VENTURE 60

INSTRUCTION BOOK

INTRODUCTION

by Bruce Tharpe

The Venture 60 is the flagship of what I hope to be an ever-expanding line of kits from BTE. I've been designing and building models like this for many years now and can honestly say that the Venture 60 is my personal favorite. It seems to have the smooth flying characteristics of a bigger model without the transportation hassles. It's designed to build fast, fly great, and provide its builder/pilot with a high sense of value and satisfaction.

The steps in this book are numbered from 1 to 60. You should follow them in order in each main section (Wing Assembly, Tail Assembly, etc...), but you can jump around from section to section as it suits your building style. At times, you'll need one part of the structure partially completed in order to continue with another part. Please read this book and study the plans carefully before you begin building.

This is the second printing of this instruction book, which means we've had time to hear from a number of builders. Most of them have loved the model just as designed, but there's always room for improvement. Some modelers like to clip off a rib bay from each wing panel. This brings the span down to about 66", making the wing a little easier to transport. It also gives a model that rolls and snaps faster with a slight increase in landing speed. Another common modification is a soft balsa cowl built onto the nose that flairs into the spinner. A number of builders like to use dual servos (one in each wing panel) for the ailerons. All of these ideas have worked out well, so plan ahead if you wish to incorporate them into your Venture 60. Your input is always welcome at BTE.

CHOOSING AN ENGINE - The recommended engine range for the Venture 60 is as follows:

.60 - .65 2-Stroke
.65 - .80 4-Stroke

To some modelers, the Venture 60 may seem on the big side for these engines, and I suppose it is compared to a lot of sport models. But the Venture 60 is also designed to be as light or lighter than those smaller airplanes, resulting in a very low wing loading. A typical sport .60 engine swinging a fairly low-pitch propeller will provide nearly unlimited vertical performance at the design weight of 7.25 pounds, so extra power is simply not necessary. Besides, bigger engines weigh more and may need tail weight to balance, which will ultimately raise the wing loading, increase in-flight stresses, and hurt the model's performance at low-speed.

RADIO REQUIREMENTS - You'll need at least a four-channel radio with standard servos for each function. Be sure to use a radio system that transmits on a frequency approved for use in model aircraft.

GLUES - The Venture 60 can be assembled almost entirely using cyanoacrylate adhesives (abbreviated throughout the book as "CA"). These super glues usually come in three different viscosities: thin, medium, and thick. Use thin CA on tight-fitting balsa or to tack glue an assembly. Use medium CA on lite-ply, or on joints that have a small gap. Thick CA (sometimes called "slow") is good for larger gaps or for applications where you need a few seconds to properly position the parts. When using thin or medium CA, the parts should already be in contact and positioned perfectly before application of the glue. Capillary action will pull the CA into the joint and allow it to soak into the surrounding wood.

There are several places in the book where the use of epoxy, yellow glue (aliphatic resin), and flexible white glue are specified. Epoxy is generally used in high-stress areas like the firewall and wing center joint. Yellow glue is nice to use on joints that will require sanding. Flexible white glue is good for adhering to plastics, like the canopy.

Whatever glue you use, don't be stingy with it! The overall strength of every model airplane depends on properly bonded joints. Let's build!

BTE
BRUCE THARPE ENGINEERING
8622 E EVANS CREEK ROAD, ROGUE RIVER, OR 97537
Quality-Minded Model Aircraft Kits

WING ASSEMBLY

The flying qualities of your VENTURE 60 depend almost entirely on building a straight, warp-free wing. A true building board that is not bowed or twisted is a must for accurate construction. A perfectly flat table, counter, or door core can be topped with a pinnable surface like cork, foam board, or sound-deadening board. Pin the wing plan to your building board and protect it with a layer of waxed paper. You can roll up one side of the wing plan to keep it neatly out of the way while working on the opposite wing panel.

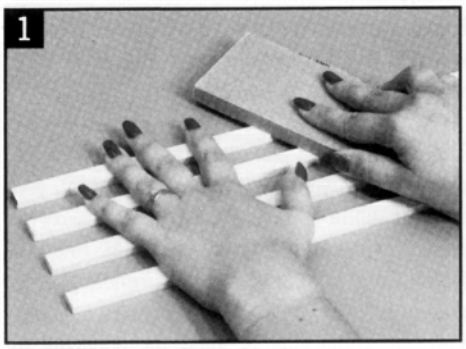
A check-off box has been provided for every step in the manual to help you keep track of your work. If a step has two boxes, you must perform the step twice, once for the left side and again for the right.

BUILDING THE WING PANELS

1. ☐ a. Drill two 1/4" diameter holes in each wing rib, one ahead of the main spar and one aft. The actual placement isn't critical; these holes will allow the transfer of hot air during covering (helps prevent "ballooning").

☐ b. The 3/32" balsa trailing edge sheeting is provided extra wide so that you can cut them perfectly straight before installation. Use a long straightedge to trim the four sheets of 3/32" x 2" x 36" balsa down to 1-1/2" wide.

☐ c. Now's a good time to sand the 1/2" sides of the spruce main spars. It will be difficult to sand them after they've been glued into the wing structure without hitting the edges of the wing ribs. Use 150 or 220 grit.



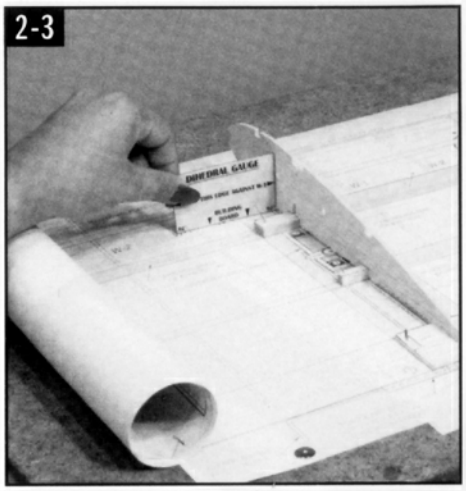
2. ☐☐ a. Pin the bottom 1/4" x 1/2" x 36" spruce main wing spar over the plan. Position the pins carefully so they won't interfere with the ribs or shear webs to be added later.

☐☐ b. Pin a 3/32" x 1-1/2" x 36" balsa trailing edge sheet into position, again watching the placement of your pins.

☐☐ c. Use a few ribs to accurately position the bottom 1/4" x 1/4" x 36" balsa rear spar, then pin the spar in place.

3. ☐☐ a. Carefully cut the dihedral gauge from the printed "Tools 'N Stuff" sheet.

☐☐ b. Glue two W-1 ribs in place, using the dihedral gauge to set the root rib at the proper angle (2 degrees).

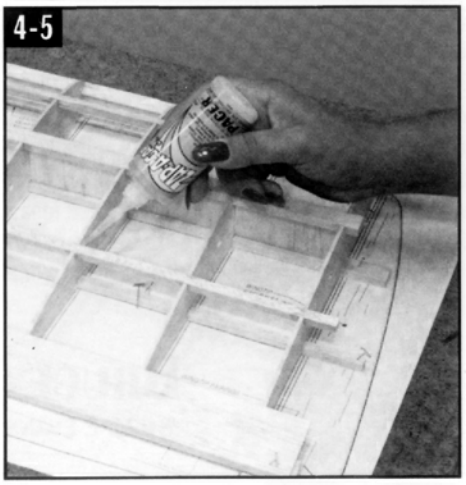


4. ☐☐ a. Glue the two W-2 ribs in place. Cut one of the 3/32" balsa shear webs to fit between the W-2s and glue it in place.

☐☐ b. Starting at the outboard W-2 wing rib, glue on a 3/32" balsa shear web followed by a W-3 wing rib. Continue alternating webs and ribs until all nine W-3s and nine shear webs are attached. Don't worry if the rib positions begin to vary slightly from the plan (which is most likely due to the plan paper shrinking or stretching during the blueprinting process). Just keep the ribs parallel to the drawing and go for nice, tight joints between the ribs, webs, and spars.

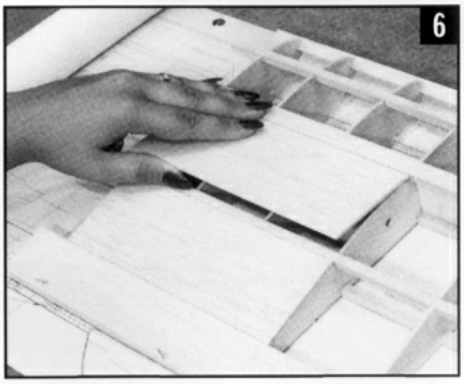
5. ☐☐ Glue the following items into place:

- Pre-shaped 1/4" x 1/2" x 36" trailing edge.
- 3/32" x 1-1/2" x 36" trailing edge sheeting.
- 1/4" x 1/2" x 36" spruce top main spar.
- Pre-shaped 3/8" x 3/8" x 36" leading edge.
- 1/4" x 1/4" x 36" balsa top front spar.
- 1/4" x 1/4" x 36" balsa top rear spar.



6. ☐☐ a. Remove any pins that are located under the area where the top center sheeting will be installed. You don't want any surprises later on when you try to lift your wing from the building board!

☐☐ b. Sheet the center section using two 3/32" x 3" x 7" balsa pieces aft of the main spar, and two pieces of 3/32" x 2" x 7" balsa forward of the main spar. The sheets will have to be trimmed and sanded for a perfect fit. Yellow glue is recommended for this step because it makes the joints easier to sand. Pin or tape the sheeting in place and allow it to dry.

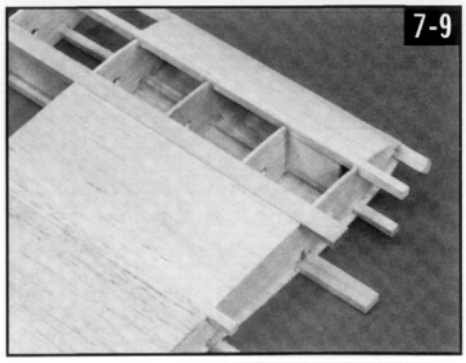


7. ☐☐ a. When dry, unpin the wing panel from the building board and install the bottom 1/4" x 1/4" x 36" balsa front spar.

☐☐ b. The 1/8" lite-ply wing dowel plate needs to be bevelled slightly on the top and bottom edges to fit snugly between the forward spars. When it fits well, glue it in place.

8. ☐☐ **This is Important!** Go back over every joint in the wing right now using medium CA glue, especially if you've been using thin CA to "tack" things together. When finished, you should be able to see a small build-up of glue on both sides of every joint. Remember that the strength of the wing is determined by the integrity of the glue joints.

9. ☐☐ Install the bottom center sheeting as you did the top except for the area between the main spar and the forward spar. Leaving this area open will allow access when joining the wing panels and installing the wing dowels.



10. ❒❒ a. When dry, trim and sand the leading edge, trailing edge, spars, and sheeting flush with the ribs at both ends of the panel.

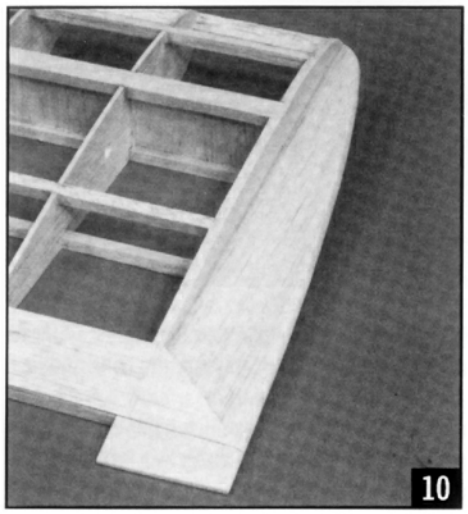
❒❒ b. Attach W-4 to the W-3 wing rib at the tip. W-4 provides extra support and surface area needed during covering.

❒❒ c. Glue the 5/16" balsa wingtip to the 5/16" balsa wingtip trailing edge, then glue this assembly to W-4.

❒❒ d. Add the 1/4" balsa top wingtip fairing and the 1/8" balsa bottom wingtip fairing to the wingtip assembly.

❒❒ e. When dry, carve and sand the wingtip fairings and the wingtip trailing edge to match the natural contour of the wing. Use a long sanding block with one end wrapped with paper to protect the trailing edge sheeting.

❒❒ f. Round off the outer wingtip edge.

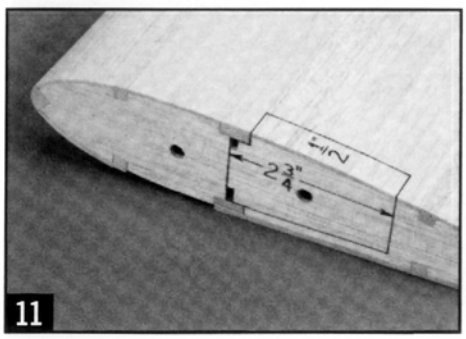


JOINING THE WING PANELS

11. ❒❒ a. Sand the top center sheeting smooth using a 150-grit sanding block.

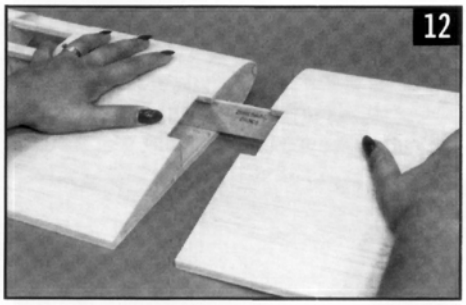
❒❒ b. Cut a servo opening into the root W-1 rib and the top center sheeting as shown in the photo below.

❒❒ c. Carefully finish cutting the slot for the dihedral brace in the remaining W-1 rib. Use a thin sanding stick or an emery board to smooth the edges of the slot. Try to make the slot just wide enough for the dihedral brace to slide through.



12. ❒ a. Trial fit the dihedral brace with the two wing panels to make sure it fits between the spars and allows the panels to make solid contact. The proper dihedral angle of 2° per panel will be automatically set by the dihedral brace. Your main goal is to create a solid wood-to-wood joint at the wing center with no gaps. Trim or sand the dihedral brace or wing panel ends if necessary for a proper fit.

❒ b. Apply epoxy to both root ribs and to the edges of the dihedral brace, then slide them all together. Use slow-drying epoxy if you want plenty of time to work, or 5-minute epoxy if you're feeling brave. Tape or pin the wing halves together, making certain that the leading and trailing edges are aligned, and allow to dry.



13. ❒ a. Double check through the openings in the wing that the dihedral brace is firmly glued to the ribs and spars. If necessary, apply some more epoxy to any "dry spots".

❒ b. Glue the 1/8" lite-ply servo backplate to the rear of the servo opening in the wing. When dry, trim the top of the backplate flush with the top center sheeting.

14. ❒ a. The threaded portion of the aileron torque rods are bent forward a few degrees to mechanically provide a small amount of differential aileron movement (more up than down). This results in smoother rolling characteristics. Place the torque rods side by side to make sure the forward angle is the same on both.

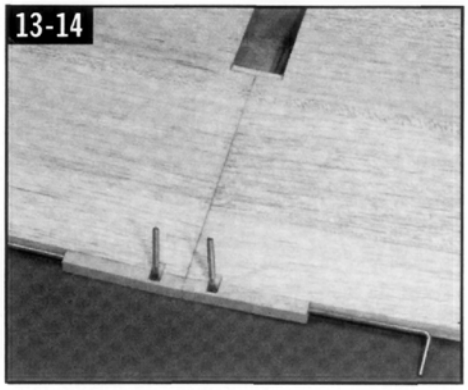
❒ b. Locate the 1/4" x 5/16" x 2-1/4" basswood torque rod blocks (with 1/8" groove), and cut notches into them to clear the upright portion of the torque rods.

❒ c. Rough up the brass bearings on the torque rods with some sandpaper, then glue them into the grooved blocks so that the outer ends of the bearings are even with the outer ends of the blocks. Be careful not to get any glue into the brass bearings!

❒ d. Glue the torque rod blocks to the wing trailing edge, again being careful to keep any glue out of the bearings.

❒ e. Notch the trailing edge just enough to allow full movement of the torque rods.

❒ f. Sand the top of the basswood blocks to match the upper wing surface.



15. ❒ Score halfway through the center of the 1/16" x 1" x 3-3/4" plywood wing bolt plate, then gently crack it to match the dihedral angle. Glue the bolt plate to the bottom of the wing at the trailing edge. (See photo 33).

IMPORTANT! Complete the steps in "Mounting the Wing to the Fuselage" on pages 5 & 6 before continuing!

16. ❒ a. Add the final two pieces of 3/32" balsa sheeting to the bottom of the wing.

❒ b. When dry, sand the bottom center sheeting smooth. Lightly sand the entire wing to remove any bumps or high spots. Be careful when sanding near the leading edge - it's very easy to distort or break the curved edges of the wing ribs with your sanding block.

17. ❒ Reinforce the wing center joint with 2" fiberglass tape applied to the top and bottom. The easiest way to do this is to mist one side of the fiberglass tape with a spray adhesive (such as 3M "77"), stick the tape in place on the wing, and saturate it with thin CA. Epoxy can also be used for this step. Run the tape completely over the servo opening, then cut it away after the glue dries. This will help to reinforce the sheeting around the opening.

18. ❒❒ a. The ailerons are virtually ready-to-use as supplied in the kit. You can block sand the top and bottom of each aileron so that the thickness of the trailing edge is constant. The idea here is to change the angle of the sanding block as you approach the tip of the aileron so that the leading edge remains unchanged. It sounds tricky, but an 80-grit sanding block will make quick work of this chore.

❒❒ b. Position the aileron on the back of the wing, leaving a 1/32" gap between it and the wingtip. Mark the location of the torque rod wire, then drill and slot the aileron leading edge to accept the torque rod wire.

❒❒ c. Tape the aileron in place and sand the outboard end as necessary to make it flow smoothly into the wingtip.

FUSELAGE ASSEMBLY

Several parts that are used in the fuselage require some preparation before assembly. It's best to have your engine, engine mount, fuel tank, and radio system on hand for some of the following steps.

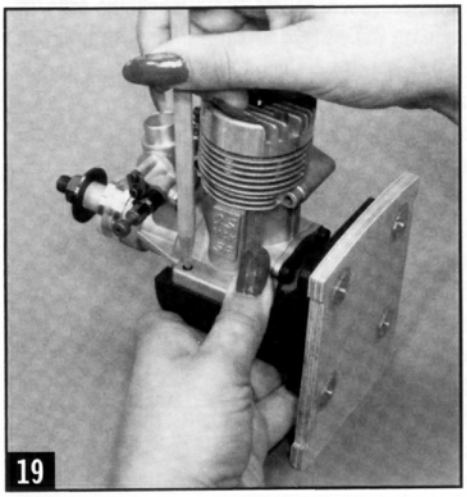
PREPARING THE FUSELAGE PARTS FOR ASSEMBLY

19. ❒ a. Using the "Cross-Section at F-1" drawing on the plan, draw the center line and thrust line on the front of the 1/4" plywood firewall, F-1. Be sure the pre-bevelled bottom edge of F-1 is facing up for this step.

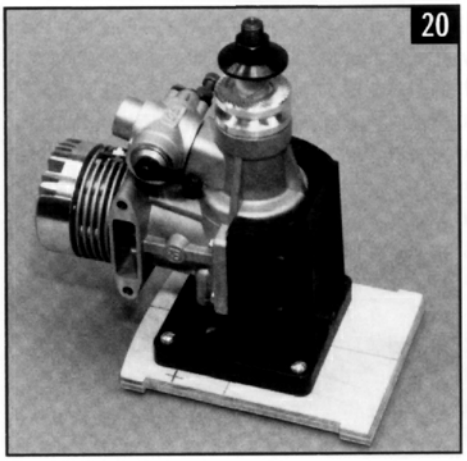
❒ b. Place your engine mount (not included in the kit) on F-1, and align it on the lines you just drew. While holding the engine mount in place, mark the locations of the four mounting holes. Remove the mount, then drill at each mark with a 3/16" drill bit.

❒ c. Hammer four 6-32 blind nuts into the back of F-1 at the mounting holes. Bolt your engine mount onto F-1 using four 6-32 x 3/4" machine screws. Tighten all four screws, then apply medium CA around the edges of the blind nuts. Avoid gluing the threads!

❒ d. Place your engine on the engine mount and mark the location of the engine mounting holes. Drill at the marks (and tap, if necessary) for your engine mounting bolts (these are also not included in the kit but are generally supplied with the engine mount).

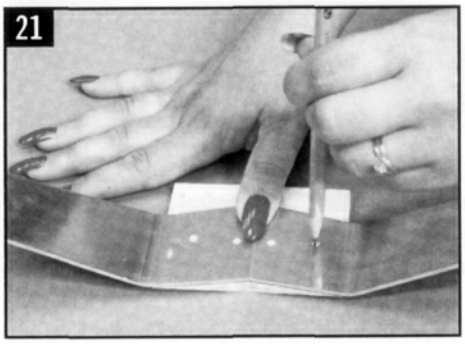


20. ❒ Temporarily bolt your engine to the mount, then mark the best spot on F-1 for the throttle pushrod to come through. The idea is to route the pushrod straight towards the carburetor's throttle arm. Remove the engine and mount, then drill at the mark with a 9/64" diameter drill bit.

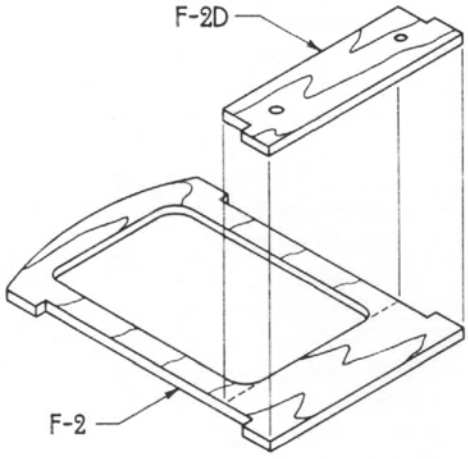


21. ❒ a. While holding both the left and right aluminum main landing gear in place on the 1/4" plywood landing gear mount, mark the location of the four mounting holes. Remove the gear, and drill 3/16" holes at the marks.

b. Hammer, and then glue four 6-32 blind nuts in the top of the landing gear mount.

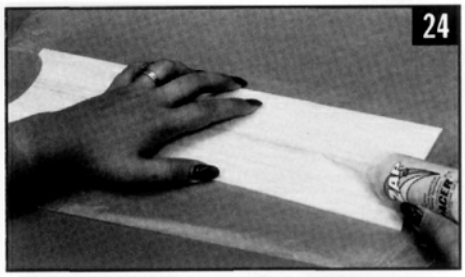


22. ❒ Glue F-2D onto fuselage former F-2. Both parts are precision-cut 1/8" lite-ply. Once assembled, drill through both formers at the two pilot holes in F-2D using a 1/4" dia. drill bit.

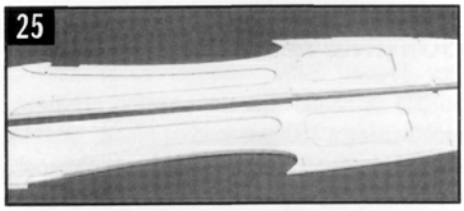


23. ❒ Using the fuselage top view on the plans as a guide, draw locating marks for the instrument panel and the headrest on the 1/8" lite-ply cockpit floor. Look ahead to photo 27 to see how the cockpit floor should be marked.

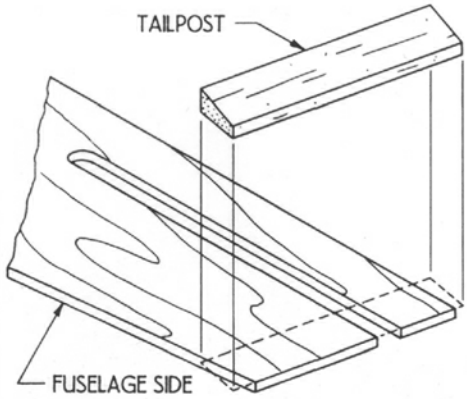
24. ❒ The 3/32" balsa nose sheeting is constructed from two precision-cut pieces which must be joined at the center. A bumpy seam will become very obvious on the finished model, so care must be taken to make a high quality glue joint. On a very smooth surface (glass is best), lay down some wax paper and mist it with CA accelerator from a spray bottle. Lay the balsa pieces on the wax paper, squeeze the parts together with one hand, and apply a bead of thin CA glue to the joint with your other hand. The accelerator on the wax paper should instantly cure any glue that seeps through. If done properly, the seam will be virtually invisible when you lift the nose sheeting and look at the opposite side. Yellow glue is NOT recommended because this top sheeting will probably need wetting for installation, which would dissolve a joint made with yellow glue.



25. ❒ Glue the fuselage doublers to the fuselage sides, primarily using the wing saddle area for proper alignment. Slow CA or 5-minute epoxy will work well for this. Do avoid the classic mistake of making two left sides or two right sides! You need one of each.



26. ❒ Add the 1/4" x 1/2" x 3-3/8" balsa tailpost to the tail end of either ONE of the fuselage sides. Allow the tailpost to overhang at both ends; it will be trimmed later.



BASIC FUSELAGE ASSEMBLY

27. ❒ a. Carefully tape (don't glue!) the fuselage sides together at the back end, sandwiching the tailpost. It's vital to the overall straightness of the fuselage that the sides are aligned to each other at this step.

❒ b. Place all of the formers, F-1 thru F-6, into position between the fuselage sides. Use a rubber band or tape at each former location to hold everything together. Double check that F-3 is right-side-up (the bottom has a shallow "V" to match the wing dihedral angle).

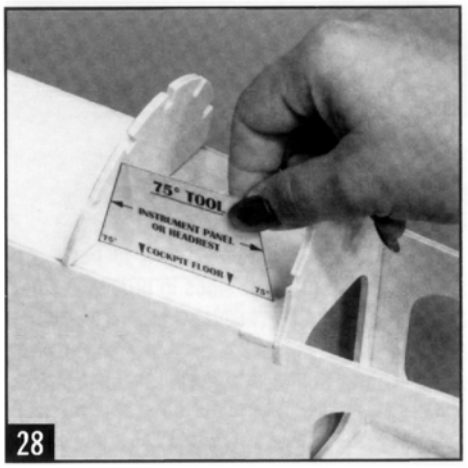
❒ c. Slide the rear fuselage bottom under the rubber bands until the tabs snap into place. Use tape to force the rear fuselage bottom to conform to the bottom edge of F-3.

❒ d. Slide the cockpit floor into place, making certain the lines for the instrument panel and headrest are facing "up".

❒ e. Carefully check the overall alignment of the fuselage. The locking action of the tabs and slots almost guarantees straightness, but it's still possible for minor warps or twists to creep in. To help keep the nose straight, install the tank floor but don't glue it in place until step 35. You may have to notch the front edge of the tank floor to clear the blind nuts on F-1. To maintain the curvature of the fuselage front (as viewed from above), it's also helpful to run a piece of tape from side to side at the nose, stretching it slightly. As a final check, hold the fuselage over the top view on the plans and look for any misalignments. If necessary, push or twist the parts into alignment and use tape to hold them there.

❒ f. When you're totally satisfied that the fuselage is straight and untwisted, grab your bottle of medium CA and start gluing! Glue at the corners first, followed by the longer, straight sections. Don't forget to glue the tailpost to the second side. Go over all of the joints a second time with medium CA. When dry, remove the rubber bands and tape.

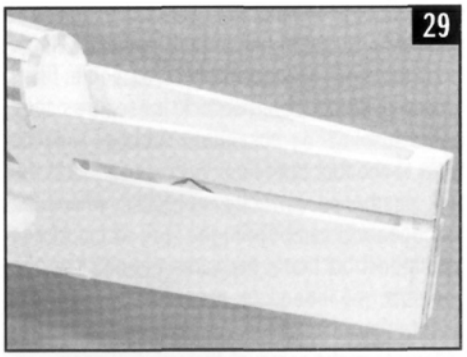
28. ❒ Cut the 75° Tool out of the "Tools 'N Stuff" sheet, then use it to glue the headrest (HR) to the cockpit floor at the correct angle. Don't bother bevelling the bottom edge of the headrest - just fill the small gap between it and the cockpit floor with medium CA.

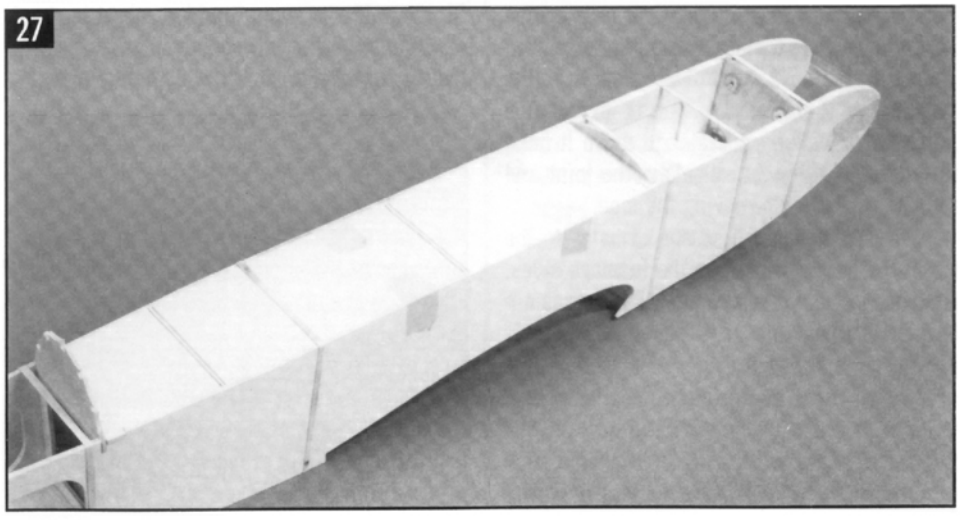


28

29. ❒ a. Add the five 3/16" x 1/4" balsa turtledeck stringers to the notches in the formers. Before you glue, sight down each stringer to make sure it's straight. You may have to modify some notches to make the stringers perfectly straight. After gluing, trim the ends of the stringers flush with the front of the headrest and the rear of F-6.

❒ b. Sand the ends of the tailpost flush with the edges of the fuselage sides.


29

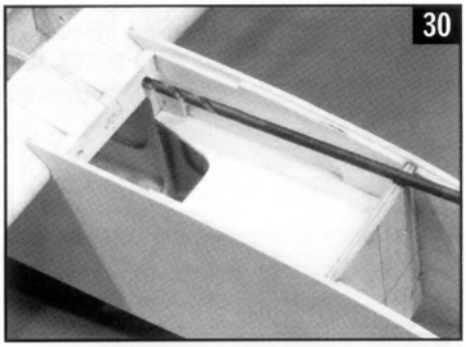

27

MOUNTING THE WING TO THE FUSELAGE

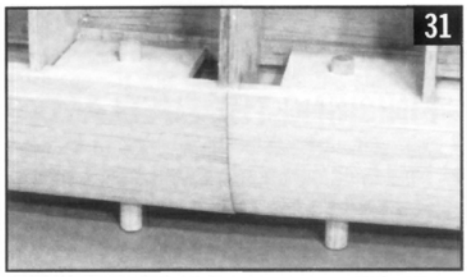
NOTE: The wing must be finished through step 15 before proceeding

30. ❒ a. Trial fit the wing to the fuselage. You may have to sand tiny sections of the wing saddle area for a perfect fit. Avoid sanding the entire wing saddle because it could change the pre-set wing incidence angle of +1/2°. Align the wing carefully, making sure it's centered and square to the fuselage when viewed from above, then tape it firmly in place.

❒ b. Use an extra-long 1/4" dia. drill bit to drill the two wing dowel holes through the wing leading edge and the wing dowel plates using the holes in F-2 as a guide. If you don't have a long drill bit, mark the hole locations on the leading edge using a pencil or sharpened dowel, remove the wing, then drill the holes.


30

31. ❒ Remove the wing, then shove the two 1/4" x 2-1/4" birch wing dowels through the leading edge until they come through the dowel plates about 1/8". Glue the dowels to the dowel plates and to the back of the leading edge where they come through. Yes, it's tough to reach through the wing opening to do this, but a long applicator tube will help.

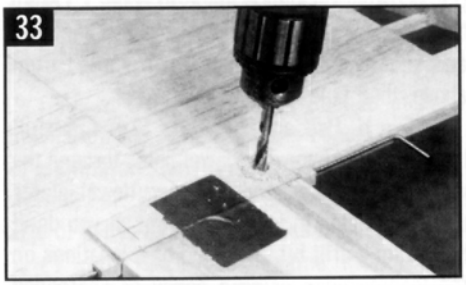

31

32. ❒ a. Glue the two 1/4" plywood wing hold-down blocks into the cutouts in the fuselage doublers, positioned at a slight angle so that they're parallel to bottom edge of F-3 (see the "Cross-Section at F-3" on the plans). Ideally, the hold-down blocks should be flush with the top surface of the wing when installed.

b. Cut two 1-1/2" lengths of 1/2" balsa triangle to brace the wing hold-down blocks. Glue the braces in place. (See photo 34).

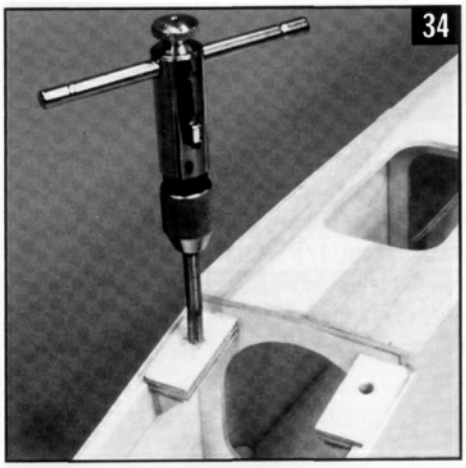
33. ❒ a. Place the wing on the fuselage and make a final check of their alignment. When satisfied, tape the wing down so it can't move.

❒ b. Using the plans as a guide, mark the wing bolt locations on the bolt plate. Drill through the wing and the hold-down blocks with a #7 (or 13/64") drill bit. It's important to keep the drill perpendicular to the wing bottom so that the heads of the wing bolts will sit flush on the plywood bolt plate.



34. ❒ a. Remove the wing, then tap the wing hold-down blocks with a 1/4-20 tap. You can make the threads rock hard by coating them with thin CA. Later, when the CA has fully cured, clean up the threads by re-tapping.

❒ b. Re-drill through the holes in the wing with a 1/4" drill bit to allow passage of the 1/4-20 x 1-1/2" nylon wing bolts.

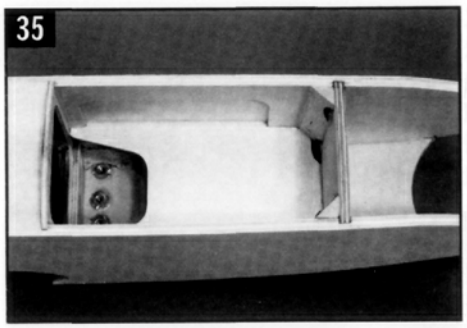


FINISHING THE FUSELAGE

35. ❒ a. Glue on the landing gear mount and the 1/8" lite-ply front fuselage bottom. If desired, cut a hole in the front fuselage bottom just in front of F-1 to allow excess oil to drain.

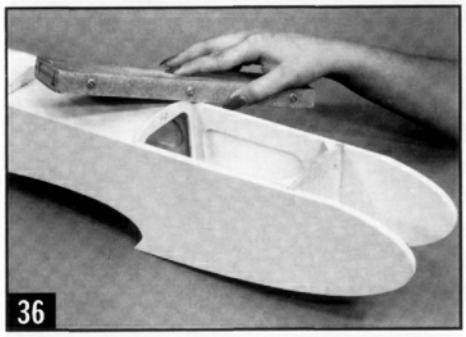
❒ b. If you put the tank floor inside the fuselage earlier to help with alignment, remove it now. Cut braces for the landing gear mount and the firewall from 1/2" balsa triangle stock. Notch the braces to clear any blind nuts, then glue them firmly in place. Redrill the throttle cable hole through the firewall brace.

❒ c. Okay, NOW you can glue in the fuel tank floor! Be sure to attach it to F-1 and F-2, as well as the fuselage sides.



36. ❒ a. Glue the 1/8" lite-ply instrument panel (IP) to the cockpit floor, again using the 75° Tool to set it at the proper angle.

❒ b. Use a sanding block to bevel the top edge of the fuselage sides to provide a solid contact point for the fuselage top. The actual angle of the bevel varies from front to back - use the tops of F-1, F-2, and the instrument panel as a guide.

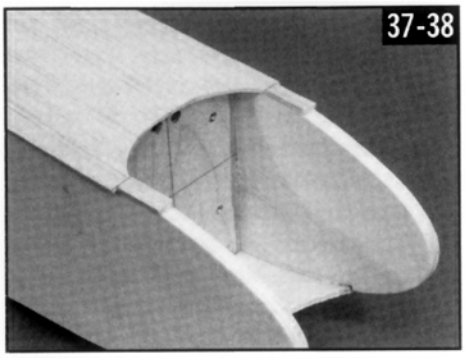


37. ❒ Even though the fuel tank doesn't get installed until during final assembly, now's a good time to get it positioned in the fuselage. A 16 oz. tank will normally need some foam rubber padding underneath to raise it as high in the fuselage as possible. You can tack the foam to the fuel tank floor with epoxy. With the tank positioned correctly, mark F-1 where the fuel lines will come through. Drill at the marks with a drill bit that's the same diameter as the fuel line you intend to use. Lastly, fasten a "pull tab" on the back of the tank made of string or tape to make removal through F-2 easy.

38. ❒ a. Tape the nose sheeting (which you prepared in step 25) in place on top of the fuselage. You may have to wet the top surface of the balsa with warm water to make it bend easier. Apply thin CA all along the joint and allow to dry before removing the tape.

❒ b. Glue small scraps of balsa to the top of the nose "cheeks" on the fuselage sides, just ahead of the fuselage top. The scraps are needed to blend the nose sheeting smoothly into the contour of the model's front end.

❒ c. Coat the inside surface of the top sheeting between F-1 and F-2 with epoxy. A disposable epoxy brush with an extension stick shoved into the handle works well for this step.



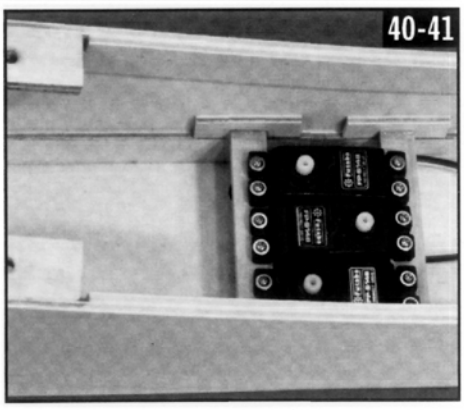
39. ❒ Sand the entire fuselage with a sanding block, starting with 80-grit sandpaper, then 150-grit. Round off the top and bottom corners as shown in the former cross-sections on the plans. Also, sand the rear edge of the top sheeting flush with the instrument panel and cut away the exposed portion of the tailpost at the stabilizer slot.

SERVOS AND PUSHRODS

Traditional balsa pushrods are supplied with this kit for several reasons. They're light, stiff, virtually slop-free, don't change length at different temperatures, and don't require much more work than other types of pushrods. They are bulky, however, and take up a lot of room, especially towards the tail. The plans show how to install the servos and pushrods so that the pushrods are straight from end to end (no bends) and so that they don't interfere with each other, causing binds. Study the plans carefully to see how the rudder & elevator pushrods are constructed - they're not identical!

40. ❒ Cut two 3-1/2" servo rails from the 1/4" x 1/2" x 12" basswood stick provided in the kit. The edge of the fuselage doubler provides a nice flat spot for positioning the rails. Space the servo rails apart about 1/16" more than the width of your servos. Glue the rails in place, then secure each end with a servo rail bracket (four places).

41. ❒ Mount your rudder, throttle, and elevator servos to the servo rails as shown in the "Servo Installation" drawing on the plans.



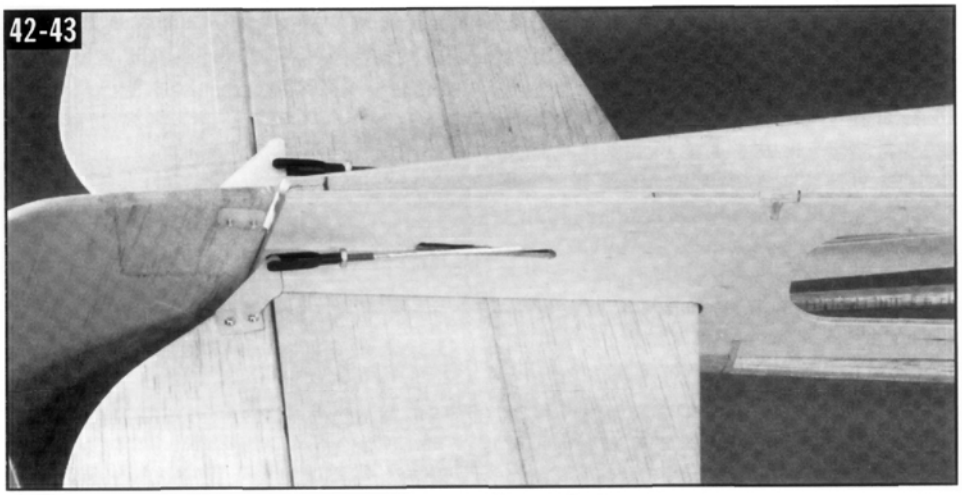
NOTE: The tail construction must be finished through step 51 before proceeding.

42. ❒ a. Cut a pushrod exit hole in each side of the fuselage as shown on the plans. A good way to do this is to drill holes at each end of the slot, then use a sharp knife to connect the edges of the holes. Try to keep the holes small for now; they can be enlarged later if necessary for clearance.

❒ b. Temporarily install the nylon control horns on the rudder and elevator using two 2-56 x 1/2" machine screws for each horn. Notice that the horns aren't identical! Be sure to use the correct horn on each control surface.

❒ c. Pin or tape the stabilizer, elevator, fin, and rudder into their proper positions on the rear of the fuselage.

43. ❒ a. Start the pushrod construction at the control surface end. Bend a 4-40 threaded rod 90° about 1/4" from the smooth end. Drill a 3/32" hole through a 3/8" x 3/8" x 24" balsa pushrod stick 3" from one end. Insert the bent portion of the threaded rod into the hole in the pushrod stick and glue them together. Wrap the assembly with heavy thread or fishing line, and smear the entire wrapped area with epoxy or medium CA.



❒ b. Cut the 12" length of 1/16" music wire supplied in the kit into two 6" lengths (one for the rudder pushrod, one for the elevator pushrod). Make a "Z" bend at one end of the 6" wire and a 1/4"-long 90° bend at the other end. If you don't like "Z" bends, you can use solder clevises or ball links instead (not included).

❒ c. The final, critical step is to mark the location of the front drill hole in the pushrod stick. To do this, feed the pushrod through the fuselage and attach it to the control surface using a 4-40 clevis. Cut off the front end of the balsa pushrod 2" aft of the servo arm. Now slip the "Z" bend into the servo arm and place the servo arm on the servo in its neutral position. Neutralize the control surface, then mark the drill hole location on the pushrod. Remove the pushrod and wire, drill a 1/16" hole at the mark, clean the wire, and glue it in place. Wrap with thread, coat with glue and you're done! If you haven't done so already, repeat this step for the other pushrod.

❒ d. Trial fit both pushrods in the fuselage. The pushrods shouldn't rub on each other or any part of the fuselage structure. When satisfied, remove the pushrods and tail.

TAIL ASSEMBLY

Yellow glue (aliphatic resin) is highly recommended for gluing all of the tail pieces because joints made with yellow glue are much easier to sand than CA.

STABILIZER AND ELEVATOR

44. ❒ a. Glue together the 5/16" balsa stabilizer rear, the 1/8" x 5/16" x 24" spruce stabilizer spar, and the 5/16" balsa stabilizer front and leave them pinned to the building board until dry.

❒ b. Trim the ends of the stabilizer spar (a razor saw works well), then glue the two stabilizer tips in place and allow to dry.

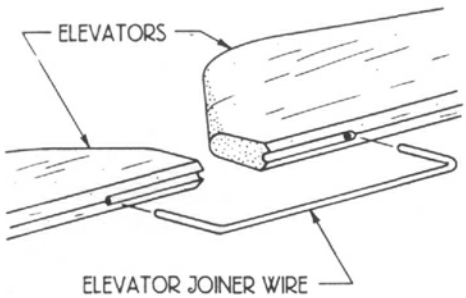
❒ c. Sand the top and bottom of the stabilizer with a sanding block. You'll find that 80-grit sandpaper will cut through the glue joints faster and better than trying to finesse them with finer grit sandpaper. Once the joints are smooth, re-sand with 150-grit sandpaper.

45. ❒ a. Sand the top and bottom surfaces of the elevators to bring the trailing edge down to a constant thickness of about 1/16"

❒ b. Mark the front of the elevators where the 1/8" elevator joiner wire is to be installed. Be sure the elevators are spaced apart from each other as shown on the plan. Drill and groove the elevators to accept the joiner wire, clean the wire with sandpaper, then epoxy it in place on the elevators. Make sure the leading edges are aligned with each other before the epoxy cures.

❒ c. Cut two 5-1/2"-long pieces of fiberglass tape and glue them to the inboard ends of the elevators using thin CA or epoxy. Wrap the tape around the leading edge so it covers the top and bottom, and trim away the excess after the glue dries. This tape will help strengthen the elevators and it provides a hard point for the control horn.

❒ d. Drill two 3/32" holes for the nylon control horn using the plans as a guide. Harden the wood inside the holes with thin CA.



46. ❒ Temporarily tape the elevator to the back of the stabilizer, then use a sanding block to round off all of the edges. Sanding the stab and elevator at the same time insures that they will "flow" together perfectly at the tips.

FIN, RUDDER, & TAILWHEEL

47. ❒ a. Glue together the three 1/4" balsa fin pieces FIN-1, FIN-2, and FIN-3. Line up the top of FIN-3 with the top of FIN-1.

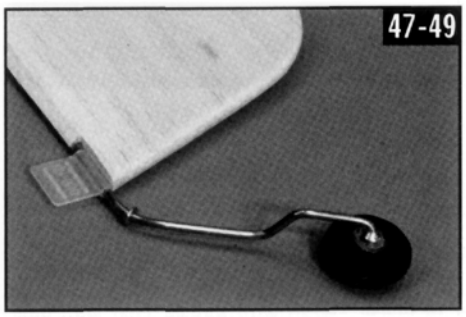
❒ b. When dry, trial fit the fin to the fuselage. It will help to have the stabilizer in place (the fuselage must be completed through step 39 in order to do this). You may have to sand the fin's base or front edge for a good fit.

❒ c. With the fin still on the fuselage, tape the rudder to the back of the fin so that the rudder is lined up with the bottom of the fuselage. Remove the fin/rudder combination and sand all of the edges round, except for the fin base, of course!

48. ❒ Secure the tail wheel to the pre-bent tail wheel wire using two #2 flat washers soldered on either side for a clean, trouble-free installation. If you prefer, 3/32" wheel collars may be substituted for the washers (wheel collars not included in the kit).

49. ❒ a. Slide a #2 flat washer onto the tailwheel wire, followed by the nylon tailwheel bearing. Bend back the wire above the bearing 90° as shown on the plan. This is tough wire, you may need a vise and hammer! After bending, view the wire from above to make sure it's parallel to the tailwheel.

❒ b. Drill a 3/32" hole at the top of the notch in the 1/4" balsa rudder, 90° to the leading edge. Trial fit the tailwheel wire in the hole and tweak it as necessary until the bearing is parallel to the rudder leading edge.

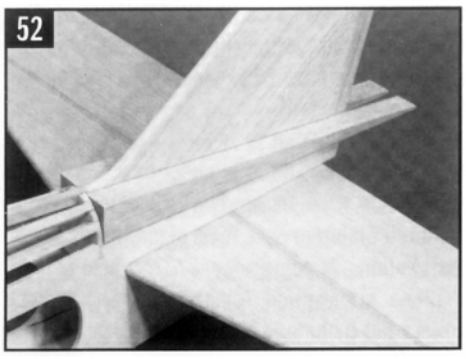


50. ❒ a. Cut a slot in the tailpost to accept the flange on the tailwheel bearing, and trial fit the rudder to the fuselage and tailwheel assembly. Don't glue anything yet - just get everything to fit so it goes together smoothly during final assembly.

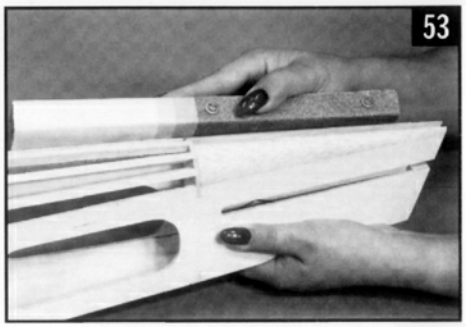
❒ b. Temporarily fit the fin, rudder, and tailwheel assembly to the fuselage. Turn the whole works upside-down and solder the #2 flat washer to the tailwheel wire at the base of the nylon bearing. You won't melt the nylon bearing if you solder quickly and blow on the finished joint. The soldered washer will help to transfer landing loads to the bearing and fuselage instead of the more fragile rudder.

51. ❒ Cut a 3" long piece of fiberglass tape, wrap it around the base of the rudder and glue it in place. When dry, drill two 3/32" holes for the control horn using the plan as a guide.

52. ❒ Fit the fin to the fuselage so that it's perfectly aligned with the center line when viewed from above. Glue the two balsa tail fairing blocks in place on either side of the fin. Be careful not to get any glue on the fin itself.



53. ❒ Remove the fin, then carve and sand the tail fairing blocks to blend in smoothly with F-6 and the stringers.



COVERING

At this point, some modelers prefer to glue the tail surfaces to the fuselage, then cover. Others prefer to cover all of the pieces separately before hinging and final assembly, which is what we recommend.

IMPORTANT! You must use a plastic film to cover the Venture 60 wing. Do not use an iron-on fabric. Open-structure wings like that used on the Venture 60 are lightweight, simple to build, and very strong in bending. However, they don't have as much torsional strength as wings with a bunch of sheeting, cap strips, etc... The Venture 60 wing depends upon the covering material to provide the extra torsional rigidity needed to withstand flight loads. It's been our experience over many years with wings of this kind that any type of plastic film will satisfy this requirement. Iron-on fabrics are plenty strong, but sometimes they don't stick well to the structure. If the covering isn't bonded to the ribs and spars, there's no way it can add any torsional stiffness to the wing. **Only plastic film coverings are approved by BTE for use on the Venture 60 wing.** Any type of covering may be used on the fuselage and tail surfaces.

We used Insignia Blue Top Flight MonoKote to cover the Venture prototypes. You'll need three 6-foot rolls of material (color of your choice) to cover the model. Always read the manufacturer's instructions provided with your covering material and follow them to the letter.

The road to A Good Finish always starts at the village of Surface Preparation. Your vehicle of transportation is a muscle-powered Sanding Block. Pack along some goodies like Wood Filler and pretzels, and you'll be ready to go.

Okay, so sanding a model airplane isn't as fun as a cross-country adventure, but it truly is the secret to a smooth finish. The fuselage, wing, tail, and all control surfaces should already be sanded well with 150-grit sandpaper. To really smooth the wood, resand with 220-grit followed by 360- or 400-grit sandpaper. Always use a sanding block, except for the rounded edges of the tail surfaces where a hand-held piece will work better. Be sure to blow off or vacuum all of the sanding dust, then wipe the structure with a tack rag before you begin covering.

The engine compartment must be fuel-proofed prior to covering. Two coats of polyester fiberglass resin, sanded after each coat, is our preferred method. Some modelers like to use epoxy resin or several coats of dope. Whatever you use, follow it up with a couple coats of fuel-proof paint that matches your covering material. Most makers of plastic films offer matching paints just for this purpose. Even if it's not a perfect match, it won't be very noticeable once the engine is mounted.

Now the fuselage can be covered using two pieces for the bottom (front and rear), a piece for each side, and two pieces for the top in that order. The most difficult area to cover is the turtledeck. Iron one edge of material to one of the fuselage sides, overlapping it about 3/16". Pull the material over the stringers and iron it to the opposite side. To cut off the excess, slide a piece of thin cardboard under the film to protect the material underneath, then use a straightedge to guide your knife. The cockpit area should be covered last.

Moving to the wing, drill holes through W-4 above and below the wingtips to serve as vents. Cover the wingtips separately from the wing panels, using two pieces for each tip (top and bottom). Cover the wing bolt plate with another separate piece. Now you can cover each wing panel starting with the bottom. Run the material around the leading and trailing edges so that the top piece can overlap, placing the seams on the bottom where they can't be seen easily. Wait until the top and bottom pieces of covering material have been sealed completely around their edges before shrinking the large open areas between the ribs using a sealing iron or heat gun. To maximize the torsional stiffness of the wing, firmly bond the covering to all of the ribs and spars by going over each one with your sealing iron.

The tail surfaces and ailerons should each be covered with two pieces, first the bottom then the top. Iron outwards from the center to avoid trapping air bubbles.

FINAL ASSEMBLY

54. ❒ a. Easy Hinges are included in the kit for hinging all of the Venture's control surfaces. Let's start with the stabilizer and elevator. Use a #11 X-Acto blade to cut slots right through the covering material that are about 1/2" deep in both the stabilizer and the elevator as shown on the plan. Slide six Easy Hinges halfway into the slots in the stabilizer. Now carefully slide the elevators onto the exposed portion of the hinges. (Some modelers like to clip off the corners of each hinge to help ease assembly). Push the elevators all the way on, check the tips to see that they're lined up, then deflect the elevators both ways to be sure they don't bind. Apply four or five big drops of THIN CA (any brand) to the center of each hinge on both sides and allow five minutes to dry. Thin CA MUST be used for maximum penetration of the hinge and the wood. Do not overglue, and do not apply a second layer of glue. When done correctly, the hinges should actually appear dry.

❒ b. Use the same process for hinging the ailerons, with the following exception: Before sliding the aileron onto the hinges sticking out of the wing trailing edge, apply some epoxy to the slot and hole for the torque rod. Insert a scrap of wax paper between the torque rod and the wing, then slide the aileron in place. Allow the epoxy to dry, remove the wax paper, then apply CA to the Easy Hinges.

❒ c. You can cut slots now for the rudder hinges, but wait until the fin has been glued to the fuselage before installing them.

55. ❒ a. The stabilizer and fuselage need a firm wood-to-wood joint, which means the covering material must be removed from the stabilizer where it contacts the fuselage. To do this, slide the stabilizer into its slot and check its alignment carefully from above and behind the model. You should have the wing bolted to the fuselage so you can visually confirm that it's not tilted or skewed. Now use a very sharp knife to carefully and slowly cut through the covering material on the stabilizer at the sides of the fuselage, trying not to cut into the balsa itself. Remove the stabilizer and peel away the covering between the knife cuts, exposing the bare wood beneath.

❒ b. Apply plenty of five-minute epoxy to the stabilizer slot in the fuselage and to the exposed wood of the stabilizer. Slide the stabilizer into place and wipe away any excess epoxy with alcohol. Double check the alignment before the glue dries.

56. ❒ Slide the fin into place and cut away the covering material where it contacts the tail fairing blocks. Use epoxy to glue the fin to the fuselage and stabilizer.

57. ❒ a. Epoxy the nylon tailwheel bearing into the slot in the tailpost. Slide the rudder in place temporarily to make sure the bearing is positioned correctly.

❒ b. If you haven't done so already, cut the hinge slot in the tailpost. Slide three Easy Hinges halfway into the rudder. Apply some epoxy to the hole in the rudder for the tail wheel wire, then slide the whole rudder into place. Make sure the rudder has full travel without binding before the epoxy sets.

❒ c. Apply thin CA to the rudder hinges.

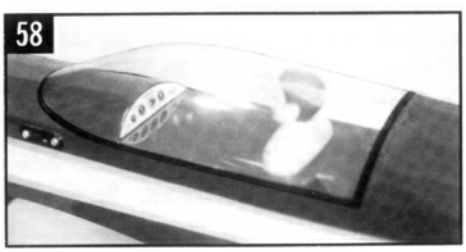
❒ d. Drill a 1/16" dia. hole through the fuselage side and the tail wheel bearing as shown on the plan - try not to go through the opposite side. Screw a #2 x 3/8" sheet metal screw into the hole to firmly secure the tail wheel bearing to the fuselage.

58. ❒ a. If you want to install a pilot, now's the time to do it. The BTE prototypes feature Williams Brothers 2" scale Sportsman pilots, sanded at the base to fit under the canopy. Cut away the covering so that your pilot can be firmly glued to the cockpit floor.

❒ b. Cut the printed instrument panel from the "Tools 'N Stuff" sheet and glue it to IP using a flexible white glue like Wilhold R/C-56. It isn't necessary to cut away the covering for this step. An extra printed instrument panel is included just in case you need another one.

❒ c. Trim the canopy at the molded cut lines using scissors. Sand the rough edges smooth, being careful not to scratch the plastic. Trial fit the canopy to the fuselage, trimming as necessary for a good fit. When satisfied, clean the canopy inside and out, then glue it to the fuselage using Wilhold R/C-56 or an equivalent. Run a couple of temporary tape strips from one fuselage side, over the top of the canopy, to the opposite side to hold the canopy firmly in place. Wipe away any excess glue, and allow to dry.

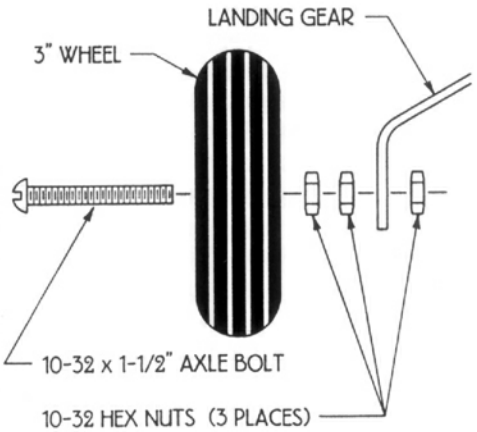
❒ d. Finish off the canopy installation by running 1/4"-wide striping tape along its base (half on the canopy, half on the fuselage) and around the back edge.



59. ❒ The large decals supplied with this kit are easy to apply using the "wet" method. First, cut out the decals as close to their edges as possible. To apply, totally wet the surface with soapy water (spray cleaners like Sig Pure Magic or Fantastic work well). Lay the decal on the wet surface, slide it around until it's placed where you want it, then squeegee out the water using a scrap balsa paddle. Allow several hours to dry.

60. ❒ Install a 3" diameter main wheel on each of the aluminum landing gears using the hardware shown in the drawing below. The wheel hubs will probably need to be drilled with a 3/16" dia. bit to accept the axle bolt. A drop of CA on the inboard nut will prevent loosening due to vibration. Once the wheels have been attached, bolt the landing gear to the fuselage with four 6-32 x 1/2" machine screws.

LANDING GEAR ASSEMBLY



OPTIONAL WHEEL PANTS FOR THE VENTURE 60

Spruce up the looks of your Venture 60 tremendously with the simple addition of wheel pants. An optional wheel pant kit for the Venture 60 is available from BTE. The kit includes molded ABS wheel pant halves, fiberglass tape for joining them, mounting hardware, and instructions for installing the wheel pants on your model. In our humble opinion, the Venture looks naked without wheel pants, but they were left out of the kit because many modelers think they won't hold up to their rough field conditions. (If they're flying around boulders and stumps, they are probably right!) However, these are rugged units designed to take plenty of punishment, even if you fly from grass or dirt. Call us for the current price and shipping details.

ENGINE AND FUEL TANK INSTALLATION

FUEL TANK - Your fuel tank was prepared for installation in step 37. The easiest way to get it in place is to slide two long lengths of fuel tubing through the holes in the firewall so you can connect them to the tank outside of the fuselage. Now slide the tank through F-2 while pulling forward gently on the fuel lines. When properly installed, you should be able to blow through one fuel line and feel it coming out the other. If not, the fuel lines are probably kinked and you need to try again. Use foam rubber padding under the tank to raise it as high in the fuselage as possible. Once the throttle cable has been installed, you can add some padding on each side of the tank to keep it centered.

The Venture 60 doesn't have a fuel tank hatch for several reasons, the primary one being the strength derived from a boxed in nose section. Yes, installing the tank through a hatch would be easier, but in our opinion the extra strength and simplicity of the solid nose outweighs any other considerations. If you are careful with the fuel tank construction and installation, you'll probably never even need to remove it.

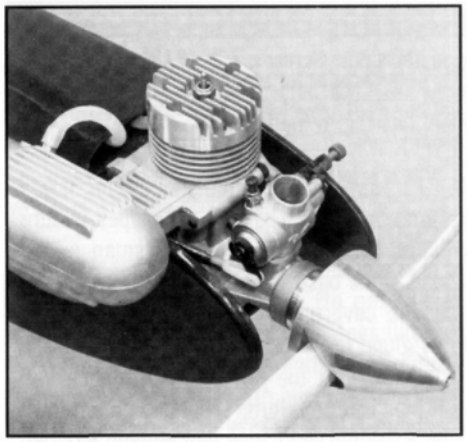
THROTTLE PUSHROD - Slide the 16" nylon throttle pushrod housing through the hole in the firewall until the end is about 2" from the servo arm. Notch F-2 to allow the housing to flow smoothly towards the servo, keeping bends to a minimum. Solder the 2-56 solder clevis to the flexible steel pushrod cable, slide the cable into the housing from the rear, and hook up the clevis to the servo arm. Now you can make a scrap balsa standoff to support the aft end of the housing. Glue the standoff to the fuselage, then glue the housing to the standoff and F-2. Remove the cable and set it aside for a bit.

ENGINE AND ENGINE MOUNT - Since these were prepared in step 19, you simply need to bolt your engine mount to the firewall followed by bolting your engine to the mount. Now you can hook up the throttle cable to the carburetor control arm using an adjustable connector of your choice. You'll probably need to shorten both the throttle cable and its housing.

MUFFLER - Always use a muffler on all of your model airplanes. Many flying sites get shut down each year because a neighbor became annoyed at the noise. Don't let this happen to you or your club! Use the muffler that was supplied with your engine or one of the many after-market mufflers that are available.

PROPELLERS - Always use a propeller in the range specified by your engine's manufacturer. For the Venture 60, we suggest choosing a large diameter, low pitch propeller. This model was designed for aerobatics, not for speed, so a low pitch propeller works well because it provides maximum pulling power at mild speeds. A 14" diameter prop is about as large as you can use on the Venture and maintain adequate ground clearance. Be sure to balance all of your props to minimize vibration.

SPINNERS - We definitely recommend using a high-quality metal spinner for the Venture 60, again to keep vibration to a minimum. The plans call for a 2-1/4" diameter spinner, although anything from a rounded spinner nut to 2-1/2" diameter will look pretty decent.



The engine shown here is an O.S. 61 SF, which is more than enough power for the Venture 60. Notice the vent line is hooked to the muffler for pressure. Notice also that the throttle cable is hooked to the throttle arm using a nylon clevis threaded onto a threaded coupler which is soldered to the steel throttle cable (phew!).

RADIO INSTALLATION

Actually, you've already done quite a bit of radio installation. Install your rudder and elevator pushrods and make sure the servo arm retaining screws are in place. At the control surface end, tighten a 4-40 jam nut against each clevis to eliminate any slop in the threads.

You should have some leftover 1/4" x 1/2" basswood servo rail material that you can use for mounting the aileron servo. Refer to the "Cross Section at Wing Center" drawing on the plan for more details on hooking up the aileron servo. Bend two pushrods from the 2-56 threaded rods included in the kit. Be sure to use 2-56 jam nuts against the clevises.

Now all that's left is the receiver, battery pack, and switch. Bolt the wing onto the fuselage, then set your receiver and battery on the outside of the model in the positions shown on the plans. Check the balance by holding your fingertips under the main wing spar. If the model seems nose heavy, you should place the battery and receiver aft of F-2. If it seems tail heavy, move them both forward of F-2. The idea is to use your radio equipment to acheive proper balance rather than lead weights. As you get used to the model, you may elect to shift the balance point aft by moving these components.

Protect your receiver and battery by wrapping them both separately with foam rubber. Secure them in the fuselage with scrap pieces of wood that can be broken away easily when necessary.

Mount the switch on the fuselage side opposite from the engine exhaust. Make certain the charging jack is accessible, but tucked away enough to keep it out of the control linkages.

Route the antenna as far from the other wires as possible. We typically run our antennas out the bottom of the model through a hole drilled just aft of F-3. Of course, tape the antenna in several places to keep it from dragging on the ground. If you wish, the antenna can be routed through the fuselage side and up to the top of the fin. Either way, use a strain relief (which is generally provided with the radio system) where the antenna exits the fuselage.

BEFORE YOU FLY

Hey, this is starting to get exciting! Even though your Venture looks ready to "venture upwards", it won't be truly ready until you give it the following basic checkout:

❒ **BALANCE** - Your model must balance in the range shown on the plans. The best way to balance a low-wing airplane is upside down. With the wing installed and the fuel tank empty, pick up the model with one fingertip on each wing panel, centered on the main wing spar. Hold your hands in close to the fuselage, not at the wingtip. If necessary, add weight to the nose or tail until the model hangs level with your fingertips balancing it on the main spar. It's impossible to design a model that will balance perfectly every time. Every model (and every model builder) is different, so every individual model must be checked for proper balance. Make sure any weights used for balancing are securely fastened to the airframe.

❒ **ALIGNMENT** - The general alignment of the fuselage, wing, and tail has already been set during construction and would be difficult to change now. You should, however, check your wing carefully for warps. Even if it was built perfectly straight, sometimes a wing will warp during the covering process. Typically you can straighten a wing like this by twisting it in the proper direction, holding it, and re-ironing the covering. It may take several tries to get it just right, but a straight wing is worth the effort. Adjust your control surfaces (rudder, elevator, and ailerons) so that they're in their streamlined, neutral positions with the trim levers on your transmitter centered. Also, check the engine alignment by viewing from above. Left thrust is a no-no, but a degree or two of right thrust is acceptable (some modelers like to add a touch of right thrust to help counteract the engine's torque).

❒ **CONTROL THROWS** - Adjust the amount of control surface deflection to the amounts shown below. These are fairly mild settings - most pilots will probably want to increase the movements after the first few flights to improve the airplane's aerobatic capability.

RECOMMENDED CONTROL THROWS

ELEVATOR: 5/8" UP, 5/8" DOWN
RUDDER: 1-1/4" LEFT, 1-1/4" RIGHT
AILERONS: 1/2" UP, 7/16" DOWN

Be sure to measure at the widest point of each control surface. Notice that the ailerons will move "up" slightly more than "down", thanks to the built-in differential of the torque rods.

❒ **RADIO** - Make a final check of the radio installation. Make double sure that all of the servo arm retaining screws are in place, the jam nuts are really "jammed" against the clevises, and the control linkages don't bind or interfere with each other. Double check that all of the control surfaces are moving in the right direction! Perform a radio range check as specified by the manufacturer's instructions.

❒ **ENGINE** - For general sport flying, engine reliability is much more important than peak performance. Take the time to break-in your engine properly on a test stand and don't allow yourself to be satisfied until you obtain a slow, solid idle and a reliable transition to full power. You may very well spend more time flying your Venture 60 at reduced throttle settings than you may think. It's simply a lot more fun to fly a model airplane when you're not worrying about your engine quitting!

FLYING

If your Venture 60 is warp-free, balanced properly, and has a good radio and reliable engine, then a successful maiden flight is virtually assured. Experienced modelers know that's good advice for any new model.

The Venture 60 is a sport model designed for sport pilots who prefer graceful aerobatics over raw speed. It's a lightweight airplane that excels in light wind conditions. It penetrates wind just fine, but like any lightly-loaded plane, you can expect to get bounced around a bit.

Pilots with four-channel experience should have no trouble with the Venture. Takeoffs are quick, thanks to all that wing area and thick airfoil. Once you're up, start trying all the maneuvers you know. If the model is balanced towards the front of the balance range, snap rolls will be pretty slow and spins may be tough to enter. Move the balance point back a 1/4" at a time, either by shifting your radio gear or adding tail weight, until you're happy with the snap/spin characteristics. With the balance point at the back of the range and increased control throws, the Venture will flat spin like crazy, knife edge forever, and lomchevak until YOU get a headache! Now slow down and treat yourself to some half-throttle aerobatics- you'll be amazed at the Venture's low-speed capabilities.

Expect the Venture 60 to "float" quite a bit on landing approaches. Give the model plenty of time to slow down before it touches. If the model makes a lot of bouncy landings, you're probably not slowing it down enough. Ideally, the main wheels and tailwheel should all touch at the same time, followed by a smooth rollout.

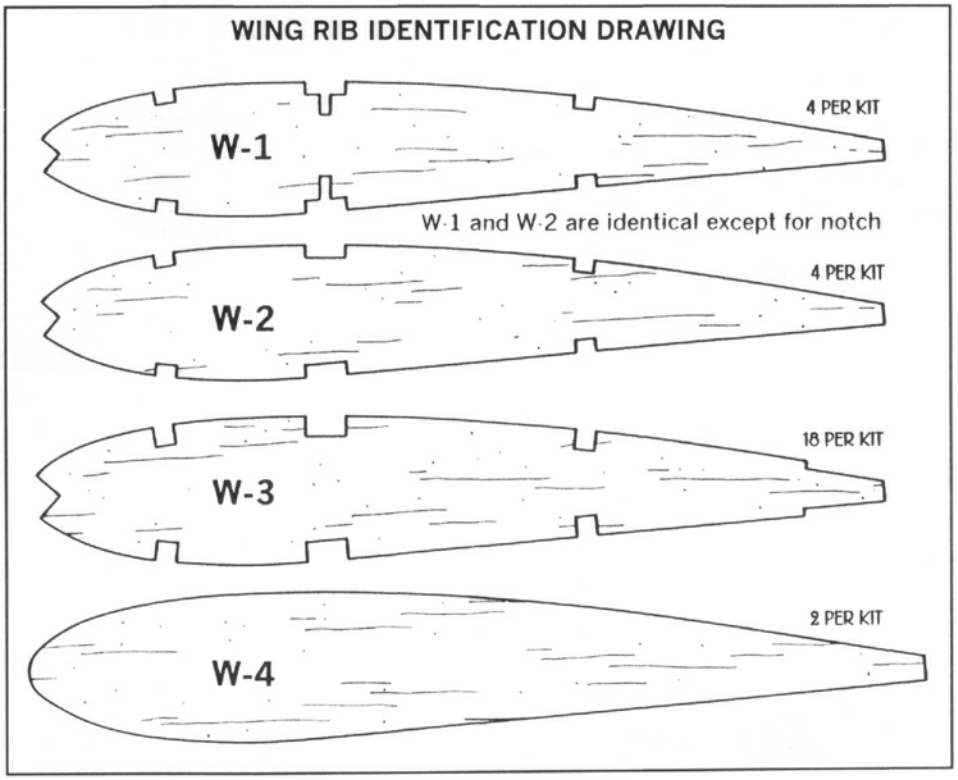
FLY SAFE! Any model airplane can become dangerous if flown in an unsafe manner. Keep in mind that radio equipment **can** fail at any time, causing total loss of control. For this reason, fly your model at a safe distance from people and property. Have an experienced pilot test fly and trim your model if you're unsure of your own ability to do so. Only fly if **all** of your equipment is operating correctly. Tune your engine from behind the spinning propeller. Safety in your shop and at the flying field is usually a simple matter of common sense.

JOIN THE AMA! BTE supports the efforts and goals of the Academy of Model Aeronautics. We recommend joining this national organization for all of their benefits including insurance. For more information, write to AMA Headquarters, 5151 East Memorial Drive, Muncie, IN 47302.

LET US HEAR FROM YOU! If you have any questions or problems with the Venture 60 kit, please call us at 541-582-1708. We'd love to see a photo or two of you and your finished model. If you enjoyed building and flying the BTE Venture 60, be sure to spread the word.

THANKS!

WING RIB IDENTIFICATION DRAWING



COMPLETE PARTS LIST

The parts in this kit are not marked or labelled for several reasons. Besides adding to the cost of manufacturing, we feel the parts are fairly easy to identify using the plans. And for those people who like to cover their models with transparent film, there's no smudgy letters to spoil the view! Check the contents of your kit carefully, label the parts if you wish, and let us know if you are missing anything. You paid for a whole kit and that's what you should have! Also contact us if there's any shipping damag or any parts that you feel are simply unusable.

LIMIT OF LIABILITY - *In use of our products, Bruc Tharpe Engineering's only obligation shall be to replace suc quantity of the product proven to be defective. User shall determin the suitability of the product for his or her intended use and sha assume all risk and liability in connection therewith.*

SHEETS AND STICKS

These parts are all packed loose in the kit box

5	3/16" x 1/4" x 18"	BALSA	Turtledeck Stringers
8	1/4" x 1/4" x 36"	BALSA	Front and Rear Wing Spars
1	1/2" Triangle x 18"	BALSA	Braces (for F-1, l.g. mount, hold-down blocks)
2	3/8" x 3/8" x 24"	BALSA	Pushrods (for elevator and rudder)
2	3/8" x 3/8" x 36"	BALSA	Leading Edges (quarter-round)
2	1/4" x 1/2" x 36"	BALSA	Trailing Edges (tapered)
1	1/4" x 1/2" x 12"	BASS	Servo Rails
4	1/4" x 1/2" x 36"	SPRUCE	Main Wing Spars
1	1/8" x 5/16" x 24"	SPRUCE	Stabilizer Spar
8	3/32" x 2" x 7"	BALSA	Wing Center Sheeting (forward of main spars)
8	3/32" x 3" x 7"	BALSA	Wing Center Sheeting (aft of main spars)
4	3/32" x 2" x 36"	BALSA	Trailing Edge Sheeting (trim to 1-1/2" width)

PRECISION-CUT BALSA AND PLYWOOD PARTS

These parts are not bagged, they are loose in the kit box.
Dimensions are approximate - Use plans for identification.

21	3/32" x 3" x 1-1/4"	BALSA	Shear Webs (an extra one for good luck!)
4	3/32" x 2" x 11"	BALSA	W-1 Wing Ribs
4	3/32" x 2" x 11"	BALSA	W-2 Wing Ribs
18	3/32" x 2" x 11"	BALSA	W-3 Wing Ribs
2	3/32" x 2" x 11"	BALSA	W-4 Wing Ribs
2	3/32" x 2" x 14-1/2"	BALSA	Fuselage Top
1	1/4" x 3" x 11"	BALSA	FIN-1 (front fin piece)
1	1/4" x 3" x 7"	BALSA	FIN-2 (triangle shaped)
1	1/4" x 1/2" x 6-3/8"	BALSA	FIN-3 (balsa stick with angled ends)
1	1/4" x 4" x 10"	BALSA	Rudder (bevelled leading edge)
2	5/16" x 1" x 3-1/2"	BALSA	Stabilizer Tips
1	5/16" x 3" x 24"	BALSA	Stabilizer Front
1	5/16" x 3" x 24"	BALSA	Stabilizer Rear
2	5/16" x 3" x 12"	BALSA	Elevators (tapered sheet; bevelled leading edge)
2	5/16" x 2" x 31"	BALSA	Ailerons (tapered sheet; bevelled leading edge)
2	5/16" x 2" x 11"	BALSA	Wingtips
2	5/8" x 7/8" x 9"	BALSA	Tail Fairing Blocks
2	1/8" x 4-1/2" x 48"	LITE-PLY	Fuselage Sides
2	1/8" x 4-1/2" x 24"	LITE-PLY	Fuselage Doublers
1	1/8" x 3-1/2" x 24"	LITE-PLY	Rear Fuselage Bottom
1	1/8" x 3-1/2" x 17"	LITE-PLY	Cockpit Floor
1	1/8" x 3-1/2" x 7"	LITE-PLY	Front Fuselage Bottom
1	1/8" x 3-1/2" x 6"	LITE-PLY	Fuel Tank Floor
1	1/8" x 1-1/2" x 9"	A/C PLY	Dihedral Brace

See Page 11 for Wing Rib Identification

LARGE WOOD PARTS BAG

Dimensions are approximate - Use plans for identification.

1	1/8" x 3-1/2" x 5"	LITE-PLY	F-2 Fuselage Former
1	1/8" x 1" x 3-1/2"	LITE-PLY	F-2D " "
1	1/8" x 3-1/2" x 4"	LITE-PLY	F-3 " "
1	1/8" x 3" x 5-1/2"	LITE-PLY	F-4 " "
1	1/8" x 2-1/2" x 5"	LITE-PLY	F-5 " "
1	1/8" x 1-1/2" x 2"	LITE-PLY	F-6 " "
1	1/8" x 3-1/2" x 3/4"	LITE-PLY	IP Instrument Panel
1	1/8" x 3-3/4" x 2"	LITE-PLY	HR Headrest
1	1/16" x 1" x 3-3/4"	A/C PLY	Wing Bolt Plate
1	1/4" x 3" x 3-1/2"	A/C PLY	Landing Gear Mount
1	1/4" x 3-1/4" x 4"	A/C PLY	F-1 Firewall
1	1/4" x 1/2" x 3-3/8"	BALSA	Tailpost (tapered stick)

SMALL WOOD PARTS BAG

Dimensions are approximate - Use plans for identification

2	1/8" x 1-1/2" x 2"	BALSA	Bottom Wingtip Fairings
2	1/4" x 1-1/2" x 2"	BALSA	Top Wingtip Fairings
2	5/16" x 7/8" x 2-1/4"	BALSA	Wingtip Trailing Edge
4	1/8" x 1/2" x 1-1/2"	LITE-PLY	Servo Rail Brackets
1	1/8" x 1" x 1-3/8"	LITE-PLY	Servo Backplate
2	1/8" x 1-1/4" x 1-1/2"	LITE-PLY	Wing Dowel Plates
2	1/4" x 5/16" x 2-1/4"	BASS	Torque Rod Blocks (with 1/8" groove)
2	1/4" x 3/4" x 1-1/2"	A/C PLY	Wing Hold-Down Blocks
2	1/4" dia. x 2-1/4"	BIRCH	Wing Dowels

METAL PARTS

These parts are banded together and wrapped in newspaper.

1	.125" x 2" x 10"	ALUM.	Left-Hand Landing Gear (pre-bent)
1	.125" x 2" x 10"	ALUM.	Right-Hand Landing Gear (pre-bent)
1	3/32" dia. x 6"	WIRE	Tail Wheel Wire (pre-bent)
1	1/8" dia. x 7"	WIRE	Elevator Joiner Wire (pre-bent)
2	2-56 x 10"	STEEL	Threaded Rod (for aileron pushrods)
2	4-40 x 8"	STEEL	Threaded Rod (for rudder & elevator pushrods)
1	4-40 x 6"	STEEL	L.H. Aileron Torque Rod (+ 1/8" brass bushing)
1	4-40 x 6"	STEEL	R.H. Aileron Torque Rod (+ 1/8" brass bushing)

HARDWARE PACKAGE

These parts can all be found in the small hardware bag

3	#2	STEEL	Flat Washers (for tail wheel wire)
1	#2 x 3/8"	STEEL	Sheet Metal Screw (for tail wheel bearing)
4	2-56 x 1/2"	STEEL	Machine Screws (for control horns)
4	6-32 x 1/2"	STEEL	Machine Screws (for landing gear)
4	6-32 x 3/4"	STEEL	Machine Screws (for engine mount)
2	10-32 x 1-1/2"	STEEL	Machine Screws (main wheel axles)
2	2-56	STEEL	Hex Nuts (jam nuts for aileron pushrods)
2	4-40	STEEL	Hex Nuts (jam nuts for rud. & elev. pushrods)
6	10-32	STEEL	Hex Nuts (for attaching axles to landing gear)
8	6-32	STEEL	Blind Nuts (for landing gear and engine mount)
1	2-56	STEEL	Solder Clevis (pre-tinned; for throttle cable)
2	2-56	STEEL	Clevis (for aileron pushrods)
2	4-40	STEEL	Clevis (for rudder and elevator pushrods)
1	Medium	NYLON	L.H. Control Horn (for rudder)
1	Medium	NYLON	R.H. Control Horn (for elevator)
1	3/32"	NYLON	Tail Wheel Bearing
2	4-40	NYLON	Aileron Connectors (supplied as one set)
2	1/4-20 x 1-1/2"	NYLON	Wing Bolts
17	3/4" x 1"	SECRET	Easy Hinges (in separate small bag)

MISCELLANEOUS PARTS

These parts are all packed loose in the kit box.

1	.030" x 4" x 15"	PET-G	Clear Plastic Canopy (must be trimmed to fit)
1	1/16" dia. x 12"	WIRE	Music Wire (for rudder & elevator pushrods)
1	1/16" dia. x 18"	CABLE	Throttle Pushrod
1	9/64" dia. x 16"	NYLON	Throttle Pushrod Housing
1	2" x 38"	GLASS	Fiberglass Tape (bagged separately)
2	4-1/2" x 19"	MYLAR	Decal Sheets (two-color stab stripe & logo)
2	4-1/2" x 38"	MYLAR	Decal Sheets (two-color wing & fuselage stripes)
1	4-1/4" x 5-1/2"	PAPER	Tools 'N Stuff (packed with decals)
1	3 ft. x 6 ft.	PAPER	Full-Size Plan (rolled)
1	12-page	PAPER	Instruction Booklet

BTE **BRUCE THARPE ENGINEERING** 8622 E EVANS CREEK ROAD, ROGUE RIVER, OR 97537 541-582-1708