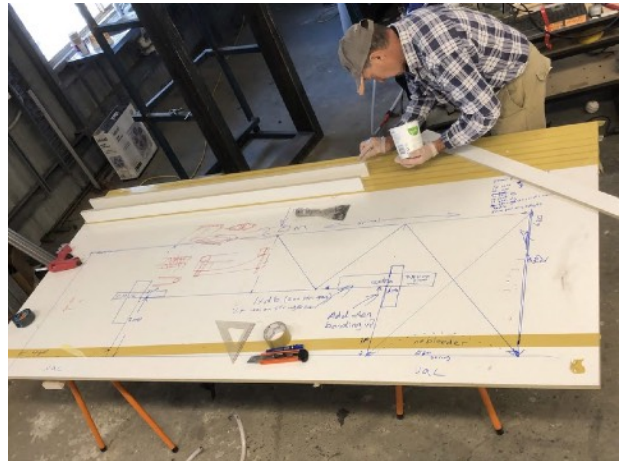
Truss beam sample

JULY 2020#6

Roan and I joined the other tender hull. Easier than the first one. Had an idea for a foamless bulkhead, should be ready to infuse soon.

Tender information: LOA is 8.4m/28', hull beam 650mm/26", BOA 2m/6'8". Reasoning behind the hull shapes: It needs to carry a ton or so, fit between the beams and have room for solar panels (some of which will be removable or on a raisable roof). The hulls have no rocker as they will always be trimmed bow up. They are double ended to avoid submerged transoms under high payloads for drag minimisation. It is also easy to

build, but adding rocker to the mould would not be difficult.



Foamless bulkhead ready for layup



Both hulls joined

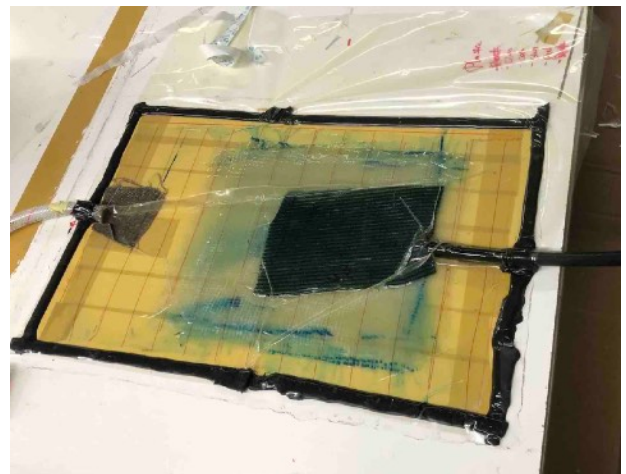
JULY 2020#7

Prepped the table for the tender floor, Rob R laid up the foamless bulkhead and Roan did some more tests, including a successful Soric one and a less successful tow in pvc one. He also serviced the vac pumps, which now work much better (more suck) and 3D printed an adaptor for the pump inlet. Handy guys to have around.

Rob R infused the bulkhead, looks good. Used a bit more resin (2 kgs vs 1.5) than expected, but there are a lot of places for it to hide. Will see tomorrow. The 1st half of the tender floor is ready to go when the pump is available. There are 4 components that require a wide table (ww hull sides, tender floor and deck). Decided it is less work to build them in halves and join them rather than extend the table. Plus the joins are all in the floppiest part so will act as stringers. Another test piece seeing whether perforated plastic between 2 layers of 6 x 400 uni would work. It does. We will probably lay up both deck halves in one shot, possibly also the ww hull halves. Volunteer insurance is apparently sorted, should have a few more workers soon. Weighed one of the tender hull shells: 50 kgs/110lbs. Not bad, on course for <150 kgs all up.



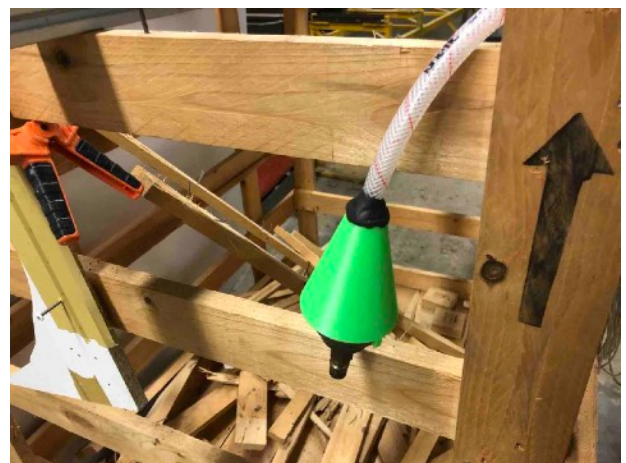
No foam bulkhead ready to infuse



10 layers of 400 with perf plastic



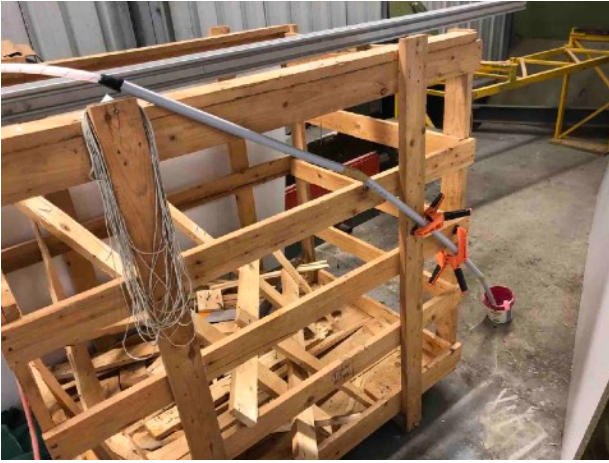
No foam bulkhead ready for cloth



3d printed adaptor



No foam bulkhead ready for plumbing



Tow infusion test