Build Your Own 18' (5.5m) Workboat

Just pretend you're building this one for her purposeful practicality, not that pretty horseshoe stern. From Canada, designer Paul Gartside sends full plans for the serious backyard boatbuilder.

As I am preparing this issue's design piece, the first signs of winter are showing in south west Nova Scotia. There was frost on the shoreline when I went to bail the boat this morning and suddenly the warmth of the workshop seems more inviting than the waters of the harbour. It's a good time of year to be contemplating a building project, real or imaginary. Something not so big that the fun goes out of it but challenging enough to keep us pleasantly occupied until spring comes round again. This small towboat might be just the ticket. The material bill is modest but the challenge considerable; here's one that will make us think.

It was first sketched up as a tender for a seine boat conversion and it takes its character from that source. Later, the plans were completed as a towboat for a floating home builder in Vancouver. It's a neat boat that would make a useful tender/towboat for any manner of waterfront operations but it is as a building project that I find it most appealing – this would be a lot fun to put together.

The defining feature is the horseshoe stern which is a cultural trait of boat architecture in the Pacific Northwest and has remained so long after it disappeared in other parts of the world. Originally it had practical advantages for the table seiners and salmon trollers in minimizing the snagging of gear. It is also a reasonably efficient one for low to medium power applications. But more than that it makes a particularly handsome stern and I suspect that as much as anything accounts for its longevity.

In the bigger boats a stern like this is often built up 'bread and butter' fashion from slabs of red or yellow cedar, edge bolted and dressed to shape; carved out of the solid in other words. A plank rabbet is then worked into the forward ends for the topside planking and on the underside of the knuckle for the bottom planking. The key to visualizing how this all goes together is to note that the lower knuckle line lies in a flat plane, the stern timbers would be stacked in that plane with the top dressed to the spring of the sheerline.

In our case we'll avoid the weight and waste of the timbered stern by planking the horseshoe in vertical staving. The curvature of the top is controlled by a harpin or deck shelf that runs from stem to stern and is sprung to the curve of the sheerline; the bottom by a heavy rim timber rabbeted top and bottom and let into the building moulds. And like all complex jobs it can be made simple by breaking it down into manageable steps. As so often in boatbuilding, the way into this is an accurate and thorough lofting. So throw away the computer, get down on your knees and I'll take you through the initial stages until we have her ready for planking.

I'm concentrating on sequence here. If you are unfamiliar with basic practice and terminology, a good lofting text will shed light on the grey areas.

First we need to get the lines plan, Sheet 1, enlarged to full size on the floor. To save space I would superimpose the profile, half breadth plan and the diagonals on one board and keep the body plan separate on another; that piece of the picture is going to get quite busy as we go along. With a blue ball point pen lay down an accurate – and I mean accurate – grid. That is, the straight lines that represent stations, waterlines and buttocks. Then add the hull lines in pencil in this order:

First define the edges of the faired surface by drawing in profile and half breath plan, the sheerline, rabbet line and knuckle line. Use the offset table, Sheet 2, to do this but then transfer the faired heights and widths to the body plan with a tick stick. Next complete the body plan using all remaining offsets in the table. Put the offset table away now and check for fairness by adding the waterlines and buttocks alternately: one waterline, one buttock, one waterline... until they are all in. Take the measurements from the faired body plan with a tick stick. When unfairness is detected, draw the best line you can, then go back and adjust the body sections to suit. The golden rule is never proceed to the next line without correcting the last. When all waterlines and buttocks are in and cross checked, add the diagonals as a final check. With luck we won't encounter anything more serious than scaling errors which can be chased out without serious hair loss.

That concludes stage one of the lofting job. We have a full size drawing that defines the outside surface of the hull and we are reasonably confident it is fair. Now we must work in from that to get at the shape of the various components we need to build the boat.

Stage two then is to plot in the construction detail. Take a red ball point pen and on the profile view, draw in the outline of the components that make up the backbone: stem, keel, apron, horn timber etc., the stern tube, rudder and skeg. Scale off the construction plan, Sheet 3, where necessary. Draw in the harpin in profile: its top lies ¾" (18mm) below the sheer. Draw in the 3" (75mm) rim timber in profile. On the body plan we need to make a deduction from the outside of planking to get the shapes of the building moulds. If you use the building set up shown on Sheet 4, we will be deducting for plank thickness plus frame thickness which comes to $1^{13}/_{16}$" (46mm). Draw a line parallel to each body section $1^{13}/_{16}$" (46mm) inboard with the red pen. Still in the body plan, draw a section through the keel and a section through the harpin on each station... I warned you this drawing would get busy.

Now the picture is coming together; we have enough information to make up the building moulds and we can make patterns of the outline shapes of all the centreline components. However, there is still some information missing and this is where we get to stage three of the lofting, plotting the auxiliary views.