This vintage aircraft, presented for the Sunday sport flyer, is an all-time favorite. It builds into a beautiful Stand-Off Scale model and flies like it looks.

MINI REARWIN
Designed By : Len Goldberg

TYPE AIRCRAFT
Stand-Off Scale
WINGSPAN
47⅝ Inches
WING CHORD
8 Inches
TOTAL WING AREA
358 Square Inches
WING LOCATION
High Wing
AIRFOIL
Modified 2412
WING PLANFORM
Constant Chord
DIHEDRAL, EACH TIP
1¾ Inches
OVERALL FUSELAGE LENGTH
34½ Inches
RADIO COMPARTMENT AREA
(L) 10" x (W) 2½" x (H) 3"
STABILIZER SPAN
19 Inches
STABILIZER CHORD (incl. elev.)
6" Average
STABILIZER AREA
72 Square Inches
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Mid-Fuselage
VERTICAL FIN HEIGHT
7 Inches
VERTICAL FIN WIDTH (incl. rud.)
6½" Average
REC. ENGINE SIZE
.10-.25 Cu. In.
FUEL TANK SIZE
4 Ounces
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
4
CONTROL FUNCTIONS
Rud., Elev., Ail., Throt.
BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa, Ply
Wing	Balsa & Ply
Empennage	Balsa
Wt. Ready-To-Fly	48-50 Ounces
Wing Loading	19-20 Oz./Sq. Ft.

THE MINI-REARWIN M-6000

Photos By Dick Tichenor ***Color Photos By Woody Woodward***

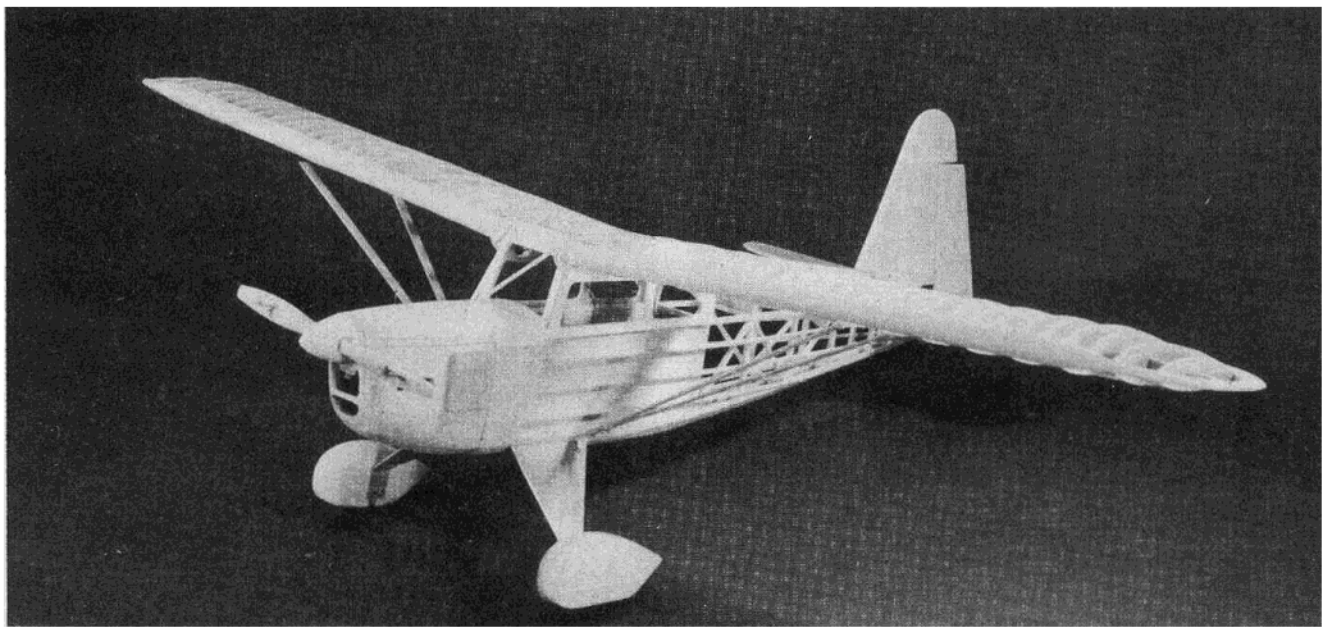
It was 1944 and I had just come home with my treasure from the local hobby shop. A 30" span Megow Rearwin Speedster with "Motor Hum Device!" (How's that, nostalgia lovers?) I could hardly wait to get out the razor blades and bandaids, and start my new project . . . a plane that only a decade before failed to go into production. (Only 20 Speedsters were ever built.) I didn't care and I liked the looks of the plane and it soon became one of my favorites. The Megow model flew well, and I scratch-built another. (I still have those Megow plans.) Now, my 13 year old son wants to build the Rearwin, but I'm getting ahead of myself.

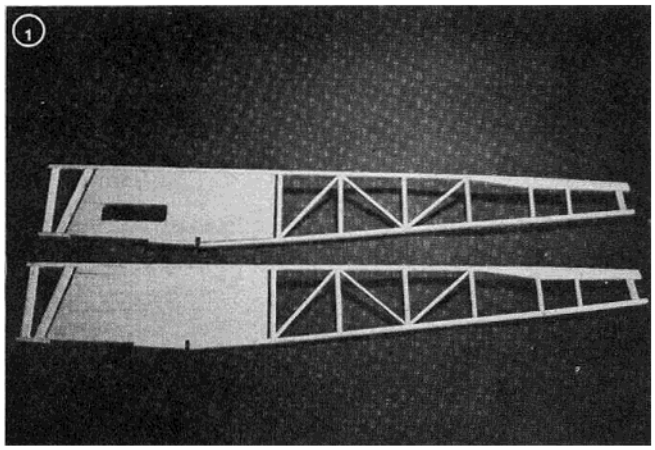
It wasn't until March of 1967, while looking through a model magazine, that I came upon the Rearwin, magnificently sculptured by Woody Woodward! This 64" span R/C model rekindled a glow I had 23 years before, and I just had to build the Rearwin again! Out came the razor blades and bandaids. Woody's plane just fit the bill for me, as I had a Super Tigre .46, and a PCS radio, with tin can servos. My son, seeing the model of the Speedster, wanted a small Rearwin, but which version should we build? The 30" span Megow was too small, and the construction was too light for a 1/2A version, and Woody's was too big, and besides that is Dad's plane!

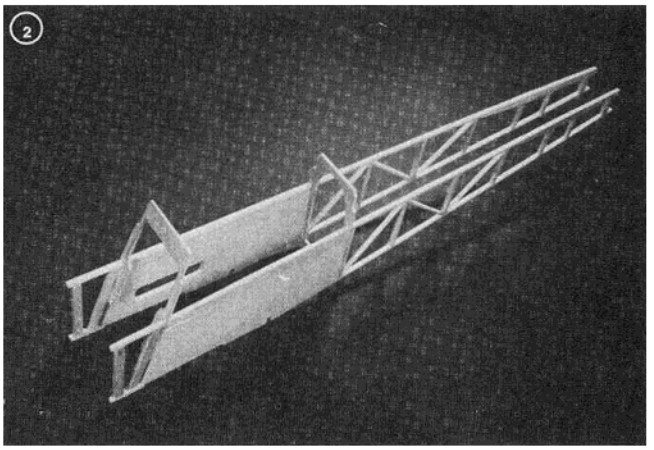
We decided to compromise, and build a 3/4 scale version of Woody's Rearwin, and power it with a K & B .19; RC guided by a Futaba radio.

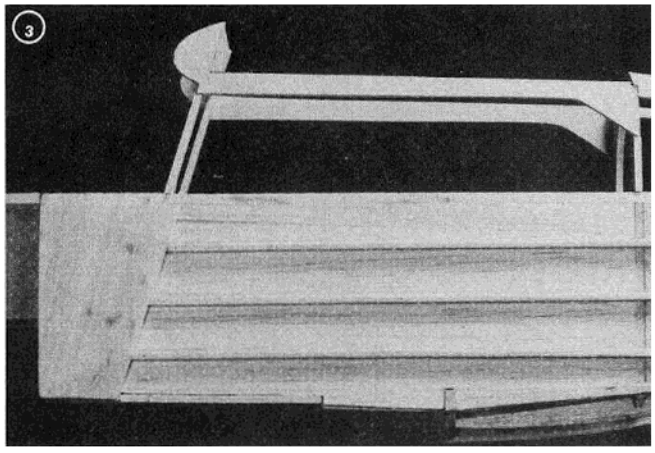
Several weekends at the drawing board yielded another Rearwin Speedster a "Mini Rearwin" with a 47½" span! Again, out came two sets of razor blades and bandaids, and together we started to scratch-build the Rearwin. Scratch-building has always been fun for me, because somehow it seemed less costly to build the plane from scratch than from a kit. With today's balsa prices at the hobby shop, now I wasn't so sure it was less costly. I wondered if balsa could be bought from a lumber company, and if it would be cheaper that way. I found my answer, and it is a resounding **yes**.

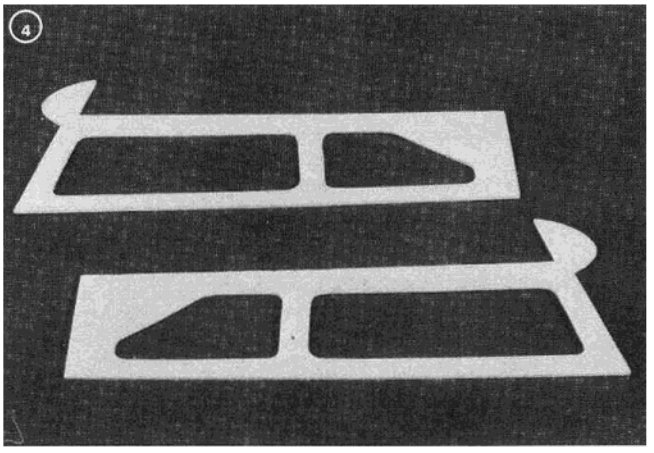
A lumber company near me, called M & M Hardwood, 5344 Vineland Avenue, North Hollywood, Calif. 91601, sells balsa of varying grades at $2.50 a board foot. Most pieces they have are 3' to 4' long and about 3" by 3" square. (Yes they will mail order, just send them shipping money, or they will ship C.O.D.) I bought a 3' section for about $5.75 and tried cutting it myself. If you have access to a bandsaw, the task is easy. In about a half hour, I cut most of the wood needed for the Mini Rearwin. Leading and

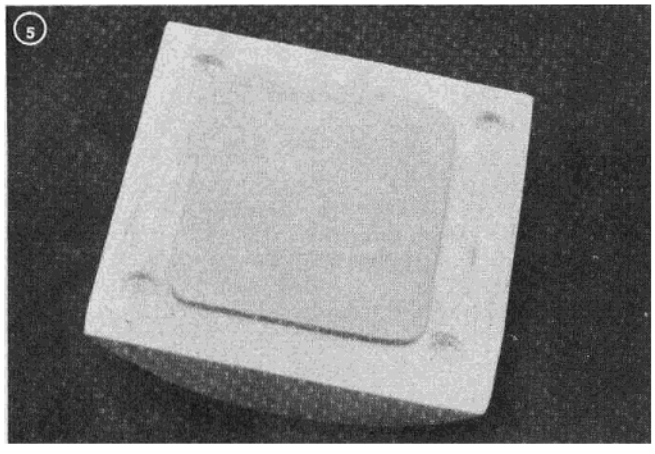


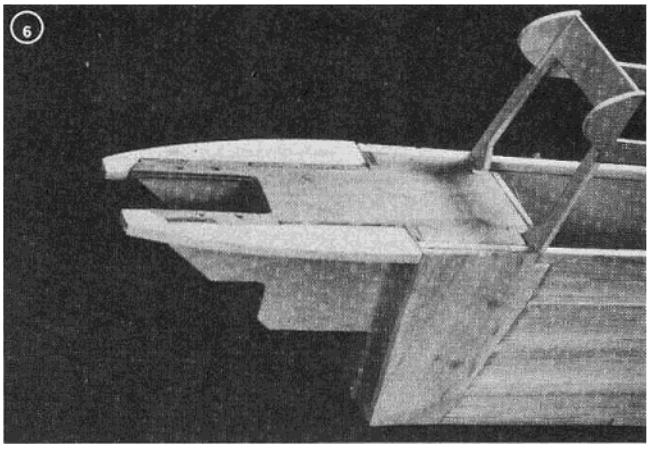

1

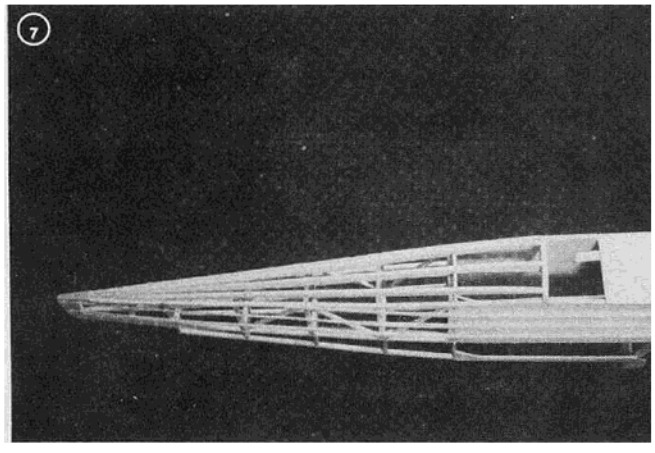

2

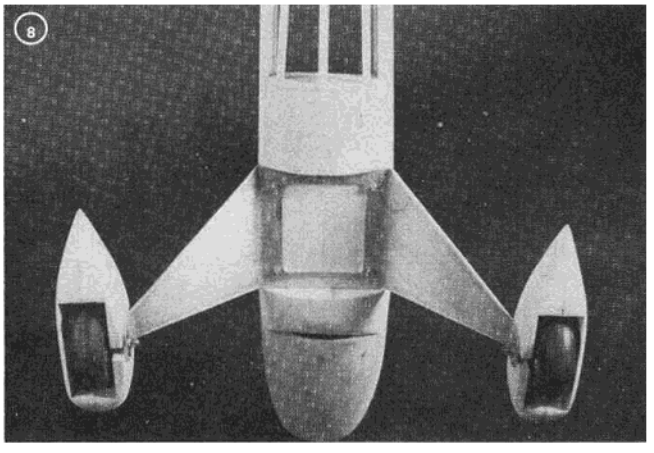

3

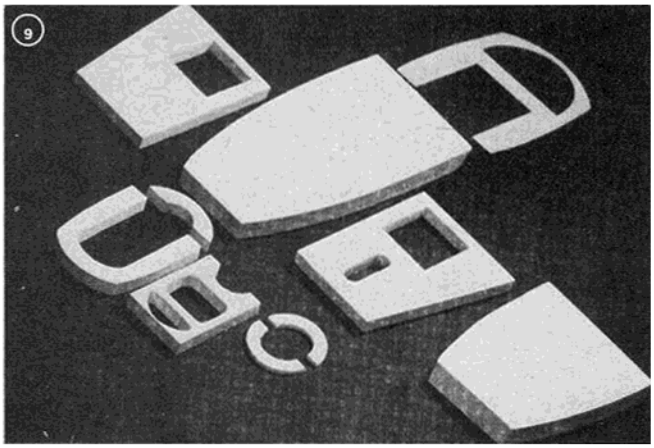

4

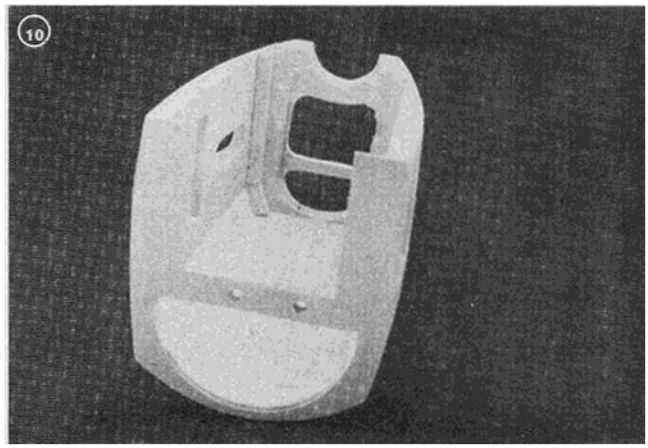

5

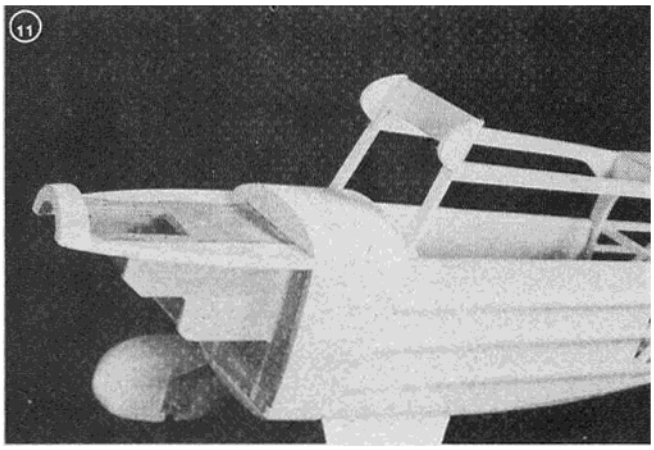

6

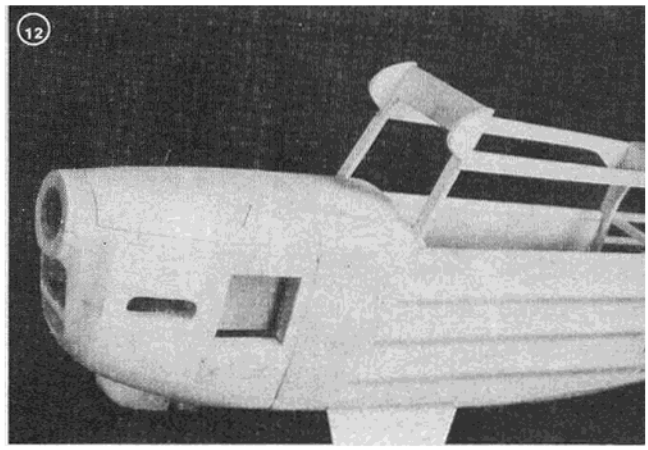

7

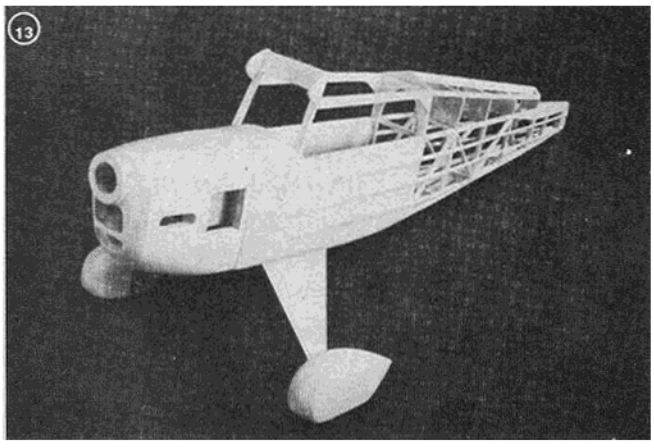

8

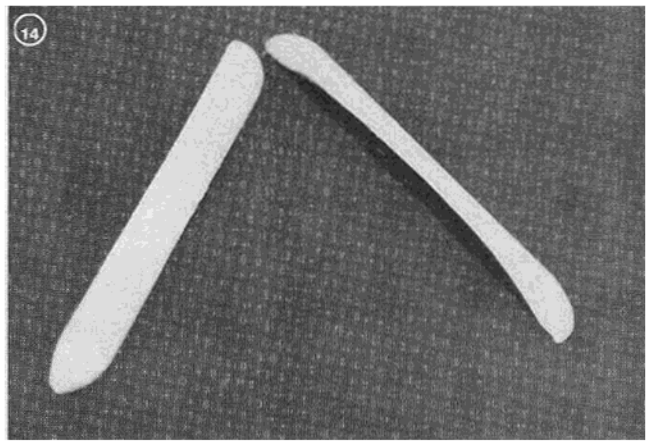

9

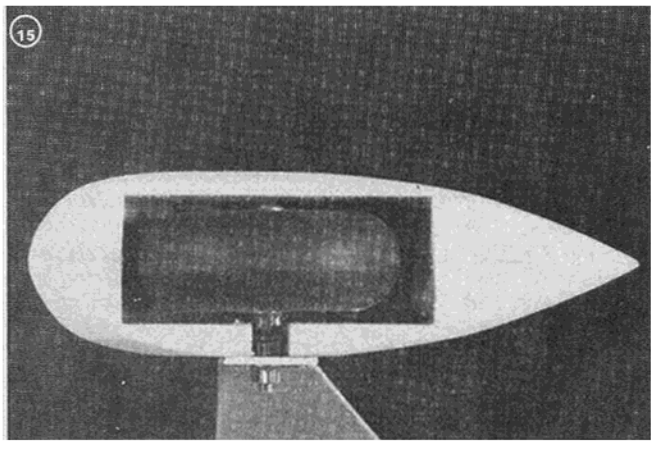

10

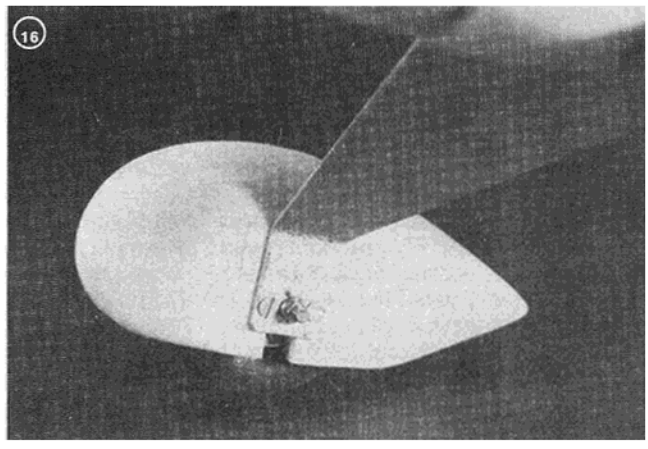

11

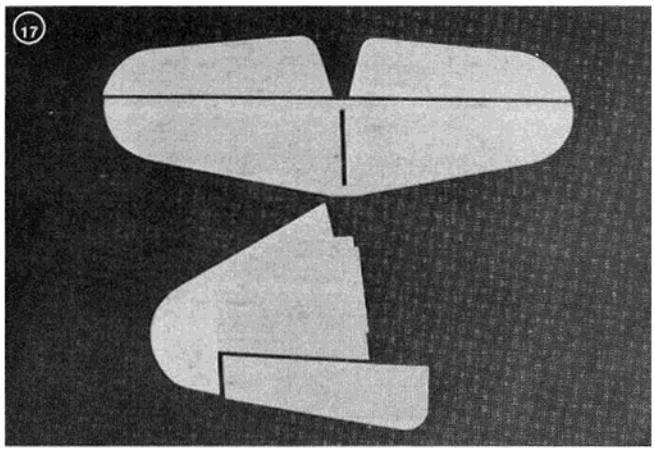

12

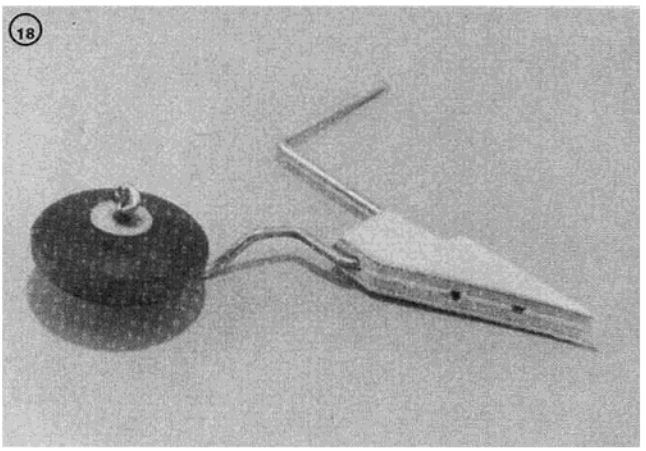

13

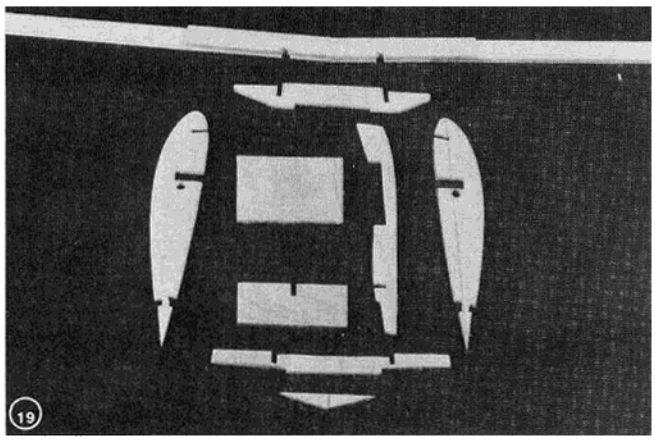

14

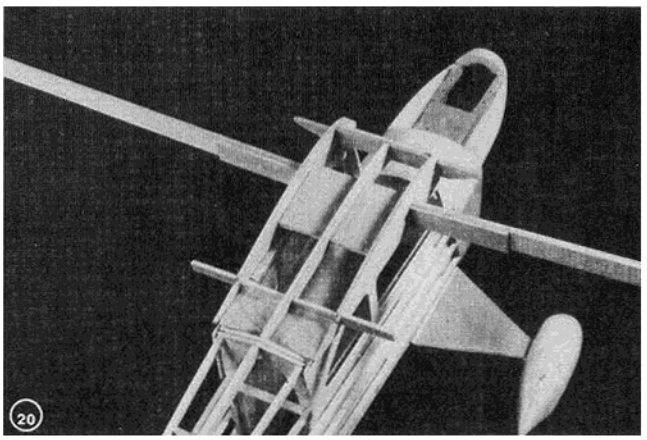

15

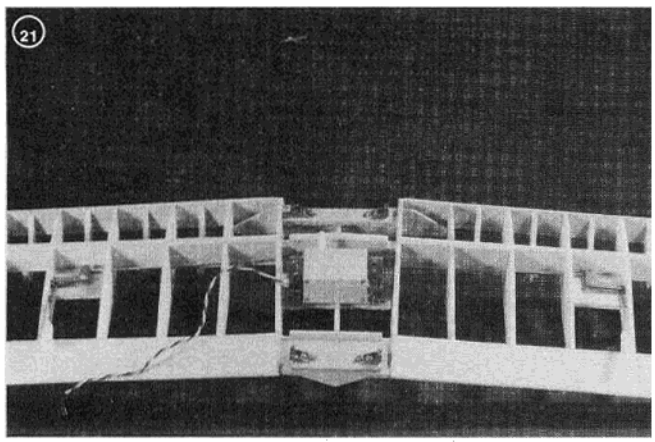

16

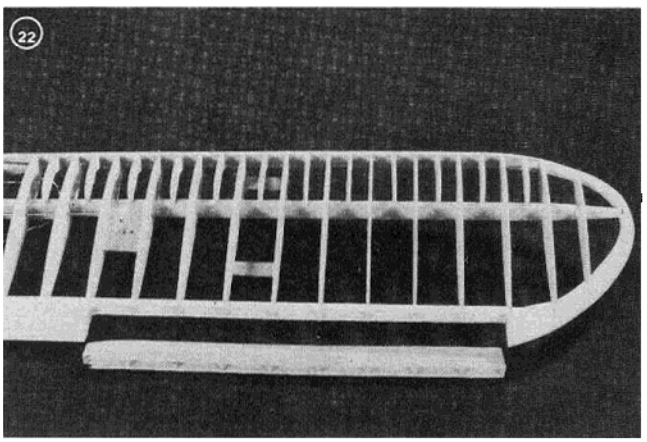












trailing edges for the wing are a snap, and the cost is fractional.

The Mini Rearwin was finished in early March, 1978, and I took it down to the local hobby shop to show the plane to the would-be test pilot, Chuck Smith. His comments were glowing, and he summed up the plane in one word, **impressive!** Several guys at the shop identified the plane as a Rearwin Speedster, and all, without hesitation knew it was a scratch-built. Several wondered if it would be kitted, and I said I didn't know . . . maybe.

A Sunday date was set for the first flight, providing the weather was good. We arrived at the Sepulveda Basin, the local flying site at about 10:30 in the morning. A slight 10 mph breeze was coming out of the south.

I called Woody Woodward the Thursday before, and he brought his camera with him and took some field shots. Woody checked the balance and weight, and guessed it would fly just like his larger version, but a little faster.

The moment of truth finally came, and we fired up the K & B .19 (with Perry carb), and adjusted it for a slightly rich mixture. Charlie checked the idle, we proceeded down the taxiway, and turned onto the main runway. The Rearwin taxied like an obedient pup, and stopped at the north end of the runway, as Charlie throttled back to an idle. I stood at the side of the runway, and through my mind flashed the entire sequence of events leading to this moment. From the concept on the drawing board, through the construction phase, the final check-out, and now the first flight. Charlie eased the throttle forward. The re-creation of a bygone era moved quickly down the runway, and winged skyward into a left turn. Charlie quickly leveled her out at about 150', and the Mini Rearwin streaked passed us in a straight and level flight.

Charlie grabbed a little more sky, and made a left turn about a quarter mile north of us, and brought the Rearwin around and overhead. The Rearwin flew rock steady, and did not show any attitude change at low throttle. This told me that the 0° down incidence on the engine was okay. Charlie flew a few more laps around the field, and then

throttled back, lining the Rearwin up with the runway. The Rearwin then settled in softly, for a smooth landing.

Charlie's comments were that the plane flew very well, with good, quick response. A slight right correction in the linkage was all that was needed. I provided about a 2° toe-in in the landing gear (thank you Dave Lloyd) as suggested by many who gave me advice during the construction of the Rearwin. This helped the ground handling characteristics of the plane.

The Mini Rearwin has all the stability of Woody's larger version, but the response and flying speed is a little quicker. I agree with Woody --- the Rearwin is the best and most stable high wing scale monoplane I have ever seen!

The Rearwin is not a difficult plane to build, but don't expect to build it in one weekend! The construction is a typical stick and stringer concept, and the fuselage is constructed on a Warren Truss design. No special tools are required, but a table type jig-saw or band-saw would be helpful, as there are quite a few plywood parts. Well enough of this chit-chat, let's build a Mini Rearwin.

THE FUSELAGE

( ) Cut out laminates F-1 (1/16"ply) and F-2 (1/8" balsa). Make two sets, one left hand, and one right hand.

( ) Bond the halves together. If you use an aliphatic resin glue, be sure to clamp the halves together between two flat surfaces, and allow to dry for at least 24 hours to prevent warping.

( ) Cut out F-3 and F-4 from 1/8" ply.

( ) With the ply on the inside, cut the port for the switch, charging jack, and glow plug jack on the right panel of the F-1 and F-2 laminate.

( ) Start construction of the right fuselage side with the F-1 and F-2 laminate and 3/16" square medium balsa. See Photo 1.

( ) Use F-3 and F-4 as a spacer gauge in locating the vertical braces on the side panel. See Photo 2.

( ) When the right side panel is complete, lay waxpaper on top of the right side panel, and construct the left panel on top of the right panel.

( ) When both panels are complete, remove from the plans and separate. Sand slight taper on inside surface of side panels at tail, at angle shown on plans.

( ) Cut out firewall from 3/16" ply.

( ) Fit firewall, F-3 and F-4 to fuselage sides. Align and glue F-3 and F-4 to sides. Do not glue firewall at this time. Allow sides to dry. See Photo 2.

( ) Cut out 3/16" cross braces and 1/8" bulkheds F-6, F-7, F-8 and F-9.

( ) Carefully draw the fuselage sides together, glue and clamp tail end together with clothespins. Shift this joint slightly to be sure the bow on both fuselage halves are equal.

( ) Install cross braces and bulkheads. Be sure to set lower cross braces at F-8 and F-9 in from the bottom to fit lower longeron.

( ) Install 3/16" x 3/8" balsa top longeron, 3/16" square side top stringers, and wedge braces.

( ) Cut out 1/8" ply F-13 (2 required) and glue to F-3 and F-4. See Photo 3.

( ) Cut out 1/8" ply landing gear plate. Fit to side laminate cut-outs and double glue in place. (Double gluing is applying glue to both surfaces, working the surfaces together, parting the surfaces, wait a couple minutes, applying more glue, and pressing the parts together. Clean up excess glue.)

( ) Cut out two F-11 from 3/16" balsa and glue in place.

( ) Cut out two F-12 1/16" ply window panels. These will be installed later, but will be used in fitting the cowl and wing. **Do not** cement in place. See Photo 4.

( ) Cut out F-16 3/16" balsa former and glue in notch in laminate.

( ) Cut out 5/8" balsa bottom block. This can also be made of 1/4" and 1/8" sheet and laminated. See Photo 5.

( ) Cut out M-1, M-2, M-3 and M-4, plywood motor mount and tank parts. Carefully fit these parts to the firewall. When all parts fit, double glue the entire assembly to the firewall, and resin coat all surfaces, except the edges of M-1 where F-14 and F-15 will be attached, and edge of firewall which will attach to fuselage. (M-1 shown, fits K & B .19 RC.) See Photo 6.

( ) Cut out 3/16" balsa F-14 and F-15.

( ) Drill 3/16" diameter hole in rear corner of tank compartment for engine pushrod.

( ) Double glue engine mount, F-14 and F-15 to fuselage. See Photo 6. Use rubber bands to insure a tight fit.

( ) Cut out F-17 and fit to 3/16" x 3/8" bottom longeron. Install by butting up against F-16.

( ) Install the other two 3/16" x 3/8" bottom longerons. See Photo 7.

( ) Lightly tack glue 5/8" bottom block to fuselage, up against F-16, and shape to fuselage contour. Fair in longerons at this time. (Tack gluing will allow the bottom block to be removed after shaping.)

( ) Cut out landing gear from .062 (1/16") aluminum alloy sheet. Drill and form as shown on the plans. Use aluminum T3 or T4.

( ) Remove the shaped bottom block.

( ) Line drill the 1/8" ply landing gear mounting plate, using the landing gear as a template.

( ) Install landing gear using 4-40 screws 5/16" long, and #4 flat washers and 4-40 self locking nuts. Free spinning nuts can be used, but epoxy them in place on final assembly. See Photo 8.

( ) Relocate bottom block, and cut it into three pieces to fit fore and aft of the landing gear. See Photo 8. Glue the fore and aft piece in place.

( ) Cut or sand 1/16" off the center section of the bottom block so it will line up with the fore and aft sections.

( ) Press the center section lightly into the protruding nuts on the landing gear so as to mark the nut locations.

( ) Using a 1/4" or 5/16" drill, lightly drill the nut locations on the bottom block for clearance. See Photo 5.

( ) Cut out a 1/16" plywood plate which will fit in the cut-out in landing gear.

( ) Position the 1/16" plywood plate in the landing gear cut-out, applying glue to the top side only, and press the center section of the bottom block onto the 1/16" ply plates, and hold for a few minutes.

( ) Remove the plate and center section, being careful not to shift the plate. See Photo 5.

( ) Install side stringers and taper to fuselage contour. The side stringers may be tapered prior to installing on the fuselage, if you like.

This completes the basic fuselage construction.

NOSE COWL AND HATCH

( ) Cut out the nose cowl and hatch parts C-1 through C-10. See Photo 9.

( ) Hollow out C-9 to clear cut-out in C-6. Rough shape front of C-9. See Photo 10.

( ) Glue C-4, C-5 and C-8 together and clamp until dry.

( ) Fit C-4, C-5 and C-8 assembly to C-9, C-1, C2 and C-6. Check this assembly of balsa blocks to be sure that it fits square to the fuselage. When everything looks okay, glue the block assembly together, but not to the fuselage. Use masking tape, clamps and/or rubber bands to be sure you have good strong joints.

( ) Rough shape the cowl to the proper contour. Do not finish shape at this time.

( ) Glue C-3 and C-7 together. Use fuselage for alignment, and hold cowl in place to be sure C-7 and C-8 are flush, then glue C-3 and C-7 to fuselage. See Photo 11.

( ) Bevel the back of C-10 to form the instrument panel.

( ) Fit the beveled end of C-10 so that it clears the bulkhead F-3 and fits behind C-3. If you get a little sloppy around F-3, use wood filler to cover up your sins.

( ) Tack glue C-10 and the lower cowl assembly to the fuselage and sand, shape and carve to the final shape. See Photo 12. When shaped, cut out hatch in C-10.

( ) Tape window panels F-13 in place and shape F-11 to fit the stringers and cowl. See Photo 13. (Window panel was omitted in this photo.)

( ) Remove cowl and F-10 and reinforce inside of cowl as shown in Photo 10.

( ) Install engine and fit cowl to engine.

( ) Locate engine needle valve on

cowl by projecting lines from the top and front.

( ) Drill needle valve clearance hole.

( ) Check prop spinner for about 1/16" clearance and fair in nose cowl to follow spinner contour.

( ) Cut out louvers from 3/8" doweling. Cut in 1/4 sections and shape as shown in Photo 14. These are functional louvers for engine cooling. Glue louvers in place.

THE WHEELS AND WHEEL PANTS

( ) Attach the 2¼ wheels to the landing gear, using 8-32 screws 1¼ long as the axle and three 8-32 lock nuts. See Photo 15.

( ) Cut out (two sets) WP-1 (1/16" ply) and WP-2 (1/2" balsa), but do not cut out wheel socket. Clamp glue these pieces together. When dry, cut out wheel socket. Save the cut out part.

( ) Cut out two pairs of WP-3 from 1/8" balsa. Cut out 1/8" x 1⅛" ply insert. Fit insert into WP-3 as shown and clamp and glue. When dry cut out clearance notch for axle nuts.

( ) Cut out WP-4 from 1/4" balsa. Clamp and glue WP-1 and WP-2 to WP-3 and WP-4. Insert cut out plug from WP-1 and WP-2 into cavity to provide support during clamp and gluing.

( ) When wheel pants are dry, remove plugs and cut approximately 1/4 wedge from each side of plug, and glue this wedge into corners on the inside of the wheel pants for backup. See plans.

( ) Shape wheel pants to final form.

( ) Install wheel pants with #4 woodscrews approximately 1/4" long. Adjust wheel so it is in center of wheel pants. See Photo 16.

THE WINDOWS AND WINDSHIELD

( ) Paint or MonoKote the cabin area F-3, the instrument panel, the exposed areas of F-13 and window panels F-12. Add 1/8" dowels behind front windshield.

( ) Cut out front windshield from .015 plastic sheet to pattern shown. Fit windshield to fuselage and trim for proper fit.

( ) Epoxy front windshield to top of F-3 and partially down top of F-13. Tape or clamp securely and allow it to dry.

( ) Epoxy side of windshield to side of F-3 and pull tight so no gap is visible on top of cowl. Clamp and hold until dry. No epoxy is necessary to bond windshield to cowl. However, if you feel more secure, epoxy it in place.

( ) Cut out side windows and epoxy to side window frames F-12. Add 3/32" x 3/16" balsa strip to inside lower edge of F-12. This will act as a stand-off for proper window position.

( ) Epoxy side window frames to fuselage, and tape in place until dry. Add stringers top and bottom to give side window frames a smooth transition to fuselage side.

THE RUDDER, STABILIZER AND ELEVATOR

( ) Cut out the rudder, stabilizer and elevator from 3/16" balsa. Glue pieces together and sand to proper contour. See Photo 17.

( ) Bend 1/16" music wire as shown and install it in pre-drilled hole in elevator. Cut a groove for wire to nest in and epoxy in place. Be sure the elevator is flat before final assembly.

( ) Cut slots for hinges (four on elevator and three in rudder). Add the third hinge in rudder at end of fuselage. Epoxy in place at final assembly.

( ) Cut a 1/8" balsa plate to fit under tail assembly. Cut this wedge shaped plate 1/8" oversize, and bevel as a fillet between the fuselage and the stabilizer.

( ) The tail assembly can be covered or finished at this time, and installed on the fuselage. Epoxy the 1/8" balsa plate to the fuselage and the underside of the stabilizer. Also, insert the rudder, and epoxy to stabilizer. **Caution!** Be sure rudder and stabilizer are in square alignment. If you are using MonoKote, be sure you have bare wood contact at all joints!

( ) Install tail wheel assembly. See Photo 18.

THE WING

( ) Cut out the 3/16" x 3/4" hard balsa main wing spar, and 1/8" plywood doubler W-10. Double glue the spar halves together, and double glue and clamp W-10 to the spar. When dry, cut notches in spar.

( ) Cut out all 1/8" plywood wing parts WR-1, W-5, W-6, W-7, W-7A, W-8, W-9 and W-11. See Photo 19.

( ) Fit all the plywood parts together on the fuselage. See Photo 20. Be sure to allow a little clearance so assembly can be removed easily. Use of masking tape as a shim on fuselage is sufficient to provide gap.

( ) Double glue all plywood parts being careful not to glue it to fuselage.

( ) Cut out leading and trailing edges from balsa stock specified. Cut angles as shown and notch for ribs.

( ) Cut out all ribs from 3/32" balsa. The false ribs may be omitted but they do make the plane look nicer. Stack the balsa and cut out all the ribs at one time. Sand and shape, notch for spars and drill 1/4" hole for pushrods.

( ) Pin down one side of the spar assembly on the plans, and install the ribs, leading and trailing edges. Check that all parts fit and that the leading and trailing edge butts at the correct angle with WR-1. If everything fits, glue the ribs, spars, leading and trailing edges. Glue aileron fillets in place, false ribs and 1/8" ply wing strut supports.

( ) Repeat the above procedure for the other side.

( ) Cut out two sets of wing tip parts W-1, W-2 and W-3 from 3/16" balsa. Glue tip part together on plans, not on the wing.

( ) Carefully slip wing tip assembly through notches in WR-5 and WR-6. Fit tip to leading edge and glue in place. Cut out W-4 (5/8" balsa) and attach to wing tip, and WR-4. Glue in place.

( ) Cut 1/8" x 3/16" hard balsa rear spars and glue in place.

( ) Cut top and bottom 1/16" balsa trailing edge sheeting and glue in place.

( ) Sand and shape leading edge, wing tips, trailing edge and fair in W-4 to wing tip and trailing edge.

( ) Fit wing onto fuselage and attach 4-40 right angle anchor nuts to 1/8" ply plates. W-5 and W-7A (1/8" ply x 5/8" wide cut to fit.) Locate nuts so they fit close to the inside of F-13. (Esna anchor nut p/n 52LHA227-40 or equivalent purchase from Elastic Stop Nut Corporation, 2330 Vauxhall Road, Union, New Jersey 07083.) See Photo 21.

( ) Locate anchor nut position on F-12 window panel using line projection method as in cowl construction. Drill 1/8" hole in F-12 both sides. Secure wing with four 4-40 screws 1/2" long.

THE WING STRUTS

( ) Fabricate two wing struts from 3/32" x 3/8" spruce. Make wing struts 1/2" longer than shown on plans. Shape and sand struts before joining, then double glue pieces together.

( ) Cut out aluminum gusset plates from .020 aluminum, and epoxy or screw in place.

( ) Form gusset plate as shown on plans and secure to landing gear with 4-40 screws 1/4" long, 4-40 nuts and #4 lockwashers.

( ) Trim ends of strut to fit against 1/8" plywood strut supports in the wing.

( ) Cut plastic hinge in half and drill for 0-80 screws. Locate and drill holes in strut and mounting plate.

( ) Mount hinge to wing after lower portion of wing is covered, but before you cover top. Use 0-80 locknuts or epoxy nut in place.

THE AILERONS

( ) Mark the outline of the ailerons on the top surface of the trailing edge sheeting. Locate the ends of the ailerons on the inside surface of ribs noted on plans. The outer edge of the spar can be located by probing through the trailing edge sheeting with a pin.

( ) Cut the aileron straight, on the marked lines. See Photo 22. A 1/4" drill can be used to change saw blade direction. (At least 3/8" to 1/2" of the aileron will be trimmed off.)

( ) Cut two pieces of 3/8" square balsa, tapered as shown on the plans, and as long as the ailerons.

( ) Cut two pieces of 1/8" x 5/8" balsa strips and glue to the edge of the spars on the inside of the aileron cut-outs. Sand flush with sheeting.

( ) Measure the depth of the aileron cavity and cut aileron, with top side down, so that the aileron plus the 3/8" tapered strip will fit flush in the aileron cavity when viewed from the top.

( ) Glue tapered strip aileron. Use masking tape to hold tapered strip firmly to aileron. Sand flush when dry.

( ) Install three hinges per aileron. (Epoxy in place during final assembly.) Notch aileron to provide a snug fit between the aileron and the wing.

( ) Cut out 1/8" plywood bellcrank platforms (2) and install bellcrank (bellcrank can be made from 1/16" formica or can be any 1" bellcrank). Locate bellcrank as shown on plans.

( ) Install pushrods through 1/4" diameter holes in ribs. Pushrods can be made from lightweight (swaged) bicycle spokes with end bent at right angle. Also, form pushrods from bellcrank to aileron horn. See Photo 21.

( ) Draw a straight line from the bellcrank to the aileron. Locate the 1/8" plywood plate previously glued in aileron and temporarily mount aileron horn with #2 woodscrews 1/4" long.

( ) Connect the linkage together and find the proper angle for the bellcrank plate. Glue plate in place and back up with 3/16" square balsa on the backside of the plate.

( ) Cut 1/16" ply exit plates and cut 3/16" wide slot for pushrod exit. Locate and glue plates in place.

( ) Check all linkage movement and be sure there is no binding. **Important**! Check with servo installed. Left stick should produce left aileron **up**!

( ) Install 1/16" balsa sheeting to top center section of wing. Sheeting is installed on top of W-9 and flush with WR-1.

This completes the basic construction of the Rearwin.

COVERING

( ) The Mini Rearwin is strong enough so that any of the plastic iron-on coverng materials can be used. Follow the manufacturer's instructions accompanying the material you use. If you use silk, silkspan or Silray, be sure you seal the balsa with two or three coats of dope first, sand it thoroughly, then apply the covering material. The cowl and wheel pants are painted. Seal the wood with two coats of sanding sealer and three coats (minimum) of clear dope. Sand with 600 sandpaper between coats. Then apply two coats of color and trim as desired.

BALANCE

( ) With the airplane complete, engine installed, and wheels and wheel pants on, place the battery pack at the rear of the cabin, above the servos. Then lay the servos and receiver inside the fuselage. Move the servos (mounted to servo tray) fore and aft until the desired balance point is found. (See the plans for the recommended Center of Gravity.) Mount the servos inside the fuselage at the position that gives you the desired C.G. If a change in C.G. is found necessary after the first flight, weight can be added to the nose or the tail. Prather Products has some lead bar weights, mounted on double stick tape which are useful for this purpose.

Good Luck!! I hope you find your Mini Rearwin is as much fun as mine. □

From RCModeler Oct. 1979