

RCM WING JIG



Thoroughly tested by RCM, this ultra simple wing jig is completely versatile, can be built in thirty minutes for under two dollars.

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HERE is a wing jig that you can make in 30 minutes at a cost of under \$2.00, and which will allow you to build perfect wings in half the time of conventional construction.

Like everyone else that builds model aircraft, I enjoy it to a point but have always dreaded building wings, particularly the elliptical airfoil types. A couple of years ago, I set out to devise a system of wing construction that would be inexpensive, provide accurate assembly, and allow the builder to work on either surface without disturbing the alignment. Several butchered wings later, the system shown evolved and has produced many wings, each straight as an arrow. What's more, I don't dread building wings any more but, rather, enjoy it. Admittedly, only wings of the constant chord variety have been built but I can see no reason why the jig would not work equally as well on tapered wings, swept wings, delta wings, stabilizers, or what have you.

To make this jig you will need one (1) six-foot length of $\frac{3}{8}$ " Reynolds aluminum rod, available from any good hardware store for about \$1.40, a couple of pieces of square $1\frac{1}{2}$ x $1\frac{1}{2}$ x 12" hardwood for the rod supports and some scrap hardwood for the rod hold downs and front rod butts. Cut your aluminum rod into two (2) three-foot lengths,

round the ends with a file and polish them lightly with steel wool. The hardwood rod hold downs should be cut to approximately $\frac{1}{2}$ " x $1\frac{1}{2}$ " x 10". Dimensions are not at all critical. A scrap of wood approximately $\frac{1}{4}$ " thick and an inch long should be glued to the top front edge of each rod support. This will serve as an alignment key later. Jig construction is now complete.

Build your wing a panel at a time. Secure the jig rod supports to a flat surface about 34" apart; sufficient for even the largest wings. I screw mine right to my work bench. Be sure the blocks are parallel to each other. Center your wing plan between the blocks and tape or tack it down. Fore and aft location of the plan is unimportant. We are interested only in the spacing of the ribs and parallelism between them.

Prepare your ribs for installation on the jig. I make my ribs in a stack and sand them to shape from an aluminum template which insures uniformity. All spar notches and gear block cut outs should be made at this time. Next drill two $\frac{3}{8}$ " holes squarely through the entire stack. One hole should be on the rib center line about an inch behind the leading edge, the other on the center line about an inch in front of the trailing edge. The location of the holes may be adjusted for easy assembly with the type

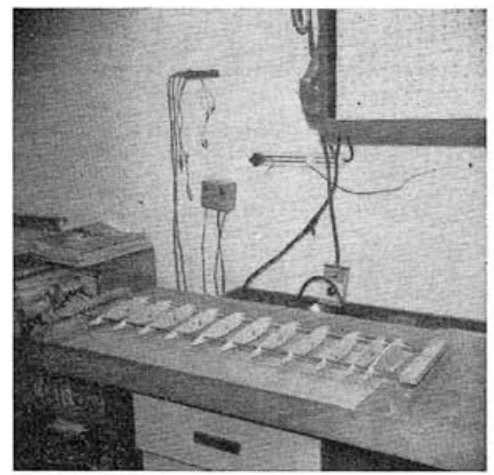
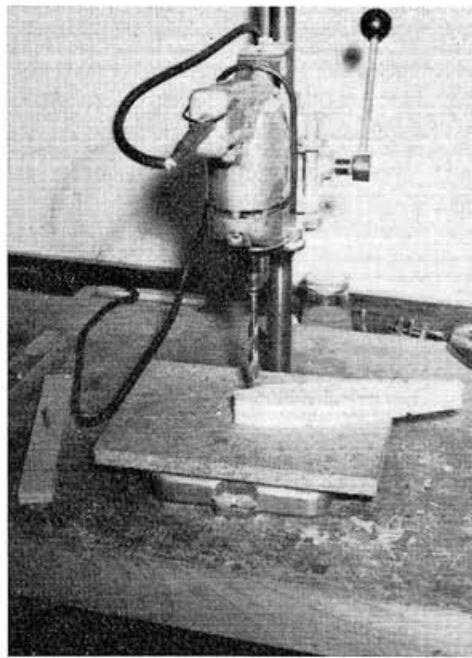
rib you are using but all holes should be in the identical place on each rib. A drill press is recommended for this job as inaccurately drilled holes could cause you to build a twist into the wing. Number your ribs in the order in which they come off the stack, and keep them in sequence when installing them on the jig. The effect of drilling errors will be minimized if this procedure is followed.

Slide the rib stack onto the aluminum rods. If you are going to install gear blocks, start with the ribs upside down. Position the rods on the support block and butt the leading edge rod up against the stop block on each side. Position the rod hold downs over the rods and screw them down tight. This clamps the rods in position and prevents any tendency for the rods to sag. Slide each rib to its respective position over the plan. Stand back and take a last check. Your ribs should be properly spaced, parallel to the support blocks, square to the rods, and square to the bench.

You can now glue in all spars, leading and trailing edges, spar webbing (don't skip the webbing, it adds tremendous strength) and bellcrank hardware if notched ailerons are to be used. Notice how nice everything fits. No zigs or sags or bends. Everything will be absolutely straight. You can even use warped stock for spars with no ill effects.



The entire jig — ready for use.

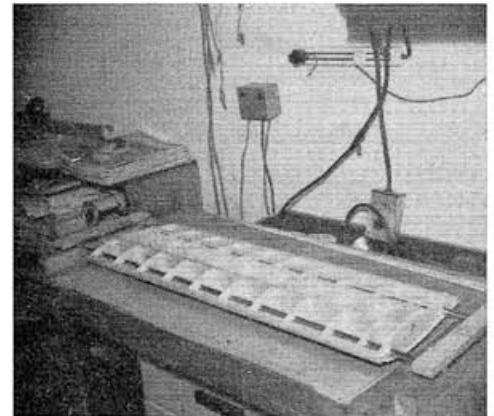
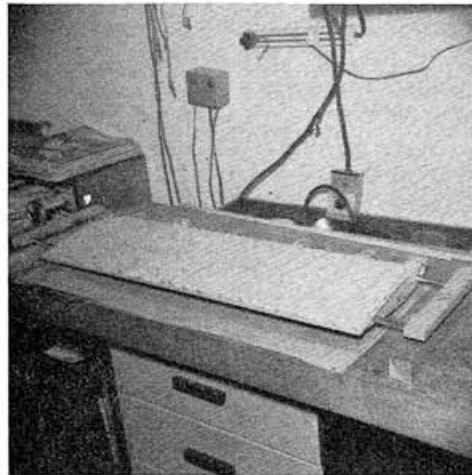


Ribs in place on the jig and positioned over the wing plan. Notice that nothing touches the plans.

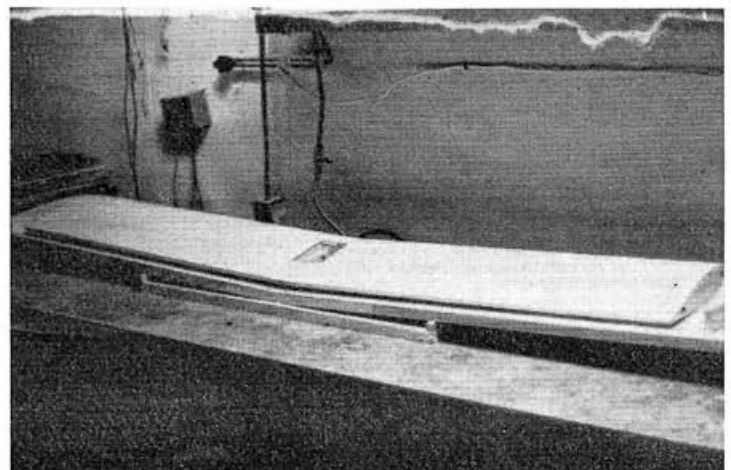
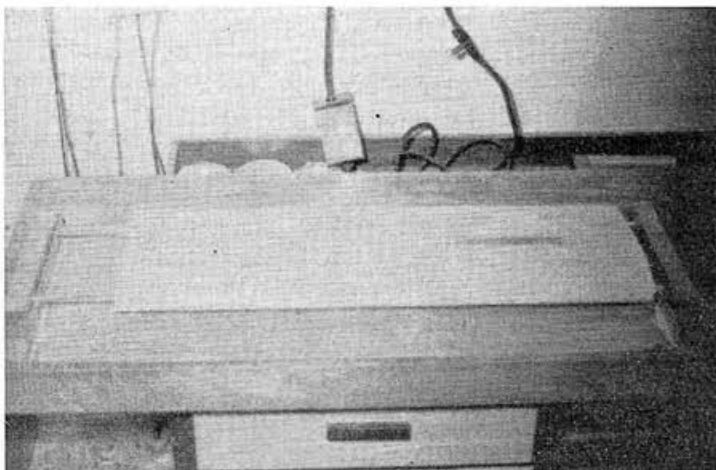


Above: Spars, leading and trailing edges and spar webbing in place. Don't leave out the spare webbing. Right: Sheeting installed. Since the ribs were placed on the jig upside down, this is the bottom sheeting. Far right: The entire assembly turned over, ready for installation of landing gear mounts and top sheeting.

Ribs for each panel are stacked and pinned together. Two $\frac{3}{8}$ " holes must be drilled thru the entire stack to accept the jig rods.



Below, Left: The panel complete, pin holds filled, completely finish sanded and ready for removal from the jig. Below: Panels pinned at the desired dihedral angle. Install tip blocks, fiber glass the center section and your wing is ready for monocoque or your favorite finish.



I prefer not to install landing gear mounts at this point but you may do so if you desire. Allow time for existing structure to dry thoroughly.

You may now apply the sheeting to the exposed surface of the wing. (If you are building the wing upside down, the sheeting will be on bottom side of the wing.) I prefer to sheet the entire

wing with $\frac{1}{16}$ " sheet, however, you may use leading and trailing edge sheeting and cap strips if you wish but it will take longer, save very little weight and distort the airfoil. Full sheeting is nice for Mono-Kote also. $\frac{1}{16}$ " x 12" x 36" sheets are available from several sources and work beautifully in conjunction with this jig. Use white or Titebond

glue to insure you have time to get the entire skin pinned down prior to the glue setting. Allow the structure to dry.

Remove the rod hold downs and flip the wing over. Mark the cut out for your hardwood landing gear mount from the top. I puncture a hole in the

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skin with a number eleven X-acto blade at each corner of the block. Flip the wing to its original position. Using the gear mount as a guide, cut out the area to be occupied by the mount. Install the mount flush with the wing skin and flip the wing over. Generously fillet the gear mount with epoxy from the top. Install the rod hold downs and make any last installations you may have forgotten. You may now apply the top sheeting. When this has dried, you will have a light, straight, warp proof structure.

At this point, I like to fill all pinholes, cracks and blemishes in the wood with Hobbyoxy Stuff. When dry, you can contour your leading and trailing edges and sand the surface smooth right on the jig flipping from surface to surface as required. Make your servo cut out and you are ready to remove the panel from the jig. Remove the rod hold downs and slide the aluminum rods out

of the wing with a twisting action. Lay the completed panel aside and repeat the procedure for your second panel.

Sand or saw the wing skins and spars flush with the center and tip ribs. I do this on a radial arm saw. One pass with the saw and I have the dihedral angle, skins and spars trimmed to shape. This can be done readily by hand however, if you do not have access to a power saw.

Install your dihedral braces and join the wing at the desired dihedral angle. If you plan to fiberglass the center section to at least the width of the fuselage, you could eliminate the dihedral braces. The resulting bonded structure will be strong enough to withstand all the flight stress you care to apply. The dihedral braces will, if nothing else, help you avoid any mental anxiety you may have in this regard so use your own judgment.

Glue on your tip blocks, sand them to shape and your wing is ready to apply your favorite finish. Even if you choose to sheet the entire wing as I do, cover the structure with silk or silkspan. Failure to do so may result in your finish cracking with age.

I believe that wings built on this jig in the manner described are as straight and warp free as any foam wing, have skins that will not loosen with age and are significantly lighter, with no sacrifice to strength. Help stamp out foam wings, start a built-up wing today!