

## Road Runner

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The fuselage sides are cut from soft  $\frac{1}{8}$ " sheet balsa and the nose doublers from 1/16 plywood. Make sure the top edge of the fuselage sides are straight. Glue on the nose doublers, making sure they are on the proper side of the fuselage sides. The hardwood motor mounts are  $\frac{3}{8}$ " x  $\frac{1}{2}$ " x 12". Cut out these to fit over the wing. Mark a line  $\frac{1}{4}$ " down from the fuselage top and 1 inch back from nose and glue on motor mounts. Check for alignment. Number 1 and 2 bulkheads are 3/32 plywood. Construct these and glue in place. Make sure the fuselage sides are aligned. Glue in  $\frac{1}{4}$ " x  $\frac{1}{4}$ " tailpost and check to be sure fuselage is straight.

### Assembly:

Make the cut-outs in the bottom of the fuselage sides to insert the wing. Measure down from the top of the fuselage  $1\frac{1}{4}$ " at the L.E. and T.E. and mark. Insert wing in cut-out and check to be sure the centerline of the wing (L.E. and T.E.) line up with the marks for 0° incidence. Finish side to side wing alignment and glue it in. Check alignment again just to be sure. Put in cut-outs and doublers over T.E. (top and bottom) and V doublers between L.E. of wing, fuselage sides and no. 2 bulkhead. Double front cut out also. Put in remainder of bulkheads with slots for push-rod. Put in tailwheel. Spot glue on the bottom block and carve outside shape. Remove and hollow to  $\frac{1}{8}$ " wall thickness. Permanently glue this block in place. By doing this now, any twisting of the fuselage can be corrected for in stab alignment. Hook up control system as per plans and mount stabilizer.

**Alignment:** mount engine using Veco extension shaft. Permanently glue in 1" nose block. Spot glue on two top blocks and carve to shape. Remove and hollow to  $\frac{1}{8}$  inch wall thickness. Now permanently glue in place. Glue on tail blocks and shape. Cowl is made from a 1"x 3" x 12" balsa block. First make the cut-out for the cylinder and fit the rear portion to the fuselage contour. Carve down from fuselage sides and fair the front into the spinner. Cut the dish effect into the front of the cowl, then dish in the sides to give the hook effect. Now cut the  $\frac{3}{8}$ " x  $\frac{5}{8}$ " air opening in the front and cut out so you

can choke the engine. Drill the air vents with a  $\frac{1}{4}$ " drill and shape with sandpaper over a dowel. Remove any excess balsa from the cowl block. Put in the tank (modified as per plans) and cut holes in cowl for vent tubes. Put in cowl hold downs and plywood inserts into cowl for hold down bolts. Finish shaping cowl for minimum frontal area. The exhaust stack is made from tin or brass and permanently fixed into cowl with epoxy. Note that the stack does not touch the engine but "almost." Glue on the rudder. Put in the fairings between the fuselage and the flaps and elevators. Sand the entire airplane. For fillets, use Du Bro large leather fillets on wing and small ones on stab. Apply as per directions with lots of Aero Gloss glue. Finish fillets with two heavy coats of Stuff sanded between coats.

### Finish:

Fill all seams, nicks and gouges with plastic balsa and sand smooth. Cover all seams with thin strips of silk applied with clear dope. Cover nose section back about 3 inches with silk. Now apply two coats of Aero Gloss sanding sealer. Sand smooth with #360 sandpaper. Apply 4-5 coats of fillercoat and sand with 360. Refill and sand any place that is not smooth. Cover the wings with medium grade Silkspan. Check for warps. Apply 4-5 coats of clear dope and sand with #400 sandpaper. Apply 4-5 coats of fillercoat to the entire airplane and sand with #600 used wet. At this stage, the finish should be very smooth with no seams or grain showing. If not, keep at work with fillercoat and #600 sandpaper. Build wheel pants as per instructions and finish same as described for fuselage. Be sure to cover joints and entire strut with silk. Use plastic balsa for making fillets between strut and wheel pant. Paint and detail the cockpit interior. The canopy was cut from the back half of a large bubble canopy. Fit and glue in place with Aero Gloss glue. Mask the edge of the canopy and fill the seam with Stuff. Sand smooth.

The color finish was applied with a Bink's Airbrush using approximately a pint and a half of color dope and lots of thinner. Let the finish dry at least 24 hours before putting on the trim. All numerals were cut from masking tape and doped on. Let dry 24 hours after the final painting then rub out the finish with rubbing com-

pound and then wax.

The finished model should weigh between 42 and 47 ounces.

### Trimming for flying:

Flying trim is probably the most important step in preparing a stunt plane for competition flying. Most new planes are not perfect at the first flight and have to be tailored to fit the individual's desires and reflexes. This procedure actually starts during construction in checking and rechecking alignment of engine, wing, flaps, stab and elevator. This has to be exact to insure good performance.

Experience has shown that little can be learned by balancing center of gravity (CG) on the ground. Different designs and airfoils require different CG locations. The following is a list of some characteristics that can be effected by CG location.

1. Unstable and too sensitive (tail-heavy) or highly stable and unreactive (nose-heavy).
2. Line tension, either too much (nose-heavy) or not enough (tail-heavy).
3. Changing of line tension in maneuvers (usually indicates tail-heavy).
4. Horizontal stability.
5. Take-off and landing characteristics.
6. Does not turn same inside and outside maneuvers.

A lot concerning the proper CG location can be learned by observing take-off and landing characteristics. A "hop off" take off may indicate a tail-heavy condition whereas difficulty in getting off is usually due to nose heaviness. The Road-runner, when properly trimmed, will roll on the ground indefinitely if neutral or slight down elevator is held into it but will fly off smoothly when given a nudge of up elevator. After the engine has shut off, the glide should be constant and with line tension. There should be no tendencies to balloon, stall or mush. These conditions are caused by tail-heaviness. If too nose heavy, the glide and landing will be good and extremely easy, but the flight maneuvers will be large and overly smooth and squares almost impossible. Good testing maneuvers are the square loops. These will usually show any bad characteristics. If the turns are not sharp, the plane is probably nose-heavy; if too quick and lacks the ability to straighten out smoothly, it is probably tail-heavy. By doing both insides and outsides, a good com-

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