



Wheel Pants not included

4-60 Bipe

Designed by...
D.B. "Doc" Mathews

Assembly Manual

50K230 Ace 4-60/90 Bipe, Kit

INTRODUCTION

The 4-60/90 Bipe fills in the series of plane kits between the 4-40 Bipe and the 4-120 Bipe. The 4-60/90 Bipe retains all the virtues of the 4-40 Bipe and adds easier construction, higher strength, smoother aerobatics and markedly improved visibility. The excellent ground handling and takeoff/landing qualities are retained in the larger version. More importantly, the 4-60/90 Bipe handles much better in moderate to high wind than the smaller 4-40 Bipe.

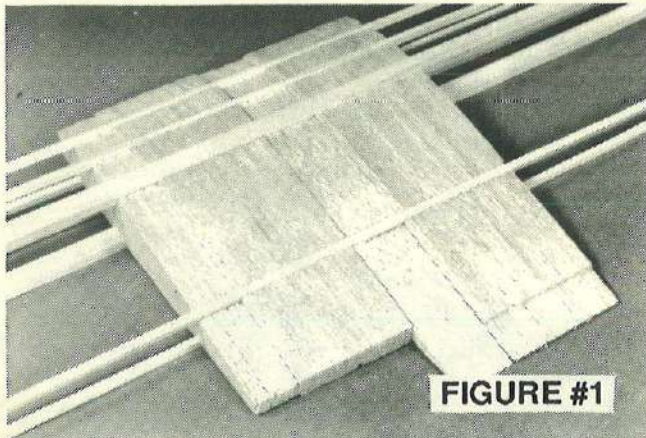
The 4-60/90 Bipe's flight envelope is broad enough to allow docile trainer-like flying with a forward center of gravity. The 4-60/90 Bipe becomes nicely aerobatic when the C.G. is moved rearward and the throws are

increased. The model flies on its lifting surfaces (as an airplane should). It is not an overpowered projectile that uses brute power for flight. As a consequence, the maneuvers are smooth and stately as opposed to abrupt and violent, making the 4-60/90 Bipe a predictable and solid flier...pure enjoyment, flight after flight.

Now that we're sure you're anxious to start, we won't praise this airplane anymore. You'll find out on the first flight what we're talking about!

Read through the instructions and familiarize yourself with the parts, before starting construction.

TOP WING CONSTRUCTION

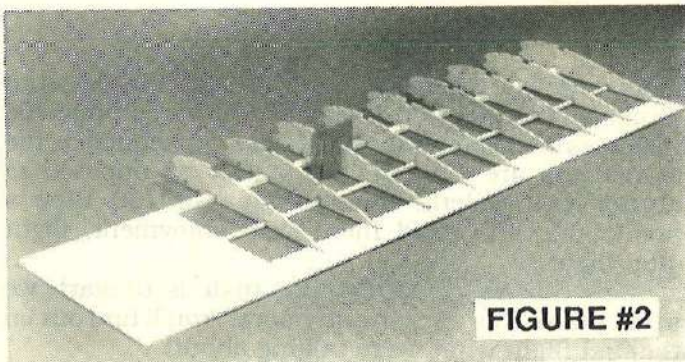


□ Begin by punching out the ribs from the die-cut sheets. (**Note:** Sanding the back side of the die sheet will aid the removal of these parts.) There are four different types of ribs: 18-Top Wing **OUTER RIBS**, 8-Top Wing **INNER RIBS**, 16 Lower Wing **OUTER RIBS**, 6 Lower Wing **INNER RIBS**.

□ Using the main spars to align the ribs, sand the edges of the ribs smooth. Test fit all spars in the stack of ribs and trim or sand if necessary for a good fit. (FIG. 1)

We prefer the CyA/ 3M Spray 77 pinless method of construction; that is, use Spray 77 (Ace part # 60K45), lightly applied, to stick the plans to a flat, smooth work surface. Then spray the plans lightly and cover with waxed paper (not plastic wrap). Now a coat of Spray 77 on the waxed paper and you can begin putting the parts down. When you need to remove the wing from the surface, work a thin steel straightedge between the wing and the waxed paper, it will then come off cleanly. If you prefer, conventional techniques can be used with pins and a soft work surface.

□ Allowing some room all around it, cut the **Top Wing Root Rib Angle Template** from the loose sheet. Glue it to a piece of cardboard or a scrap piece of balsa. Now cut the template to exact size. Do the same for the **Bottom Wing Root Angle Template** and set it aside for later.

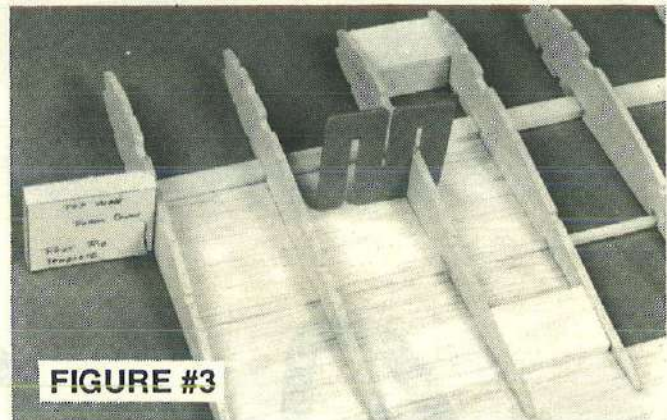


□ Build the top wing, starting with the right panel. Begin by putting the 1/16" x 1-3/8" balsa bottom trailing edge, the 3/16" x 3/8" spruce bottom main

spar, and the 1/8" sq. bottom rear in place...always let any excess extend out the tip of the wing. Use a few outer ribs to line them up. **Note:** The wing is flat from the main spar rearward.

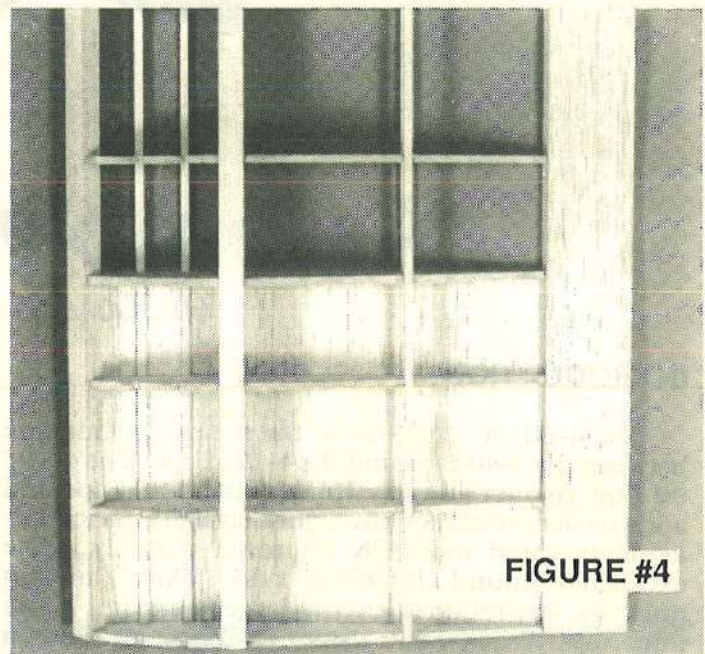
□ Cut two pieces of 1/16" x 3" balsa, 5-7/8" long from one of the lengths furnished. Cut them to width to fit between the trailing edge and the rear spar and between the rear spar and the main spar. Glue in place, flat on the surface.

□ Glue the nine outer ribs in place, using thick CyA glue, keeping them perpendicular. A House Of Balsa "Upright" is handy for this. (FIG. 2)



□ Locate the third and fourth inner ribs by using the wing bolt blocks as spacers. (**Do not glue the blocks in at this time!**)

□ Glue in the four center ribs keeping the second, third and fourth ribs perpendicular and **use the angle template to slant the first rib (root rib) inward to accommodate the dihedral angle.** (FIG. 3)



□ Now add the top main spar, top trailing edge, top rear spar and 3/8" sq. balsa leading edge, making sure it is seated square into the ribs. Leave the two 1/8" square spruce, top forward spars out for now. Remember to let any excess trail out the tip. (FIG. 4)

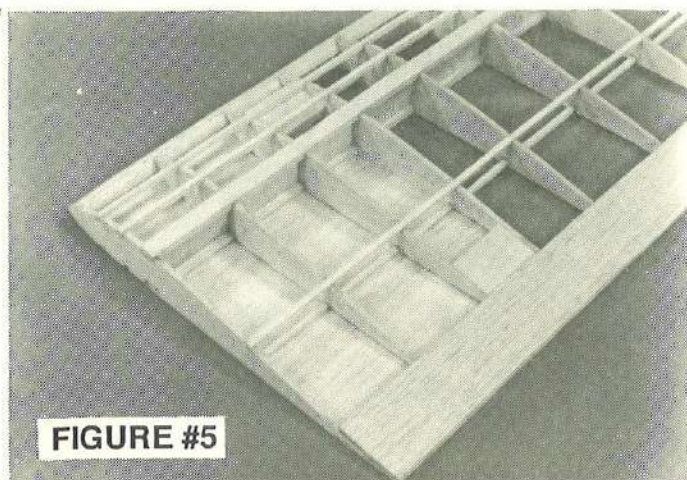


FIGURE #5

□ It is now time to install the 3/32" balsa shear webs. There are two ways to do this, depending upon your preference. The height of the webs is pre-cut so they can be installed on the rear and front face of the main spars. Their length will need to be trimmed to fit in between the ribs. Also, you will have to cut down the height of the webs that go in the center section, so they don't go beyond the top edge of the rib; this allows the sheeting to be installed later. If you choose this method, alternate the webs, one on the rear face and the next on the front face.

The plans and photos show the second way to install the webbing, which is in between the spars in an "I" beam configuration. If you do this, both the height and the width of the webs will have to be trimmed to fit. Note that either way you do it, the outermost bay doesn't have a web. (FIG. 5)

□ Remove the panel from the work surface and using a long, straight sanding block, true up the rear of the trailing edge sheets. Add the remainder of the 1/16" sheeting from the main spar forward. (This should close up the bottom of the top wing.)

□ **Do Not Skip The Following Step:** Pick up one of the rear (3/8 x 15/16 x 1-1/2") hardwood top wing hold down blocks and put it in place between the 3rd and 4th rib, with it's rear edge flush with the front of the trailing edge sheeting. If some of the block goes above the top edge of the rib, trim it off with a knife or sanding block. Firmly epoxy the block to both ribs and the bottom sheeting, making sure you have it in the proper position. (FIG. 5)

□ Install the hardwood front top wing hold down block (3/4 x 1 x 1-1/2") between the 3rd and 4th ribs, it should seat with the slot in the forward most 1/8" square spruce bottom spar. If some of the block goes above the top edge of the rib, trim it off with a knife or sanding block. Firmly epoxy the block to both ribs, bottom sheeting and spar, making sure you have it in the proper position. (FIG. 5)

□ Add the 1/16" balsa top center sheeting. It fits between the spars. (The center section should be sheeted top and bottom.)

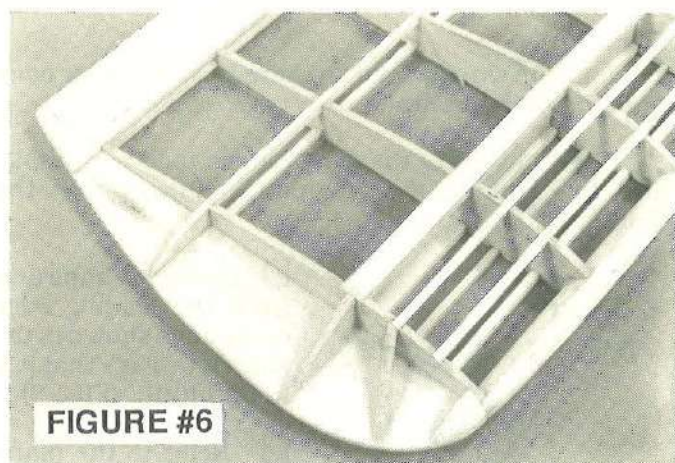


FIGURE #6

□ Trim off any excess material that extends from the center and the tip ribs. Block sand the end of the tip rib flat. Glue the wing tip on. Run it on a line from the center of the leading edge to the center of the trailing edge keeping the rear edge flush with the trailing edge, and the tip perpendicular to the rib.

□ Glue in the tip braces as follows: Note that there are three braces on both the top and bottom of the tip, one straight out from the main spar and one straight out from the rear spar, plus one diagonally from the 3rd small spar. To fabricate the braces, use the 1/8" balsa furnished and cut rectangles as high as the distance from the surface of the tip to the edge of the rib and as long as the distance from the surface of the rib to the end of the tip. Now split the rectangle diagonally and use one of the triangles for the brace...save the other one for the same location on the opposite wing panel. Repeat for all the braces.

Use some scrap 3/8" balsa to fill in the tip at the leading and trailing edge. Glue in place and carve to shape. (FIG. 6)

□ Build the left top wing panel following the same procedure as you did with the right. **MAKE SURE YOU BUILD BOTH A "LEFT" AND A "RIGHT" PANEL!**

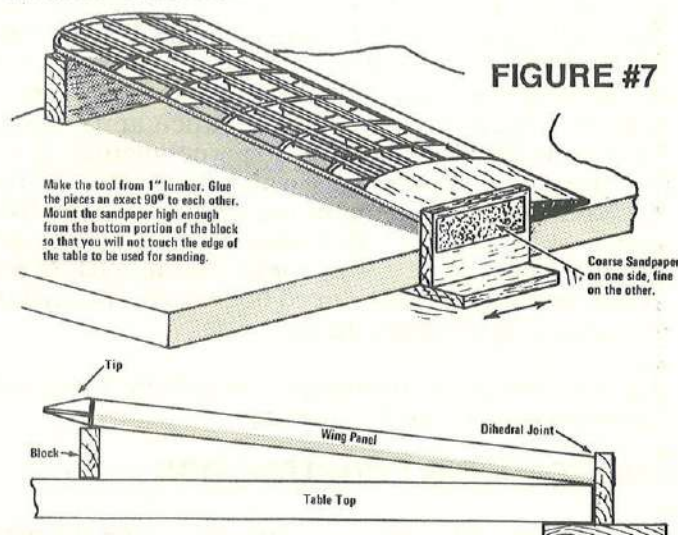


FIGURE #7

□ Refer to the Dihedral Sanding Detail and final sand the proper angle into the root ribs of both panels with the tip blocked up 1/2" for the top wing. (FIG. 7)

☐ Join the wing halves so there is 1/2" under each tip or 1" total dihedral.

☐ Carefully epoxy the wing panels together; make sure the bottom of the wing panels line up from the main spar rearward.

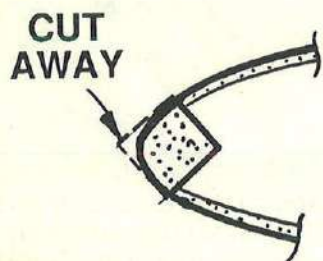


FIGURE #8

☐ Carve to shape and sand the leading edge contour as shown in the side view. Note that it is fairly blunt. (FIG. 8)

☐ Refer to the plans and cut the center portion of the rear of the wing back and cap off with the 1/8" x 3/8" balsa scrap furnished. Trim and sand. (FIG. 9)

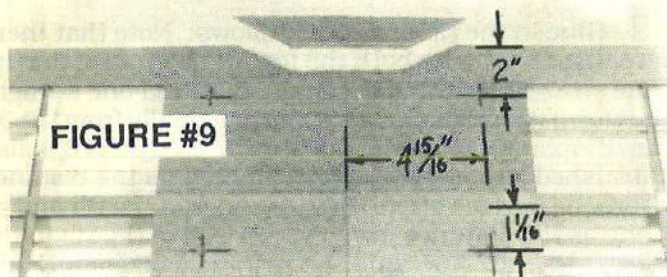


FIGURE #9

☐ Reinforce the dihedral joint as follows: Cut four 12" pieces of the 4" wide Polymat cloth and spray them with 3M Spray 77. Apply it to the wing, overlapping 1/2" at the center. Impregnate with thin CyA. Sand to remove the fuzz and smooth out.

Using the heavy 1-1/2" wide glass cloth, provide additional reinforcement by applying it to the very center of the wing in two 12" pieces. The same technique works fine.

☐ Mark, drill, and tap for the hold down screws. Locate the rear holes 2" in front of the trailing edge and 4-15/16" from the center. The front ones are 1-1/16" forward of the front edge of the main spar and 4-15/16" from the center. Center punch and carefully drill a 5/32" hole, keeping it perpendicular to the outer surface of the wing. Go ahead and drill the rear hole on through the top of the wing. Drill the front holes in about 1/2", (it's okay to drill all the way through the wing). Now tap the holes out to 10-32 with a tap. Impregnate the tapped holes with thin CyA, let set and retap to clean up the holes.

☐ This completes the wing construction. Final sand the wing to prepare for covering.

BOTTOM WING CONSTRUCTION

☐ The bottom wing build similarly to the top wing, except for the installation of ailerons.

☐ Again build the wing one panel at a time. Begin by positioning the bottom 1/4 x 3/8 x 24" trailing edge, the 3/16 x 3/8" spruce bottom main spar and

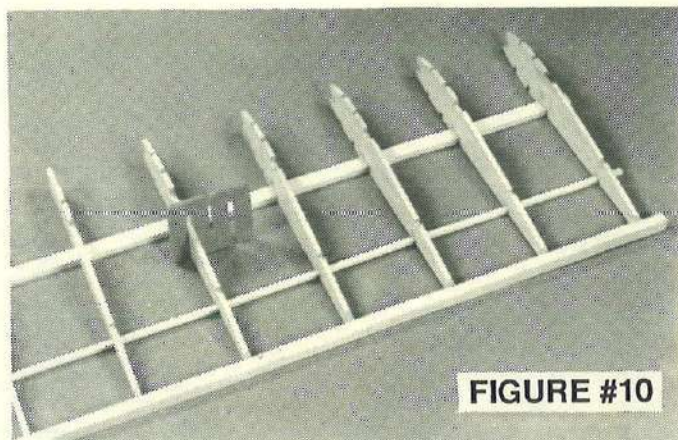


FIGURE #10

the 1/8" sq. spruce bottom rear spar in place flat on the work surface. Let any excess run out the tip of the wing. Use a few outer ribs to line them up. Note: The wing is flat from the main spar rearward. (FIG. 10)

☐ Glue the outer ribs in place, using thick CyA glue, keeping them perpendicular. A House of Balsa "Upright" is handy for this.

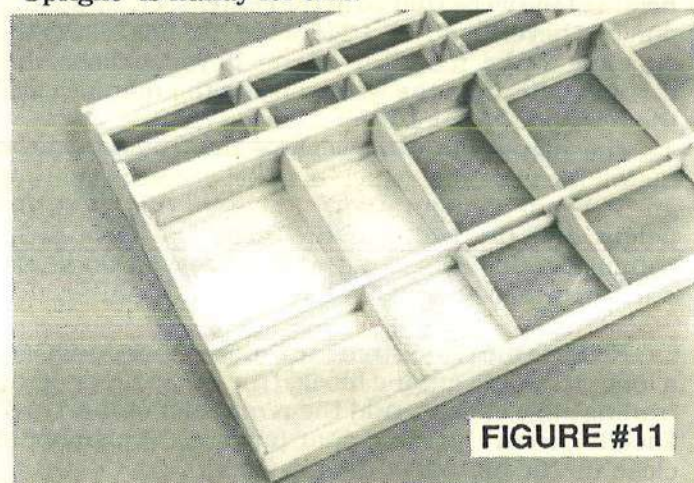


FIGURE #11

☐ Use two 1/16 x 3 x 4-3/8" pieces of balsa for the bottom rear center sheeting. Cut them to width to fit in between the trailing edge, rear spar and main spar. Glue into place.

☐ The center ribs are installed as follows: Keep the second and third ribs perpendicular and **use the Bottom Wing Root Angle Template to slant the first rib (root rib) inward to accommodate the dihedral angle.** Use the hardwood spacer blocks as a gauge to determine the distance between the first and second ribs. Glue the ribs and the rear spacer block in place. (FIG. 11)

☐ Now add the top main spar, top rear spar and the 3/8" sq. balsa leading edge in place, making sure it is seated square in the ribs. Leave the two 1/8" square spruce forward lower bottom spars out for now. Remember to let any excess trail out the tip. (FIG. 11)

☐ Glue the two 1/8" square spruce forward top spars in place. Let the glue set completely. (FIG. 11)

☐ Install the shear webs the same as you did for the top wing; refer to those instructions. You have the same two options for the bottom wing as you did for

the top wing. If you install the webs on the face of the spars, make sure you put the one for the innermost bay on the front face of the spars so the servo will clear it when it is installed. (FIG. 11)

- ☐ Add the 1/16" balsa top center sheeting. It fits in between the spars.

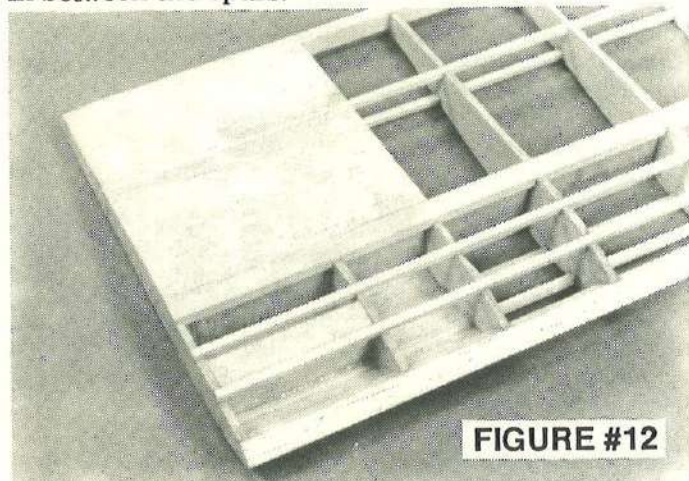


FIGURE #12

- ☐ Remove the wing and turn it upside down. Glue the hardwood front spacer block in place between the first two ribs...it is located between the 2nd and 3rd spar from the front. Make sure it doesn't extend beyond the bottom edge of the ribs, add the two remaining 1/8" sq. lower turbulator spars. (FIG. 12)

- ☐ Finish sheeting the bottom front of the wing.
- ☐ Add the wing tip and 1/8" balsa bracing as you did for the top wing.
- ☐ Sand the wing center section sheeting so it is even with the spars.

- ☐ **Repeat the same construction for the other bottom wing panel.**

- ☐ Refer to the Dihedral Sanding Detail in the top wing instruction and final sand the dihedral angle into the root ribs of both panels with the tips blocked up 3/4". Check to make sure that when both panels are joined, the total dihedral is 1-1/2".

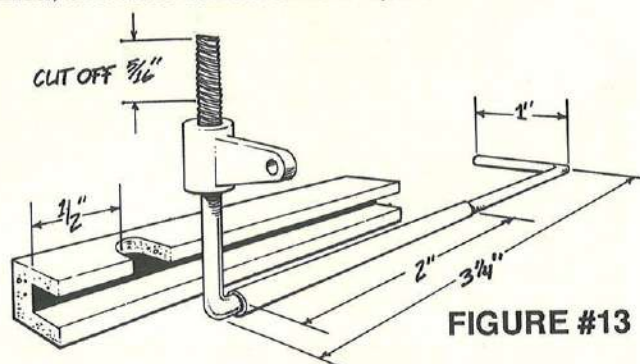


FIGURE #13

- ☐ Referring to the above drawing, make a "LEFT" and a "RIGHT" assembly with the materials furnished. Make sure the tubing is on the wire before bending it and make sure you make a right and a left assembly. If you grind a point on the end of the torque rod, it will aid insertion into the aileron later. Thread the nylon

fitting all the way on the threaded portion of the rod and, using a side cutters or hack saw, shorten the threaded portion by 5/16". This is to allow internal clearance in the fuselage. Apply some oil or Vaseline to the rod where it runs through the rod to prevent glue getting in. Roughen up the outer surface of the nylon tube with some fine sandpaper.

Notch the slotted hardwood aileron bearing blocks to clear the torque rod. (FIG. 13)

- ☐ After notching the trailing edge cap to clear the torque rod, glue each torque rod assembly to the trailing edge of each wing panel, making sure you don't get any glue on the torque rod.

- ☐ It is easiest to make the aileron servo/rail cutout with the wing in two halves; that way, you can get to the center rib to cut it away and you don't have to cut through the fiberglass reinforcing material. Use the main spar to mount the front of the servo and cut out for a piece of 1/4 x 3/8 x 2-1/2" spruce to be used as the rear rail.

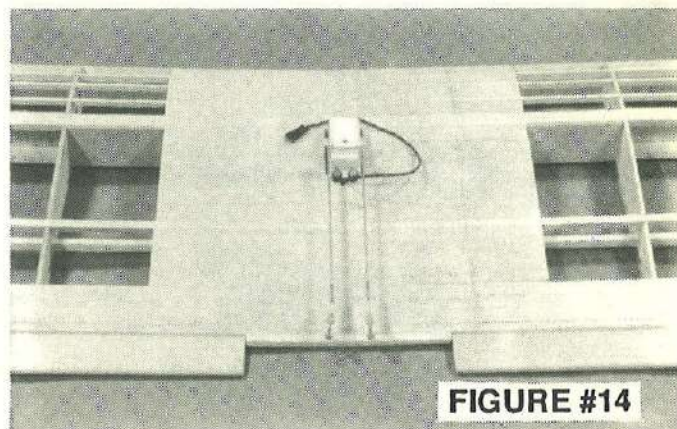


FIGURE #14

- ☐ Carefully epoxy the wing panels together, making sure the bottom of the wing panels line up from the main spar rearward. (FIG. 14)

- ☐ Carve and shape the leading edge contour as shown on the side view. Note that it is fairly blunt. (FIG. 8)

- ☐ Reinforce the center section of the wing using the 4" Polymat cloth and the 1-1/2" glass cloth just as you did for the top wing; be careful not to get any glue in the torque rods.

- ☐ Prepare the two 1/4 x 1-1/2" balsa ailerons as follows: Cut one to 22" long. Bevel the leading edge about 30° and round off the trailing edge.

Position each aileron on the wing butted against the outside end of the aileron bearing block. Making sure the torque rod is properly in it's place, mark the hole location for the torque rod and the hinge locations on both the ailerons and the wing. Drill a 3/32" hole for the torque rod and cut a groove from this hole to the end to accommodate the torque rod. Slot the ailerons, but wait until the plane has been covered to glue the hinges in. Cut and form the outer end of the ailerons to conform to the tip.

- ☐ The aileron servo can now be temporarily installed

and the linkage constructed using the threaded rod and clevises furnished. Hook the servo up first and check for the proper direction of travel...cross the rods if necessary.

FUSELAGE CONSTRUCTION

A few notes on the die cut light ply parts. Most of them will punch out cleanly and quickly...if you do have some stubborn parts that haven't been die cut all the way through, try sanding the back side of the sheet first. If need be, use a modeling knife to cut from the back side to release the part. Clean up the edges of the part with sandpaper and a blade.

There is usually one good side and one side that is rougher, has knots or some fill. This is normal. Just keep the good side to the outside of the plane when you can; it will look better.

Warpage is another normal characteristic of light ply, but the construction techniques used overcome any tendency of the warpage to be a problem.

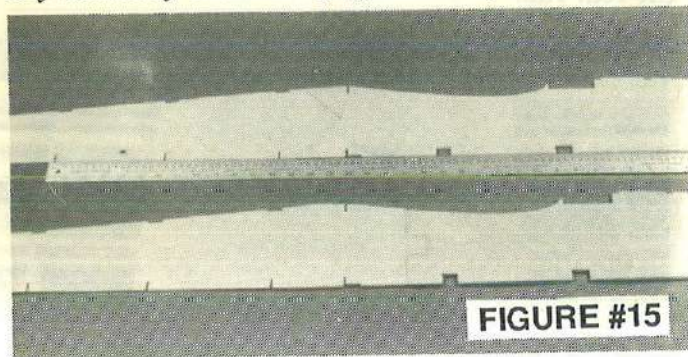


FIGURE #15

□ Using a straight edge to keep the top straight, glue the fuselage sides parts together with thick CyA. (FIG. 15)

□ Inspect your fuselage sides. One outer surface may have better quality than the other so you would want that side on the outside. Note also that there is some bow to the lite ply. This is normal and the self-locking construction will assure proper alignment as building proceeds.

□ Making a **RIGHT** and a **LEFT** side, glue the doublers to the inside of both fuselage sides with 30 minute epoxy. Scraps of lite ply temporarily placed in the slots will maintain proper alignment while you use concrete blocks or something similar to squeeze the parts together as the glue sets. Make sure you remove the scraps before the glue sets.

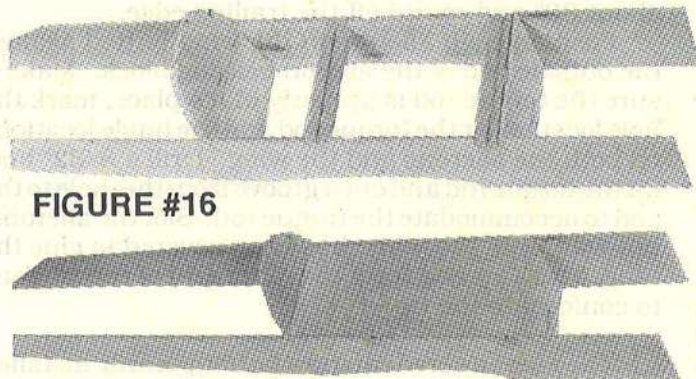


FIGURE #16

□ **Observe the following sequence carefully;** otherwise you could "paint yourself into a corner". Without gluing, fit the fuse sides, F2 (the notch goes to the top), and F3/T3 together. Slip the slotted trunion blocks in place with the slots upward. Then put the hatch floor in place, inserting the rear tab into the slot in T3 first. Some slight trimming of the tabs may be necessary. The hatch floor holds the structure square. When satisfied with the fit, glue these parts together by tacking together with thin CyA in all the corners, then running a bead of thin CyA over all the joints to penetrate the joint. Next reinforce all the joints with a bead of thick CyA on the inside. (FIG. 16)

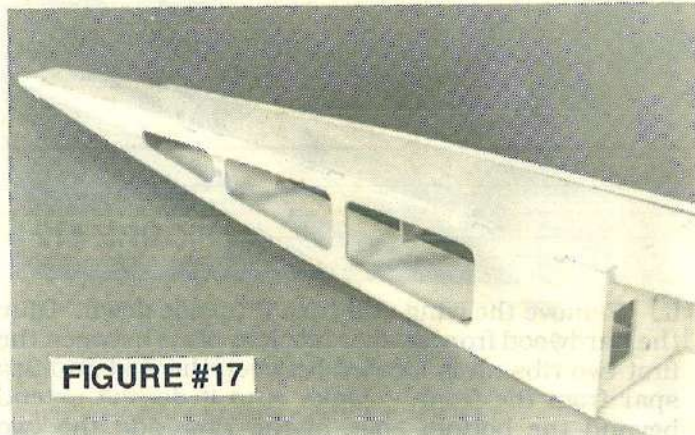


FIGURE #17

□ Fit the rear bottom into place; you will have to bevel the forward slot in the floor to clear the doubler. Clamp the rear of the fuselage together, keeping the edges lined up. Making sure the fuselage is square, spot glue the rear bottom in place; then run a bead of glue over all the joints, including where the sides join at the rear.

Laminate the two triangular lite ply tailwheel platform pieces together and glue in the notch at the rear of the fuselage. Note they hang out a bit; they are supposed to so they accommodate the nylon tailwheel bracket later. (FIG. 17)

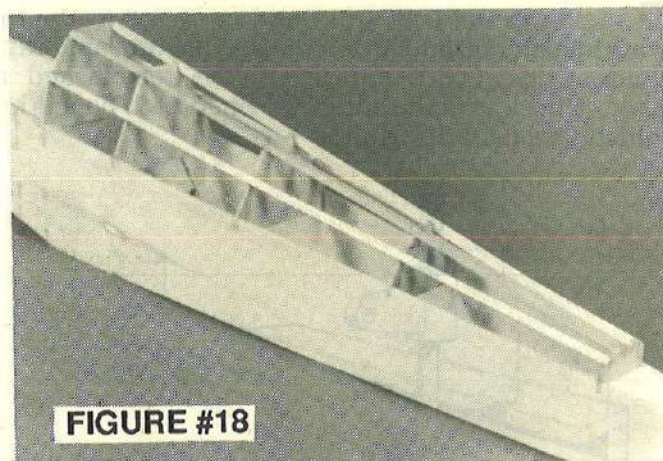


FIGURE #18

□ Glue F3T on top of F3, using a scrap piece of lite ply about 3/8 x 3" on the rear to reinforce the joint. Make sure that F3T stays vertical.

□ Glue in F4, F5, F6 and F7

□ Install the 3/16" sq. spruce stringers, gluing the side stringers in the slots in F3T and F7 and then affix

them to F4, F5 and F6, making sure they stay straight. The top ones go in the cut-outs in F3T, F4, F5, F6 and the rest on the top of F7, butted together at the center. The stringers are furnished longer than necessary and will need to be trimmed to length. (FIG. 18)

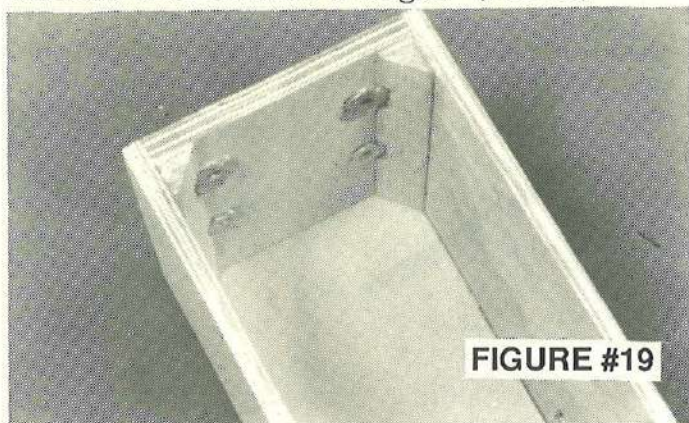


FIGURE #19

□ Using a 3/16" drill bit, drill the firewall for the motor mount. We recommend a Hayes or Tatone mount, if you are using a .60 or .90 four-stroke. The mount is centered left to right and the thrust line is 1-1/2" down from the top. Use the 6-32 screws and blind nuts to install the mount. The holes for the throttle linkage and the fuel line can be drilled later.

□ Using epoxy, glue the firewall and 1/2" triangular hardwood braces (cut three pieces from the 12" length furnished) to the fuselage. The firewall should be flush with the front edge of the fuse sides and the braces should not go all the way to the top edge; leave at least 1/8" between the top of the brace and the top of the firewall. When set, bevel the bottom of the firewall to match the fuse contour.

□ Glue the front bottom in place. (FIG. 19)

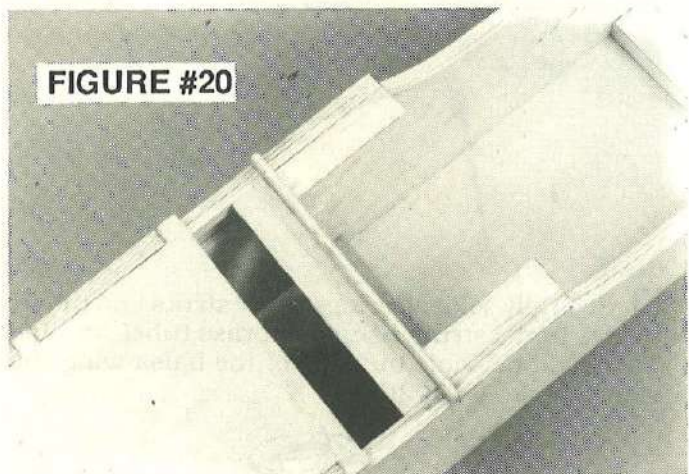


FIGURE #20

□ Sand the front fuselage bottom (to insure a good fit). Glue the 1/2" balsa triangular landing gear braces flush with the fuselage bottom. Make sure to allow for the landing gear block (LGB-1) notch. (FIG. 20)

□ Using epoxy, glue LGB-1 in forward of F2.

□ Using epoxy, glue LGB-2 in behind F2. (FIG. 21)

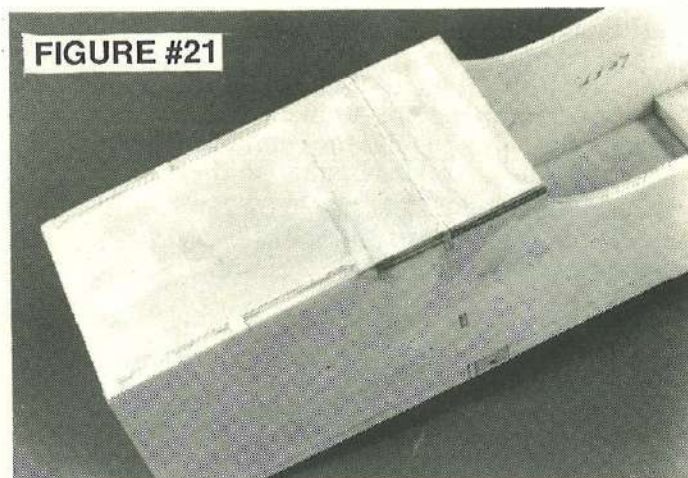


FIGURE #21

□ Plan the installation of the rudder, elevator, and throttle servos. 1/4 x 3/8" spruce is furnished for servo rails. Locate them as close to the hatch floor as possible and behind the rear trunion block, so they don't interfere with the aileron servo and linkage later.



FIGURE #22

□ 3/16" holes are to be drilled in F3 for the large outer control tubing in the proper location for your servos (depending on which side of the servo you need to come off to get proper control surface movement). Roughen up the outer surface of the large tubing where it exits the fuselage at the rear and goes thru F3, then install and glue. Note that the tubing crosses over at the rear. Trim the tubing off flush with the fuselage at the rear. (FIG.22)

□ Now it is time to make the cabane struts. You will need a large soldering iron or a small torch, some flux and some solder (silver solder is preferred).

The following steps are critical to the alignment of the top wing and need to be followed closely.

□ Take the music wire parts (six) for the struts; de-burr and round the ends; also shine them with fine sandpaper or steel wool so you get good solder joints later. Insert a strut in all four of the slots in the trunion blocks and move them in and out a couple of times to size the hole. Remove the wire struts.

□ With a sanding block, sand the hatch floor and the top of the fuselage sides flat from the front of the fuse to T3.

- Stack the two Top Wing Positioning Templates on top of one another. Line up the bottom edge flush. Line up the front edges flush with one another at the bottom. Clamp together. Check that the wing saddle area mates; due to tolerance variation in die cutting, you may have to cut and sand so they do.

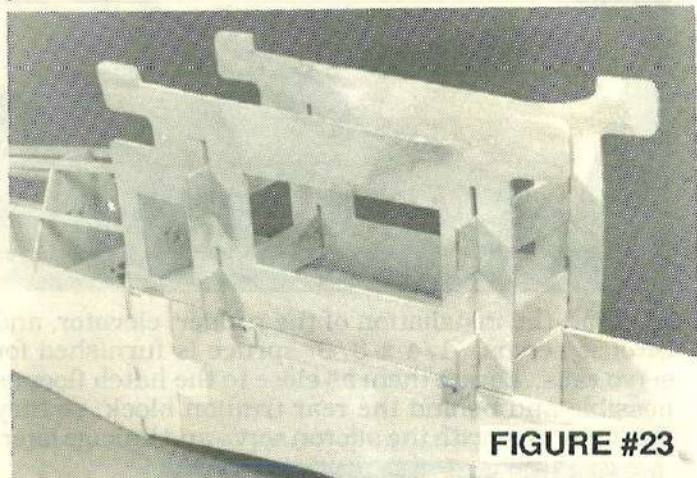


FIGURE #23

the front and the long ones in back.

- Slip one of the brass tubes onto one of the struts and then the lug. Using a 10-32 x 1/2" nylon bolt, go through the lug into the wing. Tighten down so the lug is lined up...you may need to increase or decrease the angle of the bend in the strut slightly; use a vise to do so. Repeat for the three other struts.



FIGURE #25

- Begin by assembling the temporary wing support and tack gluing it to the fuselage top with the rear of the support flush with the front of T3. Make sure it is sitting square on the fuse. (FIG. 23)

- Rubber band the top wing to the temporary support with the leading edge up against the front edge of the cutout in the support. Make sure it is centered. With a yardstick, measure from the rear edge of each wing tip back to the rear edge of the fuselage. Make sure the measurement is the same for each wing tip, right and left. Turn the fuse/wing assembly upside down and let it rest on your work surface...use a towel or something to protect the wing from getting dinged up.

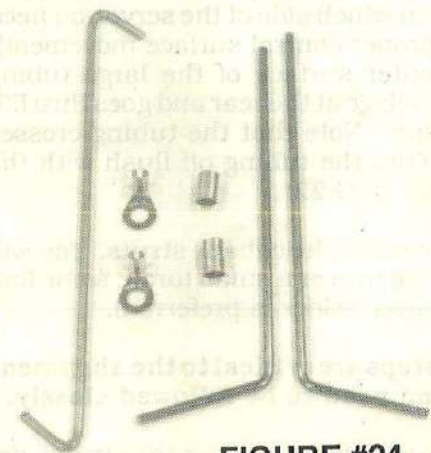


FIGURE #24

- Prepare four special lugs by spreading open the hole for the wire to 1/8" using a needle nosed plier. Use one of the pre-formed struts for a gauge. (FIG. 24)

- Now with the end of one of the struts inserted in the hole you just enlarged, bend the flat portion of the lug so it is about 80° to the wire. The

bend should be right at the shoulder of the lug. (FIG. 25)

- Prepare the four 1/2" lengths of brass tube by gently squeezing them with a pliers so they form an oval just big enough to go over two of the 1/8" struts.

- Insert the short end of each of the four struts into the slots in the trunion blocks. The short struts go in

- Position the strut cross brace so the bend is toward the top on the front strut and toward the bottom on the rear strut; slip the brass tube over it. Position it so it is equidistant between the fuse and the wing. Repeat for the other one. Everything should all be in place, lined up and ready to solder. (FIG. 25)

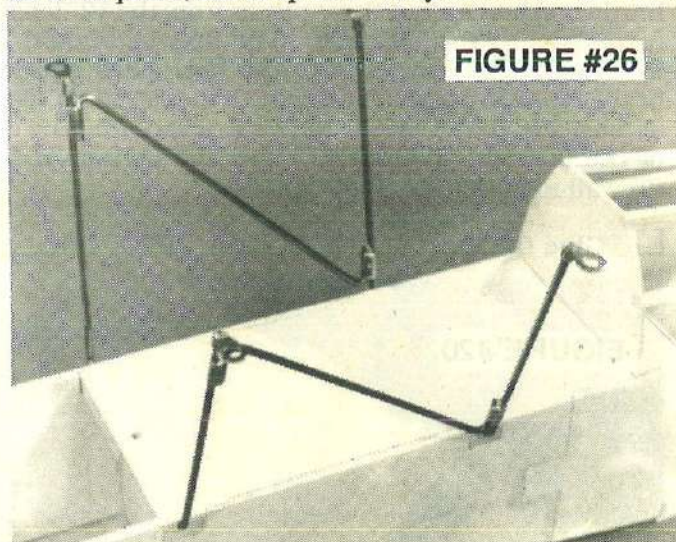


FIGURE #26

- Securely solder the lugs to the struts and the cross braces to the struts using the brass tubes as joiners. There will be some burning of the balsa wing sheet, which is ok. (FIG. 26)

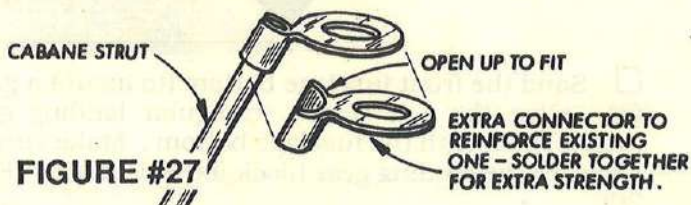


FIGURE #27

- After the usual 4 solder lugs are installed, install an extra lug to each mount making sure to get a tight fit between the two lugs and get a good solder joint (again, silver solder is recommended). This extra set of lugs will reinforce the lugs, insuring against breakage. (FIG. 27)

□ Remove the bolts, then the wing. Slip the struts out of the fuse and check all the solder joints. If there are any in question, repeat the procedure. Clean all flux residue with soap and water. File down any globs of solder and polish the solder joints with steel wool or a wire wheel.

□ The struts are now done. After the finish has been applied to the fuselage, use epoxy to glue the struts into the trunion blocks. Make sure you roughen up the glue area on the struts with sandpaper, before gluing.

□ Remove the Positioning Templates from the fuselage.

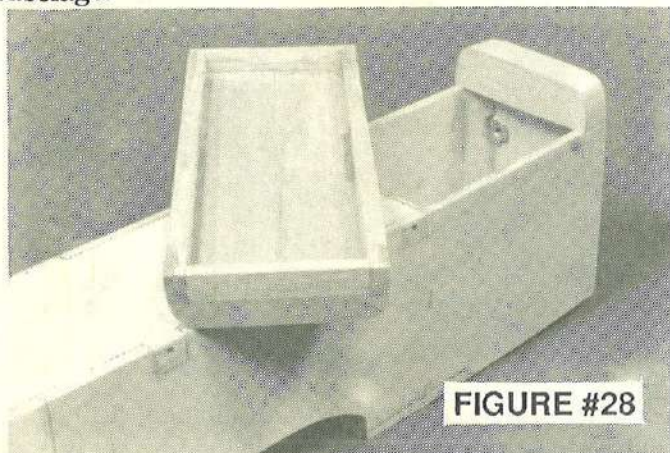


FIGURE #28

□ Next is the hatch. On a flat surface, glue the two $1/2 \times 1-3/4 \times 9-1/2$ " balsa pieces together so the angle cuts match, forming a $1/2 \times 3-1/2 \times 9-1/2$ " part.

□ Securely glue the $3/4 \times 1 \times 3-1/2$ " balsa block on the top of the fuselage, flush with the front of the firewall. Even up one side to match with the fuse side and then mark the other side so you can cut it to mate with the fuselage.

□ With a sanding block, true up the non-angled end of the $1/2$ " hatch block, then lay it on the fuselage with the front edge butted up against the rear edge of the block you just installed. Even up on side to match with the outside of the fuse side. Mark and cut the other side so the hatch block is the same width as the fuse side.

□ With the $3/8 \times 1/2 \times 26$ " stock furnished, frame up the hatch on the outer edges so it is now a 1" thick structure. Leave enough at the rear edge to accommodate the angle cut of the hatch. For the front and rear edge, you will need to use some of the scrap generated when you cut the hatch block to width. Cut the framework to match the rear angle of the hatch block. Put a piece of $3/8 \times 1/2$ " balsa widthwise centered at $4-5/8$ " back from the front of the hatch block to prevent crushing the hatch when the hold-down bolt is installed. (FIG. 28)

□ Tack glue the hatch onto the fuselage and shape the hatch as desired. (FIG. 29)

□ Drill a $3/16$ " hole down through the hatch and through the trunion block for the hold-down bolt. It

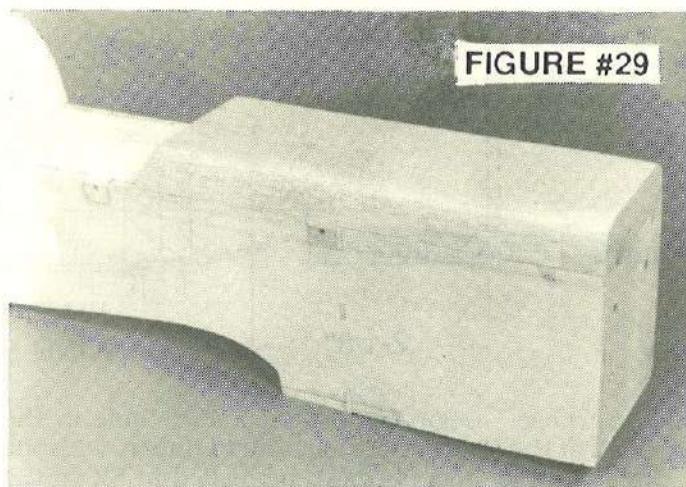


FIGURE #29

is located $5-5/8$ " back from the front edge of the fuselage and centered on the hatch. Keep the hole perpendicular to the top.

□ Pop the hatch loose and drill out the hole in the hatch to $1/4$ ". Tap the hole in the trunion block to $1/4-20$.

□ Cut two $1-1/2$ " pieces of $3/16 \times 1/4$ " spruce from the length supplied. Glue these pieces to either side of the bottom front of the hatch so they overhang the front about $3/8$ " and go up against the inside of the fuse sides to keep the hatch from moving side to side (measure in $1/4$ " from the edge of the hatch for the position). The overhang keeps the front of the hatch down...you may have to trim the pieces to clear the triangular firewall brace.

□ Install the hatch with the $1/4-20 \times 1-1/2$ " flat head bolt furnished...the bolt will countersink itself as it is tightened.

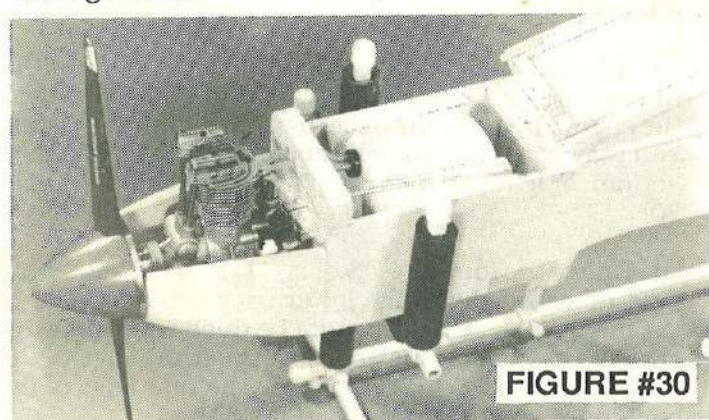
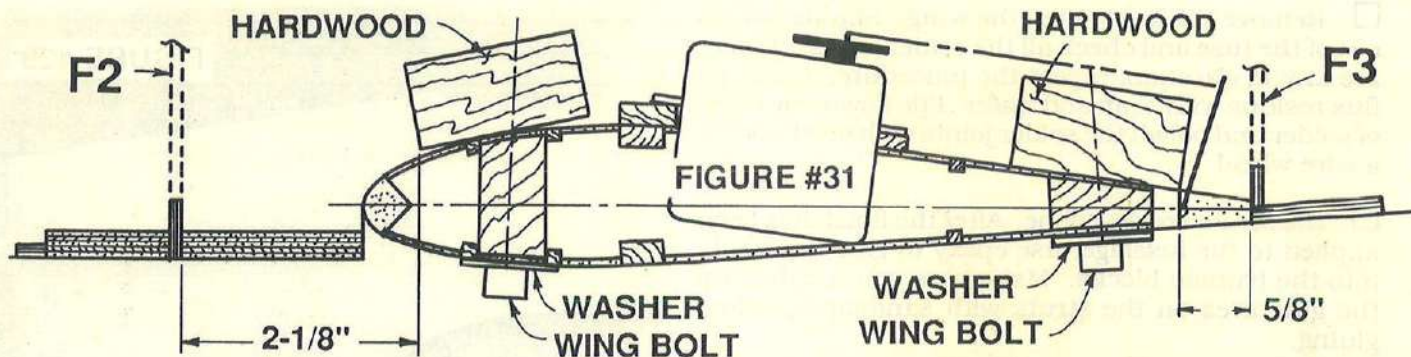


FIGURE #30

□ We would suggest installing the fuel tank at this time. A Sullivan SS-10 is recommended. Both fuel lines can come out the firewall. Position the tank as high as possible. Coat the inside of the tank compartment and the bottom of the hatch with epoxy before installing the tank. This coating will fuel proof the compartment. Once the glue is dry, install the tank. Use foam rubber to cradle the tank and hold it in position.

□ At this time, also install the throttle linkage. Temporarily install the engine and plan your linkage; an 18" length of inner (white) Nyrod is furnished for



this purpose. Begin by drilling a 1/8" hole in the firewall at the appropriate location to line up with the carb. Another hole needs to be drilled in F2 so the linkage runs straight to the planned location of the throttle servo. Install the 18" Nyrod and secure the Nyrod with thick CyA. Because the throttle arm on four stroke engines is usually close to the firewall, we recommend simply bending an "L" in the .047 music wire (furnished) to hook to the throttle arm. For the other end that hooks to the servo we have furnished a threaded coupler and clevis to solder to the music wire.

☐ If you are going to be using an Ace Nilite III, on board glow plug lighter, plan it's installation now. A hole will need to be drilled to run the plug lead through and the switch box positioned to mate with the throttle linkage.

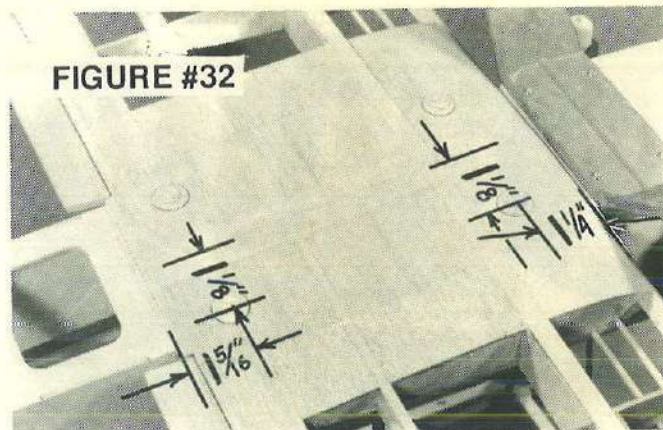
☐ Glue the 3/8" cowl sides onto the front of the airplane. Keep the bottom of the blocks flush with the bottom of the fuselage. They can be left square to the fuselage or slanted in somewhat. Check the length and make sure they don't extend beyond the spinner. (FIG. 30)

☐ Install the 1/2" filler block between the front of the cowl blocks vertically. (Trim as necessary to clear the engine.) Shape the nose of the fuselage as desired. You may want it to match the spinner contour at the bottom, or leave an "air scoop" effect to the nose. (FIG. 30)

☐ Epoxy the four 3/4 x 3/4 x 1-1/2" hardwood wing hold-down blocks in the lower wing compartment of the fuselage. The blocks must be flush with the outer edge of the sides (wing saddle); the front edge of the forward ones is 2-1/8" from F2. The rear edge of the back ones is 5/8" from F3. (FIG. 31)

☐ Position the bottom wing on the fuselage. You may have to do some trimming of the fuse rear bottom and the rear edge of the center of the wing for a good fit. **Make sure the wing fits in the saddle and take care not to change the angle of incidence of the wing.**

☐ On the outside of the wing, mark for the wing bolts. Their centers are 1-1/8" out from the center line of the wing. The front holes are 1-1/4" back from the front and the rear holes are 1-5/16" forward of the rear edge.



☐ With the wing centered and aligned, drill 3/16" holes where you have marked, being careful to keep the drill perpendicular to the outer surface of the wing. (FIG. 32)

☐ Remove the wing and drill the holes in the wing out to 1/4". Tap the holes in the hold-down blocks to 1/4-20. Impregnate the threads with thin CyA, and re-tap to clean up the threads.

☐ The wing is held on with the 1/4-20 nylon bolts and washers furnished.

TAIL ASSEMBLY

☐ Glue the two 1/4" balsa fin front and fin rear halves together on a flat surface. Notch the bottom of the fin to accommodate the horizontal stab; use the 1/4" slot in the lite ply stab base as a gauge for this notch; make the notch 3/8" deep and such that when the fin is in the slot, the trailing edges will line up. Trim and sand the fin, rounding the leading edge and keeping the trailing edge square.

☐ Pin the lite ply stab base on a flat surface. Make sure it stays flat.

☐ The stab base is to be framed with 1/4" balsa as follows: Cut and glue a 1/4 x 1/2" piece of balsa along the trailing edge for the stab base. Follow with two pieces of 1/4" square balsa for the leading edge, keeping it flush with the leading edge of the stab base. Glue on the 1/4 x 1/2" tips and using the fin as a spacer, glue on the 1/4 x 1/2" center pieces. **(Be careful not to glue the fin in place!)** Follow with the 1/4" sq. diagonals, centering them on the lite ply.

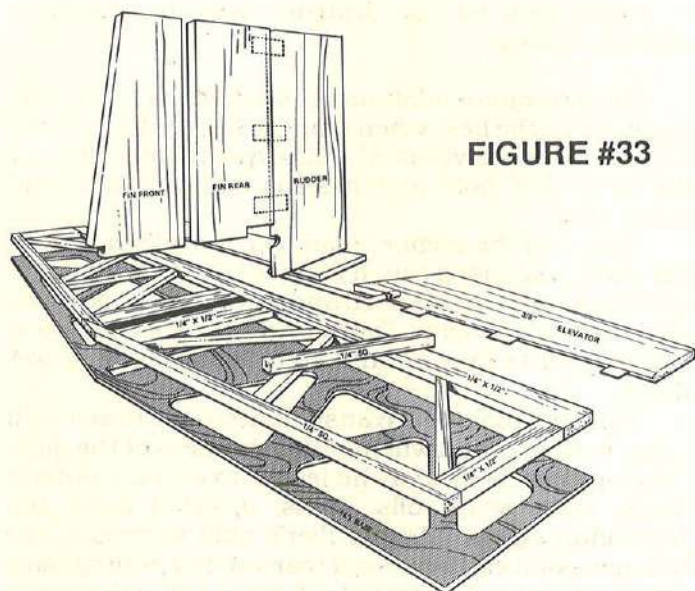


FIGURE #33

☐ Trim and sand the stab, rounding the leading edge and tips, keep the trailing edge square.

☐ Form the elevators by beveling the front edge about 30°; you can either taper the elevators to 1/8" at the rear or simply round off the rear edge. Notch and drill for the 1/8" music wire elevator joiner, making sure the ends match the ends of the stab. Glue in the joiner securely. (FIG. 33)

☐ Bevel the front of the rudder 30° and round off the rear.

☐ Slot for hinges and slip them together but, do not glue the hinges until the parts are covered.

☐ Temporarily position the stab/elevators on the rear of the fuse. You may want to tack glue it in place. Move the fin/rudder into place and cut a semi-circle

in the rudder to clear the elevator joiner.

☐ Using the full size template, the nylon tail wheel bracket and the 1/16" music wire furnished, bend the tail wheel strut as shown. **Make sure the wire is through the hole in the bracket before you begin bending!** Drill 1/16" pilot holes in the tail wheel mounting plate at the rear of the fuselage and mount the

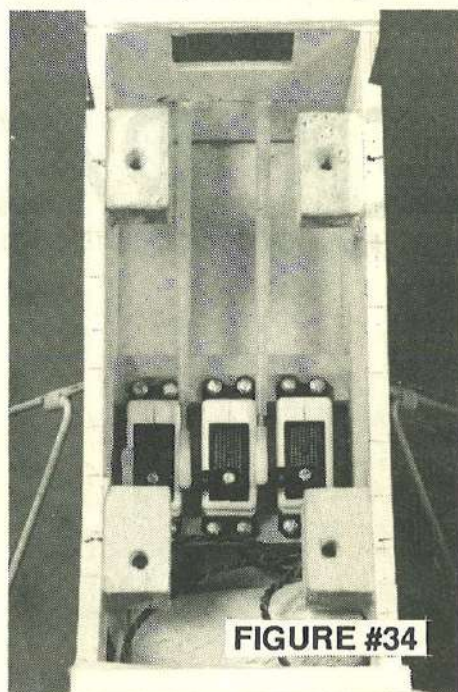


FIGURE #34

bracket in place with #2 x 3/8" self tap screws; the tail wheel strut should be up against the rear of the fuse. Sand off any overhang of the mounting plate. Check the fit and for proper rudder and elevator action. The arm of the tail wheel strut attaches to the rudder later after covering the rudder. Use a piece of thin fiberglass cloth and thin CyA to secure the strut arm at that time.

☐ Install the control horns on the rudder and elevator, using 2-56 x 1/2" bolts. Install the inner control rods (white) using threaded studs and clevises to hook to the servos and control horns. (FIG. 35)

☐ Disassemble the tail section at this time.

FINAL ASSEMBLY

☐ The fuselage and the tail assembly can be finished with your choice of covering materials and/or paint. Remember that a great deal of the 4-60/90 Bipe's success is due to the light wing loading, so keep whatever finish you choose light.

☐ After covering, install the main landing gear. It is mounted to the fuselage with four # 6 x 1/2" self tap screws. Mark and drill 3/32" pilot holes for the screws.

☐ Glue in the hinges for all surfaces.

☐ When gluing the tail assembly together, cut away the covering material where you're going to make a joint. Be careful not to cut into the wood or you'll weaken the joint. Glue the fin/rudder to the stab/elevators keeping them perpendicular. Glue the tail assembly to the fuselage making sure proper alignment is maintained. Brace the tail assembly to the fuse with the triangular stock furnished. Cover the triangular bracing after installation.

CONTINUED ON OTHER SIDE ➡

- ☐ Secure the tailwheel strut to the rudder, using a small square of fiberglass and thin CyA.
- ☐ Reinstall the control horns on the rudder, elevator and the control linkage. Complete the throttle linkage (bolt the engine in first). Install the battery pack and receiver according to the manufacturer's instructions.
- ☐ Trim and glue the canopy to the wing with a flexible white glue. Install a pilot of your choice (we recommend our 1/6th scale "Cap'n Eddy" pilot figure..Ace part # 60K63). Mylar stickers are furnished to put a large "4-60" on your choice of wing panels and two smaller ones on the fuse sides, to the rear of the wing. The Cap'n Eddy logos look great on the fin.

FLYING

- ☐ Make sure the balance point (CG) is properly located. For the first flight, we suggest that the CG be at the leading edge of the lower wing. For for more maneuverability and better snaps and spins the CG can be slowly moved to the rear.
- ☐ For the maiden flight, we suggest the following control deflections and set up:

Rudder: 3/4" right and left
Elevator: 1/2" up and down
Ailerons: 3/8" up and down
CG: leading edge of lower wing
Incidences: thrust line : 0°
 top wing: + 1°
Bottom wing: 0°

All throws are measured at the rear of the surface.

Again we'll let the designer describe the flight characteristics:

"Prop recommendation is to start with a 13 x 6, this seems to be the best when using a .60 size four stroke engine. Each individual should experiment a bit to get the prop that best matches his engine, plane and flying style.

"Start up the engine, point the model's nose into the wind, add just a touch of right rudder until the 4-60 Biqe gains a bit of speed and watch it take off on its own with no problem. This has to be about the easiest tail-dragger to take off and land as anyone has ever flown.

"The flier making a transition from a trainer with a flat-bottom airfoil will find the slowness of the flight envelope nearly ideal as he learns to execute outside loops, rolls, snap rolls, spins, inverted flight and horizontal eights. As the flier's skill increases, the balance point can be moved rearward by adding some weight to the tail; aerobatic figures will tighten and become more brisk.

"The 4-60/90 BiPe may be one of the most deceptive looking designs around. The 4-60 BiPe looks like a trainer, but possess flying qualities that are satisfying to a wide range of experience levels."

We here at Ace R/C hope you do enjoy building and flying your 4-60/90 BiPe. We welcome your comments.



ACE R/C

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