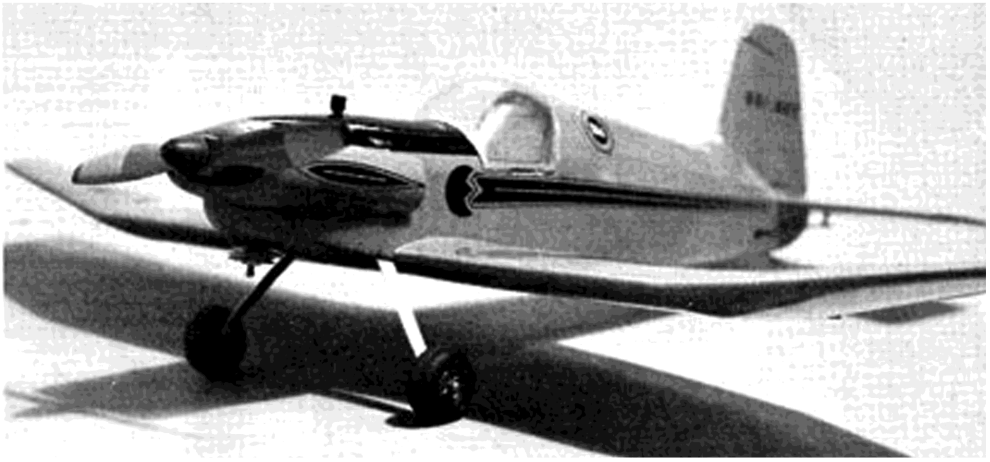
ANDREASSON BA-6
Designer-okayed Control Liner modeled by Walt Mooney



Bjorn Andreasson, a noted Swedish aeronautical engineer, has designed seven outstanding light airplanes. His seventh, the BA-7, evolved in San Diego while he was a Convair engineer, has been described and modeled in a past *American Modeler*. The BA-6 was built in Sweden. It is an all-wood, fabric covered, low wing, single place, fully aerobatic lightplane, extremely well liked by those who have flown it. Several examples are currently in construction in the United States.

Mooney's full size working drawings are on Group Plan #761 from Hobby Helpers, 1543 Stillwell Ave., New York 61, N. Y. (60c).

BA-6 has a pleasing shape, suitable for a simple U-control scale model. Particular characteristics that make for a good Ukie are the large, rather low aspect ratio, wing, the straight through elevator aft of the rudder, the simple Cessna type spring leaf landing gear, and the slab sided, flat bottomed fuselage.

The model BA-6 is exact scale as to shape and size *with no deviations*. In addition construction follows the original wherever possible with all surface textures correct (wood surfaces, fabric surfaces, metal surfaces.)

All bulkheads and formers in the model are in the correct location, the fuselage sides, bottom, top, and turtle deck follow the full scale construction. The wing has the correct number of ribs and is planked like the original. Only the tail, the flaps, and the ailerons deviate from scale construction. They are carved fom solid balsa; however, scale surface textures are simulated. The metal cowl is simulated by highly finished Fibreglas on the model.

Bjorn Andreasson has returned to Sweden to produce his BA-7 but while he was in San Diego he checked the accuracy of our model plans. After several minor changes (a relatively meagre first three view was used to make the original layout), he certified that the model is an accurate copy of the full sized ship and signed the plans with a statement to that effect.

The model has several features which should be noted. The direction of the flight circle is clockwise, contrary to most U-controls, to help keep the lines tight. This I feel is important for ½A U-controls because of their small size. In addition the U-control bellcrank is located in the wing to put it below the model's center-of-gravity and help hold the model out at the end of the lines by providing an outward banking moment.

It will be noted that the model in the photographs has a non-scale color scheme. I felt that since it is a home built type, any color scheme is okay, and the license number (SE-XEY) was for kicks. Zip-a-tone was used on the plans (dotted areas) to indicate the scale color scheme for SE-BXX. Blue on white were the colors. The circle just above the C.G. on the side view had a white "BAG" in it which is not shown on the plans. The wing walk is black anti-skid surface.

I had no accurate cockpit interior data except for the canopy hinge location, and baggage door in former 3. The instrument panel has scale instruments in a reasonable arrangement. The upper half of former 4 has been made solid but if the baggage door is made to open, former 4 should be open similar to former 5 as indicated by the phantom line. The real plane can stow skis in its baggage compartment. No seats or controls are shown, but a semi-scale simulation can be made if desired. The airplane was equipped with a stick and rudder pedals and the seats were simply cushions on the wing upper surface and against bulkhead 3.

If you're interested in building a simple, accurate, nice flying, scale U-control model for an .049 engine our BA-6 is a good choice.

Pick out quality balsa wood for this model since weight and strength are important. Medium balsa is used everywhere on the original but a little ballast was required to get the C.G. far enough forward; so I suggest, light weight wood for the horizontal and vertical tail pieces. I like to cut out all the parts before starting assembly. So in the following instructions we'll assume all the ribs, bulkheads, etc, are already cut out.

The wing is a conventional structure with a leading edge, ribs, top and bottom spar, and trailing edge. It is sheet covered all over the top and halfway on the bottom. Build the center section first by pinning the trailing edge and bottom spar to the work board and cementing the ribs as required. Then add the leading edge. When this is done, prop up one end 2-⅝" and build one outer panel in place. I used a laminated trailing edge and lapped the outer panel laminations with the center panel lamination. Then when the first outer panel is dry, raise the other end of the center panel 2-⅝" and build the opposite tip. Now add the top spar. Carve the leading and trailing edges to the shape shown in the rib sections.

Before cementing the top and bottom sheeting to the wing, install the two pieces of plywood to hold the control bellcrank. Both bottom and top spars are continuous across the center section until after the plywood installation. They are then cut away at a taper to clear the bellcrank bolt head and nut as shown on the drawing just above Andreasson's certification note. Also install the aluminum tube leadouts and the leadout wires. Take a piece of .060 music wire about 12 inches long and bend it to fit the bellcrank for the pushrod. Now install the wing sheeting. Making a careful fitting job at the dihedral joint, around the leadouts, and at the trailing edge. Trim the covering flush at the end rib and add the wing tip blocks.

Now carve the flaps, and ailerons to the shape shown in the rib sections and carve the tips to their final shape. Hinge the ailerons and flaps to the wing with thin aluminum strips (or tin can stock) as shown on the plans.

Carve the tailpieces from solid sheet balsa to the shape and sections shown. The rudder is hinged to the fin with aluminum strips. I used Sullivan Nylon U-control hinges for the elevator-to-stabilizer attachment. They have a slight springiness which tends to give neutral elevator with slack lines which can be an aid with ½A U-controls. Cloth hinges must be avoided because they will ruin the scale surface texture. Make up an elevator control horn from tin can stock. Force the point into the elevator and cement firmly in place. Sandpaper the tin can stock to give a good surface for cement bonding.

Laminate the fuselage sides and doublers. Note the doublers run from the back side of former 1 to the forward side of former 3. When this is thoroughly dry start fuselage assembly by installing formers 1 and 3. Make sure they are square with the sides and allow to dry. Then add the rest of the formers, the bottom and top covering. Now add the

upper parts of formers 4 through 7. Add the lower tail cone, fit the tail and wing (do not cement) and try the control system for clearance. Cement fin in place and add the stringers and turtle deck sheeting. Fit the stringers carefully where they touch the fin and add the little balsa fillet on the top stringer at the fin.

Make the landing gear parts. The main gear should be cut to the pattern shown and all edges carefully smoothed so no scratches are left to start cracks at the bends. Drill the holes in the flat pattern and then bend to the shape shown.

The tail wheel spring and fork are made from pieces of tin can stock soldered together. A straight pin is used for the axle.

Cover the wing, tail, fuselage, ailerons, and flaps all over (except as noted below) with tissue and water shrink, then give three coats of thin dope. Exceptions are cockpit of fuselage, area of fuselage bottom at wing attachment, and front of firewall. To keep the fuselage covering from sticking to the find below the fuselage edge line, coat the fin below the line with wax. A light colored crayon will work. The fuselage tissue should lap over the fin about an eighth of an inch above the line shown, for a doped attachment.

Install the main landing gear with a piece of inner tube rubber between the gear and the firewall as a shock absorber. Install the engine. The model picture used a K&B Tornado .049. Depending on your engine a filler block forward of the firewall may be necessary. The Tornado takes another lamination of ⅛" plywood forward of the firewall (bulkhead 1). I made it the same diameter as the Tornado fuel tank. An engine with an integral fuel tank makes installation as easy as possible. Make sure that the fuel pick up is on the outside of the circle in the tank.

Install the wing, control system, and horizontal tail, and then the tail wheel assembly. Make sure the control system is absolutely free with as little friction as possible. If you use Nylon hinges they should be able to move the surface from a deflected position to neutral, but you shouldn't be able to detect their force from the control line end by feel.

The cowl on the original model is Fibre-glas. Proceed as follows:

Laminate pieces of quarter inch thick balsa sheet into a block large enough to make the entire cowl area. Note how the apple cheeks go aft of the firewall about three eighths of an inch. Cement the center laminate lightly so it can be split apart later. Now carve the cowl to shape. Sand it to the final contours and using sanding sealer put a glossy finish on it. Indicate the cowl front opening with a light indentation. Now split the cowl block in two halves and the male forms for making the plaster molds are finished.

At this point, if you don't want to go to the bother of making a Fibre-glas cowl (which is stronger, more resistant to abrasion, and more fuel proof) you can hollow the two halves to about an eighth of an inch thick and use them for your cowl.

Otherwise, lay the two halves, center face down, on a flat board. Using floor wax or preferably a coat of tincture of green soap for a parting agent, make the two plaster molds. These molds will pick up all the flaws in the balsa forms and transfer them to the fibre-glas so be sure the forms are as near flawless as possible.

Get two large screw eyes and screw them into the forms (not clear through) to help pull the forms from the plaster molds. Let the molds dry at least twenty-four hours and then seal them with about four coats of very thin sanding sealer all over, after filling any small air bubbles in the mold cowl surface with modeling clay. Wax very well for a parting agent.

There have been many articles written on working with Fibre-glas so if you want more detailed information, finding it should not be too difficult.

Apply two thin layers of resin to the mold, let the first harden before adding the second. Let the second coat set up to a tacky state and then add the first layer of glass cloth, fitted in small pieces where necessary. Add a coat of resin and another layer of cloth and so on until you have about a sixteenth of an inch thickness. Heavy cloth may take as few as two layers, light cloth as many as five. The light cloth therefore takes longer but probably gives a stronger cowl and a smoother inner surface. Let the Fibre-glas set up for about twenty-four hours.

Remove the two Fibre-glas cowl halves from the mold. If your parting agent is good enough they will come out with a little prying. If they stick break the plaster molds to get them out. Trim them carefully to exact size. Tape them together along the centerline seam with masking tape and use some resin to glue them together with a half inch width of glass cloth down the seam on the inside. Use epoxy cement to fasten two ⅜" long lengths of dowel or aluminum tubes two places inside the cowl for retainers.

The balsa form for the canopy is laminated the same as that for the cowl except make all the cement joints very sound. Carve it and finish it in the same manner. Put a large screw eye in the bottom of this so it can be held securely in a vise. Heat the plastic over a stove until it gets soggy and then quickly pull it down over the form and hold it until it cools. Trim it to fit the cockpit. If desired, make up a canopy frame from one sixteenth diameter aluminum tubing. File a flat, half an inch long, half way through the horizontal tubes at the center of the tubes to take the pins which are used as hinge and latches. I used epoxy cement to fasten the tubes together and to cement the frame to the canopy.

You can finish the model with fuel proof dope or with nitrate dope and fuel proofer or you can follow my methods used on the original model. I used two coats of automobile primer on the cowl and three coats of clear dope on the rest of the airplane, followed by two coats of automobile enamel on cowl and airplane. Then I used decal sheet (Wondur Cals) for the contrasting color scheme. SE-XEY, my model with the non-scale paint job, was orange with black trim. You'll note on the plans that there are rib indications on the flaps, ailerons, rudder, and elevator. **These were put on by using a ruling pen and the basic enamel, adding a line of enamel at each rib. This dries as a little rise in the surface and does a beautiful job of simulating ribs under fabric at this scale. The enamel was topped with two thin sprayed coats of Fuller Plast, a synthetic varnish made by the Fuller Paint Company. This uses a catalyst for hardening, is absolutely fuel proof, tough, and has a fantastic shine.**

Now install the wheels, prop, and spinner. The original spinner is aluminum.

Wait for a calm day for test flights, I couldn't with mine because its first flight was at the 1960 Nats but I still managed to get a complete run without wrecking the model. There was no tension on the upwind side of the circle but the ship was under control most of the circle and the self-neutralizing effect of the Nylon hinges kept things from becoming too violent when there was little line tension. Make sure the C.G. is no farther back than shown on the plans, ballast it if necessary. The C.G. can be as much as quarter of an inch forward of the point indicated without any flying trouble but it becomes more prone to nosing over after landing.

Make sure the canopy is well latched, I've had it come open in flight. It didn't come clear off but the frame got bent. Take off downwind from a smooth flying surface. Remember that half inch pebbles are like 8 inch boulders to the full size ship. It's good to have the model within 3 or 4 feet of the ground when the engine quits. Because of its small size it hasn't much penetration and doesn't glide very far after the engine quits.