

TOOLS and MATERIALS

TOOLS

Tools are great things. You can never have too many -- or can you? I know of lots of people who will not start any project until they have the best and most specialized tools available. Remember that tools are the means and not the end. Get what you really need and let's get on with the work at hand.

You can build this boat with very few tools, but some are really necessary. Others are nice and will speed the work along. If you don't have access to a lot of power machinery, you may be able to find a nearby cabinetmaker who will be willing to do some of the tablesaw and planer work such as ripping out laminations, gunwales, and thwarts. I prefer to rough out planks on the table saw, but a small portable circular saw or even a saber saw will work. For that matter a hand saw will do.

A drill, screwdrivers, hammer, block plane, spirit level, tape measure, and a couple of chisels are necessary. A few inexpensive spring clamps, a combination square, some kind of saw, and a sharpening stone will be wanted. There are lots of other tools that I use when I build a boat like this, but most of them are not absolutely needed. A little ingenuity and muscle power will usually make up for their absence.

Two of the most important tools in boatbuilding can be made by you. One is a straight edge which can be just a well seasoned board or piece of plywood about 6" wide and 8' long with one edge planed good-and-straight. The other tool is a batten -- or two or three. A batten is just a strip of wood that is used for marking and sighting fair curves. To use it you merely bend it around the points being connected (molds, tick marks, nails etc.) I don't believe a good boat can be made without battens. They are easy to make but the

stock for them can be hard to find these days and any boatbuilder worth his or her salt will always have a eye out for a piece of wood that might contain one.

When you go to the lumber yard to look for your ladder frame stock, look for some batten stock as well. What you're looking for is a long, clear, straight grained piece of softwood. I've found most of my good battens on one edge of a larger piece of 2" construction lumber like spruce or fir. If you look through a pile of 2 x 8's or 2 x 10's you will probably be able to find a piece with one edge that meets the requirements. Buy it! You will probably be able to find a use for the rest of the piece, and even if it only yields one good batten, your money will be well spent. For this boat you ought to have a batten that is 3/4" x 5/8" x 14'. When you sight down your batten, it should be straight or may have a slight, smooth sweep but must not have any significant bends or quick places in either dimension. A couple of smaller sized battens, of the same general proportions, will be handy to have and are usually much easier to find..

PLYWOOD

I highly recommend that you use high quality 1/4" 5 ply marine plywood for planking. Utile, sapele and kayha are all good wood species. (Ocume is lighter but not rot resistant and should be used only if absolute minimum weight is a must -- it might save 3 lb. on the finished boat.) Although very expensive, this ply will be easier to work with, bend and twist more uniformly, and last longer. If the bank account is looking a bit thin, you could use 3/8" marine lauan ply for the bottom board, floorboards, and bow and stern sheets. I don't recommend 1/4" marine lauan for planking as it has only three plies and the face veneers are usually very thin. Fir ply is good

stuff but almost impossible to finish well because of its propensity toward checking.

OTHER WOOD

My first choice for most of the rest of the wood in the boat would be pattern grade South American mahogany or vertical grain old growth Douglas fir. Philippine mahogany (Lauan) would be fine as long as it were one of the darker and denser species. Oak is not recommended as it does not glue well with epoxy. Other locally available woods may be suitable as long as they are fairly dense, moderately durable, and glue well. You will find other woods mentioned as options on the plans or elsewhere in these directions.

GLUE

Epoxy glues are so suitable for this kind of construction that I hesitate to mention other types of adhesives. Epoxies are easy to use, fill gaps well and can be used for coating wood and putting holes as well as gluing. Building this boat will require mixing many small batches of glue, one or two ounces at a time. So a lot of time and expensive glue will be saved if you either purchase suitable pumps for measuring small quantities or get a resin that mixes in a 1:1 ratio. I have used Gougeon Brothers WEST System, System Three and SP Resins products, all with good results. T-88 is a good resin with a 1:1 mixing ratio but is too viscous for use as a coating.

It is very important to read and follow the manufacturer's instructions. Measure carefully and mix completely. Uncured epoxies, especially the hardeners, are strong skin sensitizers. Once you become sensitized, you will no longer be able to use epoxies. Sensitivity varies tremendously; some people will still be OK after hundreds of exposures but I know of one person who developed a strong sensitivity after only two exposures. Although epoxies may cure hard after

a few hours, a full cure can take days or, at low temperatures, weeks. Until it is fully cured, epoxy sanding dust can cause problems in the respiratory system.

Don't panic, just work smart. Wear gloves when working with resin and wear a dust mask when you sand.

ADDITIVES

Three epoxy additives will be helpful: milled cotton fibers, cabosil, and microballoons. For most gluing jobs, a bit of milled cotton fiber and a little cabosil, added to well mixed resin in that order, are all that's necessary. Don't make your mixture too thick or it will have trouble wetting out the surface. A thin honey consistency is what you want.

For filling holes, add a bit of cabosil and a surprising amount of microballoons to make a putty about the consistency of mashed potatoes.

ON EPOXY COATING

To read many boat building articles these days, one could easily become convinced that to set out on the water in a boat that is not protected by five or six coats of epoxy resin would be foolhardy at best, and quite possibly fatal. Well, I'm here to tell you that there are many plywood boats out there that have attained a very respectable age without the benefit of any epoxy whatsoever.

While it is true that epoxy coatings can be very good moisture barriers, they must be quite thick to be effective. Putting on multiple coats of resin and then sanding them to a paintable surface, without breaking through at laps and other corners, is a *great deal of work*.

My experience has been that if good quality plywood is used, epoxy coating is unnecessary. If your time is worth more than a dollar an hour, it will be cheaper to buy good plywood than to buy

cheap plywood and coat it. I believe (although without much scientific study to back it up) that, in thin coatings, alkyd enamel is a more effective moisture barrier than epoxy resin, so keep a good coating of paint on your boat.

However, like the death bed convert who decides that a little religion might be better than none at all, I usually do try to coat exposed plywood edges with epoxy. And I sometimes even put on a coat or two (in spite of my conviction that it will do little good) in the bottom under the floorboards where I won't have to sand it too much.

MATERIALS LIST

I've done my best to make this list as complete as possible, but I've probably forgotten a few things. I've listed the materials that I would use; substitutions could be made for many of these items.

BUILDING JIG

1. Ladder frame rails: 2" x 6" x 14' (nominal) KD spruce, two pieces, straight as possible.
2. Ladder frame cross pieces: 2" x 6" x 10' KD spruce, one piece.
3. Molds: 5/8" x 4' x 8' particle board, two pieces.
4. Mold cleats: 2" x 2" KD spruce, about 45 lineal... ft. needed
5. Various braces, etc.: 1" x 4" pine or spruce, about 20 lineal. ft. needed
6. 3" drywall screws, 1/2 lb.
7. 2" drywall screws, 1/2 lb.
8. 1" drywall screws, 1/2 lb.

BOAT MATERIALS

1. Bottom board, floorboards, bow & stern sheets: 3/8"(9mm) x 4' x 8' marine ply, one sheet.

TOOLS & MATERIALS

2. Planking: 1/4"(6mm) x 4' x 8' marine ply, four sheets.
3. Guard rails, inwales, thwart risers, stem, floor & knee laminations, keel, etc.: about 40 board feet lumber, mahogany or fir, 1" thick, one piece at least 14' 4" long
4. Breast hooks: one piece 1 1/4" lumber, mahogany or fir, at least 6" wide and 4' long.
5. Glue: two quarts epoxy resin, double if you want to coat all surfaces
6. Hardware: one pair each bronze oarlock sockets and horns.
7. Stem banding: 17 ft. 1/2" brass half oval.
8. Fastenings: silicon bronze flat head wood screws.
 - 50 #8 x 1", seats, floorboards, etc.
 - 25 #8 x 1 1/4", thwarts, etc.
 - 50 #8 x 1 1/2", inwales, etc.
 - 10 #8 x 2", outer stems, etc.
 - 50 #6 x 5/8", thwart risers, floors.
 - 70 #6 x 3/4", stem band, etc.
 - 6 #10 x 2", oarlock sockets, step.
 - 4 #12 x 3 1/2" breasthooks.
 - 1/4 lb. Anchorfast nail, #15 x 3/4"

SOURCES

Here are some suppliers that I have used in the past with good results.

Marine plywood:

Harbor Sales 800-423-0030
1401 Russel St.
Baltimore, MD 21230-2089

Boulter Plywood Corp. 617-666-1340
24 Broadway
Somerville, MA 02145

Fastenings, epoxy, oarlocks, paints, gun'l guard:

Jamestown Distributors
28 Narragansett Ave.
Jamestown, RI 02835