Love at first sight! That's what happened at the first peek of *ZIPPY!* It was featured as an EAA homebuilt in the May '83 issue of *Model Aviation,* and I fell in love with the name, the color, shape, size, and even the plaid uphostery. Lacking the skills to build a full sized aircraft, the decision was made to scale it into a radio controlled model.

The R/C *Zippy* was so easy to build and fly that I wonder why I didn't think of it before the MA article. With a FOX .35BB in the nose, she flies more like the *Cassutt* racers that designer Ed Fisher built, than a puttering EAA homebuilt. She's fast and responsive at full throttle, but when you tick back to 1/3 or 1/2 gas, she's a pussy cat!

The detailed steps of construction articles are usually such dry reading, and often so complicated to follow that they're ignored by most builders anyway, so I'll first just briefly cover the hints and quirks that you'll find helpful. You can follow the step by steps later in this article, if the *Zippy* catches *your* fancy too.

PHOTOGRAPHY: FLOYD MANLY

Comments

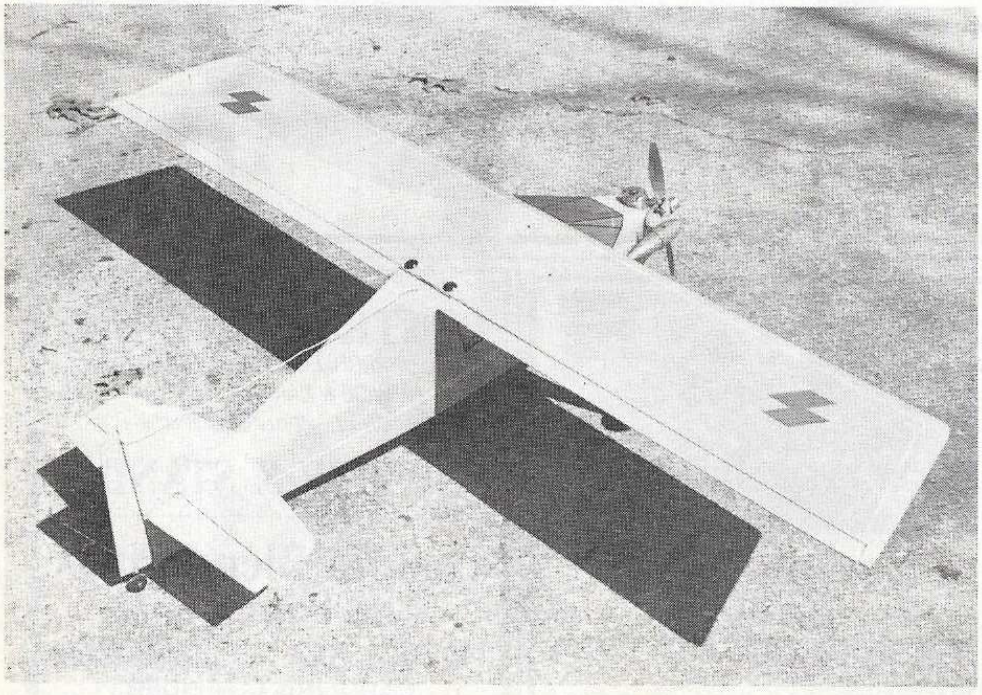
Wing. Nothing outstanding, here, and no quirks. Just build a flat wing, add the triangle tips, and hinge the one inch ailerons. Glass the center panel for strength, then the struts become decorative trim only.

Tail. Use 1/4 inch hard balsa, and connect the tail wheel.

Fuselage. Everything except the motor cowl is 1/16 thick balsa sheeting. No compound curves, and with a minimum of stiffeners to fuss with. If you're a glutton for detail, and punishment, you could add acetate clear windows all around. I took the easy way out, so just suggested windows with Silver Mono-Kote.™ The motor cowl is carved-up balsa 1/8 planks, fitted and sanded to shape. The FOX .35BB is a screamer, and a muffler is necessary to quiet it to reasonable limits. Too bad that it hangs way out of the cowling.

I was tempted to perk up the performance of our second *Zippy,* and so we used a semi-symmetrical airfoil. The flat bottom wing needed too many trim changes between power changes.

The full sized *Zippy* is not a high performance aircraft, and in fact, cruises at only 85 MPH. I fudged a little to get more than glider like speeds out of her. The Fox .35BB is almost too much motor, even for the vertical performance I wanted. A .19 or .25 should give satisfying aerobatics. The landing gear is 1/8 aluminum, but bent wire would work just as well. Scale wheels would be 1 1/2 inch, and impossible to use on grass fields. I used 2 inchers, and set them one and a half inch forward. We also deviated from true scale by stretching the fuselage almost two inches, then increasing the area of all the tail surfaces. These changes were made after the first *Zippy,* (which was right on scale,) was about as stable in flight as the bumble bee that fell in a vat of sour mash.



The *Zippy Sport* is a homebuilt aircraft, designed by Ed Fisher. The author's R/C sport scale version used a Fox 35BB for some very lively performance. Construction is straightforward and yields a strong airframe.

Construction notes

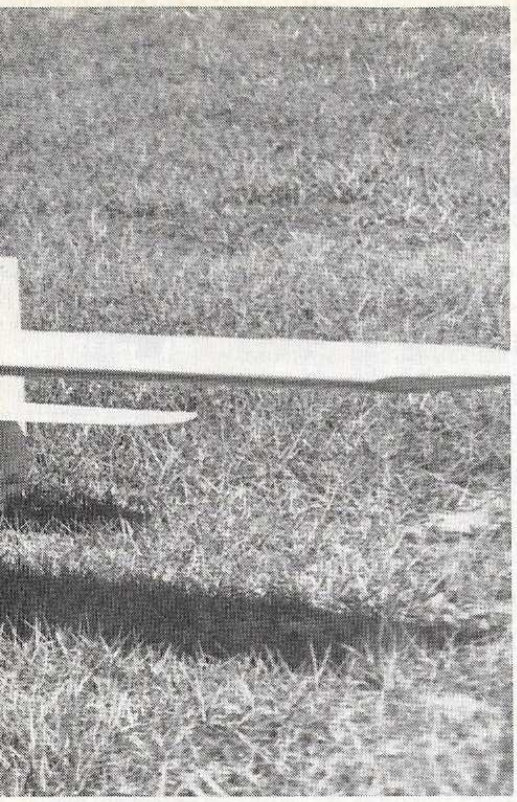
Keep her light. Four and a half pounds can be expected with standard servos and battery pack. Our's tipped in at exactly that, ready for fuel. With 541 square inches of wing, she's carrying 19 ounces per square foot. Almost in the glider range. All the wood sizes are similar to most kits, and she's strong, even if you skimp on the glue and epoxy.

Check the center of gravity carefully. The high fuselage profile makes her look bigger than she is, and that 9 1/2 inch chord wing means you don't have much moment to play with. Go for nose heavy rather than level balance, and certainly never tail down, or with that short tail she'll be squirmier than a two year old in church.

Flying the *Zippy*

Assuming that you've double checked the C.G. and the wing tip balance, and set the controls for 1/4 throw each way, and have positive throttle shut off with the trim, and calmed your test hop jitters to a mild quiver, let's chuck her into the wild blue yonder and watch her zip! At 3/4 power she'll move smartly along and climb out to head for Oshkosh. Turn her around and get to 10 dumb high before trying anything fancy. When you've trimmed her to fly level hands off, pull the throttle to idle and check out her stall characteristics. With no dihedral, but with wash out in the tips, she'll mush along for a while, then mush along some more. Just remember not to drag her in on the final approach. Keep the nose pointed right at your's and she'll come home.

You could fly her without needing more speed, and she'll eagerly do all you ask of her. Typically, for a semi-symmetrical wing, she'll zoom when the speed builds up in a long shallow dive or at the bottom of a loop. When you push the throttle to military-max expect to make elevator trim changes to keep the nose down. This is no problem until you pull back on the gas or run out of fuel. *Zippy* will want



Zippy Sport

By Floyd Manly

Perky appearance and performance characterize this R/C version of a popular EAA homebuilt.

to tuck under when the speed drops off, so be ready for it.

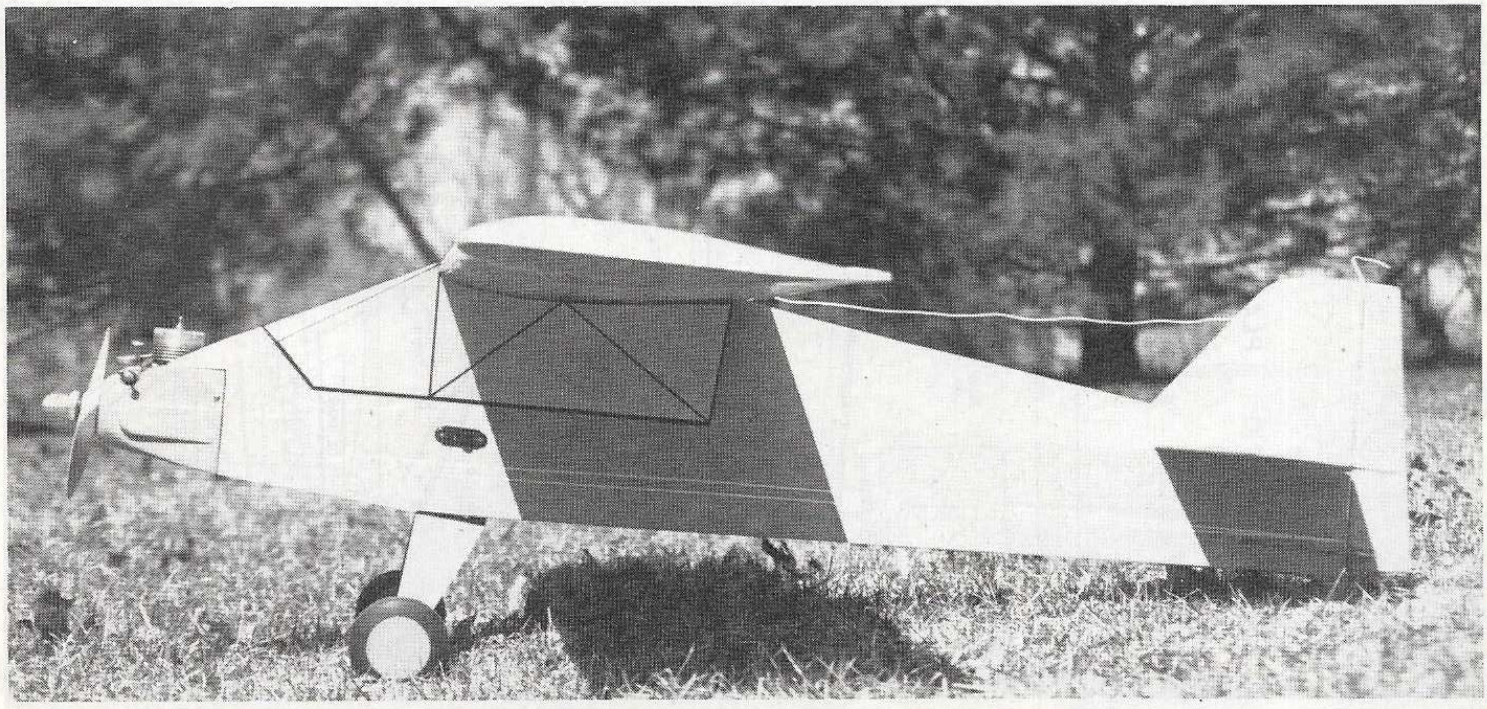
Loops are nice and smooth. Rolls are not the arrow shaft type, but more of way around the barrel. She will not spin, even though the rudder is fairly strong.

Build the *Zippy* this week, fly her come Sunday, then sit down and write us here at FLYING MODELS to tell us how much fun she is. We already know, but we'd like to hear how *you* enjoyed her.

Construction

Here we go: God, how I hate itemizing the building steps. Let's start with the wing. A wing is a wing. The fuselage is a thing of beauty. 1. Pin down the bottom leading edge (LE) sheet, glue on the bottom spar. 2. Use a temporary shim under the trailing edge (TE) of the ribs, then glue the ribs to the bottom spar, and add the top spar. 3. Remove the template shim. Pin down the bottom TE sheet and the bottom rear spars. Rock the ribs back and glue. 4. Add top rear spar. 5. Add the 3/8 × 1/4 trailing edge. 6. Add the wing bolt blocks in the center section. 7. Add top TE sheet. 8. Fit and and glue the wing tongue, then brush water on the outer surface of the LE bottom sheet to soften, then curl it up to match the ribs. Pin and glue. 9. Add the leading edge. 10. Add vertical grain shear webs between the ribs. 11. Glue top LE sheet to the LE. Brush water on the outer surface of the sheet to soften, glue and pin. 12. Add all the cap strips. Note that the center sheeting is not added until wing halves are joined. 13. Build up the other wing half repeating the previous steps. 14. Join wing halves, and add the center sheeting top and bottom. 15. Add aileron torque tubes. 16. Glass cloth and resin the center section where it will fit on the fuselage. We did not glass the top. 17. That's enough. You should be able to finish up from here. Let's get on to the fuselage.

Fuselage. Cut side sheets and glue to get the slab size. 2. Glue longerons 1/16th of an inch above the edge of the sheet. 3. Cut cabin sheets, but don't glue to the sides yet. 4. Cut wing saddle and glue to cabin sheets. Assemble an extra rib with cap strips, leading and trailing edge, then use this rib to outline and cut the wing saddle on one side. Use the cut side as a template for the other side. 5. Now glue cabin sheets to side sheets. 6. Make up the formers F2, F3, and F4. 6. Glue to one fuselage side. 7. Glue in the cross braces in the cabin area. 8. Glue other fuselage side to the formers. 9. Work inside and add the cabin braces. 10. Epoxy the plywood landing gear block with its gussets. 11. Add the aft cross braces. 12. Cut and sand the aft posts to 1/4 inch wide at the tail post. 13. Align the fuselage over the plans, pull the tail together over the center line, and epoxy. 14. Wet the fuselage sides at F4 to sharpen the bend, glue F4a pieces to F4. 15. Glue horizontal cross pieces at F5, 6, and 7. 16. Add formers 5,6, and 7. 17. Cut the turtle deck sides oversize, glue them to the formers, trim to size. 18. Cut top turtle deck oversize too, glue to sides and formers. Sand to size and shape. 19. Wet fuse sides at F2 and align over plans. 20. Add F1 and F1a. 21. Epoxy 1/16 ply doubler in tank area. 22. Glue triangle stock in tank area. 23. Glue in tank shelf. Leave it short enough to have access for your battery pack under it. 24. Glue 1/4 × 1/4 at windshield brace. 25. Cut windshield on diagonal, and add 3/32 × 1/4 diagonal brace. 26. Drill the holes for the fuel

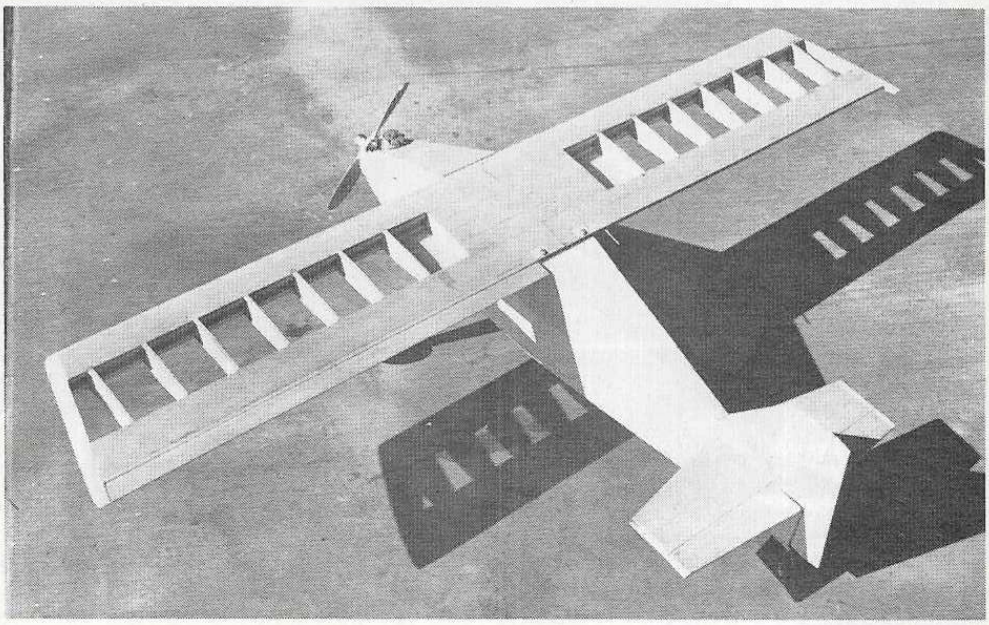


The first R/C *Zippy* (which used scale moments) was a stability nightmare. The second version is quite tame with a fuselage two inches longer.

lines and the throttle cable in F1a. 27. Glue the 1/16 balsa windshield cross grain. 28. Epoxy the chin plate. 29. Verify and adjust the motor thrust in relation to the wing. Don't assume the firewall is right. Thrust should be 0-0, but 1° down and 1° right is better than up and left. 30. Install motor and mount. 31. Cut the nose piece from 1/4 balsa then tack it to a 1/16 balsa spacer. Drill the prop hole and bolt it to the motor with the thin spacer towards the front. Note that the hole in the 1/4 is larger than the thrust washer. 32. Cut and fit the cowl side pieces. Glue them to the 1/4 balsa ring, and tack or pin to the fuselage. 33. Cut and fit the cowl chin plate. Glue to sides. 34. Cut and fit top cowl pieces. Glue to firewall. 35. Sand cowl to final shape, and add filler scrap inside to any thin spots, before adding the cheek cowls. 36. Cut, fit, and sand cheeks to final shape before gluing to cowl. 37. Cut loose the tacks and sand off the 1/16 spacer ring. 38. It *is* possible to MonoKote™ the cowl, if you use small enough pieces and plenty of patience. Might be easier to mix paints, or dope, to match. In either case, fuel proof it with clear dope or resin.

Stabilizer. Cut the horizontal stab to over size shown for the first flights. The scale outline might be okay if you're a *Cassutt* racer, but it's too small for a sports plane. It's most important to check alignment and incidence of wing to fuselage *and* horizontal stab to wing before epoxying tail to fuse. Stab must be *plus* one degree to wing.

Miscellaneous construction. Other run of the mill items, such as tail wheel, landing gear bolts, wing bolts etc., are obvious enough that they're not listed separately. Just do 'em as they're available. Leave the battery, receiver, switch and servo installation until after you're ready to check for C.G. The aircraft should be completed, covered, with the motor, prop, and cowl installed; in other words, ready to fly, except radio. Shuffle your radio gear around until you've got the C.G. where it belongs before permanently installing anything. Even though we've stretched the tail of our *Zippy,* it's still shorter than a "normal" R/C model, so you can expect quicker than normal responses to any control changes. Therefore, *expect* them, and you won't be anything but pleasantly surprised!



The wing is the conventional "D" tube construction while the fuselage is almost all 1/16 balsa sheet (**above**). Make sure wing/stab decalage is correct. The Fox .35BB (**below**) was almost too much power for the *Zippy.* With a light wing loading and the 541 square inches, any good .19-.25 will give good performance.