

Willow, Part 3

Building a light, fast sea kayak

by Bill Thomas with Jane Ahlfeld

Photographs by Bill Thomas

In our previous issue, we fitted and installed the deckbeams, bulkheads, and deck. Now we'll make and install the cockpit rim and tend to the finishing details. Then Willow will be ready for launching and good adventure.

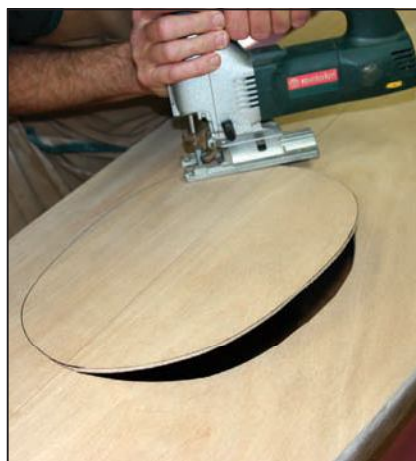


69. I do not usually 'glass the decks of the Willows. The hull-to-deck joints are strong, and the two deckbeams coupled with the hatch supports create a solid deck. If you want to 'glass your deck, first sand the plywood and ease the edges of the deck. You'll need about 18' of 4-oz cloth. Use masking tape to define a crisp edge about 1" down from the edge of the deck. Don't forget to trim the 'glass before it cures.



70. Cut the hatch spacers, lips, the coaming, and the coaming spacers. The plans include full-sized patterns for all these parts, and the accompanying drawings (page 45) offer a suggested layout with dimensions for the cockpit opening. Use a bandsaw with a sharp $\frac{1}{4}$ " or smaller blade. Work carefully. If these parts are accurately cut, it will save a lot of sanding later.

71. Strike a line down the exact center of the deck. This will be used to line up the coaming spacers and the hatch openings, and can serve as a lubber line if you install a compass block.



72. Use the hatch spacers, not the lips, to position the hatch openings. Trace the inside edge to mark the location. Work off the centerline and look at the plans for suggested location. Be aware of the position of bulkheads and deck-

beams. To cut these openings, first drill five connected $\frac{1}{16}$ " holes along the line to be cut. Open these up with a razor knife so a $\frac{1}{8}$ " jigsaw blade can be inserted into the slot. Use a jigsaw and carefully cut out the hatch opening. The cut-out sections of the deck will become the hatch.



On a perfect Maine day in high summer, the Willow sea kayak rests on a beach near Green Island Light. Built stitch-and-glue fashion with high-quality plywood and epoxy, the 17'8" x 23" x 45-lb boat is tight and tough.



73. After the openings are cut, fit in the spacers. Glue them in place with clear epoxy. Be sure to brush epoxy both under the deck and onto the spacers. When the epoxy cures, sand the edges before installing the hatch lips.



74. Fit the hatch lips in place; they will protrude into the opening more than $\frac{3}{4}$ ". When you have a tight fit, glue them in place with clear epoxy on both mating surfaces and clamp.



75. Use a compass to strike a line on the hatch lip $\frac{3}{8}$ " in from the hatch openings. Cut this with a jigsaw and sand the edge.



76. The dimensions and locations for the six hatch frames: three forward and three aft are given on the plans. Make these from 6mm plywood; start with $1\frac{1}{2}$ "-wide pieces. Scribe a line to match the camber of the deck; these frames create the camber of the hatch.



77. Cut the frames on a bandsaw and double-check their fit on the boat. The finished frames should be about 1" tall.



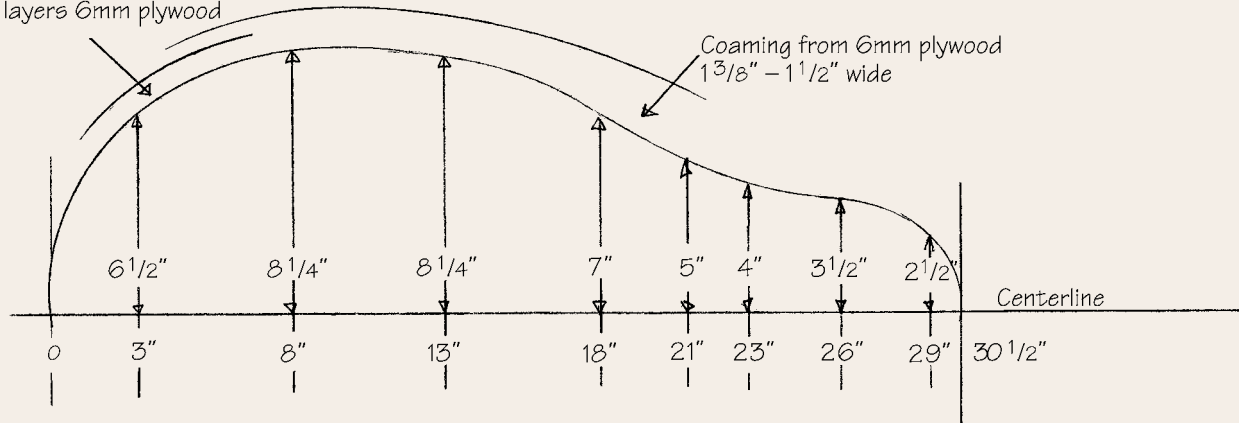
78. Note the locations of the frames on the hatches (see plans), dry-clamp the frames in place, and mark the positions. Mix 2 oz of epoxy thickened with Cab-O-Sil. Remove the frames one at a time. Butter each frame and clamp it back in place. Clean up any excess epoxy. After the epoxy cures, remove the clamps and circumnavigate each frame with $\frac{1}{4}$ " fillets. When these dry, apply a coat of unthickened epoxy to the underside of both hatches, including frames.



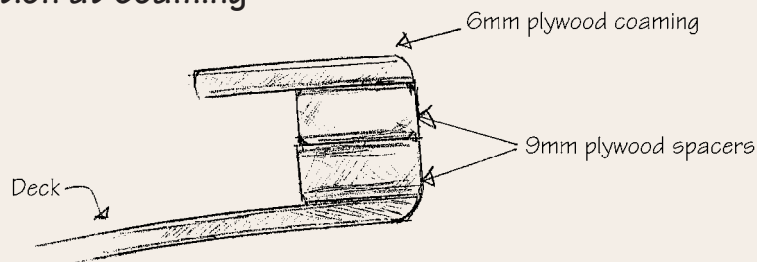
79. Working off the centerline, check the fit of the four coaming spacers. Once the fit looks good, brush unthickened epoxy on all the surfaces to be glued, starting with the deck. Clamp the spacers in place. Make sure to use enough clamps. When the epoxy is cured, take off the clamps. Using 80-grit sandpaper, clean up any uneven edges on the outside of the rim. Brush unthickened epoxy onto the top of the spacers and the underside of the cockpit coaming and clamp coaming in place. Use "buttons" under the clamp pads so the work is not dented.

Suggested Layout for Cockpit Opening

Coaming spacers, $\frac{3}{4}$ " wide
2 layers 9mm or
3 layers 6mm plywood



Cross-section at Coaming



DRAWINGS NOT TO SCALE



80. A solid-wood rim around the coaming really sets off its shape, and if the rim edge hangs just a tad below the coaming plywood, it also helps hold a spray skirt in place. Start with two pieces of straight-grained wood (mahogany looks nice), $\frac{3}{16}$ " thick, $\frac{5}{16}$ " tall, and about 93" long. These need to be steamed for about 20 minutes to make the bend. I use an old kettle, a piece of 1" copper pipe 93" long, and my backpacking stove to make a simple steambox. Wear leather gloves, and be careful—the steam and the pipe are both hot!



81. When the wood is ready, you will need to move fast, as you just have a few moments to clamp the wood in place. Start with the pieces centered on the forward edge of the coaming and work down each side toward the stern, clamping as you go. For now, just let the wood overlap at the back of the coaming. Allow the wood to sit for a day, and then take it off. Coat all appropriate edges, glue it back in place. Again, overlap the four ends at the back of the coaming, and use a saw to cut through all four pieces at once to get a snug fit.



82. Install 6mm plywood hip braces in the cockpit. Start with $4\frac{1}{2}'' \times 7''$ pieces and cut them so they fit snugly under the cockpit rim. Fillet them in place. Remember to clear-coat the back sides with epoxy before you install them. When these dry, turn the boat upside down and peek inside—you will notice that small fillets are needed where the bulkheads meet the deck. Reach in and make these fillets now.



83. Now sand the deck, ease the edges, and soften the bow so it doesn't come to a needle point. Also sand and shape the coaming; a sanding drum chucked into an electric drill works well here. Sand and clean up the hatches. Drill $\frac{1}{2}''$ holes in the bow and stern for end loops. Fill these holes with thickened epoxy. When it dries, drill smaller $\frac{1}{4}''$ holes through these epoxy plugs. Now you have bombproof tie-downs for cartopping the kayak. Believe it or not, the boat is built. Not quite finished, but built.



84. If the boat is likely to receive hard use, reinforce the ends with an extra layer of 6-oz 'glass cloth. If it is likely to see really hard use, run an extra layer of 3" tape along the full length of the keel.



85. Use a foam roller, the yellow kind, to apply three coats of epoxy onto the hull and two coats on the deck. The epoxy does not have to be fully cured between coats, but it does have to be dry enough so the roller does not stick. Work neatly, cleaning up any runs, and maybe the sanding will not be so painful.



86. Sand the boat using a random-orbit sander on the flatter sections of the hull and deck. Start with 80-grit paper, and follow with 120-grit. Try not to sand through the epoxy, and don't sand through the 'glass. In the areas where the power sander is too aggressive, use a soft sanding block. If you sand through an area, apply another coat of epoxy. When this dries, lightly sand the touched-up sections.



87. I prefer simple one-part marine finishes for the hull and good-quality varnish on the decks. For paint, one-part polyurethane or oil-based paints work fine. Prep the surface by vacuuming off the sanding dust and masking off. I use Fine-Line tape to define the borders between paint and varnish. I can be sort of a sloppy painter, so I always back up the Fine-Line tape with a wider edging of green masking tape.



88. I like to use a primer for the first coat, tinted to match my paint color. To prep, tack off the area to be painted, and wipe down with denatured alcohol. Pour a small amount of paint into a tray. Using a 3" foam roller, lay down the first coat. Roll out a 3" section, then come back with a 2" foam brush and "tip" off the paint. Always keep a wet edge, working the brush in one direction, from dry to wet. When this coat has dried (about 24 hours), sand with 220-grit paper, vacuum, and then tack the hull. Finish by wiping the hull down with denatured alcohol. Now apply the next coat. If you primed first, this next coat will be finish paint. Work neatly. Even though you will be putting on four coats of paint, treat each coat as if it were the final one. Runs and imperfections will telegraph.



89. After the last coat of paint, remove the tape and let the paint cure for an additional 24 hours before masking off for varnish.



90. Varnish protects the epoxy from UV damage. I like a matte sheen on my deck, less reflection, and an attractive rich patina. However, matte finishes do not offer the UV protection needed, so I use four coats of a good-quality high-gloss marine varnish followed by two coats of a matte finish. You know the drill: vacuum, tack-cloth, and wipe down. I never stir varnish; it just aerates the finish. Pour about 2 oz of varnish into a small container (do not work from the can), and use a foam brush to apply the finish. I like to start at the bow and work my way aft. Lay a 2"-wide section of varnish across the deck and tip it out, working from dry to wet. Keep a wet edge and don't overwork the finish—let it flow and self-level as it dries. Sand with 220-grit, cleaning the deck well between coats.



91. I do not epoxy the hatch buttons, but they do need five coats of gloss varnish, followed by two coats of matte varnish.



92. Of course, if you like a gloss finish, it does look nice....



93. Give the finish a few days to cure before rigging the boat. Start by running self-adhesive $\frac{1}{4}'' \times \frac{3}{4}''$ closed-cell foam around the inside perimeter of the hatch. Locate the positions of the buttons that secure the hatches. Measure from the ends of the boat to the locations to check that they match and are symmetrical. The plans list the hardware used to install the buttons.



94. Deck rigging is a personal choice. I believe the minimum needed is bungee cord forward of the cockpit for a chart case and navigation notes. But there are other safety issues and concerns. Consider adding a bungee behind the cockpit for storage, and to help secure a paddle with a paddle-float during a self-rescue. You'll want a place to tuck a spare paddle, and don't forget to install perimeter grab lines and tie-down loops at the bow and stern.

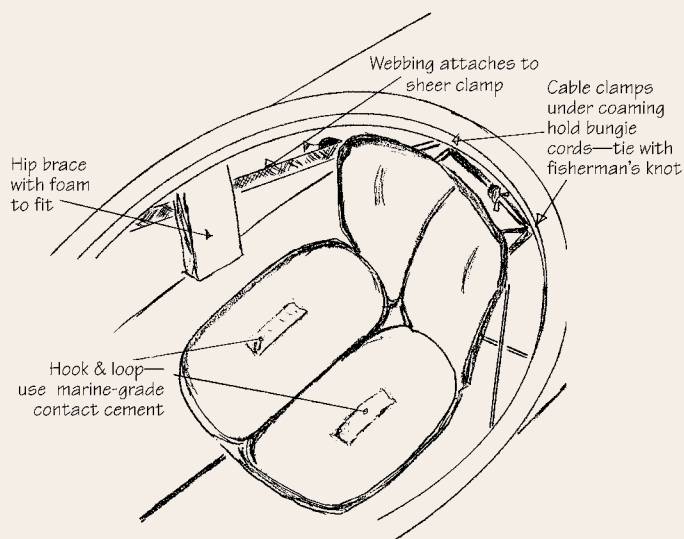


Finished and ready to go paddling, designer Bill Thomas's Willow kayak carries a compass and chart forward of the cockpit. A spare paddle rides on the afterdeck.




95. What makes a good kayak seat is another topic for debate. I believe a good seat should be low in the back, simple, and comfortable, and it should not get in the way during re-entries. Seat choice, in the end (no pun intended), is an individual one, but the seat that ships with the Willow kits has been well received.

Seat Installation



96. Use marine-grade contact cement to glue closed-cell foam to the hip braces and under the deck for knee bracing. The fit should be snug.

97. Outfit your boat for the kind of cruising you envision, and have fun on the water. 

Bill Thomas lives in South Berwick, Maine, where he designs and builds boats, custom cabinets, and furniture. He is a Maine Guide and an instructor at WoodenBoat School, where he will teach "Build Your Own Willow Sea Kayak" September 9–15.

Jane Ahlfeld teaches seamanship skills and sailing on the WoodenBoat waterfront, and she is a computer consultant.

Although you can build Willow directly from these pages, working to the large-scale plans with full-sized patterns will ease the job. Those plans (\$95 plus \$8 shipping), as well as kits and finished boats, are available through Bill Thomas Woodworking, 151 Ogunquit Rd., South Berwick, ME 03908; <www.billthomaswoodworking.com>.