

# Building a US One Meter Hull

By Jim Linville

US One Meter Class Secretary

One of the things I enjoy most about the US One Meter Class is building boats, and, in my opinion the *US One Meter Construction Guide* is a necessary reference. Many AMYA members are not aware that a *US One Meter Construction Guide* and a number of building plans for US One Meter Class yachts are available from the class. The *Construction Guide* was originally written by class founders Bob DeBow and Bob Jensen. Steve Andre made major contributions and produced the first computerized version. Bill Turner added new material and enhanced the drawings. My contribution will be to continue adding new stuff, introduce the use of modern materials such as carbon fiber, and prepare the *Guide* for distribution on the Web. In my opinion, at \$5, the *Guide* is one of the best bargains in model yachting, and believe it or not, the \$5 price tag has never changed.

Those of you who have built boats from scratch know that more time is spent trying to figure out where to put the mast step than building and installing it. And that's true for most parts of any scratch-built boat. For most of us the *Construction Guide* will solve this problem. The current edition has more than 50 pages of highly illustrated, expert information on subjects such as hull

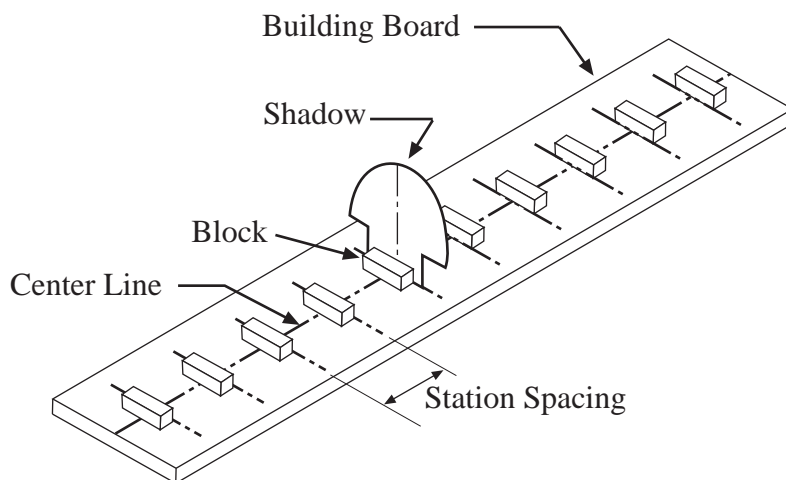
construction; building rudders, trunks and keels; keel bulbs; decks and hatches; sail rigging, masts and fittings; radio boards, winch sheeting, and sail trimming.

I wish we could publish the whole thing here in *Model Yachting*, but space constraints rule that out, so check out the following three-page sample on how to build a balsa hull. The revised booklet will be available on the Web and from the AMYA Chandlery before the summer is over. In the meantime copies of the current edition are available from the US One Meter class secretary. I've also included an abbreviated set of plans for Bob DeBow's great US One Meter yacht, *Mistral*... enough to build the hull. The full set is available from the class.

The class also keeps a library of US One Meter plans that we make available to the membership at \$3 per set. These plans range from 5 to 8 pages in length and when coupled with the *Construction Guide* provide all of the information you'll need to complete a really spiffy yacht. Currently we have 19 plans ready to be built.

For more information, contact me at any of the addresses shown in the Masthead.

## HULL BUILDING BOARD



The board has to be "warp-free". It can be plywood or particle board shelving material. Particle board is a little more difficult to cut and drive nails into than plywood. Size of the board is about 5/8" x 12" x 48". If you want to keep the board clean, cover it with shelf paper.

Draw a center line on the length of the board. Draw station spacing lines at right angles to the center line. Make sure the spacing is correct for the hull design. Lightly nail small wood blocks (about 3/4" x 3/4" x 2") to board at station spacing lines.

Note that blocks are placed in front of station lines 1 thru 5 and behind station lines 6 thru 10. Do not drive nails "home". They will be removed later.

Trace shadows (frames or formers) on 1/8" thick "doorskin" plywood or untempered hardboard. These shadows will be discarded later. Be sure you have a center line on each shadow. Cut out shadows, and sand any rough spots. Glue shadows to blocks on building board. Use 5 Minute Epoxy or hot glue. Be sure center line on the shadows lines up with center line on building board.

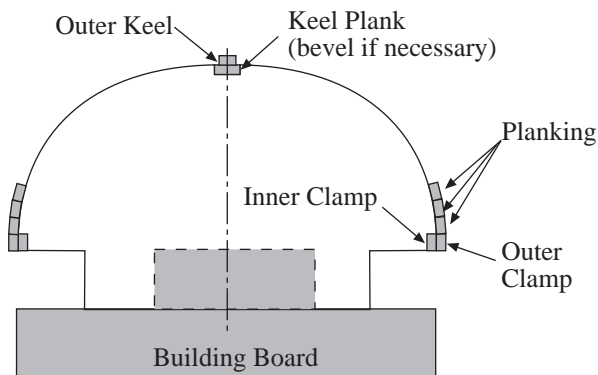
## PLANKING THE HULL

To build a straight hull you must have a sturdy jig to hold the station formers in alignment with the keel center line, they also must be perpendicular to the center line both vertically and horizontally.

Draw or trace the station former outlines on paper, cut them out and glue them to the former material with rubber cement. You can use 1/8" thick door skin plywood (or any other suitable material) for former material. Cut the formers out and sand the edges to conform to the paper templates.

Cover the edges of the formers with masking tape, where the hull planking will make contact. This helps prevent the glue from sticking to the formers. Now attach the formers to the building jig. Make sure station spacing and former alignment is correct.

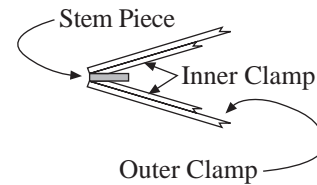
Before we start building lets talk about materials used in the construction of the hull. The keel plank and deck rails are 1/8" X 1/4" wide strips of pine or basswood. The hull is planked with contest grade "lite" density balsa wood strips. Balsa comes in several densities. If you use hard density wood its not as easy to form the strips to the formers and the hull starts getting a little heavy. You can buy 1/8" X 3" wide X 48" long balsa sheets.\*



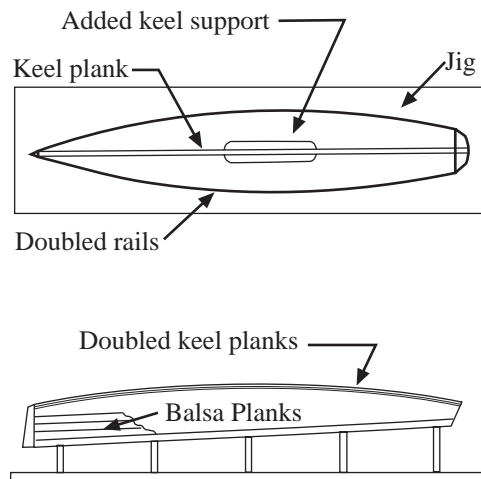
Use a balsa stripper to cut the sheets into 5/16" wide strips for planking (you can't buy precut strips in this width and this is about the maximum width for easy planking). "Zap CA thin" glue can be used throughout the construction of the hull. It will bond almost anything, including your fingers and sets up almost instantly. The joints must be tight, because the glue will not fill gaps. Therefore if you have any gaps, fill them with Micro-Balloon filler or balsa dust, and then Zap it.

OK lets start planking the hull. Lay in the first 1/4" wide pine keel plank and glue to each former. Glue a second pine plank on top of the first plank. Do this by pressing a few inches of the second plank tightly against the first plank and apply Zap to the edge where the planks meet. Capillary action will suck the glue between the planks. Continue this for the full length of the planks. For added strength in the keel fin area, glue a short 1/4" wide pine plank against both sides of the keel planking between formers 4 and 7. Install the deck rails on both sides with double planks of pine in the same manner as the keel planks.

\*Tech Editor's Note: I get mot of my wood from Lone Star Models in Lubbock, TX (800) 687-555. They're a great source for most US1M building supplies including balsa, plywood, carbon fiber sheets, and SS cable.



Start the balsa planking at the deck rail, making sure the plank is tight against the deck rail edge. Zap the edge joint as you move along the length of the hull. Continue laying planks making sure the edges are tight and that they follow the curve of the hull and are against the formers. Lay in about four planks on one side and then switch to the other side. Continue to plank the sides until you get near the water line at the bow. Glue a balsa plank along the hull bottom against the pine keel plank. Do both sides of the keel this way. For the remainder of the planking, trial fit each plank for length and end shape before gluing. When you lay flat planking strips against the curved area of the formers, the gluing edges don't meet squarely and you get a slight gaping of the edges. To eliminate this,



use a sanding block to put a slight angle on the edge of the plank to be glued in. It doesn't take much, just a swipe or two with the sanding block down the edge of the plank.

When the planking is completed, trim and sand flush any planking extending past the bow and stern formers.

OK its time to sand the hull. Use a sanding block with 100 grit Garnet paper. Its important to use sharp (new) sandpaper. As soon as it starts getting dull change it.

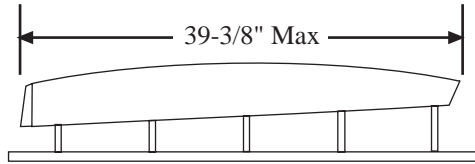
Don't press hard on the sanding block, because it will cause low spots in the hull. The glue line between each plank is harder than the balsa wood, to prevent ridging of the glue line, sand diagonally across the planking. Rub your hand over the hull, and you can feel the bad spots easier than you can see them. When the hull feels and looks good, finish up with a light freehand (no sanding block) sanding using 120 grit paper. Remember balsa wood sands fast and easy and the planking is only 1/8" thick.

Install the keel, ruder log and rudder, deck beams and hatch cover. These items are covered in other sections of the construction guide.

## TRANSOM

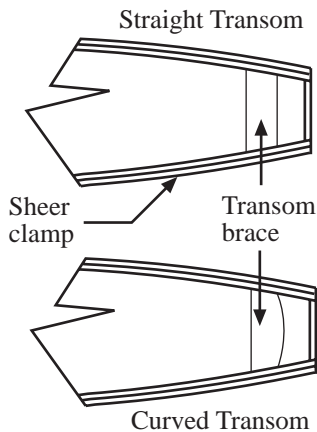
Here's an easy way to make an attractive transom on your new hull.

When the hull is planked, nose piece or bumper installed, hull



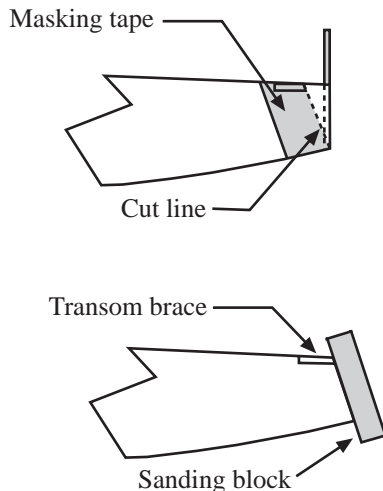
sanded and **BEFORE** you remove the frames, place the hull on a flat surface. Measure the hull for over-all length. The maximum L.O.A. for a One Meter yacht is 39 3/8". Minimum is 39". This is measured parallel to the waterline.

Fit and glue a 1/8" thick plywood transom beam between sheer clamps.



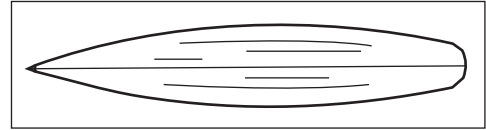
Apply masking tape to give proper cut line. Use the edge of the tape as a guide and cut through the clamps, planking and keel. Discard the last frame.

Use a sanding block to true and bevel edges. Glue a small sheet of 1/16" plywood across the open end of the hull. Trim and sand to final shape.

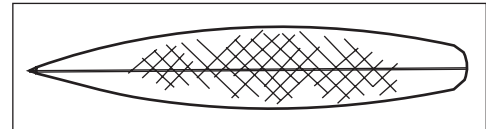


**BE SURE OVERALL LENGTH DOES NOT EXCEED 39 3/8".**

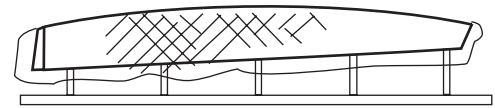
## LAYING FIBERGLASS CLOTH ON YOUR HULL



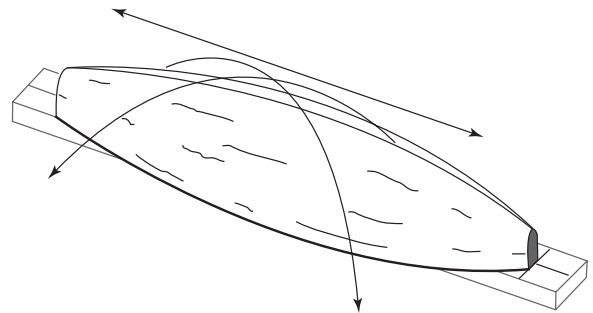
Sand hull smooth with 100 grit sandpaper. Fill in all gaps in planking and any low spots. Finish sand with 120 grit sandpaper.



Place 1 oz. fiberglass cloth over dry hull, with fibers running approximately 45% to keel. Smooth out fiberglass cloth with palm of your hand over entire hull (except transom).



Trim fiberglass cloth approximately 1" from edges of hull.



Gently apply resin or epoxy to the hull, starting in center of keel and work toward bow and stern. Apply resin or epoxy to the remainder of the hull using a downward motion and let cure.

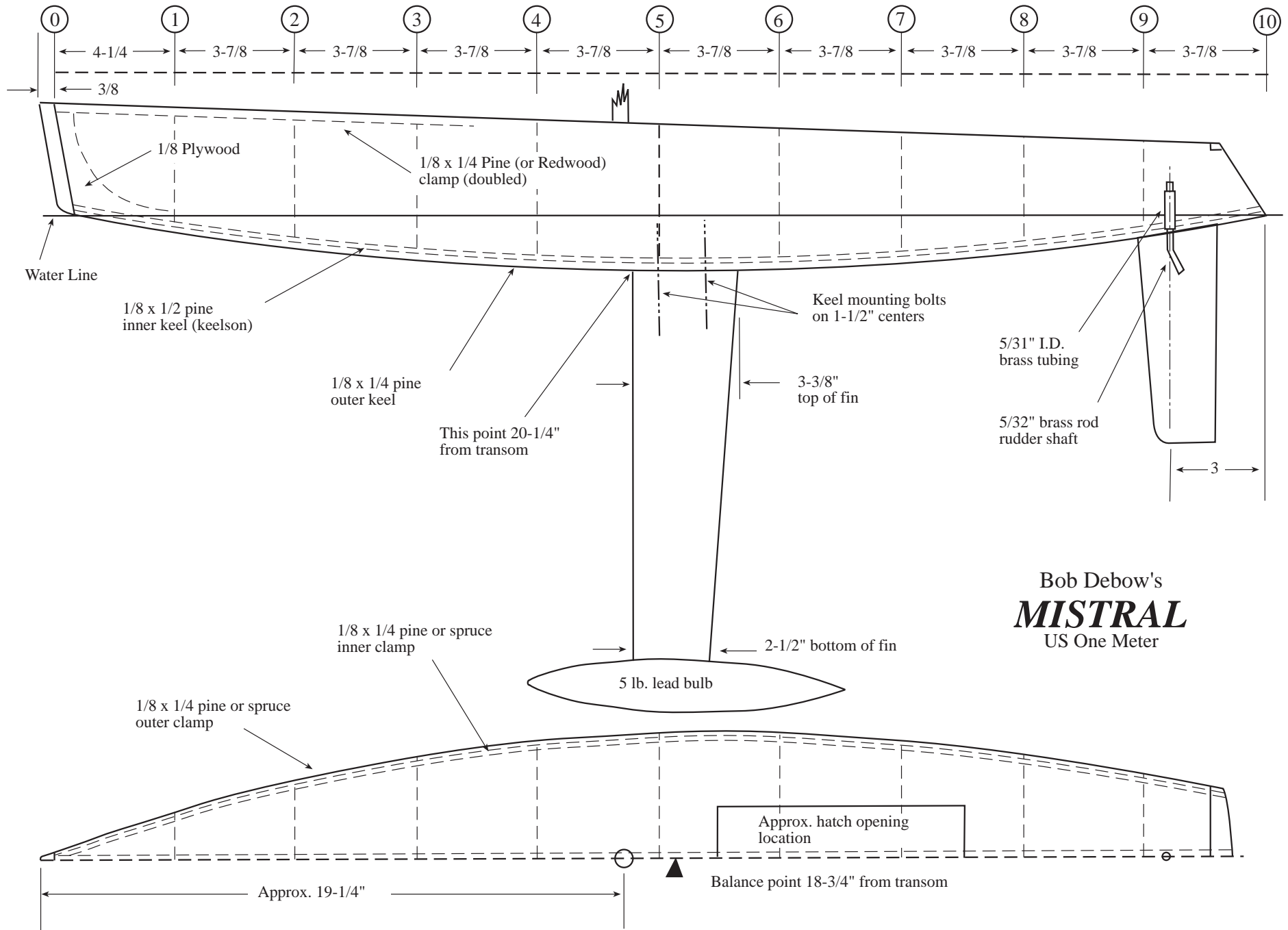
Note: If you are working with epoxy, thin approximately 30% with Isopropyl Alcohol to allow an even flow.

Trim all excess fiberglass from the hull, using a sharp knife or single edge razor blade. Trimming is easiest if resin is "green" (not completely cured).

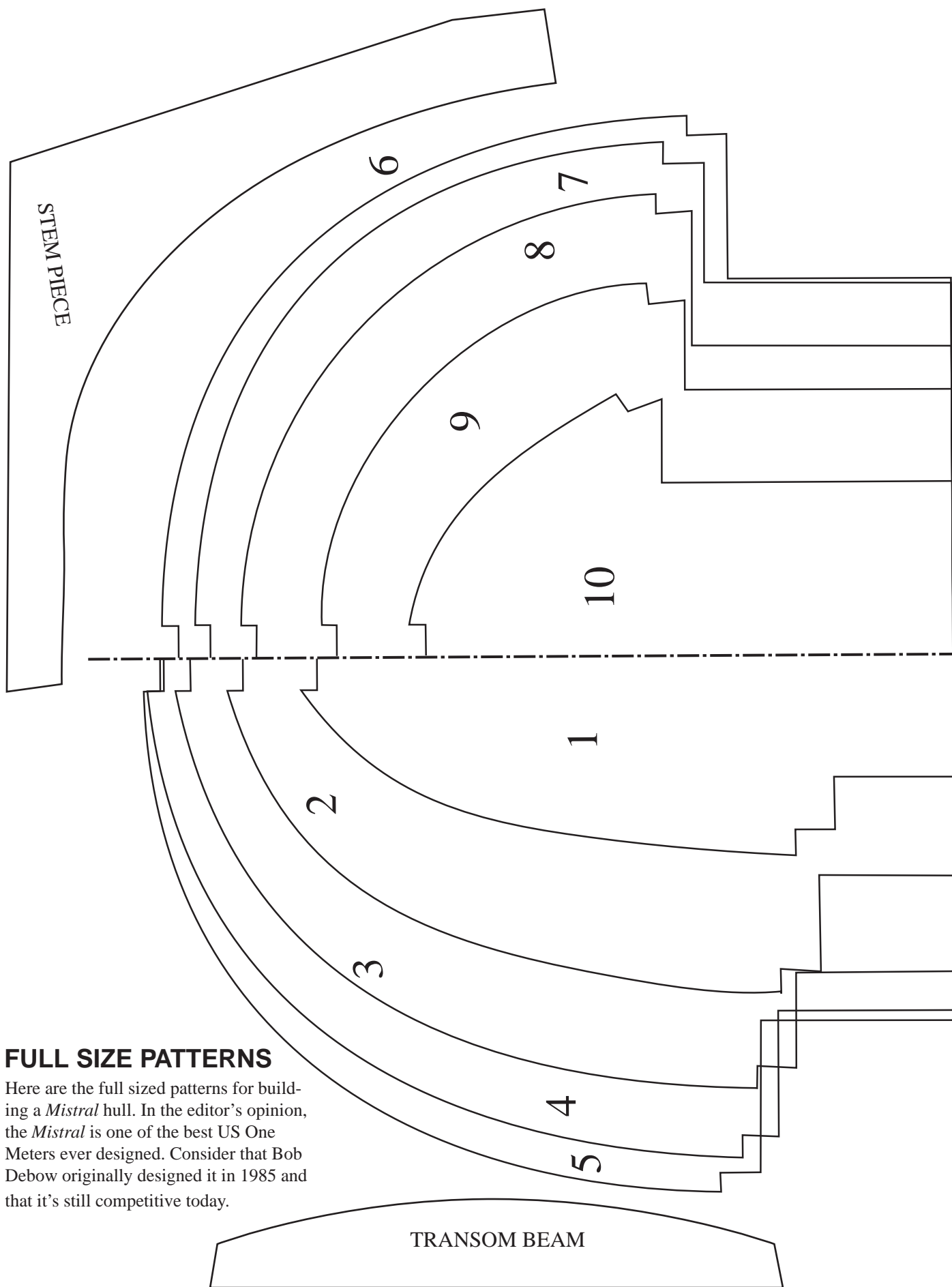
When resin is dry, sand the hull with 225 grit "wet or dry" sandpaper to remove curtains and runs. If you used epoxy you will notice a feeling of oil on the un-sanded surface. This can be wiped off with alcohol or acetone and then sanded.

Note: If you use polyester resin; Use laminating resin for the 1st coat. Use sanding resin for the 2nd coat. Use finishing resin for the 3rd or last coat.

Your hull can be finished with a thin coat of high grade spar varnish or clear two-part epoxy paint.



Bob Debow's  
**MISTRAL**  
 US One Meter



## FULL SIZE PATTERNS

Here are the full sized patterns for building a *Mistral* hull. In the editor's opinion, the *Mistral* is one of the best US One Meters ever designed. Consider that Bob Debow originally designed it in 1985 and that it's still competitive today.