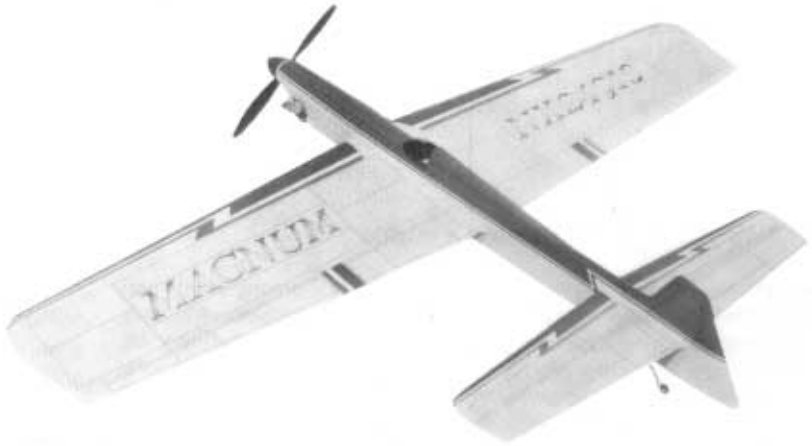
MAGNUM

BUILDING AND FLYING INSTRUCTIONS

SIG®
CRAFTSMAN'S KIT
KIT CL-24



Designed By: *Mike Pratt*

MAGNUM

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KIT CL-24

MAGNUM KIT INSTRUCTIONS

The Magnum provides the precision aerobatics enthusiast with a deluxe kit of a state of the art design. It reflects the current trend towards larger airplanes and incorporates all the popular flight trimming features like adjustable leadouts, adjustable tip weight box, and a removable fuel tank. Deluxe features include a pre-cored foam wing, precision cut foam stabilizer cores, brass bearings on the control horns, and a light weight graphite pushrod. The basic Magnum design was started in 1979. The final version reproduced in this kit was evolved from the building and competitive flying of five progressively different models over the past 6 years.

The Magnum is adaptable to many different engines ranging from .40 to .60 cu. in. The landing gear design provides enough ground clearance for props up to 14" diameter. In actual practice, the running characteristics of a stunt engine can be more important than its exact size. In precision aerobatic flying you need an engine that will run at a slightly rich setting in level flight, and then when the nose of the plane comes up for a maneuver the engine will lean out to provide more power and maintain line tension. When the airplane returns to level flight, the motor speed must also return to its original slower setting. A good stunt motor must be capable of running in this manner and holding its setting consistantly during the entire flight. Some of the most powerful engines on the market are not suitable for C/L stunt flying because they develop their power at too high an RPM and are designed to run at top speed all of the time. They are not capable of holding a consistant needle valve setting for stunt. Often times these motors will sound good in level flight right after takeoff, but then they lean out too far in a maneuver and won't slow down again when you return to level flight. Good motors for stunt develop their maximum power at lower RPM and break cleanly and consistantly from a rich 4-cycle to a fast 2-cycle as the model flies through the stunt pattern. Here are some of the best motors to consider for your Magnum.

ENGINE	COMMENTS
Super Tigre 46 *Weight 9 oz.	Smooth and powerful. Excellent 4-2 cycle reliability. Now out of production, but good used ones can be found.
OS Max .40 FP-S *Weight 10 oz.	Adequate power. Good 4-2 cycle reliability, could be made better with rework. Available in CL version.
Fox .40 Compact *Weight 8.5 oz.	Light weight. As much power as a ST .46. 4-2 cycle reliability is OK, but can be improved with rework. Available in CL version.
OS .45 FSR *Weight 10 oz.	Lots of power. Needs detuning for good 4-2 cycle reliability. Available in RC only, must be converted for CL use.
HP .40 Gold Cup *Weight 10 oz.	Powerful and smooth running. Good 4-2 cycle reliability. Available in CL version.
Super Tigre .60 *Weight 11.8 oz.	Very powerful. Needs detuning for good 4-2 cycle reliability. No longer in production, but many can still be found.
Merco .61 *Weight 12.5 oz.	Smooth and powerful. Good 4-2 cycle reliability. Available in CL version. Mounting lugs must be trimmed to fit into the Magnum. Easy on fuel.
K&B .40 *Weight 10 oz.	More power than an ST .46. Fair 4-2 cycle characteristics, can be improved with rework. Readily available in RC version, must be converted to CL.

*Weight does not include a muffler.

In addition, there is a growing amount of interest among stunt fliers about the use of the new RC "4-stroke" engines in CL stunt models. Here at Sig, we have experimented with the Saito .45 and the Enya .46, and they look very promising for CL stunt use. They operate in an RPM range that's perfect for stunt flying. While 4-stroke engines are slightly heavier than a 2-stroke engine alone, when you add in the weight of the larger fuel tank and the muffler that is required for the 2-stroke, the flying weight is actually about the same. The Saito .45 and the Enya .46 require only 2-1/2 to 3 oz. of fuel to complete the pattern. Installing a 4-stroke engine in the Magnum is a simple matter of making a new fuselage former F-1 and moving it rearward for intake clearance.

If you are just getting started in the sport of precision aerobatics, collect and read all of the model magazine articles on C/L stunt that you can find. Also, you should consider joining the PRECISION AEROBATIC MODEL PILOT'S ASSOCIATION, (P.A.M.P.A. for short) a special interest group devoted entirely to stunt flying. Their newsletter is a good way to learn more about stunt flying and to keep up with the latest trends.

NOTES BEFORE BEGINNING CONSTRUCTION

Any references made to the left and right refer to your left and right as if you were seated in the cockpit. References to inboard mean towards the center of the flight circle and references to outboard mean away from the center.

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.

Leave all the die-cut parts in the sheets until needed in construction. Remove 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.

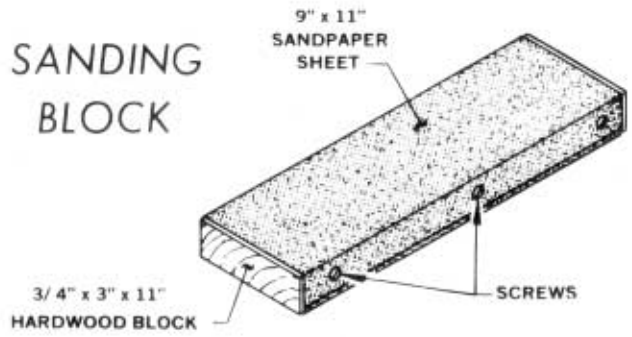
A jig saw works best for cutting out the printed balsa parts. If a jig saw is not available, a sharp modeling knife and a straightedge can be used. Cut just outside the printed lines, leaving all of the line on the part. When fitting the piece into the structure, use a sanding block to bring the edges to an exact fit.

All of the other kit parts can be identified by the "COMPLETE KIT PARTS LIST" on page 22. 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 the scrap balsa and plywood for later use during the construction of this model.

SANDING BLOCKS

An assortment of different size sanding blocks are indispensable tools for model construction. A good general purpose block can be made by wrapping a full 9" x 11" 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 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.

GLUES

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

1.) Easy to use water-base wood glues such as SIG-BOND (yellow) and SIG SUPER-WELD (white).

2.) Super strong two-part epoxy glues such as SIG KWIK-SET (5 minute cure) and SIG EPOXY (3 hour cure).

3.) Traditional solvent-base model cements such as SIG-MENT.

4.) Fast cyanoacrylate "super" glues such as Zap, Hot Stuff, Jet, etc.

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 experience with a previous model. If you are new to the hobby and not sure what type to use, we recommend that you try SIG-BOND glue for the majority of the general Magnum framework construction. It is a great all-purpose alphatic resin glue that is easy to use. You should also have on hand some epoxy glue, either slow dry or 5-minute, for areas subject to unusual strain or involving metal pieces. Some of the steps in this book call out the type of glue to use for that particular assembly. In other areas you can use you own judgement as to which type is best suited to the purpose and to your building schedule.

IMPORTANT NOTE: Use only Sig Core Bond, Sig Epoxy Glue, Sig Kwik-Set Epoxy, or Sig-Bond glue on the foam wing cores. Model cement, Sig-Ment, dope and fiberglass resin will all attack and destroy foam. For gluing the wingskins to the foam core, Sig Core Bond will work the best. If you use any product other than those listed, test them on a scrap of foam before use on the wing.

CAUTION: Some people have experienced allergic reactions when exposed to epoxy or cyanoacrylate glues. This is very rare. However, it is always important that such glues, and also paints, thinners, and solvents, be used with adequate ventilation to carry fumes away.

ABOUT PRINTED WOOD PARTS

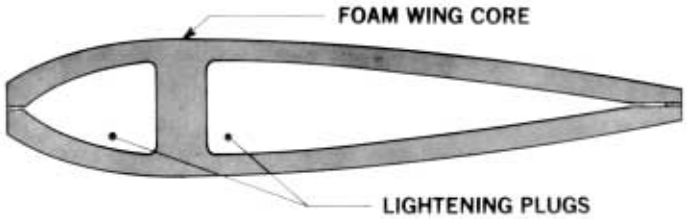
Some years ago we had kits featuring die cut parts in both thick and thin sizes. If the thick parts were cut from dry wood, the wood often crushed or crinkled on the edges, even when using a brand new die. If the thick parts were cut from wet wood there was an improvement — though many of them still crushed — but the swelled wood parts changed shape after drying, making them inaccurate. So we asked modelers if they would rather have the parts printed on the wood instead. They could be cut out in a few minutes with a saw or modeling knife and thus avoid any "die-crunching". Most voted in favor of this idea.

To answer a question we are sometimes asked — no, we do not do this to save money. It is actually more expensive to print the parts using a silk screen press than it is to run an equivalent sheet through our automatic feed die cutting machine. If we hand-sawed the parts it would be even more expensive and the labor cost would have to be added to the kit price. We believe that most modelers would rather cut their own out and save the cost. Since there are not many thick parts in our average kit, it really doesn't consume a lot of the total building time for the builder to do the parts.

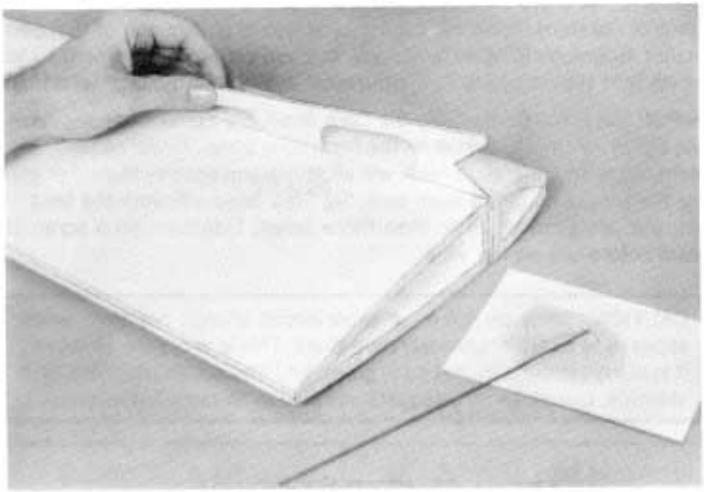
SIG®

4 WING CONSTRUCTION

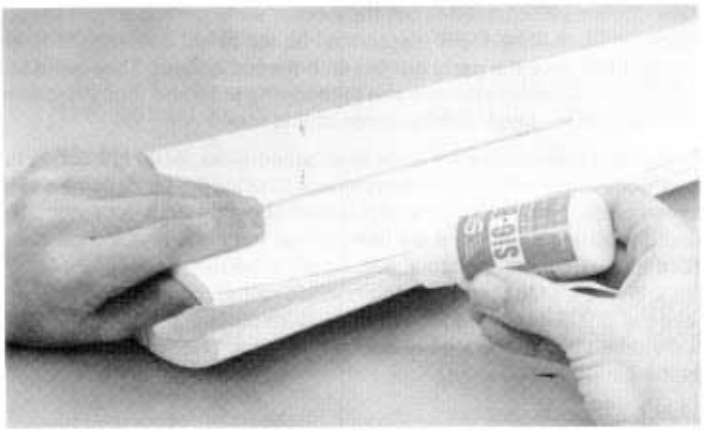
1. The foam wing cores are shipped in the block from which they were cut. Untape the foam block and remove the wing cores. Notice that the center of each wing core has been hollowed for lightness. Slide the two foam lightening plugs out of each wing core. Save these foam plugs and the foam shipping cradles as they will be needed later in construction.



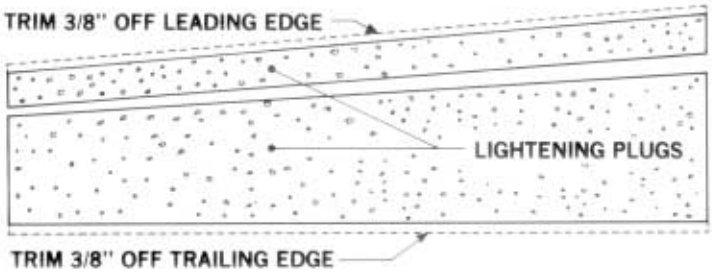
2. Remove the foam scrap from the wing spar cavity. Trial fit the lite-ply wing spar into the cavity and sand to fit if necessary. Epoxy glue the wing spar in place and wipe off all excess glue from the foam wing core.



3. Apply a bead of Sig-Bond glue into the leading edge gap of the foam wing core. Insert a piece of 1/32" x 1/4" x 30" balsa into the gaps and squeeze the foam down around the wood. Do the same for the leading edge of the other wing core and for the trailing edges.

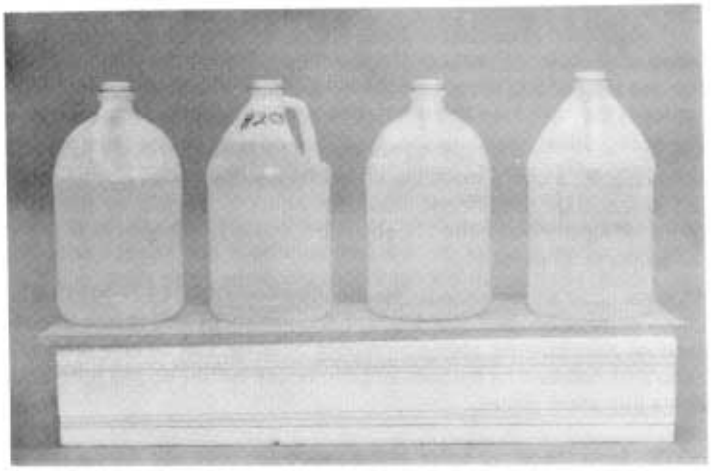


4. Trim 3/8" off the leading and trailing edges of the foam lightening plugs that you saved from step 1.

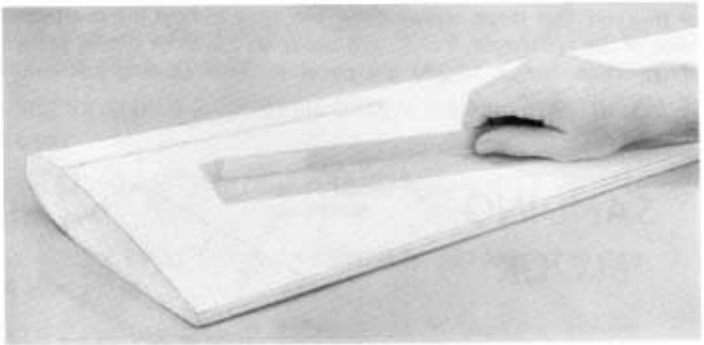


5. Slide the foam lightening plugs back into the foam wing cores.

6. Stack the foam wing cores back into their shipping cradles. Place on flat surface and weight down. (Notice in this picture that four one gallon jugs filled with water have been placed on a piece of plywood larger than the foam.) Allow to dry thoroughly before proceeding.

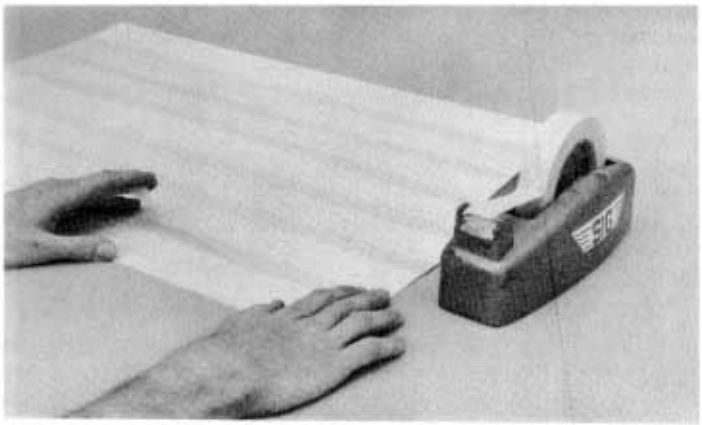


7. When dry, remove the foam cores from the cradles and lightly sand any irregularities or cutting wire marks from the cores with a long sanding block. Be sure that the foam lightening plugs are still inside the cores during this sanding, otherwise the airfoil shape of the wing may be unintentionally distorted if you sand too hard.

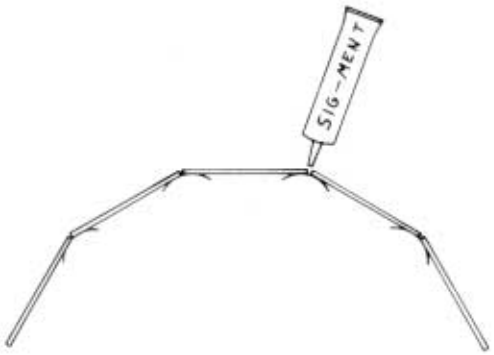


8. Use a metal straightedge as a guide, true up the edges of 14 sheets of 1/16" x 3" x 30" balsa. Use a sanding block for final touch-up if necessary.

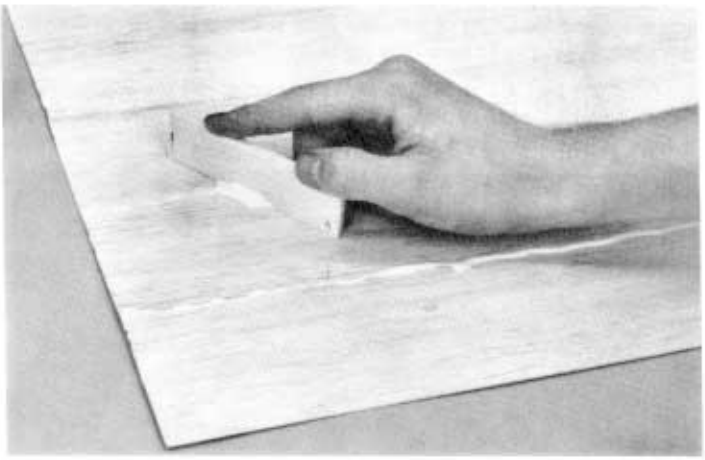
9. Tape seven sheets of the 1/16" x 3" x 30" balsa tightly together with strips of masking tape as shown. Tape the remaining seven balsa sheets together in the same manner.



10. Turn over and open up the joints between the sheets, the masking tape will serve as a hinge. Apply a small bead of Sig-Ment glue in each of the seams and close the joint.



11. Lay the sheets flat and wipe off the excess glue. Weight down the sheets on a flat surface and allow to dry.

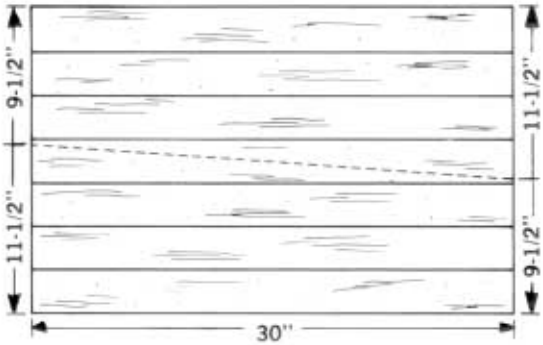


12. When dry, untape the sheets and check that all the glue seams are secure. Work more Sig-Ment glue into any gaps with your finger. Let dry. Then carefully sand the glue seams smooth with a large sanding block, being careful not to sand too much.

THE SECRET OF A PERFECT FOAM WING

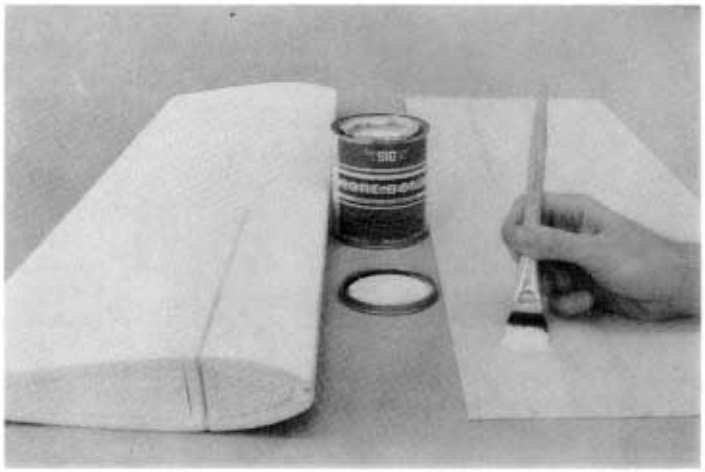
It's a simple matter of a FLAT table. Most tables are not flat, as can be seen by checking them with a good straightedge. If a foam core is covered on a bowed or twisted surface, then the wing will be bowed or twisted. And a table that checks out true but is flexible and will yield as you press on it will also spoil a wing. The ideal working surface is a sheet of plate glass. Or, it is possible to find a thick piece of plywood that is perfectly true.

13. Cut both seven-sheet layouts diagonally in two as shown by the dotted line in this diagram. This will yield four wing skins, ready to be glued onto the foam cores. NOTE: The wing skins will be glued on the foam cores with the grain running parallel to the trailing edge. Mark each of the four skins as to whether they go on the top or bottom, right or left foam core and to which side of the skin the glue should be applied in the next step.

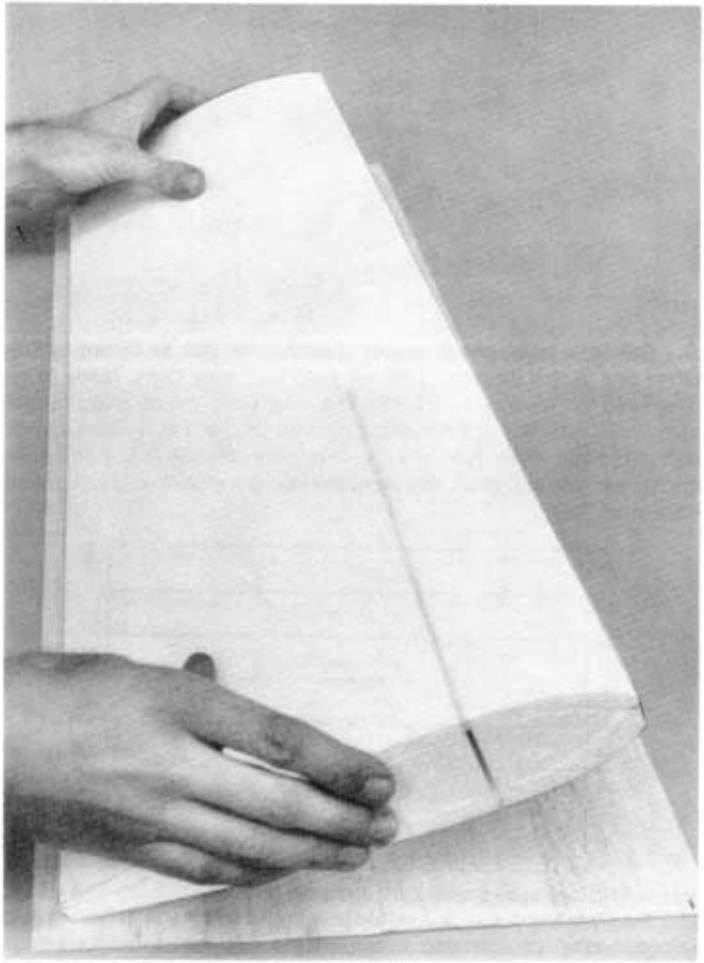


14. Sig Core-Bond is recommended for applying the wing skins. This is a special adhesive, light and strong, that is ideal for use with foam. As experienced modelers have found, many foam wing glues contain very volatile solvents. When using these glues, if the wing skin is put on before the glue is absolutely dry, the still evaporating solvents are trapped in the assembly and quickly attack and destroy part of the foam core, ruining the wing. Sig Core-Bond doesn't cause this type of damage, so it is ideal for beginners at foam wing sheeting in addition to being a superior adhesive.

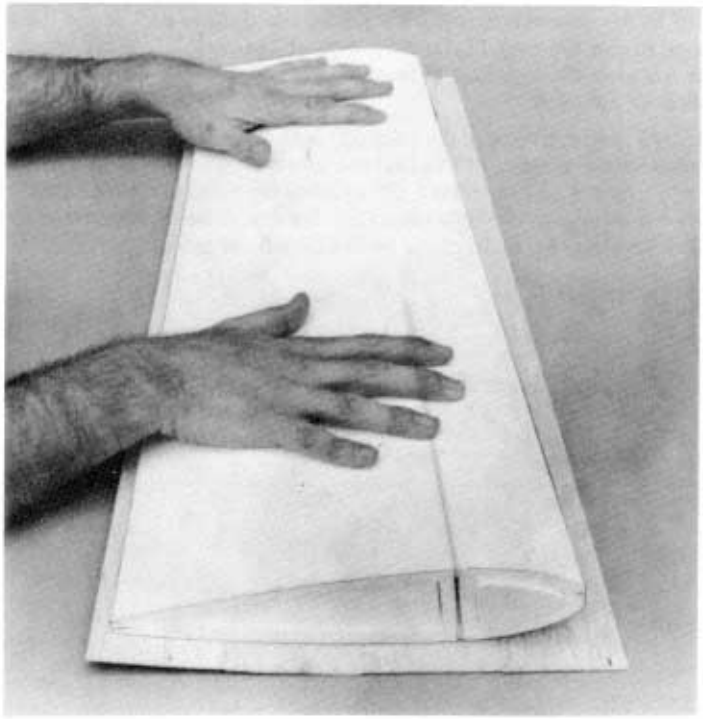
Apply a thin, even coat of Core-Bond to both sides of the foam cores and to the four wing skins. (It's easiest to stand the foam cores on end to dry since they are coated on both sides.) Allow the cores and wing skins to dry completely - at least one hour. Core-Bond must be dry for good adhesion. Read the full instructions on the Core-Bond can carefully.



15. Hold the trailing edge of the foam core just above the wing skin and lower the trailing edge ONLY onto the skin. Make sure it is properly aligned before contact is made because it cannot be removed and repositioned after contact is made. Press down along the trailing edge to make sure it is making good contact and is flat against the table.

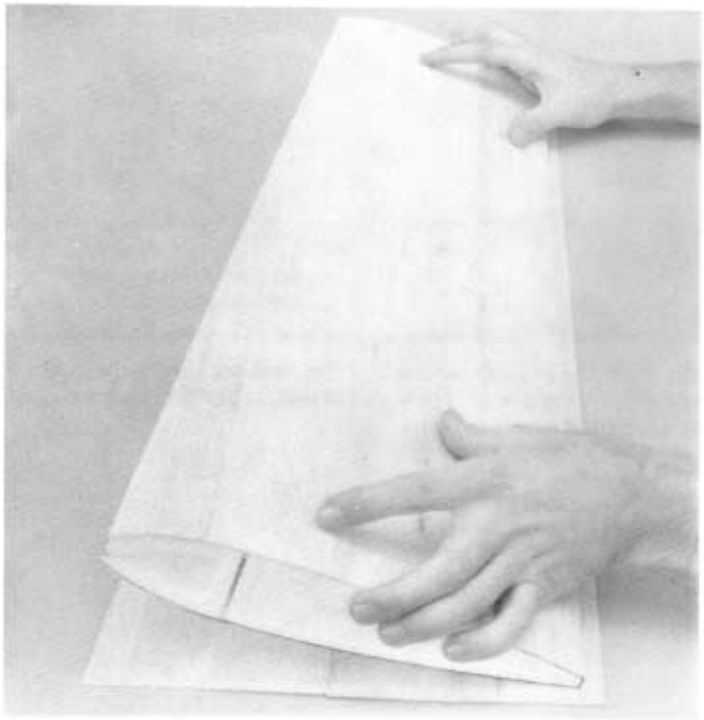


16. Roll the foam core forward onto the wing skin with a rocking motion until the entire skin is attached.



17. Using a single-edged razor blade, trim the edges of the wing flush with the foam core.

18. Turn the core over and attach the wing skin to the other side in the same manner. Trim the edges of the wing skin flush with the core.

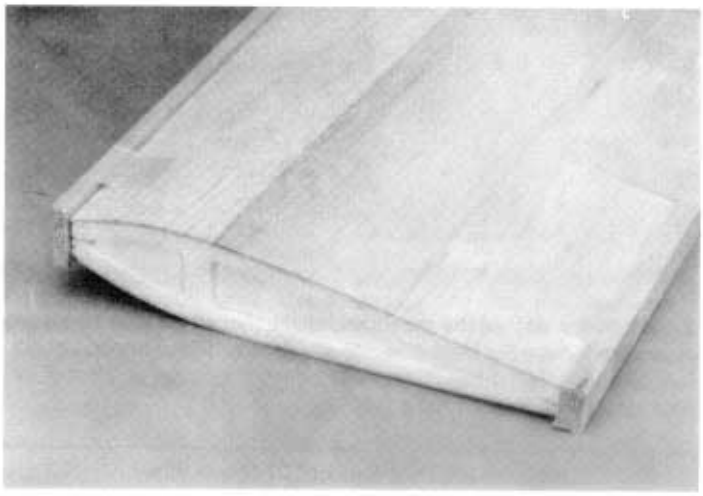


19. Repeat steps 14. through 18. to skin the other wing panel.

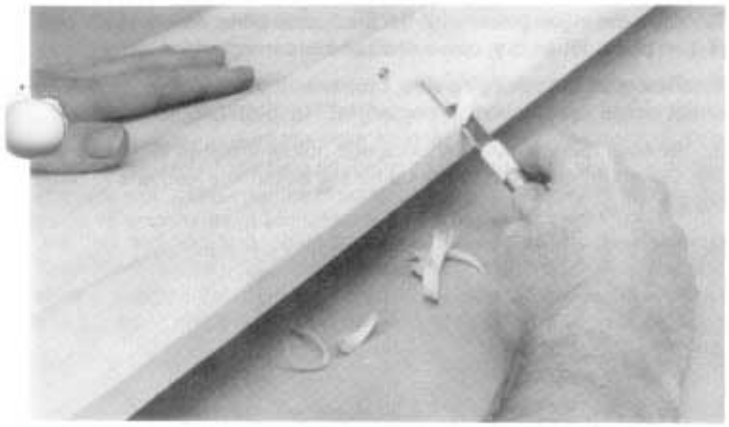
20. After the sheeting of all four sides of the wing panels is completed, stack the panels back in the foam shipping cradles, weight down on a flat surface, and allow to dry overnight. (See photo step 6.)

21. Take the wing panels out of the stack and slide the foam lightening plugs out. Sand the edges of the balsa wing skins perfectly flush with the foam core. Take care to sand just up to the foam, not into it.

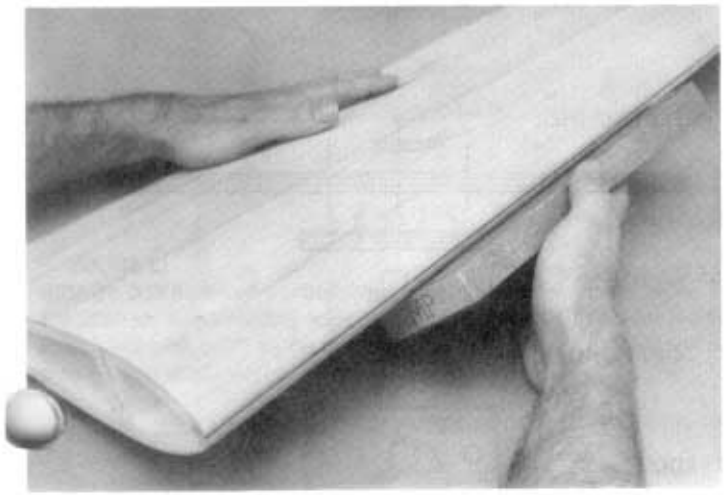
22. Glue the 1/4" x 1" x 30" balsa leading edge and the 3/8" x 5/8" x 30" balsa trailing edge in place with epoxy or Sig-Bond glue. Use masking tape to hold the pieces in place until dry.



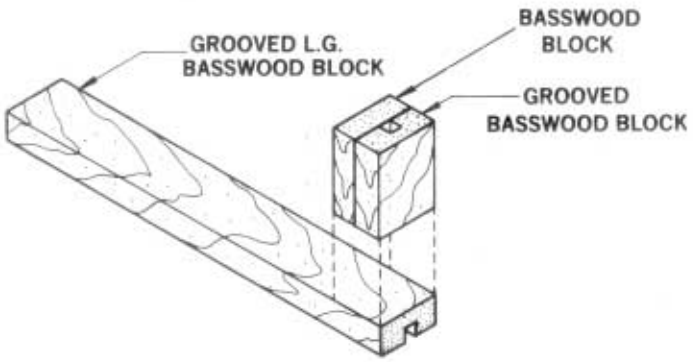
23. Carve the leading and trailing edges to approximate shape with a #26 X-Acto blade. Wrap the tip of the blade with masking tape to prevent gouging of the wing skins.

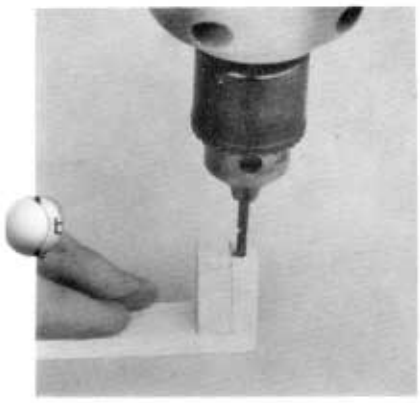


24. Sand the leading and trailing edges to exact shape with a sanding block. (NOTE: A pencil line drawn down the center of the leading edge from root to tip will help get the shape true all along the way.)



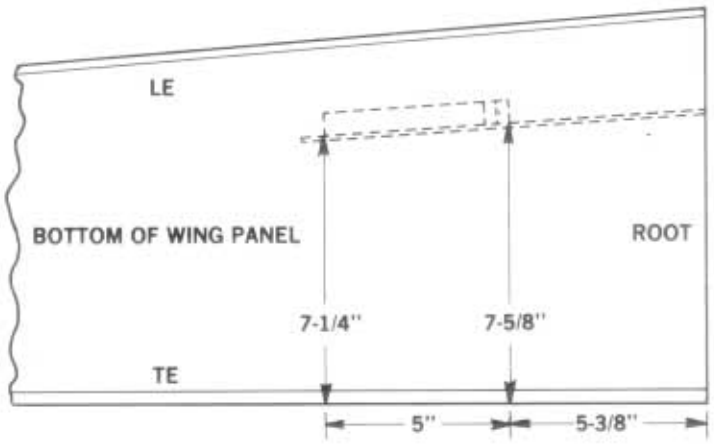
25. Epoxy the 5/16" x 5/8" x 1" basswood blocks and the 5/16" x 5/8" x 1" grooved basswood blocks together as shown. These form the "anchor blocks" called for in the next step.



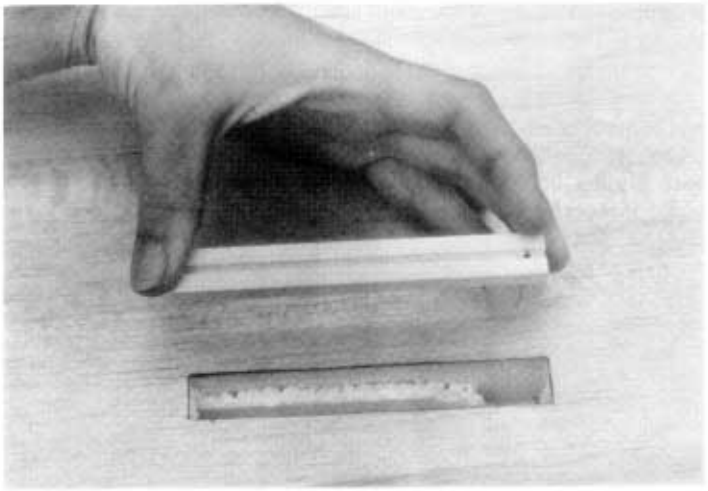


26. Epoxy an anchor block to the back of each 5/16" x 5/8" x 5" grooved basswood landing gear block as shown. Then drill a 1/8" dia. hole through the big landing gear block, using the groove in the anchor block as a guide for the drill bit.

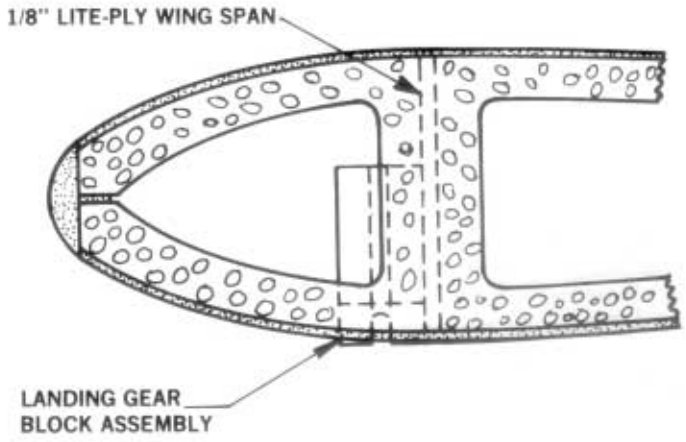
27. Draw the exact locations for the landing gear blocks on the bottom of each wing panel. The exact dimensions on this drawing show the correct location.

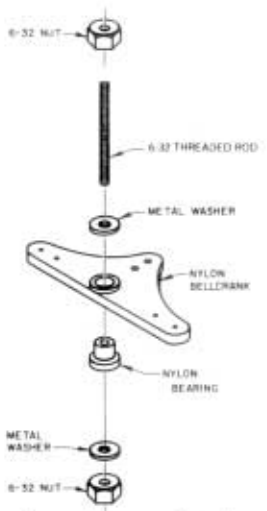


28. Cut the holes in the wing sheeting undersized at first so that the opening can be trimmed carefully for an exact fit. Excavate the foam carefully to clear the main grooved landing gear block and the anchor block.



29. Epoxy glue the landing gear blocks in place making sure they are glued directly to the 1/8" Lite-Ply wing spar. Also note that the rear edge of the landing gear block should be flush with the wing sheeting. The front edge of the landing gear block will protrude slightly above the sheeting and should be sanded off after the glue dries.





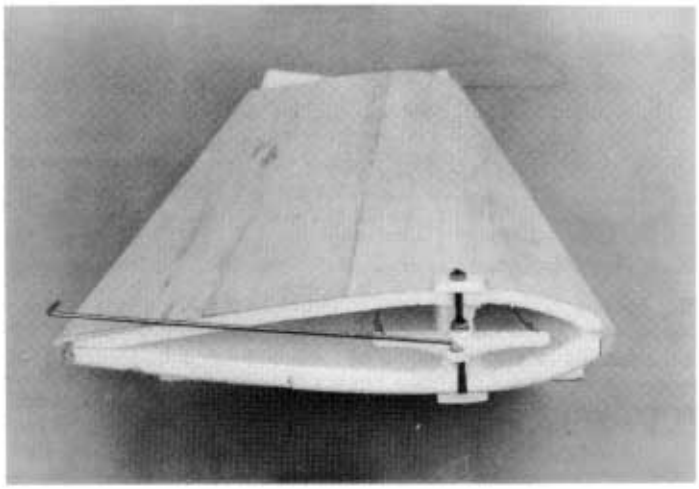
30. Assemble the bellcrank parts as shown in this drawing. (Note: It may be necessary to deburr the ends of the 6-32 threaded rod with a file to allow the nuts to screw on.) Be sure to position the bellcrank in the center of the threaded rod. Then apply a small amount of epoxy glue to the two 6-32 hex nuts to prevent loosening.

31. Attach the leadout cables to the bellcrank as shown on the plan.

32. Install the 3/32" pre-bent bellcrank pushrod in the bellcrank arm by soldering two #3 flat washers on top and bottom. Use paper spacers to protect the nylon bellcrank from the heat.

33. Cut out just enough of the foam spar at the root end of each wing panel to provide clearance for the bellcrank. The 1/8" Lite-Ply wing spar, already glued inside of the foam spar, may also have to be notched slightly to provide complete bellcrank clearance.

34. In the left wing panel, the tip ends of the Lite-Ply wing spar must be filed back 1/8" deep so that the 6-32 threaded rod fits flush. Epoxy the rod in place in the left wing panel. Make bellcrank pivot supports from scrap Lite-Ply and epoxy them in place. Install a 6-32 hex nut against each support, and coat the nuts with epoxy glue to keep them in place.



35. In the right wing panel, cut out just enough of the foam and balsa skin for adequate pushrod clearance. At this point, make sure that the control system is completely free of any binding roughness before proceeding with the joining of the wing panels.

36. Lay the top and bottom foam wing shipping cradles on a flat surface. If necessary, shim up one or the other until they are at equal heights. Break away enough of the foam cradles at the center to clear the plywood bellcrank pivot supports, and then place the wing panels in the cradles. Carefully check the alignment of the panels with a long straightedge. If necessary, lightly sand the wing root with a sanding block to achieve a proper fit.

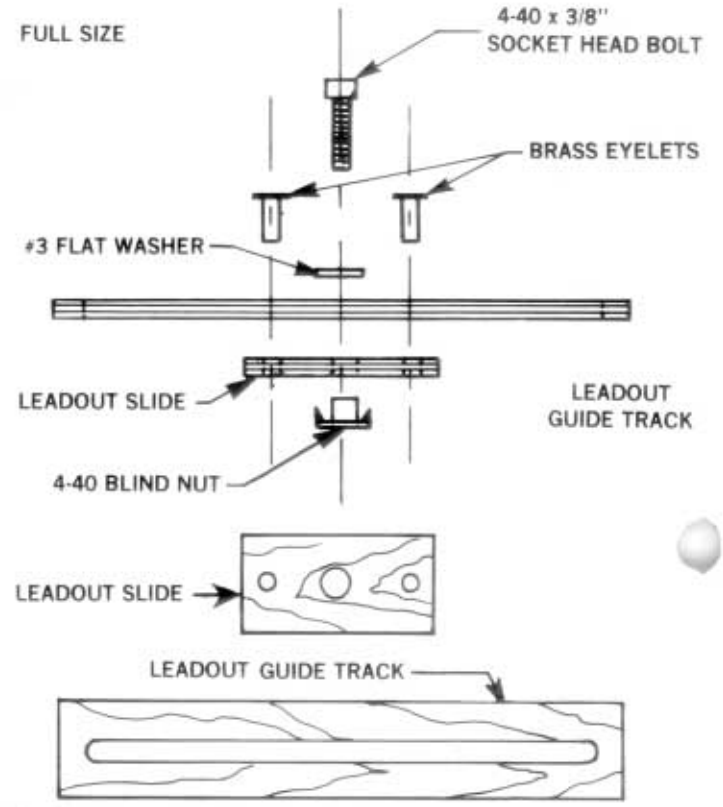
When satisfied with the wing panel alignment, epoxy both wing halves together with slow drying epoxy glue. This allows ample time for final alignment of the wing panels before the glue dries. Be certain that the leading and trailing edges are lined up exactly so that no twist between the two panels is built into the wing. Be careful not to get any glue on the control system parts. Allow the joint to dry completely before removing the wing from the cradles.

37. Glue the right balsa wing tip block and silkscreened balsa part WF-1 in place. When dry, carve and sand to correct shape.

38. Tack glue the left balsa wing tip block in place. Carve roughly to correct shape, leaving enough material for final sanding later.

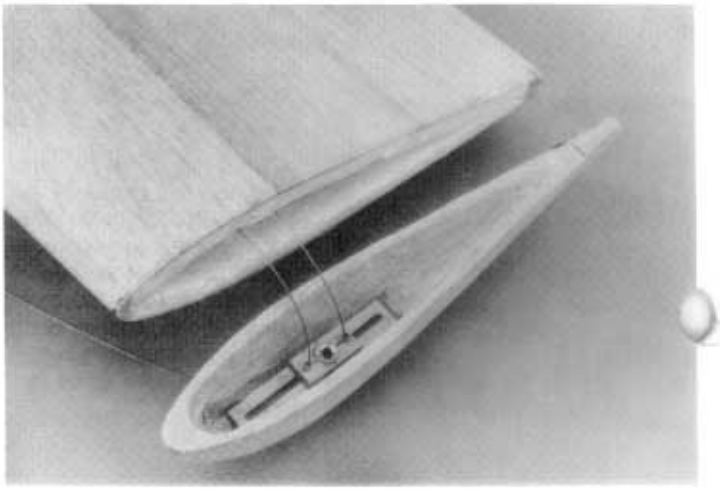
39. Remove the left wing tip block and hollow it out as shown on the plan. Cut a 1/8" wide slot in the tip for the adjustable leadouts to come through.

40. To construct the adjustable leadout guide, first drill two 1/8" dia. holes in the 3/32" x 1/2" x 3" plywood that is furnished for the leadout guide track. Locate the holes 3/16" from each end. Use a modeling knife and straight edge to cut out the plywood between the two holes, making a slot for the leadouts.



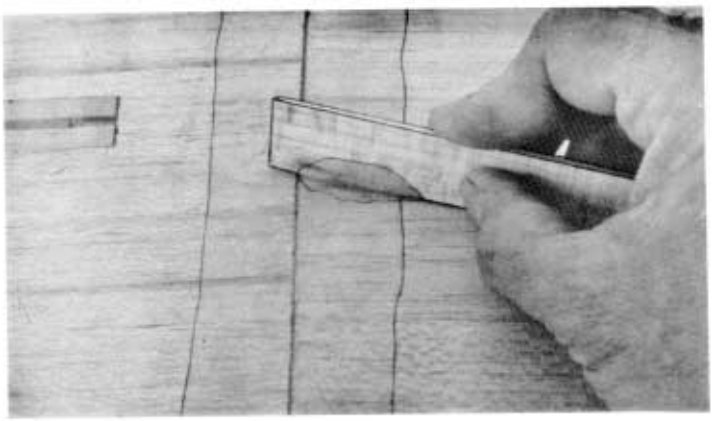
41. Drill three 1/8" dia. holes in the 3/32" x 1/2" x 1" plywood provided for the leadout slide. Then assemble all of the leadout guide parts as shown here.

42. Epoxy the completed leadout guide in the hollowed left wing tip. Remove 6" of the foam spar from the end of the left wing panel as shown on the plan. This is so the leadouts can be adjusted fore or aft of the location shown on the plan and still not bind on the foam. Thread the leadout cables through the leadout guide and glue the tip permanently in place.



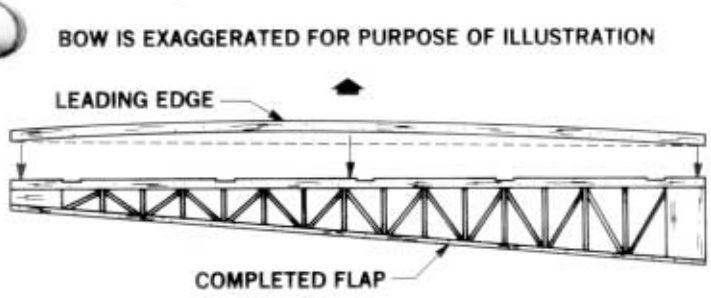
43. Glue silkscreened balsa part WF-1 in place, and when dry, finish sanding the left wing tip block to final shape.

44. Reinforce the wing center joint with 1" glass cloth tape and epoxy ...e. DO NOT OMIT THIS STEP! We have found it easiest to first apply a ...t of the epoxy glue on the wing. Next lay the tape over the glue. Then, holding one end of the tape so it won't slip, squeegee the glue through the tape with a small paddle of scrap balsa. Scrape over the tape several times to smooth it out and remove all excess glue.



FLAPS

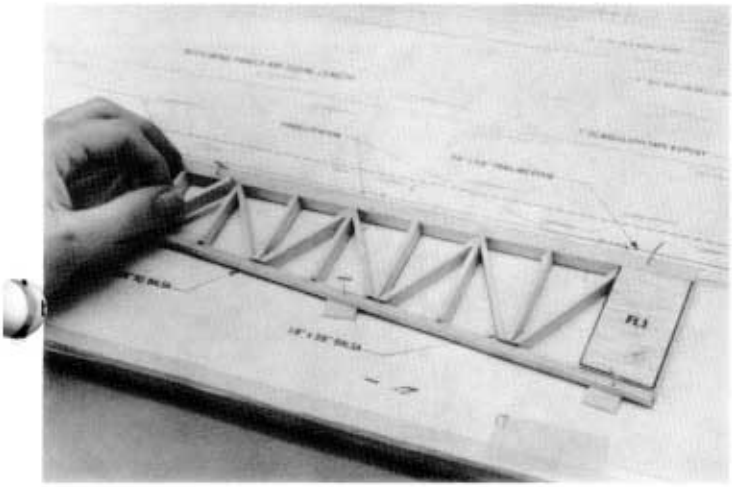
45. Place the plan on the building board and cover with wax paper. Pin the 3/8" sq. balsa leading edge to the plan. Note: If the balsa leading edge is warped, position the bow away from the front of the flap and use pins to hold straight.



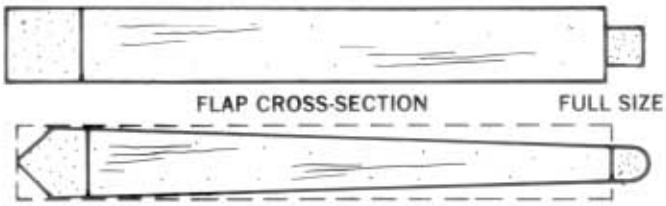
46. Cut FL-1 and FL-2 from the printed balsa sheet and glue them to the 3/8" sq. balsa flap leading edge.

47. Glue the 3/16" sq. balsa flap trailing edge in place. Use pieces of 3/32" scrap balsa to raise up the trailing edge to the proper height.

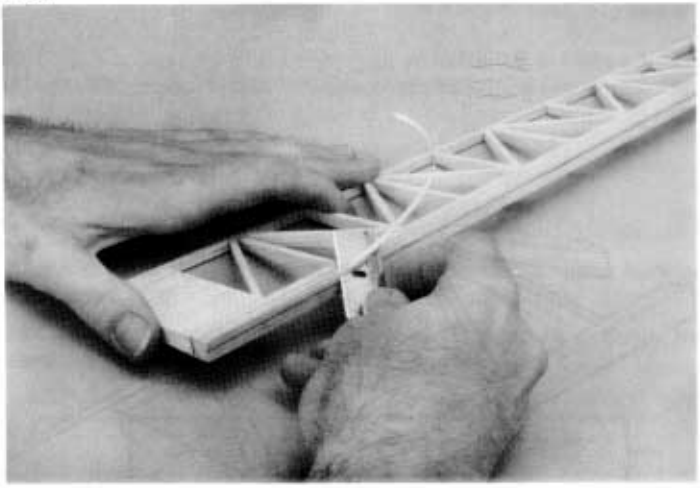
48. Cut to length and glue in place all the 1/8" x 3/8" balsa ribs and cross webbing. Allow to dry completely before proceeding.



49. With a long sanding block, carefully taper the top and bottom of the flap to the proper cross-section as shown here.



50. Draw a centerline on the flap leading edge with a soft lead pencil. Measure back 3/16" from the front corner and draw a line on the top and bottom. Roughly carve to shape and finish shaping with long sanding block.

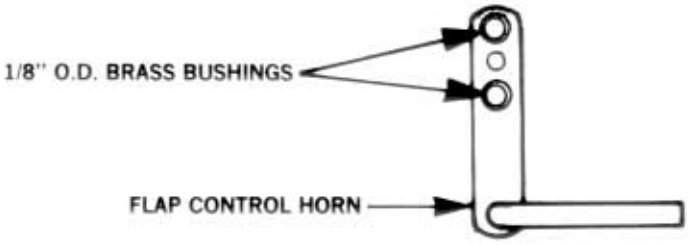


51. Make hinge slots in the flaps at this time, but do not glue the hinges in place. **NOTE:** To keep the hinge gap to a minimum, cut notches in the flap leading edge for hinge clearance as shown on the plan.

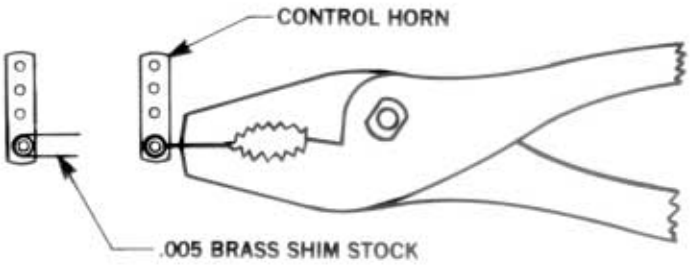
52. Repeat Steps 45 through 51 to build the opposite flap.

53. Drill out the top and bottom holes of the flap control horn with a 1/8" diameter drill bit.

54. Cut two bushings for the flap horn from 1/8" o.d. brass tubing. Make each one 3/32" long. Lightly solder the bushings in the holes in the flap horn.



55. Cut the .005 brass shim stock into four equal pieces 1-1/2" long. Make two supports for the flap control horn by bending the brass around the control horn bushings and pinching flat with a pliers.



STABILIZER

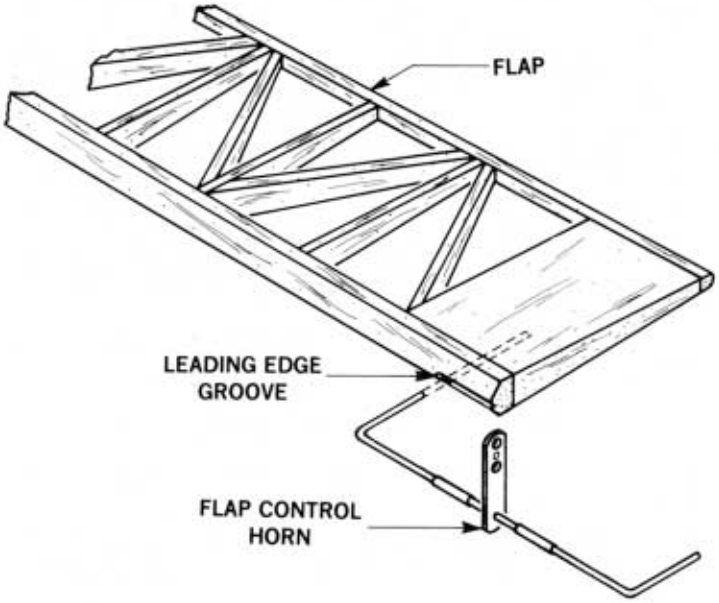
56. Using a single-edged razor blade, cut a vertical notch in the trailing edge of the wing for flap control horn clearance.

57. Cut two horizontal slots in the wing trailing edge on either side of the vertical notch to accept the brass control horn supports. Epoxy the brass supports into the slots, taking care not to get any glue on the control horn or bushings.

58. Drill 1/16" dia. holes down through the wing trailing edge and brass control horn supports. Pin the supports by sticking toothpicks coated with epoxy glue into the holes.

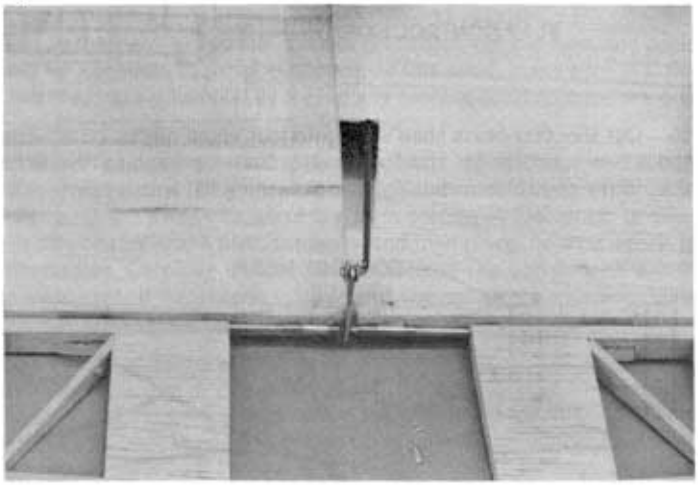
59. Attach the bellcrank pushrod to the flap control horn by soldering two #3 flat metal washers to the pushrod, one on either side of the flap control horn. Use paper spacers to insulate the control horn from the heat. Too much heat will melt the solder holding the brass tube horn bushings in place.

60. Carefully drill the flap leading edges with a 1/8" dia. drill to accept the control horn arms. Cut a groove in the front of the flaps to allow the horn to fit flush.



61. Install hinges in the wing trailing edge with slow drying epoxy. Be careful not to let any excess glue get into the hinge joint. Let dry.

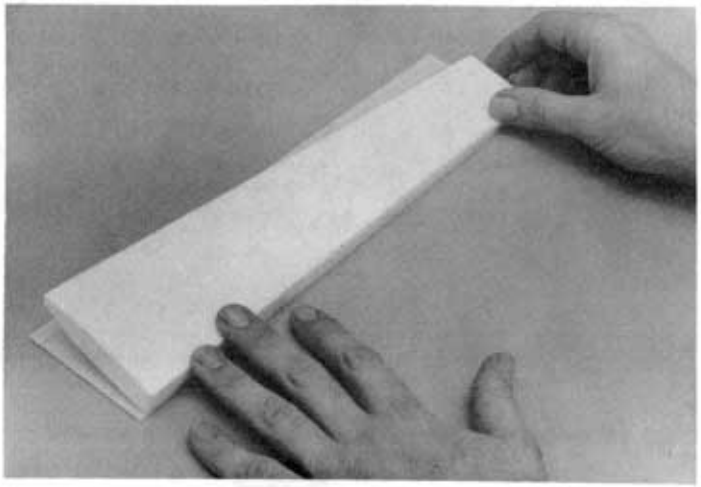
62. Carefully epoxy the flaps to the control horn arms and to the hinges. Again be careful not to let excess glue bind up the system when dry.

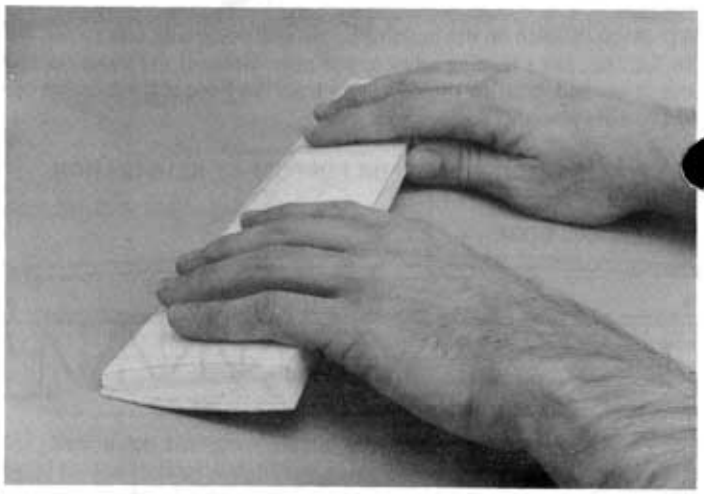


63. Lightly sand the stab foam core to remove any wire marks or irregularities.

64. Cut two 1/16" x 3" x 30" balsa sheets in half to make four 15" long stab skins.

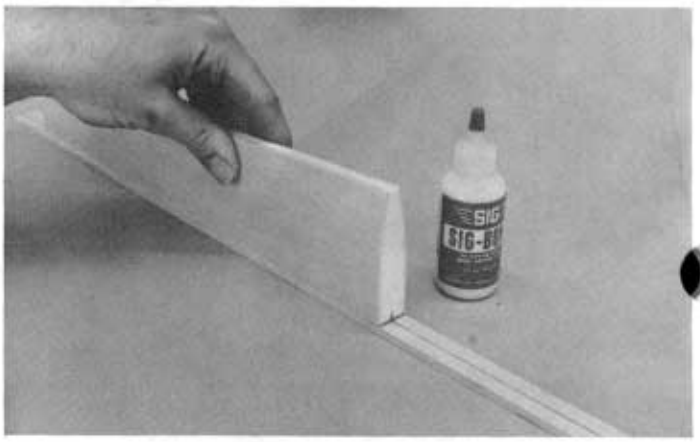
65. Apply the balsa skins to the stab in the same manner as the wing was done. Carefully line up the trailing edges of the foam core and the balsa skin, as there is not much excess balsa.



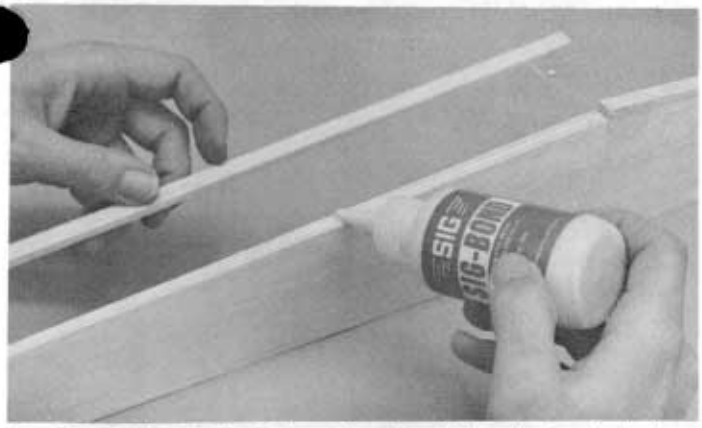


66. Draw a horizontal line down the center of the 3/16" x 3/4" x 30" balsa stab trailing edge with a soft lead pencil. Also mark the centers of the foam core at the root and tip.

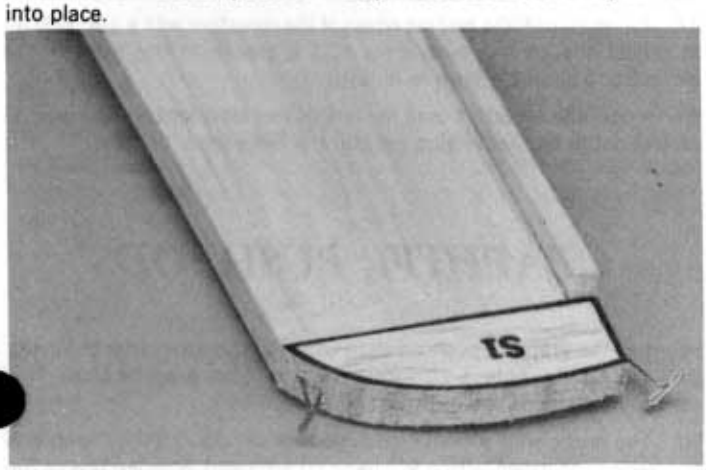
67. Glue one half of the stab onto the balsa trailing edge, using the center marks applied in the previous step for alignment. When dry, glue the other half of the stab onto the balsa trailing edge and to the first half of the stab. Allow to dry.



68. One piece of 3/16" x 3/8" x 30" balsa is provided for the stab leading edges. Cut it in half and glue the leading edges in place. Allow to dry.



69. Cut out the stab tips S1 from the printed balsa sheet and glue them into place.



70. Carve the stab leading edges, trailing edges, and tips roughly to shape. Final shaping of the stab should be done with a long sanding block.

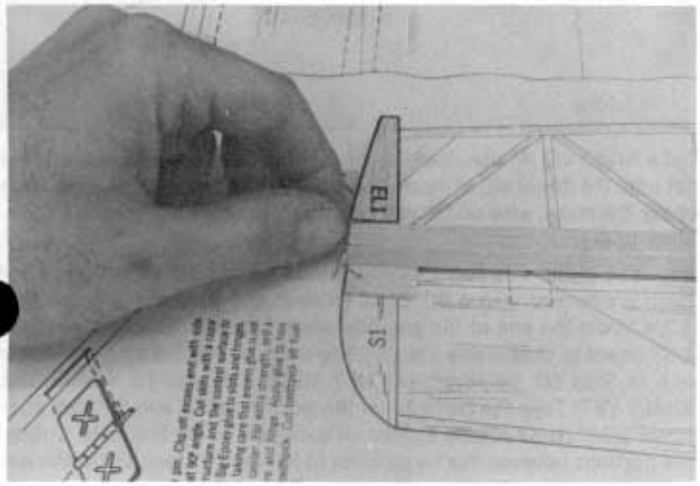
ELEVATORS

71. Place the elevator plan on the building board and cover with wax paper.

72. Pin the special-cut balsa elevator leading edges (3/8" x 1/2" tapering to 3/8" x 3/8") onto the plan. Block up the tips of the leading edges with pieces of scrap 1/16" balsa.

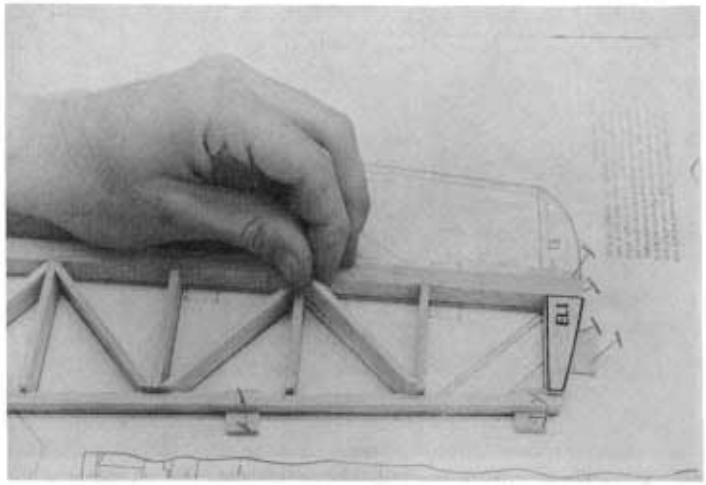
73. Cut to shape and glue in place the 1/2" sq. balsa elevator ends.

74. Cut elevator tip EL1 from the printed balsa sheet. Block EL1 into proper relationship with the leading edge and glue in place.



75. Block up the 3/16" sq. balsa trailing edges with scrap 1/8" balsa and glue them in place.

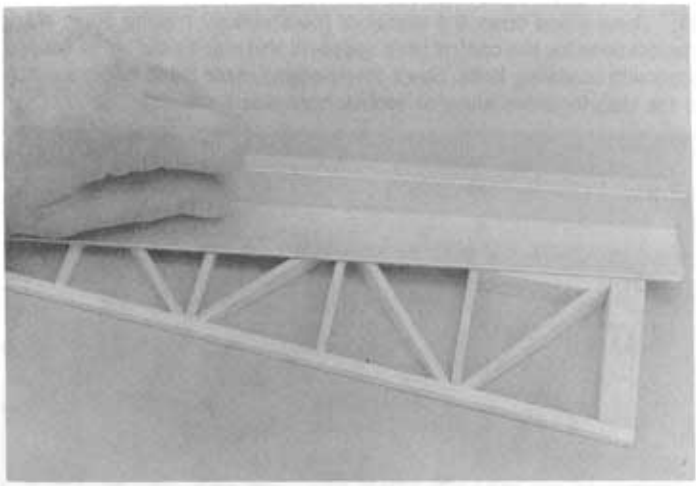
76. Cut to length and glue in place all the 1/8" x 1/2" balsa ribs and crossbraces.



77. Add the 1/16" balsa gussets and the scrap 3/8" balsa horn reinforcement.

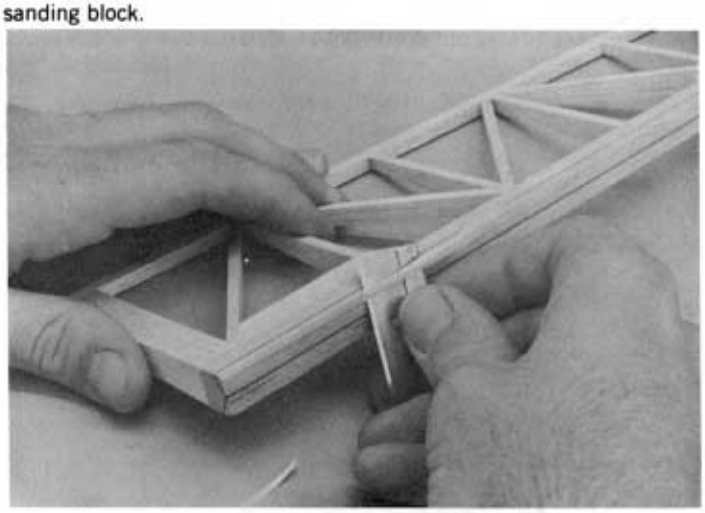
78. With a long sanding block, carefully taper the top and bottom of the elevators to proper cross-section.

ELEVATOR CROSS-SECTION FULL SIZE



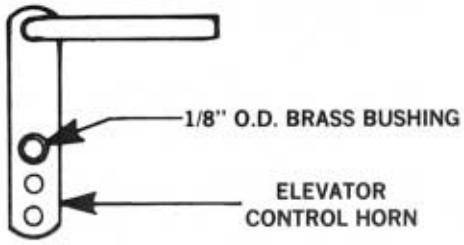
SIG®

79. Draw a centerline on the elevator leading edge with a soft lead pencil. Measure back 3/16" from the front corners and draw lines on the top and bottom. Carve the leading edges to final shape, finishing with a long sanding block.



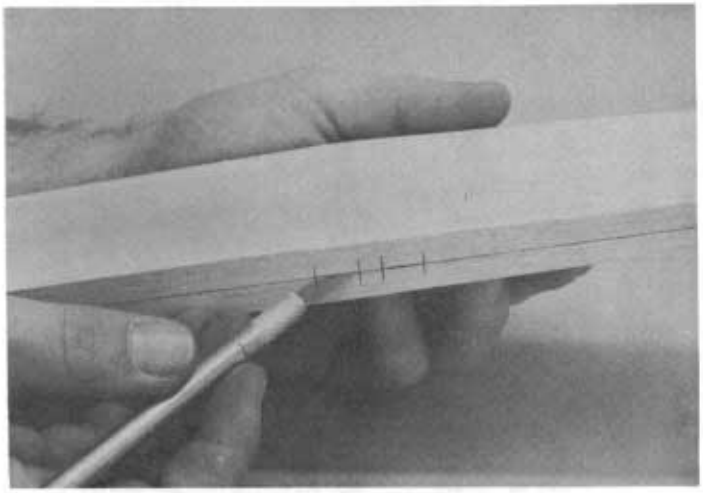
80. Make hinge slots in the elevator at this time but do not glue the hinges in place. **NOTE:** To keep hinge gap to a minimum, cut notches in the elevator leading edge for hinge clearance as shown on the plan.

81. Drill out the top hole of the elevator horn with a 1/8" dia. drill bit. Cut a 3/32" long bushing from 1/8" o.d. brass tubing and lightly solder it in the hole.



82. Make control horn supports for the elevator horn out of .005 brass shim stock just as you did in Step 55 for the flap horn.

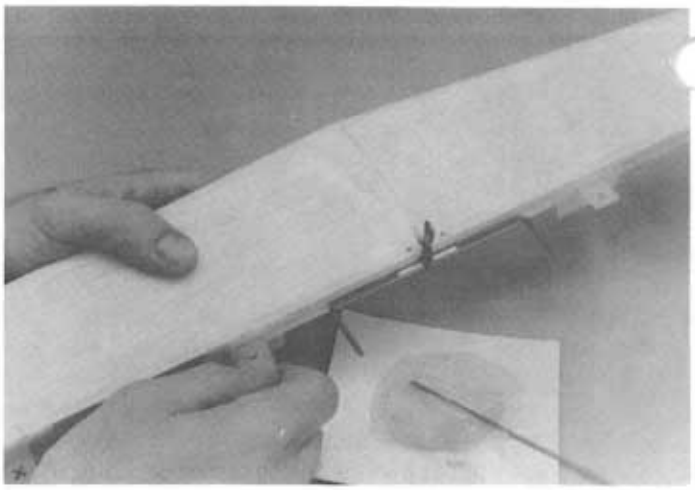
83. Draw a line down the center of the stabilizer trailing edge. Mark the locations for the control horn supports and make slots in the trailing edge with modeling knife. Use a single-edged razor blade to cut a notch in the stab for down elevator control horn clearance.



84. Epoxy the brass control horn supports into the stab. Do not allow any glue on the control horn wire or bushings.

85. Drill 1/16" dia. holes down through the stab trailing edge and through the control horn supports. Push wooden toothpicks, covered with epoxy glue, through the holes to pin the control horn supports in place. Cut the toothpicks off flush with the surface when dry.

86. Cut hinge slots in the stab and epoxy the hinges into the stabilizer only. Allow to dry.



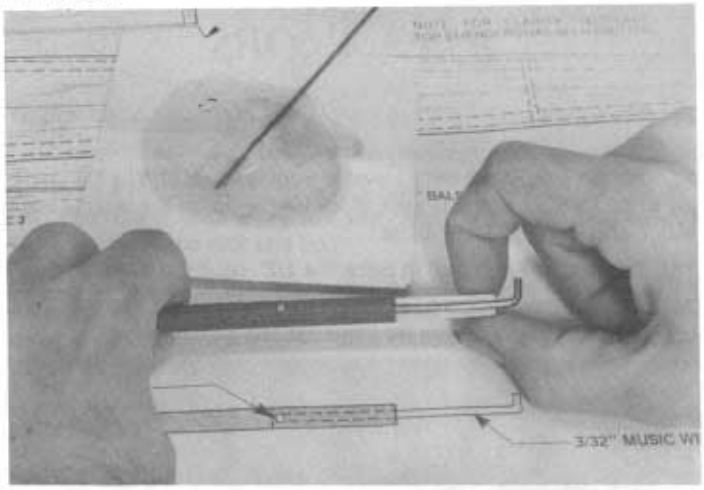
87. Carefully drill the leading edges of the elevators with a 1/8" drill bit to accept the control horn arms. Cut a groove in the front of the elevators to allow the horn to fit flush.

88. Epoxy the elevators onto the hinges and elevator control horn. Be careful not to let excess glue get into the hinge joint. Let dry.

GRAPHITE PUSHRODS

89. Lay the graphite pushrod shaft over the plans and trim to length. Drill a 3/32" dia. hole, 1-1/2" from one end of the graphite shaft. This will be the elevator end of the graphite pushrod.

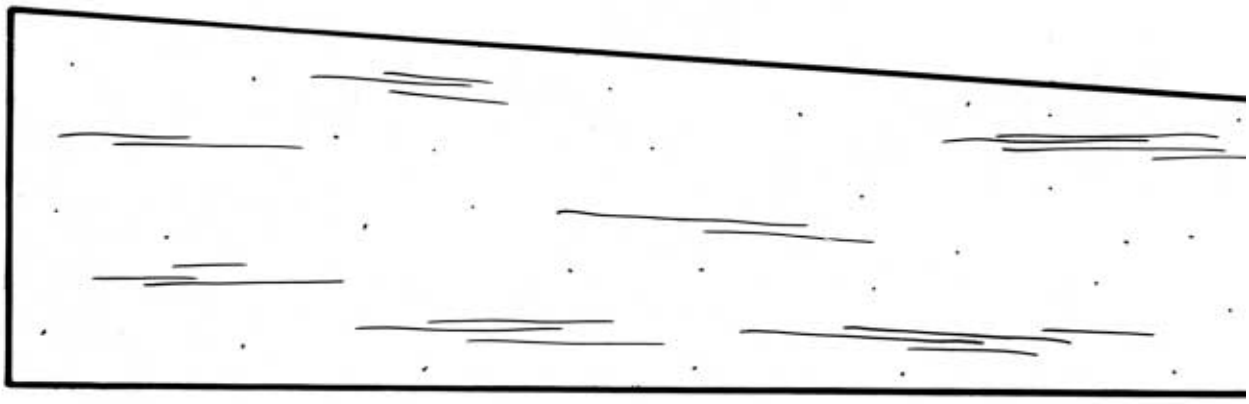
90. The music wire elevator pushrod is 3/32" dia. x 2-3/4" long, and has been pre-formed with a 90° bend on each end. Shorten one of the 90° bends enough to allow the wire to be slipped inside of the graphite shaft. The 90° bend should stick out of the shaft through the hole drilled in Step 89.



Cut a length of 1/4" dia. dowel to 1-1/2" long. Sand one side of the dowel flat until the dowel will fit inside the graphite shaft next to the wire. Then epoxy the music wire and dowel permanently inside the graphite shaft. Allow to dry.

91. The music wire flap pushrod is 3/32" dia. x 3-1/4" long, and has been pre-formed with a 90° bend on each end. Drill a 3/32" dia. ho 1-3/4" from the end of the graphite shaft. Prepare the music wire ar 1/4" dowel to slide inside the graphite shaft, as you did for the elevator end in Step 90. However, DO NOT GLUE THE PARTS INSIDE THE SHAFT YET! Take the parts out of the graphite shaft and drill two additional 3/32" holes equally spaced on each side of the first hole. Cut out the portions between the three holes to form a 3/8" long slot in the wall

THIS IS THE PATTERN REFERRED TO IN STEP 113 ON PAGE 15 OF THE INSTRUCTION BOOK.



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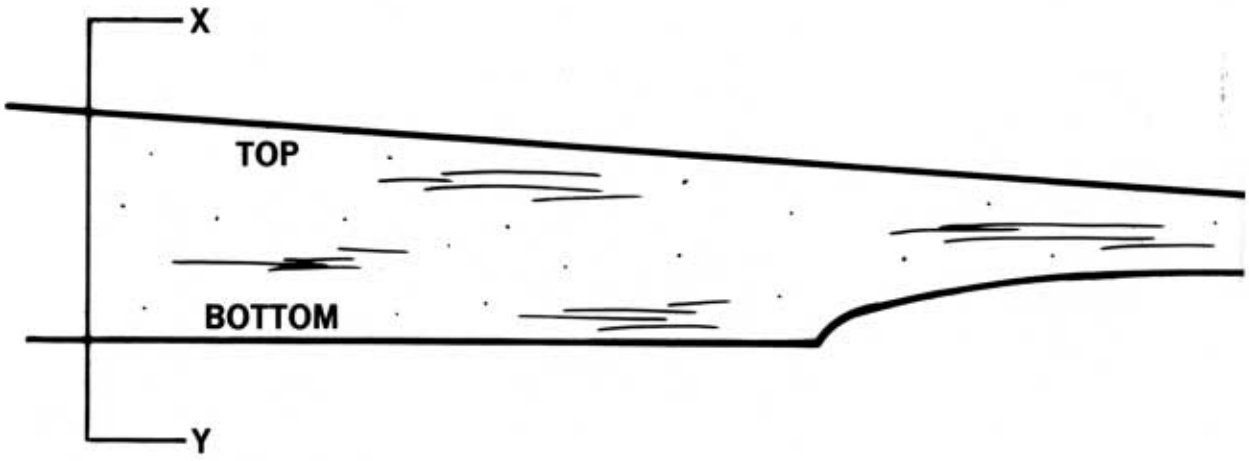

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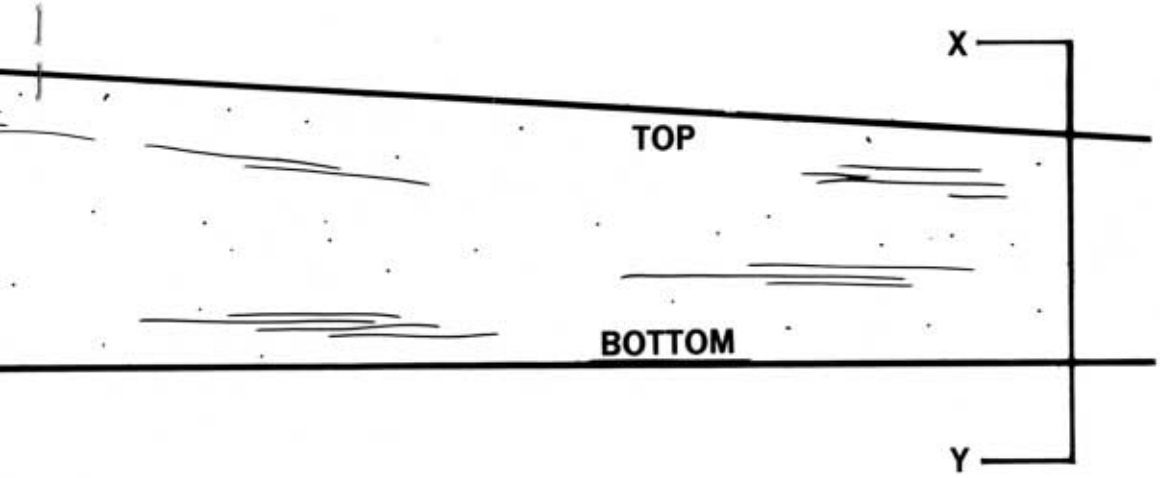
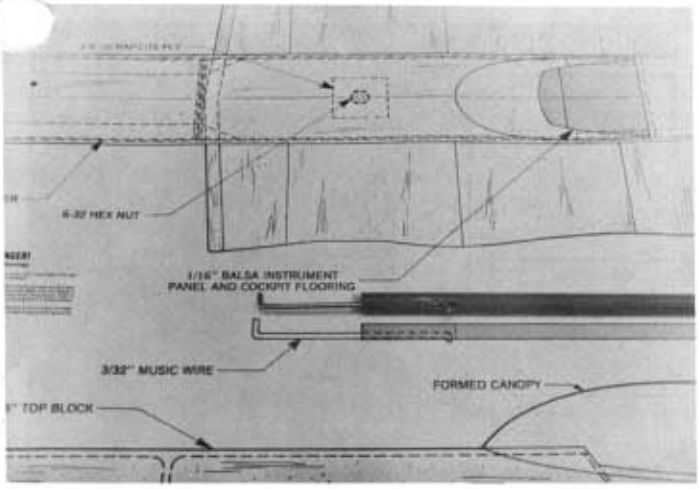


PATTERN FOR 3/32" BALSA TURTLEDECK SIDES

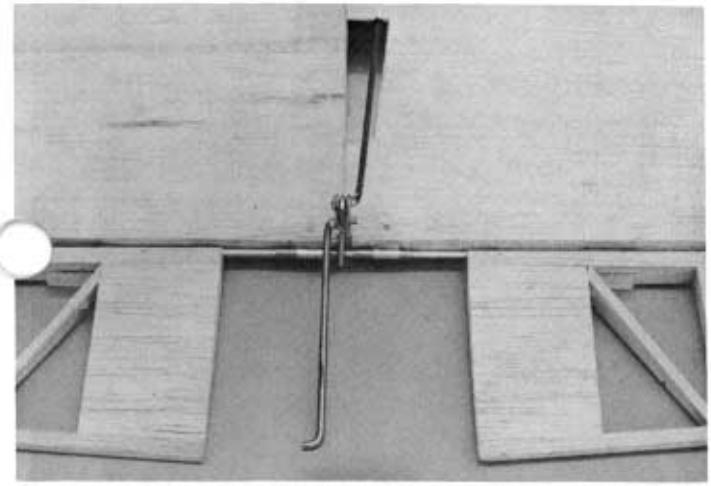
MAKE 2

CUT OUT THE PATTERN AND TAPE THE TWO HALVES TOGETHER USING THE CONNECTING KEYS X AND Y. USE A STRAIGHT EDGE TO ALIGN THE PATTERN HALVES.

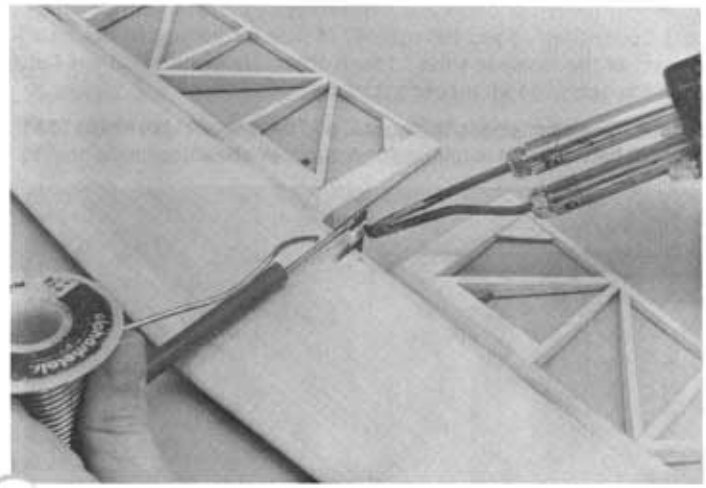
of the graphite shaft. This slot will allow adjustment of the pushrod's length later during the final assembly of the wing and stab to the fuselage.



92. Solder the 3/32" music wire flap pushrod to the flap horn using two #3 flat metal washers. Solder only one washer at a time and use paper spacers to insulate the control horn from the heat.



93. Solder the 3/32" music wire elevator pushrod, with graphite shaft attached, to the elevator horn using two #3 flat metal washers.

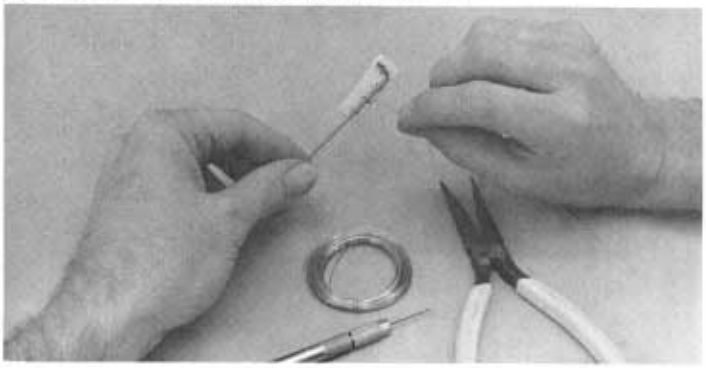


COVERING NOTE: If you are going to cover your Magnum with an iron-on pre-colored covering material (like Monokote, etc.), it is best to cover the wing, flaps, stab and elevator at this time before proceeding to the next step.

TAILWHEEL

94. Place the 1/16" dia. tail wheel wire on the die-cut lite-ply tailwheel mount FT. Mark and drill a series of small holes around the outside of the wire.

95. Lash the tailwheel wire to the plywood mount with copper wire. Apply epoxy glue to the binding and allow to dry.

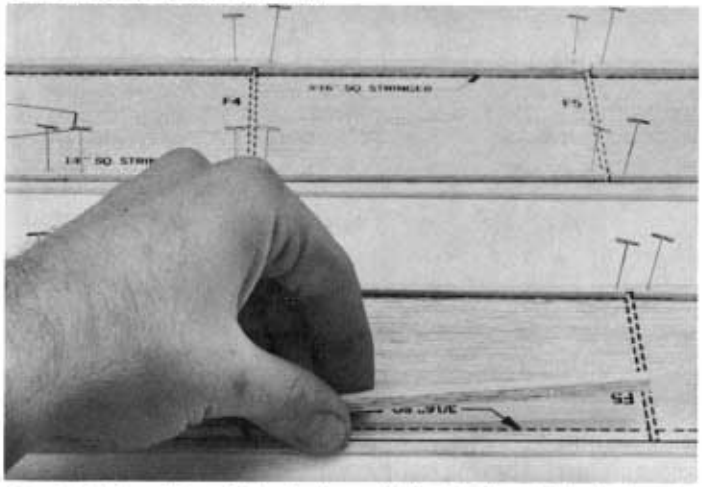


96. Bend down the tailwheel wire to the correct angle with a needle nose pliers. See fuselage side-view on the plan.

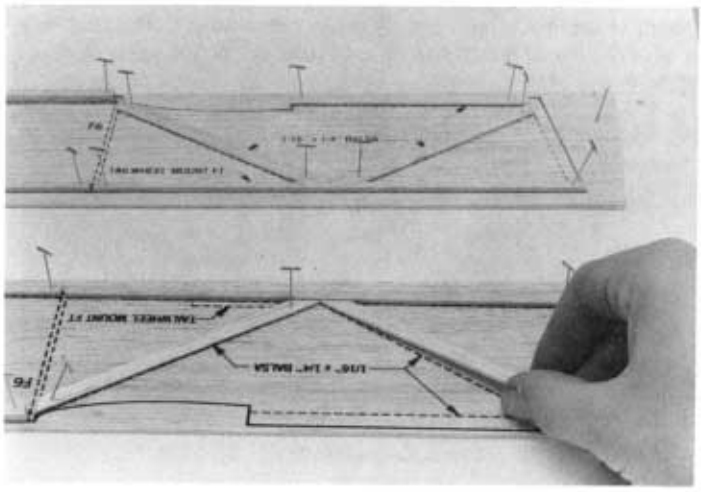
FUSELAGE

97. Cover the building board with wax paper. Pin the printed balsa sheets #1 and #3, containing the fuselage sides, onto the board.

98. Cut to length and glue in place on the fuselage sides all the 3/16" sq. and 1/8" sq. stringers. Be sure to leave a 3/32" gap in the stringers at the fuselage former locations.

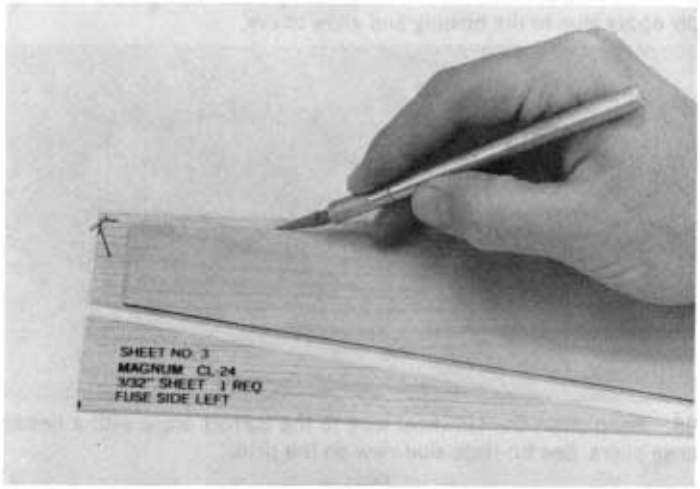


99. Cut to length and glue in place all the 1/16" x 1/4" balsa fuselage stiffeners. Do not install the tail post at this time.



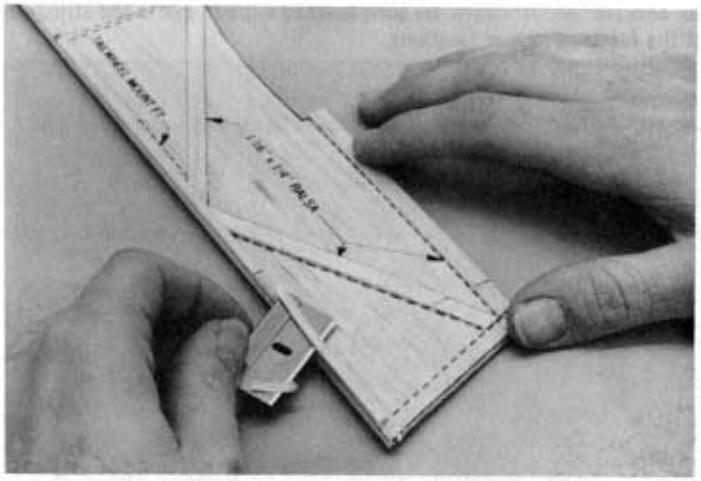
100. Epoxy the 1/32" ply doublers in place. (Do not use Sig-Bond or any other water-base glue for this, as the water can cause the parts to curl.) Mark the locations of formers F1 and F2 on the doubler.

101. Trim completely around the outside of each fuselage side with a sharp modeling knife, cutting away the excess printed balsa sheet.

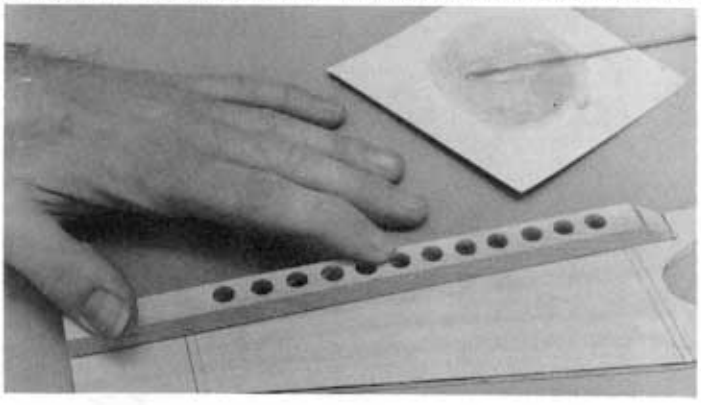


102. Cross-match the fuselage sides by pinning them together and using a sanding block to true up any rough edges. If the sides were built and cut out accurately, not much sanding will be needed.

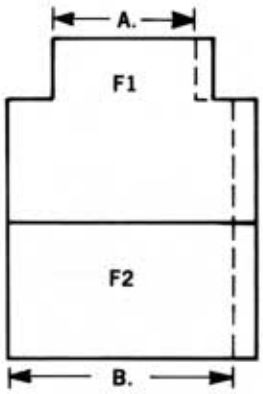
103. Bevel the rear end of the fuselage stringers with a single-edged razor blade. Install the 1/16" x 1/4" tail post to the right fuselage side only. Make the tail post 1/2" taller than the printed fuselage side.



104. Epoxy the 3/8" x 1/2" x 9" maple motor mounts to the plywood fuselage doublers. Align the motor mounts with the top and front of the fuselage sides. OPTIONAL: Notice in the photo that we have lightened the motor mount by drilling a string of 5/16" dia. holes through the mount in the fuel tank area. This does not appreciably affect the strength of the mount and can save significant weight. Also, the rear corner of the maple mount has been beveled off for the same reason.

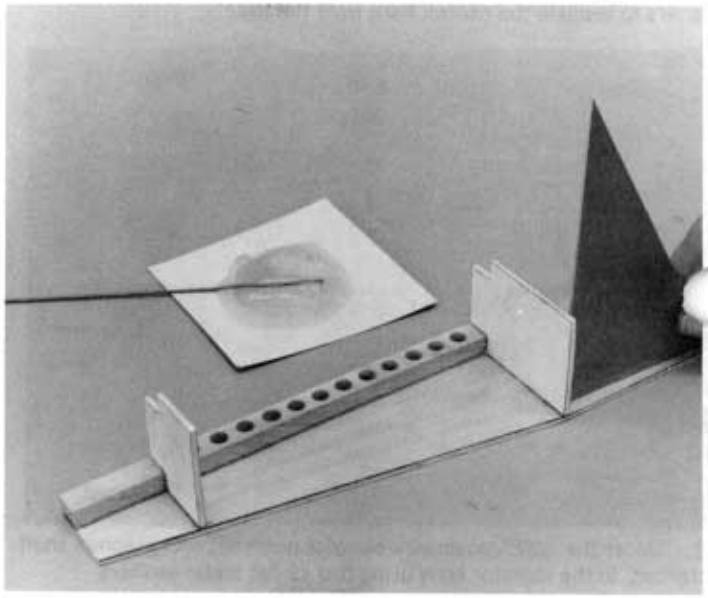


105. The lite-ply fuselage formers F1 and F2 are die-cut wider than shown on the plan. This is to accommodate the varying widths of engine crankcases. You may want to alter the width of your formers slightly to better fit your particular engine. Here are a few examples:



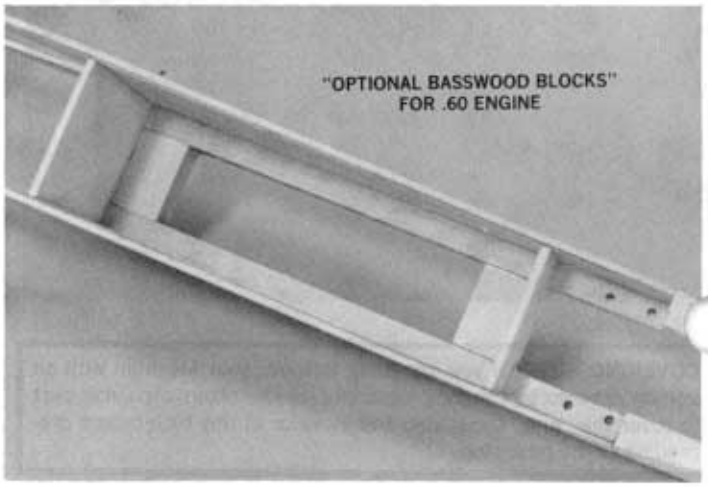
	A Crankcase Width	B Overall Width
Super Tigre .46	1-1/4"	2"
O.S. Max .40 FPS	1-1/4"	2"
Fox .40 Compact	1-1/4"	2"
O.S. .45 FSR	1-1/4"	2"
HP .40 Gold Cup	1-5/16"	2-1/16"
Super Tigre .60	1-7/16"	2-3/16" (Formers OK as is)
Merco .61	1-7/16"	2-3/16" (Formers OK as is)
K&B .40	1-1/4"	2"

106. Epoxy the die-cut lite-ply fuselage formers F1 and F2 in place on the right fuselage side. Glue them in place one at a time with Sig Kwik-Set epoxy and use a 90° triangle to hold them square until dry.

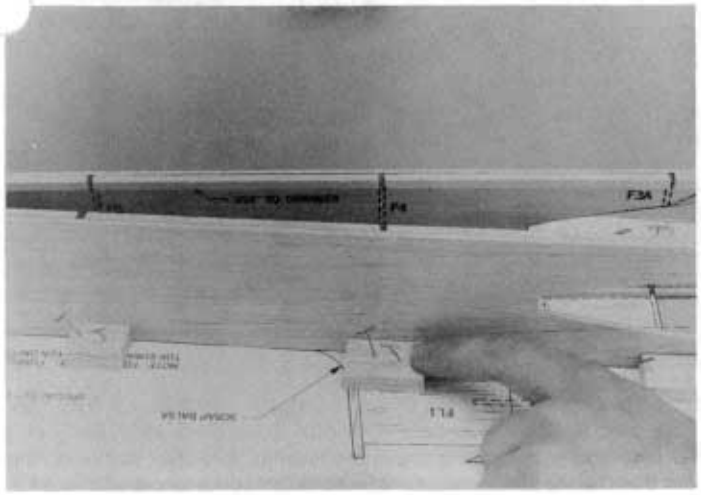


107. Epoxy the left fuselage side onto formers F1 and F2 with slow drying Sig Epoxy Glue so you have plenty of time for getting an accurate alignment of the fuselage sides to each other. Make sure that the tail ends of the sides line up properly. Let dry.

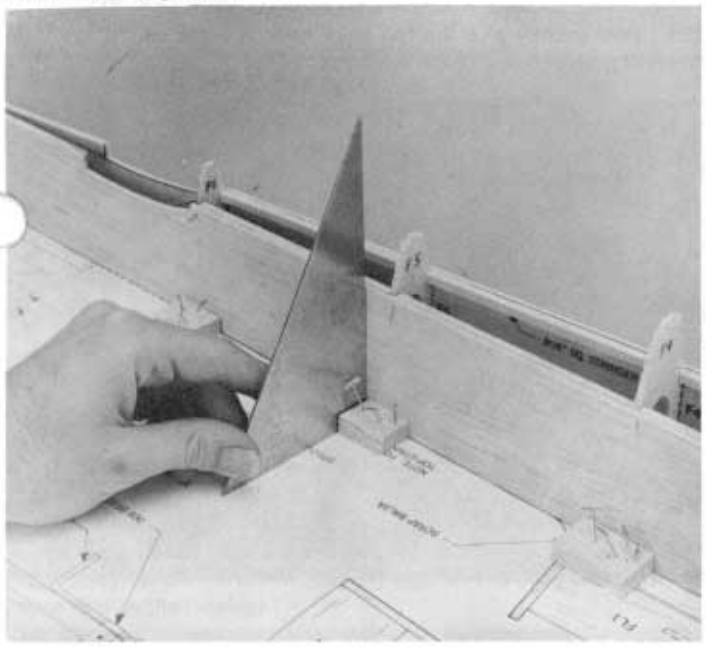
108. If a .60 size engine is to be used, add basswood cross-pieces (not furnished) between the maple motor mounts as shown.



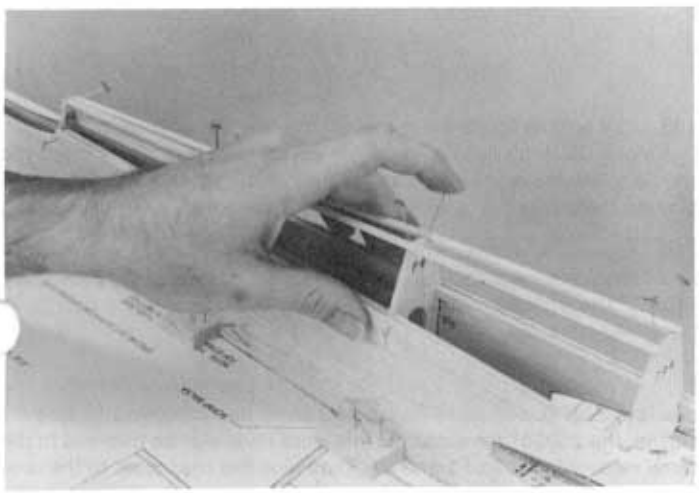
109. Place the top view of the fuselage plan on the building board and cover with wax paper. Pin the rear of the fuselage sides, between F4 and the tailpost, in place on the plan. Use blocks of scrap balsa to help hold the fuse sides in exact contour.



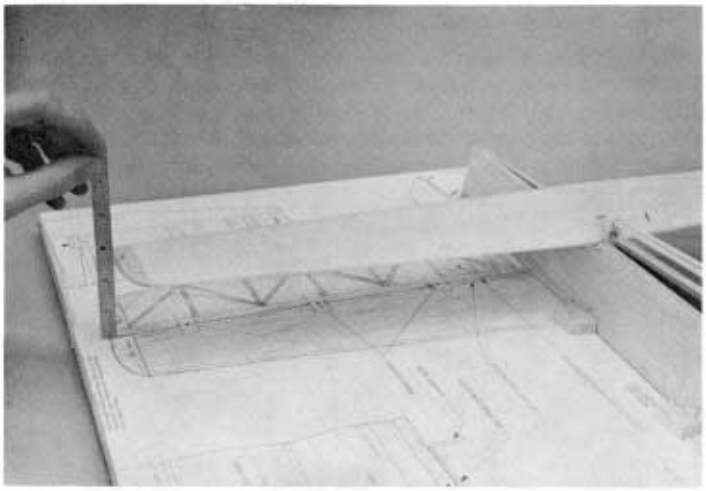
110. Pin (don't glue) the die-cut balsa fuselage formers in place. First, make sure the fuselage is square at all former locations with 90° triangle. When satisfied with the fuselage alignment, glue the formers in place without removing them.



111. Glue in place the 1/8" sq. balsa turtledeck stringers. Check for proper alignment with a long straightedge.

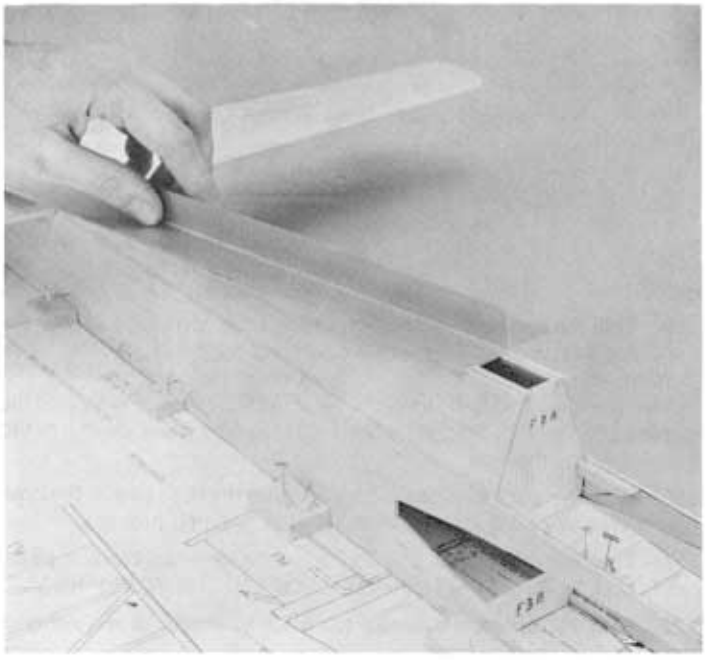


112. Use slow drying epoxy to glue the stabilizer/elevator assembly in place on the fuselage. Carefully check that the height of the stabilizer tips from the building board are equal. Also be certain that the stabilizer is perpendicular to the fuselage when viewed from above.



113. Using the pattern in the center of this book, cut both 3/32" balsa turtledeck sides from one sheet of 3/32" x 4" x 24" balsa provided. Glue in place on the fuselage and let dry.

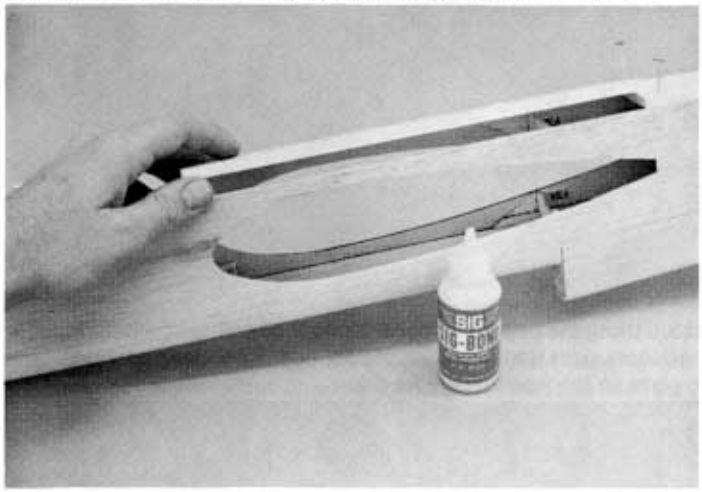
114. Sand the turtledeck sides and the 1/8" sq. stringers down to the top of the fuselage formers with a long sanding block.



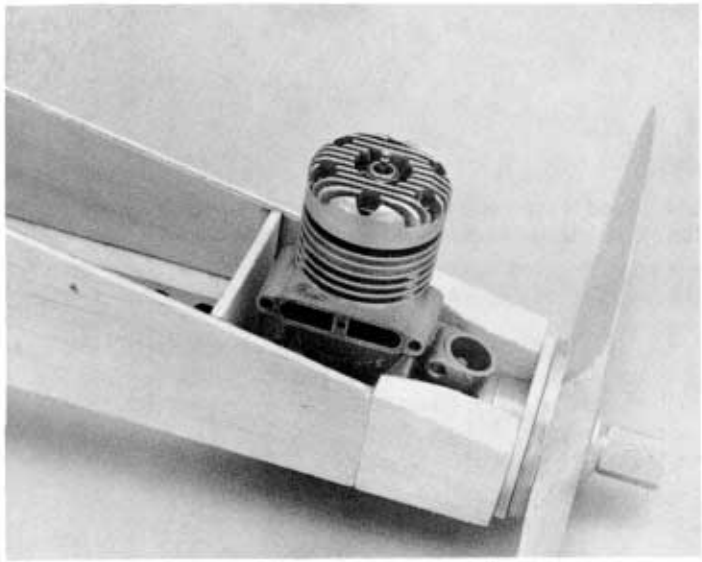
115. Glue in place the 3/16" balsa turtledeck top and allow to dry. Then, with an X-Acto knife with a #26 blade, roughly trim the turtledeck top to shape.

116. Remove the fuselage from the building board and epoxy the tailwheel assembly in place.

117. Glue the 1/4" balsa fuselage bottom sheeting in place. Notice that the bottom sheeting is applied in two separate pieces. The front piece extends from F2 to 1-1/2" behind F3B. The rear piece extends from that point back to the tailpost. When dry, carve and sand the bottom of the fuselage to final shape. See cross-section drawings on the plan.



118. Glue in place the 5/8" x 1-1/2" x 1-3/4" balsa nose filler blocks. Slip the die-cut lite-ply nose ring over the engine and install the spinner backplate and prop. Place the engine in the mounts with the spinner backplate and nose ring pressed firmly against the nose filler blocks. Mark the position of the engine mounting holes with a sharp pencil or awl. **NOTE:** Engine offset is not required in the Magnum. Just make sure there is no engine offset to the inboard side.

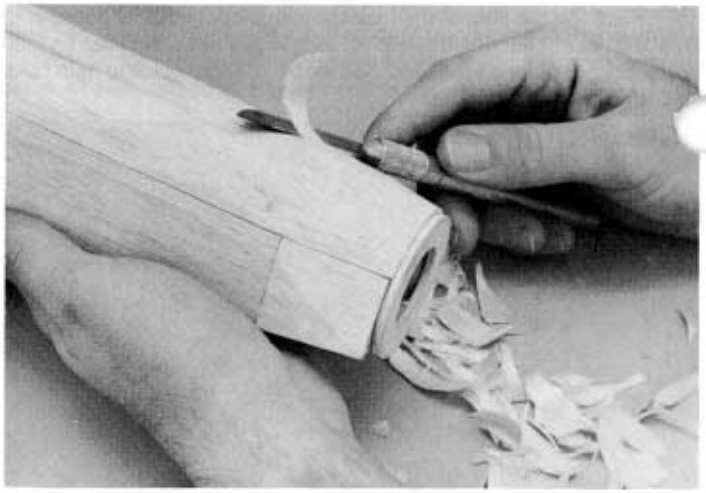


119. Drill the engine mounting holes with a 1/8" drill bit, making sure the drill is held vertical. Then with a 5/32" drill bit, drill out the back side of each hole slightly for blind nut clearance. Install the engine and tighten the mounting bolts until the blind nuts are pulled firmly into the maple motor mounts. Epoxy the blind nuts in place, being careful not to get glue in the threads.

120. With the engine installed, carefully glue the nose ring to the nose filler blocks using the spinner backplate to position it properly.

121. Tack glue the 3/4" x 3" x 18" balsa fuselage top block in place. DO NOT GLUE THE FUSELAGE TOP BLOCK TO THE NOSE RING YET!

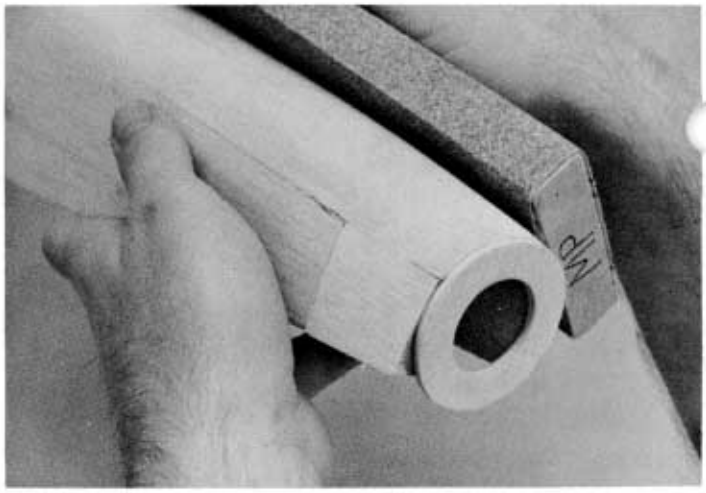
122. Roughly carve the fuselage top block to shape. Leave plenty of room for final shaping later.



123. Remove the top block from the fuselage and hollow it out to approximately 1/8" wall thickness. An X-Acto router blade #162, along with a Dremel tool with sanding drum, are ideal for this step. Notice on the plan that the top block should not be hollowed above formers F1 and F2, or above the motor mounts.

OPTIONAL: If cockpit detail is desired, cut out the rear of the top block using the toned area on the plan as a pattern. Make the cockpit flooring and the instrument panel from 1/16" scrap balsa and install at this time.

124. Permanently glue the top block back in place on the fuselage. When dry, finish sanding the top block to final shape.



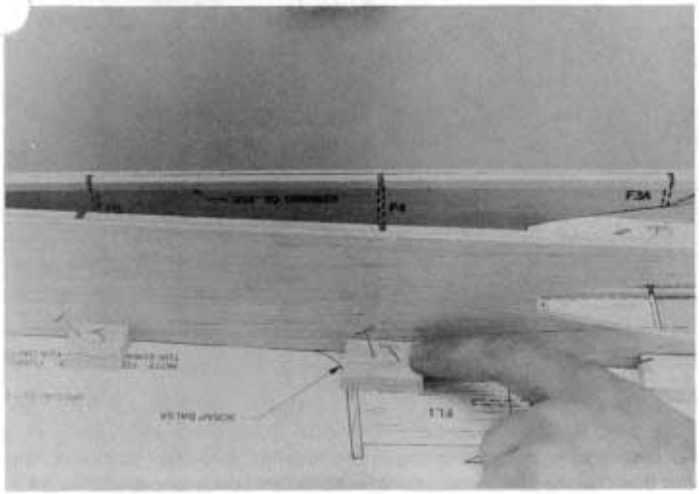
COWLING

125. Cut out the CS cowl side pieces from the 1/8" printed balsa sheet. Cut along the solid lines everywhere except near the front, there you should follow the dashed lines at this time. Crossmatch the cowl sides by pinning them together and lightly sanding the edges.

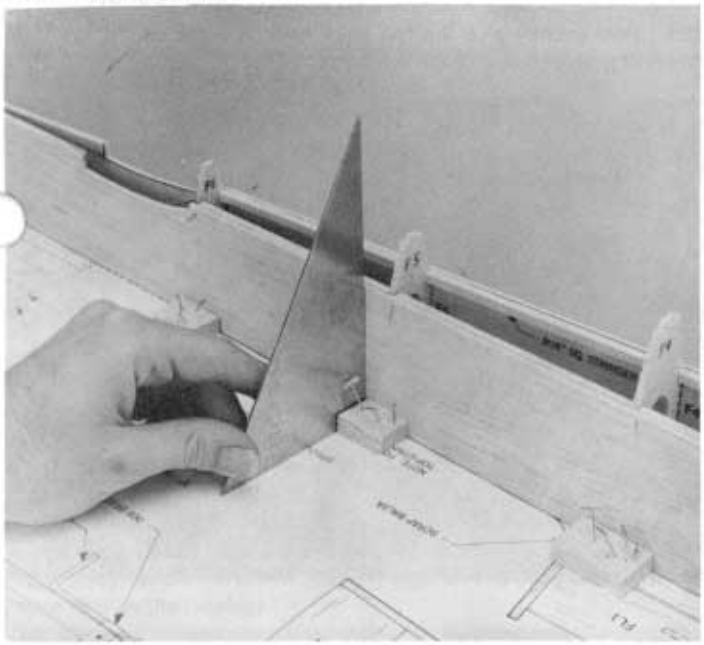
126. Make cowl hold-downs from scrap 1/32" plywood, with pattern from fuse side-view plan. Glue the hold-downs in place on the cowl sides. (**NOTE:** The printing on the cowl sides should end up on the outside of the cowl assembly.)

127. A piece of 1-1/2" x 2-3/16" x 3" balsa has been provided for the cowl block. If the formers F1 and F2 have been trimmed to fit your engine, the 2-3/16" dimension of this block must also be trimmed to the same measurement as F1 and F2. Then glue the cowl sides to the cowl block and allow to dry.

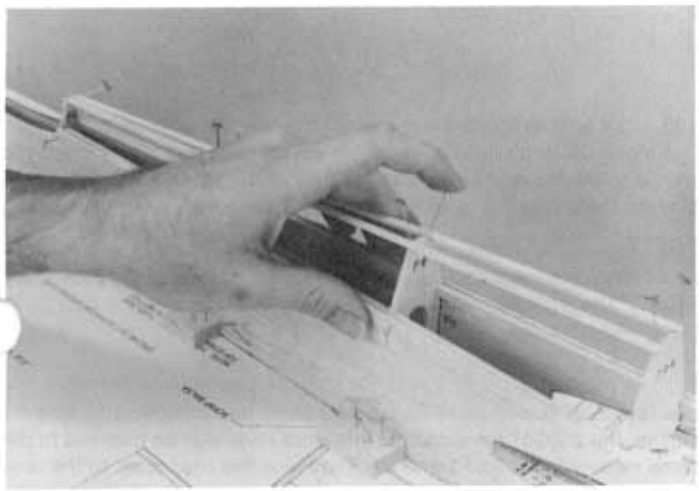
109. Place the top view of the fuselage plan on the building board and cover with wax paper. Pin the rear of the fuselage sides, between F4 and the tailpost, in place on the plan. Use blocks of scrap balsa to help hold the fuse sides in exact contour.



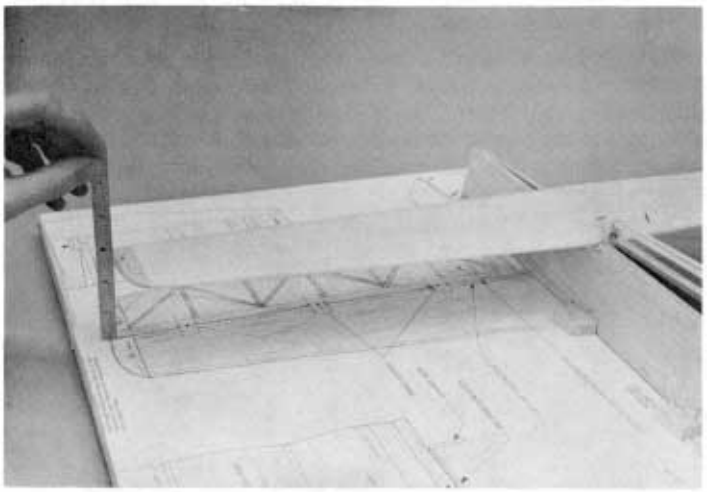
110. Pin (don't glue) the die-cut balsa fuselage formers in place. First, make sure the fuselage is square at all former locations with 90° triangle. When satisfied with the fuselage alignment, glue the formers in place without removing them.



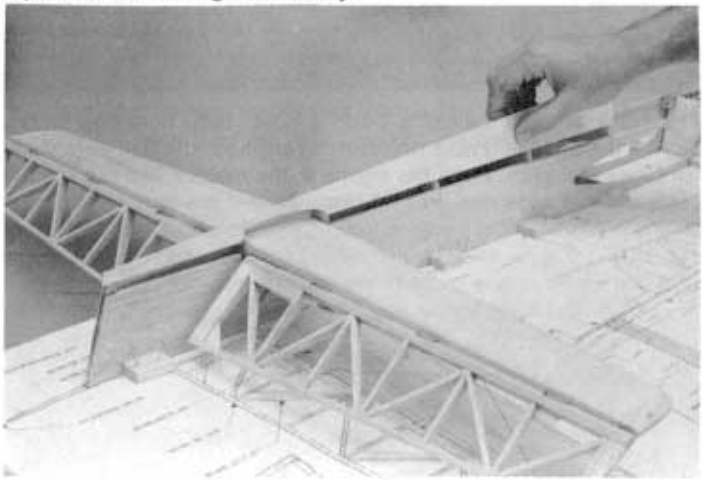
111. Glue in place the 1/8" sq. balsa turtledeck stringers. Check for proper alignment with a long straightedge.



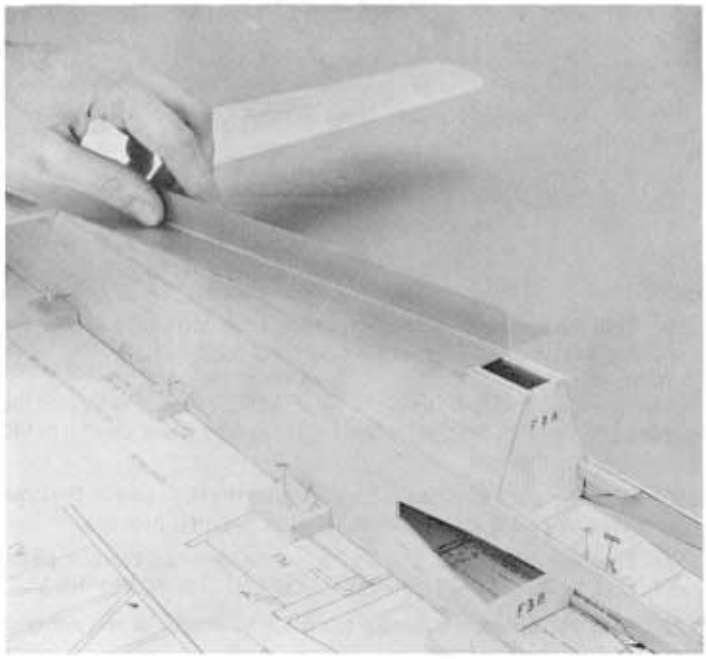
112. Use slow drying epoxy to glue the stabilizer/elevator assembly in place on the fuselage. Carefully check that the height of the stabilizer tips from the building board are equal. Also be certain that the stabilizer is perpendicular to the fuselage when viewed from above.



113. Using the pattern in the center of this book, cut both 3/32" balsa turtledeck sides from one sheet of 3/32" x 4" x 24" balsa provided. Glue in place on the fuselage and let dry.



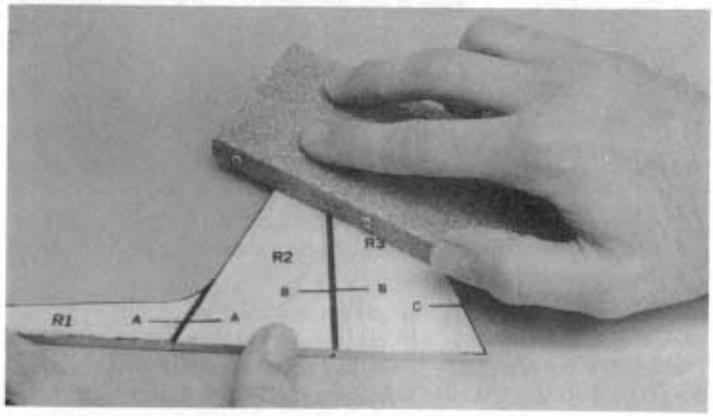
114. Sand the turtledeck sides and the 1/8" sq. stringers down to the top of the fuselage formers with a long sanding block.



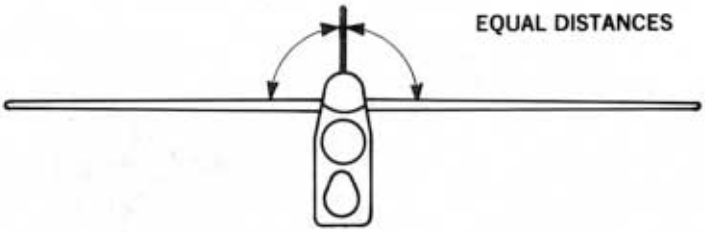
134. With cowling still taped in place, mark the locations of the four cowl hold-down screws as shown on the plan. Drill small pilot holes through the fuselage sides and plywood cowl hold-downs and install the four #2 sheet metal screws. **NOTE:** Do not over tighten the screws.

FIN AND RUDDER

135. Cut out the printed balsa fin and rudder parts R1, R2, R3 and R4. Glue R1, R2 and R3 together using the connecting key letters (A-B) for alignment. Pin down flat on building board until dry. Then sand both sides smooth with a sanding block.



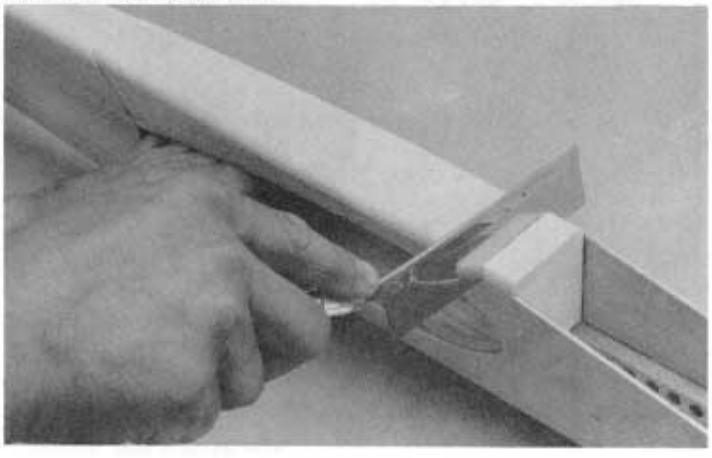
136. Glue the fin to the fuselage and align carefully. Make sure the fin is perpendicular to the stab.



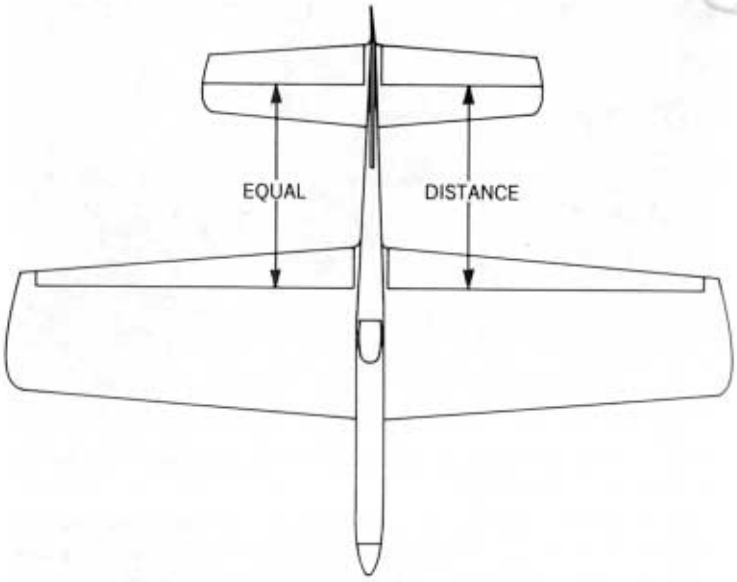
137. Taper the rudder R4 equally on both sides down to a 1/8" trailing edge. Bevel the front of R4 with a sanding block to achieve a 1/4" offset to the right and glue in place. Carefully finish sanding the fin and rudder to an airfoiled cross-section as shown on the plan.

FINAL ASSEMBLY

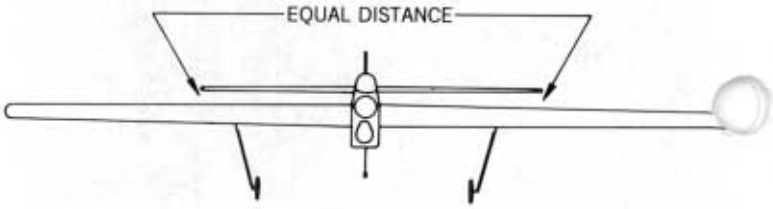
138. Using a razor saw, carefully cut through the fuselage sides and bottom block so that the entire section of the fuselage under the wing can be temporarily removed.



139. Pin the fuselage onto the wing, DO NOT GLUE, and carefully check the alignment of the wing and stabilizer. Viewed from the top, measure from the flap hinge line to the stabilizer hinge line. Both sides must have equal measurements.



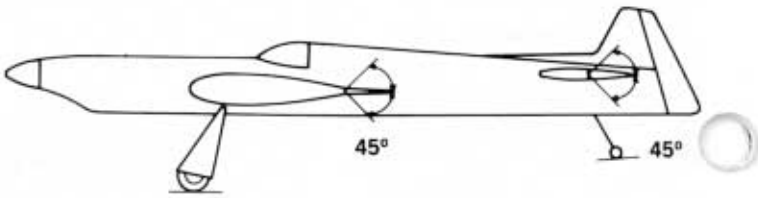
Also check the alignment of the wing and stabilizer from the front. The stab tips must be equal distance above the wing.



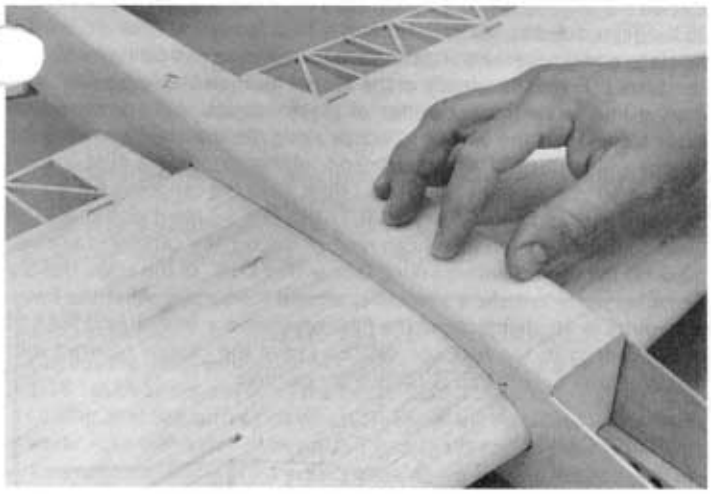
Sand the fuselage wing opening if needed to obtain proper alignment. When properly aligned, mark the exact location of the fuselage on the wing with a soft lead pencil.

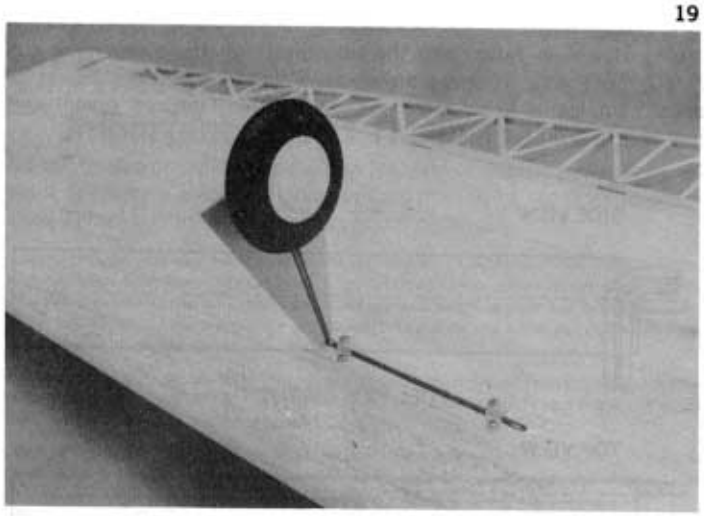
140. Glue the wing in place in the fuselage with slow drying epoxy glue. When sliding the wing in place, slip the music wire flap pushrod into the graphite shaft. Double check the alignment of the wing and stab before the epoxy dries. Let dry thoroughly.

141. Coat the 1/4" dowel pushrod plug, previously made in Step 91, with slow drying epoxy glue and slide it inside the graphite shaft to hold the wire flap pushrod. Before the glue dries, adjust the control surfaces to neutral by sliding the wire flap pushrod further in or out of the graphite shaft as necessary. Check and recheck the control surface alignment while the epoxy dries. **NOTE:** Controls should be free from any binding and have equal amounts of flap and elevator travel.



142. Epoxy the bottom of the fuselage back in place under the wing. Let dry.





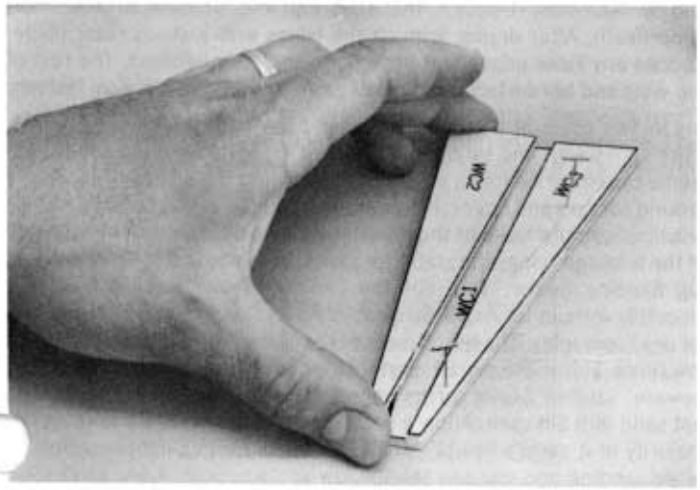
LANDING GEAR

143. Grind, file, or sand any burrs off the ends of the preformed 1/8" music wire landing gear. Insert the wires into the grooved landing gear blocks in the bottom of the wing. It may be necessary to clean out the landing gear block holes and grooves to let the wires slip in and out easily. The wires are designed to be removable - DO NOT GLUE THE WIRES INTO THE BLOCKS! Four nylon landing gear straps are supplied for holding the main gear wires in the grooved blocks. Use two straps per wire. Mark and drill pilot holes in the grooved blocks for the #2 x 1/2" screws.

144. 2-1/4" dia. wheels (not furnished) are recommended for the main gear. A 3/4" dia. wheel (not furnished) is recommended for the tailwheel. Retain the wheels on the axles with appropriate size wheel collars (not furnished) or flat metal washers soldered to the axles.

145. Test roll the model to make sure it rolls straight ahead. If adjustment is necessary, remove the landing gear from the wing, install it in a vise, and tweak the wires with a pliers.

146. Cut wheel cover parts WC1, WC2 and WC3 from the printed balsa sheet and glue the parts together. Make sure you make a right and a left wheel cover.



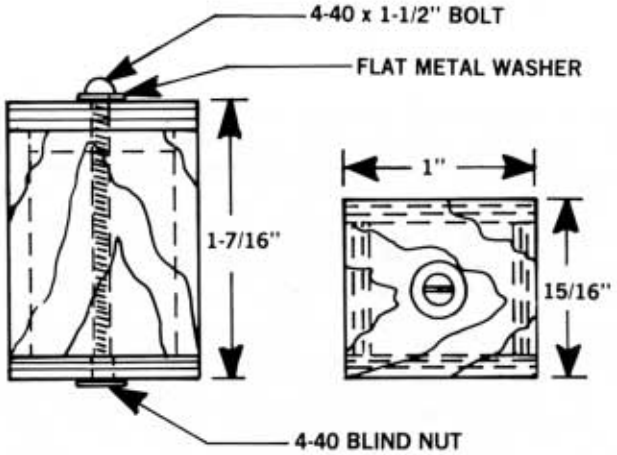
147. Carve and sand the wheel covers to proper cross-section as shown on the plan.

148. Glue the wheel covers to the landing gear wires. Make sure the wheel covers are perfectly straight, looking from the front view.

ADJUSTABLE TIP WEIGHT BOX (OPTIONAL)

149. The adjustable tip weight box allows you to dial in the exact amount of tip weight needed for your model. The prototype Magnums were flown with many different amounts of tip weight, ranging from 3/4 oz. to 2 oz. The bigger engines require more tip weight to offset the torque developed by larger diameter props. Make the tip weight box from 1/8" Lite-Ply scrap according to the drawing below.

FULL SIZE

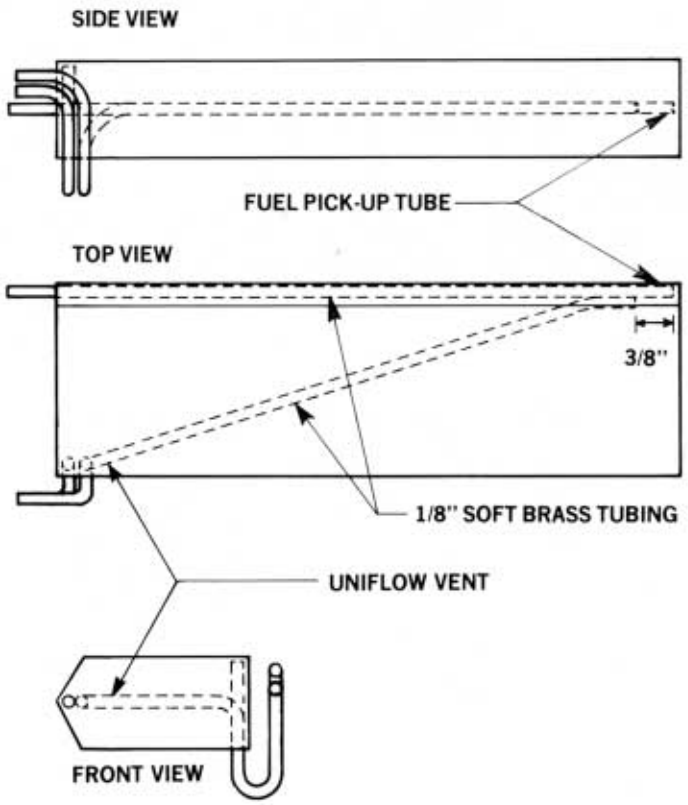


Using the location shown on the plan, place the complete tip weight box on the bottom right wing panel and trace around the outside with a soft lead pencil. Cut out the balsa sheeting and excavate the foam. Epoxy the tip weight box in place. **NOTE:** The top of the tip weight box should protrude above the wing sheeting. Allow to dry, then sand the top of the box to match the wing sheeting contour.

FUEL TANK

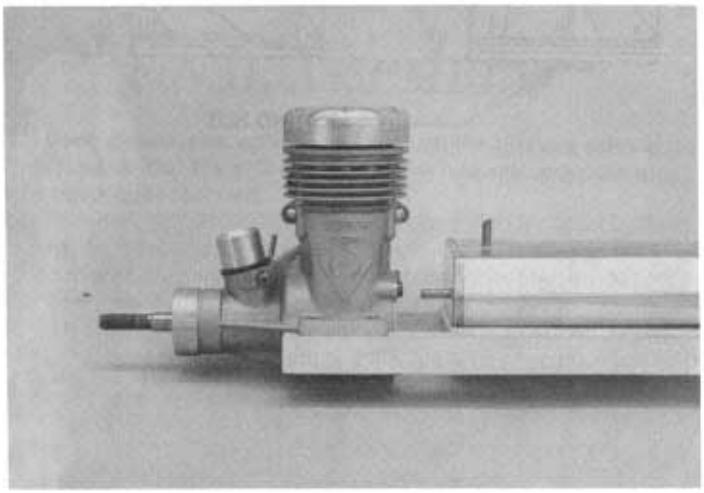
150. The appropriate size fuel tank is determined by your particular engine. The .60 size engine will burn approximately 6-1/2 oz. of fuel per flight, while the .40 and .45 engines will burn only about 5-1/2 oz.

The Uniflow Fuel Tank offers the smoothest and steadiest engine run throughout the flight. Unlike the standard fuel tank venting, the engine doesn't run leaner towards the end of the flight. If desired, revent your fuel tank as pictured below.



The fuel tank pick-up tube should always be close to the needle valve centerline. Fine tuning the engine for equal engine break on both inside and outside maneuvers is done by raising or lowering the tank from the needle valve centerline.

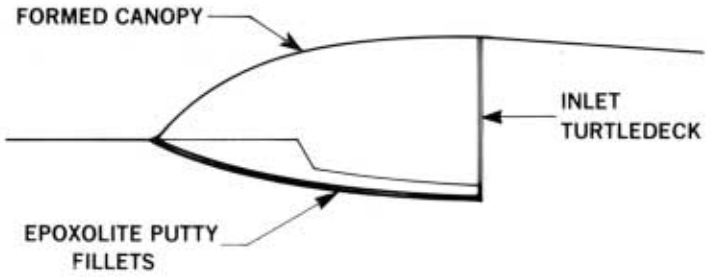
I have found that by having the needle valve centerline slightly above the fuel tank pick-up tube gives a slightly faster lap time when inverted. It gives you just a little more power on the outside maneuvers.



Install your fuel tank by first determining tank height and the location of the fuel pick-up tube. Drill a 1/8" dia. hole in fuselage former F1 for the fuel pick-up tube to pass through. Glue two scrap pieces of plywood across the top of the tank against the plywood doublers to hold the tank in place. These pieces of plywood can be broken out to remove the fuel tank if necessary.

CANOPY

151. Trim out the molded canopy with a scissors. Trial fit on the fuselage and if necessary, lightly sand the edges of the canopy with sandpaper. Place the canopy in the proper location on the fuselage and draw a line along the back edge of the canopy. Using a single-edged razor blade, inlet the balsa turtledeck along the drawn line so that the canopy will be flush. Paint the cockpit interior and add a pilot, instrument panel and other details at that time. Glue the canopy in place with Sig-Ment glue and allow to dry. **(CAUTION:** The Sig-Ment glue should be used sparingly, as too much can melt or distort the canopy.) Carefully mask off the canopy with masking tape within 1/16" of the edge. Use Sig Epoxolite putty to make a small fillet around the canopy. After the Epoxolite putty is dry, lightly sand the fillet to achieve a smooth and flush fit of the canopy to the fuselage. **NOTE:** Leave the canopy covered with masking tape until model is completely painted.



FINISHING

All of our prototype Magnums were covered with Silkspan and painted with Sig Supercoat and Sig Lite-Coat dope (see Sig Catalog). An iron-on covering material (either plastic or fabric) that doesn't require painting could also be used. Whatever type of covering you desire to use, it will not conceal a rough framework. Be sure all surfaces are smooth before proceeding. The manufacturer's directions for applying iron-on coverings are packed with the material. Follow these closely as different types of materials have different techniques of application.

The entire model should be sanded completely smooth with 200 grit Tri-M-Ite fre-cut finishing paper (see Sig Catalog). Brush three coats of Sig Lite-Coat clear low shrink dope to the entire model. Lightly sand between each coat with 220 grit Tri-M-Ite finishing paper. The bottom of the wing is a good place to start. Cut a piece of silkspan 1" larger than the area to be covered. Wet the silkspan with water, (a spray bottle works best) and apply. Work around the edges, pulling out wrinkles and stretching it smooth. Brush around the edges with thinned clear dope and it will soak through the covering and adhere to the dope underneath. After drying, trim off the edges with a sharp razor blade. Redope any loose edges that have not completely adhered. The rest of the wing and tail surfaces and fuselage are covered in identical fashion.

Brush two coats of Sig Lite-Coat clear dope onto the covered model. Sand lightly with fine sandpaper (220 grit Tri-M-Ite finishing paper). Extreme care must be taken so as not to sand into the Silkspan, especially around corners and edges. Fillets are to be added at this time. Fillets not only improve the looks of the model, they greatly increase the strength of the fuselage, wing, and stabilizer joints. Brush on one to three coats of Sig Sanding Sealer. Thin out the Sanding Sealer until it flows out smoothly without leaving brush marks. Apply the first coat of sealer and let dry thoroughly. Then sand most of the sealer away, letting it fill in the low spots. This is the most important step in obtaining a good finish. But beware, Sanding Sealer builds up weight fast. Sand thoroughly, but do not sand into Silkspan. Apply a second coat of sealer, again sanding the majority of it away when dry. Hold the model up to a light occasionally while sanding and you can see the low spots appear. If you can't sand these low spots away without sanding into the silkspan, then you need a third coat of sanding sealer. After the last coat of sealer is sanded, polish sand the model with 360 grit Tri-M-Ite finishing paper or use 400 grit wet-or-dry sandpaper to take out any deep scratches made by the 220 grit paper.

Brush or spray on one thinned coat of Sig Lite-Coat clear dope to seal off the filler coat and start a gloss build up. Then brush or spray on your "base color" coats. If you have done a good job of preparing the surface, two coats of base color should give good coverage. Mask out model and d desired trim colors and scheme. After all trim color dope is applied (but not decals), spray two to four coats of Sig Lite-Coat dope over the entire model. The clear top coats not only add gloss to your model, they also help protect your finish as well.

The Magnum on the box label was painted with Sig Supercoat color dope. The overall color was powder blue made by mixing Supercoat White with a small amount of Miami Blue. The trim colors were Sig Supercoat White, Miami Blue, and Light Red.

DECALS STIK-TITE PRESSURE SENSITIVE

Cut out the decal with a pair of sharp scissors. Leave about 1/32" to 1/16" of clear edge around the decal. Round the corners as you are cutting. Wet the surface on which the decal will be placed with soapy water (use dishwater detergent). Place the decal on the model and squeegee the water from underneath with a balsa paddle. Allow to dry. This procedure will prevent air from being trapped underneath as is possible when the decals are applied dry.

Numbers 0 through 9 are available which match the Magnum decal. You may have to purchase more than one sheet to make your particular AMA number. Order decal sheet DKM-024A.

BALANCING

The Magnum should balance 3-5/8" from leading edge of the wing at the fuselage. It is actually a personal preference exactly where the C.G. should be. A more rearward C.G. will make the model more sensitive to control movements and less stable. A forward C.G. will make it more stable and less sensitive. Each flyer has a different point at which a model will have the blend of maneuverability and stability to suit him. In no case should you attempt the first flight with the C.G. farther than 3-3/4" back from the wing leading edge at fuselage.

FLYING

The trimming process on any competitive stunter requires many flights. Making slight changes to the wing tip weight, nose weight, line rake, line length, props and fuel. The control handle is also a very critical part of the trimming process. By widening or narrowing the line spacing, you can change the model's characteristics completely. Work slowly and make only one adjustment per flight. Here are some suggested starting points:

LINES & LENGTHS

.40 to .60 cu. in. engines require .018 multi-strand lines with lengths that are between 65' and 70' depending on personal preference. I personally like to make my lines 65' from eyelet to eyelet for calm weather flying and shorten them by 3' in windy conditions.

.40 cu. in. engines can use .015 multi-strand lines with a length of 62' to 64' eyelet to eyelet.

ADJUSTABLE LEADOUTS

Start out with the leadout wires positioned at the location shown on the plan. Minor adjustments may be necessary for your particular model. Do not move the leadout guide more than 1/8' at a time.

ADJUSTABLE TIP WEIGHT BOX

During the first few test flights, use no less than four lead weights. Stuff the excess area in the weight box with foam rubber to prevent the lead weights from moving.

For additional information on flight trimming, refer to Ted Fancher's column, "Controline Aerobatics", published in Model Aviation issues May of 1985 through October, 1985.

WARNING — DANGER!

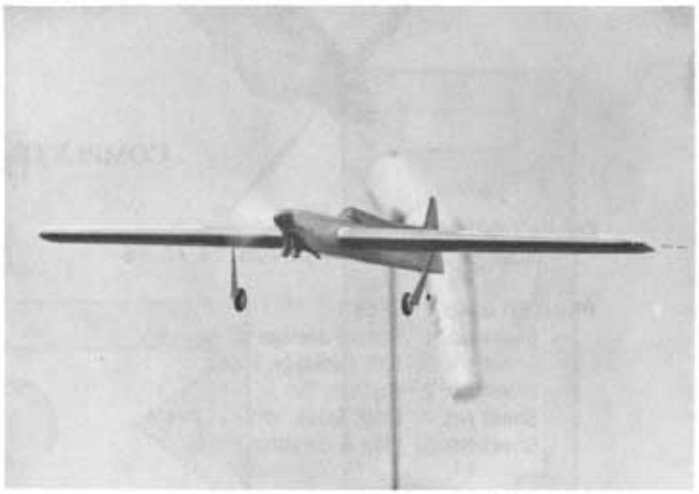
Important: Read These Warnings:

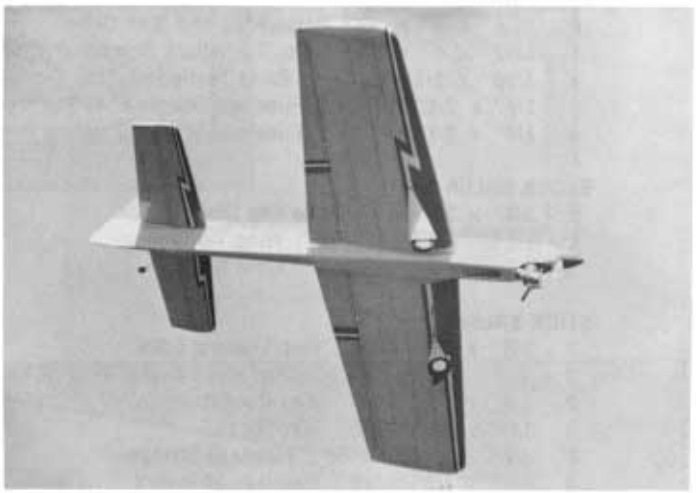
Do not fly this model airplane within 300 feet of electric power lines. Instant death from electrocution can result from flying too close to power lines. Direct contact with the lines is not necessary.

A model airplane gets very hot and can cause serious burns. Do not touch the motor during or after operation. Keep clear of the propeller. It can cut off a finger or put out an eye. Make sure the propeller is securely fastened in place and is not cracked. Model airplane fuel is flammable and poisonous. Take the same precautions while transporting and using it that you would with a can of gasoline or a bottle of poison.

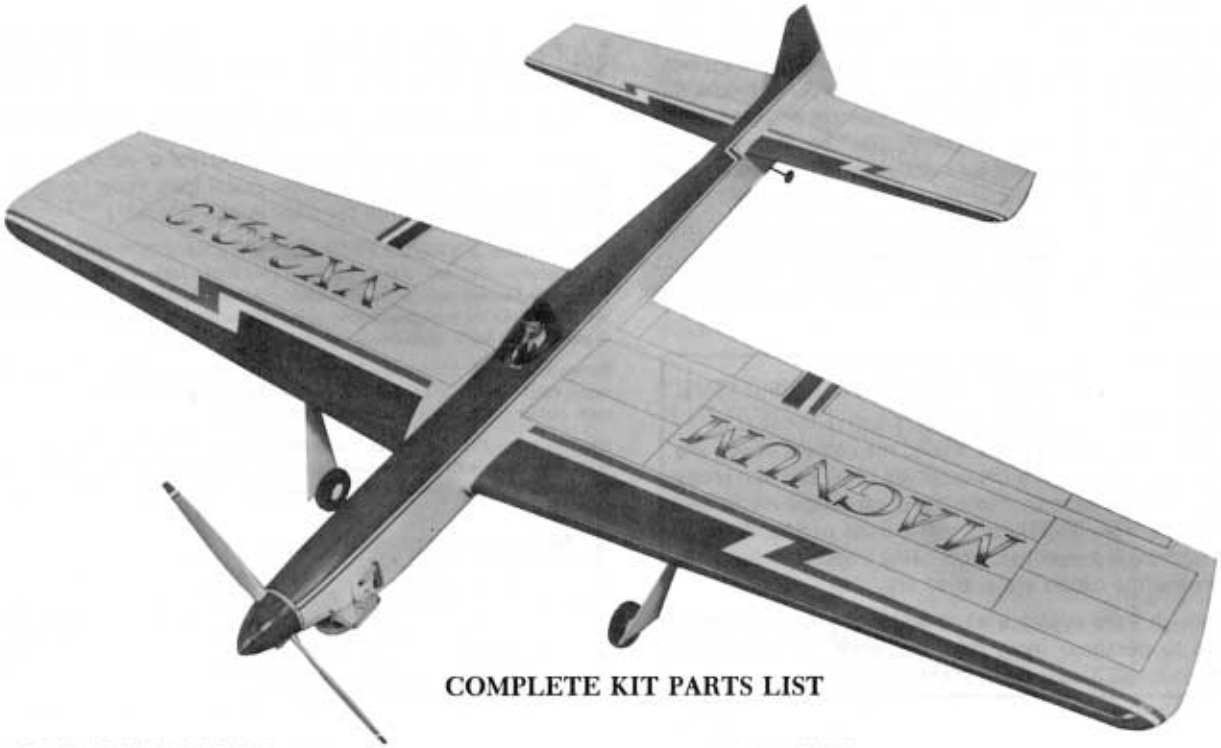
Remember that it is possible to lose control of a model airplane. Do not fly in locations where the model may hit people or damage property if loss of control occurs. Check your model and equipment regularly to insure it is safe operating condition.

LIMIT OF LIABILITY: 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.





MAGNUM IS PRO STUNT



COMPLETE KIT PARTS LIST

DIE-CUT BALSA SHEETS
1 - 3/32" x 3" x 15"; F3A, F3B, F4, F5, F6

PRINTED BALSA SHEETS
1 - Sheet No. 1; Right Fuselage Side
1 - Sheet No. 3; Left Fuselage Side
1 - Sheet No. 2; Rudder, Fin
1 - Sheet No. 4; Cowl Sides, Wheel Covers
1 - Sheet No. 5; Flap & Elevator Fill-In

SHEET BALSA
16 - 1/16" x 3" x 30"; Balsa Wing and Stab Skins
1 - 3/32" x 4" x 24"; Balsa Turtledeck Sides
1 - 3/16" x 1-1/4" x 24"; Balsa Turtledeck Top
1 - 1/4" x 2-1/2" x 18"; Fuselage Bottom Sheeting Front
1 - 1/4" x 2-1/2" x 24"; Fuselage Bottom Sheeting Rear

BLOCK BALSA
1 - 3/4" x 3" x 18"; Nose Top Block
1 - 1-1/2" x 1-3/4" x 10"; Wing Tip Blocks
1 - 1-1/2" x 2-3/16" x 3"; Cowl Block

STICK BALSA
2 - 3/8" x 3/8" x 26"; Flap Leading Edge
3 - 3/16" x 3/16" x 26"; Flap and Elevator Trailing Edge
2 - 1/8" x 1/2" x 30"; Elevator Ribs
3 - 1/8" x 3/8" x 36"; Flap Ribs
1 - 3/16" x 3/16" x 36"; Fuselage Stringer
2 - 1/8" x 1/8" x 26"; Fuselage Stringers
2 - 1/8" x 1/8" x 18"; Fuselage Turtledeck Stingers
2 - 3/8" x 5/8" x 30"; Trailing Edges (Wing)
2 - 1/4" x 1" x 30"; Leading Edges (Wing)
1 - 3/16" x 3/4" x 30"; Trailing Edge (Stab)
1 - 3/16" x 3/8" x 30"; Leading Edge (Stab)
1 - 1/16" x 1/4" x 18"; Fuselage Reinforcement
1 - 1/2" x 1/2" x 6"; Elevator Fill-in
1 - 1/2" Triangle Stock (For Cowl)

SPECIAL SHAPED BALSA
2 - 1/2" Sq. Tapering to 3/8" Sq.; Elevator Leading Edges

DIE-CUT PLYWOOD
See "Key to Die-Cut Plywood Parts" Page

HARD WOODS
2 - 3/8" x 1/2" x 9"; Maple Motor Mounts
1 - 1/4" x 3"; Hardwood Dowel
2 - 5/16" x 5/8" x 5"; Grooved Landing Gear Blocks
2 - 5/16" x 5/8" x 1"; Basswood L.G. Anchor Blocks
1 x 5/16" x 5/8" x 1"; Grooved Anchor Blocks

MUSIC WIRE
2 - 1/8" Dia. Formed Mail L.G.
1 - 1/16" Formed Tailwheel
1 - 3/32" Dia. x 3-1/2"; Formed Flap Pushrod
1 - 3/32" Dia. x 2-3/4"; Formed Elevator Pushrod
1 - 3/32" Dia. Formed Bellcrank Pushrod
2 - 3/32" Dia. Control Horns

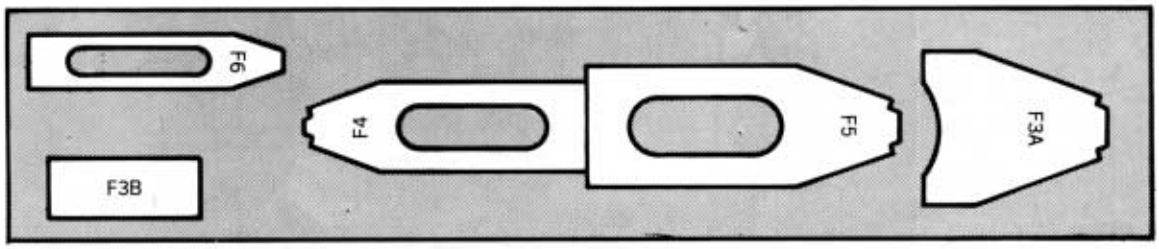
PLASTIC
1 - .030 Clean Molded Canopy

HARDWARE
1 - 15" Graphite Shaft
1 - 7' of .027" Leadout Cable
14 - Molded X Hinges with Pins
1 - 6/32" dia. x 3" Threaded Rod
4 - 6/32" Hex Nuts
1 - 3' Roll Copper Wire
5 - 4-40 Blind Nuts
12 - #2 x 1/2" Sheet Metal Screws
4 - Nylon L.G. Retaining Straps
4 - 4-40 x 1" Socket Head Bolts
4 - #6 Flat Metal Washers
1 - .005 x 3/8" x 6" Brass Shim Stock
6 - 1/4 oz. Lead Weights
2 - 3/32" I.D. Brass Eyelets
1 - 4-40 x 3/8" Socket Head Bolt
6 - #2 Flat Washers
1 - 3" Sig Bellcrank

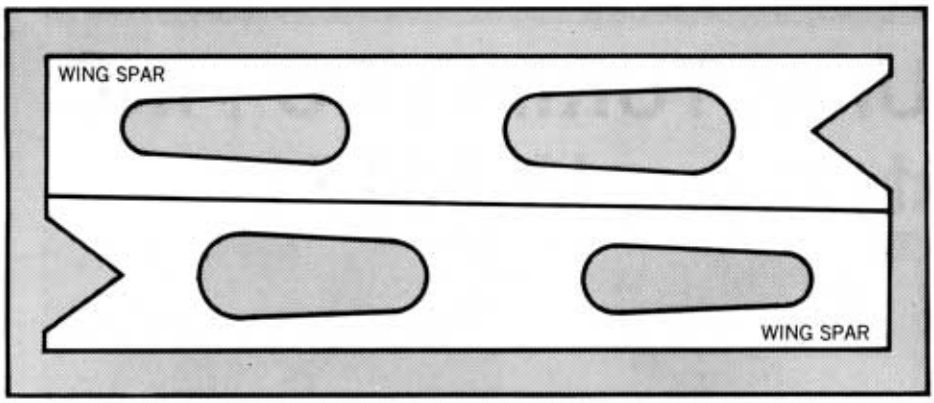
MISCELLANEOUS
1 - Plan
1 - Instruction Book
1 - 1" x 24" Fiberglass Tape
1 - Cored Foam Wing
1 - Foam Stab
1 - Magnum Decal

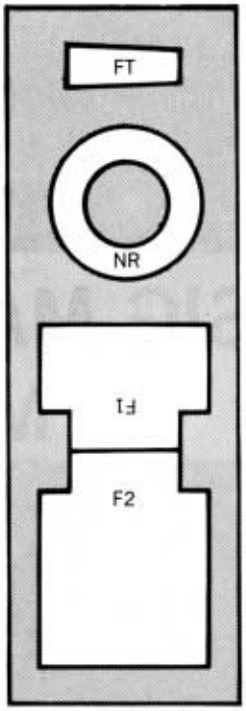
"KEY TO DIE-CUT BALSA WOOD PARTS"

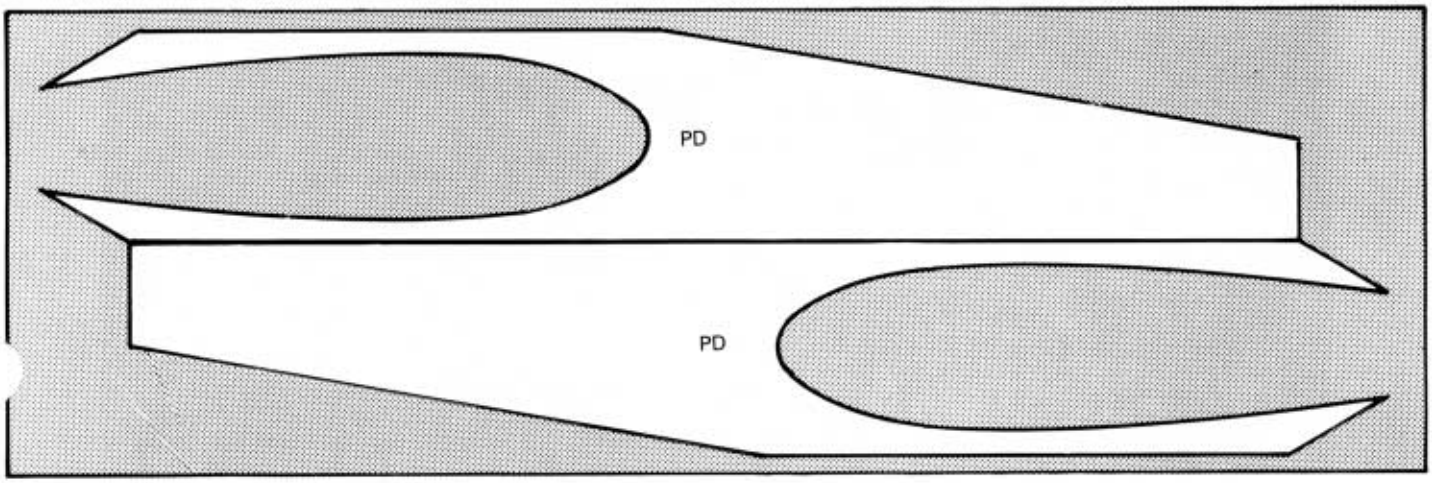
MARK PARTS IN KIT
ACCORDING TO THESE DIAGRAMS

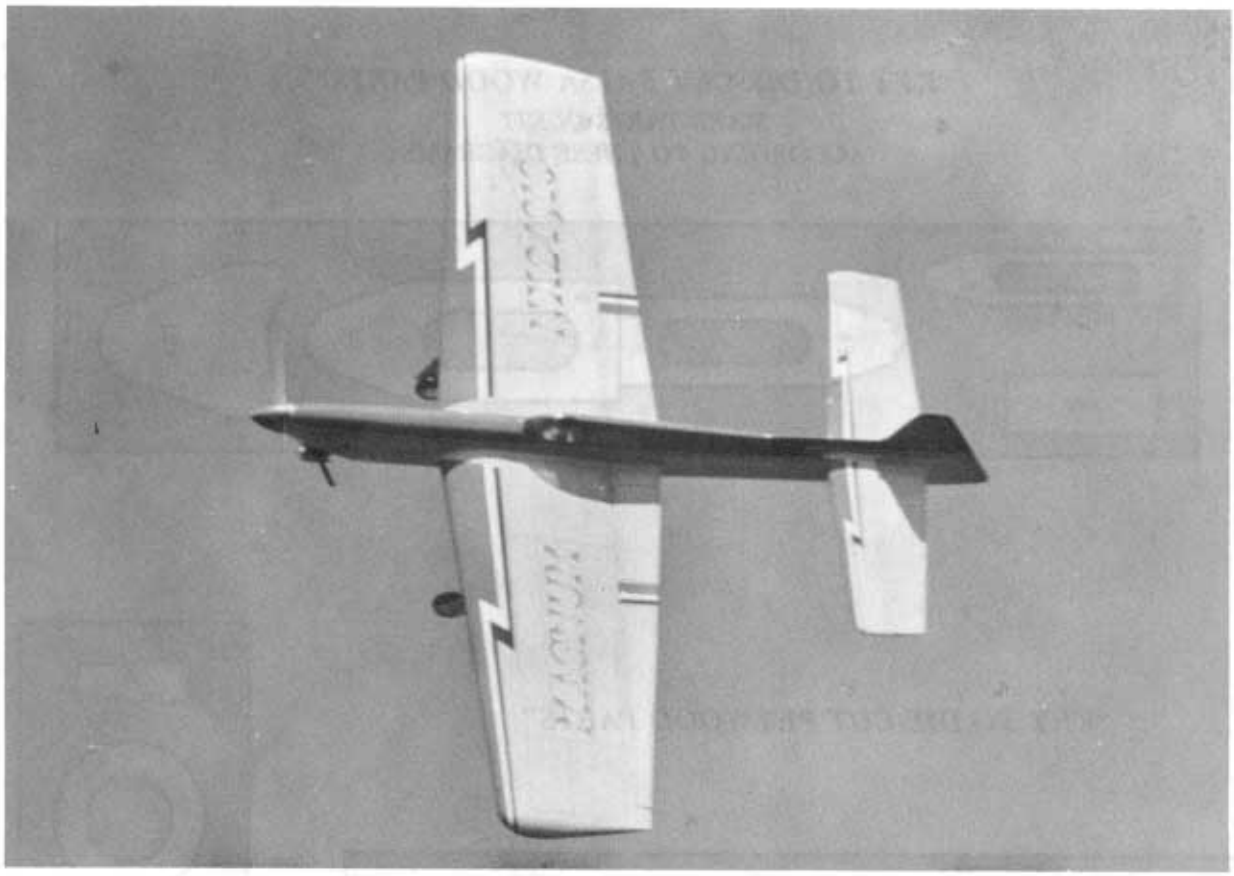


"KEY TO DIE-CUT PLYWOOD PARTS"









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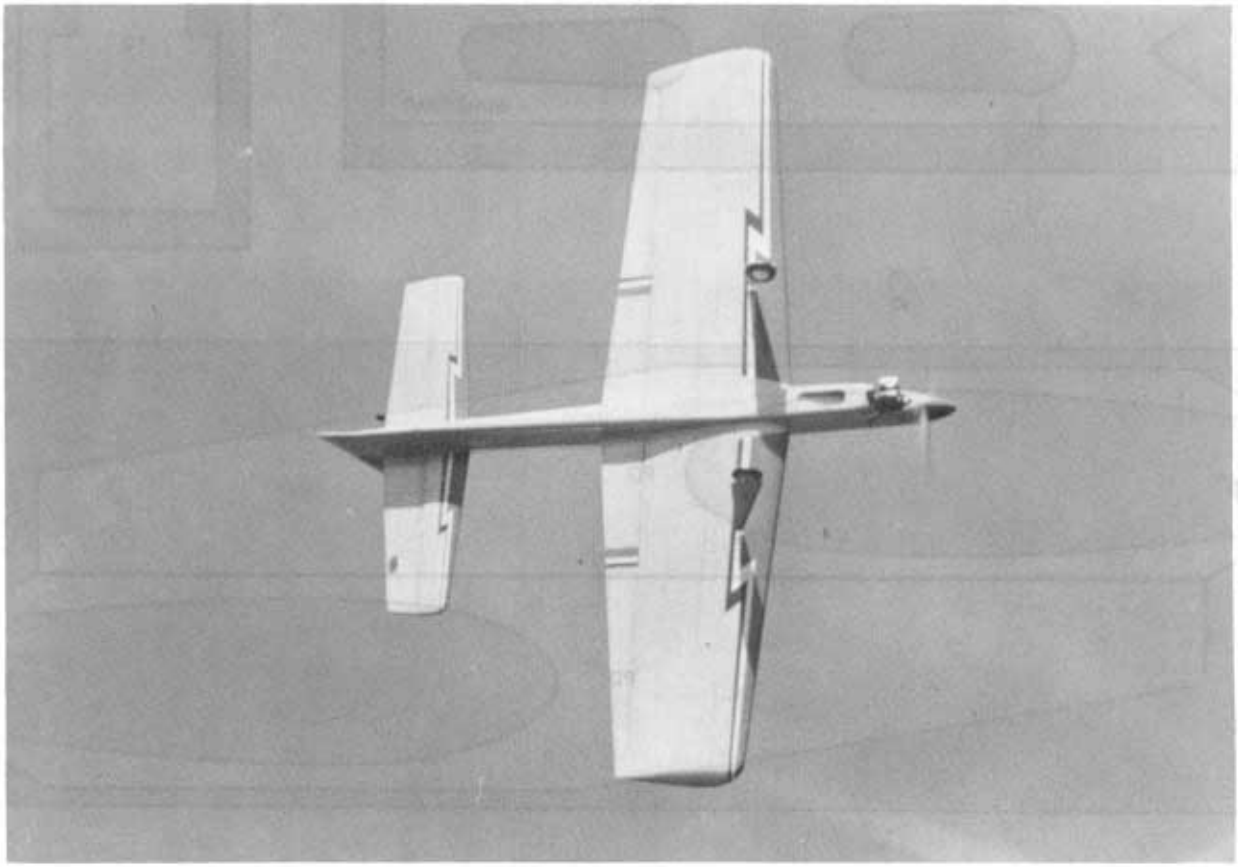

MAGNUM

UPDATE

The 3" bellcrank and the 3/32" control horns that are shown on the plans and in the instruction book have been replaced by the new SIG 4" bellcrank and heavy duty control horns. The new SIG 4" bellcrank has the pushrod drive arm located on the inside of the inboard wing. This changes the up line from the rear leadout to the front leadout. Use the drawing below to properly position the bellcrank in the wing and mount as described in the instruction book.

The new flap and elevator control horns are heavy duty units with dual uprights and are already bushed for the flap and elevator pushrods. The flap horn is made with 1/8" music wire and the elevator horn with 3/32" music wire. Again, mount the control horns as described in the instruction book.

This combination of the 4" bellcrank and the taller control horns slows down the movement of the flaps and elevators and limits the amount of control deflection to 30° up and down. The C.G.(center of gravity) can now be moved rearward slightly to take advantage of the slow control system. Balance the model at 3-3/4" from the leading edge of the wing at the fuselage.