

Sportster Bipe 40

Instruction Manual

Engine size	.35- .45
Wingspan	45 1/2"
Wing Area	716 sq. in.
Length	41 1/2"
Weight	5-6 1/2lbs.



Materials Needed to Complete the Sportster:

4 Channel radio	Propeller	Fuel tank
Engine	Wheel collars	Spinner
Fiberglass cloth/resin	Wheels	Covering
Engine mounting bolts	Hinges	Instant glue
Pushrods/clevises	Wing bolts	EPOXY

The Sportster Bipe 40 was designed for sport flying. This biplane design with symmetrical wings provides full aerobatic maneuverability, yet has enough wing area for docile low speed capability.

The parts are machine cut and sanded for accurate fit. Should you notice a difference in size between plans and parts, it is usually because paper changes size with moisture.

Different types of glue may be used such as epoxy, cyanoacrylate (instant glue) and aliphatic resin (white glue). Build on a flat surface for straight wings and fuselage.

Please read through this step-by-step instruction manual before you start building so you will have an overall idea of the construction steps and to avoid mistakes. Use the plan and parts list to identify the various parts.

WARNING!

This R/C kit and the model you will build is not a toy! It is capable of serious bodily harm and property damage. **IT IS YOUR RESPONSIBILITY AND YOURS ALONE** — to build this kit correctly, properly install all R/C components and flying gear (engine, tank, pushrods, etc.) and to test the model and fly it *only* with experienced, competent help in accordance with all safety standards and common sense as set down in the Academy of Model Aeronautics Safety Code. It is suggested that you join the AMA and become properly insured before you attempt to fly this model. **IF YOU ARE JUST STARTING R/C MODELING, CONSULT YOUR LOCAL HOBBY SHOP OR WRITE TO THE ACADEMY OF MODEL AERONAUTICS TO FIND AN EXPERIENCED INSTRUCTOR IN YOUR AREA.**

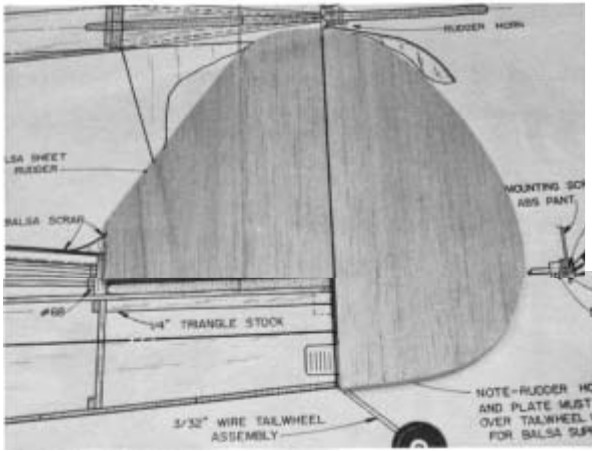
Academy of Model Aeronautics
1810 Samuel Morse Dr.
Reston, VA 22090
(703) 435-0750



BUILDING THE TAIL SECTION

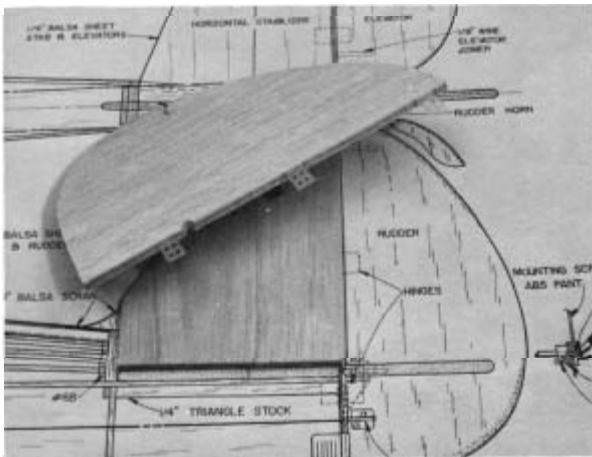
1. PREPARE THE FIN AND RUDDER

Sand the forward and rear sections of the fin if necessary for a good fit. Working over the plans, glue the fin section pieces together. Sand both sides of the rudder.



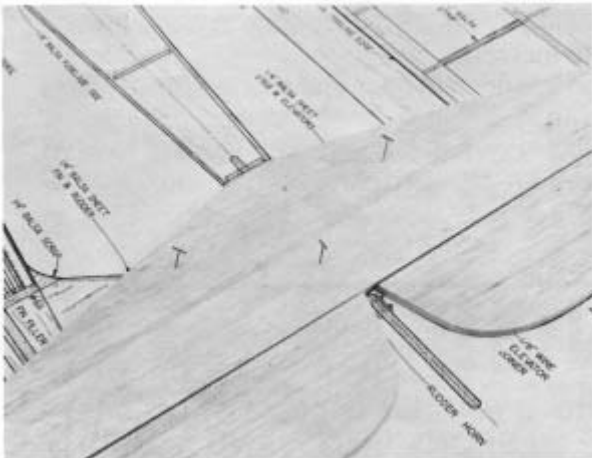
2. CUT THE HINGE SLOTS IN THE FIN AND RUDDER; CUT OUT RUDDER FOR JOINER CLEARANCE

Draw centerlines down the trailing edge of the fin and the leading edge of the rudder. Mark and cut the hinge slots. Two hinges are used above the stabilizer. The third hinge should be just below the stab and above the tail wheel strut tab. Cut out part of the rudder leading edge for elevator joiner wire clearance. Wait to shape the leading edge until the hole is drilled for the tail wheel tiller arm later.



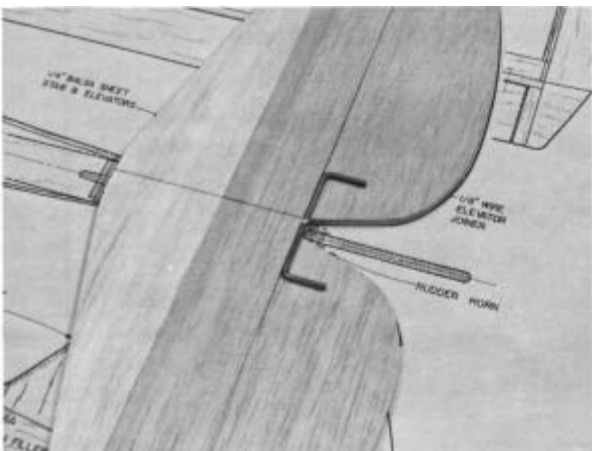
3. GLUE STAB PARTS TOGETHER; SAND THE STAB AND ELEVATORS

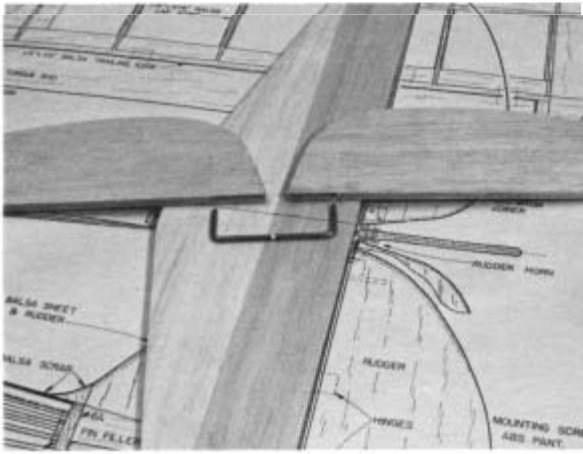
Check the fit and sand the forward and rear parts of the stab so they fit together well. Glue them together. Sand both sides of the stab and elevator halves.



4. DRILL HOLES IN THE ELEVATOR HALVES FOR ELEVATOR JOINER WIRE

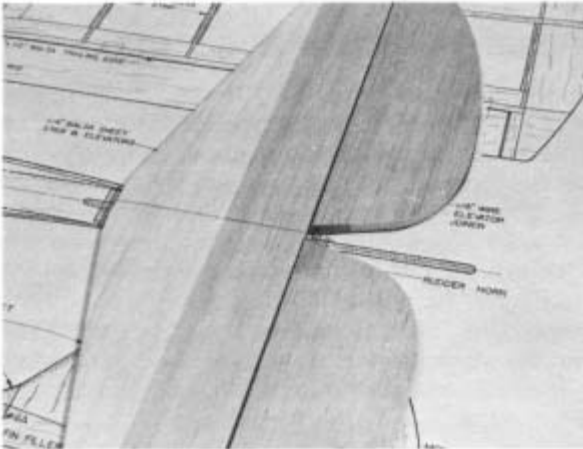
Draw a front to back centerline down the top side of the stab and a centerline down the leading edges of the elevator halves. Mark the center of the elevator joiner wire. Align the stab, elevator and joiner wire and mark the hole locations for the joiner wire arms on the centerline of the elevator leading edge. Drill the holes.





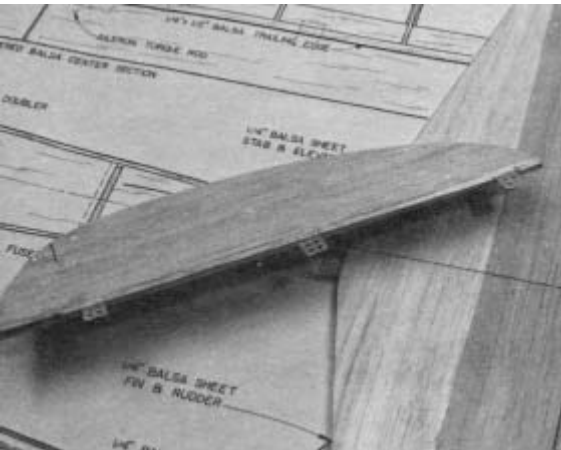
5. GROOVE OUT THE ELEVATORS FOR JOINER WIRE CLEARANCE

Cut a groove in the elevator leading edge inside of the hole so when the joiner wire is installed it will be flush with the leading edge of the elevator. Do both elevator halves.



6. TRIAL FIT THE JOINER WIRE

Temporarily install the elevator joiner wire into the elevator halves. Check to make sure that this assembly is aligned properly. Bend the joiner arms if necessary for a perfect fit. **DO NOT GLUE THE JOINER WIRE TO THE ELEVATOR HALVES UNTIL AFTER THE PIECES ARE COVERED LATER.**



7. CUT HINGE SLOTS FOR THE STAB AND ELEVATOR

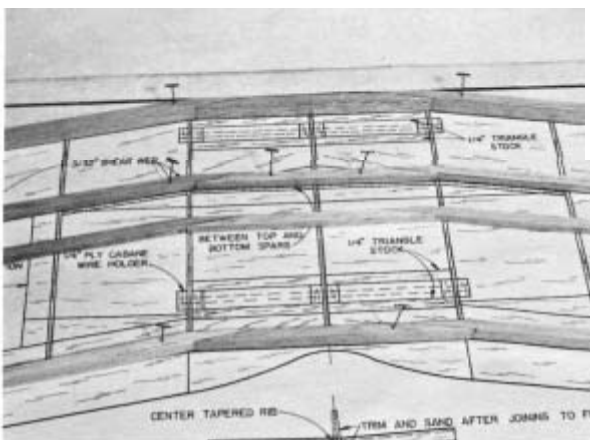
Mark and cut the hinge slots for the stab and elevator halves as you did with the fin and rudder. See the plans for locations. Shape the leading edges of the elevator halves to a ∇ .

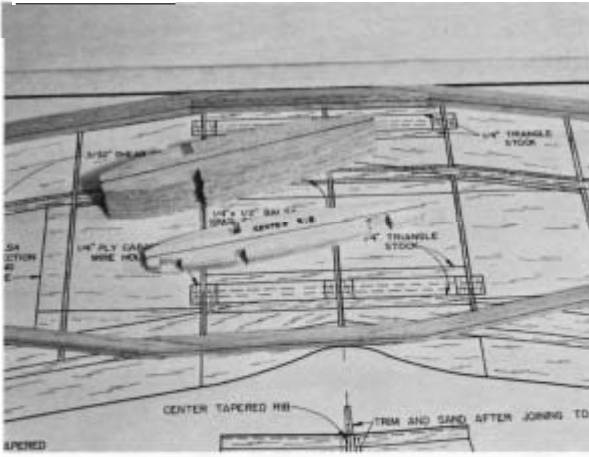
READ THIS FIRST BEFORE YOU START BUILDING THE WING PANELS: It is very important that you build straight wings with no warps or twists or you will get some flying characteristics you didn't expect! Be very careful when you align the ribs, spars, leading edges, trailing edges and sheeting at the various steps below. All these parts should be in their correct positions before you glue them in place. Hold or pin the parts in place, then glue. Use the following instructions to help you build the wing straight and warp free.

Remember: Anyone can build a wing. Only a careful builder can build a straight wing.

BUILDING THE TOP WING

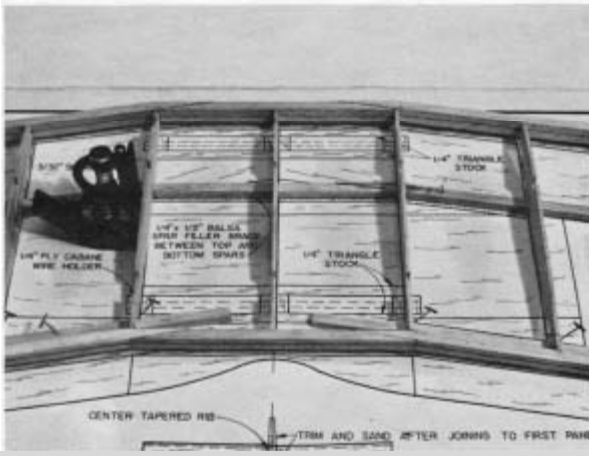
- Start the top wing by building two spars from 1/4 x 1/4 x 24 balsa, a leading edge from 1/4 x 1/2 x 24 balsa and a trailing edge from 1/4 x 1/4 x 24 balsa. Use waxed paper on the plan. Cut the parts, fit them together and then glue over the plan. The top wing is built in one piece. You will build the top wing upside down at first. Use epoxy when you glue these pieces together in this step.





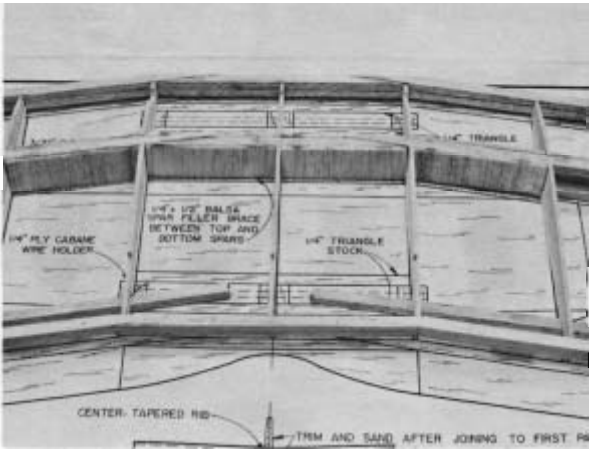
2. □ PREPARE THE RIBS

Draw a rib alignment line down the center of each top wing rib. Note that the three center ribs have 2 extra notches for the cabane mounting plate. Draw rib alignment centerlines down the back of the leading edge and the front of the trailing edge.



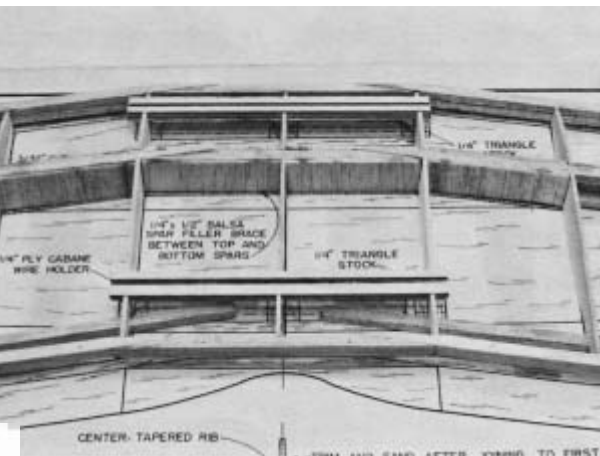
3. □ ALIGN AND GLUE RIBS, LEADING EDGE AND TRAILING EDGE TO TOP SPAR

Pin the top spar (the wing will be built (upside down) over the waxed paper covered plan. Place the ribs on the spar. Align the ribs at the positions shown on the plans. Make sure that the three center ribs have the cabane notches "up" as shown. Shim up the trailing edges of the ribs with the extra 1/4 x 1/4 x 24 spars, making sure the centerlines you drew on the ribs are parallel to the building board. When the ribs are aligned correctly, and at 90 degrees to the building board, glue the ribs to the spar. Line up the lines on the ribs with the line on the leading edge. Glue the ribs to the leading edge. Line up the trailing edge line to the rib lines and glue the ribs to the trailing edge.



4. □ GLUE IN SPAR FILLER BRACE, BOTTOM SPAR AND SHEAR WEB

Cut out the area between the spar notches on the two end center ribs for the 1/4 x 9/16 balsa spar filler brace. Glue in the 1/4 x 9/16 filler brace pieces from the center rib out past the spar scarf joint on both sides of the center rib. Glue in the bottom spar. Now cut shear web pieces from 3/32 x 3 x 24 balsa to fit between the spars at the rib bays shown on the plan. The wing should still be shimmed up with the extra spars throughout the building process. Use epoxy in this step.



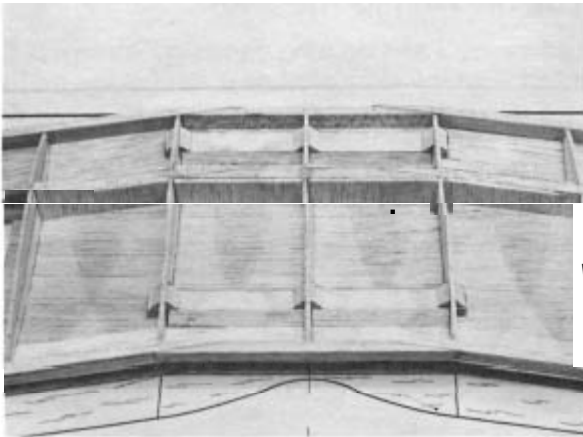
5. □ ADD THE CABANE HOLDERS

Glue in the two plywood 1/4 x 1/2 x 6 1/2 cabane wire holders with epoxy into the slots in the three center ribs. Make sure the cabane holders are flush with the top edges of the ribs.



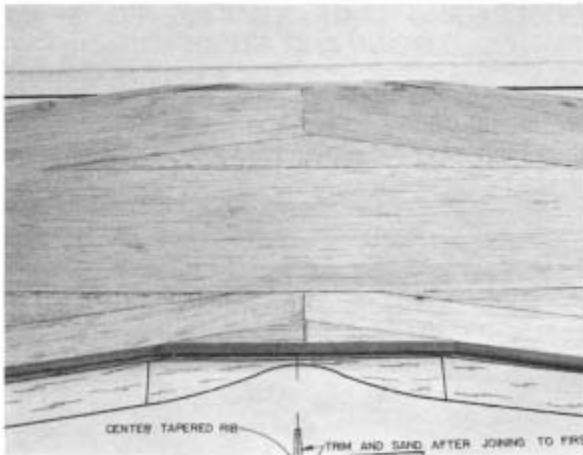
6. ADD THE SHEETING AND CAP STRIPS

Cut the sheeting to fit first then glue in place. Glue on the 1/16 x 2-1/8 x 24 leading edge sheeting, the 1/16 x 7/8 x 24 trailing edge sheeting and the 1/16 x 3 x 15 center section sheeting. Do not glue the sheeting to the cabane holders as you will cut away this sheeting later. Cut cap strips from 1/16 x 3/16 x 36 balsa and glue them in place over the rib edges.



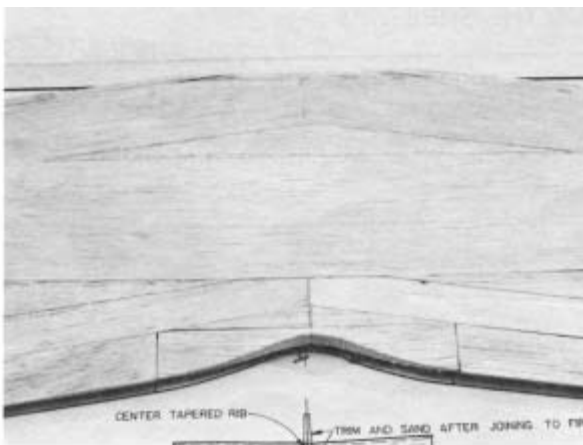
7. ADD 1/4 TRI STOCK BRACES

After the glue is dry, turn the wing over and pin it down to the building board. Use 1/4 x 36 triangle stock and cut pieces to fit along the length of the cabane holders as shown on the plan. Glue this 1/4 tri to the sheeting and to the cabane holder. Also cut tri stock to fit on either side of the three center ribs on top of the cabane holders. Glue these braces in place.



8. ADD THE REST OF THE SHEETING

Glue on the 1/16 x 2-1/8 x 24 leading edge sheeting, the 1/16 x 7/8 x 24 trailing edge sheeting and the 1/16 x 3 x 15 center section sheeting. Glue on the 1/16 x 3/16 cap strips.



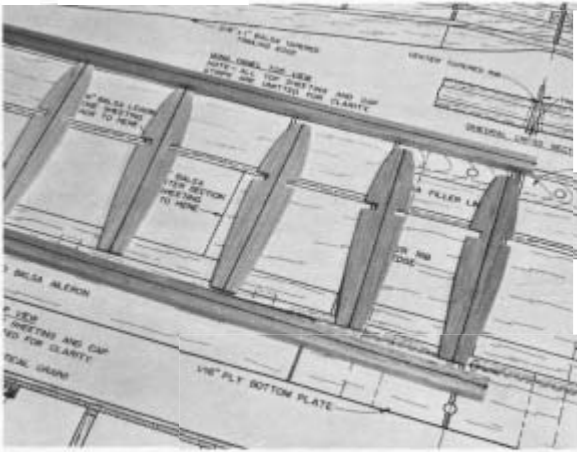
9. ADD THE TRAILING EDGE

Add the tapered 3/8 x 1 x 24 balsa trailing edge stock and the 3/8 x 1 x 6 tapered center trailing edge piece. Cut parts to fit first and then glue them in place. Now cut the curve in the center trailing edge as shown on the plan and in the photo.

BUILDING THE BOTTOM WING

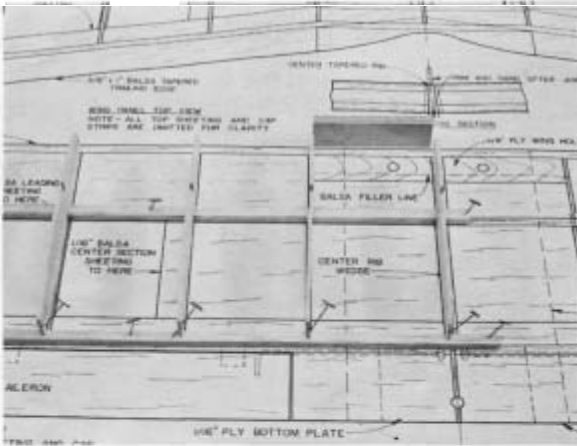
1. PREPARE WING RIBS

Mark all bottom wing ribs with a rib alignment centerline. Also draw centerlines down the 1/4 x 1/2 x 24 leading edge and the 1/4 x 1/2 x 24 trailing edge pieces. There is no top or bottom to the bottom wing at this point.



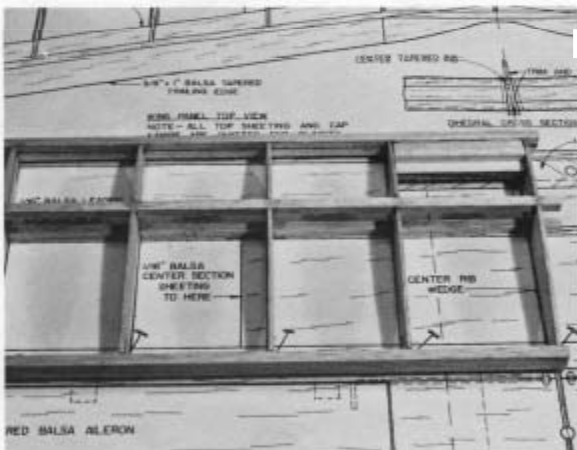
2. GLUE THE RIBS TO THE SPAR

Build the right and left wing panels separately. Build the left panel first. Use the extra spar as a shim at the trailing edge as you did with the top wing. Pin the bottom spar over the plans. Align the ribs to the spar, shim up the trailing edges of the ribs and glue the ribs to the spar. Use the 1/4 x 7/8 x 3 wing hold down block as a spacer for location of ribs #1 and #2. (Note: These hold downs are the same size as the ones that glue into the fuselage later.) Do not glue the hold down block in place yet.



3. ADD LEADING EDGE, TRAILING EDGE, TOP SPAR, HOLD DOWN AND FILLER

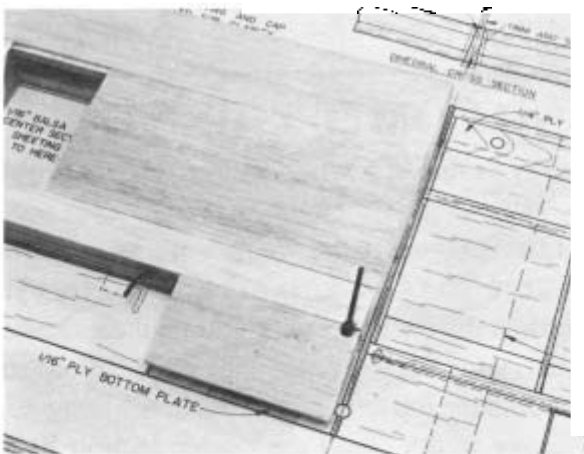
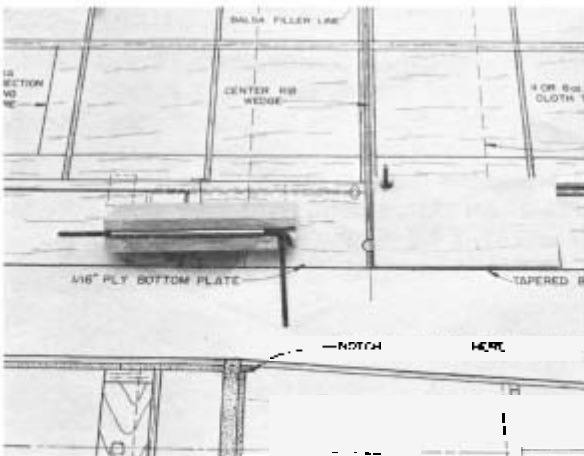
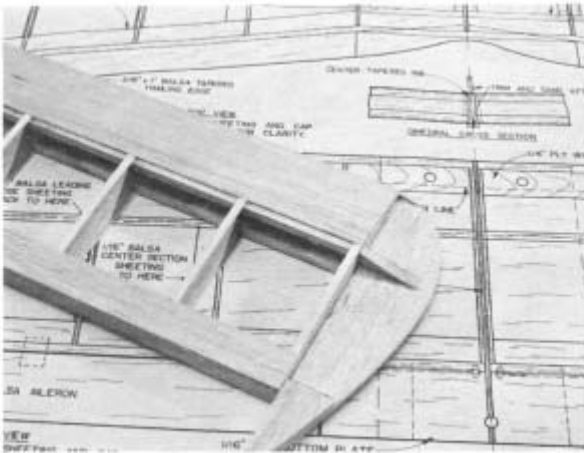
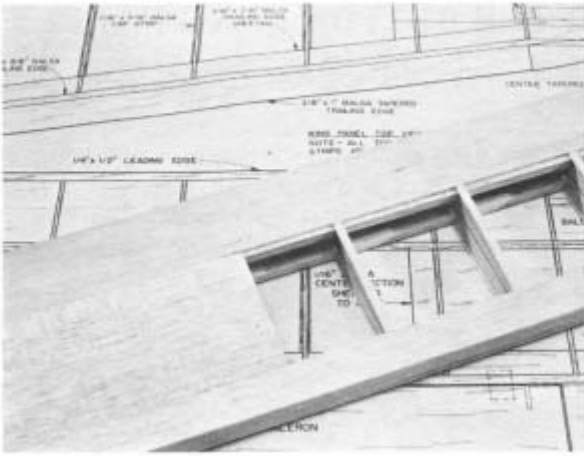
Align the above parts first and then glue in place (leading edge, trailing edge and top spar). Use epoxy to glue the hold down in place. Glue the balsa 1/4 x 5/8 x 3 filler above the hold down and sand it to the shape of the rib contour.



4. ADD THE SHEETING

Glue on the 1/16 x 2-118 x 24 leading edge sheeting, the 1/16 x 7/8 x 24 trailing edge sheeting and the 1/16 x 3 x 15 center section sheeting. Cut cap strips from 1/16 x 3/16 x 36 balsa and glue them in place.





5. □ ADD THE SHEETING AND FILLER ON THE OTHER SIDE OF THE WING PANEL

When the glue is dry, turn the wing panel over, realign it to the board and glue in the balsa filler on the other side of the hold down. Sand it to shape. Add the leading edge sheeting, the trailing edge sheeting and the center section sheeting. Add the cap strips. This completes the left wing panel for now. Remove the panel from the building board when it is dry. Now build the right wing panel by following steps 1 through 5.

INSTALLING THE WING TIPS

1. □ GLUE THE WING TIPS TO TOP AND BOTTOM WING PANELS

Cut off the sheeting and spars even with the tip rib. Do not cut off the leading edge! Glue the wing tips on both the top and bottom wings/panels. The tips should be centered on the tip rib and the leading edge centerline. The wing tips for the top wing will have to be sanded to an angle at the top to fit against the leading edge. Cut the tip brace pieces from the 114 scrap provided (1/4 x 3 x 11-7/8). Add the filler piece at the lower end of the wing tips, top and bottom. Sand this filler to shape later after hinging and installing the ailerons. Sand the leading edge to the rounded shape shown on the plans. Cut off the spars and sheeting even with the root rib on the panels.

Cut the inner tip filler from some scrap balsa and add to the inside of the tip. Shape it to match the ailerons and tip filler blocks.

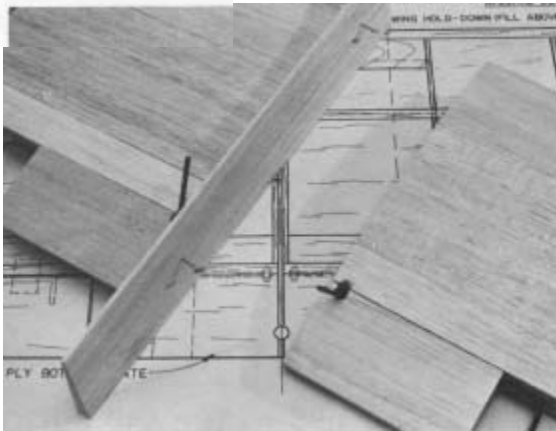
INSTALLING THE CENTER TRAILING EDGE (BOTTOM WING)

I. □ MAKE CENTER SECTION/TORQUE ROD ASSEMBLIES

Draw a centerline down the trailing edges of the wing panels and down the leading edges of the center sections. Cut a groove along the centerline in the tapered 5/8 x 1-3/4 x 3-1/2 balsa center section pieces for the aileron torque rods. Notch the center sections for backward torque rod arm movement. Glue the brass sleeves of the torque rods into the blocks with epoxy. Make right and left assemblies. Also notch the trailing edge of the wing panel for forward movement of the torque arms.

2. □ GLUE THE CENTER SECTIONS TO THE WING PANELS

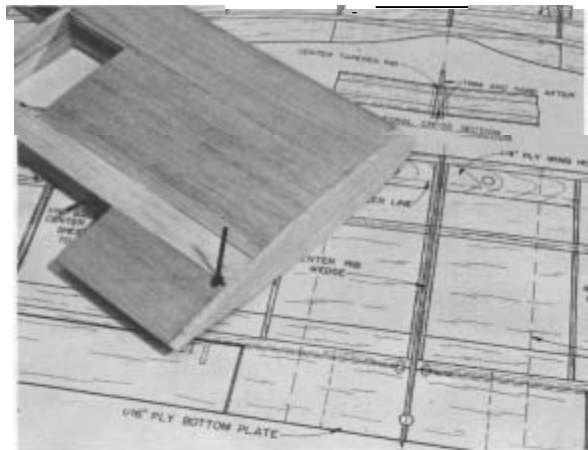
Use vaseline at the ends of the tube of the torque rod so you don't glue the wire to the wing. The rod must be free to move. Glue the rod/center sections to the wing panels up the centerlines.



JOINING THE BOTTOM WING PANELS

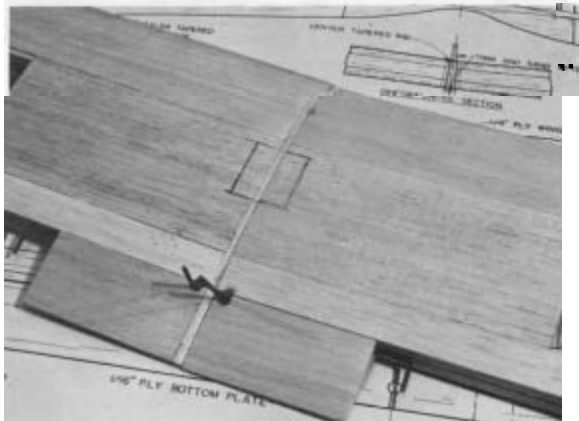
1. GLUE THE CENTER RIB TO THE LEFT WING PANEL

With the wing panels "up", glue the wedge-shaped balsa center rib to the root end of the left wing panel. Make sure the wider edge of the center rib is down and that the leading edge and trailing edge are centered on the tapered rib. Use 5 minute epoxy.



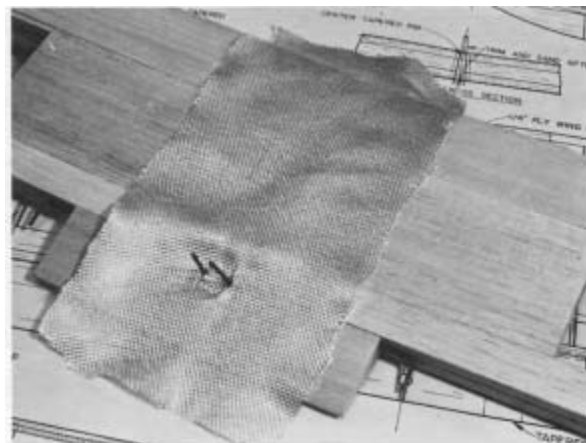
2. SAND THE CENTER RIB TO THE WING PANEL CONTOUR

Rough cut the center rib to the wing airfoil, leaving it about $1/8$ " oversize. Sand the remainder away with a sanding block so that the center rib edges are flush with the wing sheeting surfaces.



3. JOIN THE WING PANELS; ADD THE WING PLATES

Join the wing panels **upside down**. Line up the leading and trailing edges of the panels. Use a straight edge to make sure the leading edge of the wing is straight. Block up the wing $7/8$ " at the center and glue the panels together using slow set epoxy. See the drawing on the plan. **Remember the wing is upside down at this point!** When the glue is dry, turn the wing over and mark the aileron servo well location. Add the $1/16 \times 2 \times 3-1/4$ plywood wing plate to the bottom of the wing.



4. GLASS THE CENTER SECTION OF THE WING

DO NOT OMIT THIS STEP!

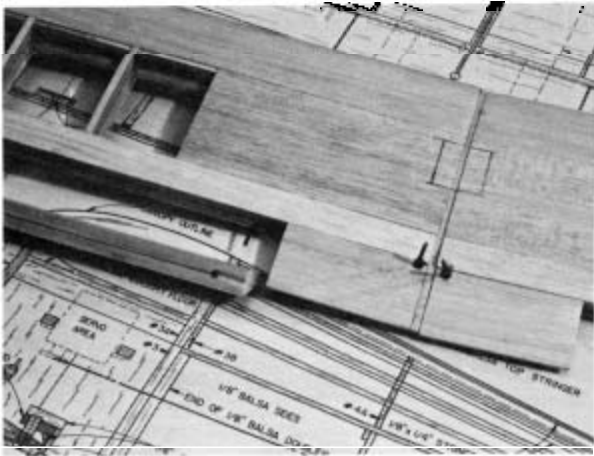
Doing so may result in a wing failure during flight!

Coat the area where the wings were joined with 5 minute epoxy and use a 4" wide strip of 6oz. glass or nylon cloth to reinforce the center joint. Saturate the cloth with epoxy and then wipe off any extra epoxy. The cloth strip should cover both the top and the bottom of the wing joint. When the epoxy is *dry*, sand the center section lightly without sanding into the glass cloth.

PREPARING THE AILERONS

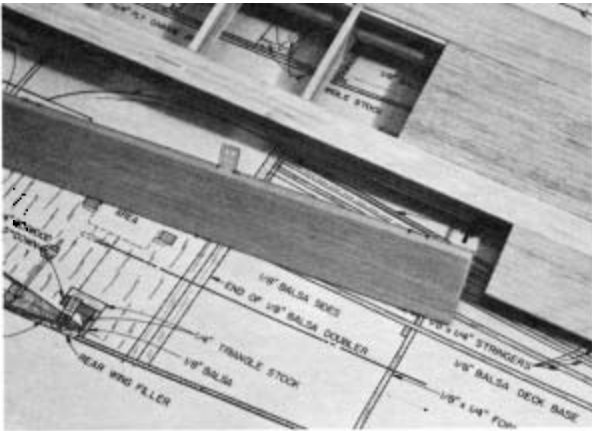
1. PREPARE THE AILERONS

Cut the aileron stock ($5/8 \times 17\text{-}1/2$ tapered stock) to length and draw a centerline down the leading edge of the ailerons. Mark and drill the torque rod holes. Groove the aileron for torque rod clearance. Make right and left ailerons.



2. CUT THE HINGE SLOTS; FINAL SAND THE AILERONS

Mark and cut the hinge slots into the ailerons and the wing trailing edge. Shape the leading edge of the ailerons to a "V". Temporarily install the ailerons with hinges to check the fit. Final sand the wing tips to match the aileron contour at neutral. Do not permanently hinge the ailerons until after they are covered.

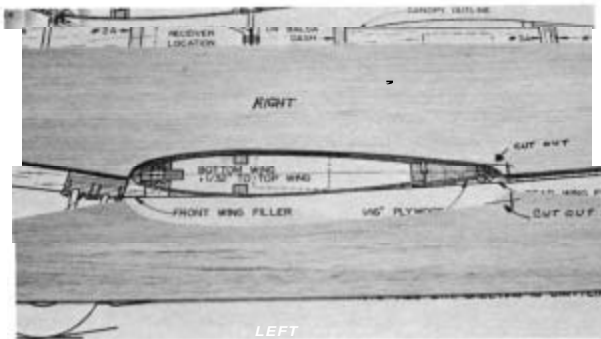


BUILDING THE FUSELAGE

1. PREPARE THE FUSELAGE SIDES

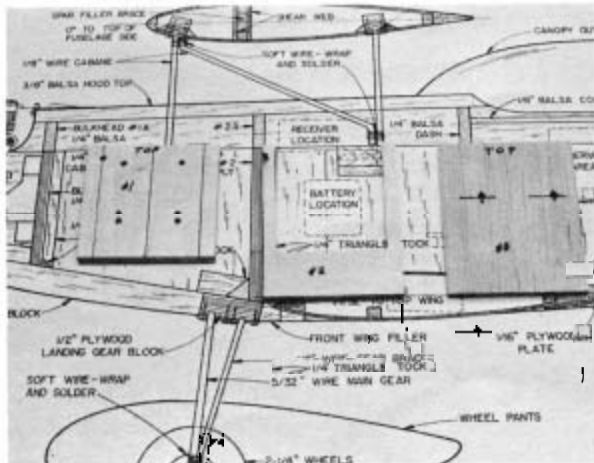
Mark the inside of the fuselage sides "right" and "left". Cut out part of the wing saddle area at the rear as shown on the plan.

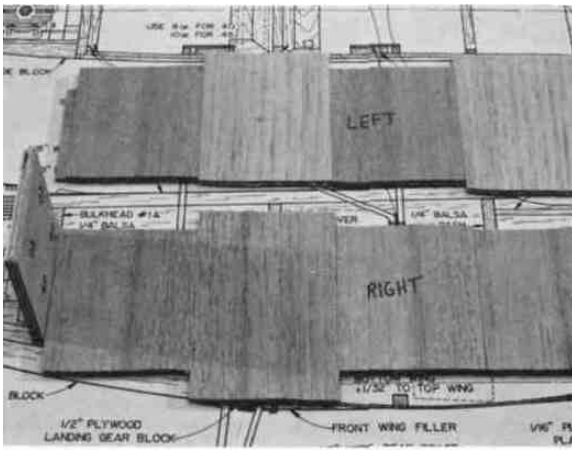
STOP! If you plan to install a 4-cycle engine, read and follow the instructions on installation of 4-cycle engines at the end of this instruction book.



2. PREPARE THE BULKHEADS

Locate the $1/4 \times 3 \times 2\text{-}3/4$ plywood Bulkhead #1, the Firewall. Mark the "top" of the firewall (the bottom has a slight angle). Mark the position of the motor mount. Mark and drill the holes for the motor mount **4-40** screws. Put the 4-40 blind nuts in positions in these holes you drilled. Temporarily place the mount on the firewall with the screws. Cut the screws off in back of the firewall so they won't get in the way of the fuel tank. Notch a hole in Bulkhead #2 for the throttle linkage. Prepare Bulkhead #3 by drilling holes for the outer pushrod housings.

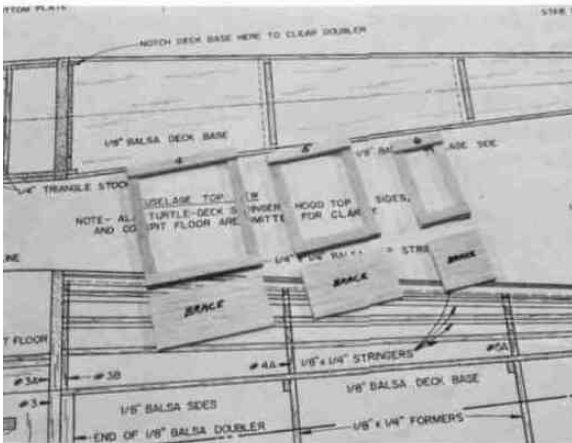




3. D GLUE THE DOUBLERS TO THE FUSELAGE SIDES

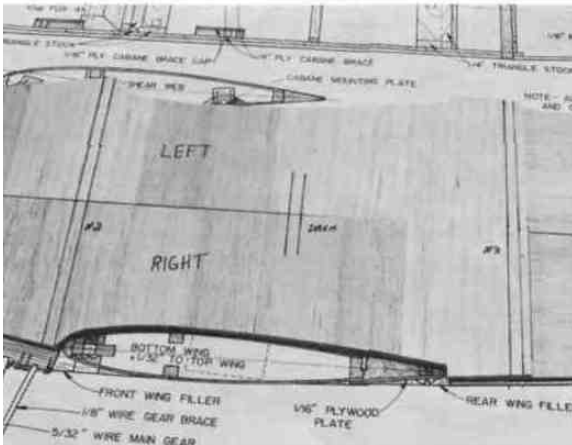
Using Bulkhead #1 as a spacer, install the 1/8" balsa doublers crossgrain on the inside of the fuselage sides. Cut the doubler pieces from 1/8 x 3 x 36 balsa first, position and then glue in place. Use slow set epoxy or thick cyanoacrylate. The doubler should extend 1/4" beyond the position of bulkhead #3. Trim the doublers to the fuselage contour.

Note: Be careful **when** you cut the doubler stock as you need to use what is left in the next step.



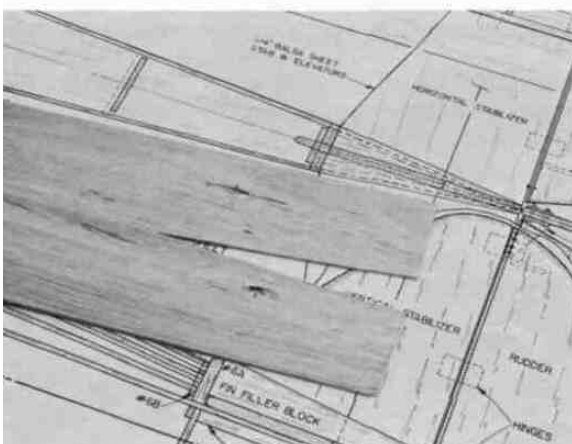
4. D BUILD THE THREE REAR FORMERS

Make Formers #4,5 and 6 from 1/8 x 1/4 x 36 balsa. Use the plans as a guide and cut the balsa to size. Glue the parts together to make the three formers. Make push rod braces from scrap 1/8 x 3 x 36 left over from the doubler stock in the step you just did. The widths of the braces are the same as that of each of the formers. The braces will be installed when the pushrods are installed **later**. **STOP!** Did you read the 4-cycle engine instructions if you plan to install a 4-cycle?



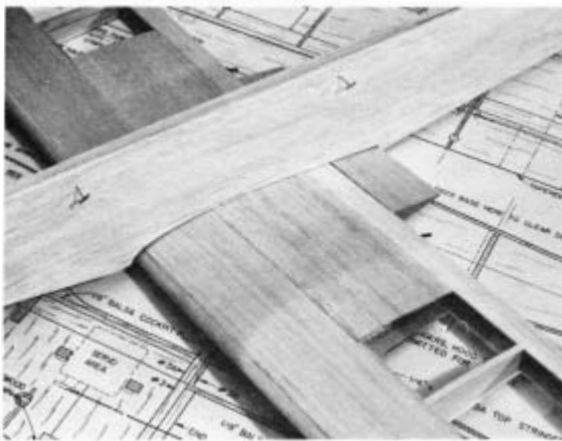
D MARK BULKHEAD POSITIONS

Mark the positions of bulkheads #2 and #3 on the fuselage sides. Also **mark** the position of the balsa dash between #2 and #3. Mark the positions of the cabane blocks now if you wish.



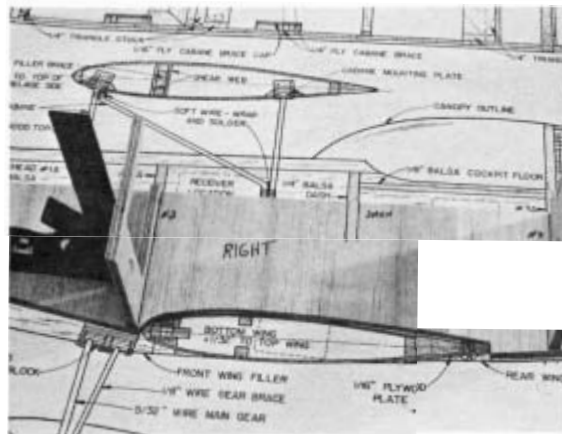
6. D DRILL PUSHROD EXIT HOLES

Mark and drill the holes in the fuselage sides for the pushrod exits for the elevator and rudder. See the plans for suggested positions of the pushrods to estimate the hole positions. A piece of brass tubing sharpened on the inside with an X-Acto knife blade makes a neat, clean angled hole for tube-style pushrods.



FIT THE WING TO THE FUSELAGE

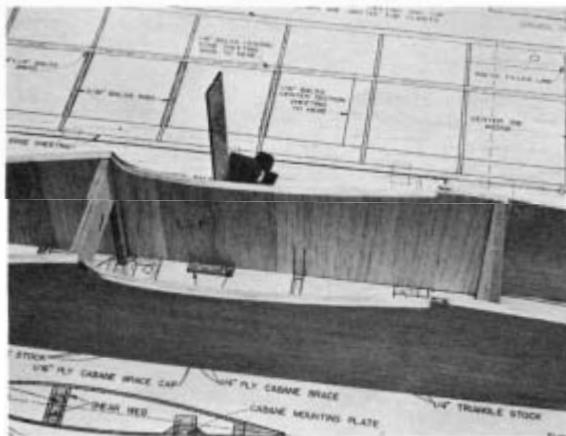
Pin the fuselage sides together perfectly lined up. Check the fit to the wing saddle cutout by placing the fuse sides on the wing. Custom sand if necessary but do not change the wing incidence.



8. SAND FUSELAGE TAIL; GLUE BULKHEADS #2 AND #3 TO THE RIGHT FUSELAGE SIDE

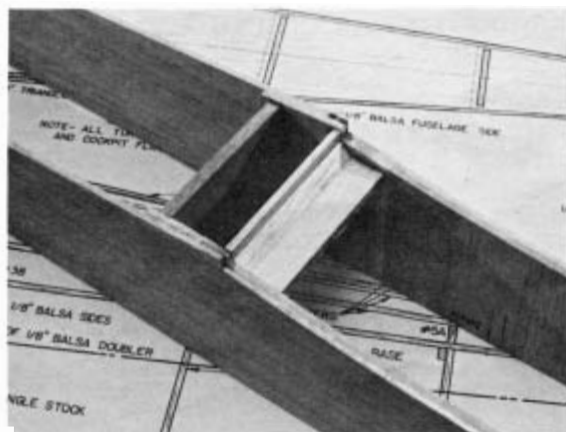
Slightly sand the insides of the fuse sides at the tail for a better gluejoint. Pin the right fuse side to your work surface. Position the bulkheads correctly (the angle is at the bottom) and glue them in place at 90 degrees to the fuse side.

NOTE: The straight edge at the top of the fuselage side is called the Fuselage Reference Line and will be used later to align the wing and stab to the fuselage.



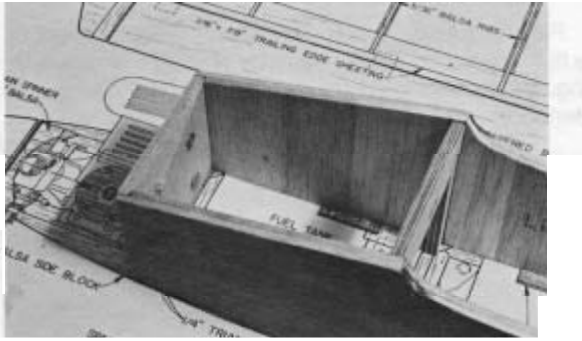
9. GLUE LEFT FUSELAGE SIDE TO THE BULKHEADS

Align the fuselage side/bulkhead assembly upside down over the top view of the plans. Make sure the flat side is resting flat on the building board and that the bulkheads are aligned to the plans. Pin the fuselage in place. Glue the left fuse side to bulkheads #2 and #3 making sure the left fuse side is also flat to the building board. Clamp or pin the fuselage in place until the glue is dry.



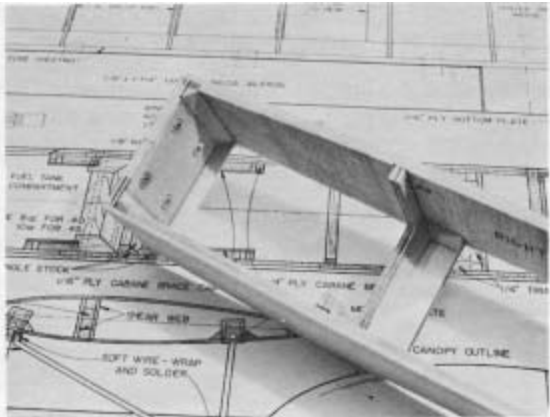
10. GLUE IN THE HOLD DOWN PLATES

The hold down plates are 14 x 78 x 3 plywood just like the hold down plates in the bottom wing. Glue the front hold down to Bulkhead #2 and the fuse side doublers. Glue the balsa 1/8 x 3/4 x 3 false bulkhead to the fuse side doublers at the rear of the wing saddle. Glue the rear hold down to the false bulkhead and doublers. Glue 1/4" triangle stock to the top and bottom of both hold down plates. Use 1/4 tri x 36 balsa stock.



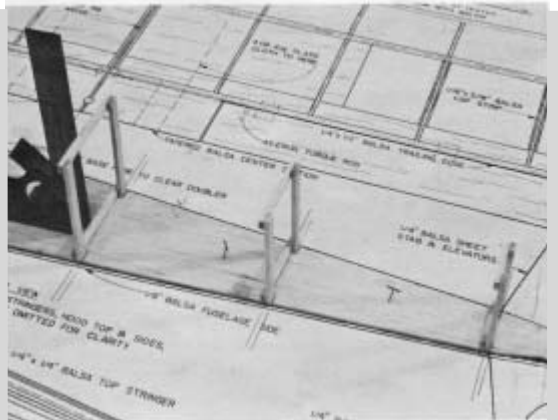
11. GLUE IN BULKHEAD #1

Realign the fuselage upside down over the plans and glue the fuse sides to bulkhead # 1. Make sure the top of the bulkhead is flat on the building board and that the front of the bulkhead is facing forward.



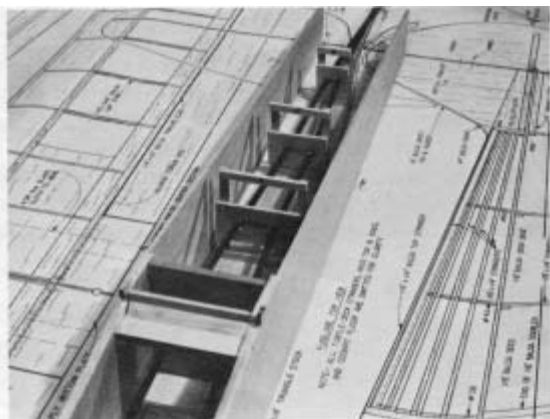
12. ADD 1/4" TRI BRACING

Add three pieces of 114 triangle stock along the back of the firewall. Extend the throttle linkage hole through the tri stock.



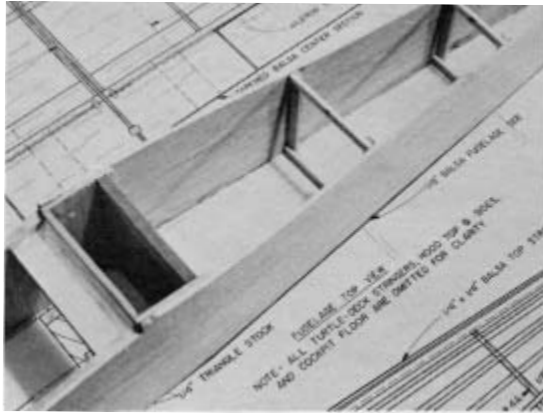
13. GLUE FORMERS TO DECK BASE

Notch the 1/2 balsa deck base at the corners to clear the doubler as shown on the plans. The deck base should butt up to the doubler. Pin the deck base over the plans to your work surface. Mark the location of Formers #4, #5 and #6. Check the fit of the formers and glue them to the deck base making sure they are 90 degrees to the base.



14. PREPARE FORMER BRACES FOR PUSHROD HOUSINGS

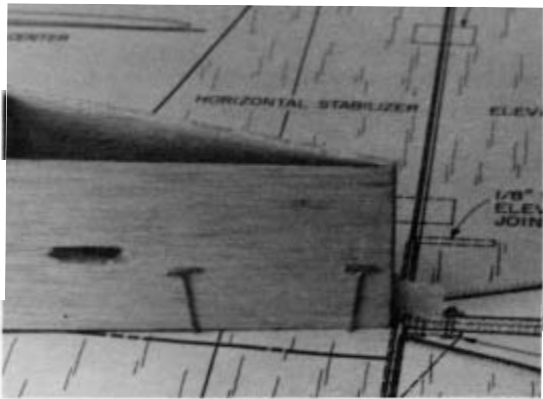
Temporarily put the fuselage/bulkhead assembly over the deck base. Use a pushrod housing and mark the location of the housing holes in the former braces. Make sure the housing follows as straight a path as possible from bulkhead #3 to the exit. Drill the holes in the braces. Temporarily install the housings to check your work. Remove the housings. Tube in a tube style pushrods are shown here but other types may be used.



15. GLUE THE FUSELAGE TO THE DECK BASE

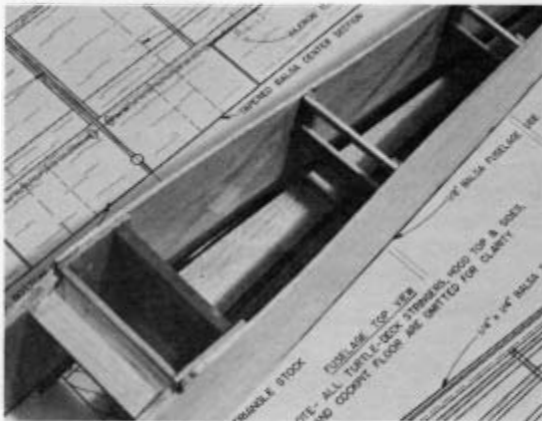
Glue the fuselagesides/bulkhead assembly to the deck base former assembly. Fuselage sides are glued to the sides of the deck base and the sides of the formers. The deck base glues to the rear of bulkhead #3.

DO NOT GLUE THE FUSELAGE SIDES TOGETHER AT THE TAIL UNTIL THE NEXT STEP!



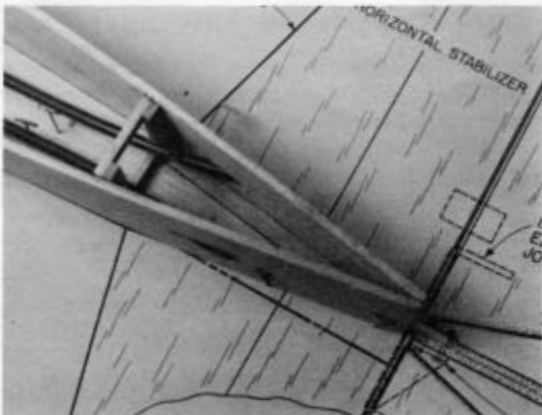
16. GLUE THE HINGE/FUSELAGE TAIL; GLUE THE FUSE SIDES TOGETHER AT THE TAIL

Glue the rudder hinge just below the stab location. Use the rudder hinge slot as a guide to placement. **Keeping the area open where the tail wheel strut mounting tab will glue later**, glue the fuse sides together at the tail.



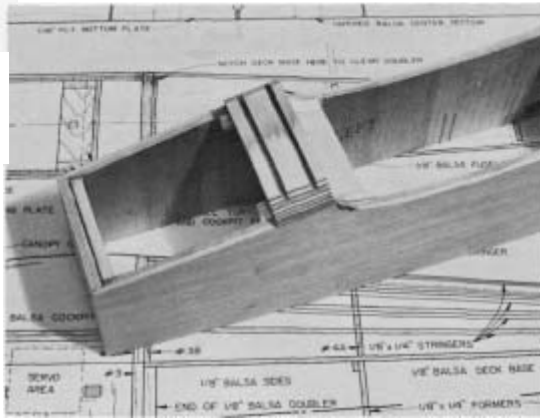
17. GLUE PUSHROD BRACES TO FORMERS; GLUE PUSHROD HOUSINGS TO BRACES

Using the pushrod housings as guides, glue the braces to the formers. Rough up the housings with sandpaper in the areas of Bulkhead # 3 , the braces and the exits. Using cyanoacrylate glue, glue both elevator and rudder housings in place except at Bulkhead #3. This will be glued later when the servos are installed. You may trim the housings at the exits now.



18. GLUE IN 1 / 4 BRACING AT THE TAIL

Glue 1/4" triangle stock at the bottom sides of the deck base between former #6 and the tail. Angle-cut the ends of the tri stock at the tail for a good glue joint.



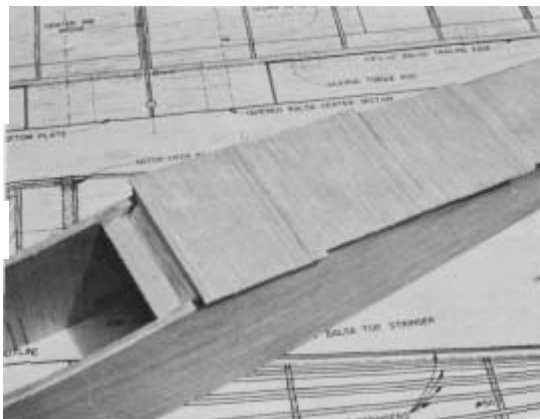
19. ADD THE LANDING GEAR BRACES

Glue in the grooved 1/2 x 1-5/16 x 3-1/2 landing gear block at the bottom of bulkhead #2. Add the 1/2 triangle stock along the front of bulkhead #2 and the top of the landing gear block. Cut the braces from 1/2" x 6 stock. You may solder the main gear now but do not install until after the model is finished. Note—The wider slot (groove) in the landing gear block is positioned toward the front of the model for main gear placement. The brace fits into the smaller slot.



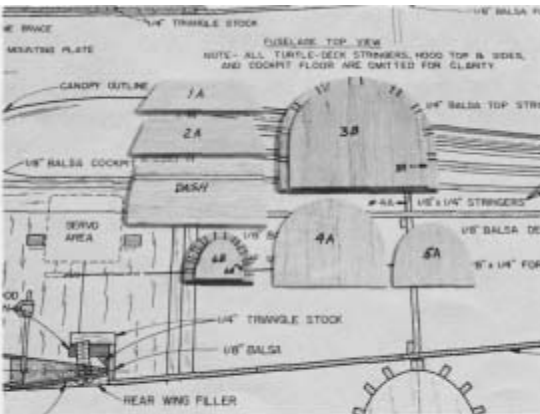
20. GLUE THE CHIN BLOCK TO THE FUSELAGE

With the fuselage still at 90 degrees to the board and over the plans, align the chin block to the front of the landing gear block and glue the chin block to the fuselage. (The fuselage is not shown aligned to the plans in the photo.)



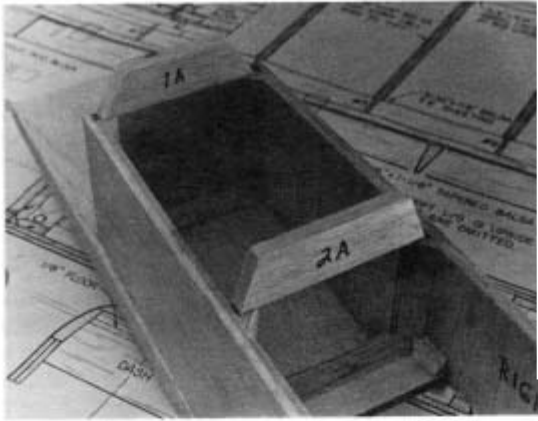
21. ADD THE Balsa BOTTOM SHEETING

With all pins removed from the inside of the fuselage, cross-grain sheet the bottom rear of the fuselage. Use 3/32 x 3 x 24 balsa and cut pieces to fit. Start at the false bulkhead and work your way back, gluing one piece at a time. Leave the last section of sheeting out until the tail wheel bracket is installed later. When the glue is dry, remove the fuselage from your building board and sand the bottom sheeting to shape.



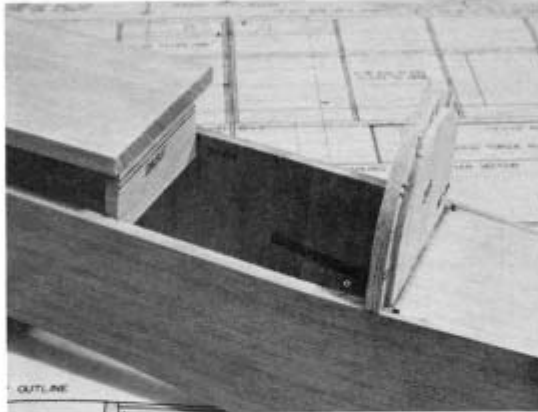
22. PREPARE TOP FORMERS 1A THROUGH 3B

Prepare the fuselage top formers by numbering them to match the plans. Mark the locations of the stringers on formers 3A and 6A by referring to the plans. Glue former 3B to the back of 3A. Glue former 6B to the front of 6A. Draw the location lines for the cockpit floor on the back of the dash and on the front of the 3A/3B assembly.



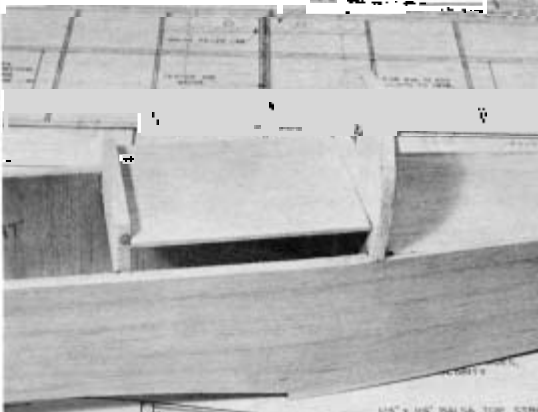
23. ADD FORMERS 1A AND 2A

Glue formers 1A and 2A to the tops of bulkheads 1 and 2. When the glue is dry sand the tops of these formers to a slight angle so the top block will mate squarely when glued. Trial fit the assembled fuel tank. Carve out a section of former 2A for fuel tank clearance if necessary. If you leave the tank in permanently, plug all fuel lines so balsa dust does not enter the lines.



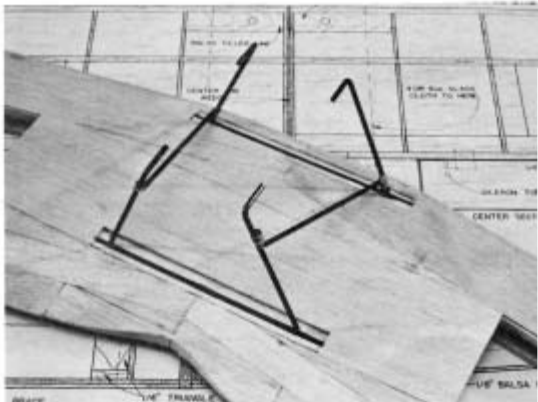
24. ADD THE DASH AND FORMERS 3A/3B

Pin the hood top in place to determine the height of the dash. Put the cockpit floor in position to determine the placement of the dash on the fuse side. Glue the dash to the fuse sides. Do not glue on the hood top yet. Glue former 3A/3B to the fuselage at the rear of the cockpit on top of bulkhead #3.



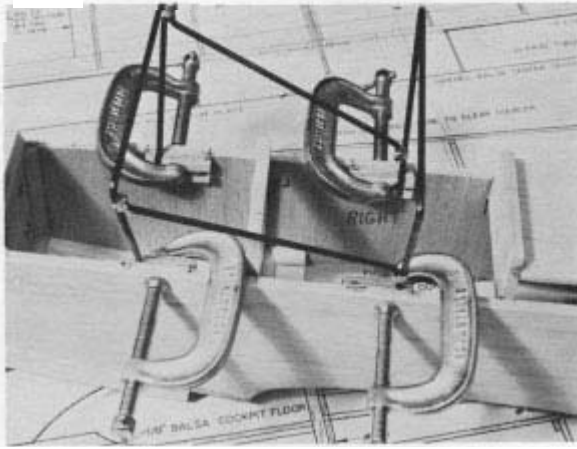
25. GLUE IN THE COCKPIT FLOOR

Glue in the 1/8 x 3 x 4-1/2 balsa cockpit floor between the dash and former 3A/3B on the lines you drew earlier.



26. SOLDER THE CABANE WIRE

The cabanes for the top wing are permanently installed into the fuselage. Cut the sheeting out over the cabane wire holders in the top wing. With the wing level on your work surface and the bottom side of the wing up, place the cabanes into the slots in the holders. The bent ends of the cabanes should face each other. Wrap the wire braces to the cabanes with the copper wire provided. With the cabanes 90 degrees to the wing, solder the bottom (nearest the wing) wire wrapped end of the cabane on both sides. Then solder the top wire wrapped end without losing the alignment to the wing.

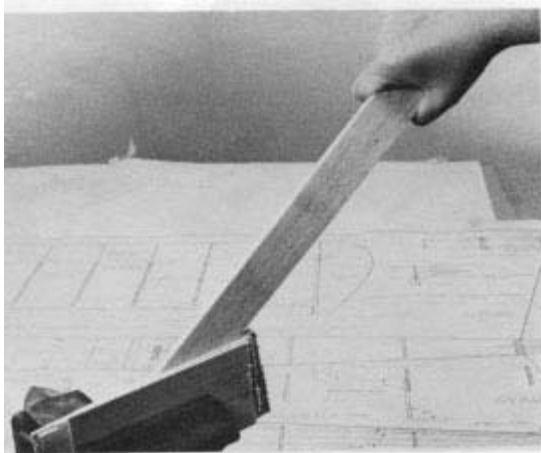
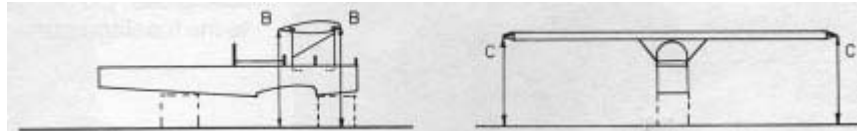
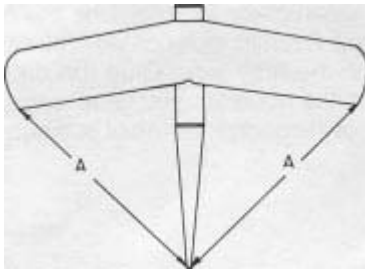


27. □ PREPARE SMALL CABANE BLOCKS

Clearance holes will have to be cut in the small cabane blocks for cabane wire clearance. Place the blocks on the cabane wire ends. The blocks should line up with the top of the fuselage. Clamp the blocks to the fuselage. Do **not** glue the blocks yet!

28. □ ALIGN THE TOP WING TO THE FUSELAGE

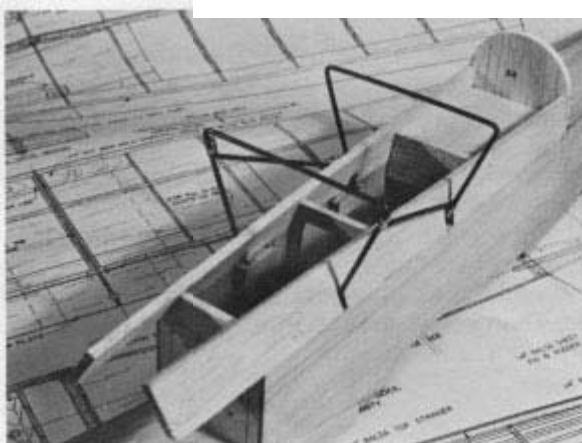
Align the Fuselage Reference Line (top side of the fuselage should be right side up) parallel to the work surface. The fuselage should be right side up. Place the top wing onto the cabanes. Line up the top wing to the work surface and the fuselage as shown in the drawings. Distance A should equal distance A, B should equal B and C should equal C. When the top wing is properly aligned, mark the positions of the cabane brace blocks in the fuselage. Use slow set epoxy and glue the blocks in place. Fill in the areas around the wires in the blocks with epoxy. Glue on the 1/16 x 112 x 1-112 plywood cabane brace caps. Recheck the alignment before the glue sets up.



When the glue is dry, fill in the slots in the cabane wing holders in the wing with silicone. Put car wax or similar material on the cabane wires and place the wing back on the cabanes. Remove the excess silicone that may ooze out of the slot. This silicone that you added makes a good seat for the wires and cuts down on vibration. After the wing is covered later, you will attach the top wing to the cabanes with the aluminum plates and the #2 x 3/8 screws provided. Tie plates should be flush with the wing sheeting. Note—Make sure you do not disturb the wing alignment when you apply the silicone to the cabane slots. The wires should still touch the bottom of the slots in the holders; the silicone fills in around the sides of the wires in the slot.

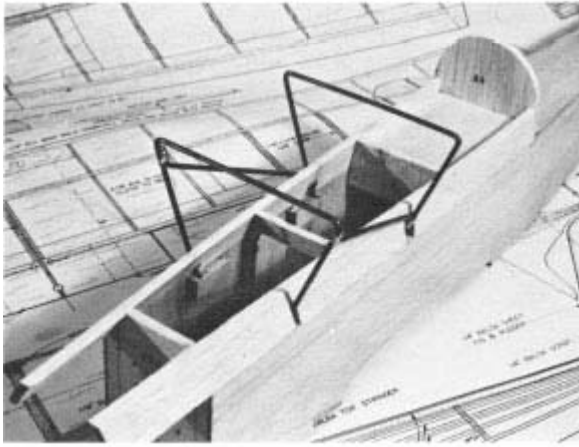
29. ○ PREPARE THE Balsa HOOD SIDE PIECES

The 1/4 x 1-3/8 x 17-1/2 balsa hood side pieces need to be twisted slightly to fit the front of the fuselage. To make it easy to twist the balsa as required, "paint" some ammonia on both pieces of the balsa sheets. Place one end in a vise and twist the other end somewhat more than is required. Hold or clamp this end until the wood dries (about 15 minutes). Note that the twist in the right piece is opposite that of the left piece.



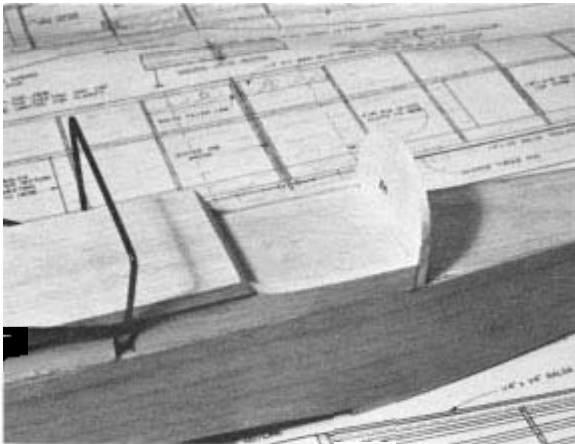
30. □ GLUE ON THE HOOD SIDE PIECES

Sand the bottoms of the hood side pieces so they will mate squarely with the fuselage sides. Notch out the side pieces for cabane wire clearance. You can fill in these notched holes later. Glue the side pieces from the front of former 3A/3B to beyond former 1A in the following manner. To prevent a twisted fuselage, glue both pieces at the same time, a little at a time, starting at former 3A/3B. Also make sure the hood side pieces extend outside former 3A/3B and the fuselage sides slightly so they can be sanded to contour later.



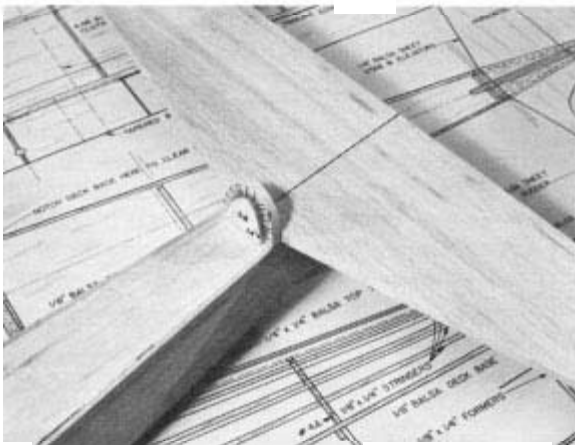
31. SAND THE TOPS OF THE HOOD SIDE PIECES

Sand the tops of the hood side pieces flush with the top of the formers so the hood top will mate squarely.



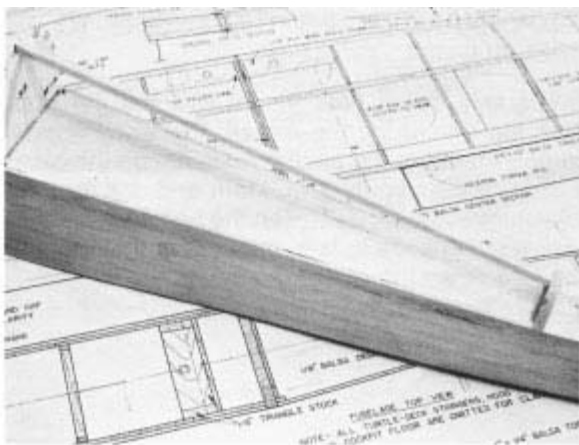
32. GLUE ON THE HOOD TOP; SAND HOOD SIDES AT COCKPIT

Trim the hood top at the cabanes first before you glue it on as it is a little difficult to sand in that area after the hood top is glued on. Glue the hood top in place. Trim the hood sides at the cockpit as shown on the plans.



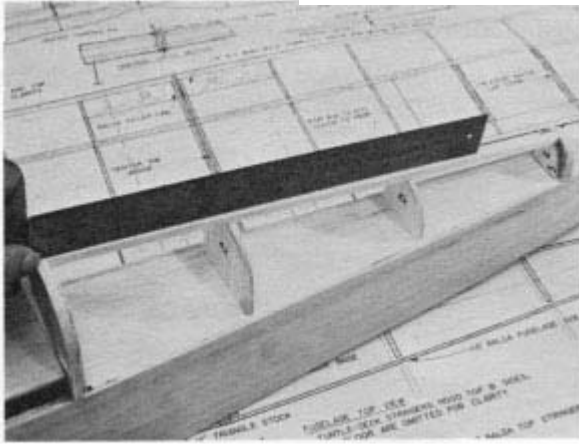
33. ADD FORMER 6A/6B

Pin the stabilizer in place so the stab is aligned with the back of the fuselage. Mark the position of former 6A/6B. Remove the stab. Glue 6A/6B in place.



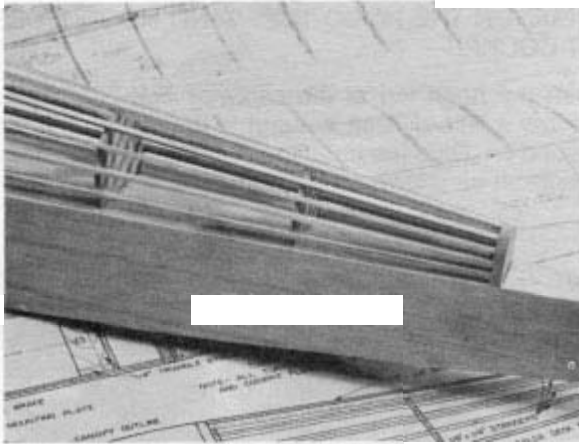
34. GLUE ON TOP STRINGER

Use the 1/4 x 1/4 x 16 balsa stock and cut the top stringer to fit between formers 3A/3B and 6A/6B. Glue the stringer in place.



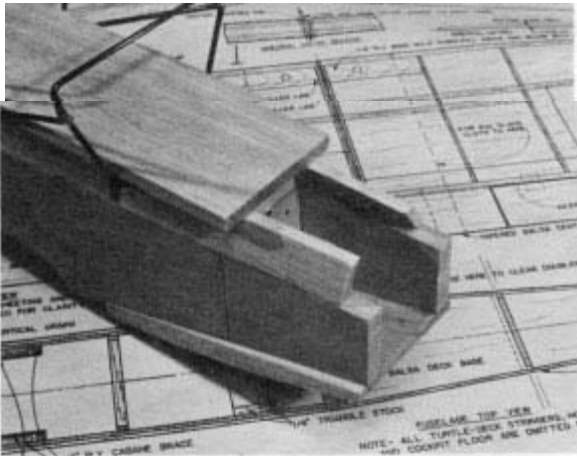
35. ADD FORMERS 4A AND 5A

Locate the positions of formers 4A and 5A by placing a straight edge along the top stringer. Place and glue the formers so they mate with the top stringer and are centered from side to side.



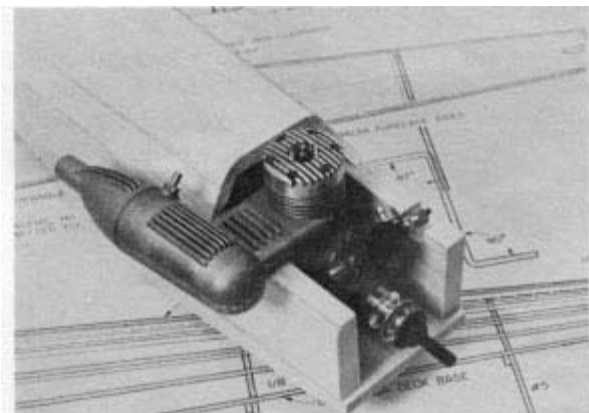
36. ADD THE TURTLE DECK STRINGERS

Use the 1/8 x 1/4 x 16 balsa stock and cut stringers to fit. Start by gluing at 6A/6B first, checking with a straight edge first, and then gluing to 5A, 4A and 3A/3B.



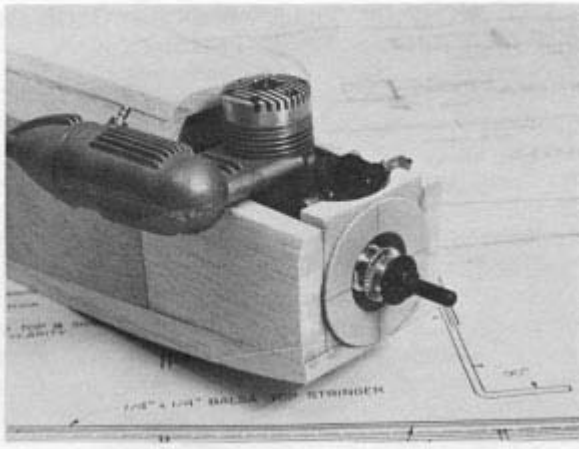
37. PREPARE AND GLUE IN THE SIDE NOSE BLOCKS; FINAL SAND THE FUSELAGE FRONT

Groove the inside of the nose side block (right or left depending on your engine) for the throttle linkage clearance. Using 5 minute, glue the nose side blocks in place. Remove excess epoxy at the chin block joint. Carve and rough sand the hood top, hood sides and chin block to the shape of the nose side pieces. The next few photos will help you to see the shape needed. Don't take too much off until you mount the engine next to see where you need clearance.



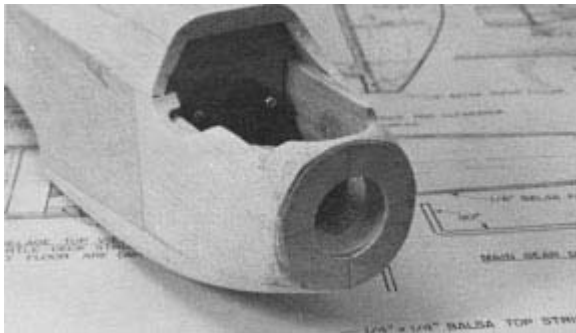
38. TEMPORARILY MOUNT THE ENGINE TO THE

Temporarily install your mount with the 4-40 bolts provided. Place the engine on the mount. Cut away areas of the engine compartment so the engine rests flat on the mount. Check for binding of the throttle arm. Mark and drill the holes in the mount for engine mount bolts. Tap the holes for bolts and nuts or use self-tapping bolts to hold the engine on the mount. The engine has no down thrust or right thrust.



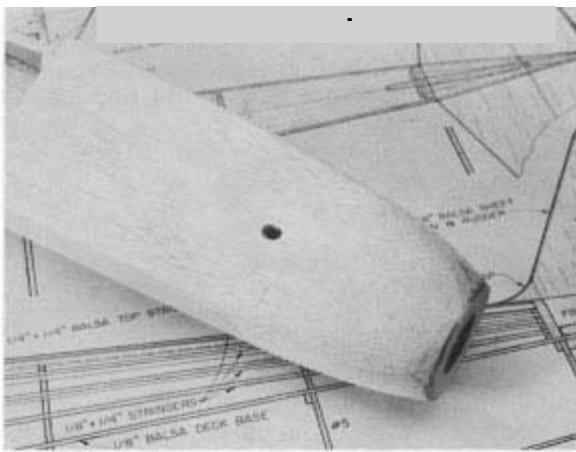
39. □ ADD NOSE FILLER BLOCK AND SPINNER RING

Using your engine as a guide, locate the placement of the 2-1/4 x 2-1/4 x 1/2 nose filler block. The engine thrust washer should extend 1/16 to 1/8 inches forward of the filler block. Cut away areas on the block for engine clearance. The placement of these parts depends on what brand spinner you will use. Inspect your spinner backplate and locate the block accordingly. When you are sure of the placement, glue the cross-grain nose filler block in place. Sand the front of the nose so the front of the filler block and the front of the nose side pieces are even. Glue the 1/16 plywood spinner ring in place on the filler block using your engine and spinner backplate as a guide for placement. The engine shaft should be centered in the hole in the spinner ring.



40. □ ADD 3/8 TRI STOCK TO THE NOSE; SAND NOSE TO SHAPE

Remove the engine and add the 3/8 triangle stock along the bottom sides of the engine compartment and behind the filler block. Use 3/8 x 12 triangle stock for this step. Custom fit these pieces so they glue to the firewall and nose filler block. Now sand and carve the nose of the fuselage to the shape of the spinner ring.

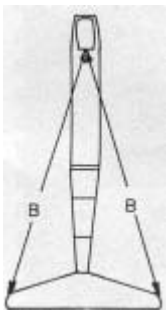


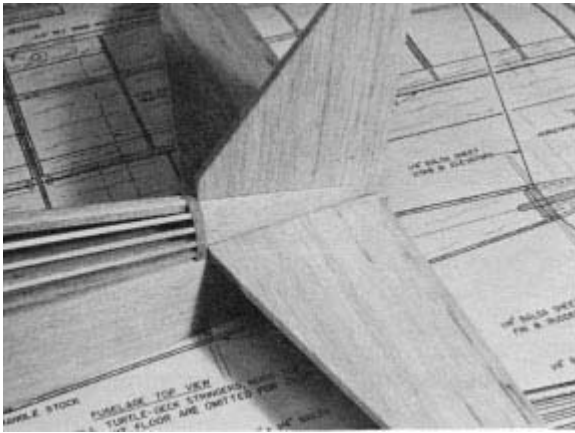
41. □ DRILL FUEL LINE HOLES AND A DRAIN HOLE

Drill the holes in former 1A for the fuel lines. See the plan for placement. Drill a hole in the bottom of the engine compartment just in front of the firewall for fuel drainage.

42. □ ALIGN THE STABILIZER TO THE FUSELAGE

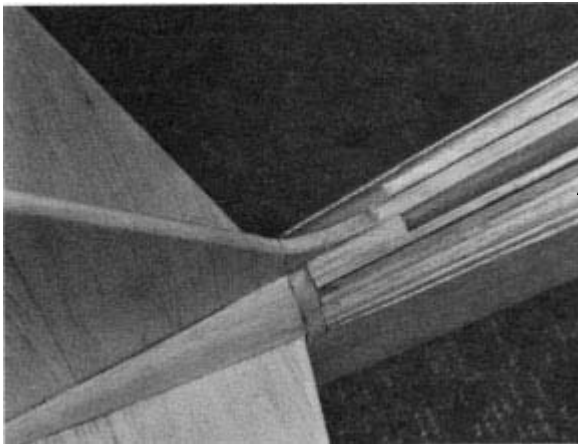
First align the fuselage to your flat work surface like you did before by making sure the Fuselage Reference Line is parallel to the work surface. Now align the stabilizer to the fuselage in the following manner: A—Draw a centerline down the stab bed at the end of the fuselage. Line up the stab centerline to the fuse centerline. B—Measure from each stab tip to a point at the center of the top of the firewall area. Each measurement should be the same. C—Measure from each stab tip to the work surface. Each measurement should be the same. D—To make sure you have zero degrees incidence, measure from the center of the leading edge to the work surface. Measure from the center of the trailing edge to the work surface. These distances should be the same. When the stabilizer is aligned, do not glue in place but go on to the next step.





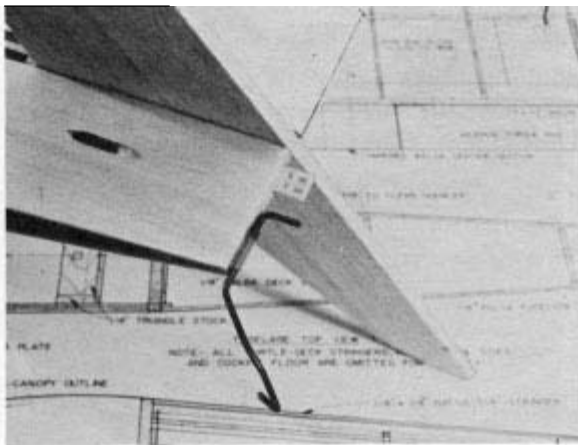
43. PREPARE THE FIN FILLER BLOCKS; GLUE ON THE STAB, FIN AND FIN FILLER BLOCK

Prepare the fin filler blocks by cutting them to pick up the angle of the top stringer. Then sand them to the contour of the stringers. Shaping and sanding is easy if you tack glue scraps of balsa the thickness of the stab and fin to the fuselage. Trim the scrap even with the fuse sides and stringer line, then tack glue the blocks in place and razor plane and sand them to shape. When ready, break the blocks loose and remove and discard the scrap. Use epoxy and glue the stabilizer to the fuselage. Glue the fin to the stab at 90 degrees to the stab and aligned on the stab centerline. Glue the fin to the stab at 90 degrees to the stab and aligned on the stab centerline. Glue the prepared fin filler blocks in place with 5 minute epoxy. Remove excess epoxy.



44. ADD DORSAL FIN AND FILLER PIECES

Use scrap balsa and custom make the dorsal fin piece and filler pieces. Glue the dorsal fin to the fin and $1/4$ " top stringer. Glue the filler pieces between the top stringer and the next stringer on each side of the dorsal fin. These filler pieces are used to anchor the covering material later.



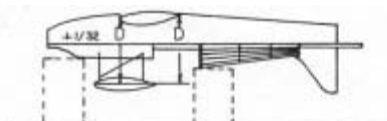
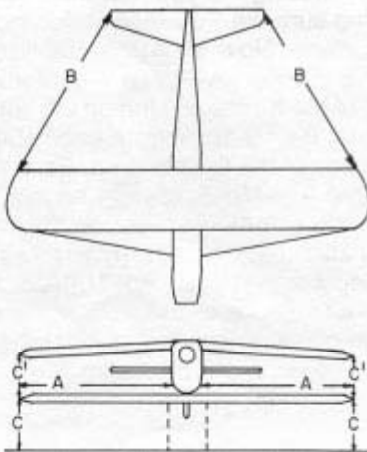
45. ADD TAIL WHEEL STRUT; FINISH RUDDER

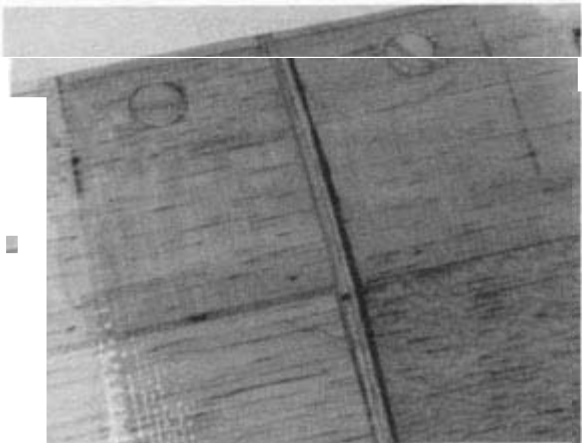
Glue the tail wheel strut in place as shown on the plans. Use 5 minute and clamp the tail until dry. Add the last piece of bottom sheeting. Mark and drill the hole for the tail wheel tiller arm in the rudder. Also groove the rudder leading edge below the hole for the nylon bearing clearance. Shape the leading edge of the rudder to a "V".

FINAL ASSEMBLY

1. ALIGN THE BOITOM WING TO THE FUSELAGE AND TOP WING

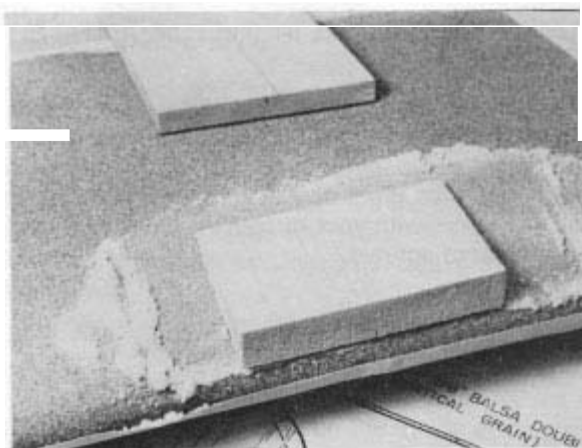
Align the fuselage upside down to the work surface by placing the fuselage reference line parallel to the work surface. Align the bottom wing to the fuselage by making the following measurements: A—Center the wing side to side in the saddle. The distance from the fuselage side to the wing tip on each side should be the same. &The wing tip to stab tip distance should be the same on both sides. &Wing tip to work surface and top wing tip to bottom wing tip distance should be the same on both sides. D—The bottom wing has a positive incidence of $+1/32$ " to the top wing. This means that the leading edge of the bottom wing should be $1/32$ " closer to the top wing than the trailing edge of the bottom wing is. When the wing is in the correct position, mark the fuselage and wing so you can position the wing exactly the same again.





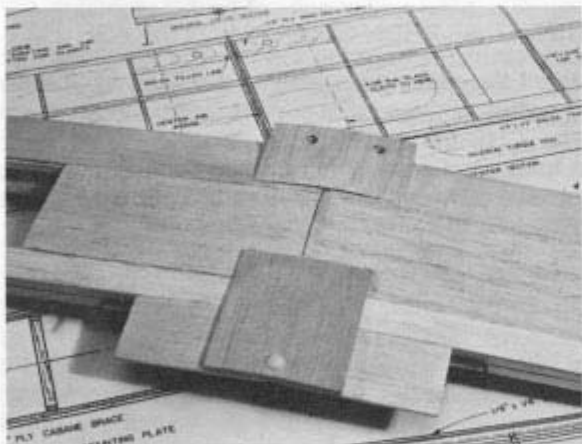
2. DRILL AND TAP WING BOLT HOLES IN THE WING AND FUSE

With the fuse aligned to the work surface and the wing aligned to the fuse, drill two 1/64 pilot holes through the wing hold down plates in the leading edge of the wing and one hold in the trailing edge of the wing. Drill the rear hole at an angle so the bolt head will rest flat on the trailing edge. Drill these pilot holes through the hold downs in the fuselage at the same time you drill through the wing. Remove the wing. Drill and tap the holes in the fuselage hold downs for 1/4-20 bolts. Counter-bore the leading edge holes in the wing so that the bolts will rest flat against the hold downs in the wing.



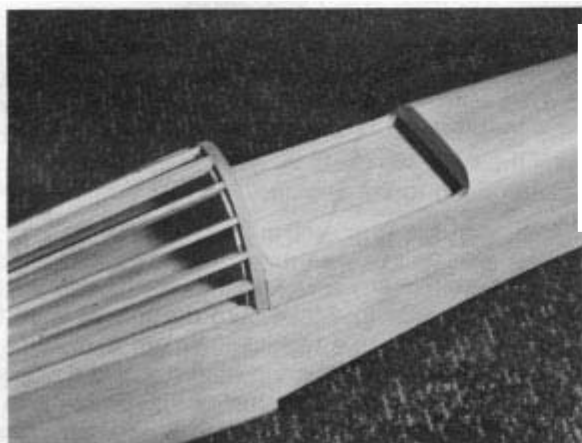
3. SAND THE WING FAIRINGS TO SHAPE

Prepare to install the wing fairings by drawing lines on the bottom of the wing even with the fuselage sides. Cut the fairings to width. Sand to shape by placing sandpaper on the wing and working the fairings back and forth.



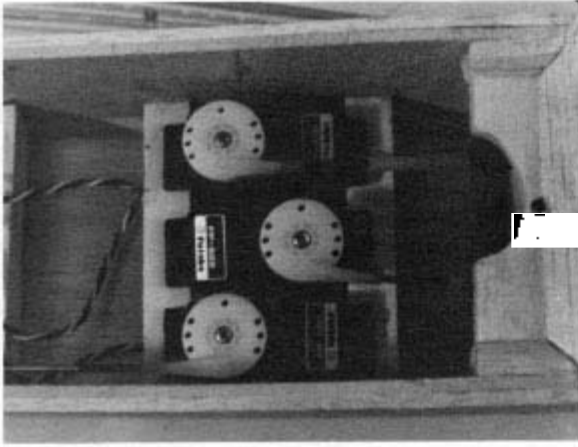
4. GLUE THE FAIRINGS IN PLACE; SAND THEM TO THE FUSELAGE CONTOUR

Drill holes through the fairings large enough for the wing bolt heads to pass through. Install the wing bolts and glue the fairings in place with 5 minute epoxy. Be careful not to get any epoxy on the wing bolts and not to glue the wing to the fuselage! When the glue is dry, sand the fairings to the fuselage contour.



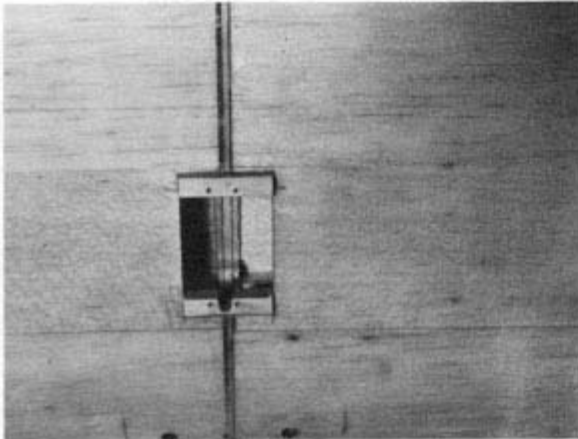
5. FINISH COCKPIT AREA: FUELPROOF FUSE; FINAL SAND MODEL

Finish the cockpit area any way you wish. You may want to add a pilot, paint the cockpit area and/or add an instrument panel. Fuelproof the engine compartment by coating all the balsa and ply parts with resin or epoxy. Now final sand the entire model.



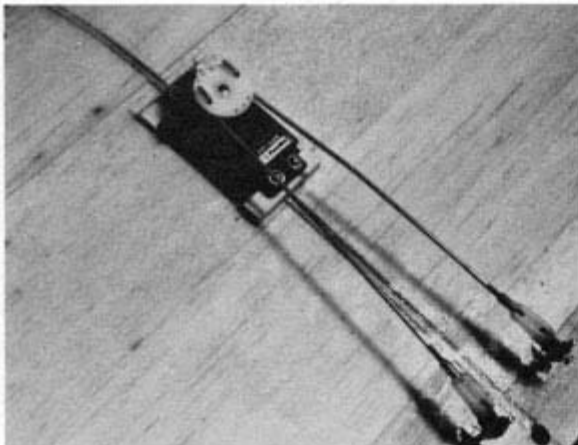
6. INSTALL RADIO COMPONENTS

Glue servo rails made from scrap plywood or hardwood into the radio compartment. Install the rudder, elevator and throttle servo directly to the hardwood rails or install the servo tray that comes with your radio. Position the battery and receiver (wrapped in foam rubber for protection) as shown on the plan. Install the on/off switch. Install the inner pushrod wires or tubes into the pushrod housings for the rudder and elevator. Also install a cable type pushrod and its outer tube for the throttle linkage.



7. CUT THE SERVO WELL IN THE TOP OF THE BOTTOM WING

The well is located directly behind the spars. Cut out enough of the wing sheeting, center rib and root ribs to allow the placement of the servo as deeply as possible inside the wing. Glue hardwood rails (from scrap) as shown in the photo or use the tray that came with your radio. Drill small pilot holes in the rails for the servo screws.



8. INSTALL AILERON SERVO AND LINKAGE

Mount the servo as deep into the wing as you can so no binding occurs with the other servos. Install threaded wire pushrods with "Z" bends at the servo. Connect the pushrods to the aileron torque rod arms with the nylon connectors, wheel collars and screws provided and clevises of your choice. This end of the linkage is therefore adjustable.

9. INSTALL THE MAIN GEAR

Place the soldered main gear and brace assembly into the slots in the bottom of the landing gear plate. Place 3 landing gear straps over the main gear and 2 straps over the brace and mark the hole positions on the landing gear plate. Drill pilot holes for the #2 x 3/8 screws. Put the screws in place.

10. INSTALL THE ENGINE AND MUFFLER

Attach the muffler to the engine. Install the engine mount unless you already have. Attach the engine muffler to the mount.

11. INSTALL THE FUEL TANK

Install the tank now if you haven't done so already. Assemble the tank per manufacturer's directions. Feed extra long fuel lines through the front of former 1A into the tank compartment. Attach the lines to the tank and pull the tank into position. Cut the fuel lines to length and attach them to the engine.

12. COVER THE MODEL

Remove any equipment that will be in the way while you are covering. Make sure the model is all final sanded and clean (use a tack cloth or rag to pick up any dust). Use heat shrink covering material and cover your Sportster Biplane. Follow the instructions available with the covering. When the model is completely covered, reinstall the equipment you removed.

13. □ INSTALL ALL CONTROL SURFACES AND CONTROL HORNS

Flex the hinges back and forth a few times and then glue the hinges into the rudder and fin slots; at the same time glue the tiller arm of the tail wheel into the rudder leading edge. Lightly sand both surfaces of the hinges, put epoxy into each hinge slot and place the hinge in place. Use 2-56 screws and backplate and attach the nylon horn to the rudder over the tail wheel tiller arm position for extra support. Glue the elevator joiner wire to the elevators. Glue the hinges to the elevators and stabilizer in the same manner as above. Attach the nylon elevator horn and backplate to the bottom of the right elevator with 2-56 screws. Glue the aileron torque arms into the ailerons as you glue the hinges into the ailerons and wing trailing edge.

14. □ INSTALL THE CANOPY

Cut the canopy on the cut lines scribed in the plastic. You can dye the canopy using Rit dye. Follow the instructions on the box. Remove the canopy from the dye when the desired tint is achieved. Glue the canopy to the fuselage with cyanoacrylate glue. Seal the edge with striping tape.

15. □ ASSEMBLE THE WHEEL PANTS

Cut and trim the wheel pant halves on their parting lines that you find on the inside of the pants. You can score this line with an X-Acto knife and break on the line or simply cut on the line with a knife.

Sand the edges of the wheel pants smooth. An easy way to do this is to lay your sandpaper down on a flat surface and move the pants over the sandpaper. This way you are assured of a straight, flat edge when you finish.

Cut a starter hole in one half of each pant in the area of the wheel opening to make it easier to cut out the opening later after the halves are glued together. Cut the starter hole at the join line. Using cyanoacrylate (instant glue), join the two halves together. Note that there is a right and a left half to the wheel pant. Make sure you have a good fit before you glue the two halves together. When the halves are joined, sand lightly along the join line on the outside of the pant to get a smooth appearance.

Use your wheel and measure and mark the area to be cut out of the pant for the wheel opening. Cut out this area.

Find the tape locations on the inside of the pant in Figure 1. Use 60-100 coarse sandpaper and sand the areas where you will put the tape.

Reinforce the inside of the wheel pants with fiberglass tape. Cut the tape into one inch squares. You should have eight pieces of tape when you finish cutting. Use 5 minute epoxy and piece of tape at each of the places you sanded before. Let the tape hang out of the wheel opening. Cut the excess off when the epoxy is dry.

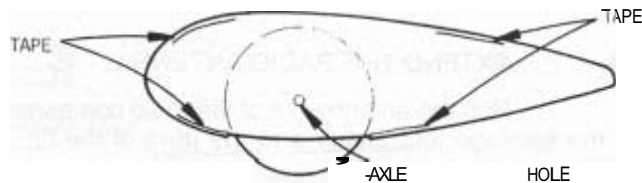


Figure 1

16. □ MOUNT THE WHEEL PANTS AND WHEELS

Mark the position of the axle hole on the inner side of each wheel pant. Drill a clearance hole at this location for your gear wire or axle bolt. See Figure 1.

Mark the position of the brass plate on the gear. Do this by temporarily placing the wheel pant on the gear. Position the pant so it does not touch the ground and is level or in the correct position for your model. Mark the position of the brass plate on the gear and on the outside of the pant. Remove the wheel pant! Solder the brass plate to the gear using Sta-Brite silver solder. Position and solder the other brass plate in the same manner.

Position the 1/8 plywood plate on the inside of the wheel pant opposite the brass plate on the gear. Temporarily put the wheel pant back on the gear to find this position. The ply plate is used as a backup plate for the brass plate so do a good job of lining these two plates up. When you have the correct positions for the ply plates, use 5 minute epoxy and glue them to the inside of the wheel pants. Let the ply plates dry.

Drill the axle hole through the ply plates in the pants.

Using the brass plate as a guide, drill two pilot holes through the wheel pants and the ply back up plate for the #2 x 3/8" screws.

Trial fit the wheel pant assembly to the gear by attaching the screws provided, wheels and wheel collars to hold the wheels to the gear. If all is in the correct position, remove the assembly from the gear. See Figure 2.

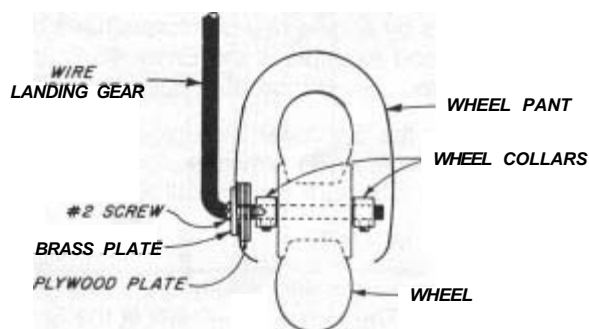


Figure 2

Paint the wheel pants. First, sand lightly with wet/dry 320-400 sandpaper but use it dry. Use K&B primer or automotive primer. Sand the primer after it is dry. You need only to sand the primer lightly. Put on the final coat of paint. Spraying works the best for the final coat but brushing the paint will give you good results also.

18. EXTEND THE RADIO ANTENNA

Run the antenna out of the radio compartment of the fuselage and attach it to the front of the fin. **DO NOT** cut the antenna wire!

19. CONNECT ALL LINKAGES (PUSHRODS), CONTROL SURFACES, CHECK RADIO OPERATION AND SET THE THROWS

Attach clevises to the ends of the elevator and rudder pushrods so they are adjustable at the tail. The other ends may be attached by "Z" bends or other method and does not need to be adjustable. Attach a clevis to the end of the throttle cable and attach it to the engine throttle arm. Attach the other end of the cable to the throttle servo with a connector of your choice. The servos and linkages should not interfere with each other. Set the control surface throws as shown on the plan.

20. RANGE CHECK YOUR RADIO SYSTEM; CHECK THE CENTER OF GRAVITY; RE-CHECK ALL ALIGNMENTS

Your model should balance at the point shown on the plan. If it doesn't, move the battery and/or receiver around until the model balances at the point shown. If additional balance weight is needed, add lead weights to the nose or tail to get the proper balance. Range check your radio at your flying site as per your manufacturer's recommendations. Recheck your wing and stab alignments. Make sure the rudder is 90 degrees to the fuselage. Check to see that all hardware is secure and that all equipment is in good condition.

21. TRIM THE MODEL

Make your first flights, with the help of an experienced modeler/flyer if this is your first model. The model may need some trim changes or adjustments to the control surfaces after the first flight. Adjust the control surfaces at the clevises until the model flies correctly.

SPORTSTER BIPE FOUR-CYCLE CONVERSION INSTRUCTIONS

The Sportster Bipe is a natural for 4-cycle experimentation. The unique looks of the Bipe just screams "4-Cycle" and the lightweight air-frame and symmetrical airfoil means the Sportster design will make the most of the 4-cycle fun. Whether you want to just "putter" around the sky, or loop, roll and snap, the Sportster/4-Cycle combination is unbeatable!

Four-cycle engines offer many benefits-their quiet, realistic sound is pleasing to modelers and non-modelers alike. High torque allows the use of high pitch or large diameter propellers for a new style of flight characteristics. They are also very fuel efficient for economical operation.

On the other side of the coin, 4 cycles are larger and heavier than equivalent power 2-cycles. That means some special care must be taken to avoid a nose-heavy airplane, such as moving the firewall and radio farther back than normal. We'll help you with that task with these instructions.

CHOOSING YOUR ENGINE

It's difficult to say what the optimum engine size is for your Sportster Bipe. The old rule of thumb was to choose a 4-cycle engine with 1-1/2 times the 2-cycle displacement for equivalent horsepower. But recent advancements by engine manufacturers have brought the power of 4 cycles way up and the weight of the engines down. One good example is the Enya .46 Four Cycle. This engine weighs just a fraction more than most 2-cycle .40's and it produces comparable power and thrust.

For the Sportster Bipe, you can choose between a .40 and .60 size four cycle. A .40 will give docile flight performance. A .60 provides plenty of thrust, but with a significant increase in weight and size. The .60 will fit, but it's going to be tight. See the full size drawings following of the Enya .46 and the OS FS-61 mounted in the Bipe.

CHOOSING A MOUNT

Low weight and rigidity are important in 4 cycle mounting. Hayes and Tatone both make good mounts for 4-cycle use. The Hayes AL-40 will fit the Enya .46. The AL-60 will fit the OS FS-61. Tatone produces aluminum mounts that are predrilled for individual engines.

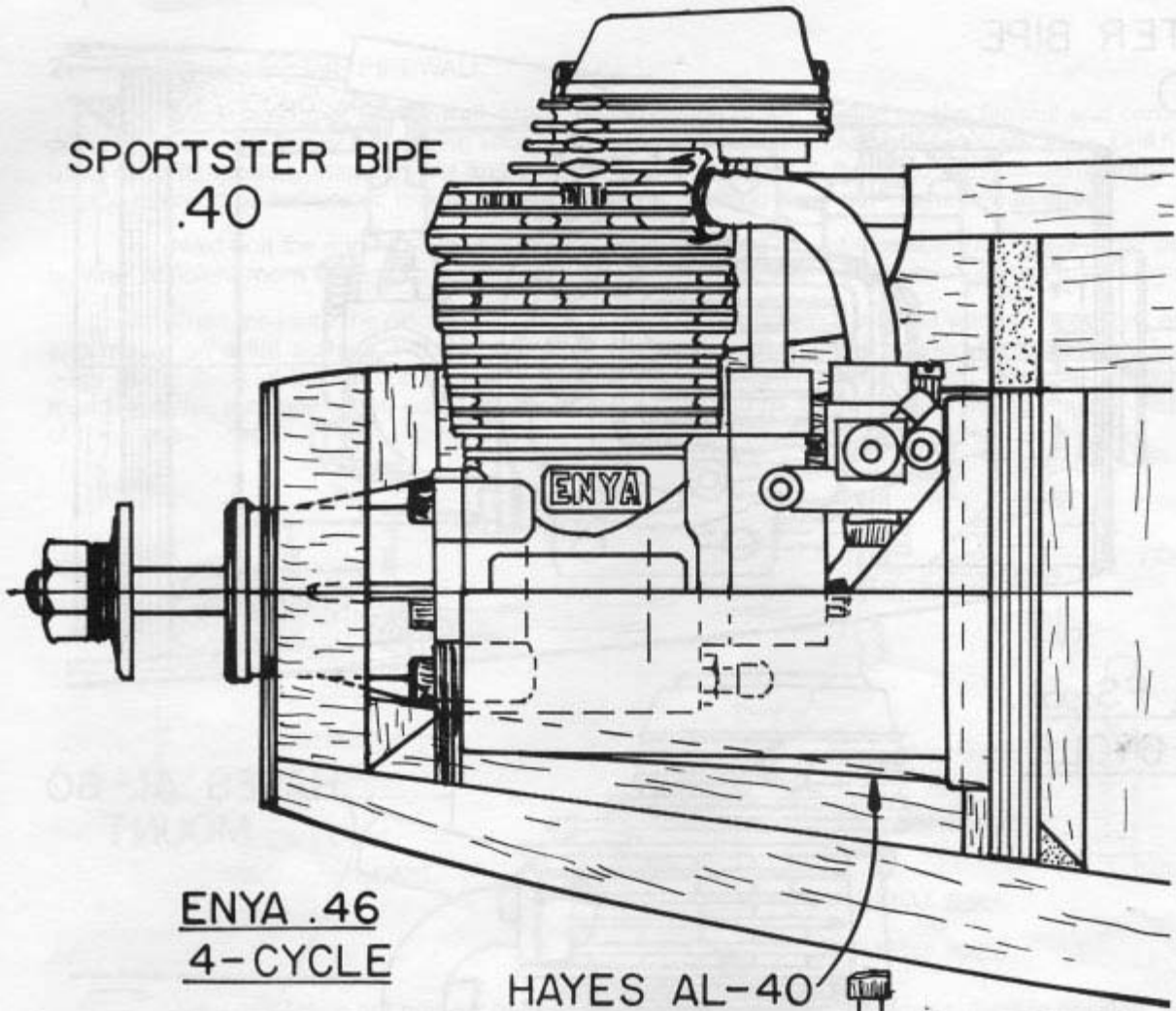
Both brands are lightweight. To improve rigidity, we recommend installing a front bulkhead. This essentially gives a beam mount system that is extremely rigid but makes removal of the mount a little more cumbersome.

BUILDING PROCEDURE

Following are new steps that refer to **4 cycle installation** to replace the steps in the front part of this book. Refer to these steps here as you build your model. Step numbers here refer to the step numbers in the front part of this book.

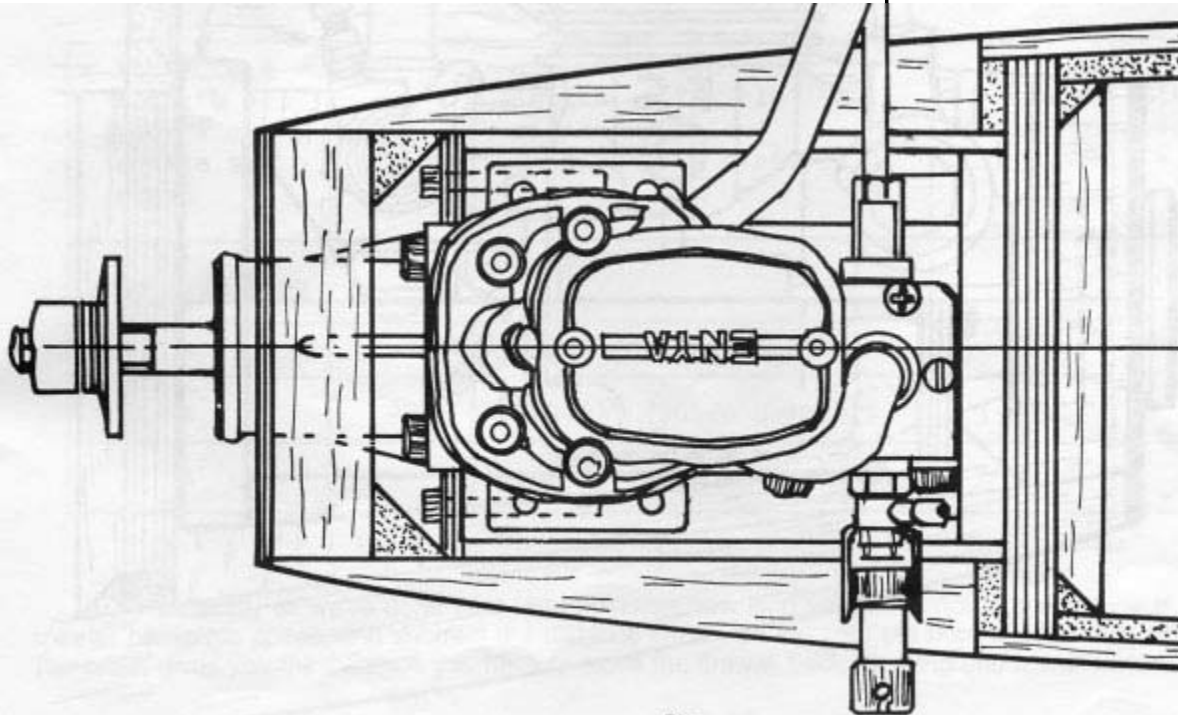
BUILDING THE FUSELAGE

SPORTSTER BIPE
.40

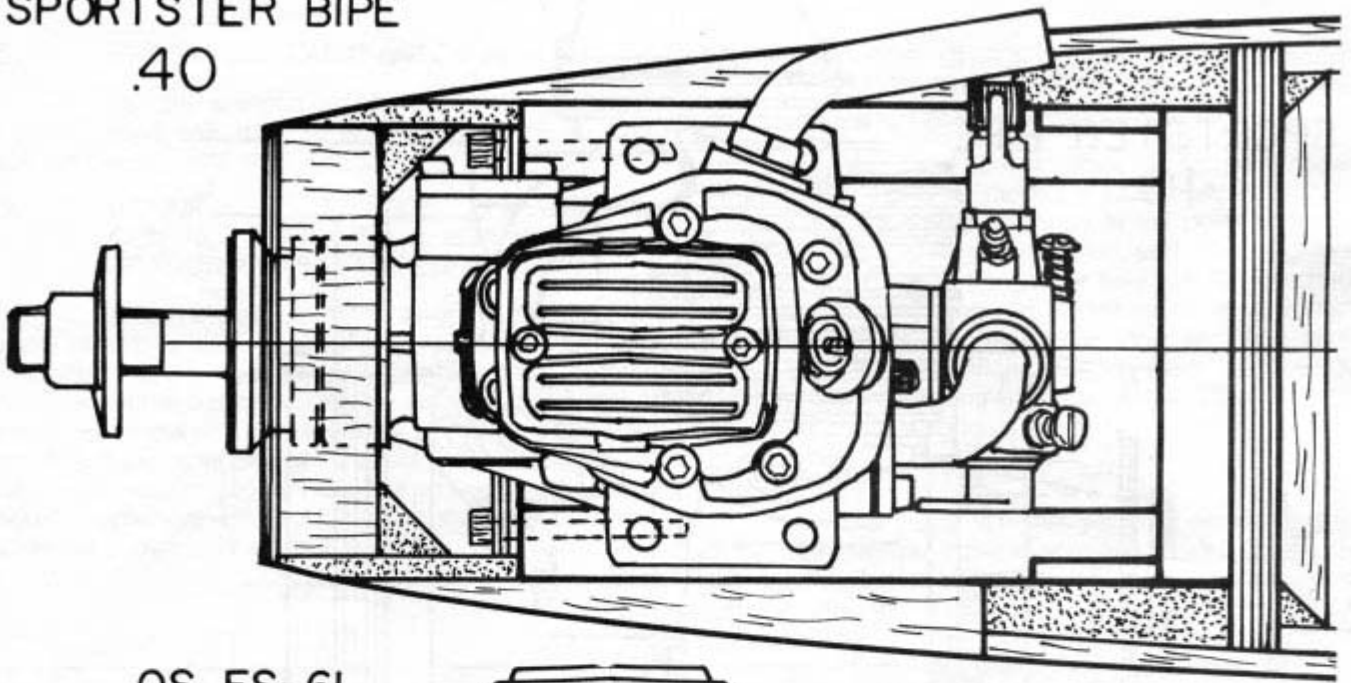


ENYA .46
4-CYCLE

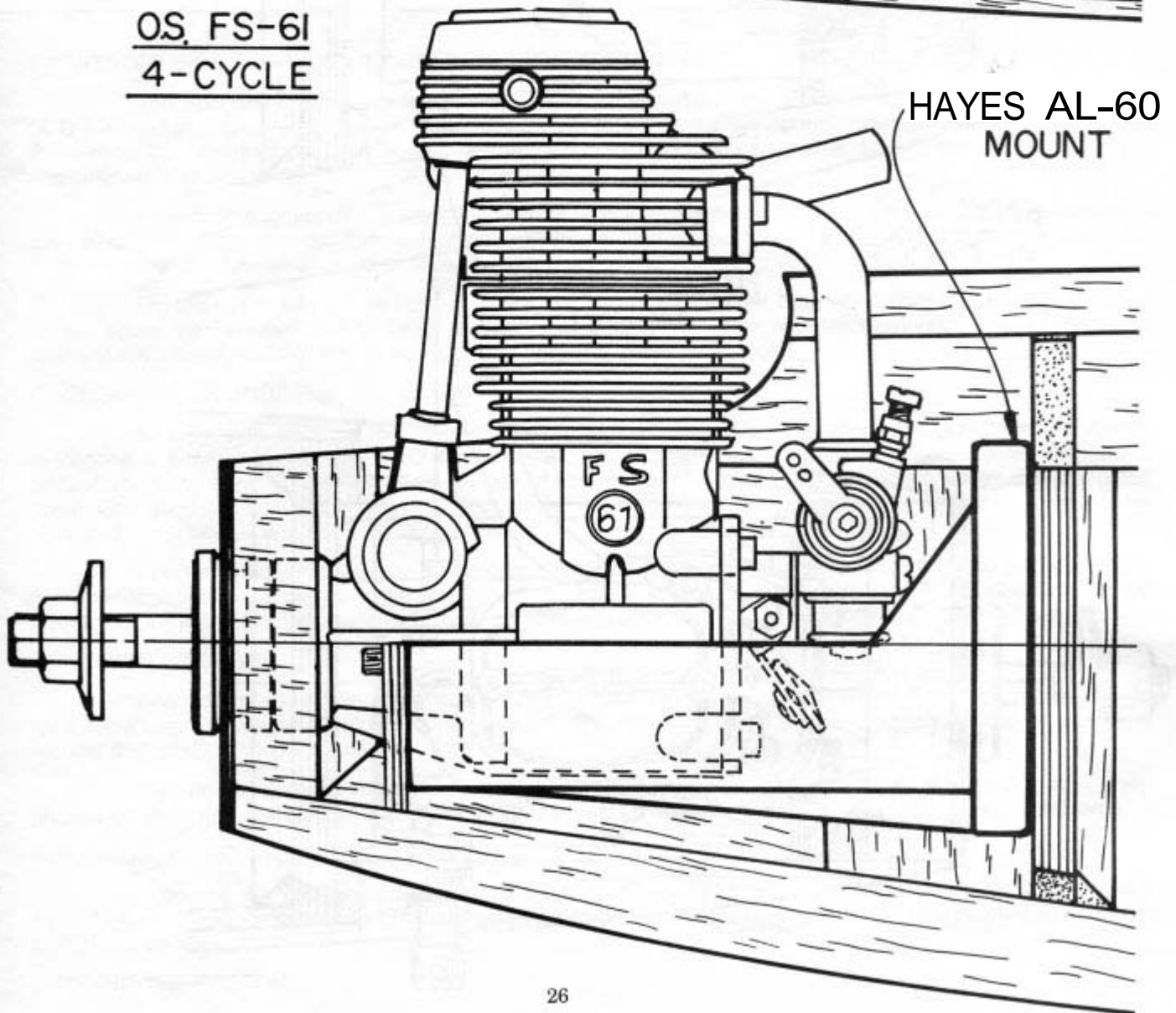
HAYES AL-40
MOUNT



SPORTSTER BIPE
.40



OS FS-61
4-CYCLE



2. □ PREPARE THE FIREWALL

Mark the top of the firewall. Mark the centerline of the engine on the firewall and center the mount in position. The thrust line of the engine should be in the same position as shown on your plan. Drill holes and install blind nuts. Temporarily install mount and trim the mount bolts that extend into the tank compartment. Drill hole for throttle pushrod to carburetor, making sure the throttle pushrod does not interfere with tank.

Next bolt the engine to its mount. If you use a Hayes mount, position the engine as far back as possible leaving sufficient room for engine and/or carburetor clearance. Make sure you don't put in any right or left thrust.

Then measure the distance from the back of the firewall to the thrust washer. To do this, place the engine and mount on a flat surface and put a straight edge across the thrust washer. Measure back from this straight edge to the back of the mount. This is distance "B". Refer to the drawings and the chart shown here. We are measuring this distance so we can determine how far back to move the firewall so the engine will fit into the nose of the model.

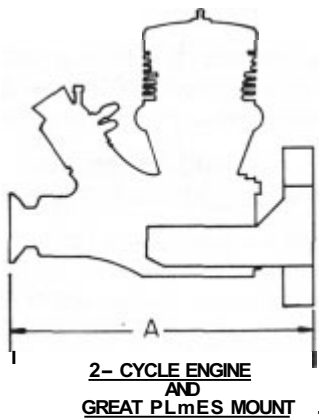


Figure 1

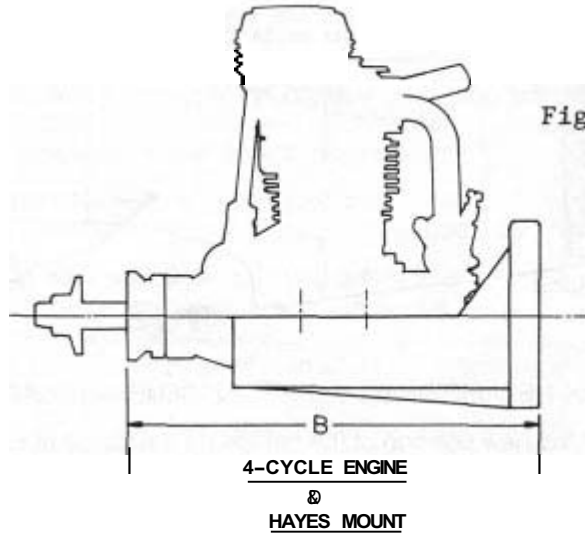


Figure 2

Now let's figure out how far back to move the firewall from the normal 2-cycle position. We have already figured out for you the "A" distance of the Sportster BiPe which is 3-3/4". The chart below also takes the spinner used into account. If you use a different spinner then mentioned, just measure your backplate depth and add that distance to the above measurement.

Distance B (length of your 4 cycle engine and mount	Minus	Distance A (length of 2 cycle engine/mount and spinner back plate)	Equals	? (Distance to move firewall back)
SPORTSTER BIPE				
B	-	3-3/4" (CB Spinner)		?
B	-	3-29/32" (Dubro Spinner)	=	?
B	-	3-7/8" (Goldberg Spinner)	=	?

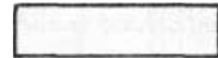
Basically all we've done here is to measure how long your new mount and engine is, allow for some spinner backplate space, and subtract the distance shown on the plan (A) from the distance you measured (B). The result gives you the distance you have to move the firewall back. See Figures 3 and 4 also.

Let's do an example to show this. Refer to the drawing showing the OS FS-61 in the Bipe. We are going to use a Goldberg Spinner. Our "B" measurement is 5-1/8 (measure from the front of the thrust washer to the rear of the mount. By looking at the information in Chart 1, we know that we have to subtract 3-7/8 (Distance A) from our distance B. The result is 1-1/4. We move the firewall back 1-1/4.

Example :

B	5-1/8
- A	- 3-7/8
?	1-1/4

Work Area: Your B



Your A



Move Firewall Back

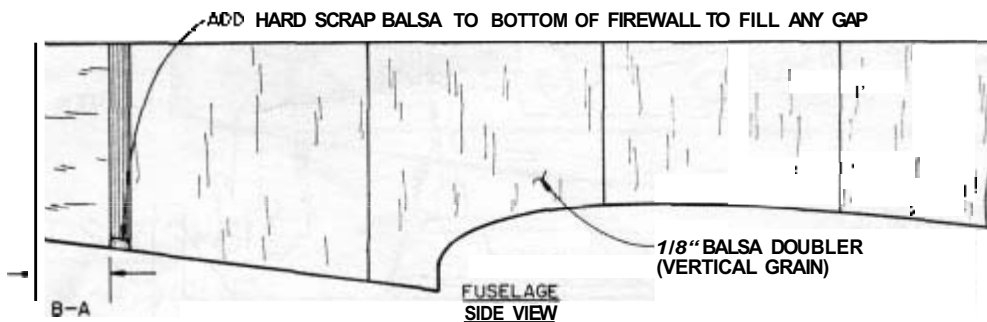


Figure 3

3. MARK NEW FIREWALL POSITION; GLUE ON DOUBLERS

Mark the new position of the firewall on the inside of each Fuselage side. Make sure your line is perfectly parallel to the front of the fuse sides. Using the firewall as a spacer, install the 1/8 balsa doublers crossgrain on the inside of the fuse side. Custom cut these pieces to fit. Do not glue the firewall in at this time. Use epoxy glue or thick CA to glue the doublers in place. The doubler should extend past Bulkhead #3. Carefully trim the doublers to the fuse side shape.

11. GLUE FIREWALL IN CORRECTED POSITION

Draw the corrected bulkhead #1 position on the top view of the plans. Next still working over the plans, glue bulkhead #1, the firewall, in place. Then add 3/8 (or 1/4 depending on your mount width-see Figures 4 and 5) scrap balsa filler blocks, vertically grained, forward of bulkhead #1. Sand the blocks flush with the fuse sides. Add 1/4 balsa filler below the firewall later when you remove the fuselage from the building board.

37. GLUE ON THE Balsa NOSE SIDE PIECES

Check for adequate width clearance for your engine. If your 4-cycle and mount is over 2-1/4 wide, you'll need to cut away part of the 1/2 nose side pieces and 3/8 scrap filler pieces in the engine mount area. Or you can custom make 3/8 balsa sides and 1/8 filler pieces as shown in Figure 5. Now follow step 37 in the front of this book and glue in the side pieces.

Next, if desired, add a front bulkhead as shown on the full sized drawings. Make this bulkhead from 1/8 plywood. Once the front bulkhead is epoxied in, drill the front of this bulkhead mount for 4-40 bolts. Then tap the mount and install 4-40 bolts.

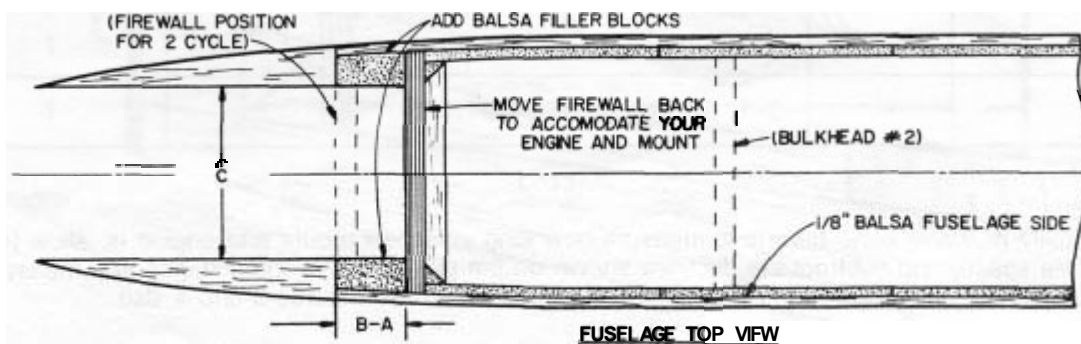


Figure 4

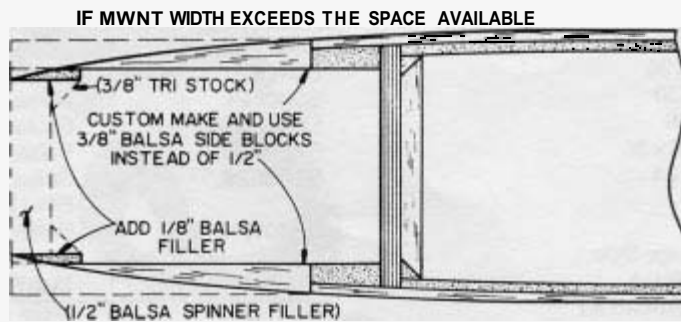


Figure 5

GENERAL INFORMATION

Center of gravity: A nose heavy airplane can be a problem! Make sure you check the CG location during construction with the radio components installed. You may need to put the radio as far back in the compartment as possible. This will avoid having to carry tail weight.

Props: Always start with the manufacturer's instructions (especially for break in) for prop selection. Read their instructions carefully because 4 cycles use entirely different diameter and pitch propellers because they operate at a lower RPM and produce greater torque than equivalent displacement 2-cycles.

You may find that after operating your sportster with recommended props that you'll want to experiment with other props. It is amazing how much you can change flight characteristics of a model by changing props.

If you are looking for higher flight speeds from your Bipe than you are getting from the average recommended prop, consider reducing the diameter and/or blade area slightly and increasing the prop pitch to bring the RPM back to the normal range. For example, with our Enya .46 equipped Sportster Bipe, the instructions recommend 13 x 5, 12 x 6, 11 x 7, 11 x 6, 10 x 6, 10 x 7 or 10 x 8 props. We started with an 11 x 7 propeller which gave us fair performance. Larger props will provide slower speeds...fine for big biplanes...but not what we wanted from our racy Sportster. For faster speed, we found that a 10-1/2 x 7-1/2 propeller added approximately 10 mph to the straight and level flight which help make vertical maneuvers crisper due to a faster entry speed. There is a trade off, however, as the engine idle was somewhat higher due to the lower mass of the wood 10-1/2 x 7-1/2 propeller. Four-cycles like flywheel weight from large diameter props. This made the plane land a little faster than with the 11 x 6. The prop we used was a prop designed for .60 size pattern engines, a Max Daily (Radio South) propeller. A similar prop is also available from DW Products. Their addresses are:

Radio South
180 E. Burgess
Pensacola, FL 32503

DW Products
5634 Crystal Ct.
Santa Rosa, CA 95404

Fuel Tank: For simplicity, we recommend a 2 line tank for your Sportster Bipe. If you can't easily reach the fuel line for fueling purposes, you might consider using one of the Dubro fueling valves. This will save extra plumbing that could leak or cause problems. Most 4 cycles have a small enough venturi that muffler pressure is unnecessary. Don't forget the crankcase drain line. A lot of excess fuel comes out of the pressure fitting. Make sure this drainage exits your fuselage. Treat it as though it were a separate exhaust.

Flying: Other than the obvious difference, you'll notice one other big difference from your first take off with a four cycle equipped Sportster Bipe: You'll need to add more right rudder than normal to counter the increased torque on acceleration during takeoff. Also, you may be surprised how big an effect the larger propeller may have on abrupt change maneuvers such as a square loop. Because there is more mass to the propeller, it has a larger gyroscopic force. When you change directions in maneuvers like a square loop, you may find that the plane changes heading. This may be a result of gyroscopic precession and/or P-factor. These factors become more prevalent with larger diameter 4 cycle props and with slower speeds generally encountered with these engines.

Also don't forget to have a slight amount of toe-in with your main wheels. Toe out and lot's of torque can cause problems with ground handling. Use some toe-in, add some rudder and your takeoffs will be in a straight line.

GOOD LUCK AND GREAT FLYING!

SPORTSTER BIPE 40 PARTS LIST

PARTNUMBER	QTY	DESCRIPTION	PARTNUMBER	QTY	DESCRIPTION
BALO19	3	Balsa Triangle 1/4x36	SS4OF22	1	Balsa 1/8 Former4A
BAL047	1	Balsa 1/8x1/4x36	SS4OF23	1	Balsa 1/8 Former5A
BAL053	5	Balsa 1/16x3x30	SS4OF24	1	Balsa 1/4 Former6A
BAL072	✓1	Balsa 1/8x3x36	SS4OF25	1	Balsa 1/8 Former3B
BAL073	5	Balsa 1/16x3/16x36	SS4OF26	1	Balsa 1/8 Former6B
BAL084	✓2	Balsa 3/32x3x24	SS4OF28	2	Balsa 5/8 Stallizer Filler Block
CANPY017	✓1	Canopy	SS40W13	4	Balsa 1/4x5/8x3 Leadina Edge Filler
MM40U	✓1	Motor Mount	SB40MO1	1	Sub Pack-ardware
SB4OFO1	✓2	Balsa 1/8 Fuselage Side	METAL001	5	Metal Gear Hold Down Straps
SB4OFO2	1	Balsa 1/8 Deck Base	NUTS001	4	4-40 Blind Nuts
SB4OFO3	1	Plywood 1/4 Bulkhead#1	NYLON03	2	Nylon Control Horn
SB4OFO4	1	Plywood 1/4 Bulkhead#2	NYLON09	2	Nylon Hinges
SB4OFO5	1	Balsa 1/4x3x3-11/16 Bulkhead#3	NYLON10	2	Nylon Aileron Connector
SB4OF10	2	Balsa 1/2 Side Block	NYLON13	3	Nylon 1/4-20 Wing Bolt
SB4OF30	1	Balsa 1/8x3x4-1/2 Cockpit Floor	SCRW002	4	2-56x5/8 Screw
SB4OF35	1	Balsa Triangle 112x6	SCRW003	4	4-40x1 Bolt
SB4OF36	1	Balsa 5/8 Chin Block	SCRW015	2	4-40x1/8 Set Screw
SB4OPO1	✓1	Plans	SCRW024	18	#2 x 38 Screw
SB4OPO2	✓1	Instruction Book <i>S/B"</i>	WBNT002	1	Wire 3/32 Aileron Torque Rod Set
SS4OW07	1	Balsa 1/2 Wing Fairing Front	WBNT009	1	Wire 3/32 Tail Wheel Assembly
SB4OW08	1	Balsa 3/16x3-3/4x3-3/4 Wing Fairing Rear	WBNTIOI	1	Wire Elevator Joiner
SB4OW10	4	Balsa 3/16 Wing Tip	WHCLOO4	2	3/32 Wheel Collar
SB4OW11	2	Balsa 5/8 Center Trailing Edge	WIREF12	1	Wrap Wire
SB4OW17	1	Balsa Tapered 3/8 Center Trailing Edge	SB40M02	1	Sub Pack Gear/Cabane Wire
SB4OW18	1	Balsa 114x3x11-7/8 Wing Tip Filler	METAL009	2	Metal Cabane Mounting Plate
SB4OW19	1	Balsa 1/4x9/16x9-7/8 Spar Filler	WBNT080	2	Wire Cabane Brace
SS4OFO7	1	Balsa 3/8x3-1/2x11 Hood Top	WBNT081	1	Wire 5/32 Main Gear
SS4OFO9	2	Balsa 114x1-3/8x17-112 Hood Side	WBNT082	2	Wire 1/8 Cabane
SS4OF29	1	Balsa Triangle 318x12	WBNT089	1	Wire 1/8 Main Gear Brace
SS4OR01	✓1	Balsa 114 Fin Front	SB40W01	1	Sub Pack-Topwing Parts
SS4OR02	1	Balsa 114 Fin Rear	SB40W02	8	Balsa 1/4x1/4x24 Spars/TE
SS4OR03	1	Balsa 1/4 Rudder	SB4OW03	3	Balsa 1/4x1/2x24 LE
SS4OSO1	✓1	Balsa 114 Stabilizer Front	SB4OW04	4	Balsa 1/16x2-1/8x24 LE Sheeting
SS4OS02	✓1	Balsa 1/4 Stabilizer Rear	SB4QW05	4	Balsa 1/16x7/8x24 TE Sheeting
SS4OS03	✓2	Balsa 114 Elevator	SB4OW20	2	Balsa 3/8x24 Tapered Trailing Edge
SS4OW09	1	Balsa Tapered Center Rib	SB40W14	1	Sub Pack-Bottom Wing Parts
RIBS010	1	Sub Pack-Upper Wing Rib Set	SB40W02	4	Balsa 1/4x1/4x24 Spars
RIB0047	✓3	Balsa 3/32 Notched Ribs	SB4OW03	4	Balsa 1/4x1/2x24 LE
RIB0048	✓12	Balsa 3/32 Ribs	SB4OW04	4	Balsa 1/16x2-1/8x24 LE Sheeting
RIBS049	1	Sub Pack-Lower wing Rib Set	SB4QW05	4	Balsa 1/16x7/8x24 TE Sheeting
RIB0049	1/16	Balsa 3132 Ribs	SB4OW20	2	Balsa 3/8x24 Tapered Trailing Edge
SB40A01	✓1	Parts Bag-Fuselage and Wing Parts	SB40W14	1	Sub Pack-Bottom Wing Parts
PLY3001	1	Plywood Spinner Ring	SB40W02	4	Balsa 1/4x1/4x24 Spars
SB4OF14	1	Plywood 1/2 Landing Gear Block	SB4OW03	4	Balsa 1/4x1/2x24 LE
SB4OF17	4	Plywood 1/14x7/8x3 Wing Hold Down	SB4OW04	4	Balsa 1/16x2-1/8x24 LE Sheeting
SB4OF32	4	Plywood 1/4 Cabane Brace (Short)	SB4OW05	4	Balsa 1/16x7/8x24 TE Sheeting
SB4OF33	4	Plywood 1/16x1/2x1-1/2 Brace Cap	SB4OW06	2	Balsa Tapered 5/8x17-1/2 Aileron
SB4OW12	2	Plywood 1/4 Cabane Brace (Long)	SS4OF31	1	Sub Pack-Strainers
SB4OW15	1	Plywood 1/16x2x3-1/4 Wing Plate	SS4OFI1	1	Balsa 1/4x1/4x16 Stringer
SB40A02	1	Sub Pack-Fuselage and Wing Parts	SS4OF12	8	Balsa 1/8x1/4x16 Stringer
SB4OF34	1	Balsa 118x3/4x3 Falsa Bulkhead	WPM DU	1	Wheel Pants Set
SS4OF16	1	Balsa 2-1/4x2-1/4x1/2 Nose Filler Block	GLTP001	1	Fiberglass Tape 8"
SS4OF18	1	Balsa 1/4 Former 1A	METAL007	2	Brass Plate
SS4OF19	1	Balsa 1/4 Former 2A	SCRW024	4	#2 x 38 Screw
SS4OF20	1	Balsa 1/4 Former 3A	WPNT002	2	ABS Wheel Pant
SS4OF21	1	Balsa 1/4 Dash			

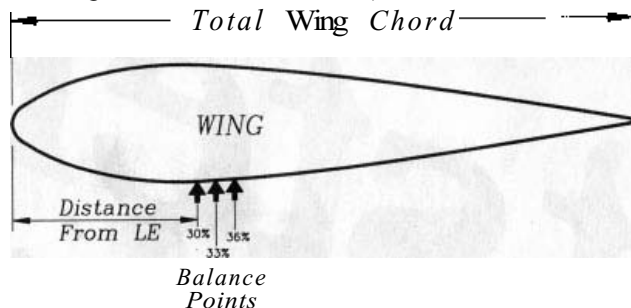
Sportster

Use trim MonoKote and these letters to create your trim scheme on your Sportster.

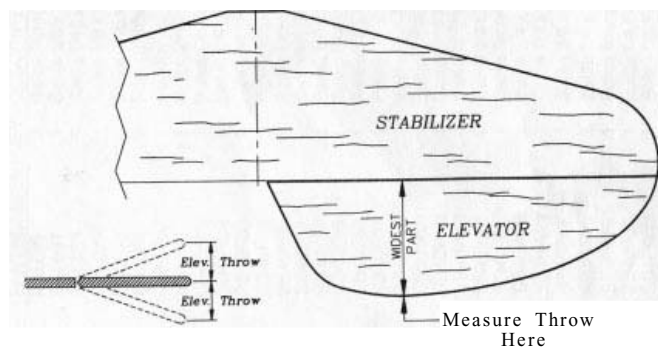
GREAT PLANES PRODUCT IMPROVEMENT SHEET

INSTRUCTIONS FOR BALANCING YOUR SUPER SPORTSTER

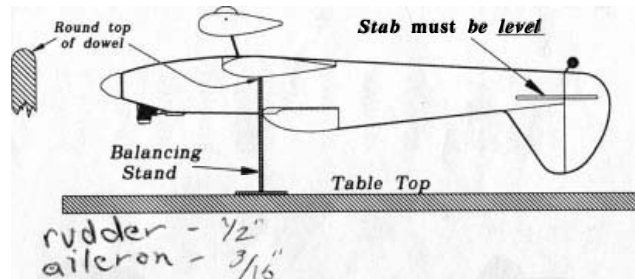
The recommended balance point for the Super Sportsters is shown on the plan, and is located approximately **29%** back from the leading edge. However, all Sportsters have been thoroughly test flown as far back as **36%**, and found to be completely stable throughout the entire range from **29% to 36%**. (These numbers represent a percentage of the total wing chord, as shown in the sketch).



If, when balancing your Super Sportster, you find it necessary to add several ounces of nose weight to balance it at the location shown on the plan, it is preferable to balance farther **aft**, up to 36% (the aft limit), rather than adding a lot of weight. As you balance farther aft, however, the airplane will become more responsive to elevator control; therefore, you should reduce the maximum elevator **throw** in accordance with the table of "Recommended Maximum Elevator Throws." The elevator throw is measured at the widest part of the elevator, as shown in the sketch.



The best way to balance your Super Sportster is to make a Balancing Stand from a square of 1/4" plywood and two 3/8" dowels. Mark the fore and aft limits of the balance range on the top of the wing (on both sides of the fuselage), and place the airplane upside down on the balancing stand as shown in the sketch (empty fuel tank). Move the airplane forward or aft on the stand until it balances with the stab level. If it balances outside the **29% to 36%** range, you must either shift the location of radio components or add weight to the nose or tail until it balances within the range.



Take note of where the airplane balances. If it balances near the front of the recommended range, then adjust the linkages to your elevator to provide the maximum throw listed in the 29%-30% column in the table below. If it balances near the middle of the range, set your elevator for the maximum throw listed in the 33% column. If it balances near the aft limit of the range, set your elevator for the maximum throw listed in the 36% column.

MODEL	RECOMMENDED MAXIMUM ELEVATOR THROWS FOR VARIOUS BALANCE POINTS		(33%)		(36%)	
	(29-30%) LE to CG	MAX. ELEV.	LE to CG	MAX. ELEV.	LE to CG	MAX. ELEV.
SPORTSTER 20	2-11/16"	[5/16"]	2-15/16"	[9/32"]	3-3/16"	[1/4"]
SPORTSTER 40	3"	[3/8"]	3-3/8"	[11/32"]	3-5/8"	[5/16"]
SPORTSTER 60	3-5/16"	[7/16"]	3-3/4"	[13/32"]	4-1/16"	[3/8"]
SPORTSTER 90	3-15/16"	[3/4"]	4-3/8"	[11/16"]	4-13/16"	[5/8"]
SPORTSTER BIPE	1-1/2"	[3/8"]	1-7/8"	[11/32"]	2-1/16"	[5/16"]

MEASURED BACK FROM THE LE OF BOTTOM WING

WARNING! If you balance your Super Sportster aft of the plan location but fail to reduce the maximum elevator throw, the elevator may over control the pitch of the airplane, and may result in unwanted stalls and "snap rolls"!