



You have to look hard and long before you realize that this is a profile model—scale details add considerably to this deceptive appearance.

Our young pilot is about to fire up Cox Tee Dee .020 engine—first flight should be made with prop on backwards to reduce power and rpm.



# famous profiles

by PAUL DELGATTO

OUR FAIRCHILD 24K IS A WORTHY ADDITION TO OUR OUTSTANDING LINE OF FINE FREE FLIGHT PROFILE SCALE MODELS.

► One of the prettiest civil aircraft ever produced is the famous Fairchild 24K whose useful life span extended from the mid-thirties until the post-war period. In fact, the popular Fairchild cabin-job may still be seen at some airports. Functional and well streamlined, the 24K could boast a point-to-point time on cross-country that is fairly comparable with some of today's machines.

The proportions of the 24K, and a classic simplicity of line do not detract from its pleasing look, make it a perfect subject for a fine-flying model. Presented as a profile type for .010 to .02 engines, our model looks surprisingly life-like due to its three-dimensional cowling.

## CONSTRUCTION

**Fuselage:** The profile portion of the fuselage, extending between the firewall and the rudder, is cut from a 16½" long, 4" wide piece of ¼" medium-hard sheet balsa. The body and all outlines can be (Continued on page 38)

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traced directly from the fullsize plan.

Portion above the wing is actually glued to the wing and removable. However, disregard this cut-out for the moment. In cutting profile, allow some extra material for a smooth contour.

Round off the corners as follows: from the front of the windshield forward to the firewall, leave the fuselage perfectly flat. From same point, but on the bottom of the fuselage, round each edge to at least a  $\frac{1}{8}$ " radius. On top, from the front of the windshield, to a point just past the leading edge of the wing, round off very slightly at the corners but, from the wing leading edge all the way back to the rudder, round off similarly to the bottom.

Using a balsa knife or single-edge razor blade, cut the section where the wing will be located. For accuracy, and don't tilt the cutting edge sideways, make repeated light cuts and save the cut-out section.

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Drill a  $\frac{1}{16}$ " diameter hole where landing gear passes through fuselage, also  $\frac{1}{8}$ " holes for the wing hold-down dowels.

Sand fuselage with fine paper, using a rotary motion to insure against sanding grooves in the wood.

**Cowling:** First, prepare formers C-1, C-2, C-3 and C-4. C-1 and C-2 are four laminations of  $\frac{3}{32}$ " sheet balsa, cross-grained for added strength. C-3 is the  $\frac{1}{8}$ " thick plywood firewall. C-4 is in two half sections from  $\frac{3}{32}$ " thick sheet balsa. Note that the rear ply of the laminated nose piece is slightly smaller all around, so that the stiff paper cowling cover will fit flush.

Before shaping the nose piece (C-1, 2) drill a hole for the engine shaft, then enlarge the hole with either a round wood rasp or sandpaper wrapped around a dowel or other round object.

The engine should be mounted on the firewall with small wood screws before assembling the cowl, this can be done after the firewall is glued to the fuselage front, but before the cowling is closed in. Should you wish to substitute a nut plate for mounting bolts, this can be done before assembly.

Begin the cowl assembly by cementing the two pieces of former C-4 to the fuselage sides and the firewall to the fuselage front. Locate the two  $\frac{3}{32}$ " sheet balsa pieces (C-5) that help lock C-3 and C-4 in rigid alignment. Cement in position the  $\frac{1}{8}$ " sq. at the cowl bottom and sides. With these as a guide it is easy to attach the nose piece C-1, 2.

Although original model required no thrust line adjustments, the ship can be flown without the cowl until such adjustments as required are made. Stiff paper cowl cover may be spot glued for engine access, after which the paper may be cemented firmly in place. Engine cut-out hole in the stiff paper is given on the pattern. Make small drain hole in the paper under the engine.

**Wing Mount:** This consists of two shaped  $\frac{1}{4}$ " square balsa mounting pieces, one is glued to each side of the fuselage, and two  $\frac{1}{16}$ " plywood wing mount pieces which fit into shallow notches cut into the fuselage top. The side and top shapes of the balsa strips are taken from the top and side views. The plywood pieces appear on the top view. Cross section of the balsa pieces is given in a cross-sectional view.

Note that the mount, when finished, should provide a shallow Vee at the top to match dihedral angle of wing. Wing mount pieces are cracked at center, with each half then bent up slightly to accommodate dihedral. To make the crack, press down on the plywood with some sharp, but not knife-edged object. Joint will be rigid when the wing mount pieces are glued in position.

Make the holes for the  $\frac{1}{8}$ " wing hold-down dowels; cut the dowel pieces to length but do not install until the fuselage has had one coat of clear dope. Landing Gear: bend it to shape from  $\frac{1}{16}$ " music wire and work through the hole already drilled in fuselage. The wire is laced to fuselage with sturdy nylon or dacron thread. It is easy to make two small rows of holes to take this stitching. Give the joint two coats of cement.

Cut the wheel-pants fairings from  $\frac{3}{32}$ " sheet balsa; sand smooth, slightly rounding the edges. These are laced and glued to the wire strut as shown. The  $\frac{3}{32}$ " landing gear braces are streamlined in cross section: i.e., they are rounded at the front, and tapered in a curve to the rear edges. Make a shallow groove in each where it

fits over the wire, glue in place and, when dry, re-coat with another coat of glue joint of wood and metal.

The  $\frac{13}{16}$ " diameter wheels are retained on the axles either by soldering a washer over the axle ends, or by wrapping end of axles with thin thread which is then cemented.

Bend the .040" diameter tail wheel axle to shape, mount the  $\frac{1}{2}$ " tail wheel (using a soldered washer or thread wrapping to retain it) and glue to the fuselage. A small piece of cloth tape (U-control hinge material is ideal) prevents wire from breaking loose.

**Tail Surfaces:** Cut both fin and rudder and stabilizer from  $\frac{3}{32}$ " sheet balsa. Leave fin and rudder flat where they are attached to fuselage, but round off the leading edge when you sand the material smooth, and sand to a moderate taper near the trailing edge. The edges of the stabilizer are rounded and shaped in similar fashion.

Cement the finished stabilizer in place; check alignment with a triangle or other right-angled object. Now cement the fin and rudder piece in place, again checking alignment. Wood filler can be molded with the finger tip where the  $\frac{1}{4}$ -in. thick fuselage meets the front of the  $\frac{3}{32}$ " thick fin.

**Wing:** Cut out the two wing panel blanks from  $\frac{3}{32}$ " thick medium hard balsa sheet. It is important that you select a wood grain that will allow the panels to be formed easily for the required camber. Each panel is  $13\frac{3}{4}$ " but allow an extra  $\frac{1}{8}$ " in length which can project beyond center rib—this will provide material for sanding the center end of each panel to match rib line.

Sand wood lightly to smooth finish and mark positions of ribs on the panels. To incorporate the camber, either steam the wood over a kettle, holding it bent while it dries, or coat the bottom side of the wood with clear dope. The dope will bend the wood when it dries. In either case, more than usual bending should be done. This will simplify attaching the sheet to the ribs, whereas insufficient bending will require forcing the work.

After cutting the ribs,  $\frac{3}{16}$ " sheet for the two center ribs, and  $\frac{3}{32}$ " sheet for the other ribs, cement all ribs in position. Note how the four  $\frac{1}{8}$ " thick fill-in pieces are tapered in cross section to match the camber after which they are cemented between the center ribs and the ribs immediately outboard.

To provide the dihedral, sand inner ends of each panel to fit against each other and it correct angle. Pin down one panel flat on the bench, then elevate the other panel five" at the tip, cement between the end ribs where they butt together. When dry, glue strip of cloth tape over center joint on top of wing. Allow to dry and coat again with cement.

**Wing Struts:** Knock-off struts are essential, as the wing is intended to detach upon a hard knock. One thirty-second music wire fittings are attached to the struts ends, fitting into small lengths of  $\frac{1}{32}$ " inside diameter tubing on the wing. Tubing pieces are glued to the wing and are retained by small pieces of cloth tape. At the fuselage end of the struts, a small rubber band can be passed through the body to hook over the wire fittings on each strut. Hole in the body can be any convenient size, to match large neoprene tubing, a piece of soda straw, etc.

**Painting and Finishing:** Raw wood surfaces require at least two coats of clear dope before applying colored dope. For the thin wood of the wings, and particularly the tail surfaces, the clear dope should be

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plasticized with castor oil, about eight drops per ounce of dope, to prevent warping.

Straight dope can be applied to the fuselage and struts.

Allow the first coat of clear dope to dry thoroughly, then sand all areas lightly with fine paper to remove fuzz. Allow the second coat of clear dope to dry thoroughly before applying colored dope. Before actual painting, cement the wing centersection fairing piece, previously cut from the fuselage, in position.

Remember that on any free flight model it is essential that not too much weight be added to the aft end. Not only will excessive colored dope make the model heavy, detracting from its performance, but the balance point might be shifted too far back for normal flying.

If possible use spray can colored dope as it sprays on much more lightly than brushed dope. Two coats of colored dope are sufficient. If the dope brushes on too thickly, thin it slightly (as one part in 10).

Paint the wing hold-down dowels and slip and cement them in place.

Trim lines for duplicating the color scheme on the original model are given on the plan.

The color scheme is all yellow, with black pin-stripping for the control surface outlines, etc. The long, wide stripe on the fuselage side is red Scotch brand tape. Craft-tint can be used instead of painted pin striping. If you paint these stripes, rule them on with black India ink. Windows can be white dope or can be cut from white art paper and cemented in place. Cowl openings are of black dope.

*Flying:* Model should be test glided over soft grass. If it noses down too steeply,

place a thin balsa or hard wood shim under front of wing. If model stalls, noses up abruptly, place the shim under back of wing. However, be sure that you are not throwing the plane too hard, or pointing it nose up when you release it. Aim at a spot on the ground about 30 feet away and launch with a smooth motion—never throw it.

While it is unlikely that additional shimming would be required, a second thickness of material can be added if necessary. It is not advisable, however, to shim the back of the wing excessively (decreasing the angle of incidence) since stability can be affected.

It is desirable that the model has a very slight right-hand turn, as it will counteract any possibility of the engine torque turning the plane to the left when the engine is running full speed. Also, a wide circling glide pattern will reduce the distance between you and the model and take advantage of any rising currents encountered.

Tight turn can be achieved either by bending the rudder ever so slightly—breathe on it while holding at a slight deflection angle at the rudder trailing edge—or, by bending down very slightly the rear edge of the elevator on the left side of the stabilizer. This adjustment has the additional advantage of holding the nose down during the turn.

Make your first power flights with only a small amount of fuel and with the engine running rich (that is, the needle valve is opened until the engine loses rpm's perceptibly—usually marked by a more ragged tone and by presence of exhaust smoke).

Your Fairchild 24K has been designed for gentle flying characteristics. However, if the model tends to stall under power, downthrust is called for. Or if the ship

turns sharply left under power, despite a right turn in the glide, then you will need right thrust. These engine adjustments are accomplished by adding a thin washer between the crankcase and the firewall at the top for downthrust, and between the left side of the case and the firewall for right thrust.

As you increase the length of the flights and the amount of power by leaning out the needle valve, continue to observe the glide for smoothness and speed, as well as turn, after the engine cuts. Good adjustment will favorably affect the power flight.

How does the model fly? Like a bird! Takeoffs from smooth surfaces are amazingly realistic. Climb-outs are clean and fast; the glide is quite efficient for this type of craft.

Just be sure that you have a big field when you fill that tank and turn her loose!