Buzzer

Buzzer is a classic cabin model with exceptional performance. Model makes flights of over 20 minutes routinely. Buzzer is rock stable and controllable at the limits of vision.

Sport/Old-Timer Electric

By Bill Winter with John Hunton
Color Photography By Bernie Stuecker and Tom Schmitt

Classic lines of this traditional model show up in this view. Performance is surprisingly good for a "cabin" model.

BUZZER

Designed by:
Bill Winter and John Hunton
TYPE AIRCRAFT
Sport/Old-Timer Electric
WINGSPAN
57 Inches
WING CHORD
8-3/4 Inches
TOTAL WING AREA
485 Sq. In. (Approx.)
WING LOCATION
High Wing
AIRFOIL
Flat Bottom
WING PLANFORM
Constant Chord
DIHEDRAL, EACH TIP
2-1/2 Inches
OVERALL FUSELAGE LENGTH
38-1/2 Inches

RADIO COMPARTMENT SIZE
8-1/2" (L) x 2-1/4" (W) x 2-1/2" (H)
STABILIZER SPAN
23 Inches
STABILIZER CHORD (inc. elev.)
6-1/2 Inches
STABILIZER AREA
140 Sq. In. (Approx.)
STAB AIRFOIL SECTION
Flat Bottom (Lifting)
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
7-3/4 Inches
VERTICAL FIN WIDTH (inc. rud.)
6-1/4 Inches (Avg.)
REC. MOTOR SIZE
Geared 05 Electric
BATTERY SIZE
7-Cell/1400 mA
LANDING GEAR
Conventional

REC. NO. OF CHANNELS
3
CONTROL FUNCTIONS
Rud., Elev., Throt.
C.G. (from L.E.)
3-1/2 Inches
ELEVATOR THROWS
3/8" Up — 3/8" Down
AILERON THROWS
N/A — N/A
RUDDER THROWS
1-1/4" Left — 1-1/4" Right
SIDETHRUST
0°
DOWNTHRUST/UPTHRUST
4° Downthrust
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa & Ply
Wing ..... Balsa & Ply
Empennage ..... Balsa
Wt. Ready To Fly ... 43 Oz. (2 Lbs. 11 Oz.)
Wing Loading ..... 12.76 Oz./Sq. Ft.

LEFT: Bill Winter with the classic Buzzer electric powered model. Lines of the best full-scale 1930's airplanes are seen in the Buzzer, yet performance is fully contemporary.

BELOW: The classic Buzzer and the advanced Hummer were laid out for the same propulsion system. Both models perform very well, the Buzzer having the edge in stability and the canard Hummer the edge in stall stability. Both models are capable of extended flight. Bill Winter on left, John Hunton on right.

Bill Winter dedicated his life to model aviation through writing, editing, designing, and encouraging contributors. Bill was involved in design from the very earliest modeling days. There is an aesthetic continuity in his creations ... you can see a model of his and readily recognize it as "Winter." There was a sense of proportion in his designs that captured the very essence of the "Golden Age" of aviation. He achieved this perfection through iteration. He would begin the basics of a design with proven wing loading, areas and moments, then overlay it time after time refining the design until it became what he had really visualized.

One September afternoon when Bill launched his Buzzer into the clear sky, as we watched it climb out he said, "Isn't that just beautiful?" And it truly was.

Bill designed a companion model, the Hummer (January 1999 *R/C Modeler*). One afternoon when I dropped by Bill's house for our weekly meeting, his son Mark said that Bill had been taken to the hospital earlier that day. I noticed that the latest copy of *RCM* with the Hummer was in a stack of unread mail. I took the magazine to the hospital to show Bill. As we flipped through the pages of the beautifully presented Hummer article, a big wide grin came across his face and tears formed in his eyes. "That is a good one," he said.

The next day he was gone.

John Hunton

CONSTRUCTION

To build a light airframe that is efficient, yet structurally sound, several different sizes of wood of various weights are required for specific applications. It is normally expected of the builder to review the plans carefully and obtain the required wood in the proper amounts before building. There are many good suppliers who advertise; some will grade wood for a small charge. Wood sizes are given on the plan and are not covered in the narrative. To assure equal strength, cut all longerons from the same sheet or select and match the stick material carefully.

Study the fuselage construction photos. Note that internal frame C is built over the section detail on the plan. When this frame is glued to the inside of the fuselage sides, it makes a strong former and accurately jigs final assembly. Formers A and B are aircraft (Birch) ply. You will need a jig saw or coping saw to cut out B. Fuselage side sections at the landing gear and wing hold-downs are filled in with sheet which is installed before the sides are lifted from the board.

Pin down one side over the plan. Use carefully matched and selected material for the longerons for equal bending later in the process. Use a straightedge to align straight portions of the longerons. Do not pierce the longerons with pins, straddle the wood. Single pins, however, can be used to install verticals and diagonals. Add all nose and fill sheet parts. Build the second side directly over the first using wax paper between to prevent adhesion of the sides.

When completely cured, lift the frames from the bench and separate where necessary with a balsa knife or razor blade. Block-sand the surface of each side flat. Add doublers to the nose portions (be sure to make opposite sides), noting that there are additional inner doublers. Pin down the right side flat on the board. Glue former C into position against the upright. Glue ply bulkhead B to the side sheeting and against the rear face of the upright. Cut out small balsa right angle triangles and use to align both sections. Make sure the opposite side dry-fits to frames B and C before gluing it in position.

Cut out the plywood landing gear plate, drill holes and install. Install the wing hold-down plate at former C (this part will be drilled and tapped later). Build-up the battery support platform and servo mount structure. Add the landing gear boxes (see detail), then the

During seventy-odd years of designing user-friendly "RPV's" of the third kind, it became written in stone that unique pleasures require specialized craft to fit a variety of flying environments including, if you will, the bedlam at the club site on some Sundays. When you have the opportunity to float beneath the puffy clouds, nursing air currents, sticks untouched, or nudging them while watching your bird come alive, you realize that "flight" is made sublime by an occasional out-of-body experience. R/C itself may be the common denominator, but in its own world the Buzzer is as good as it gets.

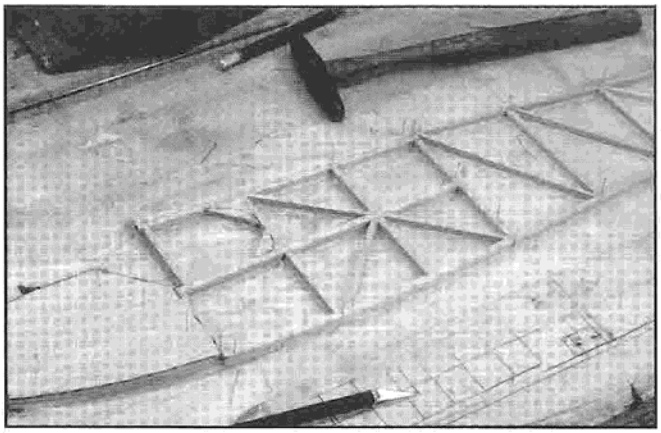
Power is a Master Airscrew 2-1/2 to 1 geared "can" motor turning a 12 x 8 folder with seven 1400 mAh cells. With that heavy pack, weight is 43 oz., wing loading is 12.76 oz./sq. ft. on an area of 485 sq. in. Span is a big 57", chord is 8.75". Guys who built my Goblin used everything from an 8 x 6 direct to, lordy, a 15 x 12 with a smorgasbord of cells and gear ratios. With Buzzer we are talking duration of both run and glide.

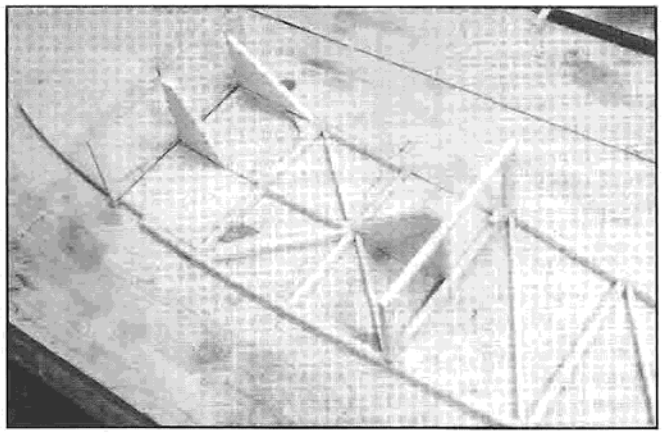
Buzzer has a pedigree. I designed a 30" one for CO_2, published on a fold-out center-spread plan in the December 1948 Air Trails. In more recent years Don Srull rescaled it to 26" for plan sales with the mini 6 HiLine motor when he was associated with that company. Its area was 100 sq. in. Dave Reese, now the HiLine man, markets that plan for $3.50. Power is the Micro-4 motor. So now 50 years later, finding these pretty variants such good fliers, I've designed this enlarged version to delight all "plane watchers" ... Bill Winter

Bill Winter designed and built this "classic" model while I was teaming with him on his more "contemporary" Hummer design. It was with great surprise that I watched Bill take the Buzzer off on its maiden flight. It climbed quickly into the base of the clouds and was thermalling before I knew it: this cabin model with its ungainly long landing gear.

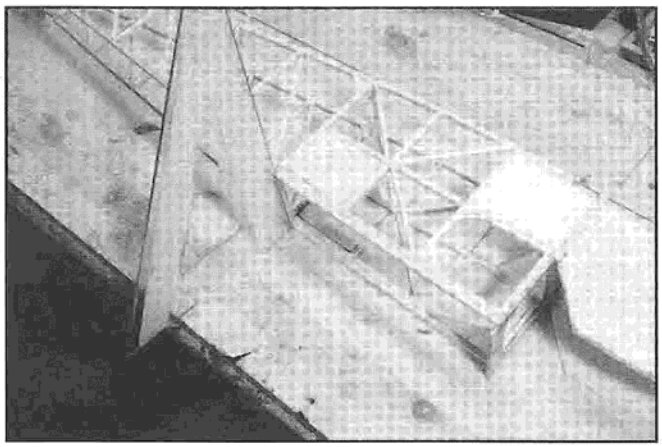
Surprising performance aside, the Buzzer design evokes the era in general aviation of frenetic creativity where iterative design methodology was pushing the performance envelope of "rag-wing" aircraft to the limit. The 1930s can be seen in the Buzzer from any aspect. The gentle curves and efficient ellipses are in stark contrast to the straight line, tin can designs of yesterday and more in line with the curves of modern composites.

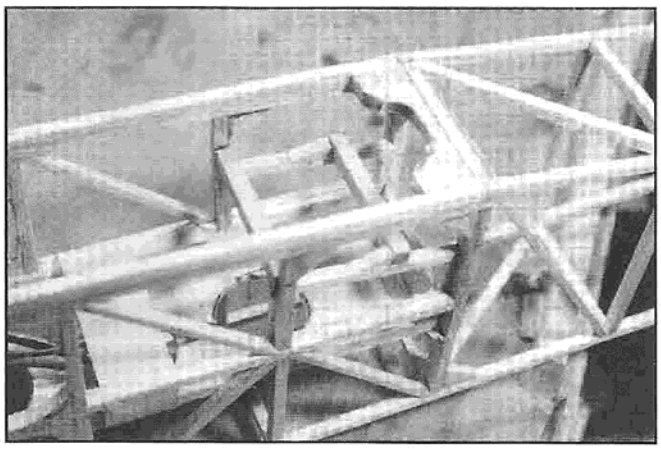
In working with Bill, I have come to realize that there are many joys beyond pure performance ... joys involving the quality of flight. The Buzzer gives us that ... John Hunton





LEFT: Fuselage sides are built on top of each other for perfect alignment. Wax paper is used to separate the sides. Cabin gussets are installed in the rough and sanded to final inside shape with a Dremel sanding drum after fuselage assembly. RIGHT: Formers B and C are installed (note small balsa triangles used for good verticality).

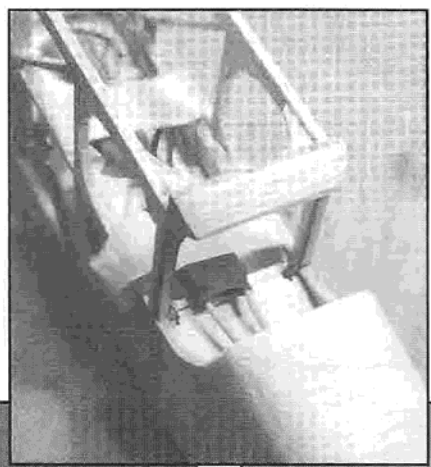




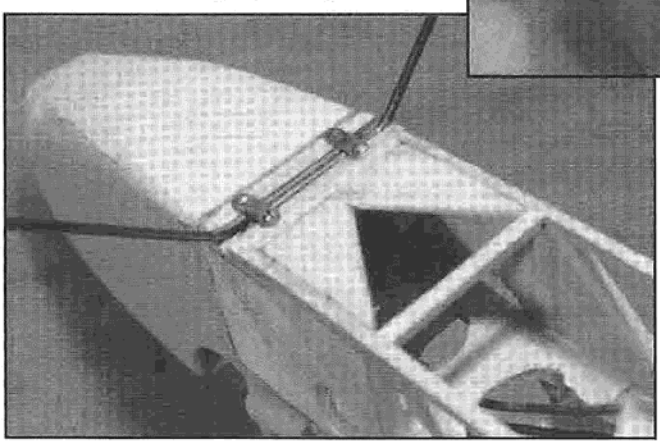
LEFT: Basic fuselage box is completed using a drafting triangle for good alignment. RIGHT: Framed-up servo tray is mounted over the battery box bottom. Wing hold-down screw plate is installed but not tapped for screws yet.

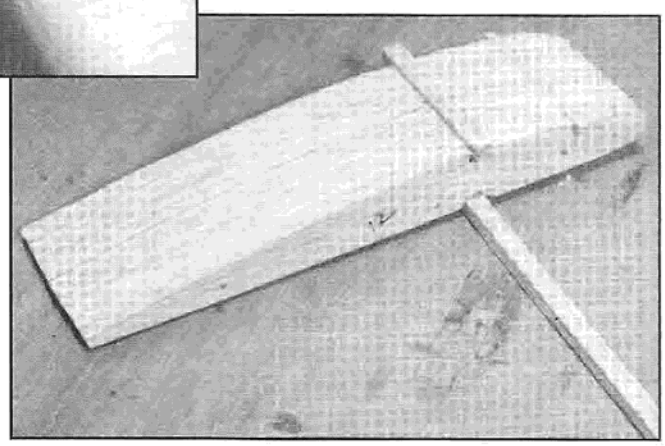
nose former A, using light rubber bands to hold sides snugly against it. Leave the nose top open. Add all crosspieces in the parallel side area. Do not add the cabin (B) windshield capstrip until later.

The rudder post line must be exactly on the fuselage centerline and, when viewed from the rear, it must be vertical. Mark a centerline on formers B and C. Select a perfectly straight strip of wood for a guide and pin or spot glue it on the centerline marks; long enough to reach past the rudder post. Pull the rear together and pin (and adjust) until accurate, then glue together. Add top and bottom crosspieces. Be certain that each pair is the same length. If one appears to be too short, put light rubber bands around the fuselage to pull sides snug. Use pins through the longerons, if necessary, while gluing.

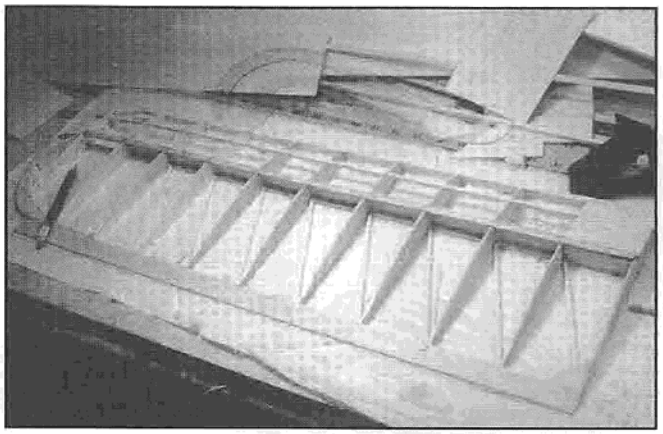


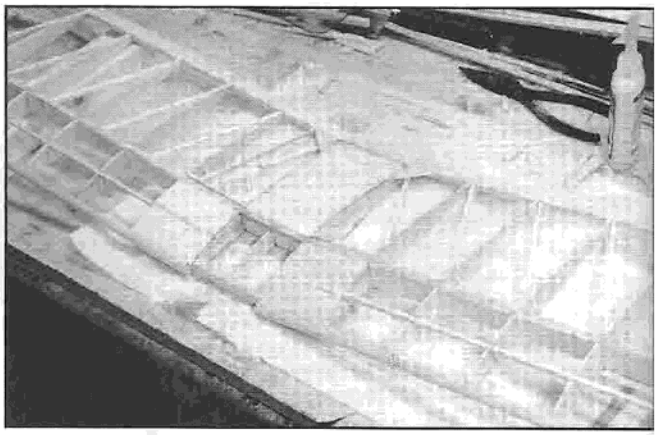
RIGHT: Framed fuselage shows final shaping. Top cabin fairing is not installed until after wing hold-down dowel hole has been drilled, ensuring proper alignment.





LEFT: Landing gear wires are staggered and inserted into side plate boxes for temporary assembly before final covering. RIGHT: After cutting out basic wing ribs of common shape, they can be installed on a stub spar for final shaping with a sanding block. Trim trailing edges flat also.





Outer wing panels are built separately, then joined to the flat center section at the proper dihedral angle. Plan shows detail of how to build in some washout at each tip ... washout helps stall stability.

Cover motor holes with tape, then install the motor (with its brushes toward the sides of the plane) and the switch harness with the down switch position being on (yes, positive gravity forces can turn a switch off). Cement the fuzzy part of a Velcro pad (full battery length and width) to the battery platform. Add top nose corner pieces and sheeting (see detail for cross section). Carve away excess wood and refine the shape of the nose with medium, then fine sanding board and pad.

The nose block is made of two vertical sections, split on the centerline, from laminations of light 1/4" sheet. Tack-glue together on the centerline for outside shaping. Then separate at the tack-glue points and hollow out. Glue the sections back together. Epoxy two hardwood anchor pieces to the firewall to take the two nose block mounting screws.

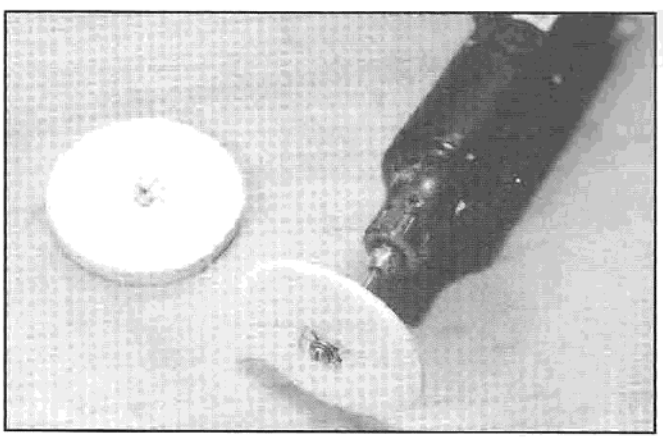
Mount the servos, then make up pushrods grooving them to match the clevis wires. Bend clevis wires 90° and insert into slot in balsa pushrod. Wrap joints with thread and coat with medium CA. Be sure that machined threads extend far enough into clevis to allow for adjustments in both directions. Temporarily attach and shape top windshield blocks making room for wing dowel insertion.

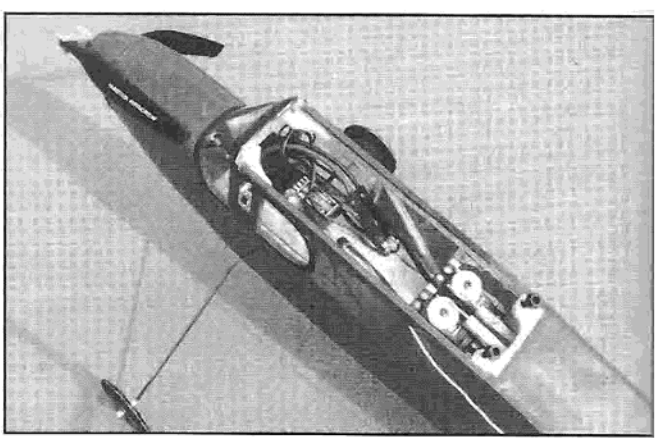
To cut the tough 1/8" landing gear music wire, use a Dremel tool and a grinding disc or cutoff tool (mine is a Tuf Grind AC4 for up to 30,560 rpm). Goggles should be used. In any case, keep the plane of rotation at right angles to your face in case of grinding wheel breakage. Do not use heavy pressure when cutting. Dress cut ends with a small file.

A 5" vise provides enough "anvil" for serious banging with a hammer. Clean the wire near bend points and cut-offs, then mark with a felt-tip pen at the bend sites. File a small notch in your vise jaw so when you bend a wire a small radius is provided to prevent stress fractures. Pull the wire in the direction of the bend and tap with the hammer to cold-form the wire. Check frequently against the outline on the plan. Start with the inboard ends for bending, then allow extra axle length to be cut off to suit wheel thickness plus wheel collars.

Wheels are made up of two thicknesses of 1/8" lite ply laminated with predominate grains at right angles. Drill axle holes before final rounding. A nut will clamp the wheel blank to a machine screw which can then be clamped into a hand-held rotary tool chuck. The wheels are easily shaped with scraps of fine sandpaper on this hand-held lathe.

Cut brass or aluminum bearings from tubing with a K&S tubing cutter, a fine Zona Saw, or by rolling under a single-edge razor blade. Force the bearings through the holes, apply epoxy, then push a washer over the tubing on each side to the wood. Don't





LEFT: Wheels are turned on a Dremel Tool and shaped with sandpaper. Balsa wheels were replaced later with lite ply wheels shaped the same way. RIGHT: Internal equipment layout is typical with Battery Eliminator Circuit (BEC) used. We use temperature probe to check extent of battery charge. Note Master Airscrew 12 x 8 folding propeller, high quality Sermos connectors.

get epoxy inside the bearing holes.

Trial-fit both landing gear legs, drill for and install the hold-down straps, then remove for covering.

Stabilizer

Cut out and pin down the tip segments, then the leading and trailing edges. Install the bottom center section sheeting. Note that ribs are designated A, B, and C. The B ribs can be stack sanded. Fit and glue all ribs in place with the two A ribs resting on top of the center section sheeting. Add C ribs. Install the top spar then complete top center section sheeting. Cut in hole for fin spar. Shape and block-sand all edges, then sand the tips with a sanding pad.

Cut elevators to outline from light 3/16" sheet. Taper to a 1/16" trailing edge with a sanding block. Drill holes for the wire joiner yoke, recessing elevators to receive this wire. Shape leading edges to a vee. Lay elevator assembly against the stabilizer and mark hinge locations, then make hinge slots with a #11 X-Acto blade. Assemble elevators to the yoke with epoxy and pin down against wax paper and a straightedge.

Fin and Rudder

Pin down firm wood for leading edge and spar, noting extra length required for mounting. Cut crosspieces for snug fits. When the glue has cured, lift from board, round the leading and trailing edges and tip piece. Cut rudder to outline and block-sand to a 1/16" trailing edge taper. Shape leading edge. Slot rudder and fin for hinges and dry-fit. Lightening holes are recommended, but are optional on rudder and elevator surfaces.

Wing

The wing has two panels and a separately built center section. Butt ends of the main spars help form a box into which the joiner ends are inserted and glued at final assembly. The "diamond" leading edge is installed after the ribs, spars, trailing edges, and bay diagonals have been assembled.

Use firm balsa for wing spars. Select straight grained wood and the straightest pieces that you can find for the spars. If the spars have any bow at all, place the bows in opposition at the top and bottom.

Trace off the rib outlines and cut out all ribs. The method we used to cut out the ribs follows: apply a light coat of 3M spray adhesive onto the traced rib patterns, apply patterns to a sheet of medium 1/16" balsa, apply a light adhesive spray to the balsa sheet and apply that sheet to another matched sheet, etc. Cut out the stacked ribs on a band saw, peel off the outline, block-sand the matched ribs lightly, then separate and mark each rib. If you do not have a band saw, cut out a 1/16" ply template for marking individual ribs and cut them out by hand. Stack the full length of ribs on a stub spar, sand them lightly, and trim the trailing edges even.

Pin down the bottom spar against a straightedge to prevent wavering. Using one rib as a spacer, pin down the trailing edge, again checking with a straightedge. Note that rib B allows for 1/16" sheet forward of the spar in the root rib bay. Place tip parts with a 1/8" shim under to produce tip washout.

Erect ribs (except E) on the bottom spar, checking verticality and trueness with a small triangle. Tilt the root rib using the provided dihedral gauge. Locate, but do not glue, the top spar which extends to rib D. Check top of the spar with a straightedge, then glue joints as far as the outermost rib C. Bend down the remaining length of spar and glue to rib D. Install rib E and the spar extender. Install the "turbulator" spar as shown. Glue spar webs between ribs and spars as indicated.

Install all diagonals. At the root, fit 1/8" sheet balsa fill piece between spars where shown to complete the joiner box. Cut away the root rib to expose the box. Use appropriate scrap to check the box-spar fit.

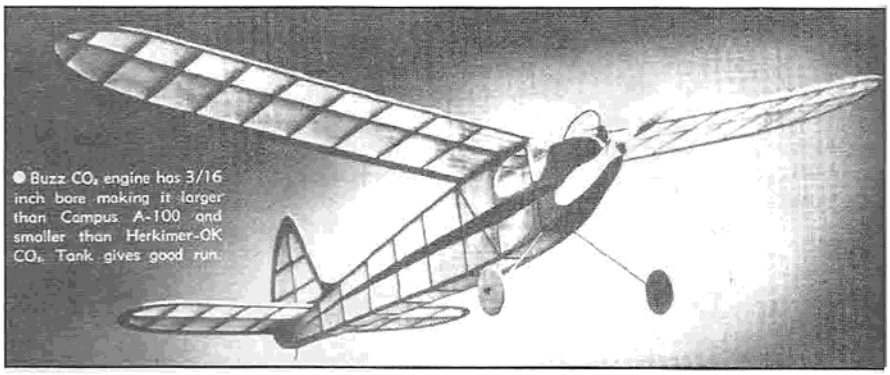
Dry-fit the diamond leading edge into the rib notches. Trim any ribs as required. Pin the LE to the board, holding snug against the ribs while gluing the joints. Sheet the portion of the root bay between the spar and L.E. and apply remaining sheet.

To build the center section, pin down the bottom center sheeting piece for the center section; it is exactly 2-7/8" wide by 5-1/8" long. Glue it to the bottom rear face of the bottom spar. Add a similar piece at the front of the spar 2-3/16" long. Glue both ribs A in place at right angles (90° to the work surface). Cut out the ply spar joiners from aircraft ply (not lite ply) and glue to the front face of the spar. Install the top spar, then the web which fits against the front edge of both spars. Fit the 1/8" balsa fill strip between the spars, flush with the rear edges. Dry check the joiner for a close sliding fit into the wing boxes. The bottom edge of ribs B should butt against the edges of the sheeting.

Cut out, but do not install, the hold-down dowel plate. Drill the dowel hole as indicated. Immediately behind the dowel plate is a 1/4" sheet support to which it will glue. The support glues to the top of the bottom sheeting, and its top is shaped to match rib A. Glue in the center front partial rib. Complete the top sheeting.

Trial-fit each outer wing panel to the center section and check for proper dihedral (trim joiner if required). There is a tolerance of 1/8" in dihedral, but both sides should be equal. Block-sand the butt end of each wing panel for a close fit. When the joiner slides properly into place, it is glued. Place a small amount of epoxy on the tongue and slide into place. Withdraw it immediately and re-coat with epoxy. Put a bit of epoxy into the box and along the root rib. Join the panel and center section using pins and/or small clamps as needed. When epoxy is set, repeat for opposite outer panel. Trial-fit and epoxy dowel plate into place.

Mate the wing to the fuselage with pins and/or rubber bands. When aligned, the wing hold-down dowel hole is drilled from the front of the cabin bulkhead, and through the dowel plate. Begin with a 1/16" dia. drill to establish the center, then use progressive drills (by 1/16") to enlarge the hole to dowel size. The drill will simultaneously cut a groove in the bottom of the wing center section sheeting, which allows dowel alignment. Remove the wing and epoxy the dowel through the hole and into the groove. Recheck that the wing is



aligned in top view, then drill holes through wing and plate to take 3/16" nylon bolts. Remove the wing and enlarge its holes to clearance diameter. Tap the fuselage plate as required.

Pre-assembly

It is wise to do some additional work before covering the airframe. With the wing mounted and the fuselage sitting flat on the bench with the tail propped up, fit the horizontal stabilizer to the fuselage. Trim and block-sand the seat until the stab sits parallel to the bench. Pre-fit the fin using a triangle to check that it is vertical. Do any final touch-up sanding on the airframe, then cover.

We used Oracover's transparent films for covering. Follow directions for application closely. The main ingredient for success and long-lasting film application is to install it under tension by pulling it and tacking it at many places around a panel. After the panel edges have been sealed, do not soften the edges and relax the built-in tension. Use Coverite's BalsaRite on sheet surfaces and edges for good adhesion. After covering the empennage, dry-fit control surfaces for alignment and free movement. All hinges should be thin Mylar or nylon. A drop of CA on each side of each hinge joint should be sufficient. Install control horns and complete the final assembly.

Flying

The C.G. must be exactly as designated. Shift the batteries as required to bring C.G. on line. In standard rigging with a non-lifting stabilizer, the center of lift is behind the C.G., so that a download to trim must be exerted by the horizontal tail for aerodynamic stability. The lifting tail, as used on the Buzzer, is not normally used on full scale aircraft, but is a throwback to the efficient Free Flights of many years ago. This allows the center of lift to be forward of the C.G. so that the horizontal stabilizer must exert an upward force to compensate for stability. Since all force vectors point upward, Buzzer is quite buoyant, both under power and in the glide -- it is a real floater.

Use of the lifting tail is poorly understood and it has an undeservedly bad reputation. As a rule of thumb, the percentage of airfoil section thickness should never exceed 50% of that of the main surface. A flat bottom wing airfoil, as in the Buzzer, requires at least 3° incidence in this case. The lifting tail is not used with anything not flat bottom. If the plane tends to "tuck" with speed (easily controlled with the large elevator), more angular differential is needed. If the C.G. is wrong, or the plane requires up trim with power-on vs power-off down trimming, it can be unflyable.

We concentrate on techniques for optimum performance, beginning at the point where you are familiar with the feel of the plane. Power management is critical. Do not expend all power in one gigantic climb -- it may go 3000 ft. high. Rather, when at a comfortable altitude for extended gliding, shut power down. Such cruise control allows for several renewed climbs, extended thermalling, and reserve for late tight approaches.

Climb out straight from launch. If you have to hold stick pressure, fine-trim the clevis involved after you have come down. Best climb is about midway between stall speed and maximum climb angle. Gyroscopic effects of the propeller mass causes better performance in left-hand power climb circles than right-hand. In glide there is no difference. Fly upwind and when there is sufficient distance to complete a wide, shallow turn about halfway back to you, establish such a turn with rudder trim. When about 300 ft. high, shut down power. If speed increases, maintain speed with up trim -- or even back stick if necessary. Maintain circle with rudder trim, intervening with stick if reaction is too slow. Fly with trim only whenever possible, finding the best combinations. In open country on a warm day, thermals will find you.

Upon entering a thermal, the plane will speed up and bank tighter. Use a touch of up trim as your judgment indicates.

When drift is too great for soaring, "wind-surfing" is the way to go. Establish a straight line in the sky at right angles to the wind, extending outward, for example, from left to right. Fly that line with enough crab to prevent drift, turning upwind as you near an extension point. Never allow the nose to swing downwind across the line, but open the circle at about the 270° point to come back on line -- like a hang glider working a cliff. When altitude and space permit an occasional 360°, come back in to the "climb bump" with a delicate touch of up. Down can plateau the rise. Strong wind can be worked, even power off, by flying a series of slight S's, alternating about 5°-10° left to right with the average path straight upwind.

When gliding in calm air, try gentle up trim until you discover the best glide speed for conditions. Judge the resulting sink rate, not speed over the ground. Thermal seeking ability is enhanced by varying the relative amount of washout in the tips. For example, use roughly half the designated washout in the right tip. The plane will still stall straight ahead and the tip should drop first only in a forced, severe, abrupt stall. In normal flight the plane will tend to turn right into thermals.

If you get caught in a "boomer," immediately fly a straight line toward yourself to get out of the thermal, using slight down. Thermalless area lift may extend up to 1500', with an occasional thermal spike drifting through. If the plane suddenly tends to change its turn on its own, don't fight it. It has sensed a nearby thermal. In powerful lift a spiral will not get you down; you might have to try "stuff." You begin a rudder spiral, held for a 180° turn, then gently use opposite rudder for another 180°. Speed will increase, but the plane will progressively get more on its back with each segment, approaching split S attitudes. If all inputs are gentle, and the ship is allowed to fly itself through the split-S hands-off, you need not reach "red-line." A lot of people will want to know how you did that! Over the years I have learned to blend wingovers and spiral dives and have never broken or lost an electric when doing this.

In its world, the Buzzer is as good as it gets!

✈