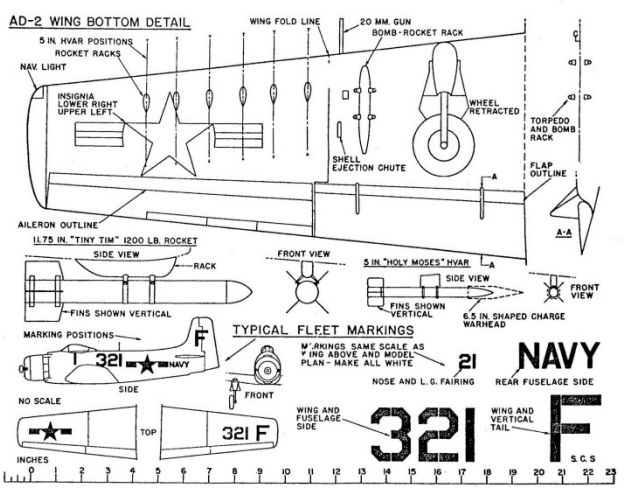
Douglas AD-2 Skyraider



A Scale Military C/L model by Cal Smith.

Construction can be started with fuselage. Engine mount is built first. This consists of 1/4" plywood firewall for radial mounting of the O&R 60 and 1/8" plywood sides which are joined to crutch later. Join sides to firewall with Weld wood glue use a few small brads for gluing pressure. Add 3/8" wide triangular gussets behind firewall at the side joint. Build 1/4" sq. balsa frames inside plywood sides as shown to stiffen the assembly.

Next build the crutch over top view of fuselage plan. While crutch is on work board, build up bottom halves of formers 7 to 12. Add the 1/8" plywood mount for tailwheel strut and arresting hook at rear end of the crutch. Stitch and cement tailwheel strut wire and bolt arresting hook aluminum mount to plywood before cementing plywood to crutch if latter is to be used.

Cement 1/8" sq. strips to bottom corners of formers. When this assembly is dry it can be taken up from work board and joined to engine mount plywood sides. The front crutch ends should be clamped or pinned tightly to outside surface of the plywood sides while cement dries. Side formers 4, 5 and 6 can be added now.

Next add the 1/8" sheet top halves of all formers above crutch. Build up the edge stiffeners of removable section between former 4 and 7. Note that there are two No. 6 formers required in this section. Place a layer of wax paper between edge stiffeners and at former 7 so that removable section can be broken away from main structure later after planking is completed. Pin stiffeners and formers to main structure. Next add 1/" sheet stabilizer platform strips, backbone Send tail post.

When this structure is dry the fuselage skin can be added. Three inch wide sheets of 1/8" stock form vertical surface of lower fuselage side. The rounded top portion of fuselage including removable section is planked with 1/8" x 3/8" strip. It will be helpful to wet the strips to form the shapes at front and rear. While planking is drying the horizontal tail can be built so that it can be assembled to tail before adding fin and rudder. Stabilizer is carved from 1/2" sheet and taper in thickness to 5/16" at tips.

Elevators can be built of two layers of 1/4" sheet with the Veco horn assembly sandwiched between layers, or can be carved from 1/2" sheet like stabilizer. The elevators are joined to stabilizer with aircraft fabric hinges or any other type preferred. Attach a 19" length of 1/16" dia. wire to elevator horn. Slide this pushrod through fuselage structure, punching formers or notching crutch as needed for clearance. Cement stabilizer in position permanently only after pushrod and horn are checked for ample movement and freedom.

The fin and rudder can be added next. Note the two offsets in the hinge line. The fin can be built up of several thicknesses of 1/2" sheet with front portion hollowed for lightness. The rudder is carved from a 7/8" thick plank or can be laminated from two layers

Douglas AD-2 Skyraider

of 1/2" sheet. Front edge of rudder is rounded at the corners to simulate shape of the prototype.

Bottom of fuselage has been left uncovered so that the arresting hook mechanism and flap system can be installed if these are to be used. If you are building a flying scale version these can be omitted and the bottom covered now however if you intend to use model for the Carrie Event, leave bottom uncovered so that hook and gadget work can be done later after the wing is joined to fuselage.

The nose section of fuselage can now be completed. The sides top and bottom between formers 3 and 4 are built up from block balsa. This is necessary to facilitate carving of the intake scoops and cowl flap indentations. Plank the space between formers 4 and 5 with 1/8" x 3/8" strips and 1/8" sheet on the bottom and corners at the wing leading edge. The front face of the blocks at former 3 is covered with 1/16" plywood bulkhead; this should be made in sections for ease of cementing. Use cement liberally at this point. Spread a layer over the end grain of blocks and inside of plywood.

Let dry and then add another cement layer for permanent attachement. Carve intake scoops and cowl flap indents and fair the planking ends into blocks carefully. Check photos for proper shapes. Next, hardwood cowl mount blocks are glued (Weld wood) to engine mount sides and former 3.

The aluminum cowl used on original model was obtained from Miniature Aircraft Corp, Staten Island, N. Y. It is supplied with their F2G kit. The shape is almost exactly to scale for our AD2. The diameter is 4 3/16" however, exact scale diameter of the AD2 cowling is 4 3/8” This slight difference is hardly enough to bother with, but some scale builders may wish to make up their own aluminum or lathe turned wooden cowl to the exact dimensions.

The cowl flaps are strips of 1/32" thick aluminum sheet flush-riveted to rear cowling edge. The cowling is cut out at top for engine cylinder and exhaust. Drill side for needle valve extension and mounting screws. The timer arm does not extend outside cowling, so no cut-out is needed for it. With 2 speed engine, the timer should be locked down tight and any timer movement can be done with engine stopped.

This about completes fuselage and tail construction. The whole should be sanded smooth and given a few coats of sanding sealer. A layer of lightweight tissue can be doped on next so that the finish color will have a smooth base.

Wing construction comes next. Wing of the prototype Sky raider has about 3 1/2° of twist built in. This means the root airfoil has a greater angle of incidence than the tip airfoil. This is standard aircraft design practice and improves stalling characteristics of the wing. Center portion of wing stalls first while tip sections are still maintaining lift, giving better aileron control longer and letting the aircraft fall straight ahead when it does stall without rolling off on one wing or the other.

Now you may wonder what all this has to do with control line flying. All we can say is we tried it and it works. Just as many of the laws of balance and area for big airplanes apply to models, so the wing twist helped the performance of the Sky raider model.

The ship kept right on flying at reduced speeds and no rolling tendencies showed up even when the model did stall. The extra trouble involved is worth the effort. So if you follow the procedure outlined here your wing will come together like blocks and still have the desired characteristics.

Note on (he drawing the short lines under leading and trailing edge of each rib. These indicate heights for blocks that should be placed under these parts so that the twist can be built in. The main spar is cut from 1/8" sheet and laid down over the plan with its bottom edge flat on the surface. Next cut out the leading edge and lay down over the plan using the jig blocks as indicated. Cut out ribs 2-8 and slide over main spar and cement to leading edge as indicated. This whole assembly should be well pinned down to the work board.

Add too skin, 3" wide sheets of 3/32" stock. Wet wood to bend easier over leading edge and near inboard end of panel. Make two panels in this

Douglas AD-2 Skyraider

manner, leaving bottom skin off. When it's thoroughly dry, run control-line leads through ribs and hold down with cellophane adhesive tape. They can be attached to the bell crank later. Next cut out the 1/8" plywood spar joiners and drill for landing gear wire and attachment.

Joiners are now slid into position in notches in ribs. Check alignment and cement- in place. Now add the center section ribs and the gusset behind leading edge center joint. Cut out the two center ribs for bell crank mount and bell crank. Landing gear wires can be bent to shape now, slid into position and fastened to front spar with eye or "J" bolts. Note doubler block placed next to rib 3 around the gear leg. This will protect the skin from being broken out in those hard landings.

With landing gear assembled, bottom skin can be added to wing panels. Bevel .trailing edge skins so that a sharp trailing edge results. Tip blocks can be cemented to wing ends now and carved to shape, and sanding of the wing covering completed. Bell crank can be joined, to the line leads next. If two speed ignition is to be used, bell crank should be made of insulating material such as fiber or Micarta sheet. Flexible wire leads should be soldered to line leads also. Drill bell crank mount and bolt down bell crank temporarily. The wing can be slid into the fuselage bottom and with the elevators and bell crank in neutral, the pushrod can be bent to fit bell crank.

Do not attach push rod and bell crank now. First cover top of center section of wing with 3/32" sheet and cut a slot for pushrod and a hole for the bell crank pivot bolt. With wing separated from fuselage, now would be a good time to apply sanding sealer and tissue to wing. When wing is ready for permanent joining to fuselage, alignment should be carefully checked before doing so. Then assemble pushrod to bell crank and solder on a small retaining washer. Bell crank can then be bolted firmly to its mount. Check for free movement. Cover all mating surfaces with cement and slide wing into fuselage bottom, pin firmly, checking alignment before cement sets and dries. Cover bottom of center section with 3/32" sheet and block balsa as needed to fair into fuselage bottom at former 5.

With final assembly completed, finish and engine accessories can be added. The model's surface should be prepared according to whether you intend to use 2 speed ignition or strictly glow plug operation. If you use ignition and gas and oil for fuel, regular airplane dope can be applied if you use glow fuel, the model should be finished from the wood out with fuel- proof dopes. The original model was finished with sealer, tissue, sealer, clear dope and sprayed Titanine insignia blue, In that order. Insignia blue Is not the exact Navy color but very close. The actual Navy color is called India blue and is a bit darker than Insignia blue.

Details such as landing gear, fairing, canopy and antenna mast can be added now. The wire landing gear strut used is faked considerably in that wire bends back at an angle from the vertical strut. This diagonal member on the prototype is actually the retracting linkage and is V shaped viewed from below. Since supporting the main strut at the leading edge would be difficult in the limited space available, it was decided to make the main strut a dummy and run the wire back to the front spar for better support and shock absorbing qualities.

The main strut is formed from length of Neoprene tubing singye way and wrapped around the wire strut. A shallow hole is drilled under leading edge for too end of the tubing to rest in. The bulbous fairing is carved from block balsa, notched and cemented over, the Neoprene tubing. Wheels are Veco 2 1/2" dia. with die cast spoked hubs. The Veco wheels are very realistic and resemble the prototype closely. Exact scale diameter wheels are 2 1/4" dia.