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3-Meter Scooter

You won't find many competitive Sailplanes with the trainerlike stability of this well-crafted design. Here's a ship that will make the most of your flying skills, whatever your experience level.

■Leon C. Kincaid

IT DOESN'T TAKE a high-tech model to win in Sailplaning. This design is neither an F3B type nor a slow floater but offers some of the advantages of both. The 3-Meter Scooter is simple, stable, and consistent within a moderate speed range. It will move out to find good air and then float in the lightest lift.

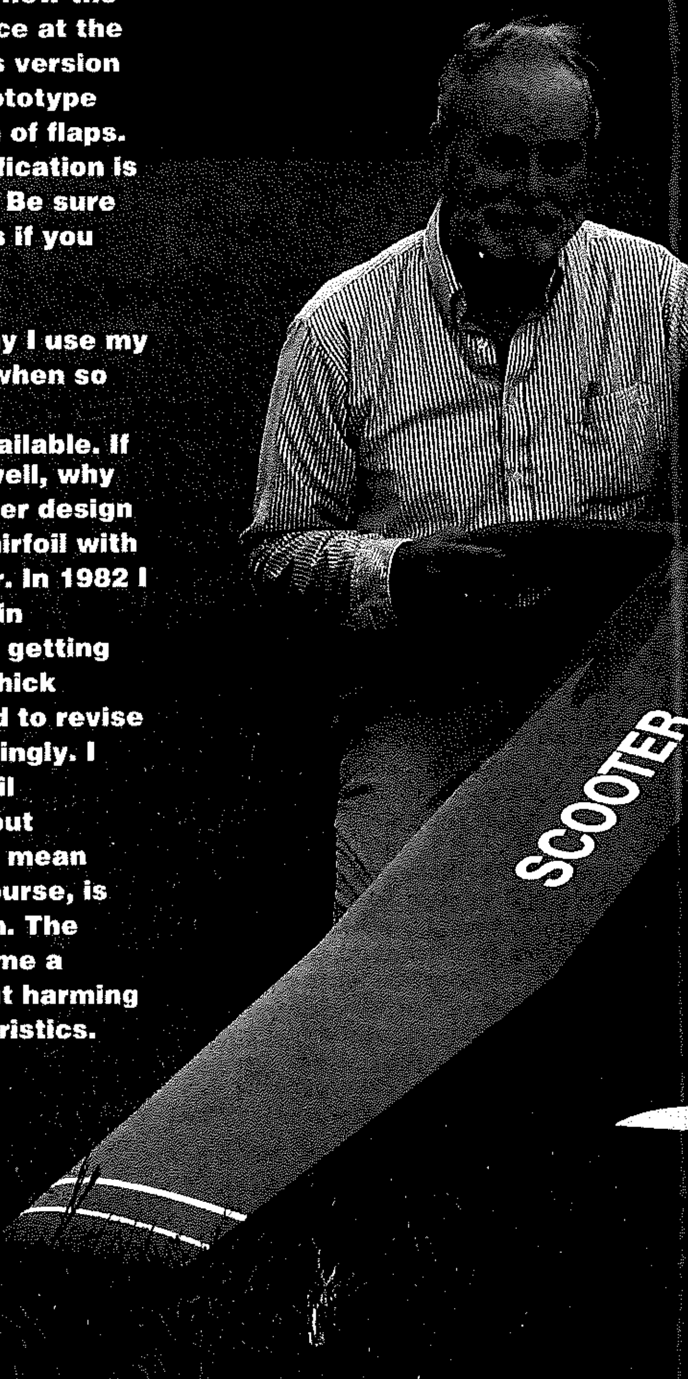
If you're an expert, the 3-Meter Scooter will put you in the winner's circle almost every time. If you're a sportsman or novice, it'll make you an expert in record time. This Sailplane is similar to my earlier, successful 2-Meter Scooter, but it has a thicker airfoil.

The 2-Meter version took first place at both the 1982 and 1983 Nationals. (It was flown by John Gunsaullus of St. Petersburg, Florida the second year.) Four years later, Nelson Montgomery flew it to the number one spot at the 1987 Canadian Nationals. The 3-Meter, meanwhile, finished first in its category at the 1986 Nationals and won the Hi Johnson trophy for the highest score in any class.

John Gunsaullus flew the 3-Meter to first place at the 1990 Nationals. His version differs from the prototype only in the addition of flaps. That optional modification is shown on the plan. Be sure to omit the spoilers if you include the flaps.

I've been asked why I use my own-design airfoil when so many ready-made alternatives are available. If something works well, why change? The 2-Meter design used a 10%-thick airfoil with a 3% mean camber. In 1982 I learned of a group in California that was getting good results with thick airfoils and decided to revise the 2-Meter accordingly. I increased the airfoil thickness to 12% but maintained the 3% mean camber. This, of course, is the 3-Meter version. The modification gave me a strong wing without harming the flying characteristics.

Several years later, a measurement of all coordinates revealed that the true mean camber was 3.25%. That seemed perfect



[illegible] airfoil [illegible]% mean [illegible] high-[illegible]mance Sailplane. On [illegible] hand, I didn't want [illegible]

a mean camber as high as 4%. At that level (and sometimes [illegible]) the model becomes more of a floater—and such ships often lose their ability to penetrate.

[illegible] removing [illegible] from the bottom of one of the 3-Meter prototypes. This increased the mean camber one-half percent. The model flew extremely well, except that when I used *down* trim to move out faster, it responded more slowly than the thicker, lower-cambered plane.

Another experiment used computer-assisted design to reduce the airfoil to 10% while maintaining the same mean camber. Again, performance was terrific—in fact, hardly distinguishable from the 12%-thick airfoil model—but for a single flaw. In trying to [illegible] I found that the spoilers were almost worthless. The model needed flaps instead.

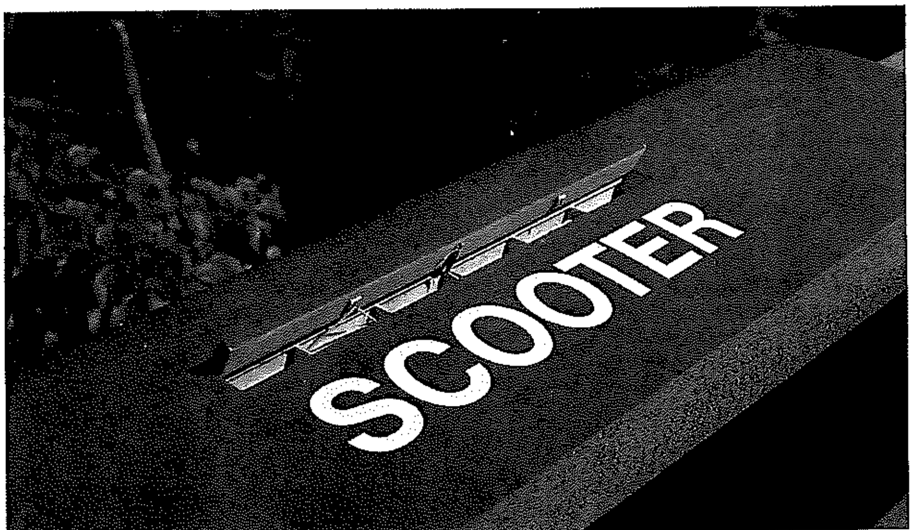
As noted, John Gunsaullus's success with a 3-Meter that he equipped with flaps prompted me to include the flaps in the plan as an optional modification.

Whether you build the model with or without flaps, don't tamper with the dimensions shown on the plan. You'll be rewarded with an all-around good-flying Sailplane that's safe, consistent, and reliable.

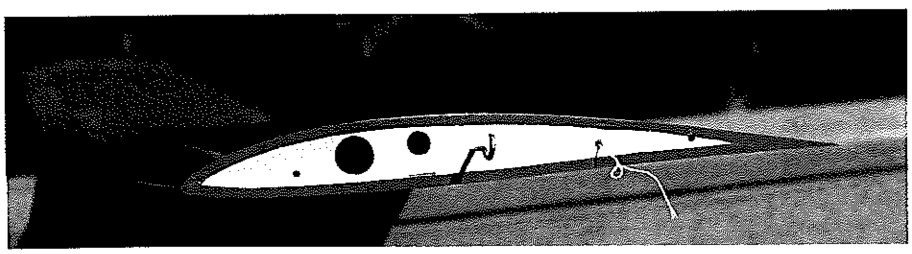
Construction. The 3M Scooter has a 12%-thick airfoil with a 3% mean camber. The high point of the upper camber is 33% aft of the leading edge. The slight

The author holds the 3-Meter Scooter, with the 2-Meter design that started it all at right. The 3-Meter version has been upgraded with a 12%-thick airfoil but retains the 3% mean camber of the original. Each model has two first-place Nationals wins to its credit.

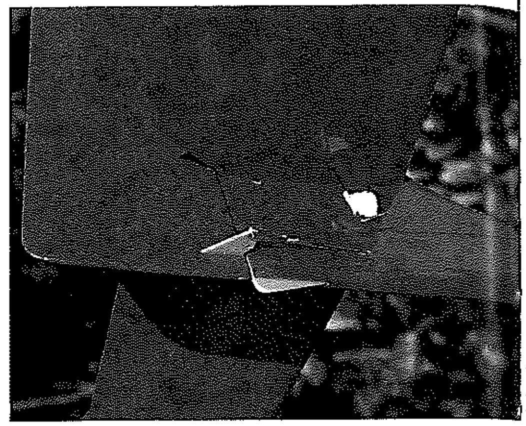
Looking down on the control layout. Shown are the 600-mAh ½AE battery, receiver, elevator servo, bulkhead-mounted switch, rudder servo, wing retainer hooks, and spoiler servo with pull strings over the ball links. Also note the small hook that holds down the rear hatch cover.



Note the small hold-down hooks (normally only one is required) for the raised spoiler, and the tube with the pull string (carpet thread is used) held in place with small toothpicks.



A look at the wing root shows the holes for the vent, weight tube, wing rod, spoiler cord, and rear wing rod. Both the vent and the spoiler cord hole were originally used for alignment pins.

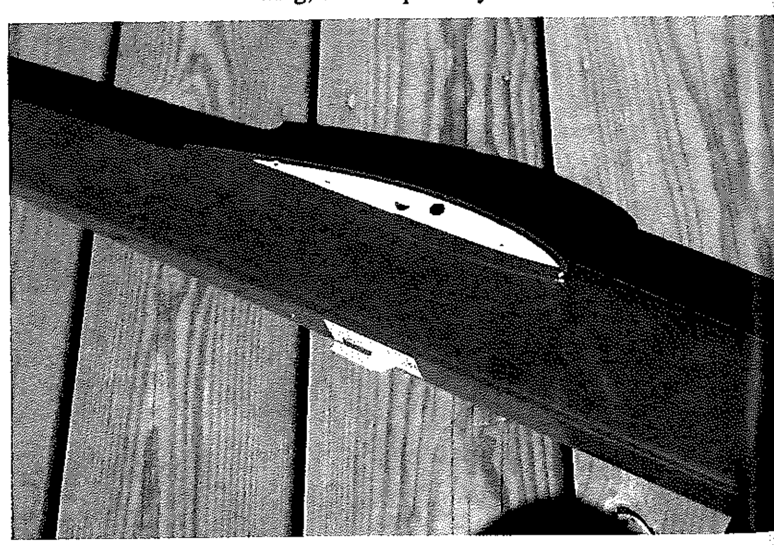


The hole for the setscrew that locks the stab in place is reinforced with a ring of MonoKote Trim Sheet. The allen wrench that operates the setscrew has been inserted in the hole. The horn and tail skid were made from 1/16 phenolic, although the Goldberg horn and small tail skid also work fine. The one-piece rudder hinge wire has been bent and secured in the bottom of the rudder.

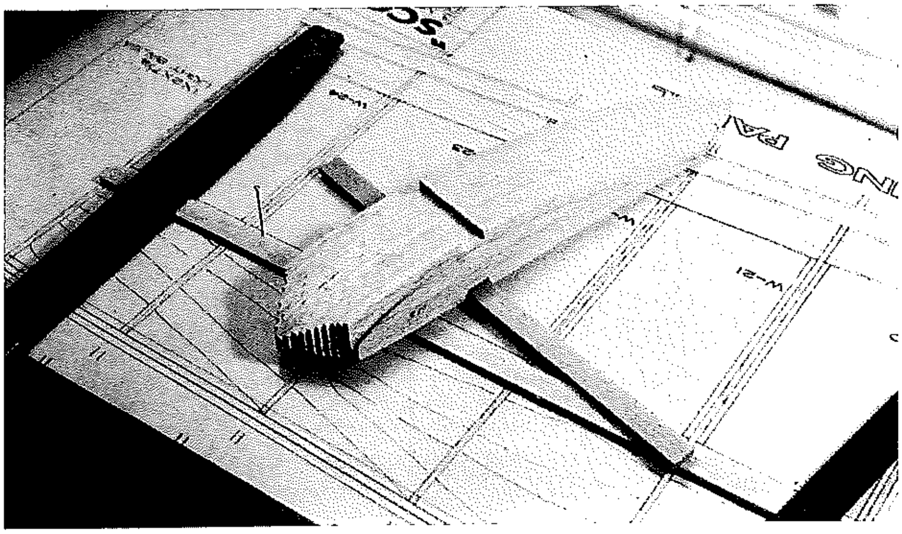
undercamber should cause no problems. Adding a ⅛-in. shim under the trailing edge keeps the bottom spar flat. With the rib in this position, the top spar will be 90 degrees above the bottom spar. From this point onward, the wing is built exactly as if it had a flat-bottomed airfoil.

The wing tip panel ribs are all cut out using the root rib (W1) as shown on the plan. While they maintain the same bottom contour as the root rib, their upper camber is different. This reduces the Phillips entry, raises the trailing edge slightly, and makes the chord line almost two degrees less at the tip than at the root. You get almost two degrees aerodynamic washout right off the building board.

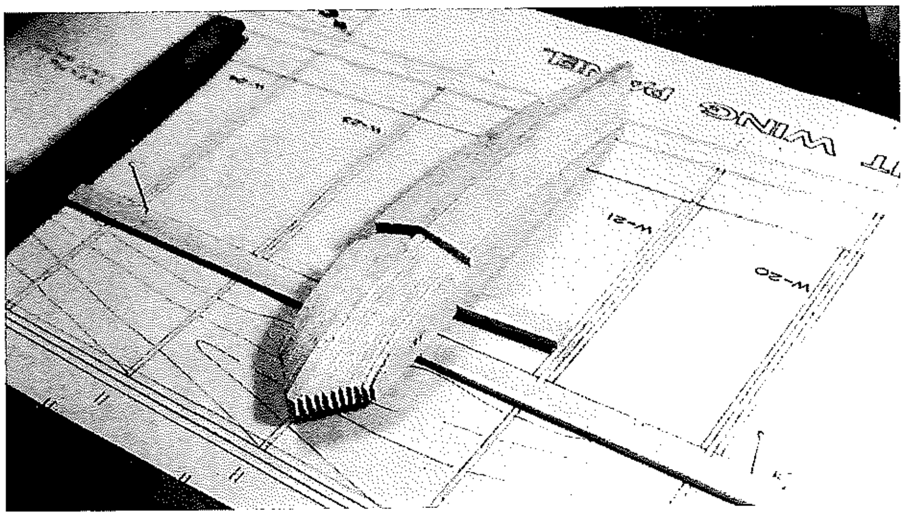
Obtaining the correct dihedral angle depends on proper drilling of the wing rod tube hole in the plywood rib (W1). Until recently I used a Windsong 5/16 x 10-in. steel wing rod. Although this works extremely well, the new Lovesong 11/32 x 10-in. rod is even better. The Lovesong rod requires a ⅜-in.-O.D. brass tube in the wing; this fits perfectly when sandwiched



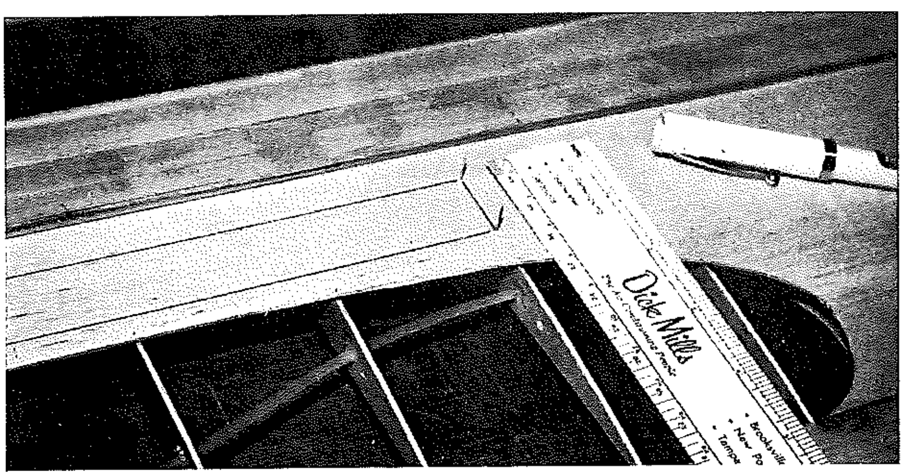
Left: The homemade tow hook was crafted from 2024 T3 T-extrusion aluminum. Right: Close-up of the aluminum tow hook showing the wing mount. An extra 1/16 of sheeting was added to the bottom of the fuselage in order to inlay-mount the hook flush with the bottom.



The wing tip ribs have been cut to length, the W15 through W25 ribs stacked, and the tops of the W16 through W24 ribs contoured to airfoil shape.



The ribs have been tapered to the proper contour and the top spar notch has been recut.

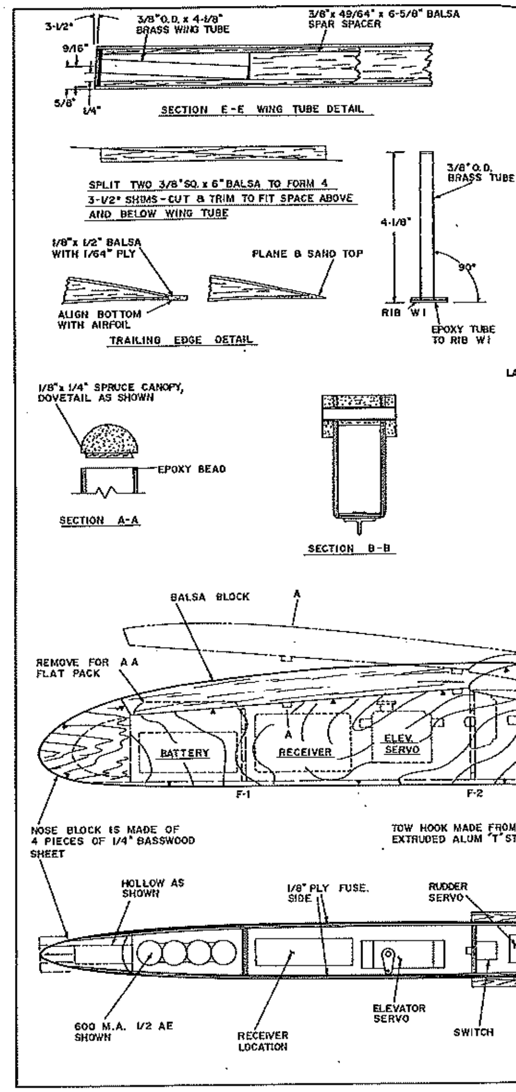


The wing sheeting for the leading edge and around the spoilers and inner fairing is added as one piece. The spoiler area will be cut out between the pins in each corner of the spoiler bay.

between the two $\frac{3}{8}$-in.-wide spars.

If you're using the $\frac{11}{32}$ rod, as I recommend, you'll be drilling a $\frac{3}{8}$-in. hole. If you're using the $\frac{5}{16}$ rod, the hole will measure $\frac{11}{32}$ in diameter. The center of the $\frac{3}{8}$-in. hole should be $\frac{5}{8}$ in. from the bottom of the airfoil, or $\frac{9}{16}$ in. from the bottom of W1. The center of the $\frac{11}{32}$ hole will be $\frac{39}{64}$ in. from the bottom of the airfoil, or $\frac{35}{64}$ in. from the bottom of W1. In either case, the distance from the bottom edge of the hole on the rib to the top of the rib bottom spar notch should be one-fourth inch.

I'm getting ahead of myself here on purpose. I want you to have an idea of how everything falls into place. For example, before assembling the wing, assemble rib



W1 and the $4\frac{1}{8}$-in. wing rod tube as follows:

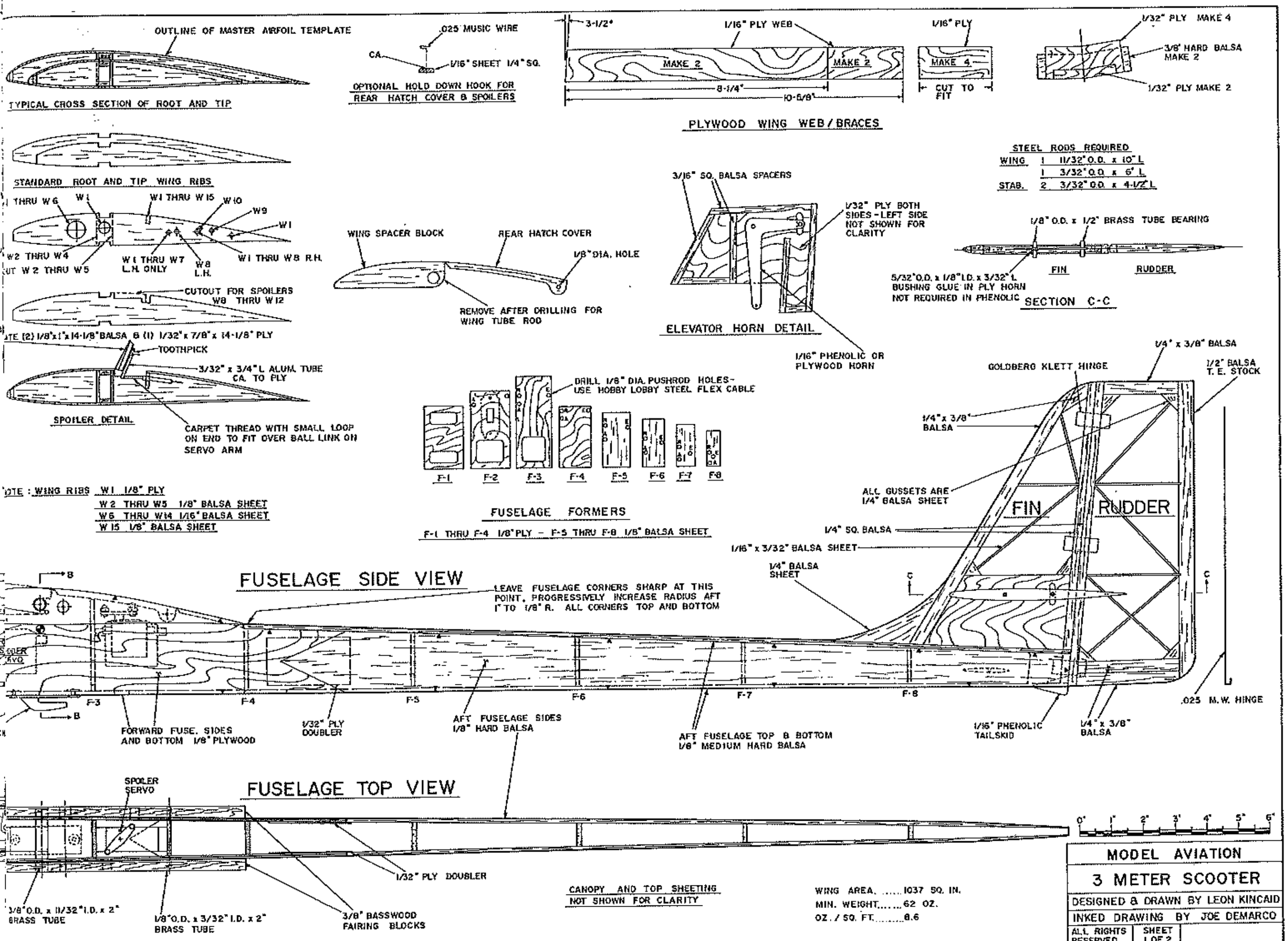
Lay the rib flat on your work surface. Insert the tube straight up, check all sides for squareness, and glue it in place. During wing assembly, when you add the W1-tube unit to the bottom spar, the tube will fall over and touch the spar. The rib will be tilted $3\frac{1}{2}$ degrees, with the tube at a $3\frac{1}{2}$-degree angle. The space under the tube should be $\frac{1}{4}$ in. high at the root rib. At the outboard end of the tube (four inches outboard of the root rib), there should be no space under the tube.

If you use a $\frac{5}{16}$ rod and the $\frac{11}{32}$ tube, you'll need to shim $\frac{1}{64}$ in. both in front of and behind the tube to keep it in the center of the $\frac{3}{8}$-in.-wide spars. Be sure to plug the ends of the wing tubes with $\frac{1}{32}$ or $\frac{1}{16}$ ply or balsa, gluing it securely in place. This keeps excessive glue out of the tubes during wing assembly.

Do's and don'ts

1) Use a drill template and a piece of brass tubing with small teeth filed on the cutting edge to drill the holes. Don't use a twist drill; it will drift off to one side.

2) Use a good-quality sandable aliphatic glue on most balsa parts, a cyanoacrylate (such as Zap) where specified, and a good slow-drying epoxy for high-strength



plywood areas.

3) Select your wood carefully. Use only straight-grained wing spars. Use the lightest sheeting available for the outer wing panels. Use hard balsa on the fuselage sides.

4) Be sure to make several 1 x 2 x 12-in. sanding blocks.

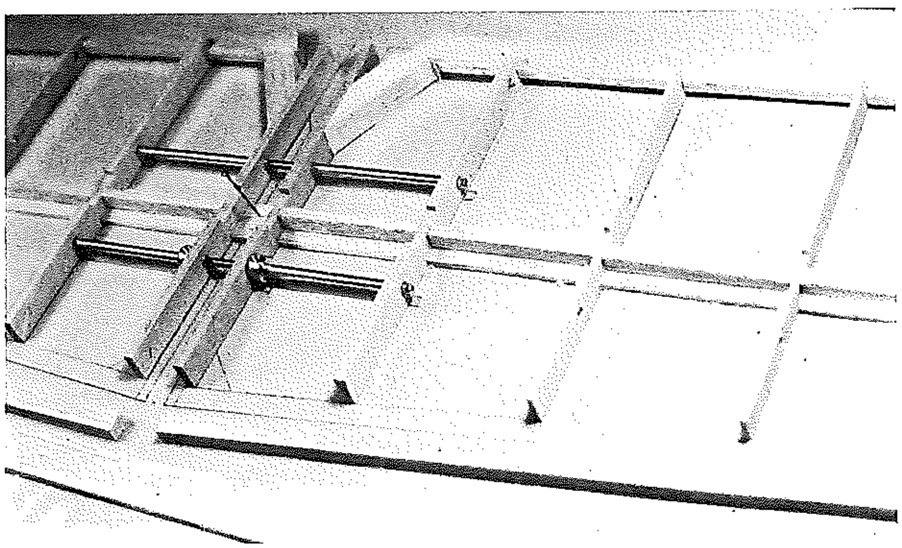
Templates. Make the wing and stabilizer airfoil/drill templates before beginning construction. I cut the templates from 1/16 plywood. Make the master wing airfoil template first, but don't drill it with holes yet. Cut the W1 wing rib template, making it 1/16 in. smaller than the master airfoil template—i.e., the dimension of the airfoil minus the sheeting.

To maintain accuracy, drill all holes in W1, clamp it in position on the master template, and use it as a guide for drilling the latter. Placed on the fuselage sides, this will make an accurate master for clamping and drilling the wing rod and other required holes. It also will be useful in contouring the top of the fuselage and in laying out and shaping the fairing blocks.

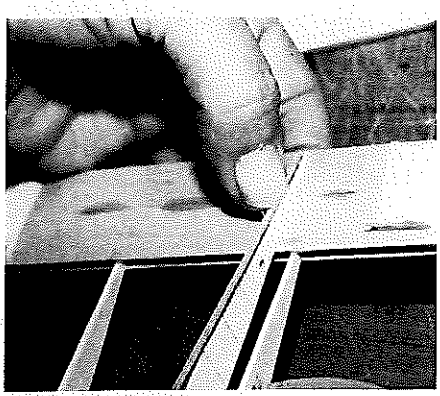
A piece of 1/8 x 3/8-in. spruce spar stock works well for the stabilizer rib template. The stab drill template will be used to drill not only the stab ribs but also the stab horn and horn box.

Fin and rudder. Since the fuselage will be assembled around the fin, it stands to reason that the smaller part should be made first.

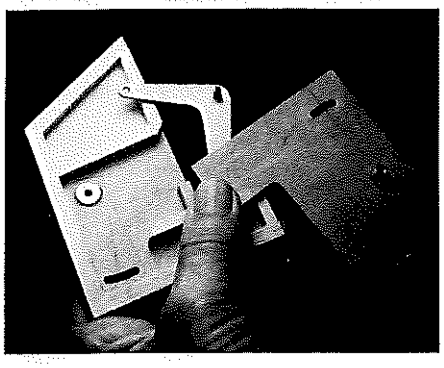
Cut out the two 1/32 ply horn box sides as shown on the plan. Using the stabilizer drill template, drill the 1/8-in. hole for the stab bearing, then drill a line of about five holes to rough out the clearance slot for the rear stab spacer tube. Lay down one side of the ply box, and build it up around the outside edge with 3/16 spacer frame. The overall thickness should be 1/4 in. (the thickness of the fin) after you've added the



Stab assembly under way. The two locking collars on the pivoting shaft house the setscrews that hold the stab in place. Final sanding will be done with long sanding blocks.



Be sure to use the master airfoil template to align the trailing edge to the wing. The TE is edge taped, spot glued, and CyA'd in place.

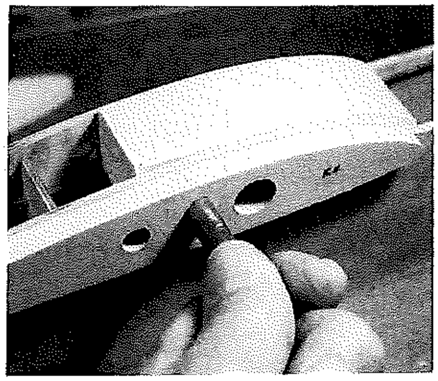


The plywood horn box side. Note that spacers have been added for thickness.

second side. Confirm that measurement before proceeding.

Remove the top side, and glue the ⅛-in.-O.D. x ½-in.-long stab bearing in place. The bearing should protrude ⅛ in. Use a $\frac{3}{32}$ wire and a T-square to check it for squareness. Once the glue is dry, grease the bearing where the horn will swivel; this is not for lubrication, but simply to keep the horn from accidentally being glued in place when you add the top side.

Accurately position and glue the horn and the $\frac{1}{32}$ plywood side. When the glue is dry, sand these parts square at the front and rear. Drill a ⅛-in. hole in your building board, making it ⅛ in. deep. Place the horn box flush on the building board with the stab bearing inserted in the hole, then build the fin around the box.



Boring a weight access hole through the wing spacer block. In the model shown, the hole penetrated the fuselage and fairing blocks. Because this left a weak area between the wing rod tube and holes, the author now recommends leaving the area solid and removing or sliding the wing out on rods to gain access to the weight tubes.

Build the rudder as well, but leave the dorsal fin off for now. Shim the rudder trailing edge, or you can simply eyeball it.

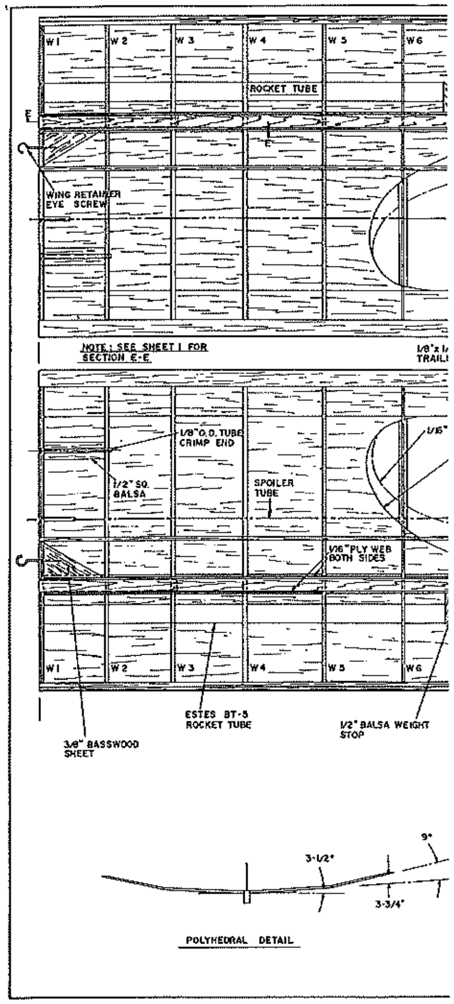
Fuselage. I highly recommend that the forward sides, the bottom, and the forward bulkheads (as well as the W1 wing ribs) be built with good-quality five-ply aircraft plywood. Strength is needed in this area, and the nose will require additional weight in any case.

Cut the forward sides from the aircraft ply, and splice them with hard balsa. Use the master airfoil template to locate the wing rod tube holes, wing retainer hook clearance holes, and spoiler cord clearance holes. Sand the sides to blend them smoothly together, using the master airfoil template to contour the top of the fuselage to the required shape. Leave the airfoil shape slightly oversized until the wing is completed and sanded.

Cut the fuselage bottom and the bulkheads from aircraft ply and balsa. Make the nose block from four pieces of ¼-in. basswood, cutting out the center section so that lead for ballast can be added. Taper the nose block as shown.

Assemble the fuselage as follows:

Position the bottom on the Saran Wrap-



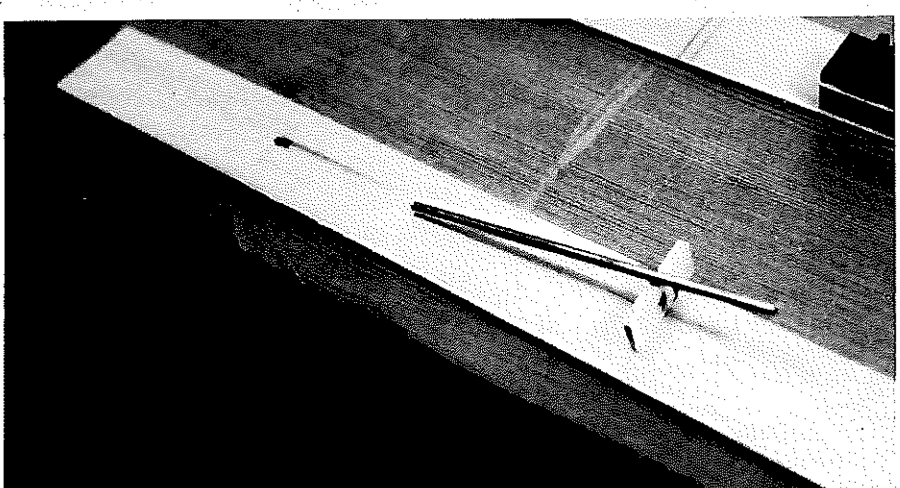
covered plan. Glue on the nose block and bulkheads. Set the fin/horn box assembly in place. Note that the leading edge of the fin just barely rests on bulkhead F8.

When the glue is dry, add the outer housing of the stabilizer pushrod through the bulkheads, terminating it in F8. Add the inner pushrod (steel flex cable is recommended) and metal clevis. Hook it up to the stab horn to make sure it operates freely.

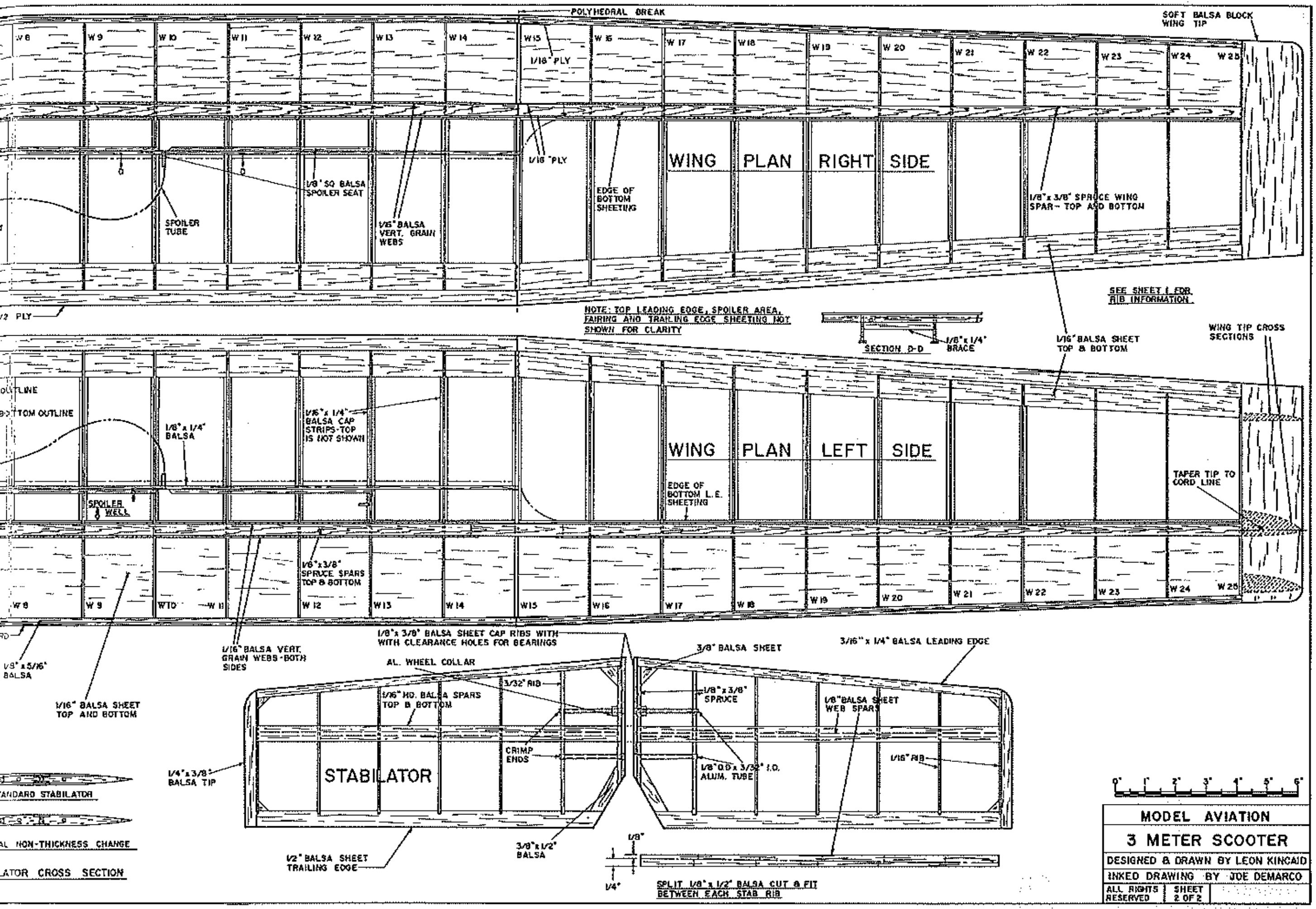
Note: If you forget to build the fin/horn box, in order to assemble the fuselage sides you'll have to substitute a piece of ¼-in. sheet wood wrapped in a piece of Saran Wrap approximately 1¼ inch square.

Make sure you drilled and slotted the rudder pushrod exit just aft of F8 before adding the sides. Install a piece of uncut brass tubing through the wing rod tube holes to help align the sides. I use slow-drying epoxy when adding the sides; this gives me plenty of time to check everything for alignment and squareness.

Since the fuselage is straight from F2 to F8, make a small 90-degree template to check each side against the wing tube. When the angle is equal on each side, clamp around the F3 area, continue clamping along the fuselage to F8, and then clamp the sides to the lower ply section of the fin and/or rudder post. Finally, clamp the sides to the nose block



A sharp piece of $\frac{1}{8}$-in. tubing is used to gouge clearance for the rudder pushrod housing exit.



and anywhere else that may be required. When this is dry, add the rudder post/fin, the antenna housing, and the aft fuselage top.

Use the master airfoil template to cut the two wing fairing blocks from ⅜-in. basswood. Once the airfoil is shaped, taper the inner face approximately ⅛ in. With the wing tubes inserted through the fuselage, add the fairing blocks to check the taper. Trim the inside surfaces until the outside of the fairing blocks are parallel. Insert the wing rod, making sure it's square with the outside surface.

Do *not* glue the blocks on the fuselage at this point; wait until the wings are almost completed. If you fail to properly square off the butt of the wing, you can always trim the fairing blocks. That's a lot easier than trying to square the butt or face of the wing.

Make the wing spacer block. This hinges on the main wing rod tube and rests on F2. Add the rear hatch cover, hinging it onto the rear wing wire tube. Add the cross-grained sheeting between the sides aft of the rear hatch cover.

Sand the spacer block, hatch cover, and cross-grained sheeting to airfoil shape. Cut, carve, and sand the canopy block to fit over the radio area, neatly positioned against the spacer block. The canopy and spacer blocks may be glued together after covering—simply trim away the covering at the glue area—or they may be left separate. Cut strips of ⅛ x ¼-in. spruce to the inside width of the fuselage. Glue these to the bottom of the canopy to accurately position it.

Wings. Note that the bottom of W25

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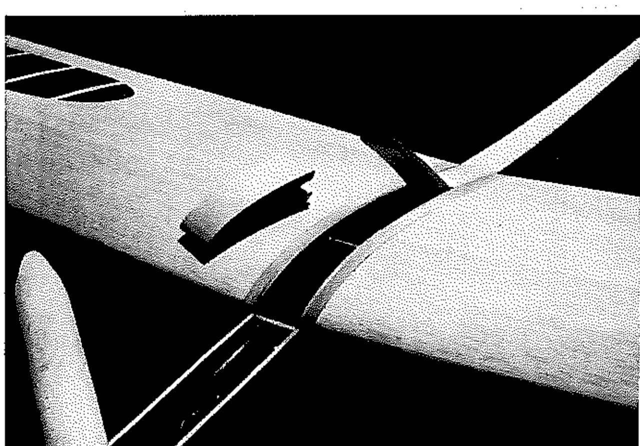

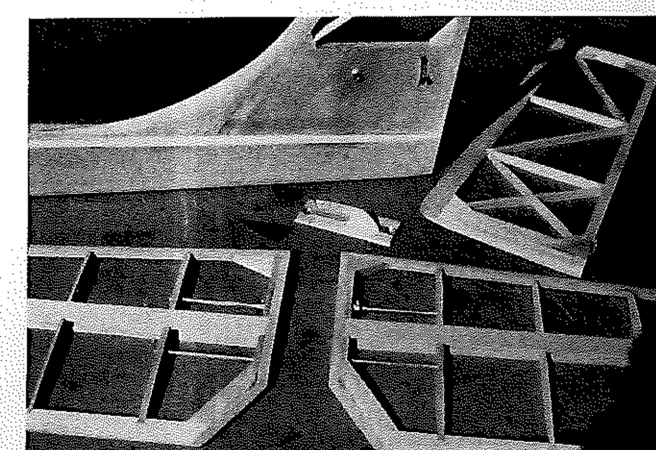

Left: The top of the fuselage has been sanded to shape, and the canopy has been fitted to the spoiler block. A piece of balsa has been removed from the spacer block so that the wing rod tube can be snapped on. Right: Tail components, standard tow hook, and phenolic tail skid ready for assembly. The tail skid is the dark, triangular-shaped object to the left of the tow hook. Note the phenolic rudder horn in place.

was shown earlier. Note also that the positive charge jack lead is also connected to this switch terminal. The unconnected lead shown with the disconnect on it—the other fuse mate—(please see the May issue) is, of course, the positive lead from the battery.

Moving along, we come to another difference. It's how the negative leads are collected and connected. In all, there are three negative leads that need to be connected together—just like before. Previously, these were interconnected on an unused set of arming switch terminals that served as tie-points. In the system pictured, they are interconnected with a device that'll cost you all of six pennies—a wire nut.

The three leads under discussion include the negative lead from the battery, the negative lead from the charge jack, and the negative input lead from the speed control. These leads are stripped of insulation for about $\frac{3}{8}$ in. (don't cut or nick any strands, please!), the exposed wire ends are manually twisted together lightly (just to gather them), and then they are tightly interconnected by screwing on a (blue) wire nut. "Blue" is a particular size wire nut that I routinely use for this particular purpose.

As shown, the high current carrying wire is the same high- flex kind previously described. I generally use 14 to 16 gauge. The charge jack wires are 20 or 22 gauge insulated single conductors from speaker wire. (See Bob's discussion of the speaker wire in the March issue of *MA*.) As pictured in this example, the arming switch is a single pole single throw (SPST) type which I no longer use in new installations. My preference now is for a double pole version as shown in the sketch.

So there you have it—one more Electric installation technique to add to your collection. As mentioned earlier, one purpose of this mini-series is to offer a variety of wiring options for your consideration and selection. The idea is for you to see what variations are possible, and then choose among those offered, or even come up with your own custom variation. Remember, all installations have a motor, a battery, and an "everything else." It's in the latter area where you have the real opportunity to do your own customizing and develop an installation best suited to both your model, and to you.

Incidentally, in case you are wondering, most newer models I have are equipped with the speed control remaining an uncommitted entity—i.e., it is not soldered in as part of the harness but rather has connectors on both its input and output. Thus, it's easy to swap speed controls in and out—which I do for test and evaluation purposes. The "unitized" wiring version shown here is in many of my earlier models. Whatever, both methods are very workable approaches.

So much for another month. By the time you read this, all of the country should be well past the winter blues and into the sky blues! Happy, Quiet-Power Landings, Everyone! □

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matches the shape of W1. Consequently, *all* ribs can be cut using the W1 template.

Make two ribs from $\frac{1}{8}$-in. ply, 10 from $\frac{1}{8}$-in. balsa, and 38 from $\frac{1}{16}$ or $\frac{3}{32}$ sheet balsa. Twenty of the 38 ribs will be used for the tapered tip panels. Select 10 for the left panel and 10 for the right.

Using a thin-line felt-tip pen, mark two ribs as W16, two as W17, and so on, continuing through W25. Place one of the spars on the plan, and insert each rib in its correct location. With the felt-tip pen, mark the ribs where the excess is to be cut off at the leading and trailing edges.

Contour the top of the airfoil of the two W25 ribs as shown on the plan. Using a short piece of $\frac{1}{8}$ x $\frac{3}{8}$-in. spar stock, stack the W15 through W25 ribs and then contour the tops of the W16 through W24 ribs. Follow the same procedure for the opposite panel. You will have to recut the top spar notch in the tapered ribs.

Cut the leading and trailing edge sheeting to the proper length for each panel. Make the leading edge sheeting

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about 1/8 in. wider than shown on the drawing, since it contours over the ribs. Cut off the excess later.

Begin wing assembly by pinning the bottom leading edge sheeting in place on the plan. Position the bottom spar 1/8 in. from the edge of the sheeting, checking the distance with a straightedge. Secure the spars by holding or weighting them down, *not* by pinning, and glue them in place. CyA (cyanoacrylate) adhesives work well here.

Add the sheet trailing edge. Again, don't pin it down. Remember to use a 1/8-in. shim under the trailing edge (and under the Saran Wrap) during assembly.

Add ribs W6 through W14, then the W16 through W25 ribs. Glue them to the spar area only, *not* to the leading or trailing edge sheeting.

Add the W1 plywood rib with the brass tubing. Tilt the rib until the tubing touches the bottom spar. The rib and tubing will be at 3½ degrees. Align the tubing with the spar, and add a drop of CyA to hold it in place.

Make the 3/8 x 49/64 x 6⅝-in. spar spacer from two pieces of balsa, one measuring 3/8 x ¾ x 6⅝ in. and the other measuring 1/64 x 3/8 x 6⅝ in. Attach the spacer to the bottom spar, flush against the end of the tube. You'll need it for spacing the spars at locations where there are no ribs.

Add the main top spars in all panels, and the 1/8 x ¼-in. balsa spar for framing the spoiler in the center panels only. If you're using the optional flaps, omit the spoilers and their framing.

Add a 1/16 ply web/brace to one side of the tube area. Add tapered shims (primarily to fill up the space) and lots of epoxy to the area around the brass tube. Before the epoxy runs out, add the other 1/16 ply web/brace.

When the tube area is dry, cut and trim W2 through W5 and glue them in place. Add the remaining ply webs and the vertical-grained balsa webs.

Plane and sand the leading edge; glue it to the ribs.

With a long straightedge or a piece of old trailing edge stock, shim or wedge the leading edge sheeting against the ribs and CyA it in place. Go slowly, bending the sheeting as you work until all of it has been glued to the ribs and the leading edge. Leave the top sheeting off for now.

Because of the undercambered airfoil, only the tip of the ribs will be touching the bottom sheet trailing edge. With the trailing edge properly positioned but not pinned down, apply slight finger pressure to the top of each rib in turn until it bends and lies flat on the trailing edge. Add a drop of CyA, being careful not to glue your finger to the rib. When you release the finger pressure, the trailing edge will lift up with the rib. When all ribs are

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attached, add the top trailing edge sheeting. Do not add the ½-in.-wide ply-and-balsa trailing edge at this time.

Remove the panels from the building board when dry. Block sand the ends at the polyhedral break until the panels fit together perfectly. Lay the center panel back on the building board, prop the tip panel to the correct angle, and butt glue the panels together. Wipe away excess glue.

When this assembly is dry, add a ⅜-in.-wide brace between the spars and 1/32 ply braces to each side of the spar joint and the back side of the leading edge.

Add pasteboard rocket tubes (Estes BT-5) for additional ballast.

Reposition each wing center panel on the building board. Add the top leading edge sheeting. When this is *completely* dry, raise and shim the center panels until the outer or tip panels are lying flat, and add the tip panel sheeting. Check for proper washout before all the pins have been added. Twist the tip if necessary until the trailing edge is about ⅛ in. higher at the tip than at the polyhedral break. When the washout is correctly established, add the remaining pins.

Cut, trim, and sand excess sheeting from the leading edge. Add ⅛ x ⅜-in. hard balsa or spruce for the leading edge cap.

Add the inboard center panel fairing sheet to the *bottom* of the wing only. Add the diagonal-grained basswood block that anchors the wing retainer eye screws. Add a piece of balsa ½ in. sq. and approximately 1⅞ in. long as a support, positioning it between W1 and W2 above the ⅛-in. hole for the rear wing wire tube.

To insert the ⅛-in.-O.D. brass wing wire tubing into the wing at the proper angle, proceed as follows:

Remove the tubing from the fuselage. Install one wing half on the main wing rod. Using a long extension drill or a piece of ⅛-in.-O.D. tubing with coarse teeth filed on the end, insert the tubing through the fuselage and one inside fairing block, then into the ⅛-in. hole in the W1 ply rib. Drill through the ½-in. support block until you've penetrated rib W2.

Remove the first wing half, and drill the opposite one. Add a little glue to a ⅛ x 2¼-in.-long tube, then insert it into the newly drilled holes. Don't forget to crimp the end of the tubing to prevent the wire from entering too far.

Install the spoiler cord tubing. This should be rather stiff.

Add the top fairing sheeting and the cap strips. Temporarily install the spoilers, holding them in place with small hooks and rubberbands from within the spoiler bay.

Align the bottom of the ½-in.-wide ply-and-balsa trailing edge, ply side down, with the bottom of the wing. Tape the trailing edge temporarily in place, and spot glue it with CyA. Check the alignment. When it's correct, remove the tape and glue the trailing edge in place.

Add the lightweight balsa block wing tips. Make sure they are airfoil-shaped when viewed from the end. Taper the tips on the top and slightly on the bottom, continuing to the chord line. Round all corners, and fair them in.

The completed wings are ready for trimming and sanding. Plane away all excess balsa from the tops of the trailing edge, spoilers, and leading edge. Sand all areas to final shape. I recommend making a female airfoil template and using it for at least the first third of the wing.

Stabilator. This is built relatively quickly. Build the two halves almost flat, then sand them to final shape.

All the ribs are ⅜ in. wide and the same length as the root rib. Cut four ribs from ⅛ x ⅜-in. spruce spar stock, 10 from 1/16 or 3/32 sheet balsa. Use the stabilator drill template to drill the ribs. Using two pieces of ⅛-in.-O.D. tubing, stack each stab half and taper the ribs from ⅜ in. wide at the root to ¼ in. wide at the tip. Leave all the rib ends square at this point. Notch the ribs for the 1/16 x ½-in. spars.

Place the bottom spar for both stabilator halves over the plan. Glue each rib to the spar, and cut away excess leading edge material.

Add the slightly tapered ⅛-in. balsa webs/spacers between each rib. Make sure that each spacer is level with the spar notch. Add the top spar.

Add the leading and trailing edges. This may be done either with the stab halves on the building board or by picking them up and judging the fit by eye. Be certain to notch the trailing edge for the ribs.

Add the tip blocks, gussets, and tubing. The latter should be flush with the face of the spruce rib. I also add an aluminum wheel collar (Perfect brand), and drill and tap for a 4-40 allen-head setscrew. When this is dry, add a ⅛- or 3/16-in.-thick by ⅜-in.-wide spacer rib on the face of the root rib. Cut clearance holes in the spacer rib for the stab bearing and for the spacer tube in the horn box.

Trim the trailing edge for rudder clearance. Contour the leading edge with a razor plane and sanding blocks. Sand the ribs to fair in with the leading and trailing edge stock.

Covering. Even when I haven't flown well, I still enjoy hearing how nice my plane looks or how neat the construction is. The secret? Make good use of those sanding blocks, then top it off with a neat covering job. You don't need a lot of trim to look good. In fact, too much trim looks vulgar and adds drag.

I highly recommend that you do your covering only on very dry days. If you must, bring your model into an air-conditioned house for 24 to 48 hours before covering it. Covering laid over a damp frame will wrinkle on the first dry day.

Although you can use any covering material desired, I recommend MonoKote. I use Black Baron on the canopy and wing tips since it works beautifully on compound curves.

Radio installation. The fuselage is rather narrow, but a standard 500-mAh flat battery pack will fit fine with a little clearance carved out of the canopy block. The new ½A 500-mAh and the ½AE 600-mAh flat packs are only 1⅛ in. high and fit perfectly.

The area between F1 and F2 will take two standard servos, with the receiver placed between F2 and F3. I usually put the receiver and the elevator servo between F1 and F2 and the rudder servo between F2 and F3. Having found that a standard-size servo for the spoilers fits rather tightly, I've been using a microservo mounted between F3 and F4. If your pushrod housing has a different diameter than mine, you may be able to accommodate a standard servo.

Mount the switch on bulkhead F2, or install a Du-Bro switch mount high on F2. Though a retractable tow hook isn't required for a heavyweight Unlimited class Sailplane such as this, a Fourmost hook will fit under a Futaba servo (and presumably under most standard servos) if you want to use one. The hook can be activated by the spoiler servo or by a microservo such as the Futaba S-33, mounted directly in front of the hook and next to F2.

An E-Z connector mounted on the arm of the hook will allow a pull string to clear the rudder servo to the arm of the microservo, but the installation is tight. I slip a looped spoiler pull string over ball links on the arms of the spoiler servo, using a toothpick to secure the other end on the spoiler. That's all it needs. The toothpick will tighten even more when the string is pulled.

Flying. The 3M Scooter is as stable as a trainer. Turns are fairly tight, and stalls are very shallow. There's nothing tricky about this model. You can't say that for most competitive Sailplanes.

At 58 oz., my first prototype was too light. Making it about six ounces heavier gave me optimal flight times. I suggest locating the center-of-gravity right in the middle of the spar, with the tow hook either exactly at or just slightly forward of the CG. After you fly the plane my way—that is, the safe way—and learn its characteristics, you can move the CG aft to reduce the decalage and considerably increase gliding speed.

For extra ballast on windy days, slide the wings about an inch out on the wing rods, and insert ½-in.-O.D., 1-in.-long slugs. If you need only half that much weight, insert six ½ x 1-in. pieces of wood dowel, and then six slugs. Each wing panel can accommodate up to 12 1-in.-long units. I know lead is best but have been using steel slugs anyway. Also nice would be ½-in.-O.D. brass.

Slow-floating Sailplanes look beautiful aloft, but often they're unable to get out of bad air quickly enough. At the other extreme, models that attain speeds of 50 to 80 mph are at a disadvantage if they can't find super lift. Without that ability, these high-powered ships will be on the ground in no time. The 3-Meter Scooter strikes a happy medium. Have fun with it while you're finding out for yourself. □

RC Giant Scale/de Vries

Continued from page 35

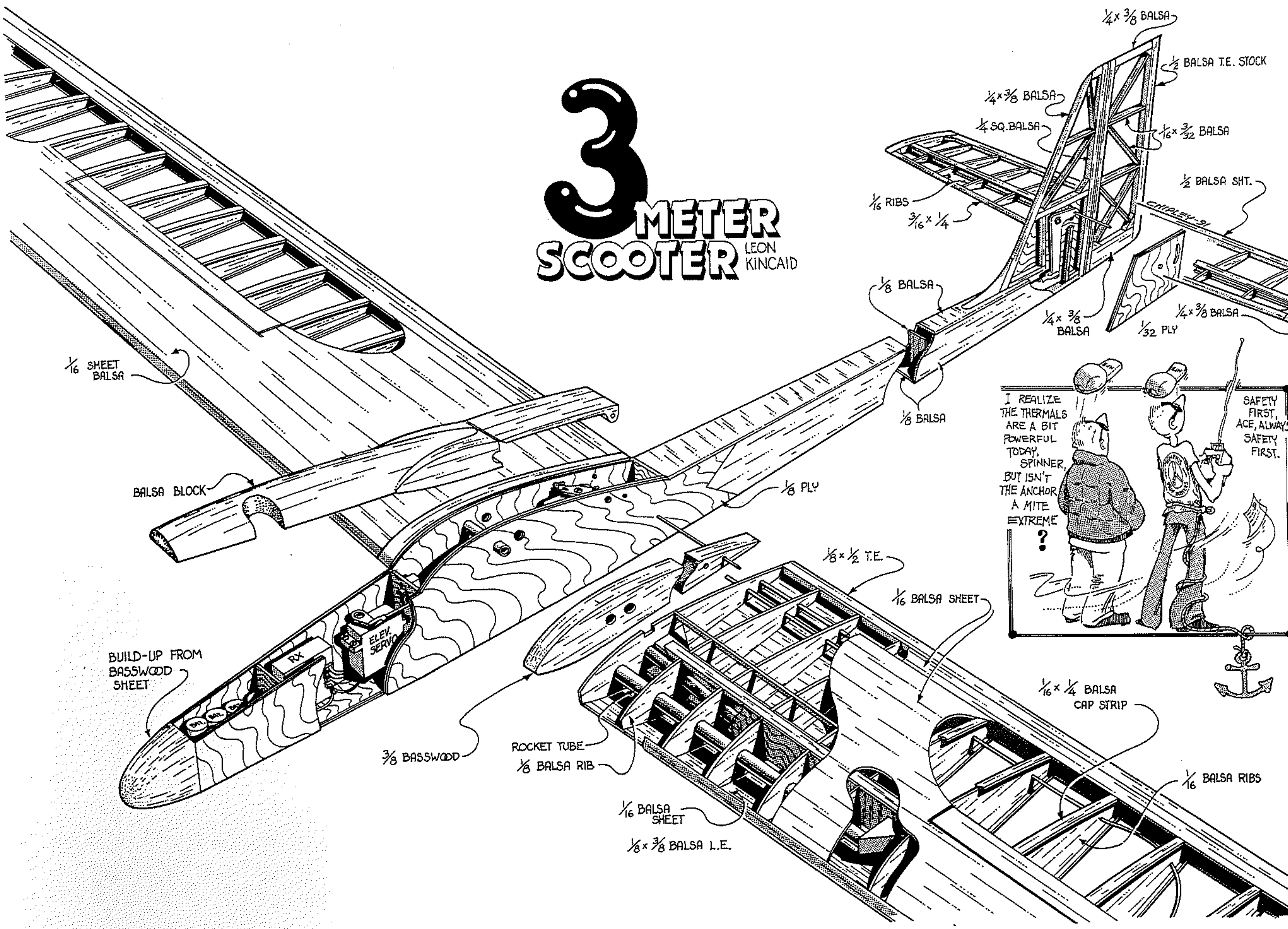
so that what are obviously very large models might be included in the Giant category. I've received a letter from Ford Lloyd in Australia (no less!) that indicates that the folks Down Under have come up with a nifty way to categorize big ducted-fan monoplanes. The Australian rule—a Giant monoplane is one whose fuselage *or* wing span is two meters (79 in.) or larger—seems to handle the problem rather neatly.

In response to the column about templates, George Chwascinski, of Nashville, Illinois, has come up with another material that sounds great. George bought a roll of freezer paper for about two bucks. He traces the pattern on a piece of the paper and then sticks it to balsa or plywood using his MonoKote iron.

After the part is cut out and sanded, the freezer paper can be stripped off—neat and clean! It's a quick way to produce Giant Scale model parts when you're scratch-building.

If you'd like to be a Supermarine Spitfire pilot, Giant Scale-sized, Ralph Ropp (P.O. Box 608, Rocklin, California 95677; tel. 916/782-6616) has a set of drawings and accessories for you. Ralph's drawn the Mark IX version of the beautiful British warbird in ¼ scale. The span's 110 inches and, with a Sachs-Dolmer 5.8 cu.in. engine, it should weigh out at 35 to 40 pounds, ready to fly. Of built-up construction, Mr. Ropp's Spit should be a magnificent project.

With the prices of some Big Bird kits heading for the stratosphere, it sure is nice


3 METER SCOOTER
LEON KINCAID
1/4 x 3/8 BALSA
1/2 BALSA T.E. STOCK
1/4 x 3/8 BALSA
1/4 SQ. BALSA
1/16 x 3/32 BALSA
1/2 BALSA SHT.
1/16 RIBS
3/16 x 1/4
CHIPLEY-91
1/8 BALSA
1/4 x 3/8 BALSA
1/32 PLY
1/4 x 3/8 BALSA
1/8 BALSA
1/16 SHEET BALSA
BALSA BLOCK
1/8 PLY
I REALIZE THE THERMALS ARE A BIT POWERFUL TODAY, SPINNER, BUT ISN'T THE ANCHOR A MITE EXTREME ?
SAFETY FIRST, ACE, ALWAYS SAFETY FIRST.
1/8 x 1/2 T.E.
1/16 BALSA SHEET
ELEV. SERVO
RX
BUILD-UP FROM BASSWOOD SHEET
1/16 x 1/4 BALSA CAP STRIP
3/8 BASSWOOD
ROCKET TUBE
1/8 BALSA RIB
1/16 BALSA RIBS
1/16 BALSA SHEET
1/8 x 3/8 BALSA L.E.