SIGRC52

BUILDING AND FLYING INSTRUCTIONS

INTRODUCTION

Sailplanes are an easy and relaxing way to learn and enjoy radio control flying. To fly them well, however, takes a lot of skill and knowledge about the air in which they fly. The RISER was designed with the beginner and sport flier in mind to create a "floater" that's docile and predictable in flight. The RISER'S gentle handling characteristics doesn't mean it lacks performance. Experts will find the RISER is capable of holding its own in two-meter sailplane competition.

The versatile RISER can even make a good R/C trainer! Many model clubs around the country like to train student pilots on a sailplane because of their gentle and slow speed flying characteristics. The slow speed allows the beginner ample time to develop the skills that are necessary for flying radio controlled models. If you have never flown an R/C model before, we strongly recommend that you obtain the assistance of a skilled R/C pilot before attempting to fly your Riser for the first time.

Instructions for installing the optional wing spoilers are included with the kit on a separate sheet. Spoilers are essential for making consistent spot landings and for other multi-task soaring events. Since they aren't necessary for everyday fun flying, the materials for adding spoilers to your RISER are not included in the kit.

Notes Before Beginning Construction

Any references to right or left refers to your right or left as if you were seated in the cockpit.

To build good flying models, you need a good straight building board. Crooked models don't fly well! The building board can be a table, a workbench, a reject "door core" from the lumber yard, or whatever - as long as it is perfectly flat and untwisted. Cover the top surface of the building board with a piece of celotex-type wall board or foam board, into which pins can be easily pushed. Don't hesitate to use plenty of pins during assembly to hold drying parts in correct position.

When pinning and gluing parts directly over the full-size plans, cover the plan with wax paper or plastic kitchen wrap to prevent gluing the parts to the plans.

Don't use a ball point pen for making marks on the model during construction. If not sanded off, these ink marks will show through the model's final finish. Use a pencil instead of a pen.

Identifying Kit Parts

Leave all die-cut parts in the sheets until needed in construction. Then remove the pieces from the sheets carefully. If difficulty is encountered, do not force the part from the sheet - use a modeling knife to cut it free.

The die-cut balsa wing ribs are identified below. The die-cut plywood parts can be identified using the plans and the "KEY TO PLYWOOD FORMERS". Mark the identification numbers on the corresponding parts before removing them from the die-cut sheets.

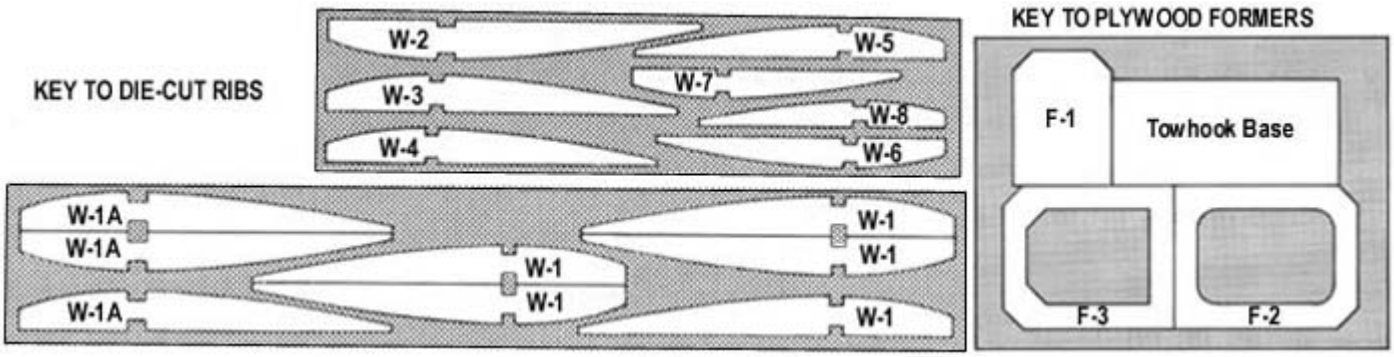
All of the other parts can be identified by the "COMPLETE KIT PARTS LIST". Sort the different sizes of sticks and sheets into individual piles to avoid confusion during building. Cut all long pieces of balsa first, followed by medium lengths, before cutting up any full length strips into short pieces.
NOTE: Save any scrap balsa and plywood until the model is completely done. Some of it may be called for during construction.

COMPLETE KIT PARTS LIST							
Die-Cut Balsa							
2	1/16"x3"x18" Inboard Wing Panel Ribs, W-1 & W-1A	2	1/16"x3"x12" Outboard Wing Panel Ribs, W-2 thru W-8				
Silkscreened Balsa							
1	3/32"x5"x36" SHEET NO.1; Fuselage Sides	1	3/16"x3"x18" SHEET NO.2; Tail Parts				
Sheet Balsa							
8	1/16"x1"x20" Leading Edge Sheeting	1	1/16"x3"x36" Wing Center Sheeting, Shear Webs	1	3/32"x3"x36" Fuselage Sheeting, Top and Bottom	1	1/4"x2-1/4"x8" Fuselage Top Block and Hatch
Stick Balsa							
14	1/16"x3/16"x36" Capstrips	3	1/8"x3/16"x36" Diagonal Ribs for Tail, Fuselage Stiffeners	3	3/16"x1/4"x36" Stabilizer, Elevator, Fin and Rudder Frames	1	1/4" Triangle x12" Fuselage Longerons
3	1/4" Triangle x36" Fuselage Longerons						
Special Shaped Balsa							
4	1/4"x1"x20" Trailing Edge Stock	4	3/8"x20" Shaped Leading Edge				
Block Balsa							
2	3/4"x1"x 6" Wingtips	1	1-1/2"x2"x2-1/2"; Nose Block				
Hardwood							
1	1/4"x3/4"x1" Basswood - Notched Towhook Block	2	5/32" dia. x3" Birch Dowels - Wing Hold-down Dowels				
Spruce							
4	1/8"x1/4"x18" Outboard Wing Spars, Top and Bottom	4	3/16"x1/4"x 20" Inboard Wing Spars, Top and Bottom	1	3/16" sq. x4" Elevator Joiner		
Die-Cut Plywood							
2	1/32"x4-1/2"x9-1/2" Fuselage Doublers FDF, FDR	1	3/32"x2-3/8"x11" Dihedral Brace	1	1/8"x4-1/2"x6" Fuselage Formers, Towhook Base		
Hardware							
6	Easy Hinges	2	Small Molded Nylon Control Horns (for elevator and rudder)	5	#2 x1/2" Sheet Metal Screws (for control horns & hatch hold-down)	2	2-56 R/C Links (clevises)
4	2-56 x10" Threaded Rods	2	.190" o.d.x20" Outer Nylon Pushrod Tubing	2	.130" o.d.x24" Inner Nylon Pushrod Tubing		
Miscellaneous Parts							
1	3/32" dia.x1-7/8" Formed Wire Towhook	1	38"x50" Full-Size Printed Plan	1	28 Page Instruction Booklet	1	3"x4-1/2" Decal

About The Building Sequence

The quickest and most efficient way to complete a model is to work on several pieces at the same time. While the glue is drying on one section, you can start on or proceed with another part. Work can even go forward on several sections of the same assembly at the same time, such as the front and rear sections of the fuselage.

Keep in mind that the numbering sequence used in these instructions was chosen as the best way to explain the building of each major component and is not intended to be followed in exact one-two-three fashion. Start on the wing at NO.1 and after doing as many steps as is convenient, flip over to "FUSELAGE CONSTRUCTION" and do a step or two there, then over to "TAIL SURFACECONSTRUCTION" and so forth. You will, of course, arrive at points where you can go no farther until another component is available. Plan ahead! Read the instructions completely and study the full size plans before beginning construction.



Radio Equipment Requirements

The RISER requires only elevator and rudder control, so any radio with two or more channels may be used. If you plan to use spoilers, a radio with at least three channels is required. Be certain that your radio system's frequency is approved for use in R/C model aircraft. Using a frequency assigned to R/C surface vehicles (cars, boats) not only endangers your model to interference from model car or boat drivers (who may not even be in sight), it is also against the law.

Glues

There are so many different glues available today for model construction that it can be confusing even for the experienced modeler. To simplify matters, most glues can be classified as one of four basic types:

1. Fast cyanoacrylate adhesives (abbreviated in these instructions as "CA") such as SIG CA, Hot Stuff, Jet, etc ...
2. Easy-to-use water-based glues such as SIG-BOND (yellow) and SIG SUPER-WELD (white).
3. Super strong (but heavier) two-part epoxy glues such as SIG KWIK-SET (5-minute cure) and SIG EPOXY (3-hour cure).
4. Traditional solvent-based model cements such as SIG-MENT.

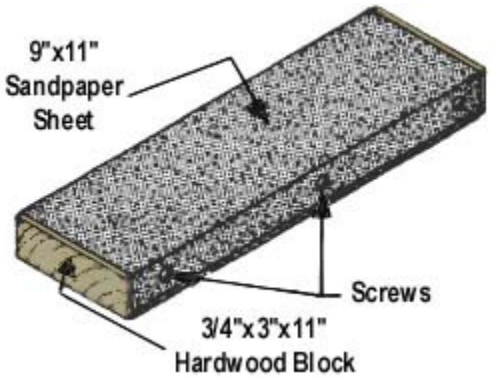
Each of these types has different characteristics and advantages. Often times, the choice of which type to use is strictly a matter of personal preference based on your prior experience with a previous model. Some of the steps in these instructions call out the type of glue to use for that particular assembly. In other areas you can use your own judgement as to which type is best suited to the purpose and to your building schedule.

For general construction of the RISER, we recommend that you use cyanoacrylate adhesives. These adhesives have become very popular with modelers because of their fast drying times. With CA, you can virtually build a structure from start to finish without having to wait for the glue to dry. Most brands, including SIG CA, come in three different viscosities: thin, medium, and thick.

- Thin CA has a watery consistency and uses capillary action to penetrate and soak into a joint. Since it is so thin and dries so quickly, the parts to be joined must be in firm contact with each other before application of the glue. Use thin CA for the initial assembly of balsa parts over the plans.
- Medium viscosity CA (SIG CA PLUS) can also be used for initial assembly in the same manner as the thin, but it takes a little longer to dry. Joints made initially with thin CA should be reglued with medium CA for additional strength. Medium CA should also be used when gluing plywood, spruce, or hardwoods.
- Thick CA (SIG CA SLOW) dries slowly enough that it allows you to apply the glue to the parts before assembling and gives you time to reposition the parts if necessary. Thick CA is good for gluing doublers to fuselages and forming fillets in high stress areas.

The drying time for all CA's can be speeded up by spraying an accelerator (such as SIG KWIK-SHOT) right on the joint. SIG-BOND is handy for gluing things such as wing leading edge sheeting or center sheeting where you need to apply glue to several parts in one operation. You should also have on hand some epoxy glue, both 5-minute and slow dry, for areas subject to high stress or joints involving metal parts.

You can't get along without a good sanding block



An assortment of different size sanding blocks are indispensable tools for model construction. A good general purpose block can be made by wrapping a 9"x11" sheet of sandpaper around a piece of hardwood or plywood. Use three screws along one edge to hold the overlapped ends of the sandpaper. Put 80-grit paper on the block during general construction. Switch to 220-grit paper for final finish sanding just before covering.

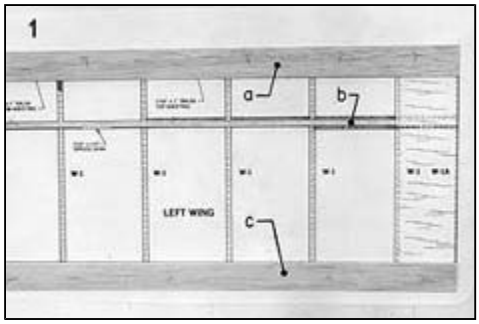
Another handy block can be made by gluing sandpaper onto a 24" or 36" long piece of aluminum channel stock. Most hardware stores carry a rack of aluminum in various sizes and shapes. This long block is very useful for sanding leading and trailing edges accurately.

Finally, glue sandpaper onto different sizes of scrap plywood sticks and round hardwood dowels. These are handy for working in tight places and for careful shaping where a big block is too hard to control.

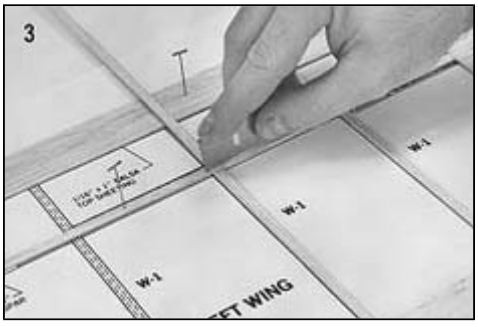
WING CONSTRUCTION

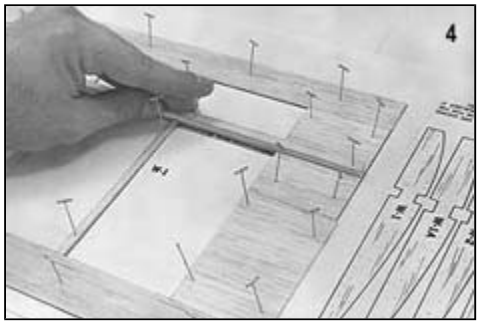
Inboard Wing

1.
   a. Pin down the 1/16"x1" front bottom sheeting.
   b. Pin down the 1/16"x3/16" balsa spar cap strip.
   c. Pin down the 1/4"x1" trailing edge.
2. Cut pieces of 1/16"x3" balsa for the center section sheeting. Glue and pin in place.

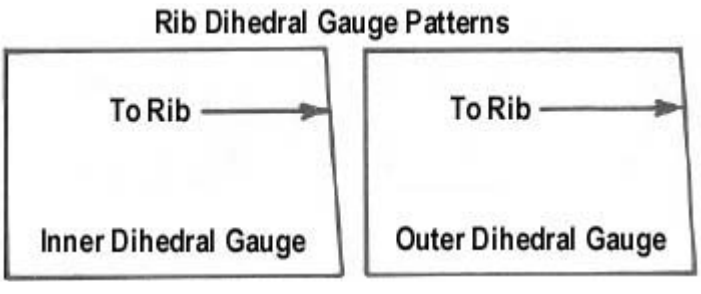


3. Cut pieces of 1/16"x3/16" balsa for the bottom rib cap strips.
4. Glue and pin the rib cap strips in place. Add the 3/16"x1/4" spruce spar on top of the spar cap strip. Use a few ribs to locate the spruce spar in relation to the trailing edge.
5. Glue and pin all ribs in place except for the two end ribs located at the dihedral joints. Glue the ribs to the cap strips, planking, spruce spar, and trailing edge stock.

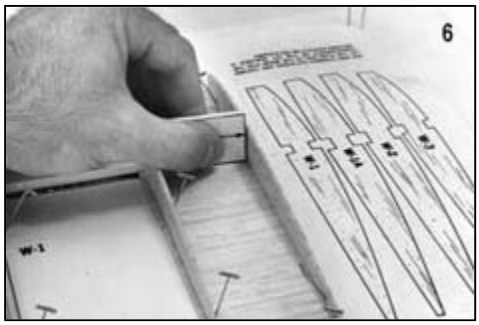


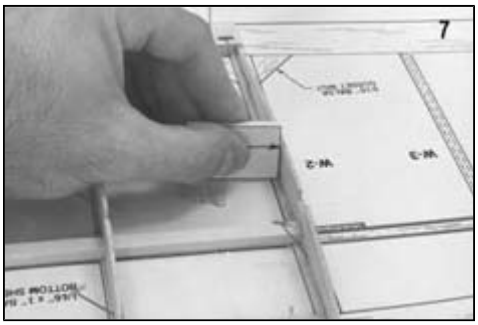


6. Glue the inboard and outboard guide patterns to a piece of scrap plywood. Cut out the patterns and use the inboard rib guide to angle W-1A panel end rib. Glue and pin the rib in place.
7. Use the outboard rib guide to angle W-1A outer rib. Glue and pin the rib in place. Use scrap 1/16" balsa to level the guide.



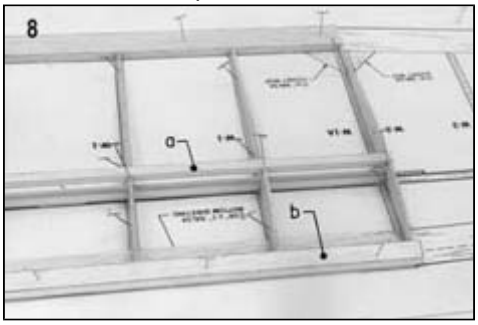
8. a. Glue and pin the 3/16"x1/4" top spruce spar in place.
   b. Glue and pin the shaped leading edge in place.

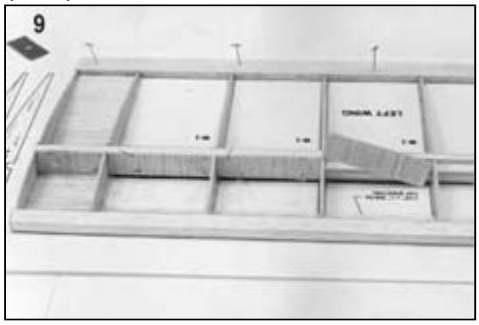


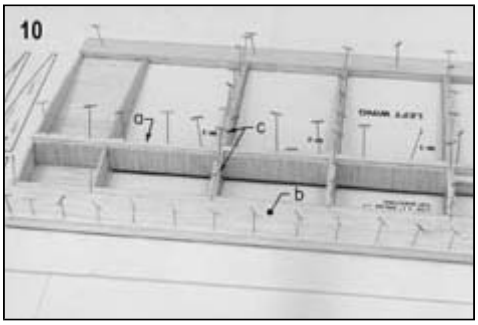


9. Cut vertical grain pieces of 1/16"x3" balsa sheet for spar shear webs. Glue and pin these in place. Note that these extend oniy out to the fourth rib bay.

10. a. Glue and pin the top spar cap strip.
    b. Glue and pin the 1/16"x1" top sheeting.
    c. Glue and pin the 1/16"x3/16" rib cap strips.

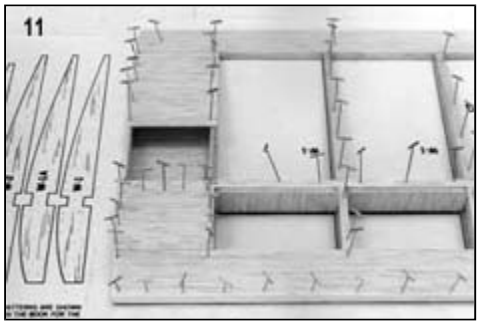


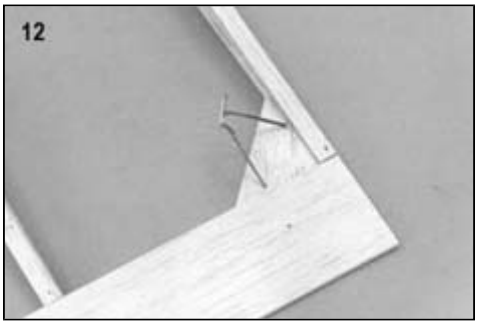




11. Cut pieces of 1/16"x3" balsa sheet for the top center section sheeting. Leave open, as shown in the picture, the area where the 3/32" plywood dihedral brace WR will be installed.

12. Cut the wing gussets from the 3/16" printed balsa sheet. Glue wing gusset WGR in place as indicated on the plan.



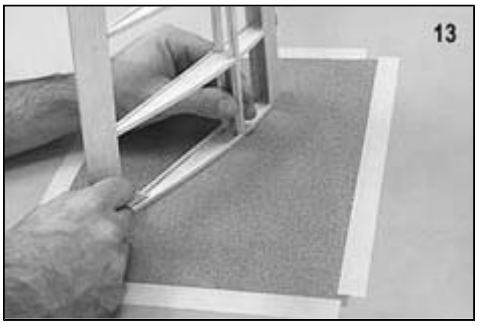


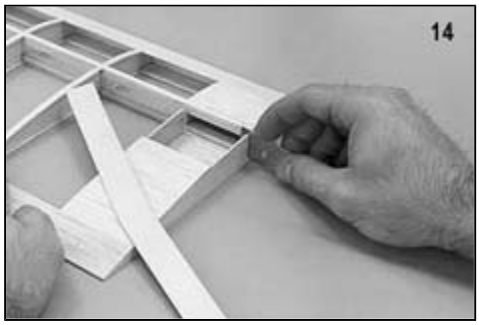
13. Tape a piece of 80 grit sandpaper to a flat surface. Carefully sand the inboard and outboard dihedral joints.

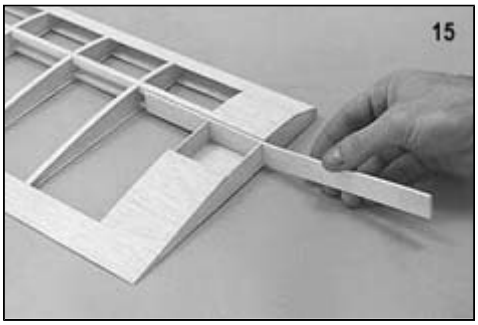
14. Complete cutting the slots in the two balsa ribs for dihedral brace WR as shown in the picture.

15. Trial fit dihedral brace WR buf do not glue in place at this time.

    Repeat this procedure for the other inboard wing panel so that you will have one left panel and one right panel.





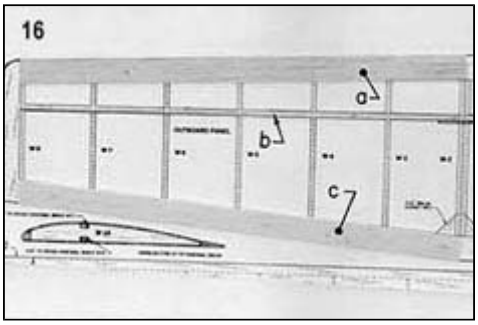


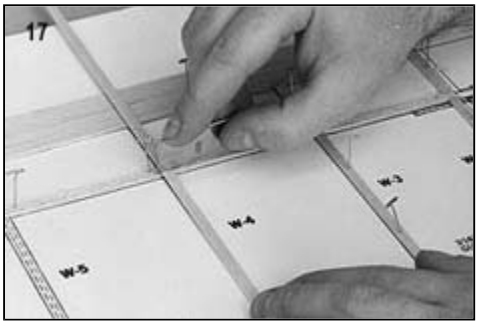
Outboard Wing

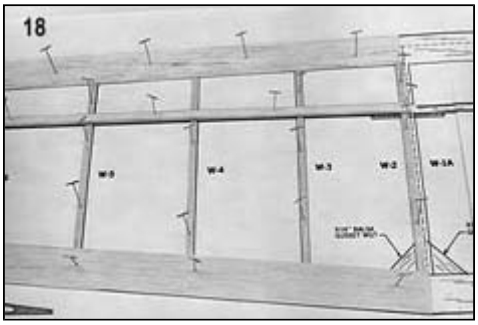
16.
   a. Pin down the 1/16"x1" bottom sheeting.
   b. Pin down the 1/16"x3/16" spar cap strip.
   c. Pin down the 1/4"x1" trailing edge over the plans.

17. Cut pieces of 1/16"x3/16" balsa for the bottom rib cap strips. Glue and pin these as indicated on the plans.

18. Glue and pin the 1/8"x1/4" spruce spar on top of the 1/16"x3/16" spar cap strip. Use a few ribs to locate the spruce spar in relation to the trailing edge.

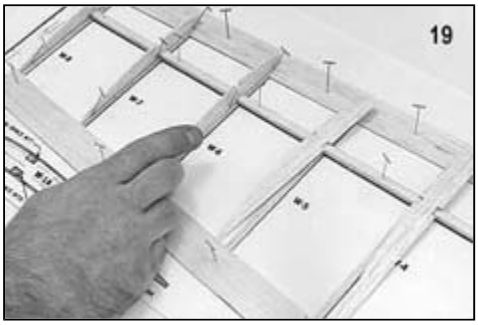






19. Glue and pin down the ribs (except W·2) in place. Glue the ribs to the cap strips, spruce spar, planking, and trailing edge stock.

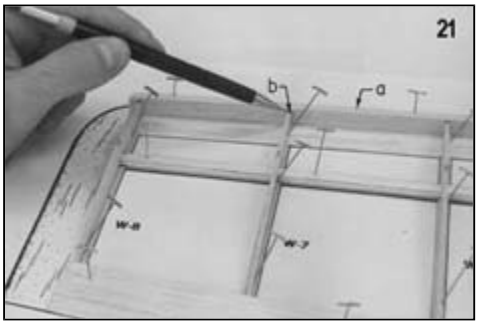
20. Use the outboard rib guide to angle rib W·2. Glue and pin W·2 in place. Use a piece of cap strip stock to put the guide level with the rib cap strip.



21.
   a. Pin but do not glue the piece of shaped leading edge in place.
   b. Use a pencil to mark where the ribs touch the leading edge.

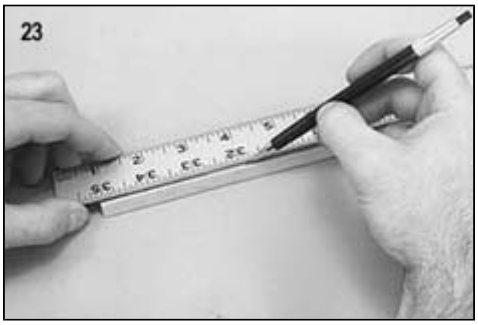
22. Use these marks to draw a line on the back of the leading edge.

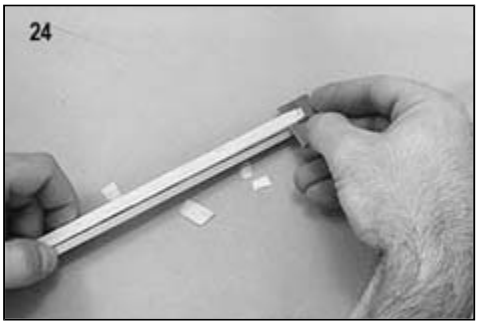
23. Draw a line on the front of the leading stock, taking off the same amount.

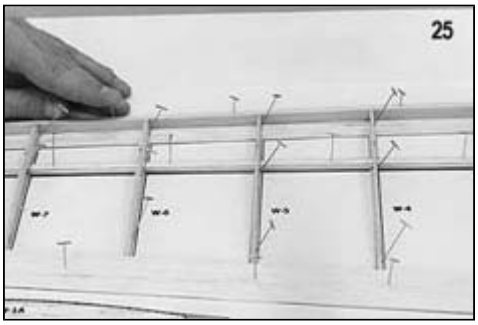


24. Use a single edge razor blade to trim off the excess. Sand with a sanding block to smooth any rough areas.

25. Glue and pin the leading edge in place.







26. Glue and pin the 1/8"x1/4" spruce top spar in place.

27.
    a. Glue the 1/16"x3/16" top spar cap strip on top of the spar.
    b. Glue and pin the 1/16"x1" top sheeting in place.

28.
    a. Cut pieces of 1/16"x3/16" balsa for top rib cap strips.
    b. Glue and pin the cap strips in place.

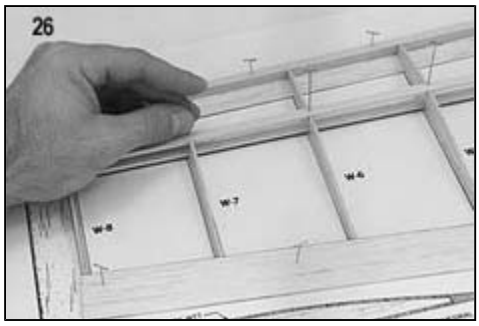
29. Glue wing gusset WGT in place as indicated on the plans.

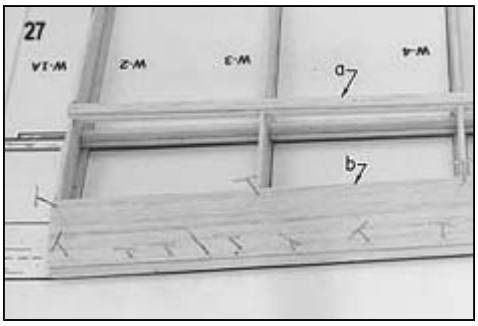
30. Block sand the entire wing panel to smooth out any rough surfaces.

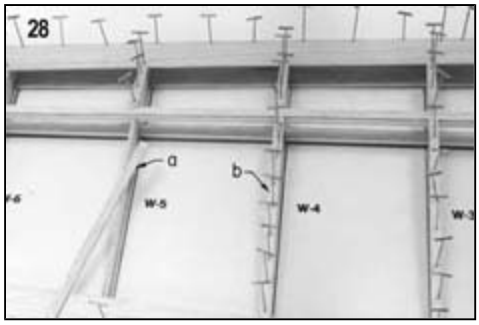
31. Tape a piece of 80 grit sandpaper to a flat surface. Carefully sand the dihedral joint.

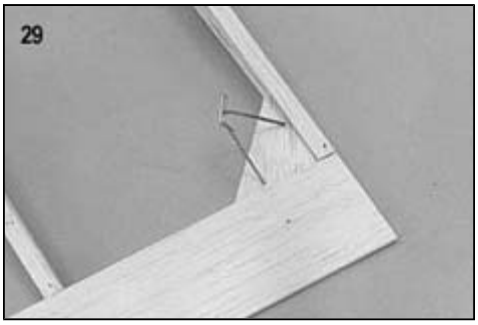
32. Repeat this process for the tip rib.

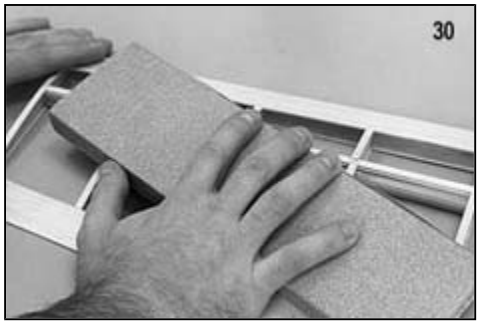
33. Trace the wing tip pattern on the 3/4"x1"x6" balsa block.

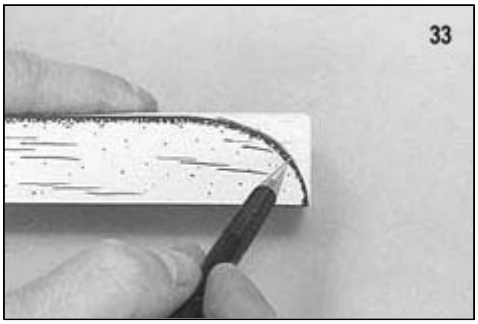


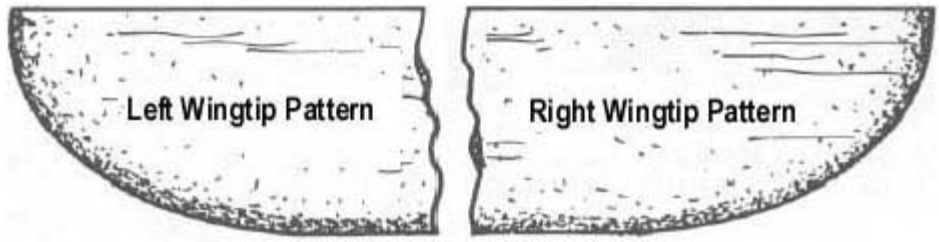










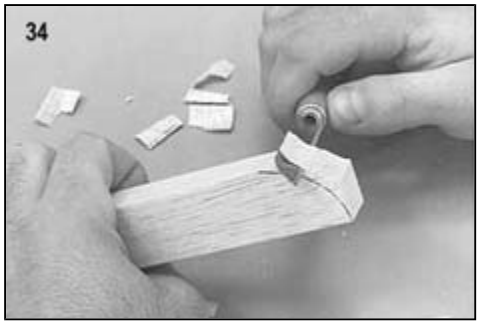


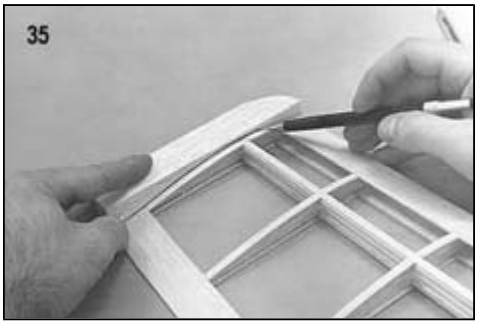
34. Carve the tip block.

35. Place the tip block against the tip rib. Trace around it as shown in the picture.

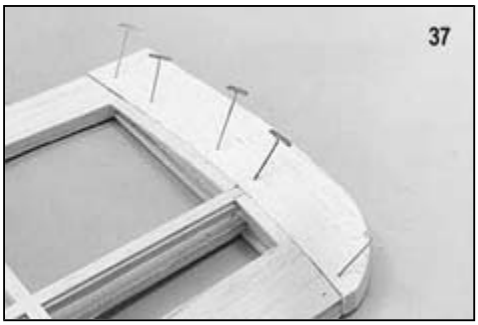
36. Carve the tip block up to the line.

37. Glue and pin the tip block to the tip rib.

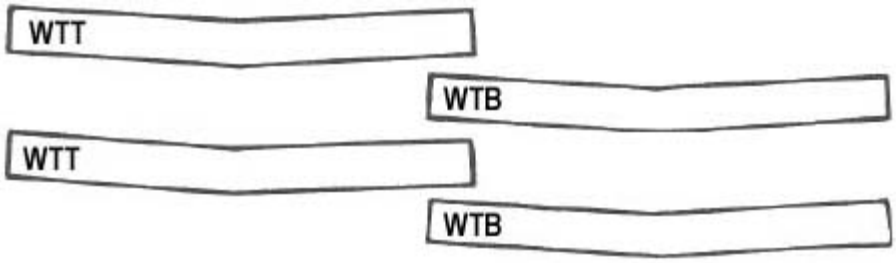




38. Carve the tip block to shape. Sand down to smooth any rough areas.



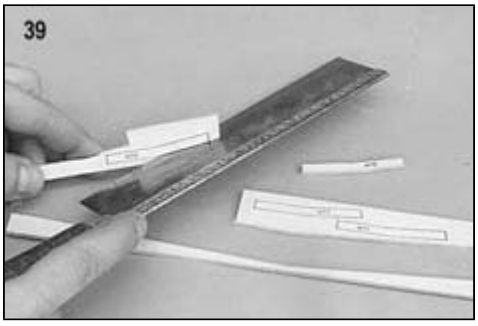
39. Use the patterns supplied to make two WTT's and two WTB's. Cut these from the scrap 3/32" die-cut plywood brace WR.

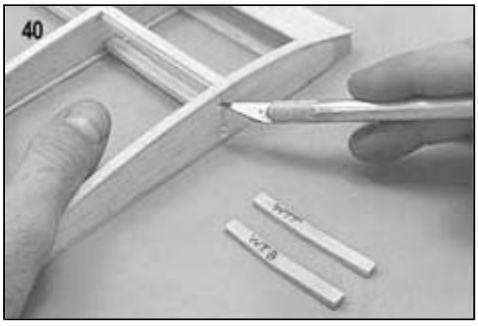


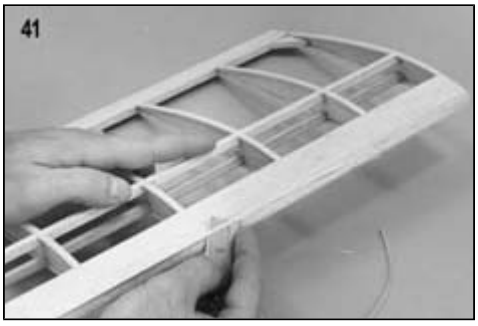
40. Trial fit the dihedral braces WTT & WTB. Trim the ribs if necessary, but do not glue the dihedral braces in yet.

Repeat these procedures for the other outboard wing panel so that you will have one left panel and one right panel.

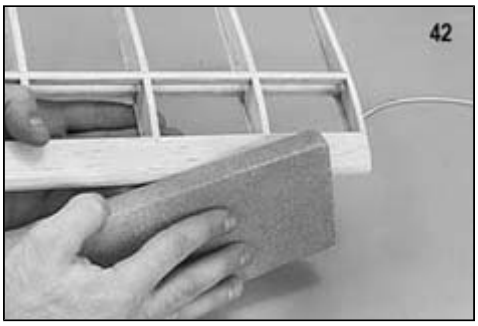
41. Carve the leading edge of all wing panels with a single edge razor blade to airfoil contour.







Joining Wing Panels

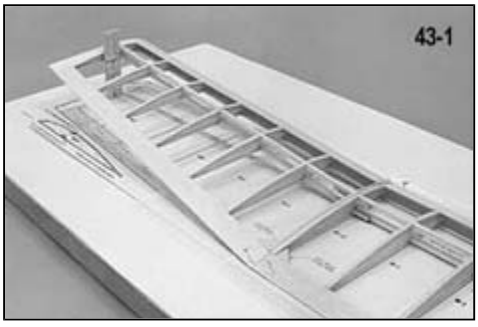


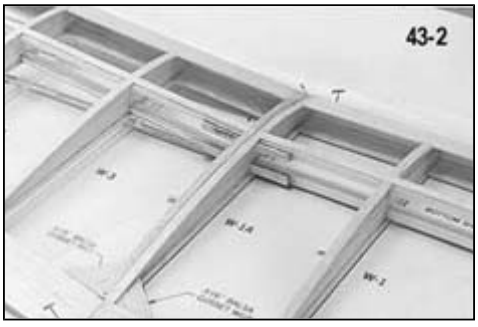
42. Sand the leading edge smooth with the sanding block.

43. Trial fit WTT & WTB dihedral braces in the inner panels at the outboard rib.

Pin down the inboard panel over the plan. Position the outboard panel on the plan against the inboard panel and raise the tip rib 2-1/4" as shown. If the joint between the two panels does not match perfectly, sand one or both of the ribs until it does.

Glue the panels together with epoxy glue. Have a "wet" joint to insure that the glue will fill any gaps in the seam. Also epoxy glue dihedral braces WTT and WTB in place as shown. After the epoxy has set up, take up the wing panels and peel off any excess glue that has squeezed out. It is easier to do this before the glue completely cures.

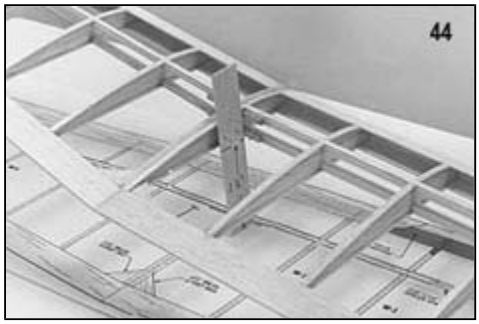


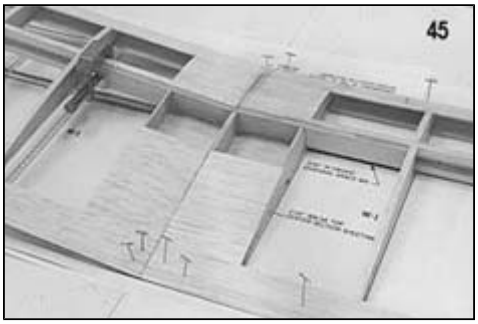


Repeat the same procedure to the other outboard and inboard wing panels. You will now have one left wing and one right wing.

STOP: If you wish to add the spoiler option it.js best to do it before proceeding to the next step. (See "Optional Spoilers" at the end of this section).

44. Position the two wing halves over the plan. Pin the right half down so that its inboard panel is flat on the plan. Block up the left wing half 2-3/4" at the inboard-outboard joint. If the joint between the right and left wings do not match perfectly, sand one or both of the ribs until it does.



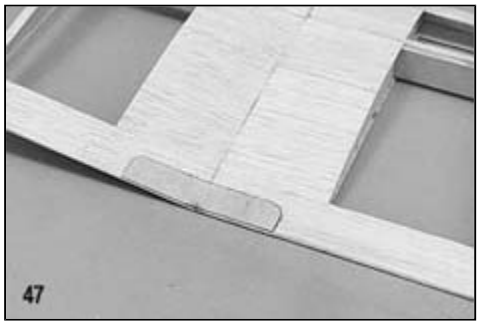


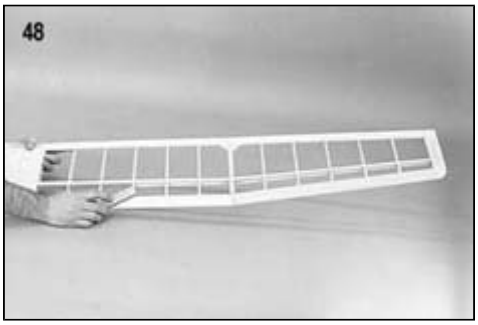
45. Glue the panels together with epoxy glue. Have a "wet" joint to insure that the glue will fill any gaps in the seam. Also epoxy glue dihedral brace WR in place as shown. Be sure to glue it securely to the top and bottom spars. Take up the wing panels and trim off any excess glue as done when gluing panels together.

46. Cut pieces of 1/16"x3"x36" balsa and finish sheeting the center section of the wing.

47. Rubber bands can cut into the balsa wood. To protect the area, use pieces of scrap 1/32" plywood and glue into place on the wing trailing edge as shown.

48. Completely sand the entire wing with fine sandpaper. The wing is now ready for covering.



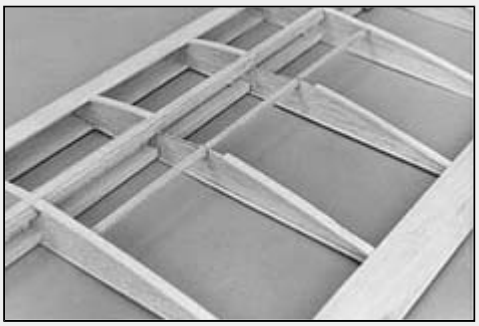


Optional Spoilers

1. a. Cut to length a piece of 1/4" x 1" trailing edge stock for the spoiler.
   b. Cut through the cap strips and ribs (as shown on the plans and side view drawings) to allow the spoiler to fit flush in the wing. Make these cut outs only in the two center ribs of the spoiler bay.

2. Trim away the cap strip material from the two center ribs of the spoiler bay to allow for the 1/16" x 1/2" balsa sheeting.

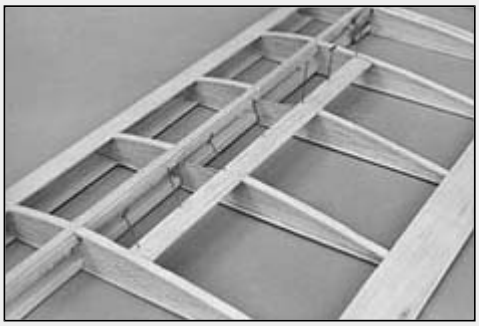
3. Cut pieces of 1/8" sq. balsa to fit between the ribs and glue in place as indicated on the plans and side view drawings. These will act as a shelf for the 1/16" x 1/2" balsa sheeting.

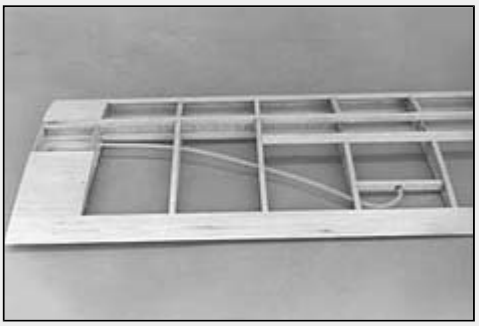


4. Cut a piece of 1/16" x 1/2" balsa sheeting and glue in place on top of the 1/8" sq. balsa and flush with the top of the wing.

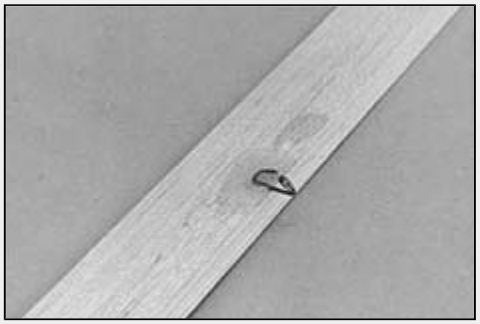
5. Cut a piece of 3/16" x 1/4" balsa to fit in between the ribs as shown on the plans. Drill a 1/8" hole through the center of it to allow the plastic tubing to fit through. Glue the balsa piece in place.

6. Using heat, pre-bend the plastic tubing to the shape shown on the plans. Drill 1/8" holes through the ribs at the locations shown on the plans to allow the tubing to pass through. Slip the tubing in and glue in place.



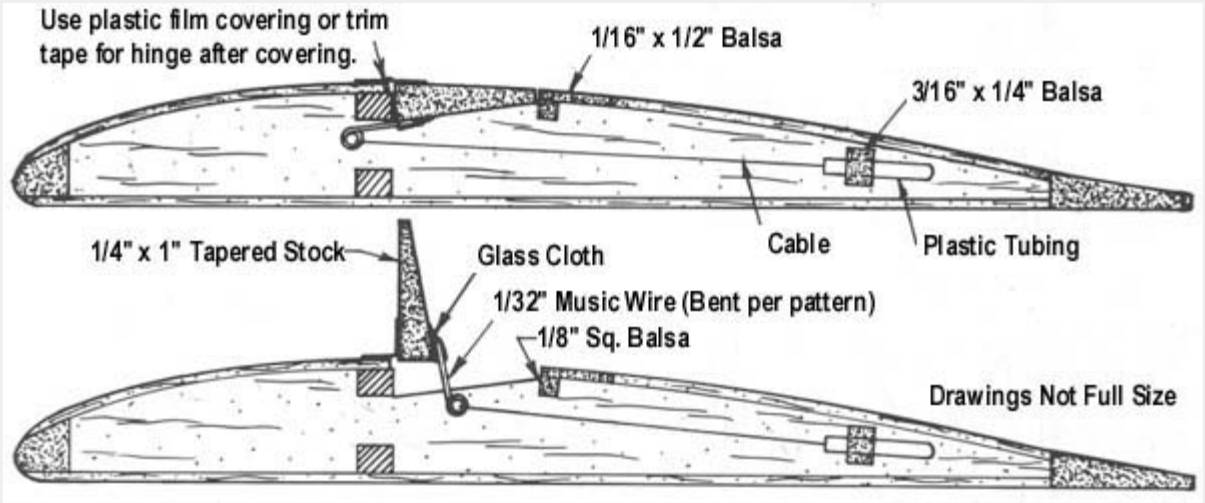


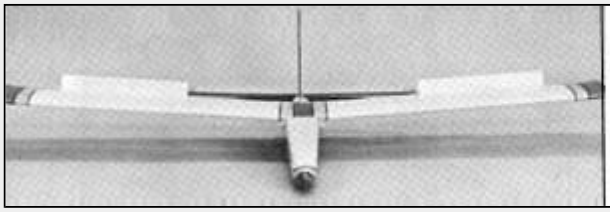
7. Cut and bend a piece of 1/32" music wire per pattern and epoxy glue in place as shown on the plans. Also epoxy glue a small piece of glass cloth over the wire.

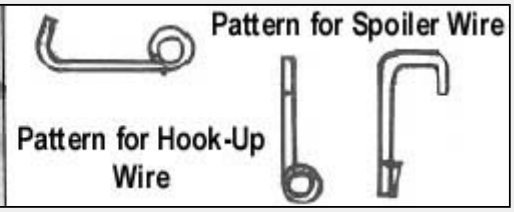


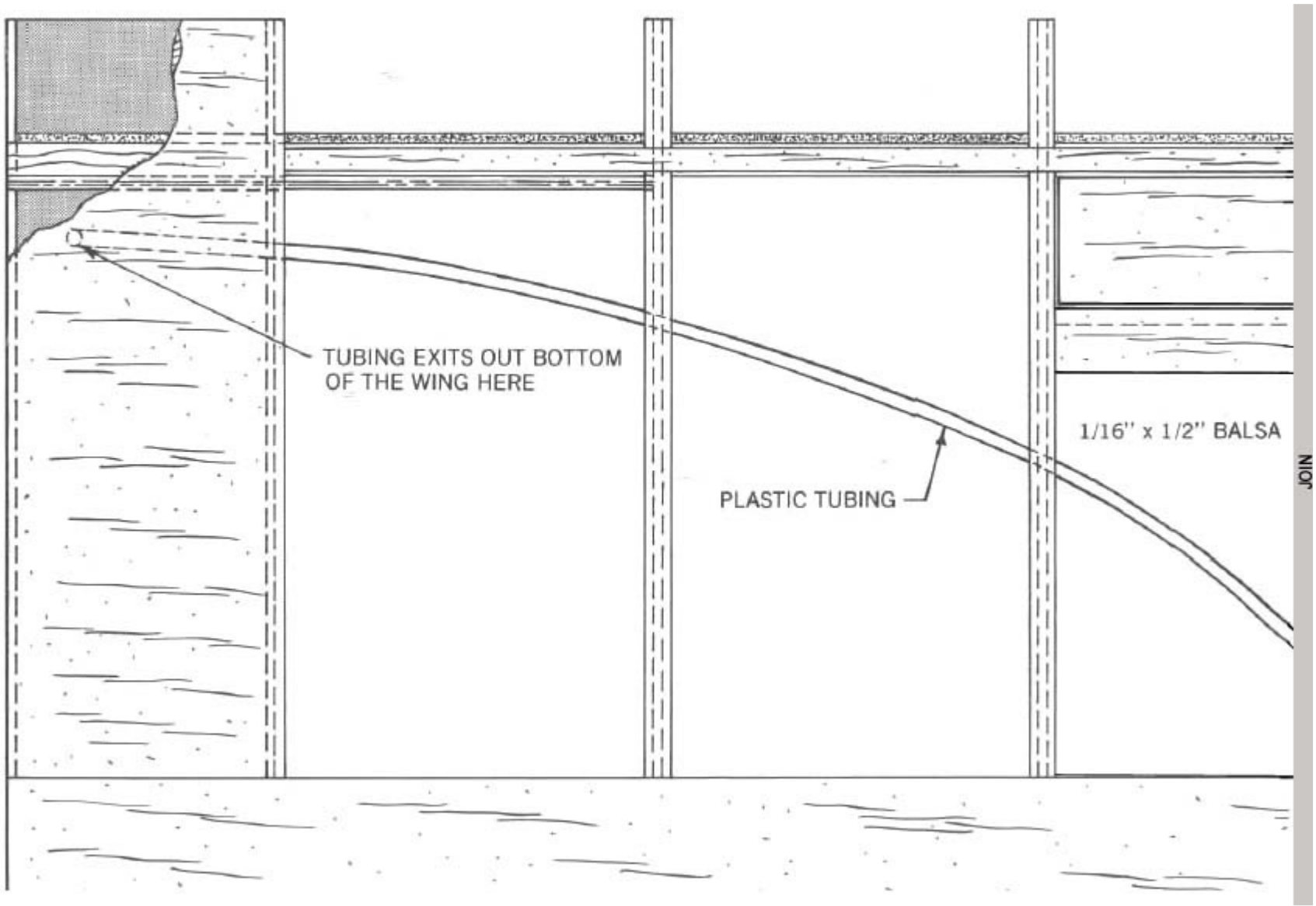
8. Repeat this process for the other wing and then continue with the wing construction.

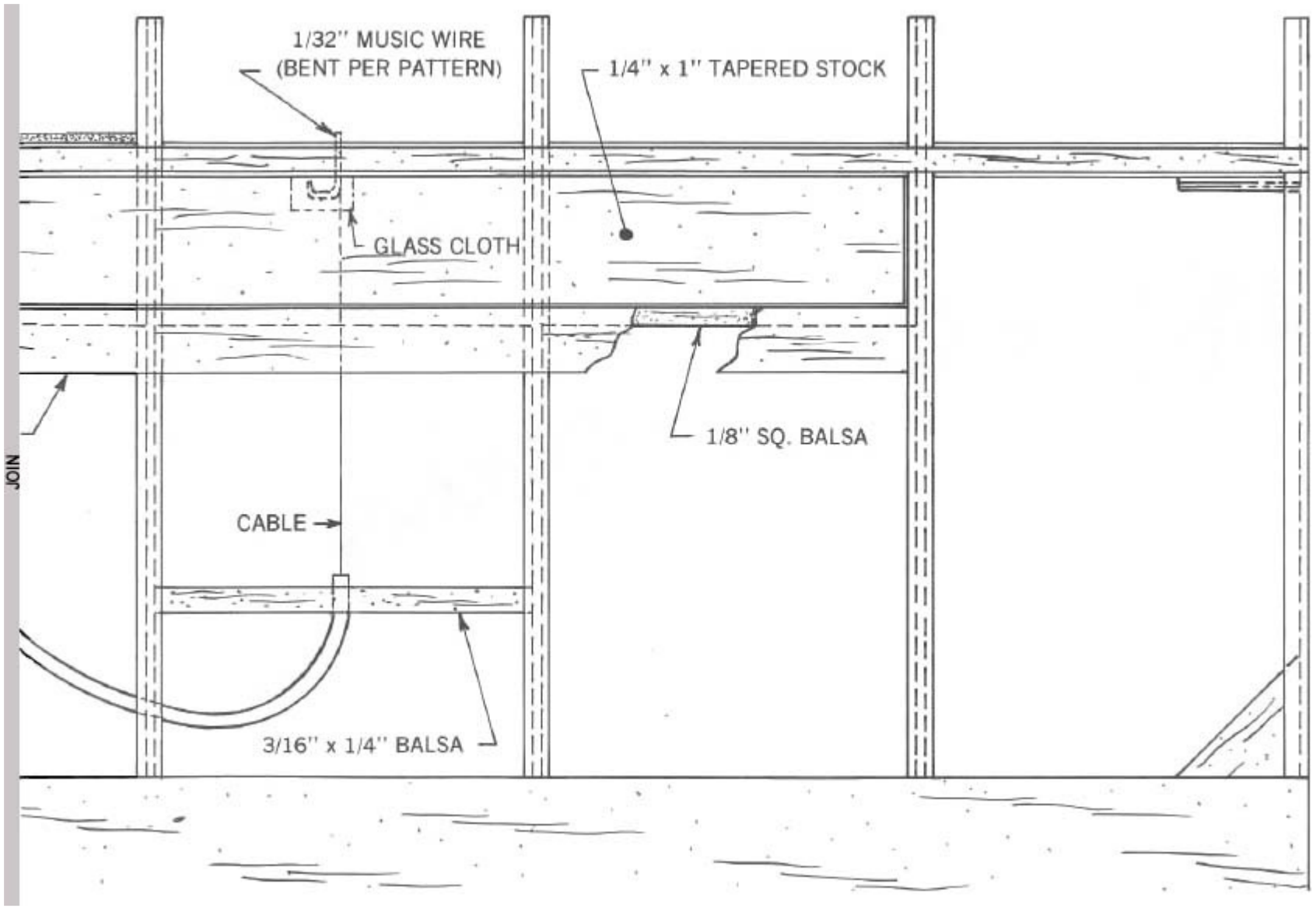
   After covering the wing and the spoilers make hinges for the spoilers out of pieces of plastic film covering or trim tape and install the spoilers. Feed the cord through the plastic tubing from the servo hook-up side of the tubing. Connect the cord to the wire on the spoilers. Make the servo hook-up wire per pattern. Both pieces of cord from the spoilers are connected to this. The exact placement of the hook depends on where your servo is installed. Connect the hook to the servo. Both spoilers should come up at the same time andboth should open the same amount.







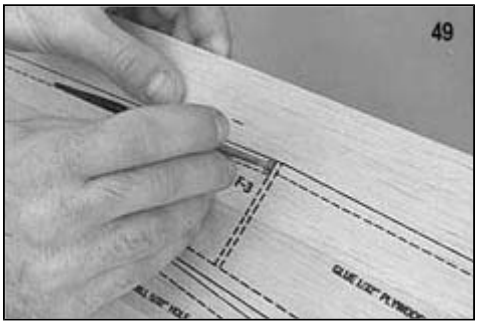

TUBING EXITS OUT BOTTOM
OF THE WING HERE
PLASTIC TUBING
1/16" x 1/2" BALSA
JOIN

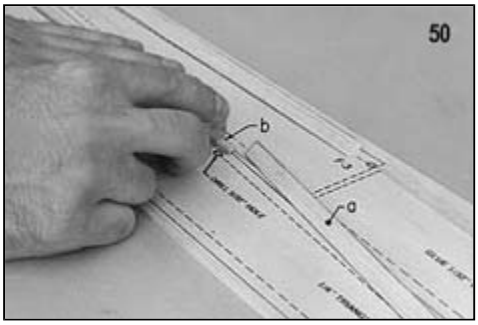

1/32" MUSIC WIRE
(BENT PER PATTERN)
1/4" x 1" TAPERED STOCK
GLASS CLOTH
1/8" SQ. BALSA
CABLE
3/16" x 1/4" BALSA
JOIN

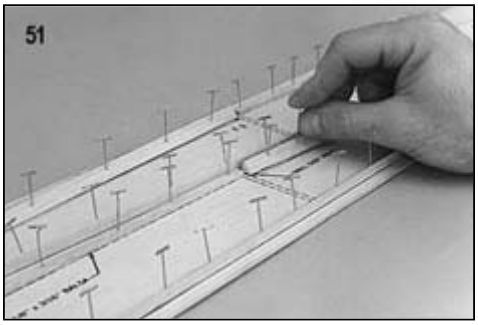
FUSELAGE CONSTRUCTION

49. Drill or cut out the 5/32" dowel holes in the fuselage sides. This will locate the holes after the plywood doublers have been glued in place.

50.
    a. Cut pieces of 1/4" triangle stock, and
    b. 1/8"x3/16" balsa as indicated on the printed fuselage sides.
51. Glue and pin the 1/4" triangle stock pieces and 1/8"x3/16" pieces in place.



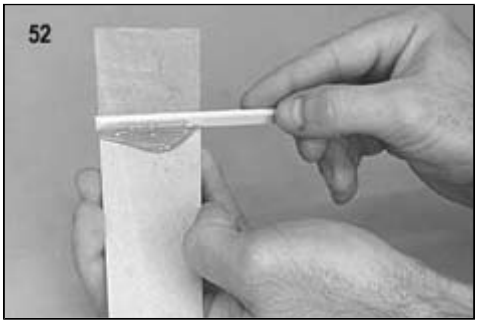


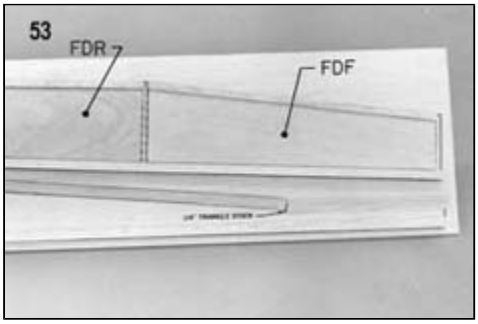


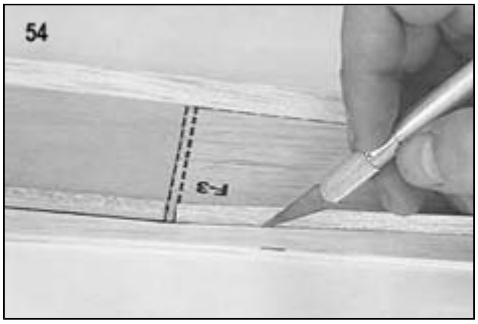
52. Using a paddle, spread a thin coat of epoxy glue on both die-cut 1/32" plywood doubler's FDF. Don't use a large amount of epoxy as this will add unnecessary weight.

53. Glue one doubler FDF onto the right fuselage side as indicated and the other to the left fuselage side. Repeat this same procedure for right and left doublers FDR.

54. Cut out the fuselage sides with a knife. Be sure to cut just outside of the lines.







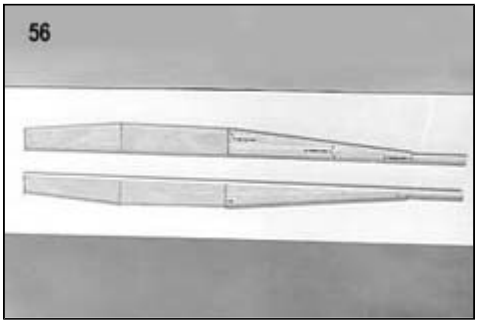
55. Use a sanding block to sand the fuselage sides to final shape. Match the sides to each other.

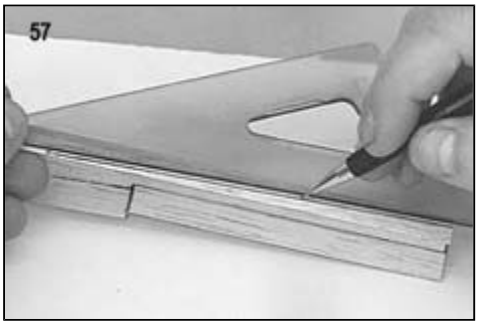
56. The fuselage sides are now ready for joining.

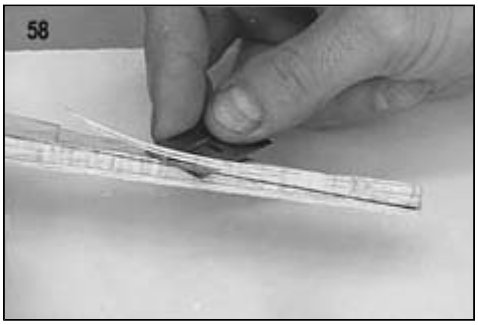
57. Refer to the top view of the plans and draw a line for the bevel at the rear of the fuselage.

58. Using a single edge razor blade, cut the bevel at the rear of the fuselage.

59. Epoxy glue plywood formers F-2 and F-3 in place on one of the fuselage sides. Use a square to be sure the formers are perpendicular to the fuselage side.

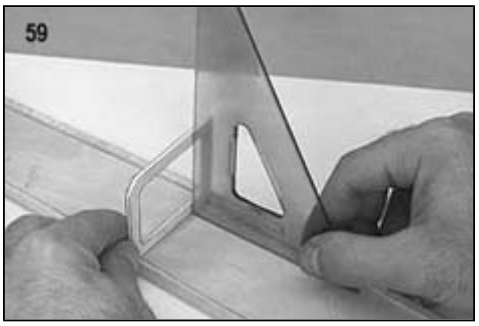


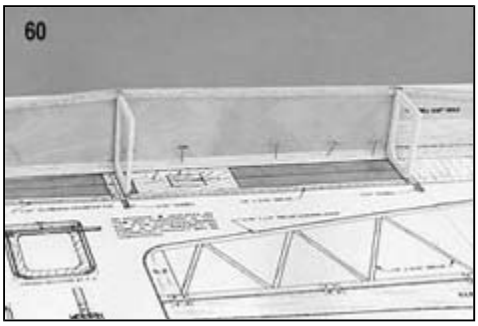


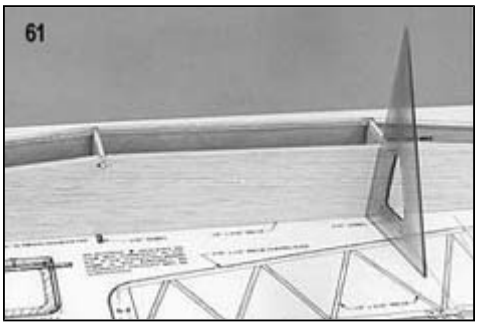


60. Pin the side in position over the top view of the plan.

61. Epoxy glue the other fuselage side to F-2 and F-3 over the plans. Check with a square before the glue sets up.



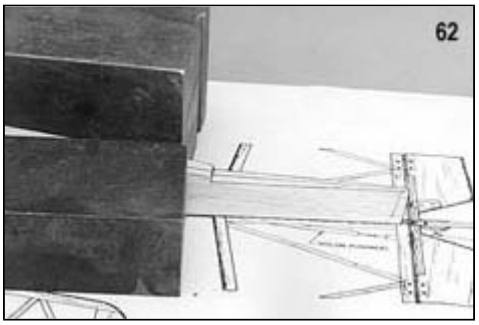


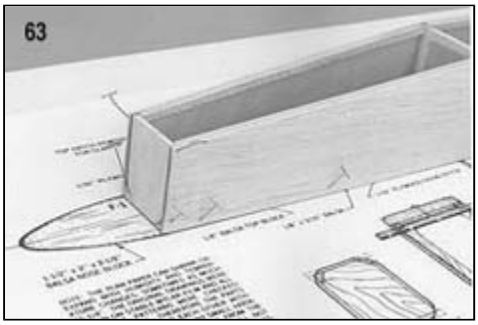


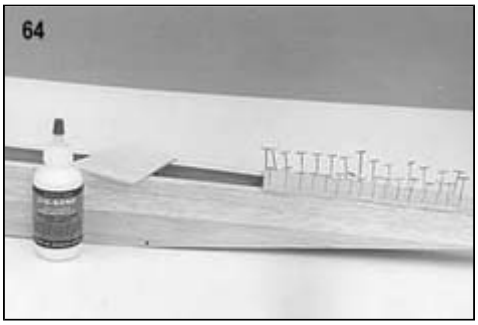
62. Pull the fuselage sides together at the rear using square weights (pieces of scrap iron shown here) and glue together.

63. Epoxy glue both sides of F-1 and glue in place over the plans. Pin or use weights to hold the sides until the glue sets up.

64. The bottom of the fuselage may now be sheeted using cross-grain pieces of 3/32" sheet balsa. The top of the fuselage is sheeted later.



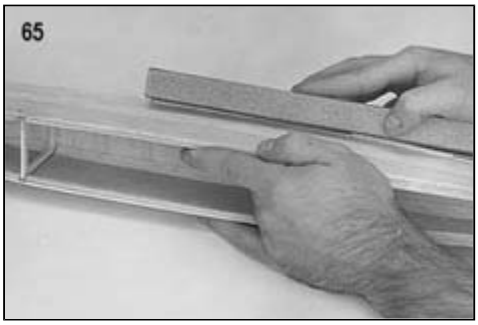




65. Use a sanding block to smooth the rough edges

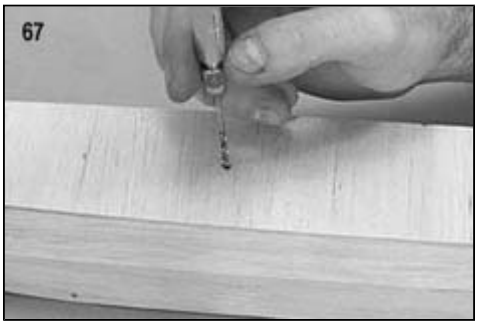
66. Glue the 1/8" Lite-Ply towhook base in place as indicated on the plans.

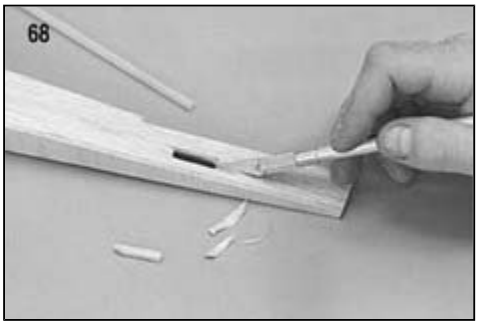
67. Drill a hole for the towhook through the bottom of the fuselage and the towhook base. Do not glue the towhook in. It is best to do this after covering the model

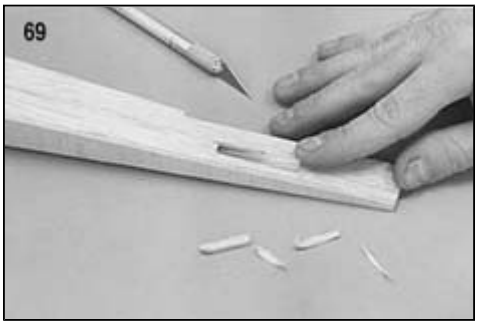


68. It is best to have the tail parts complete at this time so that they may be used for pushrod alignment. Mark the location at the rear of the fuselage for the exit slot of the rudder pushrod. Cut out the exit slot. Trim around the slot so that the outer tubing fits tightly.

69. Insert the outer tubing through the slot and push the tubing up through the fuselage into the servo compartment.

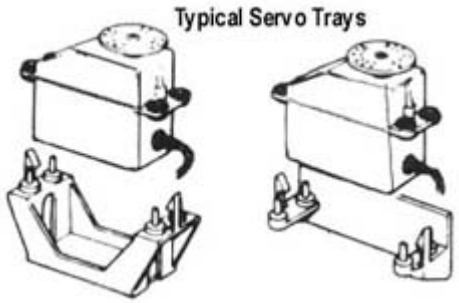






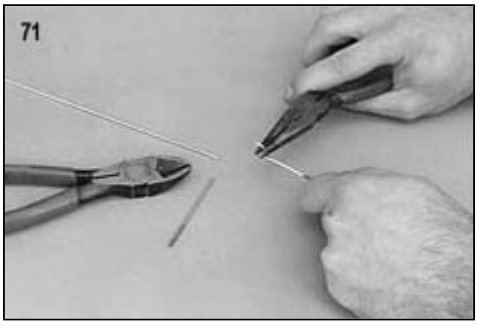
70. Secure the servo, using the manufacturer's mount or mount on hardwood rails. See "Radio Installation" for more information on mounting servos.

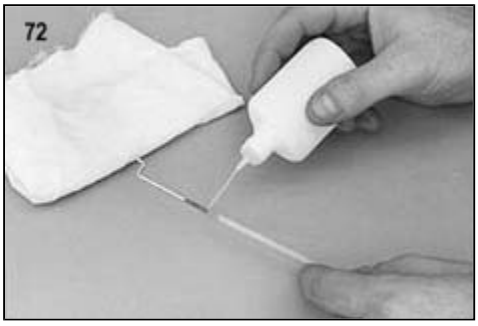
71. Cut off 2-1/2" at the threaded end of one of the threaded rods. Put a "Z" bend (or a "L" bend if you are going to use a pushrod keeper) in the non-threaded area of the rod.

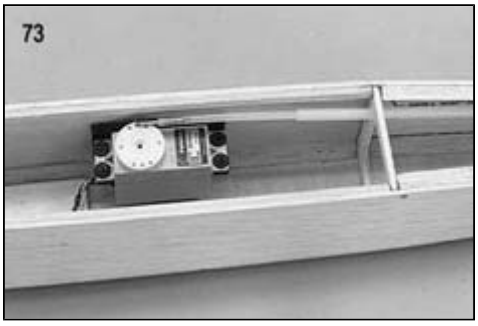


72. Clean the threaded area with a rag dipped in alcohol or thinner. This will remove any oil from the wire. Thread the wire into the inner tubing. Use epoxy or cyanoacrylate "super" glue to glue the threaded rod into the tubing.

73. Slide the inner pushrod tubing into the outer pushrod tubing. Install the Z-bend through the servo arm and hook it up to the servo. This will give an indication of where the outer tubing is to be fastened to F-3.







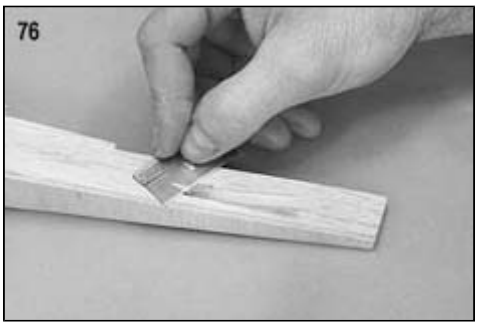
74. Remove the inner tubing and use a piece of scrap 1/32" plywood to make a mounting bracket for the outer tubing as shown. Epoxy glue this bracket in place

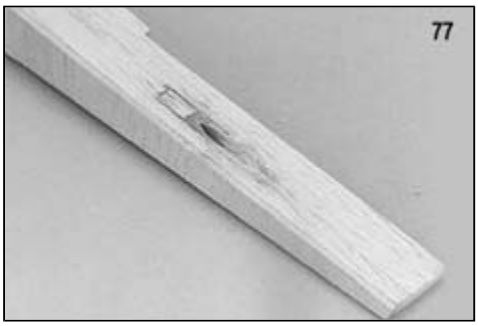
75. Epoxy glue the outer tubing in place at the rear of the fuselage. Wipe off any excess glue.

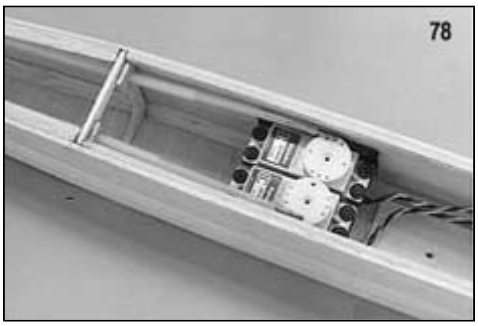
76. Use a single edge razor blade and trim the outer tubing flush with the outside of the fuselage side.

77. Fill in any holes around the pushrod with scrap balsa. Sand flush with a sanding block

78. Repeat the same procedure for the elevator pushrod. When complete the servo installation should look similar to that pictured.



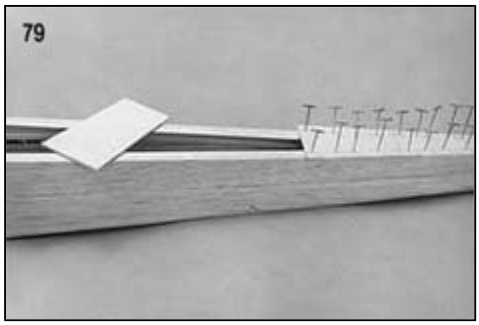




79. Sheet the top of the fuselage with pieces of cross-grained 3/32" sheet balsa. Smooth the rough edges with a sanding block.

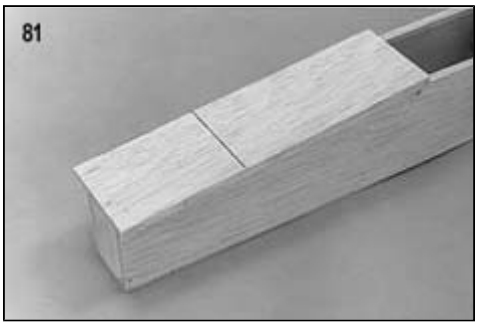
80. Mark a line 3" from the end on the fuselage top hatch sheet (1/4"x2-1/4"x8" balsa). This will indicate where to cut the hatch apart from the rest of the top.

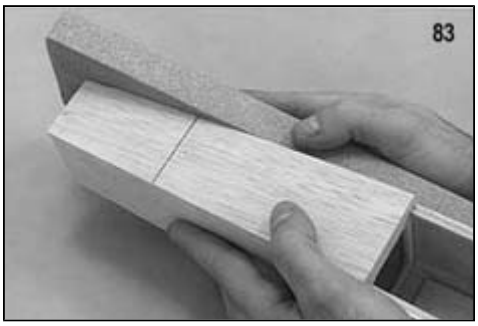
81. Tack glue the top hatch sheet onto the fuselage. The front should be flush with F-1.



82. Use a single-edge razor blade to trim the top hatch sheet flush with the fuselage sides.

83. Smooth the rough edges with a sanding block.

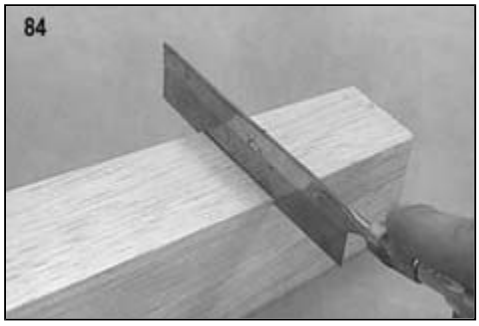


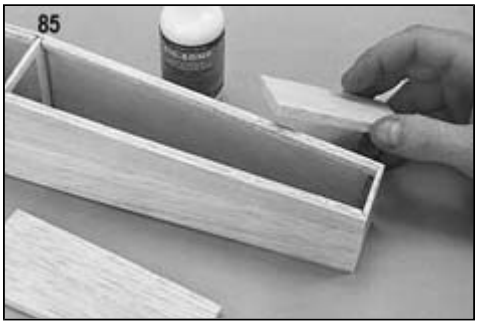


84. Saw along the line previously marked to cut the hatch apart from the rest of the top.

85. Remove the hatch and top sheet from the fuselage. Permanently glue the top sheet in place.

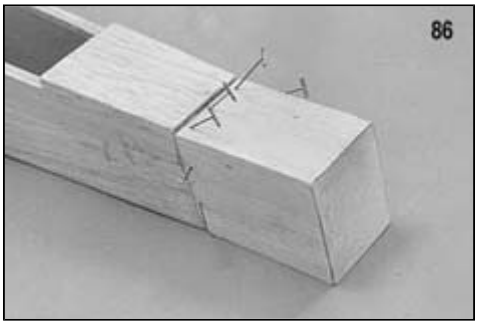
86. Glue and pin the 1-1/2"x2"x2-1/2" balsa nose block to the fuselage. It should be flush with the bottom of the fuselage, and a slight jog at the top of the fuselage as shown in the picture.

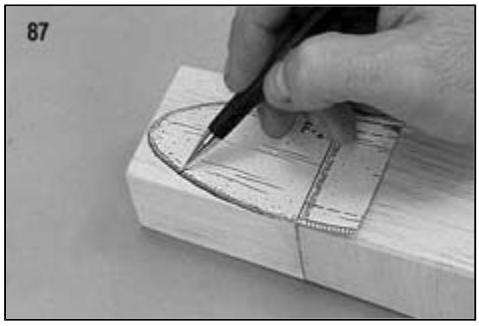


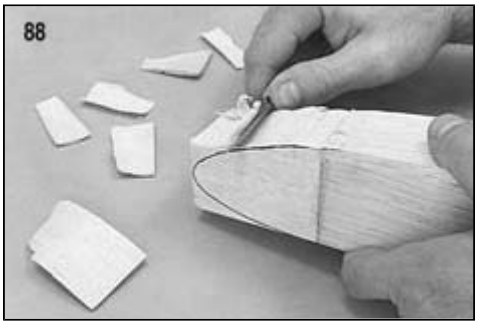


87. Use the nose block side view drawing to trace the pattern on the side of the nose block.

88. Carve the nose block down to the line previously drawn. Note that part of the fuselage top sheet will also be carved.



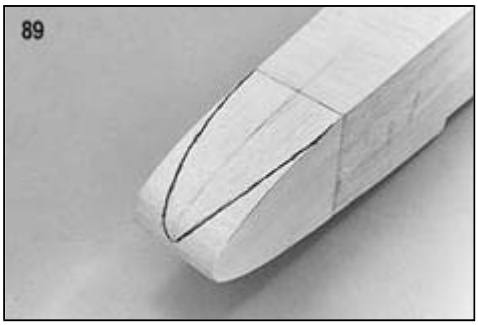


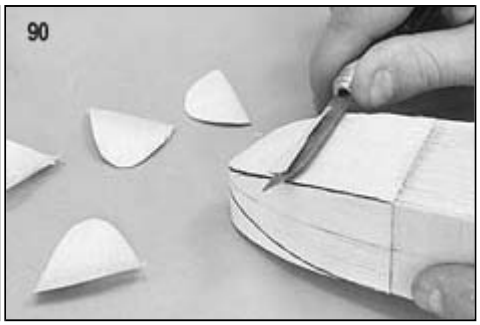


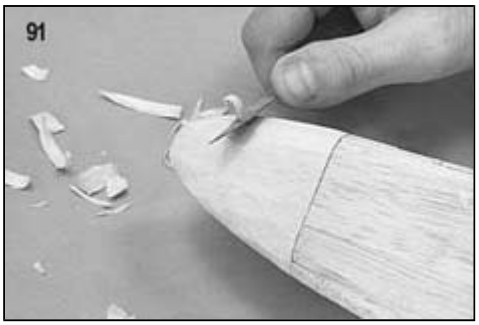
89. Use the nose block top view drawing and trace it on the bottom of the nose block.

90. Carve the nose block down to this line.

91. Tack glue the hatch in place. Carve the edges of the nose block and fuselage to shape. Use the cross-section drawings (F-l, F-2, F-3, rear fuselage) to determine the exact contours. Don't shape the open top of the fuselage where the wing will sit.



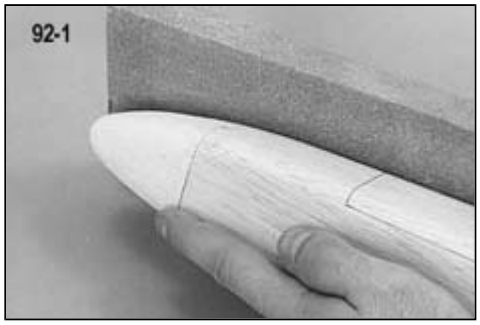


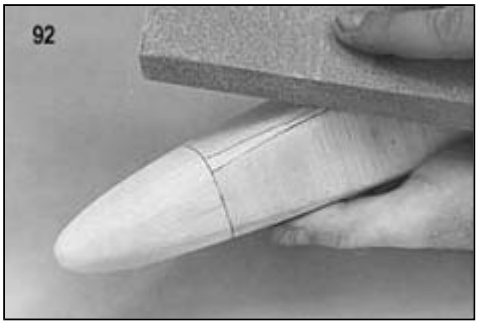


92. Block sand all edges to smooth out any rough areas.

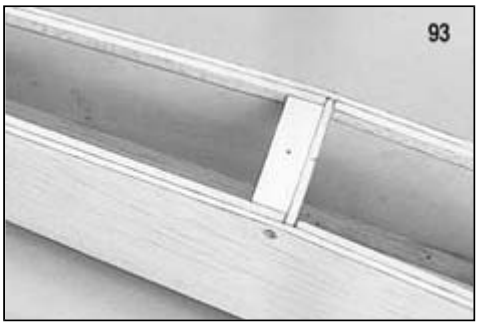
93. Remove the hatch and glue in a piece of scrap 1/8" Lite-ply for the hatch hold-down plate "HH" as indicated on the plans. Drill through hatch for the 2-56x1/2" hold-down screw.

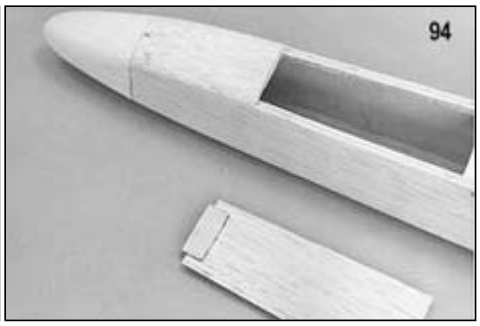
94. Glue a piece of scrap 1/32" plywood (hatch tongue) to the front of the hatch on the bottom side as indicated on the plans.

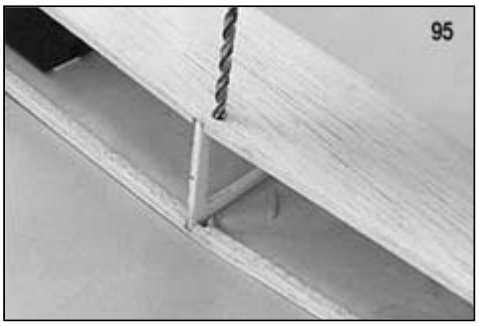




95. Drill the dowel holes on through the plywood doublers for the 5/32" wing hold-down dowels. It is best not to glue in the dowels until after the model is covered. The fuselage may now be covered. Refer to the covering section.



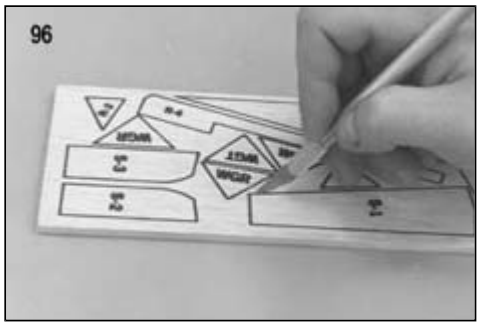


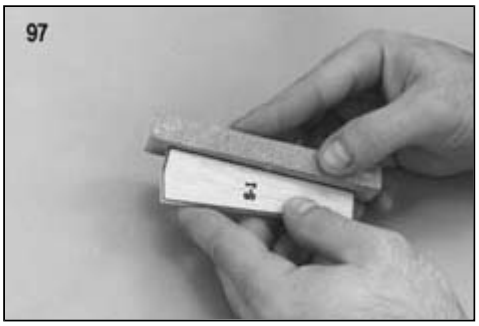


TAIL CONSTRUCTION

96. Use a modeling knife or jig saw to cut the printed parts out of the 3/16" printed balsa sheet. Be sure to cut just outside of the lines.

97. Sand the pieces down to the line with a sanding block.

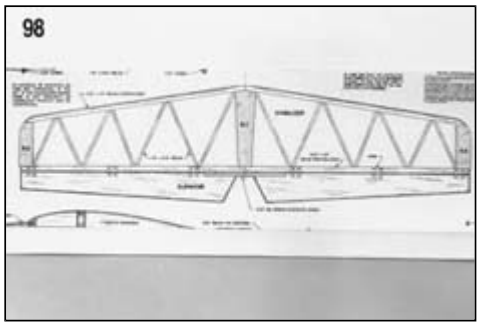


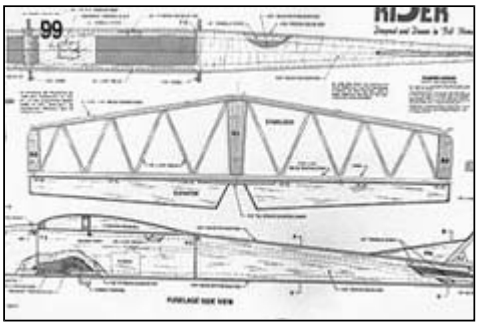


98. Pin 5-1, 5-2, and S-3-in place over the stabilizer plan.

99. Glue and pin the 3/16"x1/4" leading and trailing edge pieces in place over the plan.

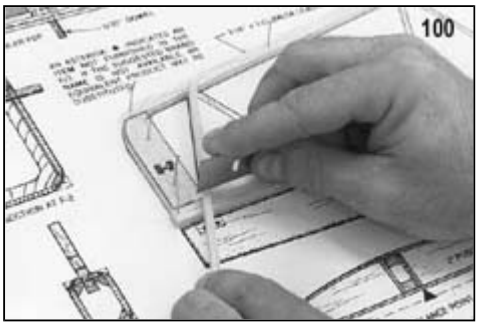
100. Cut pieces of 1/8"x3/16" balsa for the cross brace pieces.

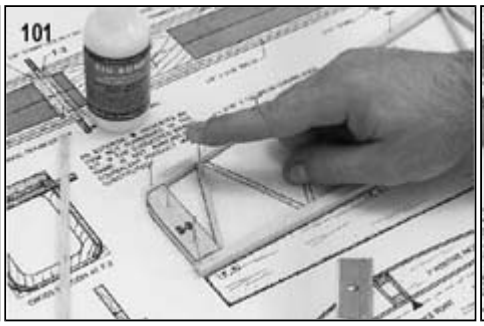


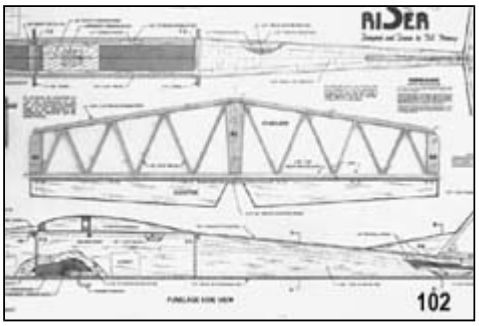


101. Glue and pin the 1/8"x3/16" cross braces in place over the plan.

102. Completed stabilizer ready for sanding.



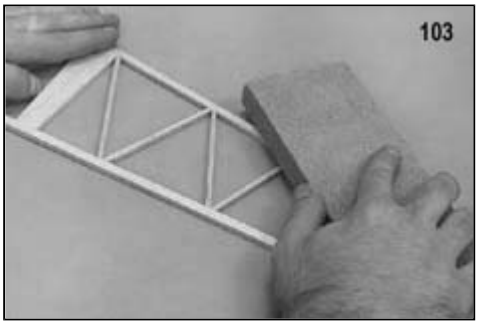


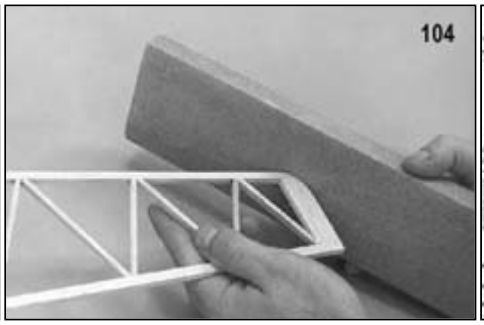


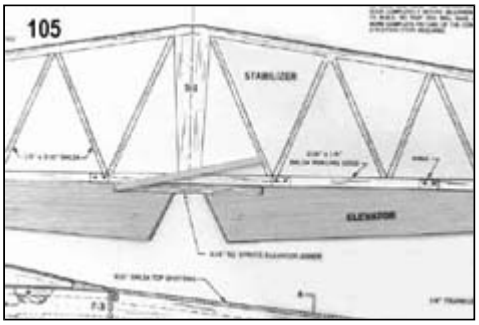
103. Block sand the stabilizer to smooth any rough areas. Be sure to sand the print off of the wood.

104. With a sanding block, shape the tips as indicated on the plans. Round the leading edge and the tips.

105. Pin the elevators over the plans. Trial fit the 3/16" square x4" spruce joiner.



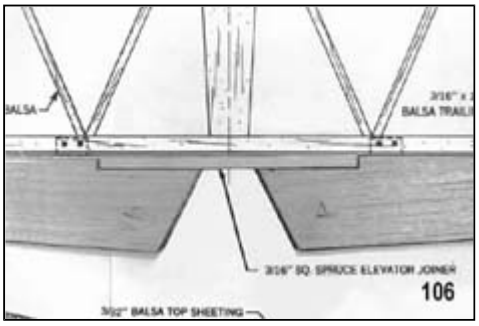


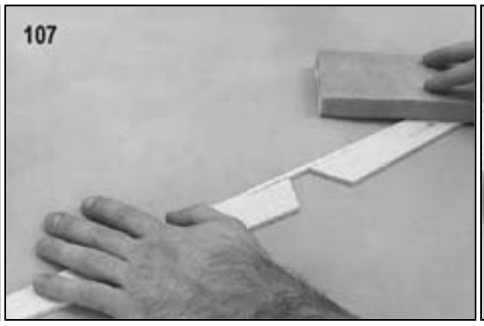


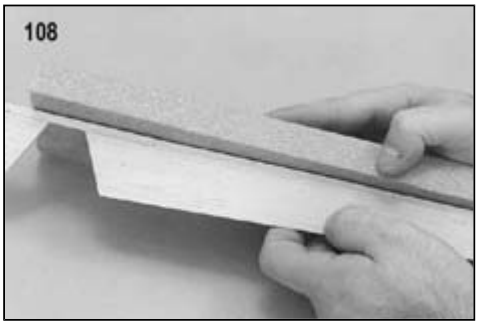
106. Glue the spruce joiner in place.

107. Block sand the elevator. Be sure to sand off the printed areas.

108. Round all edges of the elevator with a sanding block. Also round the edges of the spruce joiner.



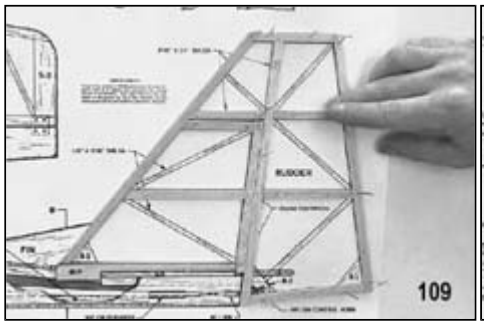


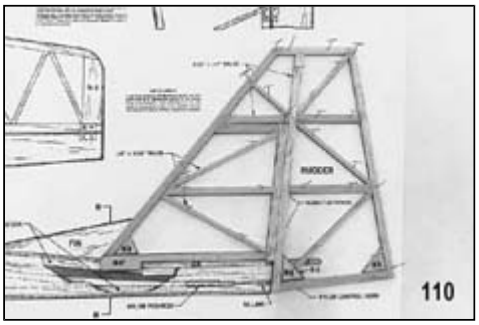


109. Glue and pin R-4and all pieces of 3/16"x1/4" balsa in place over the plans for the rudder.

110. Glue and pin R-1. R-2, R-3, and all 1/8" x 3/16" cross pieces in place over the plans.

111. Glue the small fin onto the large fin.



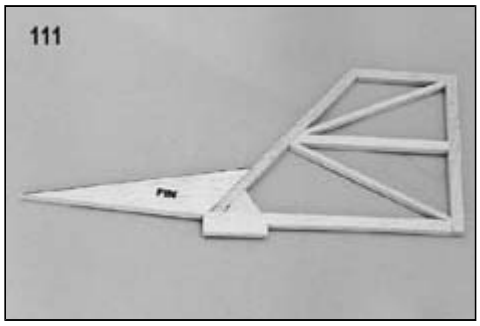


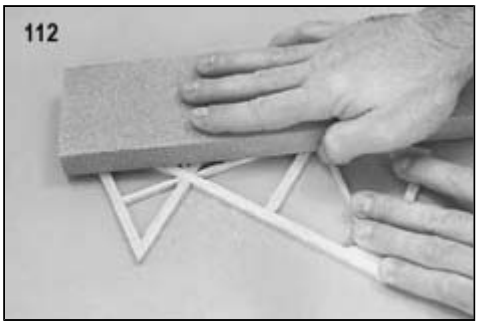
112. Block sand all pieces.

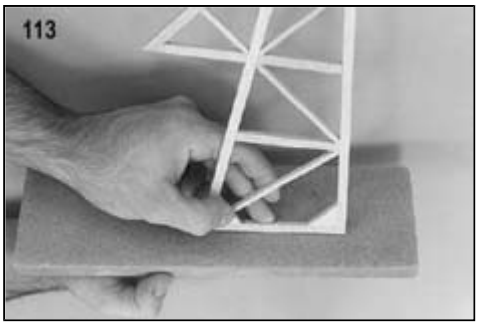
113. Round all edges with a sanding block.

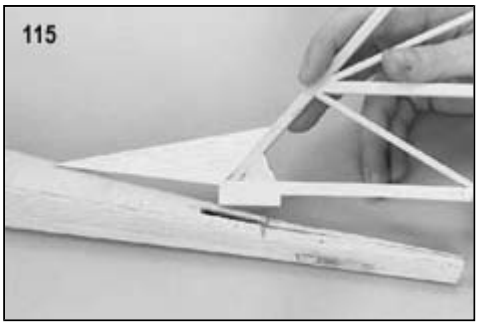
114. Cut a slot in the fuselage top for the fin tab.

115. Trial fit the fin tab into the slot. Do not glue the fin into place yet.







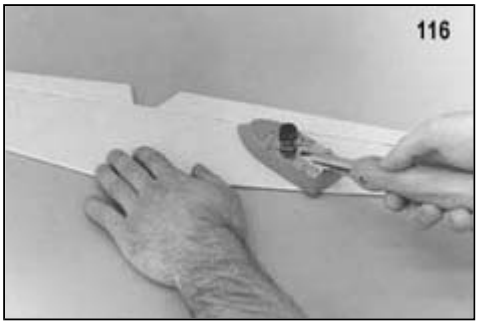


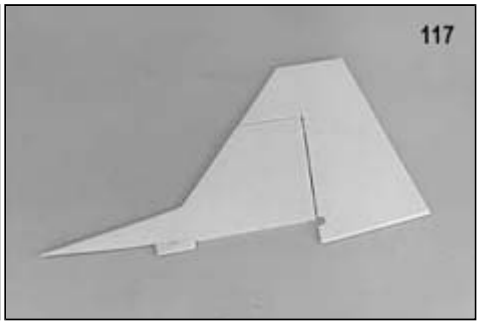
FINAL ASSEMBLY

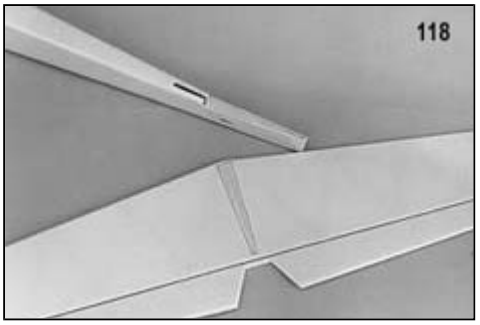
116. Cover the stabilizer and elevator using the procedures outlined in the "COVERING" section. Once they are covered, install the Easy Hinges as described below. Use four hinges located as shown on the plan.

117. Cover the fin and rudder as you did in the prior step, and install the hinges. Use two Easy Hinges for the rudder.

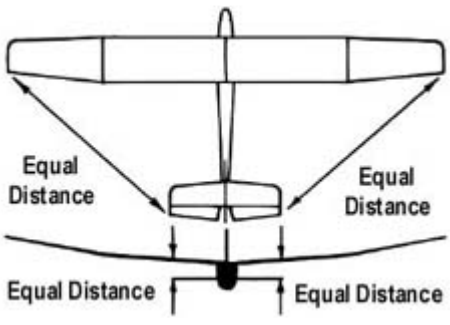
118. Use a sharp knife or razor blade to carefully remove the plastic film covering on the bottom of the stabilizer where it will be glued to the fuselage. This is important to insure wood-to-wood contact at the glue joint.







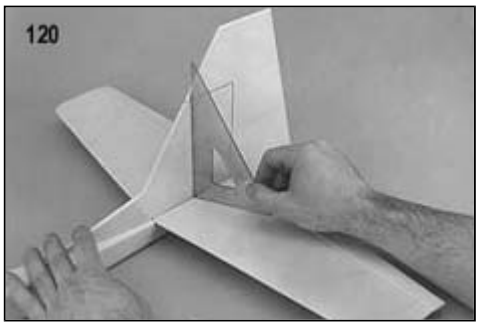
119. Position the wing on the fuselage. Use Kwik-Set (5-minute) epoxy to glue the stabilizer to the fuselage. As the glue dries, carefully check the alignment as shown in the diagrams.



Hinging The Control Surfaces with Sig Easy Hinges

Sig's famous EASYHINGES have been included with your Riser kit for hinging the rudder and the elevator. Even though they are obviously super thin, EASYHINGES are actually a three-part laminate. The tough, plastic inner core is sandwiched by an absorbant wicking material. The hinges have also been chemically treated to slow down the drying time of the thin CA (which is normally instant) to about five minutes. This extra time allows the CA to soak all the way down to the end of the hinge and into the wood surrounding it. Once the glue has dried, the hinge cannot be pulled from the control surface without tearing wood out with it.

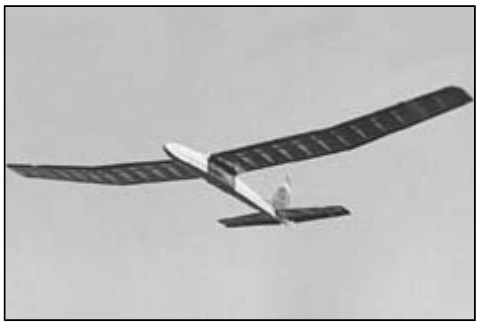
120. Remove the covering material from the top of the stabilizer and fuselage where the fin makes contact. Epoxy glue the fin in place. Use a square to make sure that the fin is perpendicular to the stabilizer.



121. Glue the two 5/32"x3" wing hold-down dowels into the holes you drilled earlier. The exposed ends of the dowels can be painted to match the covering, if you wish.

122. Use epoxy to glue the formed wire towhook and the hardwood towhook block in place on the fuselage.

NOTE: If you would prefer to use a commercially-available adjustable towhook, install it now on the plywood towhook base plate.



COVERING

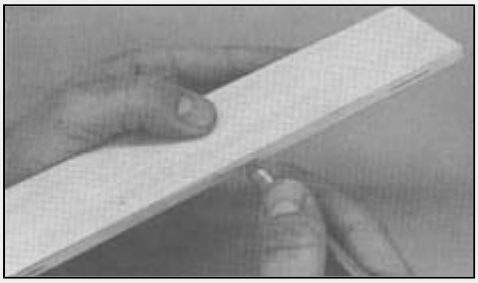
The RISER design is ideally suited to use a plastic iron-on covering material. Although other brands will work, we recommend Sig Supercoat Covering for its light weight, low cost, and ease of application. To cover the RISER, you will need at least two rolls of Supercoat. For that finishing touch, use Sig Super Trim self-adhesive trim sheets to add a bit of trim color.

If you choose another brand of covering material, be sure to read the manufacturer's directions that come with the material.

Developed from the start to take advantage of the popular cyanoacrylate adhesives, EASYHINGES are fast, strong, and lightweight. With these hinges, there is finally a solution to the dreaded, tedious job of hinging control surfaces. No more gouging and picking to make oversize slots in the wood. No more messy epoxies to bind up the hinge joint. Simply follow the instructions here (which may very well take longer to read than to do!) and you will probably never want to use another type of hinge again.

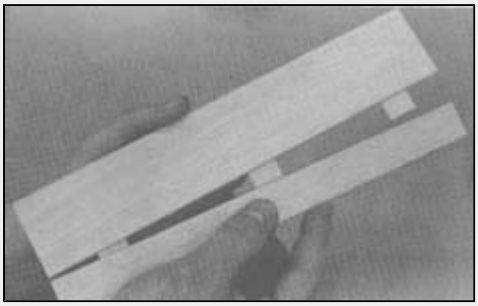
Hinging Instructions

1. Use the plans to mark the hinge locations on the tail surfaces. Marks made with a felt-tip pen can later be wiped off the plastic covering.

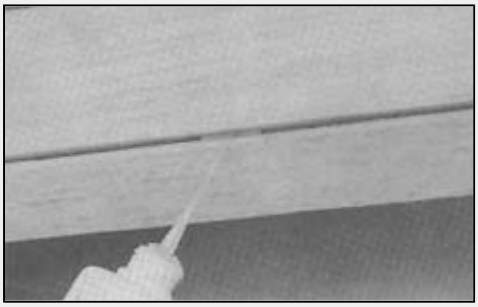


2. Next, using a #11 X-Acto blade (or similar) cut a slot approximately 1/2" in depth and slightly wider than the hinge. Continue cutting all of the slots in both pieces to be hinged.

3. After all slots have been cut, insert an EASYHINGE halfway into each slot in one of the pieces to be hinged. Then carefully slide the matching model part onto the other half of the hinges. You'll find it easiest to slide the part onto the hinges at an angle, one hinge at a time, instead of trying to push it straight onto all the hinges at once.



4. At this point the surface to be hinged is attached but not glued. Align the two surfaces and adjust the gap between them as required. For best control response, the gap should generally be as small as possible but big enough to allow the control surface to move to the maximum deflection that you will require.

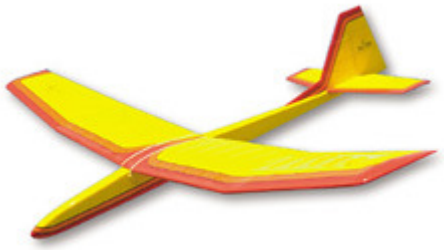


5. Place three or four drops of any brand cyanoacrylate adhesive (thinnest variety) directly onto the EASY HINGE in the gap. You will notice that the glue is quickly wicked into the slot as it penetrates both the wood and the hinge. Continue this process, gluing the same side of all of the hinges. Then turn the surfaces over and repeat the gluing process on the other side of each hinge.

6. After the glue has cured, approximately five minutes, the joint can be flexed. You may notice a slight stiffness in the joint. This can be eliminated by flexing the surface to full deflection each direction a couple of dozen times. Don't worry about shortening the life of the hinge as they are almost indestructible.

NOTE: The photos show the hinges being installed on a sample piece of bare wood. For your Riser, we recommend that the surfaces be covered before hinging. Simply cut the slots and proceed with the steps described below as if the covering wasn't even there!

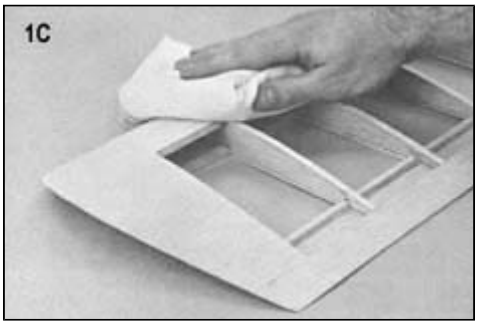
Follow their instructions closely when applying the material, as different brand coverings can have slightly different handling characteristics and application temperatures. However, the basic techniques for applying iron-on plastic coverings of any brand are similar, and the following hints and photos should be helpful.
NOTE: The structure shown is of a different model but the same procedures are used.

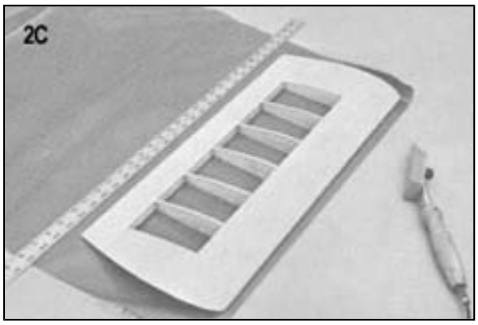


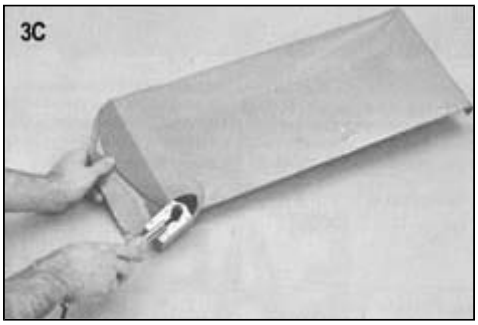
1. The structure that is to be covered must be clean, dry, and dustfree. Sand all surfaces smooth with fine sandpaper. Remember that the covering material cannot hide poor workmanship. Wipe the entire surface with a tack rag or a cloth dampened with alcohol to remove all excess dust.
   NOTE: Cover the bottom of the wing first and then the top of the wing. This leaves the overlapping seam on the bottom.

2. Cut the covering material to the required size allowing approximately one inch excess around the edges. Remove the plastic backing and lay the adhesive side of the covering material against the structure. Have it as smooth as possible before beginning to iron.

3. Tack down at several places along the outside edge. Next seal the entire edge of the structure. Don't try to shrink the covering tight until later.
   NOTE: Wipe surface of iron periodically to remove any colored adhesive that may ooze from the covering material.

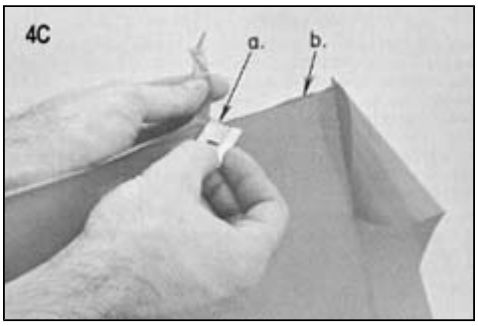


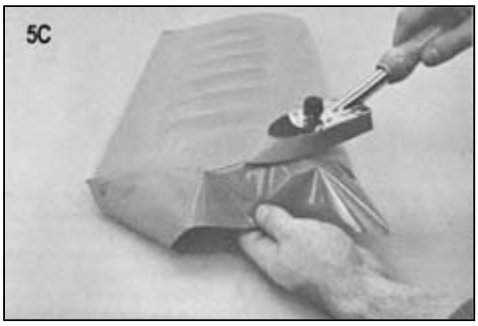


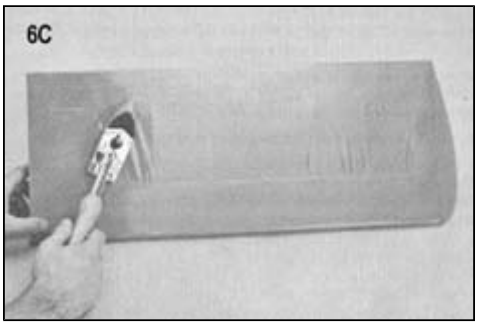


4. a. Trim off the excess with a razor blade or a modeling knife.
   b. Seal the loose edges down with the iron.
5. Repeat the process on the top of the wing.

6. Shrink the covering in the inner areas with the iron. Keep the iron moving, allowing the heat to shrink the covering at the same rate. To keep the covering from "ballooning-up", put small pin-holes in each rib bay on the bottom of the wing.



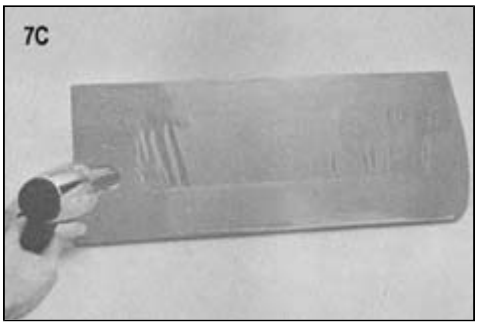


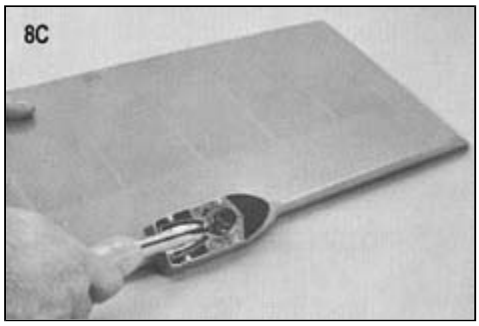


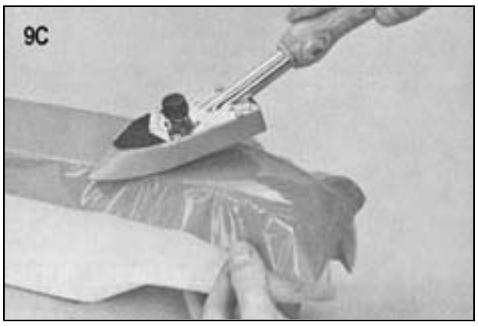
7. A heat gun could also be used to shrink the covering. Keep it moving - 4" to 6" above the surface. It will melt the covering if held too close. Don't hurry the process.

8. Seal down all over-lapping seams and edges.
   NOTE: The wing instructions refer to built-up structures with open framework areas. When covering sheet surfaces better results may be obtained by starting at the center and working toward the outer edges. This allows the air to escape from under the covering as it is applied.

9. Cover the bottom of a fuselage first. When doing compound curves, as on the nose shown here, be sure to leave extra material around that area. Grip the covering and apply heat. As the covering becomes pliable pull the covering around the curve. Work slowly and cover small sections at a time.



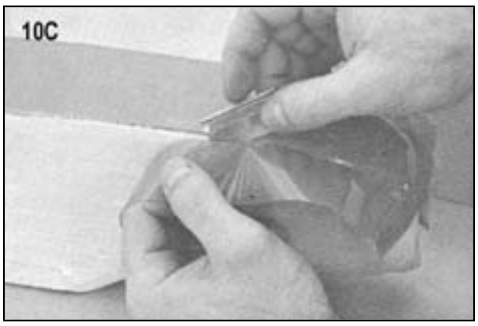


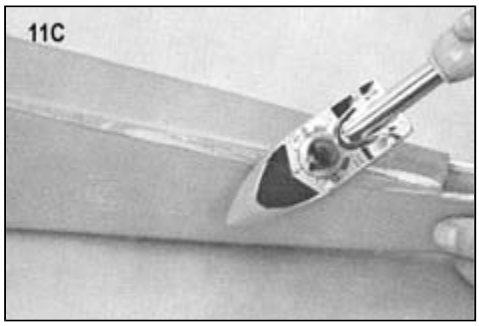


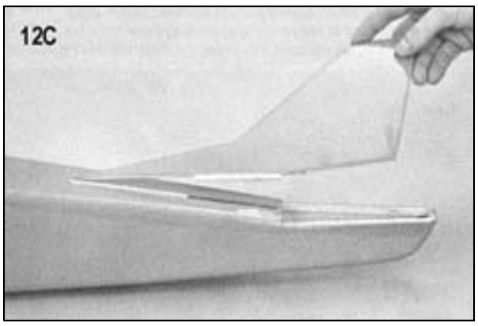
10. Trim off excess and seal edges. Repeat this procedure on the sides. Allow about 1/8" to 1/4" overlap for a fuel-proof seam.

11. Cover the top and seal down all edges.

12. Remove covering from areas to be glued. There must be wood-to-wood contact in the glue joints. Strips of covering may be applied over seams to seal them.





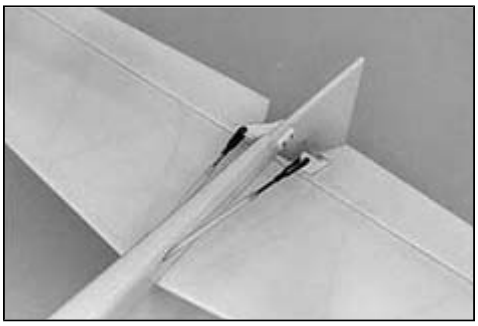


RADIO INSTALLATION

The following information can be used as a guideline for mounting your radio in the RISER. The methods described below are fairly standardized and should work well with any system, although you should read and follow the manufacturer's instructions supplied with your radio.

Mounting Servos In The Fuselage

The rudder and elevator servos should be mounted side-by-side in the wing opening so that the output arms are lined up with the ends of the nylon pushrods. Screw the servos to hardwood mounting rails that are epoxied across the inside of the fuselage. We recommend that the hardwood mounting rails be made of 3/16"x3/8" spruce, pine, or basswood. Do not make the rails out of balsa! Glue scrap pieces of balsa to the fuselage sides around the ends of the mounting rails so that they can never come loose in flight. If you plan to use the optional spoilers, the third servo should be mounted forward of the flight control servos.



You can also use foam servo mounting tape and stick the servos to the fuselage sides. For the best bond to the fuselage, coat the balsa where the servo will be seated with a thin film of epoxy. Although this method is quick and easy, it is generally accepted that the servo rail method of servo mounting is more secure in the long run.

Elevator And Rudder Hookup

Attach a small nylon control horn to the rudder and another to the elevator using #2x1/2" sheet metal screws. Mount the rudder control horn to the left side of the rudder and the elevator control horn on the bottom of the right elevator half, as shown on the plans.

Slide an inner nylon pushrod into its outer sleeve and attach the Z-bend to the servo arm as you did in Step 73. Be certain to completely tighten the small servo screw that holds on the servo arm.

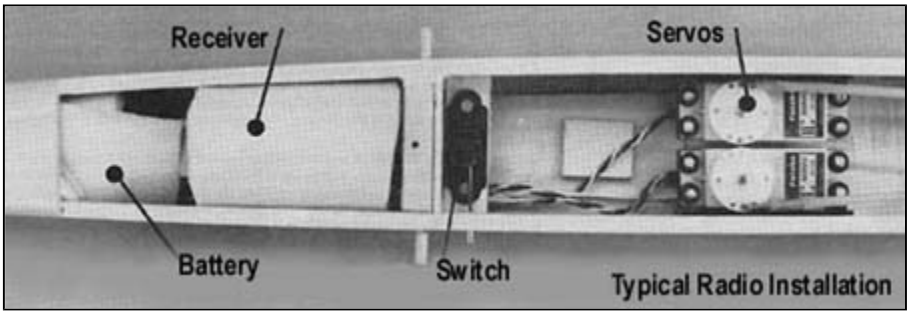
The inner nylon pushrod must be trimmed to length before it can be hooked up. With the servo arm and the control surface held in neutral, cut off the nylon tubing 1-1/4" from the control horn. To keep the exposed inner portion of the nylon pushrod from flexing, it must be supported by the smooth end of the threaded rod. Cut a 2-56 threaded rod to the required length and screw it into the nylon pushrod about five or six turns. Lock it in place with a couple of drops of thin CA.

Screw the clevises provided in the kit onto the threaded rods.
NOTE: Depending on our supply at the time of packing, your kit may contain nylon clevises instead of the metal clevises shown in the photo.

Repeat this procedure for the remaining pushrod.

Receiver And Battery Installation

Wrap the receiver and the battery pack separately in foam rubber (such as SIGRF240), held on with rubber bands or tape, to protect them from damage. Locate the battery pack as far forward in the nose as possible. Position the receiver right behind the battery. The weight of these components will help to balance the RISER.The foam rubber should be thick enough to hold the battery and receiver firmly in place so that they will not shift around in flight.



The receiver antenna can be run out of the bottom of the fuselage and taped at the aft end; or run out of the top hatch and connected to a straight pin on the fin using a small rubber band. The switch can be mounted directly on the fuselage side (locate it so that you won't accidentally touch it during launch). If you prefer, the switch can be mounted internally as shown in the photo. Use a short piece of music wire poked through the fuselage side to activate the internal switch. Lastly, make certain that the charging jack is easily accessable inside the fuselage.

Pre-Flight

Be certain to range check your radio equipment according to the manufacturer's instructions before attempting test flights. If there are any problems, send the radio in to be tuned or repaired. Various brands of servos can give different amounts of control surface travel. By moving your pushrod linkages into a different hole of the control horn and/or into a different hole of the servo arm, you can change the total amount of control surface travel you'll get when the transmitter stick is moved to the full throw position. Adjust your pushrod linkages to produce the amounts of movement listed below. Measurements are made at the trailing edge of the control surfaces at their widest point.

The control surface measurements listed should give you plenty of control during your first flights without being overly sensitive. Test flights may indicate a need for slightly more or less movement, depending on individual model performance and personal preference.

RECOMMENDED CONTROL SURFACE MOVEMENTS For test flying, the following are suggested:	**ELEVATOR**	3/8" UP and 3/8" DOWN
	RUDDER	1-1/4" LEFT and 1-1/4" RIGHT

Before flying, you should also adjust all your pushrod linkages so the control surfaces are in neutral position when the transmitter sticks and trim levers are centered. After the first test flight, readjust the linkages if necessary so that the trim levers can be returned to neutral position. It may take several flights before exact trim is established on all the flight controls.

Airplanes Must Be Straight And Balanced (or straighten up and fly right!)

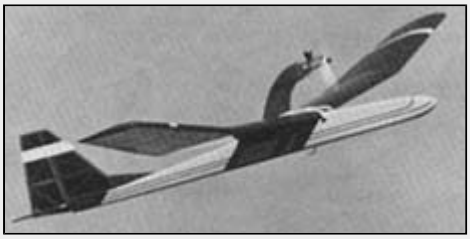
One of the secrets to a good flying model is to make sure the wing is straight and the model is properly balanced. Check to make sure there are no warps in the wing. If there are, twist the wing in the opposite direction of the warp and apply heat to both sides of the covering material, starting on the side opposite the warp. Hold until the covering cools, then recheck for straightness. Try again if necessary. It is helpful to have a friend assist you with this procedure.

The spanwise balance of the wing is an often overlooked but essential part of balancing a model. Place your assembled RISER wing on a flat table with both wingtips equal distance above the table. Let go and observe which wing panel falls to the table. Add very small amounts of weight to the opposite wing tip until it will balance on the dihedral joint at the center of the wing. Permanently install the weights in the wing tip.

To check the fore and aft balance of your model, mount the wing on the fuselage. The fuselage side view plan shows the location for balancing your Riser. For the first test flights, you should balance the Riser slightly forward (1/8") of the point shown on the plans. For everyday flying, you may want to adjust the balance point. A more rearward balance point or Center of Gravity (C.G.) will give the Riser a flatter glide but it will also make it more sensitive to control movements. A forward C.G. will make the controls less sensitive and the model more stable for better wind penetration with a very slight loss of thermal capability. Balance the Riser to suit your needs and style of flying. Move the battery pack and receiver fore or aft to locate the C.G. where you want. After flying your Riser, you may want to readjust the final balance to achieve the desired performance. Every model will fly a little different! Never change the C.G. position more than 1/8" between flights. Do not attempt to fly the model with the balance point too far back, which could make the model unstable and uncontrollable.

OPTIONAL RISER POWER POD

An alternative to the high start or winch is to use one of these easy-to-build Sig Power Pods. The pod's main advantage is that it requires much less room than the other launching devices. You can mount any reed valve or rotary-valve .049 - .051 engine (not included) for safe, dependable launches. The pod is held on by the wing rubber bands so it can be easily removed whenever you want. Order No. SIGSH660.



"A model or radio that is not prepared and working properly on the ground before takeoff will not improve in the air - IT WILL GET WORSE! There is no point in attempting to fly until everything is 100% correct,"

FLYING THE RISER

First Test Flight

While it is possible that a R/C sailplane can be mastered by a beginner without any assistance, the odds of success are pretty slim. Don't be too proud to ask for advice and help from more experienced fliers. A little help at the right time from an instructor can get you out of trouble and possibly save your model from a bad crash.

Choose an area that is free of obstructions such as buildings and trees and pick a day when there is little or no wind. Fasten the wing to the fuselage with eight #64 rubberbands. Place six of the rubberbands on parallel to the ribs and crisscross the final two. If your flying site is occupied by other fliers, check with them to be sure that your frequency won't interfere with theirs, and vice-versa.

Turn your receiver and transmitter on and fully extend the antenna. Gently hand toss the sailplane into the wind with the nose pointed slightly down and the wings level. Start by running a couple steps with the model, then release it with a smooth spear throwing action. Aim for a spot on the ground about 50 yards out ahead of you.

DO NOT THROW THE SAILPLANE VIOLENTLY!

If the nose of the sailplane pitches up, feed in some down elevator. If the nose pitches down, feed in some up elevator.

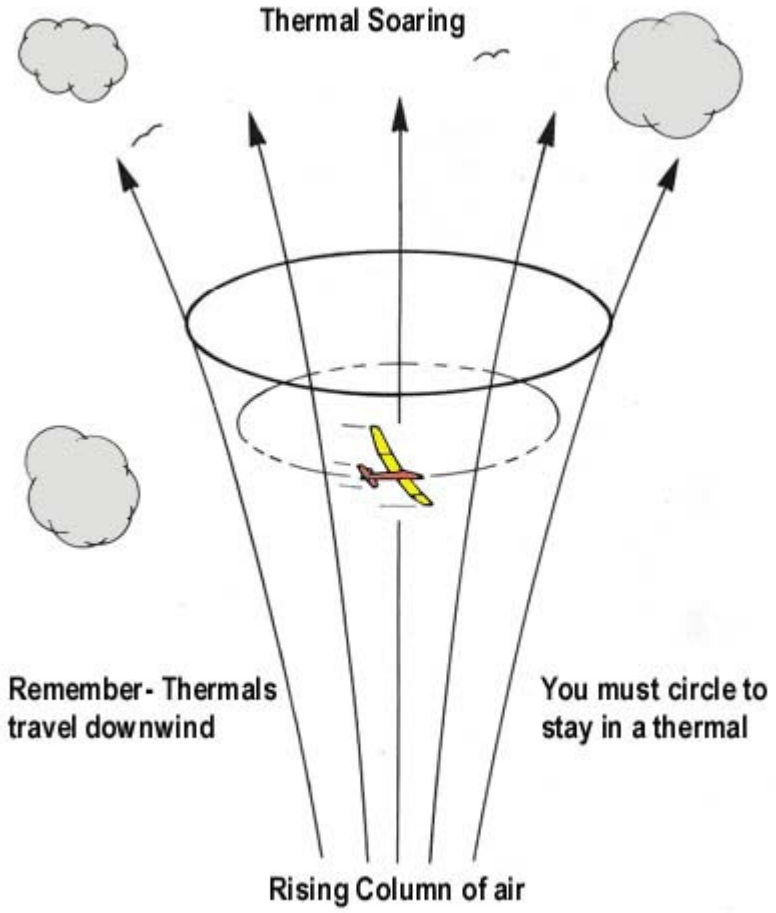
DO NOT OVER CONTROL!

Keep your control movements smooth. If the sailplane veers left, feed in some right rudder. If it veers right, feed in some left rudder.

The main thing to remember when flying a sailplane is not to over control. If the model does get out of control, and you have sufficient altitude, a glider is so stable that you can usually just let go of the sticks momentarily and the model will right itself. Many models have crashed because a beginner continued to send the wrong input. On landing, when the sailplane is about two feet from the ground, make sure the wings are level and start slowly feeding in some up elevator to slow the model and establish a gentle descent. The model should settle onto the ground in a slightly nose high attitude.

Thermal Soaring

Thermal soaring is by far the most popular type of R/C soaring. It is not uncommon to see two or more sailplanes riding the same thermal, all of them circling for altitude and staying in the thermal. A thermal is a rising column of hot air - air that has been overheated by the sun radiating off dark areas of ground such as roads, plowed fields, buildings, etc. Thermals can be found year around and just about anytime of the day. However, the most active time for thermals is during the spring and summer months with mid-morning to mid-afternoon being the best time of day to find them. Thermals are easy to detect on days when the wind is light. Many times you can feel the temperature difference when the warm thermal air passes by you. Often a low fluffy cumulus cloud indicates the location of a thermal. Also watch for large birds (hawks, gulls, eagles, buzzards, etc.) circling and maintaining their altitude without flapping their wings. They are riding a thermal!



Thermals are normally small near the ground and tend to increase in diameter the higher up they go. To get into a thermal, we must first gain some altitude. There are two commonly used methods of launching a sailplane into the air.

- **HIGH-START:** A high-start is made up of surgical tubing and nylon cord. Its purpose is to "sling-shot" the glider into the air like a large rubber band launched model. High-starts come in several different sizes to match the class of the sailplane being flown - a two meter class or standard class hi-start is recommended for the RISER. The standard class high-start usually consists of 100 feet of rubber surgical tubing and 350 feet of nylon cord (although some brands may differ slightly). The surgical tubing is fastened to a stake pounded into the ground. The other end of the tubing is then tied to the nylon cord, while the other end of the nylon cord has a small parachute attached to it. The high-start is layed out on the ground directly into the wind. The parachute end of the high start is attached to the sailplane's towhook. Start walking backwards with the model, stretching the high-start as you go. Go back until the high-start has been stretched to a maximum of 800 feet.
  With the sailplane pointed at the stake, raise the nose to approximately 30 degrees and level the wings. Firmly toss the sailplane into the air. Feed in a small amount of up elevator after the launch and the sailplane will begin to climb to the maximum height of the high start. If the sailplane veers to the left or right correct it with opposite rudder. DO NOT OVER CONTROL! If it constantly veers from side to side and is hard to control, you are probably holding too much up elevator. Back off a little to regain good directional control. As the sailplane reaches the top, the line should drop off by itself. If it doesn't, feed in a little down elevator to allow the sailplane to dive slightly and the line will fall off. Pull back on the elevator to level off so you can start trimming for the flattest glide.

- **WINCH:** A winch is a battery operated device that uses an electric motor to drive a large spool that reels in the long towline. There is no rubber surgical tubing involved. As the line is reeled in, it pulls the sailplane up to altitude. The speed of the winch is normally controlled by the glider pilot using a foot pedal as he flies the model with his hands. Most competition oriented sailplane enthusiasts prefer a winch launch over a high-start simply because they can control the speed that the line is reeled in and thus better control the speed and pull on their model. A practiced winch operator can often get his sailplane to greater heights than with a high-start.

Now that the sailplane is at altitude, it is time to go thermal hunting. Start by trimming the RISER for a nice flat glide and head upwind flying a zig-zag pattern. Never cover the same ground twice while searching for thermals. Be looking for areas where you can see heat waves radiating up, or hawks circling, or swirling "dust devils" being picked up off the ground. Remember, smooth flying is the secret to long flights. Watch the sailplane closely as it is flying. If it suddenly seems to "rise up on a step", stops sinking and starts gaining altitude, you know you are in a thermal. Or if you see one wing or the other bump up, immediately turn towards the high wing to try to get into the thermal that caused the bump. Once you are in a thermal, feed in a small amount of rudder trim to set the sailplane up for a large glide circle of approximately 100 to 200 feet diameter. As the sailplane continues to gain altitude, you can open up the glide circle slightly. Once in the thermal, do not let the sailplane get so far downwind that you can't get it back to the field if the lift dies out.

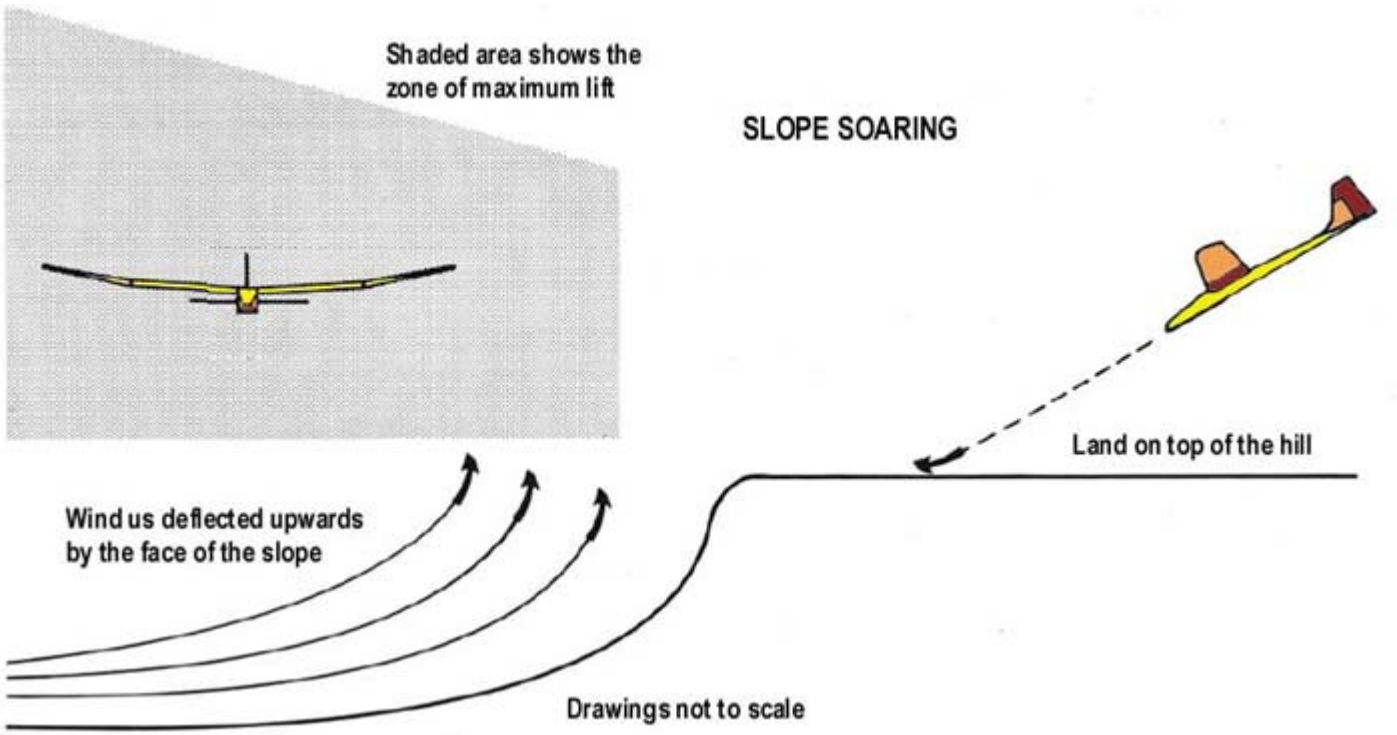
Slope Soaring

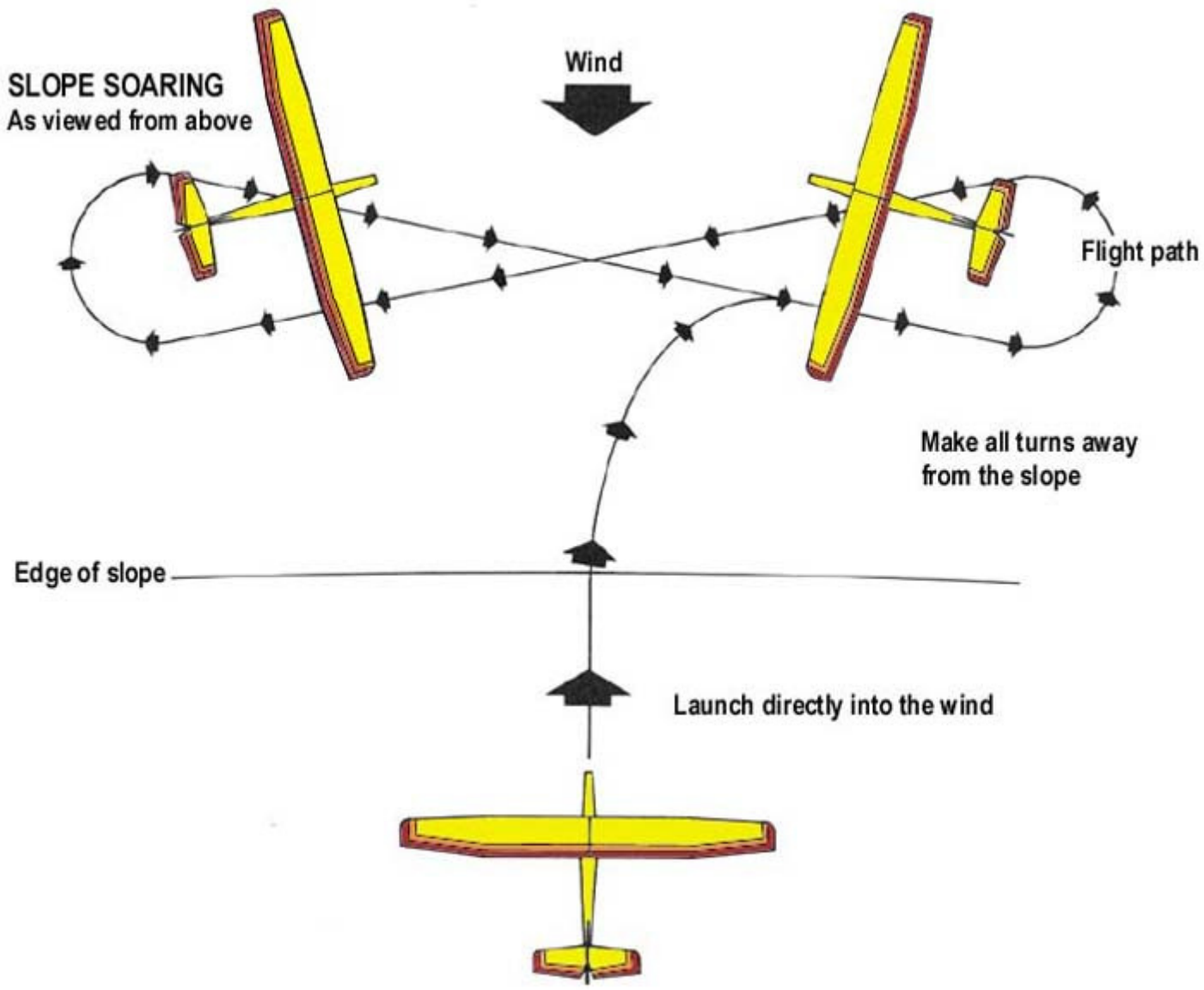
Slope soaring is a unique sport in itself and probably the fastest growing aspect of R/C soaring. Wherever you can find a decent size hill with a 1015 m.p.h. wind blowing into it, you can slope soar. When the wind is blowing into the face of the hill, it is deflected upward by the slope of the hill. This upward rising air is the lift we use to soar on. Wind velocity and the amount of slope in the hill will determine the amount of lift generated by a particular site. The amount of lift can also be affected by obstructions such as trees, buildings, etc. So try to pick a hill with a long smooth approach to it that is free of obstructions.

Although there are many special aerobatic slope soaring designs around, the RISER can give a pretty good account of itself at slope soaring for duration. The only addition you need to make to your RISER for slope soaring is to add some ballast to help it penetrate the wind. Depending upon the actual velocity of the wind on the day you are flying, try adding 6 - 12 ounces of weight inside the fuselage directly over the C.G.

Launch the sailplane out over the crest of the hill by throwing it with the wings level and with the nose of the sailplane pointed slightly down. Fly the sailplane parallel to the slope, and when you need to turn around, always make your turns into the wind, away from the slope. Use smooth control movements and fly the sailplane back and forth across the slope staying in the lift. Never turn downwind, into the slope until you decide it is time to land. When landing, make sure that you have a fair amount of altitude, then fly the sailplane behind the slope, and make a gentle descent to a landing on top of the hill. If you are too high on your landing approach, make S-turns to lose altitude or go around.

It will take a little practice to master the art of slope soaring, but it is well worth the effort and a lot of fun.





If you have any technical questions or comments about this kit, or any other SIG product, please call us.

SIG MODELER'S HOTLINE
1-800-524-7805
Weekdays, 7:00am - 4.30pm Central

SIG MFG. CO., INC.....Montezuma, Iowa 50171-0520

LIMIT OF LIABILITY:
In use of our products, Sig Mfg. Co.'s only obligation shall be to replace such quantity of the product proven to be defective. User shall determine the suitability of the product for his or her intended use and shall assume all risk and liability in connection therewith.