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Getting Started, Keel, Frames, Stringers and Planking

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Sundowner build...2

Committing to a build means acquiring some material and...cutting it with no return, so on with the job!

The first thing to make was a suitable board to mount the assembly on to maintain alignment until it was rigid enough not to warp. A piece of MDF as large as the hull stiffened with some 2"x1" battens sufficed, and it's first use was as a drawing board to draft out essential details of the hull lines on paper (wallpaper backing paper is good for this) to use as patterns.

I decided to make the main backbone (the keel) of the hull out of a piece of thin (13mm) well-seasoned oak that I had around (and I had from green and cut off a log 25 years ago). It was as hard as iron and seemed a good idea at the time. I marked out the shape on the plank from my (scale) drawings and cut it out with a jigsaw. The bow stem piece was also oak and tenoned into the keel. One aspect of making your own design is the necessity to think ahead and in model boat terms the first brush with this was to remember to cut a slot to put a propellor shaft and tube in (because drilling a very long and straight hole later if you forgot would *not* be easy or enjoyable). That is where the fun started because when I cut a slot leaving only the outer end joined for later removal the wood bent and warped. Since the construction called for side pieces all along the keel with cut aways to suit the frames, I was able to *nearly* rectify this with strong glue, brass screws and many clamps. Note that brass screws were more or less essential as not only might rust get a hold, but the tannins in oak cause steel to rust quickly. I don't know if this applies to stainless steel, but I had some suitable brass screws in stock. For those interested, the choice of glue caused me some thought. I wanted to use the same glue for all of the wood construction, and this had to stand a marine environment somewhat less stringent than a real boat. I also wanted it to be quite rigid and ideally have some gap filling capability: it also had to be paintable, able to be applied 'to itself' when joints made over time were close together, ideally cleaning up with water prior to it setting etc. To cut a long story short, I decided to use Titebond 3 and I have had no cause to regret this although I did seem to use a lot (the instructions say 'apply liberally'!). The early and painful part was realising that a late winter start in my workshop meant that I had to make a few joints twice as the glue did not set properly owing to



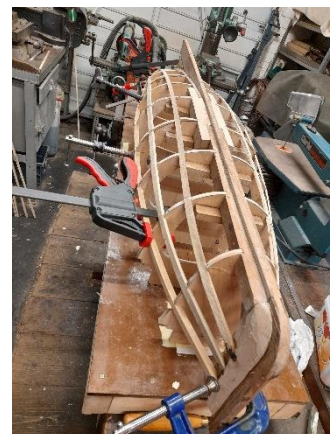
temperature (it needed to be over 45deg.f). Thankfully spring and summer meant good progress.

Anyway, the keel looked fine, so I found some marine ply from old packing cases (large offcuts sold as marine anyway) 9mm thick for the frames. This wood was significantly better than the stuff sold as marine in the DIY places. Most of the frames eventually were to be cut away, so I cut the outlines (not forgetting some extra height to allow the frame to be fastened upside down to the rigid baseboard while it was glued up: an essential step to keep it all the right size). The shapes were developed from some small-scale line drawings I found, and the scaling up was likely to introduce some errors. I also cut away some 'insides' and half cuts to make removing the waste later easier. The frames and the keel ended up as the photo. The broad keel stiffeners you can see were around the propeller shaft opening and to help the warping I mentioned above. It was at this point I thought I had better resolve the propeller shaft tube and glue it in. You can buy these ready-made, but since I had metal fabrication equipment, I thought I had would make it. It is made from a piece of 12mm thin wall stainless steel tube with phosphor bronze bushes pushed into each end then reamed for a 6mm shaft. Owing to its length I thought I had better add a centre bearing, so pressed in a reamed piece of PTFE to the centre (which will need re-reaming with a 'sharpened' 6mm shaft when I get some as pressing it in reduced the bore slightly) before adding the second end bearing. It is epoxy glued into its slot to seal and secure it.

When I had to clear out my father's workshop (he made some Windsor chairs using ash), I inherited a load of ash, so decided to use some of this for the stringers. Cutting them out using an ancient portable table saw was easy, and ash is also easy to bend especially a little steaming. I used a wallpaper steamer I had from countless



decorating tasks at home and a pipe. worked well and the stringers were fitted with many clamps (a man can never have enough clamps). This is where I was essentially testing the hull shape as the stringers gave some '3-D' ideas of issues. I did have to fiddle a little here to get smoother lines, but nothing major. You can see some added fillets at the bow where I thought there had to be some reasonable 'land' to glue the planks to that the stringers rebated into. At this point (ie before gluing the frames and stringers together) I screwed the frames to the building board you can see in the photo (taking care to place the screws where I could remove them when the hull was



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completed!). In fact, I found that once the keel, frames and stringers were all fitted and glued, I could remove the hull from the baseboard without any twisting and this made the planking easier regarding access. The planks themselves do not apply much twist when fitting them.

The project entailed much thought about the best order to make and add things. The problem with a glued 'box' is that you have to ensure that you can fit everything later on, so I burned much midnight oil thinking about the order of things. This became very obvious when deciding when to add upper works items like decks etc. as this is when the hull gets boxed in! Also, things like 'does the rubbing strake get added before or after the deck' were perplexing to make construction more logical.

The next job was planking the frame. Double diagonal planking is a good way to prepare a hull with 'voluptuous curves'. It was my first go at anything like this and I was apprehensive...

I thought about using hardwood as per prototype, but decided that I could not face steaming and bending loads of planks individually (and at eye watering cost), so decided to use more plywood: this time birch plywood 1.5mm thick, taking care to choose a type with waterproof glue used in laminating (this was easy to find and buy, and not too expensive). The eventual hull would then be 3mm thick less a bit lost to sanding to smooth joints. After some experimentation, planks cut 'across grain' (the three-ply nature had a strong preferential bending direction) between 10 and 20mm wide depending on the hull curvature at the point required were used. I found that another ancient tool I had around came really useful for this: a large A3 paper guillotine! Thank goodness too because using a craft knife or saw for this would have been a real trial on my limited patience (large scissors, I later found, would do with some hand exercising).



Each plank on the first layer had to be glued and clamped to the stringers and frames it crossed (a man cannot have enough clamps etc) and this, with the glue setting time, meant that two planks, one on each side, was the limit at one time. Having calculated that this meant that it would take 10 months if I allowed 24 hours for each to set, I had to take some risks and reduced this time to about 2 months in the end for the first layer (the glue got a safe grab after about 5 hours). The photo shows the first layer about 70% finished. Note that many planks had to be shaped slightly (ie tapered in width) to fit flat, especially where the hull changed curves quickly. This was not as hard as it sounds using a large pair of scissors and marking out on the job plank by plank. I worried at first about small gaps (say 0.5mm here and there) but then realised that the second layer would laminate over these OK. The black splodges are where glue overspill went off in contact with a clamp...curious effect but 'sandable off'. The second layer was harder and I will leave that to next instalment!

