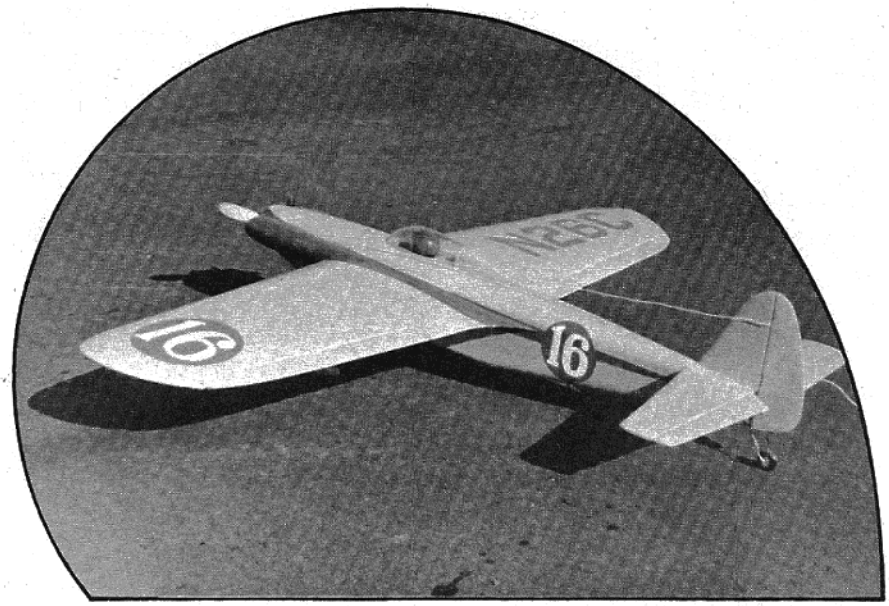
SHOESTRINGS

FRED REESE'S SUPER-FAST QUARTER MIDGET RACER CAN BRING THE HARDWARE HOME FOR YOU.



The "Shoestring" design is based on the wing concept by Don Dombrowski of using two fiberglass arrow-shafts for both structural strength and as the wing building jig. As you know, building a lightweight, thin, tapered wing that is straight, can be difficult. Sheeted foam is not foolproof and is much heavier than our built-up wing. Don's experience with Formula I wing design gave us the symmetrical laminar wing root section but it took 3 wings to decide on the tip airfoil. After trying some thinner sections, the 2410 was selected for its high lift and low stall speed characteristics. The result is a wing that will not snap out of a tight turn, yet has very little drag for top speed potential. Landings are not difficult as the plane can be slowed down without fear of stalling.

Another advantage of this wing design is non-sensitive aileron control, especially around neutral. This means smoother flying and fewer course corrections and the resultant loss of speed.

The long nose and tail moments allow plenty of room for the fuel tank and the battery pack and result in less sensitive elevator control when combined with the forward CG location. In fact, the airplane takes a little time to get used to at first because it is less sensitive than most pattern ships, yet it flies much faster.

Construction goes very quickly once the basic parts are cut out, but some time and care must be taken to get the wing ribs and the shaft holes accurately aligned.

Begin by making a 1/16" plywood wing root and tip rib templates with the ¼" holes for the arrow shafts. Stack seven pieces of 3/32" balsa between the templates and drill two ¼" holes through the stack and then bolt together with ¼" bolts. Now carve and sand until the stack of ribs is finished. Repeat for the other side of the wing by reversing the tip and root to give a right and left wing panel. Lay each rib over the plan and trim the leading and trailing edge. Make two 3/32" root and tip ribs from the plywood rib templates. Cut out the two fuselage sides and, using the root template as a guide, drill the two holes in the fuselage sides. Cut out the firewall, the two bulkheads, and the 3/16" sq. and 1/8" sq. strip stock. Glue the strip stock to the fuselage sides and then epoxy the two bulkheads into place. Pull the tail together and then epoxy the firewall into place. Use 5-minute epoxy so that you can hold each joint until set so that the fuselage is straight.

The yellow Crawford arrow shafts are not long enough for the wing but they can be lengthened with a dowel plug, epoxy, and another short section of arrow shaft.

Before sliding the shafts through the fuselage, mark the rib locations on the shafts and open up the holes in the fuselage sides slightly so that the shafts will slide through freely. Slide the two root ribs and the tip ribs onto the shafts and, using Hobbypoxy II or other slow drying epoxy, glue the root ribs only and the shafts to the fuselage. Wipe away any excess epoxy oozing out around the root ribs. Place the airplane upside down on a flat surface and put pieces of 1/4" sq. balsa under the arrow shafts near the tips and the root and leave until the epoxy has set. Use blocks, tape, and pins or whatever, to make sure that . . . . . .

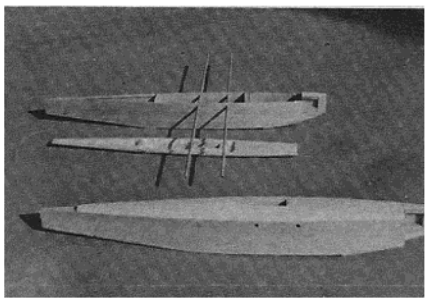
everything is flat against the table. The oversize holes in the fuselage sides allow the shafts to position themselves parallel to each other, which ensures a straight wing.

Temporarily remove the tip ribs and slide the remainder of the wing ribs onto the shafts and locate on the marks. Glue and pin the 1/16" x 1/4" leading edge strip and the 3/16" sq. trailing edge to the ribs and the fuselage root. Now glue the ribs to the shafts with Titebond glue and a small paint brush. Return the airplane to the flat surface and the ¼" sq. jigging strips, and add the 1/16" sheeting and the capstrips. When completely dry, the wing should be rigid, and you can now sheet the top of the wing and finish the cap strips. Add the ½" sq. leading edge, tip blocks, aileron linkage, trailing edge and fillets. The aileron linkage is made from 3/32" music wire in brass tubing and is first tack cemented to the 3/16" sq. T.E. strip. Next, the 1¼" x 3/8" trailing edge stock is notched to fit over the linkage and then epoxied over the tubing portion of the linkage.

The top fuselage block and front hatch is made first from one piece of 3/4" x 3" sheet and is cut apart after shaping. Tack cement into place and rough shape, then remove and hollow for lightness. A Dremel Moto Tool is really handy for this operation. On Quarter Midgets, where weight is so critical, all blocks should be hollowed. If some care is taken in wood selection and in finishing, this airplane will weigh in right at 2½ pounds, plus or minus a couple of ounces depending on the radio equipment and the engine used. Set the hollowed top block aside for now and build the motor mount.

When the motor mount unit is finished, the maple motor bearers will protrude out the back about ¼" and will plug into the two holes cut into the firewall. With the cheek cowls and the chin block this gives a very rugged front end. If you have been running .60's, it may not appear strong enough but it is more than enough for a .15. Begin by epoxying the two maple motor bearers to the ½" sheet side block. If an engine other than the O.S. Max is used, move only the lower engine bearer to clear the crankcase. Cut and epoxy the other pieces of ½" sheet to complete the block and then epoxy it to the firewall. Fit and epoxy the 3/4" sheet chin block and the top fuselage block that you prepared earlier. Rough shape the front end but leave the upper fuselage sides flat to facilitate the addition of the cheek cowls. Add the cheek cowl blocks (hollow first) and decide if you will cover the engine. The cowl can be made from a balsa or foam block which is shaped with the rest of the front end and then covered with glass cloth and Hobbypoxy II and then hollowed to clear the engine. I can't tell any difference in speed, with or without the cowl, but it looks better in place! The same is true for the wheel pants.

Finish shaping the fuselage and make the tail wheel bracket from 1/16" wire in brass tubing. The completed unit is then epoxied to the rear of the fuselage with a piece of glass cloth or nylon reinforcing tape for additional strength. I have tried using smaller wire and smaller tail wheels but they

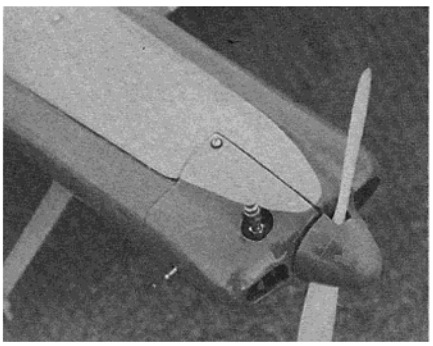


Construction views of Shoestring fuselage. Note arrowshaft wing spars.

break and the tires come off the hubs. Make a small fillet of epoxy around the wing root and smooth with your finger.

Epoxy the stabilizer and the rudder onto the top of the fuselage and carve the hatch for the radio compartment and you are ready to finish. I MonoKoted the wings and used the new K & B Super Poxy on the fuselage and tail group. Trim was done with paint around the cheek cowls and foreward fuselage and MonoKote trim sheets for the rest.

The servos, in their tray, are mounted on 3/8" x 1" pine molding. This is the molding that is used around the bottom of most indoor walls. This molding provides enough surface area for trouble free glue joints to the fuselage sides. Set up the aileron and elevator so as to get minimum movement. The ailerons should move about 3/16" in each direction and the elevator ¼". The rudder travel can be greater for easier



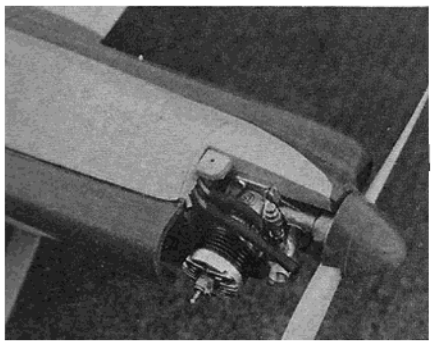
Close-up view of Fred Reese's Quarter Midget Shoestring with cowl in place. Note air intake, easy access to glow plug and needle valve.

ground handling.

Before flying, recheck all control surfaces for alignment and free movement. Use an engine that is sufficiently broken in to give a reliable idle. I say this because many of you will be starting with a new engine.

The first flight will probably be a surprise to you, and you may not like it. I didn't! The airplane goes very fast and the

With the Shoestring's cowl removed, there is complete access to all parts of the O.S. Max .15 engine.



control responses seem agonizingly slow. I did not feel comfortable with the airplane until I had put in about five flights. Then, the more I flew it, the more I came to like and appreciate its gentle responses. Now I prefer it to my other previous designs. The airplane does not over react to my over reactions and I can fly the pylon course smoothly even in a tense racing situation. The airplane will respond and do what you want it to do, it just takes more stick movement. These flying characteristics will allow you to take advantage of the speed and the Shoestring does offer a speed advantage.

If you haven't tried Quarter Midget racing yet, start now. By the way, wing kits for the "Shoestring" are available from your local hobby shop or from "House of Balsa", 2814 E. 56th Way, Long Beach, California 90805, for $10.95.

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