

A two-for-one deal for ½A power that can't be beat — build a control-line or free-flight model from the same plan!

by Paul DelGatto

## WACO C-6

• Forget the old bugaboo about hard-to-fly free-flight biplanes—they're as simple to make and fly as mono-wing models. Our Waco C-6 is one of the sweetest flying sportsters we've ever built.

We've taken some liberties in scaling the free-flight C-6, to make it more stable in flight. If you've a hankering to build the control-line version, you'll note that the plans show scale stab and rudder outlines. All photos shown are of the free-flight version.

Flying the model is a pleasure, since it is easy to alter adjustments and very simple to secure proper flight trim—an item which particularly pleases us.

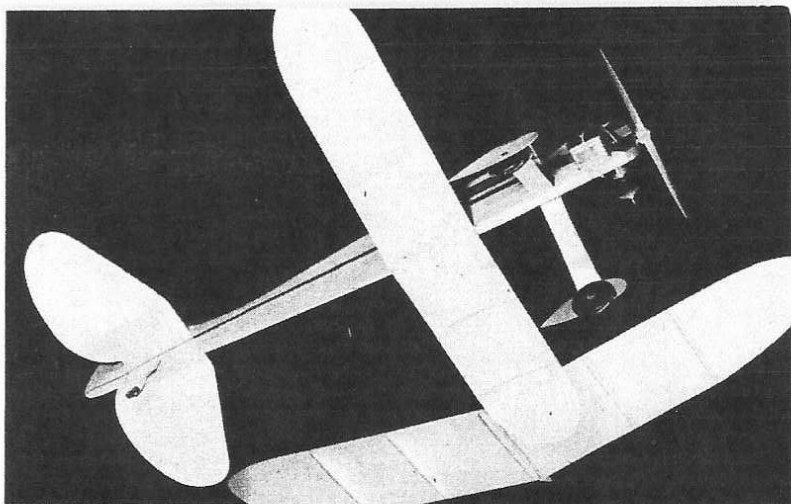
Last time we flew the free-flight C-6 an interesting incident occurred. It happened to be a pretty windy day and the performance of the model was being put to the test. After about six or seven flights, we decided to really "lean" out the engine for a red-hot flight. The model rose quickly, following much the same pattern it had on previous flights. Suddenly, the lower wing flipped off! Expecting to see the model spin in, we were surprised to see it glide down. The descent was steeper and the circle was tighter, but the model was stable all the way down.

Checking the model, we found that we had been too stingy with the dowel pegs used for wing fastening. Since the lower wing was smaller, we cemented it permanently in place. This has proved to be very satisfactory.

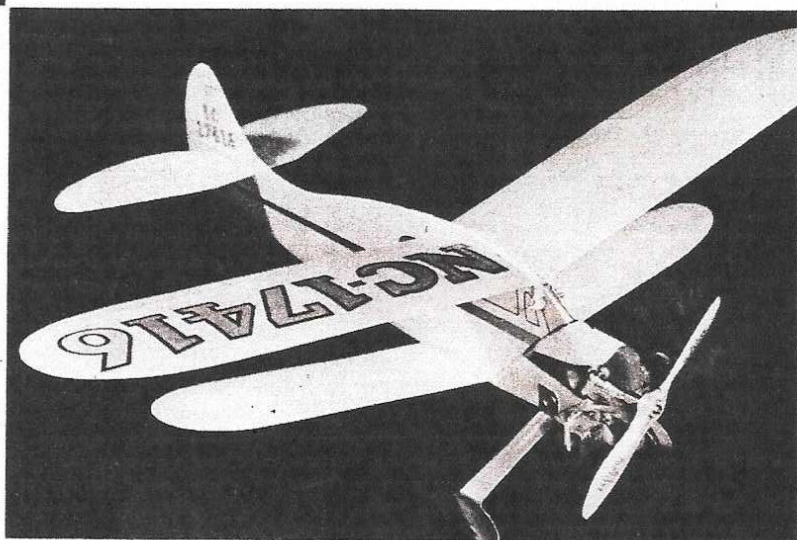
**FUSELAGE:** After enlarging the plans from half to full-size, begin construction with the fuselage. Cut the silhouette fuselage to shape from a sheet of ¼" medium-hard balsa for the free-flight version—use harder wood for the control-line model. Then add the 1/16" plywood side pieces at the front, let the unit dry thoroughly, then sand the fuselage to shape.

The landing gear strut is made from a sheet of 1/32" dural or brass. Note that the plan indicates the extended unbent pattern for the strut. Cut two struts to this shape and then bend them as indicated in the front view and photos. The struts are then bolted in place on the fuselage.

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Above: There are no great structural problems here. Just cut the wings to the proper outlines and add a few ribs. The fuselage is made from a hard sheet of balsa which is reinforced at the nose with plywood sides. Not one block, strip or piece of covering is used in the entire assembly.



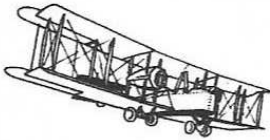
Above: Note the simple upper wing attachment—two dowel pegs and a few rubber bands. The heavier weight of this wing makes it advisable to use this mounting so that it can disengage safely in a rough landing.



Above: If you prefer control-line, the plans show details for planking the underside of the wings and installing a control system. Since weight isn't important, you can add full color trim without losing performance.

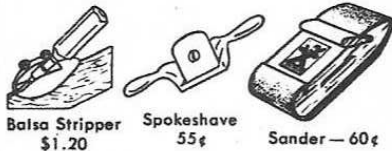
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line and cut the parts to shape. Note that two pieces of wood must be joined to form the free-flight stab.

Sand the stabilizer to the shape shown on the side view of the fuselage, then install it on the fuselage. Cement the rudder in place over the stabilizer.

For the control-line version, offset the rudder to pull towards the outside of the flight circle. Also, install the elevator hinges and horn. Details are shown on the plan.

**FINAL ASSEMBLY:** Complete the model by sanding out minor irregularities. Having done this, apply at least three coats of fuel-proof dope. Sand with fine sandpaper between coats for a smooth finish.

Drill the engine mounting holes and bolt the engine in place. Install a fuel tank as indicated on the plan. If you wish, make a small metal strap so that the tank can be bolted to the fuselage. The original tank was held on with rubber bands and worked satisfactorily.

It will be necessary to add wing struts if you've built the control-line version, since the inboard strut will be used as a line guide. Follow the dimensions shown, then install the lead-out wires and add the pushrod. Add the tail wheel strut, made of 1/16" wire, and hold the wheel on with a dab of solder. Note that this applies to both versions—the plan shows the strut for the free-flight version only, for clarity.

The appearance of the model is greatly improved by adding color trim as indicated. Decals also help.

**TEST FLYING:** Test-fly either version using reduced power on a calm day. Increase the power when you've achieved proper control over the model. A word of caution: fly the control-liner so that it takes off down-wind. This way it will have sufficient flying speed when it comes around into the wind.

**BILL OF MATERIALS**  
(Balsa unless otherwise specified)

- 2—1/4" x 2" x 36" Fuselage
- 3—3/32" x 3" x 36" Free-flight wings, stab, rudder, ribs
- 1—3" x 12" x 1/16" (plywood) Fuselage sides, bellcrank bearers
- 5—1/16" x 3" x 36" Control-liner wings

OK .049 Cub or similar engine; 1/16" piano wire; 1/32" dural or brass sheet; small fuel tank; small nuts and bolts; washers; 1/8" wood dowel; 1-1/2" diameter wheels; fabric hinges; bellcrank; elevator horn; .020" lead-out wire; clear fuel-proof dope; colored fuel-proof dope; decals; small rubber bands; 1/2" diameter wheel; cement; plastic fuel line; 6" diameter propeller.

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Add the 1/8" dowel pegs under the upper wing position. Make these long enough to engage the wing hold-down rubber securely.

If you're building the control-line version, mount the plywood bearers and the bellcrank mount as indicated. Use small bolts and nuts to secure the assembly to the model. The bellcrank should move freely without binding.

**WING:** The wing construction is simple. Using 3/32" balsa, cut the wing panels to shape. Next, make twelve wing ribs as indicated—using the appropriate outlines for the type of model you want. Cement the ribs in place, carefully bending the sheet balsa to follow the contour. Each wing is made in two halves.

Note that the control-line version uses 1/16" balsa throughout, with both the upper and lower wing surfaces covered with 1/16" sheet. The free-flight version has 1/16" ribs with 3/32" panels at the top. The bottom is left open to conserve weight.

To put in the dihedral, prop up the wing tips as indicated and sand the center angle in on each panel. Use a liberal amount of cement to join the halves and check to see that the proper dihedral angle is achieved. The free-flight version requires extra dihedral for stability—scale dihedral can be used on the control-line version. Both are shown on the plan.

Note that the two center ribs on the lower panels are butt-joined together to strengthen the assembly. On the upper wing, these ribs are 1/4" apart so that the fuselage can fit snugly between them. A 1/4" sheet balsa upper fairing should be cemented in place to complete this assembly.

**TAIL SURFACES:** The rudder and stabilizer are made from 3/32" sheet balsa. Use hard stock for the control-line model. Select the appropriate out-