

WING AND VERTICAL FIN CONSTRUCTION

STEP 1

When skinning the foam wing cores, use the foam core beds (foam that cores are cut from) as a jig to keep the wings straight and true during construction. Use a water based contact cement to prevent damage to the foam wing cores. Follow the manufacturer's instructions for applying contact cement to the surfaces to be glued together. Apply contact cement to one side of the 1/20" balsa wing skin and place it in the bottom core bed (glue side up). Apply contact cement to the side of the foam core that will mate to the wing skin. When glue is set, lay the foam core directly over the wing skin and press into place in the core bed. Apply contact cement to the top surface of the wing core and the next wing skin, and join in the same manner. Take the next section of the core bed and lay on top of the sheeted wing core, repeat the above process for the remaining wing core. With both wing cores skinned and set in the core beds, weight the core beds down with books or sand filled containers. Make sure the weight is evenly distributed over the entire surface and allow to set overnight.

After the wing cores are set, carefully trim away the excess skin material from the leading and trailing edges, and at the root and tip of each panel. Glue the 1/8x1/4" balsa trailing edges and 1/4" square balsa leading edges to the wing cores with 5 minute epoxy. Join the two panels together with 5 minute epoxy. Join the panels upside down and flat on your building surface for the proper dihedral angle (the taper of the airfoil creates the dihedral angle on the bottom surface). Sand the trailing and leading edges to the profile shown on the fuselage side view.

Wrap the center of the wing with the supplied glass tape coated with 30 minute epoxy. After the epoxy has cured, make two cutouts for the elevator servos (elevator and aileron). Make enough room in the cutout for the elevator servo to allow for the elevator servo to move the sliding tray unit back and forth (allow for about 1/2" of travel at each end).

STEP 2

Glue the 1/16" die cut plywood tip-plate reflex-guide to the tip of each wing panel with 5 minute epoxy. Glue the balsa tip block to the tip-plate with 5 minute epoxy. Glue the 3" section of fixed tapered aileron stock to the wing core trailing edge and the tip-plate with Slow CA. Use the reflex (upward cant) of the tip-plate to set the trailing edge stock at the correct angle for neutral elevator. Sand the tip block to match the contour of the tip-plate reflex-guide.

STEP 3

Laminate three 3/32" die cut pieces of balsa to make the rear center section of the wing. Glue the pieces together with Slow CA. Make sure the order of the pieces produces a channel and cutouts for the aileron torque rods and rod bearings.

Control horn detail. Thread a 4-40 nylon nut onto the threaded portion of the aileron torque rods. Slide a small piece of fuel tubing over the horn wire and install the swivel ball link and nut.

STEP 4

Laminate two 1/8" die cut balsa, and one 1/8" die cut lite plywood vertical fin bases with Slow CA (make two units). Make sure to put the lite plywood piece in the center to create a slot for the vertical fin.

Glue the two 1/8" die cut balsa vertical fin sections together with Thin CA. Slide the completed vertical fin into the slot in the laminated fin base unit. Glue the vertical fin in the slot with Thin CA. Sand the fin base to a rounded section along the bottom and where it mates to the fin. Sand the leading edge and top of the vertical fin to a rounded contour.

Measure out along the trailing edge 6" from the center joint and make a mark for the location of the vertical fin assembly. Make a second mark a couple inches forward of the trailing edge 6" out from the center joint to assure that the vertical fins are square to the center joint of the wing. Draw a line across the chord of the wing for locating the fins after covering (covering will be cut away for gluing, thus exposing the mounting position).

Cut the tapered trailing edge stock to clear both sides of the vertical fin assembly's position on the wing by 3/32". Drill a hole in the smaller inside piece for the aileron torque rod and check for proper fit. Cut a notch in the leading edge of the 3/16" dowel joiner where they will be joined at the position of the vertical fin assembly. Glue the dowel joiner in the notch with Slow CA being sure to keep the leading edges of both pieces straight and even. The joiner will fit in the cutout in the vertical fin assembly when it is glued in place on the wing. Cut hinge slots with a hobby knife and attach aileron to wing with hinges (do not glue at this time).

Drill a 3/16" hole in the center of the leading edge for the 3/16" wing hold down dowel. Glue the wing hold down dowel in place with a generous amount of 5 minute epoxy.

STEP 5

Glue the 1/16" die cut plywood servo tray to the top of the 3/16" plastic tube with Slow CA. Slide the 1/8" dowels into the plastic tubes and make sure they slide back and forth freely. Drill 1/8" holes in the 1/16" die cut plywood sliding servo tray end plates to line up with the 1/8" dowels attached to the aileron sliding servo tray. Glue the sliding servo tray end plates at each end of the aileron servo cutout with 5 minute epoxy trapping the 1/8" dowels of the sliding tray unit in the holes. Finish sand the entire wing.

FUSELAGE CONSTRUCTION

STEP 1

Mark the locations of the F-2, F-3, and F-4 1/8" die cut balsa plywood bulkheads on the 3/32" die cut balsa forward fuselage sides. Glue the 1/4" square balsa stringer to the top inside edge of the fuselage side with Thin CA. Glue the 3/8" balsa triangle stock to the inside bottom edge of the fuselage with Thin CA being sure to leave a 1/8" overhang towards the rear. Glue the 1/8x1/2" balsa doubler with Thin CA to the fuselage side directly below the top stringer leaving a 1/8" step at the front for the F-2 bulkhead. Repeat above steps to make the other rear fuselage side. Make sure to produce a left and right side.

STEP 2

Glue the two fuselage sides to F-4 with Thin CA. With F-4 and the two fuselage sides directly over the fuselage plan top view, slide F-2 in place and glue with Slow CA being sure to keep the sides square with the plan. Slide F-3 in place from the bottom and glue in place with Thin CA. Mark a vertical center line on F-2 for engine mount reference.

STEP 3

Glue F-7 and F-8 1/8" die cut balsa doublers to top inside edge of the 3/32" die cut balsa rear fuselage side with Thin CA. Glue the three 3/8" balsa triangle stocks to the bottom inside edge of the fuselage side with Thin CA. Repeat above steps to make the other rear fuselage side. Make sure to produce a left and right side.

STEP 4

Glue F-5 1/8" die cut balsa plywood bulkhead and F-6 1/8" die cut balsa bulkhead between the rear fuselage sides with Thin CA. Be sure to keep the two sides square to one another during assembly.

STEP 5

Note that the bottom of the front and rear fuselage assemblies is flat. The two assemblies will be joined with both sections setting flat on the building surface. Bring the front and rear assemblies together so that the bottom of the F-3 bulkhead is 3/16" back from the bottom front edge of the intake location where F-10 will be positioned. Bring the rear fuselage assembly sides together and glue to F-3 with Thin CA. Glue both sides to F-4 with Thin CA. Glue 3/8" balsa triangle stock to the rear upper inside edge of the fuselage sides over F-8 and to the F-6 bulkhead with Thin CA. Glue 1/8" die cut balsa F-10 into intake opening created by the overlap of the front and rear fuselage assemblies with Thin CA. Glue the 1/8" die cut balsa F-11 doubler to the inside edge of F-10, the front fuselage side, and F-4 with Thin CA. Glue the 1/8" die cut balsa F-11 doubler to the inside edge of the fuselage at the wing saddle cutout and at the notches in F-4 and F-5 with Thin CA. Glue the hardwood wing hold down block in the cutouts in F-11 with 5 minute epoxy.

Use 1/4" balsa sheet for the front fuselage bottom sheeting and glue in place with Slow CA. If you are going to use the 3/32" wire skid for engine muffler clearance, glue the 3/8x3/4x1-1/2" hardwood block with 5 minute epoxy to the inside of the bottom sheeting against the front of F-3. Cut 1/4" balsa sheet for the rear fuselage bottom sheeting and glue in place with Slow CA. Assemble fuel tank according to manufacturer's instructions. Drill holes for fuel lines in F-2 making sure that they will clear the center positioned engine mount. Run lines through F-2 and seal with 5 minute epoxy or silicone sealant.

Glue the 1/4" square balsa cross brace with Thin CA to the top back side of F-4 between the rear fuselage sides. Cut 1/4" balsa sheet to cover the top of the front fuselage assembly back to the 1/4" square cross brace and glue in place with Slow CA. Cut 3/32" balsa sheet cross grain for the rear fuselage assembly and glue in place with Slow CA. Cut 3/32" balsa sheet cross grain to cover the top of the air intakes on both sides of the front fuselage assembly and glue in place with Slow CA. Cut away the center bottom portion of F-4 bulkhead to allow clearance for servo linkages or servos as needed.

STEP 6

Extend the previously drawn vertical center line to the top and bottom 1/4" balsa sheeting of the front fuselage assembly. Laminate two 1/16" die cut plywood engine mount plates together with Slow CA or 5 minute epoxy. Position engine in mount so that the rear edge of the spinner will clear the front of the mount and secure with 5 minute epoxy. Remove the engine and glue 3/8" balsa triangle stock to each side of the rear of the engine mount with Slow CA. Glue this assembly to F-2 with 5 minute epoxy being sure to align the center of the two plywood plates with the vertical center line of F-2. Make sure assembly is square to the front of F-2.

Center the F-1 1/16" die cut plywood ring on the front of the engine mount plates and glue in place with Slow CA. Cut 1/4" balsa sheet to fit between the bottom of F-1 and F-2 and glue in place with Slow CA. Glue the 3/8" balsa cowl blocks between F-1 and F-2 with Slow CA. Cut and sand 3/8" balsa triangle stock to fit in the corners between the cowl blocks and the bottom sheeting between F-1 and F-2, and glue in place with Slow CA. Cut and sand 3/8" balsa triangle stock to fit against the top inside edge of the cowl blocks between F-1 and F-2, and glue in place with Slow CA. Cut 1/4" balsa sheet to cover the top of the cowl blocks between F-1 and F-2, and glue in place with Slow CA. Sand all fuselage corners to a rounded contour. Sand the engine cowl area to a rounded shape to match F-1 ring at the front of the fuselage. After the front of the fuselage is shaped, drill a hole where the engine will be located and use a Dremel tool to open up the engine compartment until the engine can be mounted with the supplied 4-40 bolts.

NOTE: If you are building the slope soaring version of the Cutlass 10, do the above steps to create the engine compartment (do not make engine cutout), but you will use the molded nose cone where the spinner would be mounted in the powered version. Cut the excess mold material off flush with the bottom edge of the nose cone and check its fit against F-1. Sand the bottom of the nose cone against a flat, hard sanding block until it fits flush with the outside edge of F-1. Use rough sandpaper to scratch up the inside bottom edge of the nose cone so that glue will adhere well to its surface. Mix up some 5 minute epoxy and micro balloons to a consistency that will just barely flow, and line the inside of the nose cone with a generous coating of this mixture. Place the nose cone over F-1 and make sure the outside edges are flush with one another. Set the fuselage on its tail so that the glue in the nose cone will flow back down and make contact with F-1.

STEP 7

Position the wing in the wing saddle area and note that the wing hold down dowels lie on top of the bottom section of the F-3 bulkhead. Cut a V-shaped notch for the dowel to rest in starting with a 1/8" opening across its top. Slowly enlarge the size of the V until the wing will set flush in the fuselage wing saddle opening.

With the wing sitting in the fuselage, position the two 3/32" die cut balsa wing fairing sides to line up with the fuselage at the front and rear of the wing and glue in place with Thin CA. Glue the 1/4" balsa sheet to the two sides with Slow CA. Sand the wing fairing to conform with the fuselage shape and curvature.

With the wing in place on the fuselage drill a hole through the fairing, the wing, and the wing hold down block for the wing bolt. Tap the hole for the 6-32 nylon bolt and check the fit.

STEP 8

Laminate the two 3/32" die cut balsa jet outlet separators for the rear of the fuselage. Sand the assembly to a tapered and rounded section. After covering, the jet outlet separator and jet nozzle rings (1" diameter plastic tubes) will be glued to the rear of the fuselage.

FINISHING AND FINAL ASSEMBLY

STEP 1

Finish sand the entire model and vacuum, or use a tack rag to remove sanding dust before proceeding with covering. Cover entire model before final assembly. Follow the manufacturer's recommendations and instructions for the covering material of your choice.

STEP 2

Mount your engine, prop and spinner, and hook up the fuel line to your engine's needle valve.

STEP 3

Install your servos in the wing cutout and sliding servo tray and hook up linkages. The elevator servo is attached to the sliding servo tray by a pushrod with a Z-bend inserted in an appropriate sized hole drilled in the sliding servo tray. The aileron servo is connected to the aileron torque rods with two pieces of threaded pushrod wire and the supplied swivel ball links. Aileron throw should be about 5/16" each way with an additional 3/16" elevator travel. Your receiver and battery should be wrapped in foam and placed in the rear of the fuselage. Shift gear around as needed to achieve the desired gear ratio. Do not attempt to fly unless your model balances at the recommended CG as shown on the plan. Balance the model at the CG location shown on the plans right outside the fuselage sides.

STEP 4

After all parts are covered, mount the aileron stock to the wing with hinges and securely glue the hinges in place. Remove a strip of covering from the wing 6" out from the center joint and align vertical fin assemblies over the line made during construction. Glue the fin assembly to the wing with 5 minute epoxy. Cut and trim the canopy to fit on the forward portion of the fuselage and glue in place with Slow CA or glue designed for use with clear canopies. Glue the jet outlet separator and jet nozzle rings to the rear of the fuselage with Slow CA.

STEP 5

If you are using the wire skid, drill a 3/32" hole through the bottom of the fuselage and the hardwood block according to the fuselage plan side view. Insert the end of the wire through the hole and secure the skid with the nylon strap and #3 machine screws.

STEP 6

Always fly your model in a safe and courteous manner. Never fly in an area with obstructions, power lines, or too close to houses. Be a good neighbor and use a muffler if there is any chance that the noise of your model's engine might disturb someone. We sincerely hope you will enjoy your new Cutlass 10 and wish you many hours of great flying fun.

CUTLASS 10

FOR POWER OR SLOPE SOARING

Span: 34 in. Radio: 2-3 ch. req'd.
 Area: 240 sq. in. Designed By: Bob McVicker
 Power: .09-.10 Drawn By: James Renger
 Weight: 18-26 oz. Instructions By: John Lupperger

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