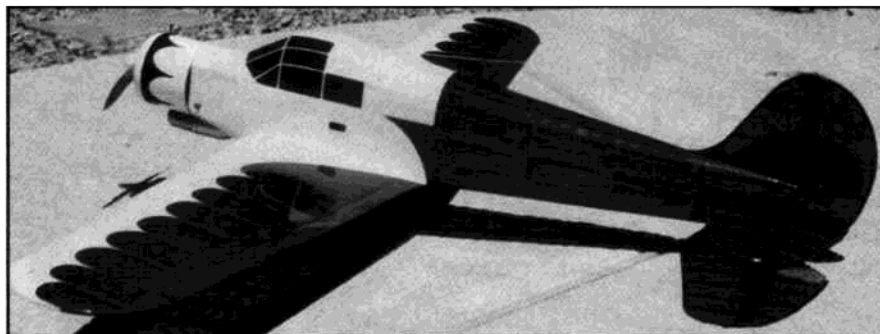


WITH THE CLASSIC LOOKS OF THE 30s, THIS SPORT MODEL IS LOADED WITH PERFORMANCE.

I designed this plane because I thought it would be fun to have a "Porsche engine in an old VW." I used a 15% symmetrical airfoil with a 12" root and an 8" tip chord. The leading edge of the wing has 3° of sweep back with 1" of dihedral under

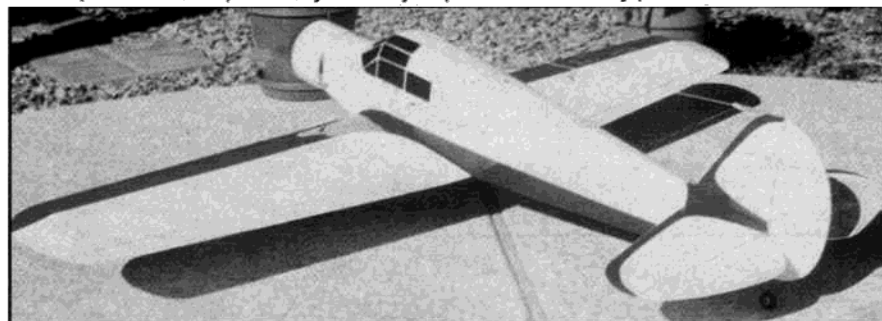
each tip. It has a rather long rear tail moment arm and all of this gives a plane that will do nice aerobatics. To give it a unique look, and for general appearance, I used an old Aeronca L.C. built back in the 30's. It creates a stir wherever I've taken it, and

most people think it's a scale plane. I built it very light and installed a Super Tigre G.S. .40 for power. This gives a high power to weight ratio, in a very affordable package, my version of "a Porsche in a VW." If you can fly rather well, handle a tapered wing, and have a little building experience, try this one on for a thrill. The wing is built with no washout, as I like to be able to fly equally well upside down. Remember, washout right side up, is wash-in, upside down. This is like all other design features, a trade-off. To fly it, keep your speed up and don't pull it off early on take-off. It will need a little



Development Of The Aeronca Acro (LC)

The first plane I made of this design had a longer nose and used built-up stick construction like the Sig Seniorita. That plane turned out to be nose heavy, slightly spirally unstable, and was rather hard to build. I hate to air freight lead so I cut the nose back, changed the construction method to lite ply, and increased the dihedral. I also changed the size and shape of the elevator and rudder. I changed the wing dihedral three times and lowered the height of the elevator. I flew my second plane for about eight months and had several other competent people fly it and I believe I have it right now. I then drew my finished plans and made the red and white model. The plane is stable (neutral stable). It will fly where you put it and is a very practical model.



ABOUT THE AUTHOR

Robert has been interested in modeling since before he was a teenager, and he's now 65. He was a sail maker and he and his wife had their own sail loft where they built and sold sails for use both here in the U.S. and also in Canada. Robert found the same aerodynamic principles that work on sails also work on airplanes. He has always had an intense interest in how things work and in making practical things that really work; he likes things that are beautiful, but functional, and don't cost the earth. He and his wife are now retired and he enjoys flying with the Arizona Model Aviators.

NAME
AERONCA ACRO (LC)

Designed by:

Robert G. Taylor

TYPE AIRCRAFT

Sport Scale

WINGSPAN

61 inches

WING CHORD

10 inches (Avg.)

TOTAL WING AREA

592 Sq. In. (Approx.)

WING LOCATION

Low Wing

AIRFOIL

Symmetrical

WING PLANFORM

Double Taper

DIHEDRAL, EACH TIP

1 inch

OVERALL FUSELAGE LENGTH

43-1/2 inches

RADIO COMPARTMENT SIZE

(L) 10" (W) 4-1/2" (H) 5"

STABILIZER SPAN

23 inches

STABILIZER CHORD (inc. elev.)

6-3/4 inches (Avg.)

STABILIZER AREA

120 Sq. In.

STAB AIRFOIL SECTION

Flat

STABILIZER LOCATION

Top Of Fuselage

VERTICAL FIN HEIGHT

9-1/4 inches

VERTICAL FIN WIDTH (inc. rud.)

7 inches (Avg.)

REC. ENGINE SIZE

.40 2-Stroke

FUEL TANK SIZE

8 Oz.

LANDING GEAR

Conventional

REC. NO. OF CHANNELS

4

CONTROL FUNCTIONS

Rud., Elev., Throt., Ail.

C.G. (from L.E.)

3-1/2 inches (At Fuselage)

ELEVATOR THROWS

3/4" Up — 3/4" Down

AILERON THROWS

3/8" Up — 3/8" Down

RUDDER THROWS

1-1/4" Left — 1-1/4" Right

SIDETHRUST

N/A

DOWTHRUST/UPTHRUST

N/A

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage Balsa, Plywood, Spruce

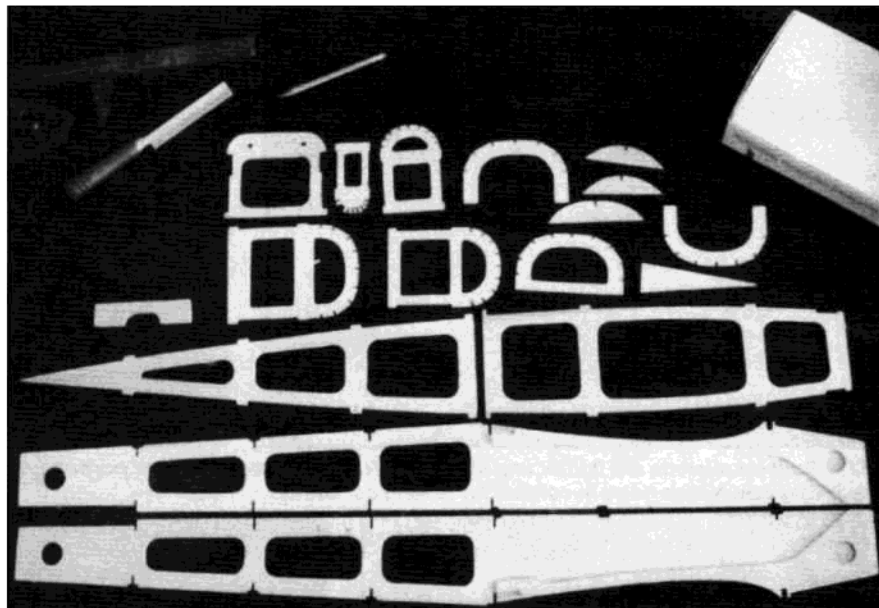
Wing Balsa, Plywood

Empennage Balsa

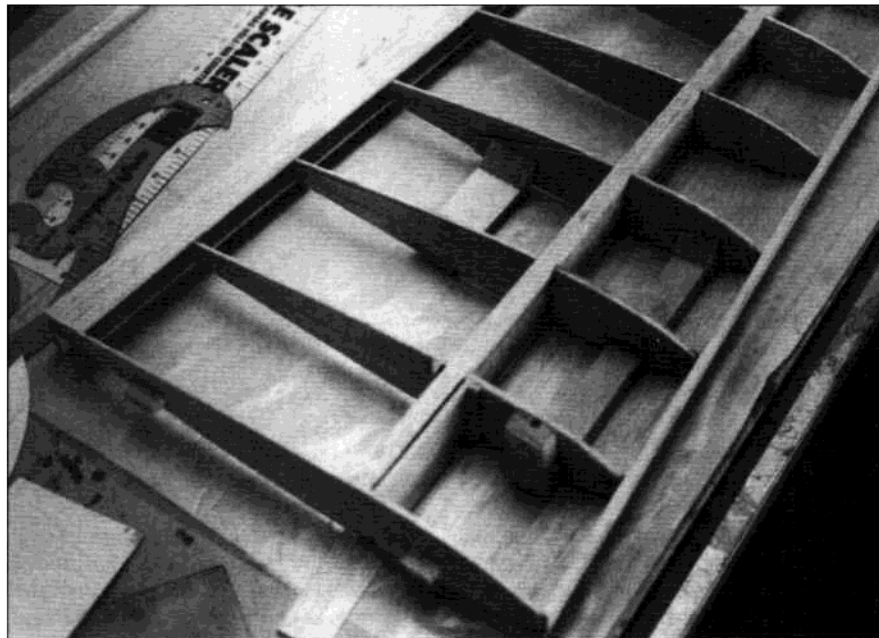
Wt. Ready To Fly 80 Oz. (5 Lbs.)

Wing Loading 19.5 Oz./Sq. Ft.

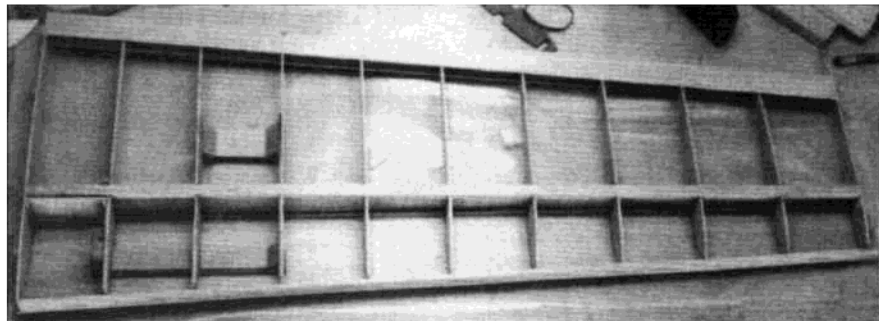
right rudder on the take-off run, but with the long rear moment arm it's pretty gentle. Just maintain plenty of speed while flying. The plane is quite fast but is rather large and very light so it will slow down quickly. When landing, back off on the power and let it slow down, then add in a couple clicks of power, make your final turn and set up a nice sink rate. When you're just off the end of the runway, pull the power off and start your flare for that "grease it down the



Lite ply fuselage parts kit, all parts sawn out prior to assembly.



Wing assembly showing pocket for front dihedral brace and vertical landing gear torque block with plywood cap.



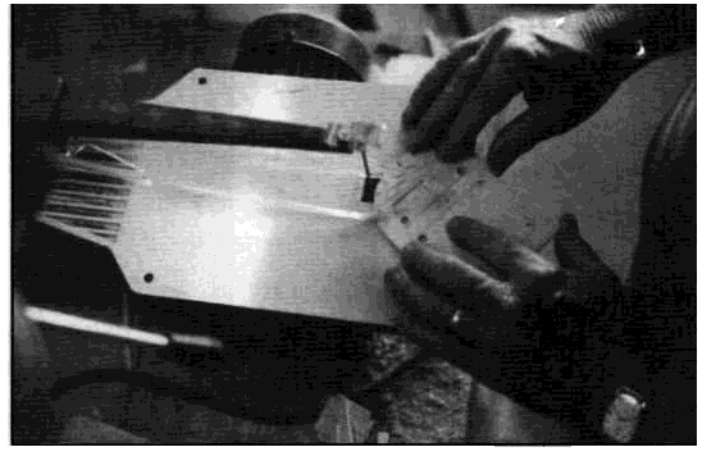
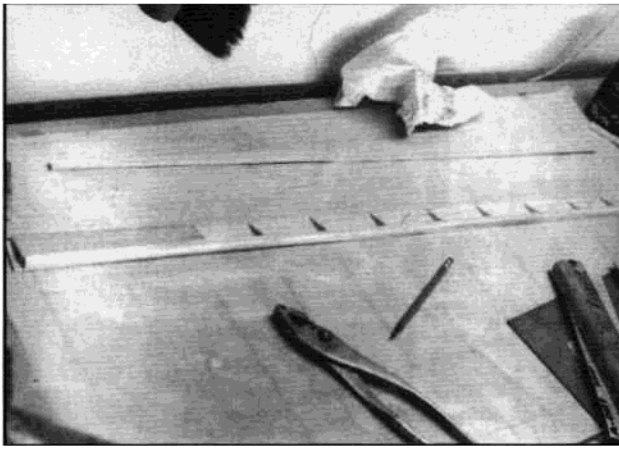
Wing panel with landing gear blocks and rear support for wheel pants in place.

center" landing. That's the only kind you do isn't it? My plane will roll well, knife-edge, perform rolling circles, wonderful hammer-head stalls, and spins like crazy, a real fun airplane to fly. So, if you want an airplane with classic looks and great performance, give this one a try.

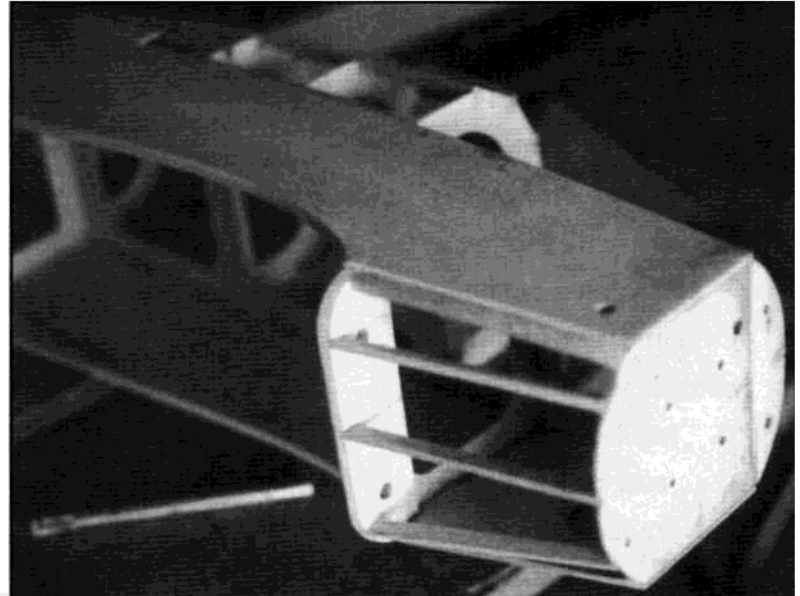
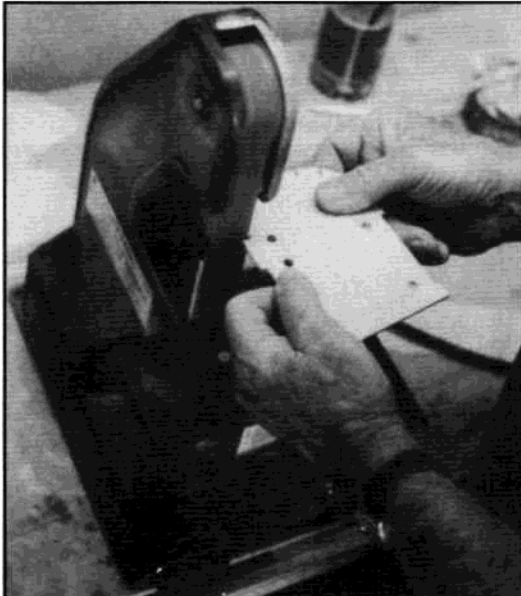
CONSTRUCTION

Wing:

Cut ribs from 3/32" balsa and doublers from 1/16" ply. Glue doublers to ribs (be sure they are on the right side). Pin down bottom spar. Glue ribs to spar and set the first rib at 2°. Glue in top spar and shear



LEFT: Built-up ailerons are lighter and straighter. Note filler used on inner portion for aileron torque rod. **RIGHT:** Sawing out formers using a jig saw. Notice holes in corners for sawing out center.

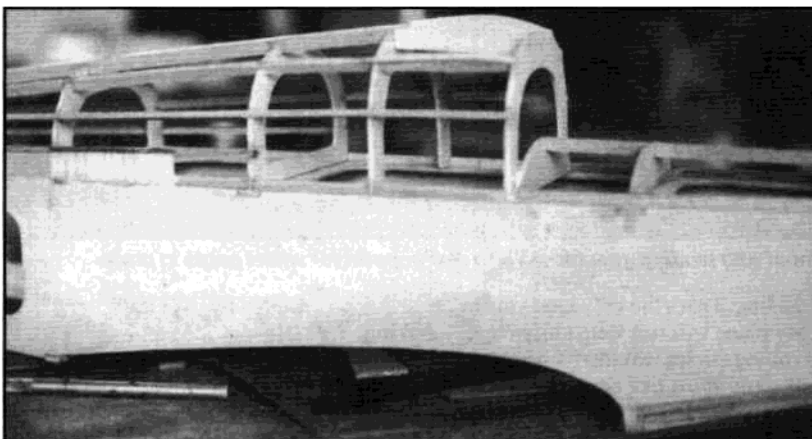


LEFT: Sanding tabs and notches so they fit tight and make good glue joints. **RIGHT:** Stringers are used in fuselage to bend planking around for good shape.

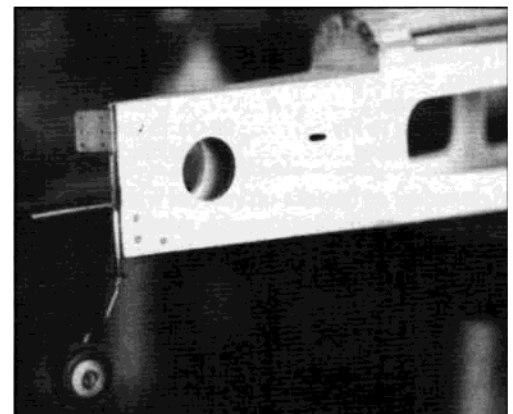
webbing. Be sure both spars are straight (top and bottom). Glue on 3/8" x 1/4" trailing edge. Cut 1/8" leading edge approximately 5/8" on one end and 1/2" on the other and 30" long. Put a line down the middle and glue on the front of your ribs so the middle lines up with the middle of your ribs. I clamped my leading edge to the ribs using rubber bands and short sticks stuck behind the spar. Glue in the landing gear blocks and

plywood bracing for the landing gear. I made the torque block on the end of the grooved hardwood landing gear piece long enough to glue from bottom wing sheeting to the top. I then put a 1/16" ply doubler over the end of the torque block and the grooved landing gear block. (I have had torque blocks split on hard landings as the grain is running the wrong way.) If you don't ever make hard landings, don't worry about it.

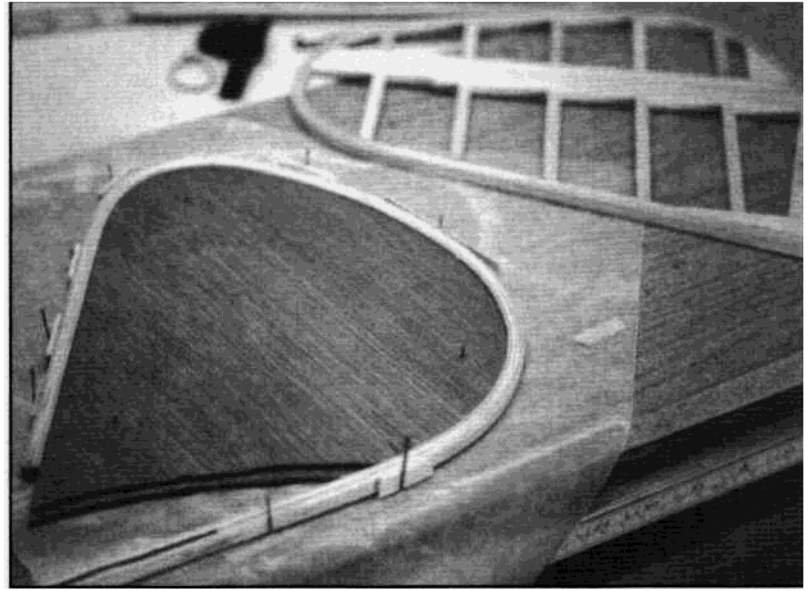
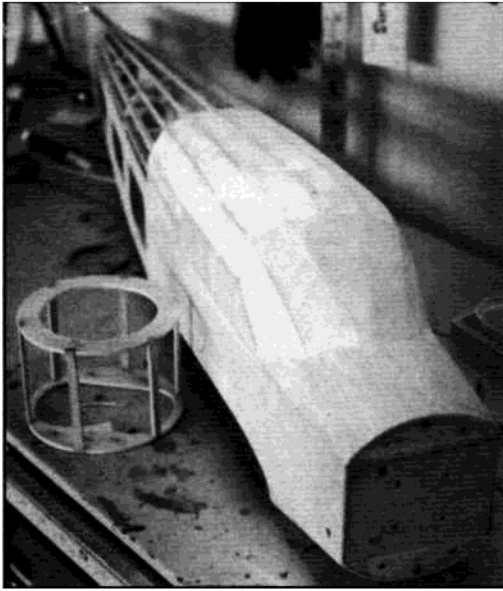
Construct the second wing panel up to this stage, and check the dihedral angle. Be sure the wing panels are straight, but don't worry about twist yet, we will take care of that when we glue on the planking. Glue in triangle brace to W2 as a clamp for the dihedral brace. Glue in the 1/16" piece in front of spar and between W1 and W2 as a clamp for your front dihedral brace. Drill out the landing gear torque blocks through the wing



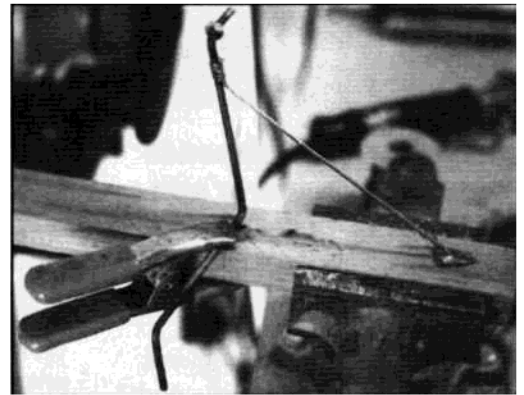
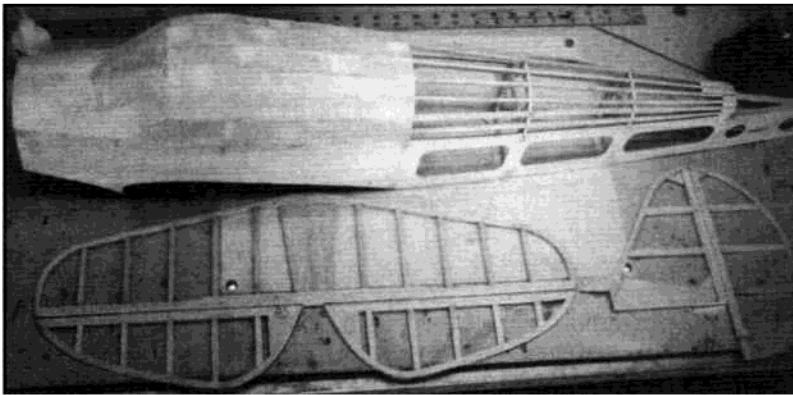
Cabin frame before planking.



Tail wheel assembly. Note the two dowels used to lock it in place.



LEFT: Fuselage sheeting glued in place, and cowling frame ready to be sheeted. RIGHT: Outer vertical fin and rudder frame being molded around door skin molds. Notice the blocks between nails and frame material to prevent nicks.



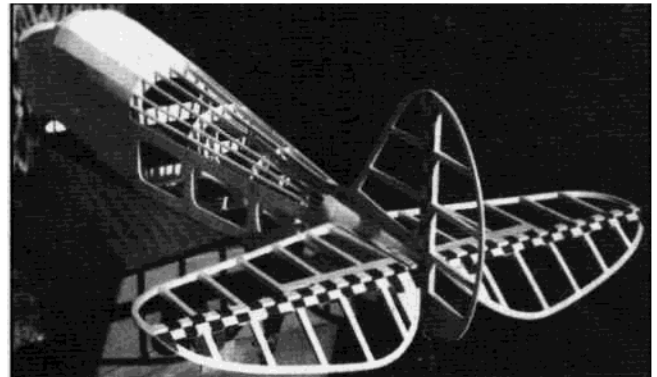
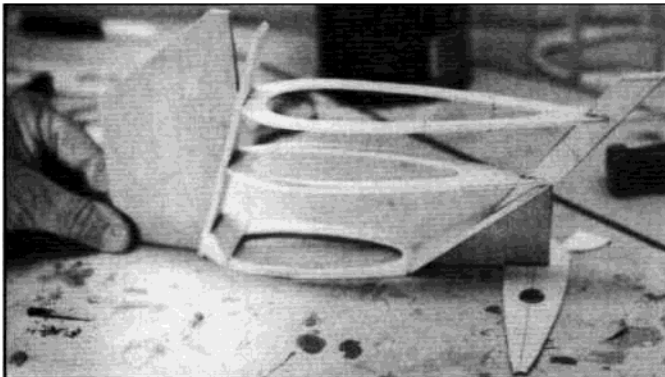
LEFT: Besides providing excellent control, these tail assemblies are very light. RIGHT: A simple jig is used for setting angles for landing gear brace.

panels. Cut a jig piece for rear of wing to rest on to keep it from twisting. Mine was 28-1/4" long x 11/32" at one end, and 23/32" on the other. I used 1/8" wide material. Now put a line down the center of your end ribs. I put this line down the center of all my ribs before assembly, to line my leading edge on. Now cut four 1/2" x 3/8" blocks and tack glue on your rib centerline. Sand the front of the rear trailing edge piece so it blends in with the ribs. Clamp the rear of wing to something straight and glue on the 1" wide 3/32" rear sheeting. Make sure the trailing edge ends up straight. Make a piece of

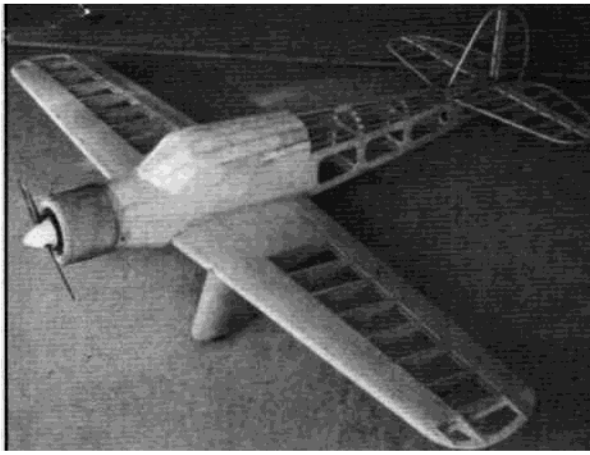
3/32" x 3" balsa for leading edge sheeting. I sliced off one end and flipped it over and glued it on the other to make it wide enough. Glue the leading edge sheeting down the middle of the lower spar. Now pin down your jig piece. Be sure it is straight, as your rear edge will rest on this. Set the wing on the jig and weight it down. I used large cans of food (real high tech). Now the most important thing you will do is take a small level and lay it on those blocks we glued on the centerline of the end ribs. Be sure each one is level (no twist in the wing). If you want to use some washout, now is when to

install. Now put some slow drying glue on the landing gear blocks and ribs (I used Elmers or Sigment) and bend the sheeting up to the leading edge and "Hot Stuff" it. You may need some help here. The "D" tube is what gives the wing its torsional rigidity. If you twist the wing while gluing the leading edge sheeting in place, it will be forever twisted.

Check each wing panel tip and be sure it remains level. My food cans did the trick. What I try to accomplish here is to do one thing at a time. Spar straight, leading edge straight, trailing edge straight, **then no**



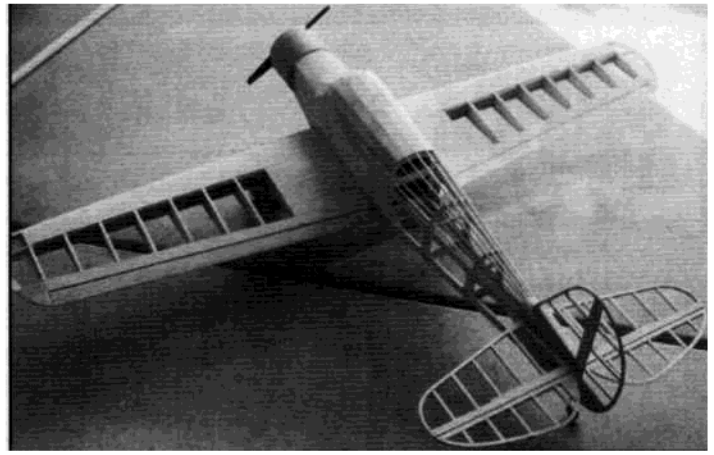
LEFT: Author's jig for setting wheel pant angels. Both wheel pants must be alike. RIGHT: Tail and fuselage assembled and ready to cover. Notice MonoKote hinges.



Bare bones. Note how wingtips are done.

twist, okay? If the wing is straight, glue on top sheeting. Before you do this, drill through your torque block and bottom wing skin. You can cut out the slot for your landing gear now if you want. Glue on top "D" tube sheeting, center sheeting, install the lite ply tips, install rib caps, and glue on the second 1/8" leading edge piece. To make the ailerons and rear section of wing, cut a 3/32" piece approximately 1-1/4" wide x 28-1/2" long. Glue a 1/4" x 3/8" piece along one edge, then add the filler block on the inner edge where your torque rods will go. Next, cut the aileron ribs from 3/32" sheet. I put a 1/4" rib on the end.

Lay this assembly on a flat surface and sand it down to a nice straight angle, so that



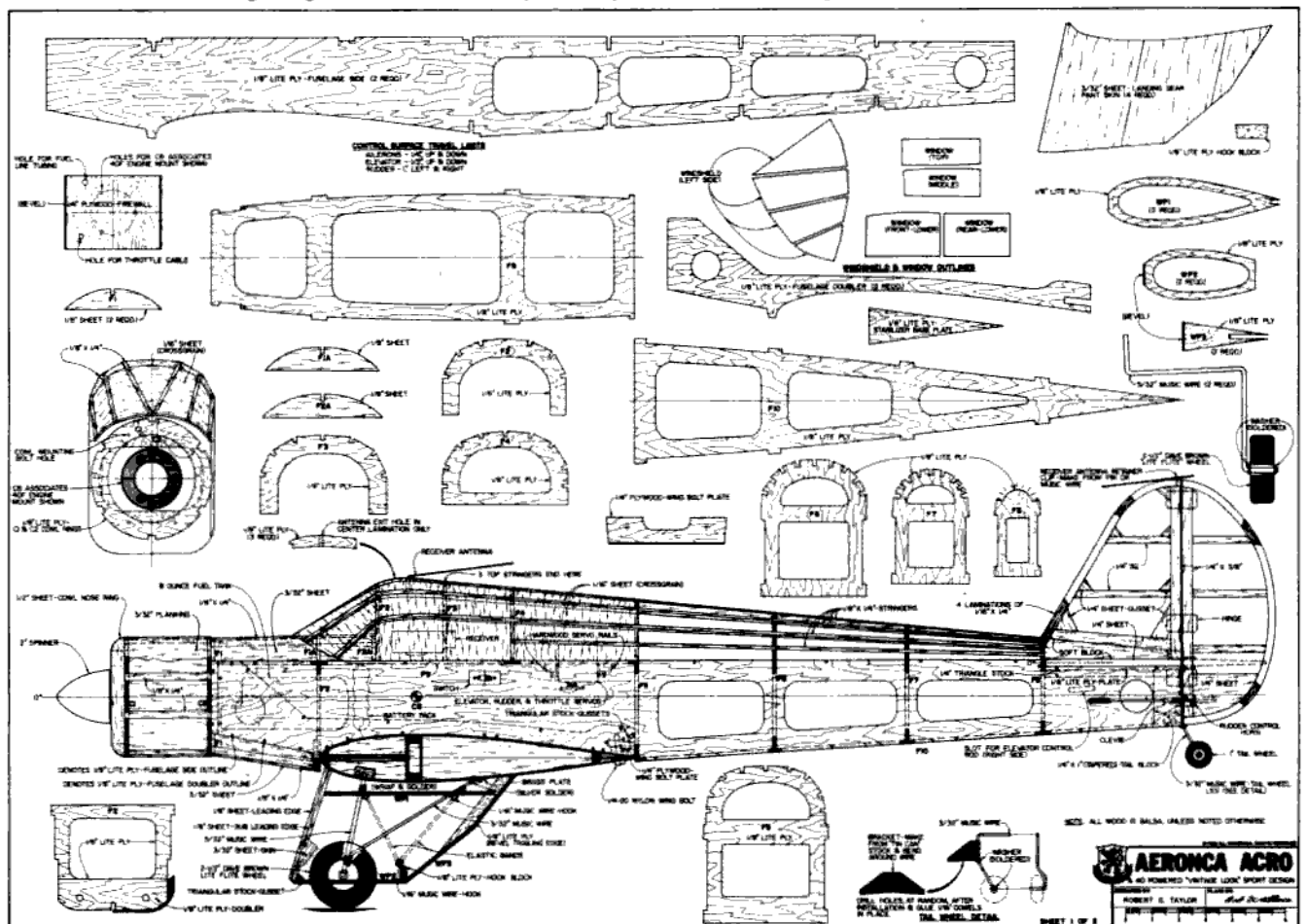
Assemble everything and be sure it works and fits prior to covering.

with another piece of 3/32" sheet glued on top, it will fit the back of the wing and complete the airfoil. On one of my planes, I used solid ailerons. They will work well if you can find straight wood. Cut aileron piece to make the center section. Cut out for the aileron torque rods. Glue these in so that they line up with the centerline you put on W1. Cut two slots through W1 on either side of spar for the dihedral braces. Cut dihedral braces and fit in. I cut the hole for the aileron servo before the wing panels are joined, and shape/sand each side. When joining, use a 1" block under each rib W11 and be sure they are not twisted. I also hinge the ailerons before joining the wing panels. Use double sided tape and tape a full sheet of 100 grit

sandpaper to a flat surface, then use that to sand the center seam for fit. Once you get a good fit, epoxy the dihedral braces and center seam together. This is a good time to cut out the fuselage F1 former and use it for a drill jig to drill the wing for the 1/4" dowels. You can also drill it when the fuselage is first assembled, before the fire wall goes in. Be sure to reinforce the wing center section seam with fiberglass cloth and resin.

Fuselage:

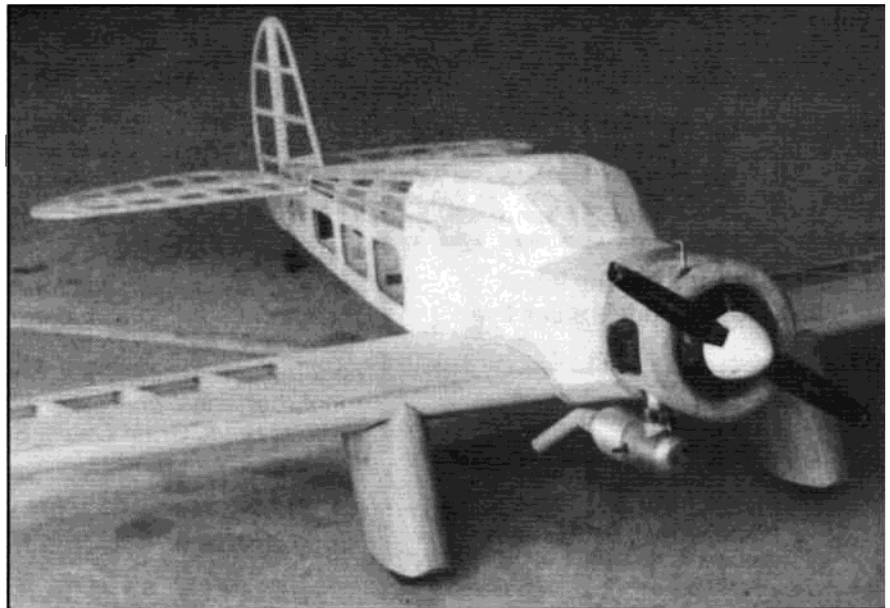
Cut out parts. Tip: Cut slots to size and cut tabs oversize. That way you can custom fit each part. Decide now how you're going to drill your wing dowels. When you drill the dowels, go through the front dihedral brace and glue to back of rear dihedral



Material List

All wood is balsa, unless otherwise noted.)

- 2 — 1/16" x 3" x 36"
- 12 — 3/32" x 3" x 36"
- 2 — 1/8" x 3" x 36"
- 1 — 3/16" x 3" x 36"
- 1 — 1/4" x 3" x 36"
- 1 — 1/2" x 3" x 36"
- 4 — 1/4" x 3/32" x 36"
- 1 — 1/2" x 1/4" x 36"
- 7 — 1/4" x 3/8" x 36"
- 2 — 1/8" x 1/4" x 36" spruce
- 9 — 1/8" x 1/4" x 36"
- 3 — 1/4" sq. x 36"
- 1 — 1/4" x 1/2" x 36"
- 2 — landing gear blocks 5/32"
- 1 pcs. 5/32" wire and one 3/32" (.093") wire
- 2 — 1/8" x 12" x 48" lite ply
- 1 ea. — 1/16" x 6" x 24" ply and 1/4" x 6" x 24" ply
- 2 — 2.5" Dave Brown Wheels and a 1" tail wheel
- 1 — Carl Goldberg 3/32" strip aileron hardware
- 4 — Carl Goldberg 1/16" threaded rods and clevises, also cable for throttle.
- 2 — 1/4" nylon bolts and 17 hinges.
- 4 — Sig landing gear retainer straps.
- 1 — 8 oz. tank
- Fiberglass cloth and covering (I used 3 rolls MonoKote)

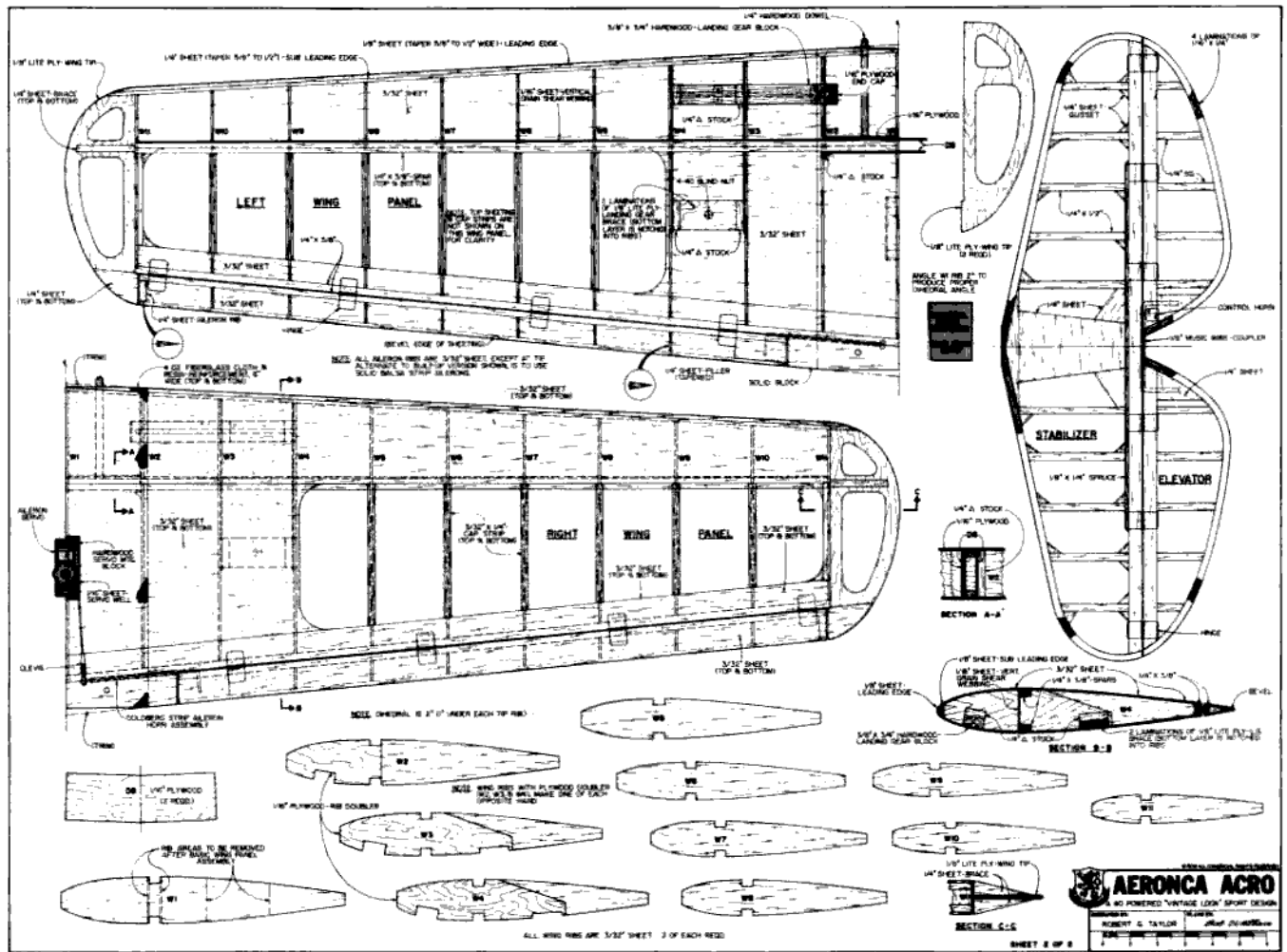


Right side of plane showing muffler position; plane stays nice and clean.

brace. Put the fuselage structure together with rubber bands and check for squareness and alignment. I used epoxy on former F1 and the wing hold-down pieces, and the rest was "Hot Stuffed." Leave the fire wall out at this time. The nice thing about this method of building is that if the parts are cut right, it should all align properly. Epoxy the tail wheel bracket between the fuselage sides and put 1/8" dowel pieces through it. Also at this time, epoxy a hinge above the tail wheel

bracket. Cut and drill the fire wall and epoxy it in place. Now sand the fuselage to accept the wing, and bolt it in. Jig the fuselage up so that it's level with the wing bolted on and check the incidence angles. It will fly a lot better if it is straight and true. The wing should be set at a 0° incidence angle. Now glue on the cabin formers then add the stringers. A tip here is to put the stringers on with rubber bands and check for straight-

ness. By using a razor saw and cutting away one side of a notch and sliding a sliver of scrap balsa in the other side you can have the stringers straight. Remember these are the highlights of your fuselage contour. Now glue on the forward formers. Cut out the cowl rings next. I like to nail them together, sand them and cut the notches for the stringers, then I cut out the inside and



FULL-SIZE PLANS AVAILABLE - SEE PAGE 200

drill the back ring (C2) for the mounting bolts. These bolts go through the fire wall with blind nuts on the back. Cut six 1/8" x 1/4" x 3-1/4" stringers and assemble the cowl frame. Next, cut 3/32" sheet, 3" wide for the cowl planking. I edge glued it together, wet it, wrapped it around the cowl and let it dry. I then precision cut it to size and Hot Stuffed it on to the cowl frame. Cut the cowl nose ring from 1/2" sheet balsa, glue it on, and shape it as shown. Next, cut the planking for the front of the fuselage (both top and bottom), wet it and wrap it around and hold it to dry with rubber bands. When dry, carefully cut it to size and glue it on. Triple the 1/8" lite ply piece between F2 and F3 and run the receiver antenna through it and out to the tip of the rudder. Using 1/16" balsa sheet, plank from F5 forward, run the grain vertically between the stringers. Start at the rear and move forward to the windshield. Now install the windshield stringers and sheet these areas, also cross grain. There are five pieces in the windshield. You can now use balsa filler/putty to smooth up this area, then sand smooth. Now, doesn't that look neat? See; an award winning model is balsa, ply, and putty! "Don't tell anyone now."

Landing Gear:

5/32" wire won't bend real sharp if you don't heat it, but when you mark it and heat it, you can't see the mark. "Not to worry." Set a block up with a clamp on your vice so when you stick the wire in the vice and against the block, it will line up with your mark at the edge of the vice. Now heat the wire red hot at the mark, stick it in the vice and tighten it up against the block, then bend it over and give it a whack with an old number 9 (a heavy hammer). Reset the block and do the next bend until each landing gear leg is done. If you set the blocks the same every time, both sides should come out the same (give or take .005"). Now it's bent but too soft, so heat each bend red hot again and quench them in water. Now it's too hard, "not to worry." Heat each bend again just until you see color come on the wire, then lay it down to slowly air cool. It should now be tempered and springy again.

Wheel Pants:

This is what's going to give your plane character. Cut out the 1/8" lite ply pieces and sand. Cut a piece of 1/8" sheet, 3/4" wide x 5" long, for leading edge. Put a line down the middle of it. Next, mark where the lite ply pant formers will glue to it, then cut the 1/8" by 1/2" lite ply trailing edge and mark where the formers will glue to it. Glue the trailing edge to WP3 and, when it's dry, glue WP3 to WP2 and set the angle by using a simple jig (see photo). Now glue the leading edge to the ribs on marks and line up with the centerline. Glue in the hook and lite ply block to hold it. Glue triangle stock at front tip. Now sand and fair the whole unit on that big piece of sandpaper you double taped down earlier, then


make up the 3/32" sheet skins. Run the grain vertically as shown on the plans. Form them around the frame and hold in place with rubber bands. When you have it in a proper alignment, "Hot Stuff" it in place. Install the wheels on your 5/32" landing gear wire legs with washers soldered on. You have to keep them narrow. Solder and fit the rear brace and the rubber band hooks. Install the landing gear legs into the wings. Mark the wheel pants right side and left side and fit them to the wing. I used a compass to scribe the pants to the wing. By scribing and sanding you can get a good fit, just take it slow. The wheel pants are held on with No. 6 rubber bands so they will give when they are hit. They also won't tear the wing up.

Tail:

I cut molds for outside pieces from plywood, 1/4" thick (actually I used two door skins for this, as they are inexpensive). Strip 12 pieces of balsa 1/4" wide and 1/16" thick. Make them a fat 1/4" wide so you have some sanding leeway. Soak the pieces in water and ammonia for a couple hours to make them pliable. Nail the forms on a flat surface and bend four strips around the forms at a time. Hold strips in place with pins. Put a small scrap of wood between the pins and the strips as you're bending them since they are soft and will dent easily. When they are dry, put wax paper under them and "Hot Stuff" them together. I used Thick Hot Stuff and did one strip at a time. Once these pieces are glued up, they are very strong. Now construct the tail components and sand to shape. One tip I can give you is to sand all four sides of each piece to remove the fuzzies. If you do not do this, these will fall off later and appear under your MonoKote as small lumps.

At this point I like to prepare the wing for covering. Aileron servo installed, ailerons hinged, landing gear, and wheel pants on. Next, I hinge my tail surfaces and install the control horns and get them ready to cover. I then figure where my pushrods will exit the fuselage and cut the necessary slots. I then take some scrap 1/4" balsa and tack glue it in place of the stabilizer and vertical fin. On each side of these pieces, I tack glue the blocks that will make the pieces that go on each side of the fin. The whole idea here is to hold these blocks where they will eventually go, so you can shape and sand them to look like a faired-in continuation of the fuselage. When finished shaping and sanding, split these apart and you should have two perfect fairings for your tail. Next, glue the tail surfaces and these fairing blocks in place. I find I can get a better glue joint if I do it this way; it's a little harder to cover but not that bad. Now you can install your servos. Mine were installed in the middle of the rear cut-out on F9. I used a Super Tigre .40 engine on all my models so if you use something else, yours may not balance like mine. I made the pushrods from 1/4" dowels. My radio receiver went behind the windshield and the battery behind the fuel tank. I mounted my

engine and cut the necessary hole in the cowl. The needle valve went through the front cowl ring. Wouldn't you just know it would? I had to triple the width of the plywood ring at that point and then drill through it (while saying sweet things under my breath about getting a remote needle valve). Assemble your whole plane and make certain that everything is working properly. You don't want any surprises after you are finished covering it. For balancing, I like to assemble the aircraft with the battery pack left out, then I use the battery pack for ballast to get the proper C.G.

I used MonoKote for covering the fuselage, wings, tail surfaces, and wheel pants. The cowl was glassed with light fiberglass cloth and painted, and the inside of the cowl, the fire wall, and the fuel tank compartment were all fuelproofed. I also drilled a hole in the bottom of the cowl and in the bottom of my tank compartment to get fuel out of the plane in case of leaks. The windows were cut from trim material and installed using a glass of water with detergent in it. The detergent gives you a chance to adjust the window placement before it sticks tight. Be sure and squeegee all the water out when they are properly aligned. I mark my C.G. point on the top of the wing, then turn the plane upside down and check it on those C.G. spots. I then slide the battery pack back and forth on the wing until it balances. In all planes with the engine side mounted like in this plane, I build a small box in the tip of the left wing to hold balance weights. I not only like my models to balance fore and aft, but also laterally. Now install your battery pack where it balanced and you should be ready to fly (well at least the plane is ready). Be sure and do a radio range check and control function check to ensure that all controls are moving in the proper direction. That tip could be worth the price of the whole model! 

**From
RCModeler
Feb. 1996**