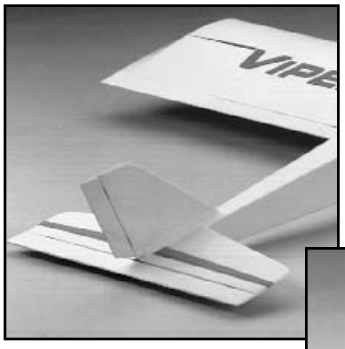
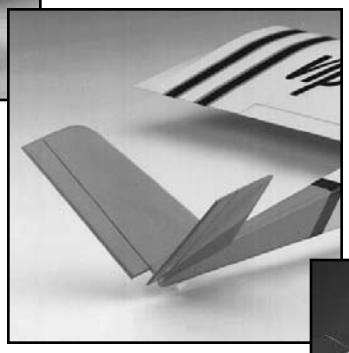
HOBBICO® VIPER™



Stock tail design

- **Comes 70% prebuilt, requiring very little sanding.**
- **Control surfaces are preshaped and ready for covering.**



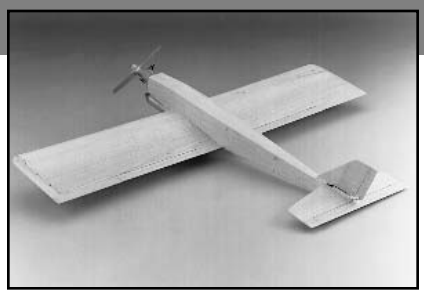
V-tail design
(optional)

- **Wing features balsa sheeting over foam core.**
- **Meets all requirements for Quickie 500 racing.**

Mid-tail design
(optional)

- **Can be customized with three different tail configurations**

Congratulations upon purchasing your new Viper RTC kit. The Viper RTC is assembled with only the finest materials and workmanship so you can enjoy the fun of flying more quickly and easily than ever before. We have completed 70% of the assembly. All that needs to be done is final assembly and covering - you can customize. This airplane is a joy to fly and promises hours of pure enjoyment. If Quickie 500 racing is your goal., you will find the Viper to be a very competitive performer in the racing circles. For more information on Quickie 500 racing, contact the Academy of Model Aeronautics at the address shown below.



Academy of Model Aeronautics
5151 E. Memorial Drive
Muncie, IN. 47302
Tel. (317) 289-4236

AMA SINCE 19

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About this manual:

Two decisions must be made before construction of this airplane can begin.

1. What size engine will be used?
2. What style of tail will be used?

1. Engine Size:
If a .25 size engine is to be used for powering your Viper, no additional reinforcement is required to the nose. You may skip the steps with the checkered flag (▀). If a .40 size engine is going to be used, complete the steps marked with a checkered flag (▀).

2. Tail Configuration:
Conventional Tail: This is a normal tail and all of the wood required to build this version is included with this kit. This is the easiest of the three versions to build and is highly recommended for flyers/builders with limited building experience.

Mid-Tail: The mid-tail offers a very unique appearance to the Viper as well as offering better elevator response. This is due to the fact the stabilizer and elevator are out of the wing slip stream. Although the mid-tail is not difficult to build, it will require careful attention to insure the stabilizer and fin are square.This can be either an aerobatic or racing configuration and requires some additional 3/16" balsa to complete.

V-Tail: The V-tail version is slightly more difficult to build than the other two versions. Extra care must be taken to make sure the tail assembly is square, level and at zero incidence. V-tail airplanes theoretically reduce drag because there is only two control surfaces. This is primarily a racing configuration and 3/16" balsa is required for completion. This configuration is not recommended for beginners. This also requires a radio that mixes V-tails or an electronic mixer for elevator/rudder.

90-Day Limited Warranty

If you, as the original owner of this model, discover defects in parts or workmanship within 90 days of purchase, Hobbico will repair or replace it—at the option of our authorized U.S. repair facility, Hobby Services— without charge. Our liability does not include cost of shipping to us. However, Hobby Services will pay shipping expenses to return your model to you.

You must provide proof of purchase, such as your original purchase invoice or receipt, for your model's warranty to be honored.

This warranty does not apply to damage or defects caused by misuse or improper assembly, service or shipment. Modifications, alterations or repair by anyone other than Hobby Services voids this warranty. We are sorry, but we cannot be responsible for crash damage and/or resulting loss of kits, engines, accessories, etc.

Repair Service

Your Viper must be returned directly to Hobby Services for warranty work. The address is:

Hobby Services
Attn: Service Department
1610 Interstate Drive
Champaign, IL 61821-1067
Phone: (217) 398-0007
Hours: 9:00-5:00 CST Mon. thru Fri.

Please follow the instructions below when returning your model. This will help our experienced technicians to repair and return it as quickly as possible.

1. ALWAYS return your entire kit.
2. Include a list of all items returned and a THOROUGH, written explanation of the problem and service needed. If you expect the repair to be covered under warranty, also include your proof of purchase.
3. Include your full return address and a phone number where you can be reached during the day.

If your model is past the 90-day warranty period or is excluded from warranty coverage, you can still receive repair service through Hobby Services at a nominal cost. Repair charges and postage may be prepaid or billed COD. Additional postage charges will be applied for non-warranty returns. All repairs shipped outside the United States must be prepaid in U.S. funds only.

All pictures, descriptions and specifications found in this instruction manual and on the product package are subject to change without notice. Hobbico maintains no responsibility for inadvertent errors.

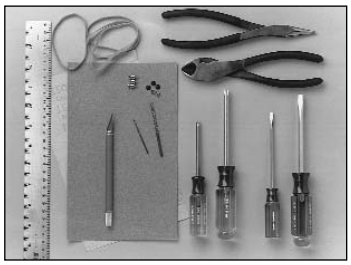
Other items you'll need:

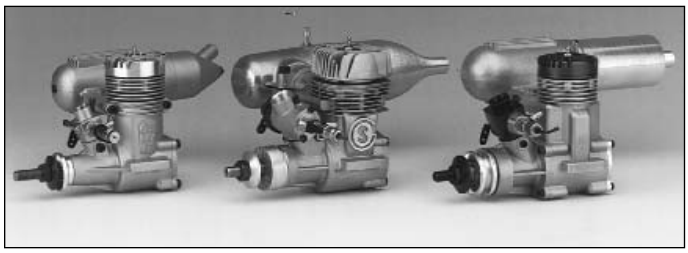
Glues

Choose any 5- or 6-minute epoxy, such as Hobbico Bullet, which has been formulated especially for R/C model building. Epoxies offer a strong bond and a variety of curing times suited for every step of assembly. You'll also need an instant-setting CA (cyanoacrylate), a thicker CA+, and a 30-minute epoxy, plus rubbing alcohol for easy epoxy cleanup.

Hardware

Tools and accessories required for assembly include a hobby knife; flat tip screwdriver; file; needle nose pliers; drill bits; ruler; and 3 feet of medium fuel tubing.





Model Engine

Power your Viper with any high-quality, .25-size model engine. The O.S. ..25 FP, SuperTigre G-34 and Irvine .25 RC are just a few examples. Look for features such as easy break-in, easy starting, efficient carburetion and low maintenance. Check the manufacturer's recommendations for propellers to use with your engine. For Quickie 500 racing you will want to choose a high performance, .40 size engine.

Radio Equipment

To let you send the commands that control your Viper's "flight path," you'll need a 4-channel aircraft radio system with four standard servos. Many 4-channel radios include just three servos. You may need to purchase the fourth separately. The servos and radio receiver will be mounted on-board your model and need to be cushioned from jolts and vibration. One-quarter inch thick foam rubber sheets are available for this purpose.

Getting Ready for Flight

Your Hobbico Viper is ready for takeoff in as little as 15-20 hours. Your hobby dealer can help you decide what accessories you'll need for flight. You will need glow fuel with a 10-15% nitro blend to keep your engine performing at its peak...and your Viper will have the power to perform the impressive aerobatic maneuvers.

Other General Items Required

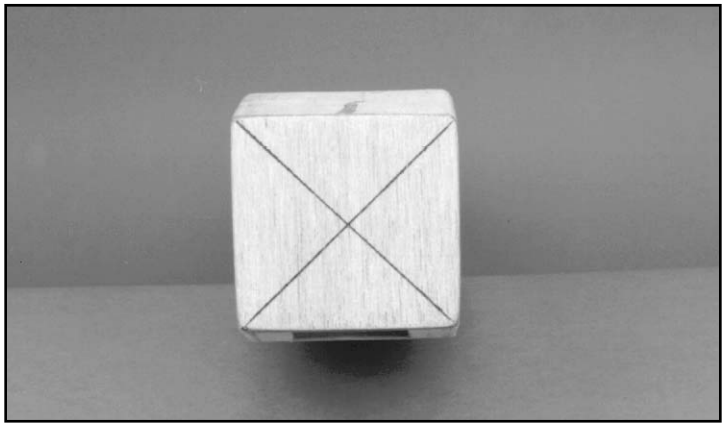
Masking Tape	Covering Material	Hex Wrench for #6-32 Bolt	Drill and Drill Bits:
Fine Line Felt Tip Pen	Sealing Iron	3M "77" Spray Adhesive	1/16", 1/8", 9/64", 5/32", #7
A Wooden Match	1/4"-20 Tap	90Þ Triangle	or 3/16", 1/4"
Balsa Filler	Engine Mount	Sand Paper (220 grit)	

Additional Items Required for Optional Quickie Racer, V-Tail or Mid Tail

1 sq. Yard 2oz. Fiberglass
3/16 Hard Balsa (V-Tail and Mid Tail)
Wire and Tube Pushrod
Cable Pushrod (for throttle)
6 oz. Hayes Fuel Tank
Candle Wax
45 Minute Epoxy

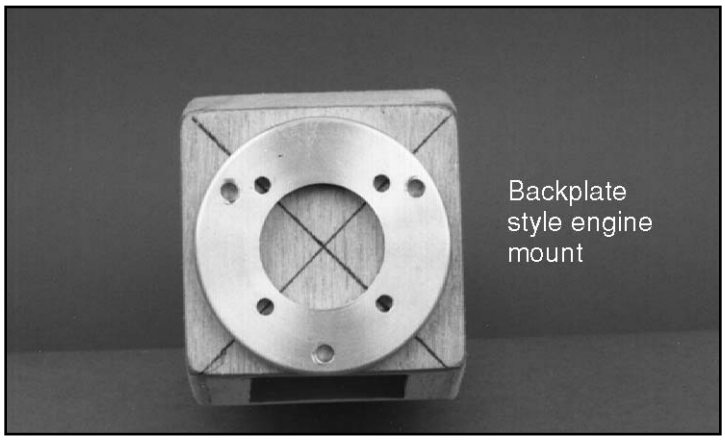
FUSELAGE PREPARATION

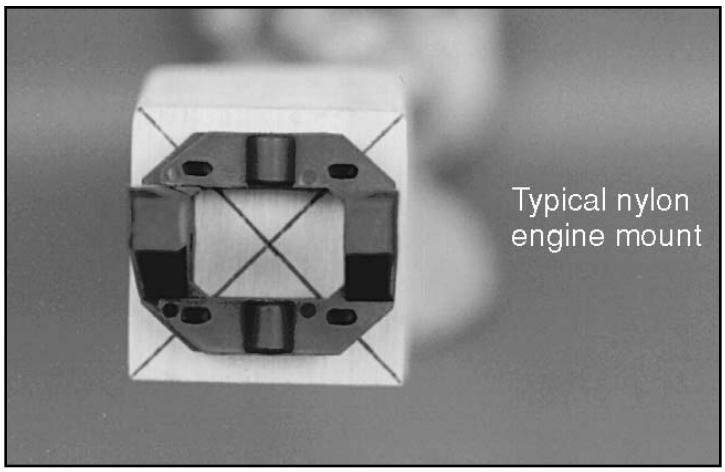
Marking firewall for engine mount



☐ **1.** With a straight edge, draw lines from corner to corner on the firewall. This will help you position the engine mount.

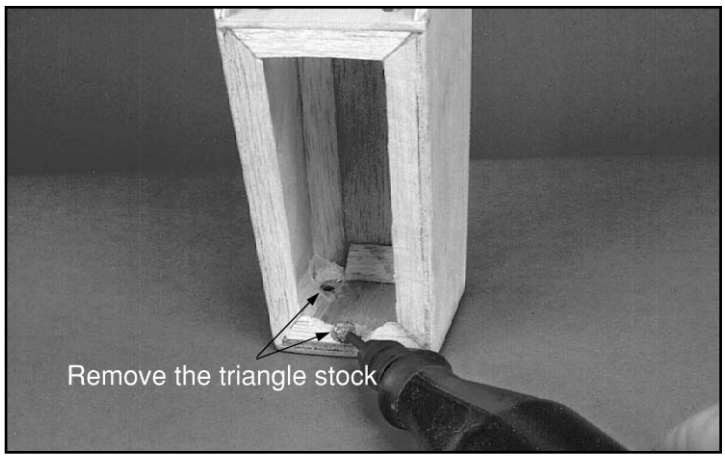
Drilling holes for engine mount





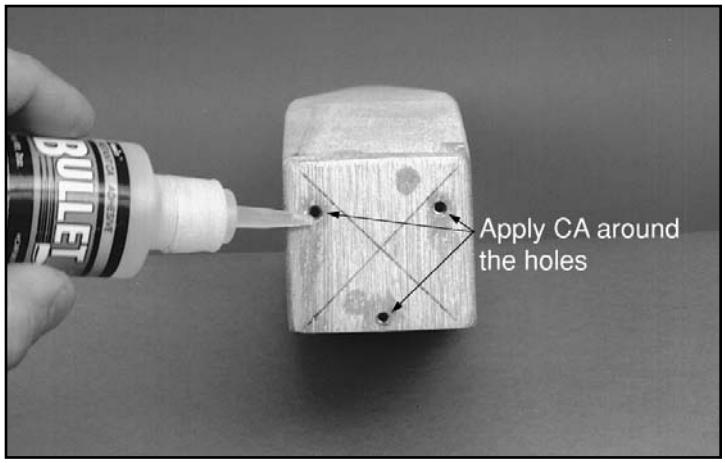
☐ **2.** Center the engine mount on the firewall using the lines as a reference. Mark and drill 5/32" (4mm) holes according to the motor mount you plan to use.

Installation of blind nuts



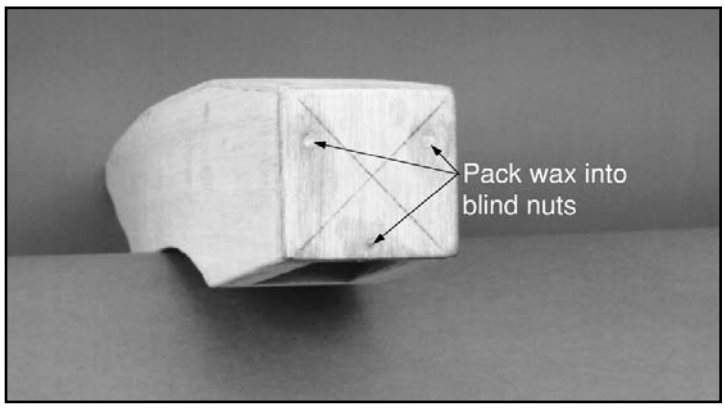
☐ **3.** Using a file or a Moto-Tool™, remove the triangle stock around the holes drilled through the firewall. This creates a flat surface to mount the blind nuts against. Install #6-32 blind nuts into the holes and apply thick CA to secure them in place.

Hardening blind nut holes



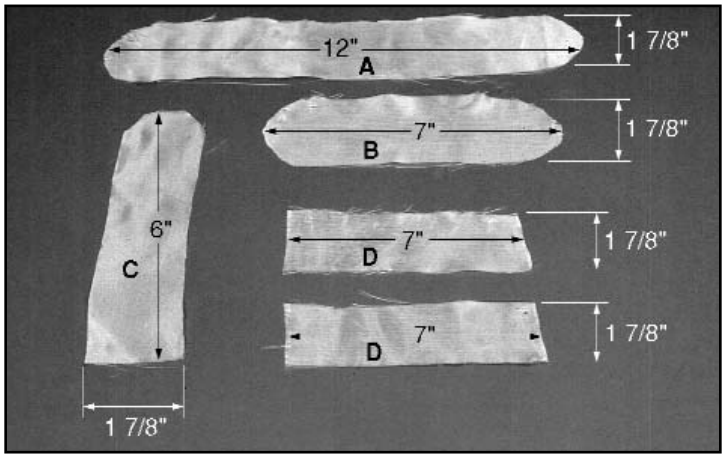
☐ **4.** Apply thin CA to the outside of the holes to harden the firewall around the blind nuts.

Protecting blind nut threads



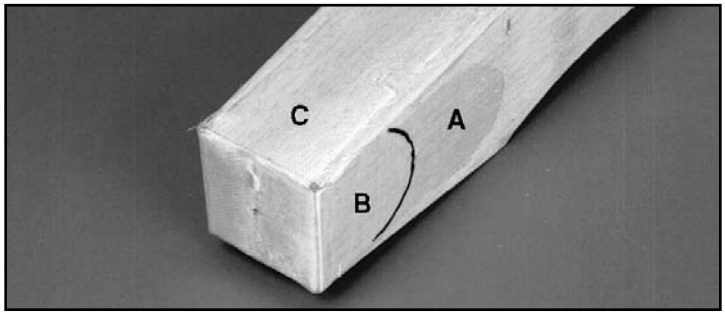
☐ **5.** Pack wax into each of the blind nuts to protect the threads from being clogged by epoxy.

Cutting fiberglass cloth



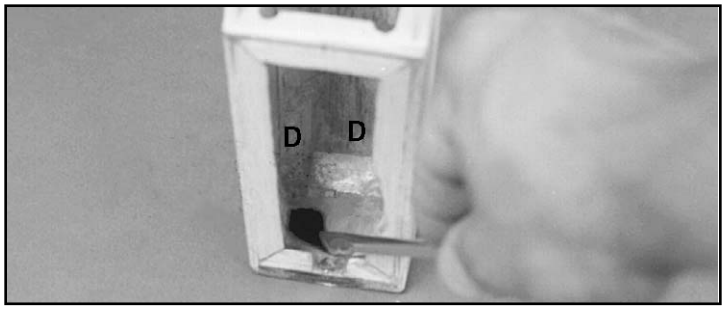
☐ **6.** Cut (5) pieces of 2 oz. fiberglass cloth as shown. Mark the center of pieces A, B, and D.

Installing the fiberglass cloth



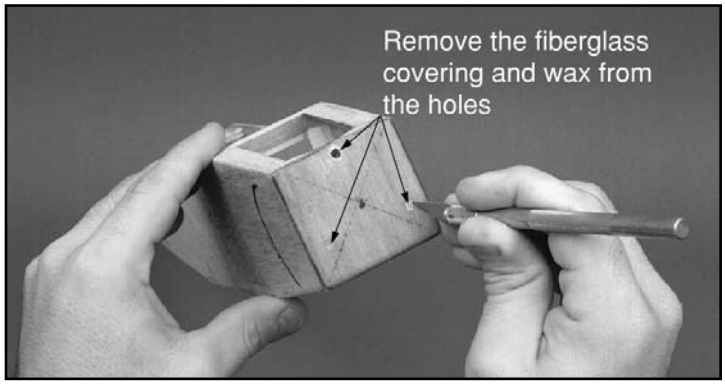
☐ **7.** Apply a very light coat of 3M "77" spray adhesive to the nose of the fuselage. Place the center of piece "A", cut in the previous step, at the center of the firewall and wrap the remainder around the left and right sides of the fuselage. Wrap piece "C" starting at the bottom of the firewall up over the top of the fuselage. Wrap piece "B" starting at the center of the firewall over pieces A and C and around the sides of the fuselage. Coat the fiberglass cloth with 45 minute epoxy and remove all excess epoxy with a squeegee.

Fuel proofing the fuel compartment



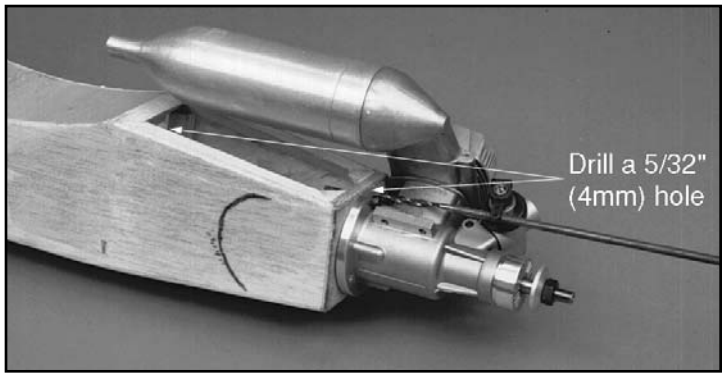
☐ **8.** Install piece "D" of the fiberglass cloth on the inside, wrapping from one side over the firewall to the other. Install the other piece "D" from the bottom of the firewall to the top of the fuselage. Completely coat the entire fuel tank compartment, making sure all of the fiberglass is saturated and the fuel compartment is fuel proof.

Opening the blind nuts



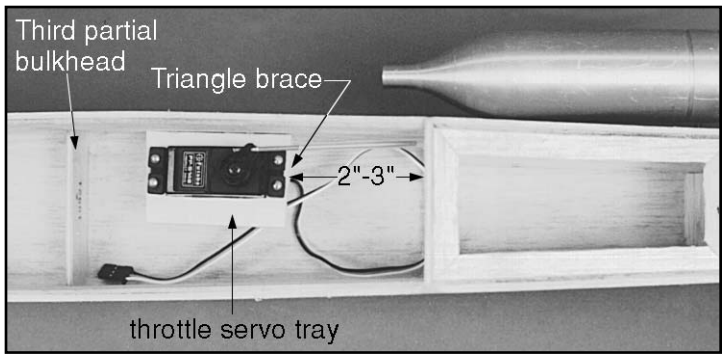
☐ **9.** Using a hobby knife, remove the fiberglass covering the bolt holes. Pick the wax out of each of the blind nuts.

Drilling hole for throttle rod tube



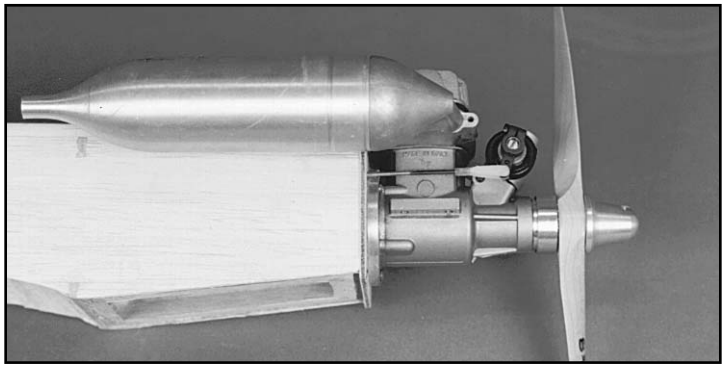
☐ **10.** Using a 5/32" (4mm) drill bit, drill a hole through the firewall directly behind the throttle arm. This will be the hole for the throttle rod tube. Drill another hole through the second bulkhead and in the most direct path to the throttle servo. Make sure it does not interfere with the wing saddle. Note: A long drill bit is shown but not nexessary.

Installation of throttle servo tray



☐ **11.** Using a file, enlarge the throttle servo tray hole to accommodate the servo being used. Then, with thick CA, install the throttle servo tray as shown. Make sure that enough room is left under the servo tray to accommodate the throttle servo you'll use. Also make sure the throttle servo will not interfere with the aileron servo. Install the servo tray 2" to 3" from the second bulkhead. Locate the triangle brace and install it under the front portion of the servo tray using thin CA. Mount the throttle servo according to the manufacturer's recommendations.

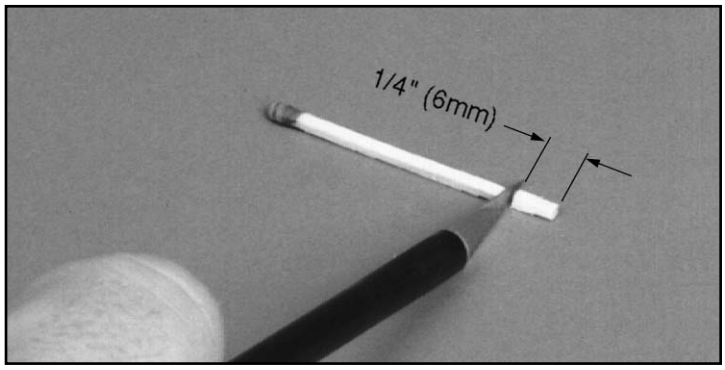
Installation of throttle rod



☐ **12.** Roughen the entire throttle rod tube using sandpaper. Slide the tube through the hole in the firewall and the first bulkhead. Slide the rod into the tube and direct the rod straight to the servo arm with as little bending as possible. Apply epoxy to the tube where it goes through the firewall and the first bulkhead. Also attach the tube securely to the side of the fuselage. Thread a clevis onto the throttle pushrod. Slide the pushrod into the tube and out past the servo. Mark the pushrod where the pushrod crosses the outside hole of the throttle servo arm. Place a "Z" bend at this mark. Connect the "Z" bend to the throttle servo arm. Adjust the pushrod using the clevis. Note: It may be necessary to replace the pushrod with a cable in some engine positioning situations.

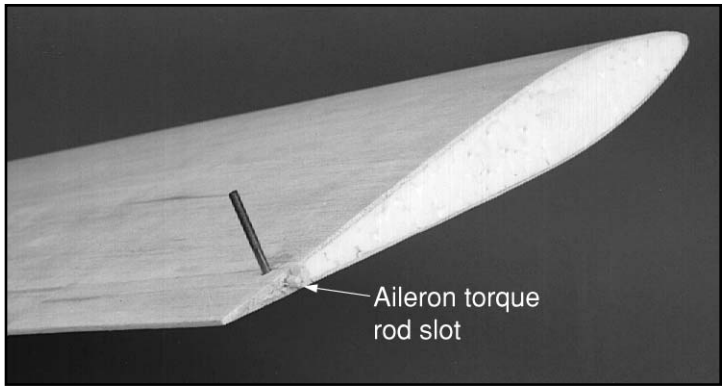
ASSEMBLY OF WING

Making an alignment peg



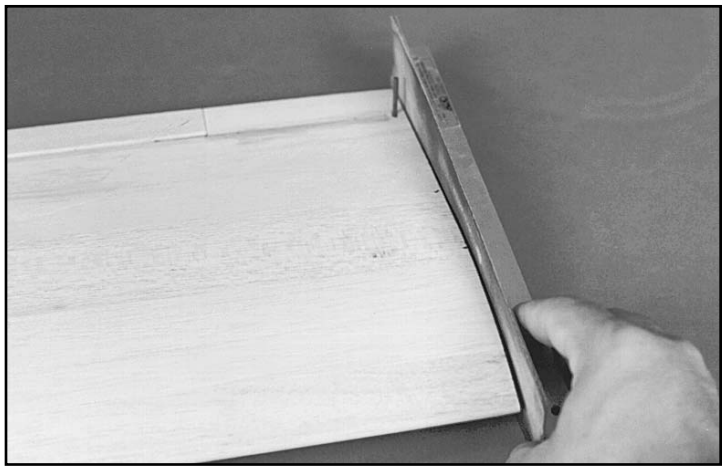
☐ **1.** Cut about 1/4" (6mm) off the end of a wooden match or similar piece of wood.

Installation of alignment peg



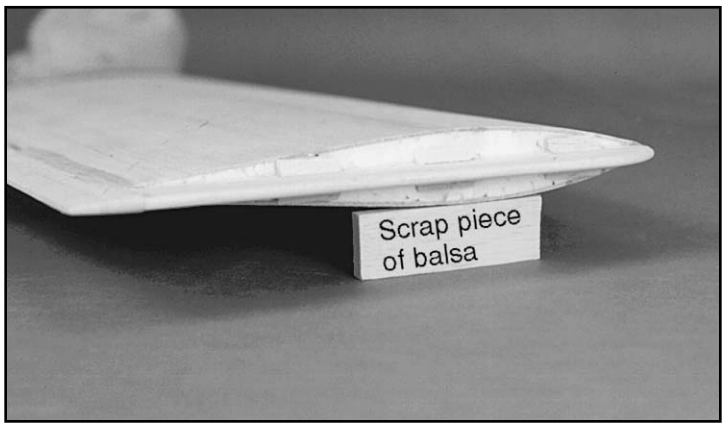
☐ **2.** Using thick CA, glue the piece of match into the hole in the aileron torque rod slot in the trailing edge of one of the wing panels. This will serve as an alignment peg.

Trial fitting wing halves



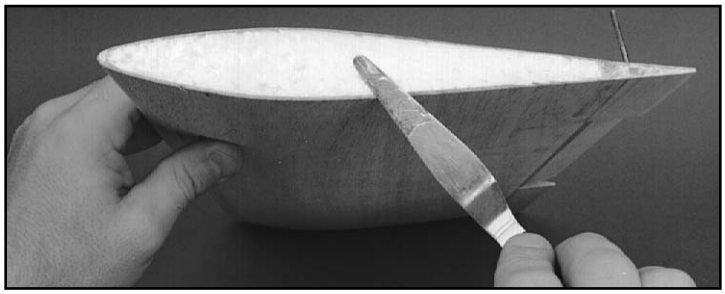
☐ **3.** Position the two wing halves together and check their fit. Adjust the angle of root center section using a sanding block. This should be done with the wing on a flat surface and **one** of the wing panels blocked up to the proper dihedral angle. It is 5/8" (16mm) for Quickie 500 racing or aerobatics and 1" (25mm) for beginners.

Setting wing dihedral



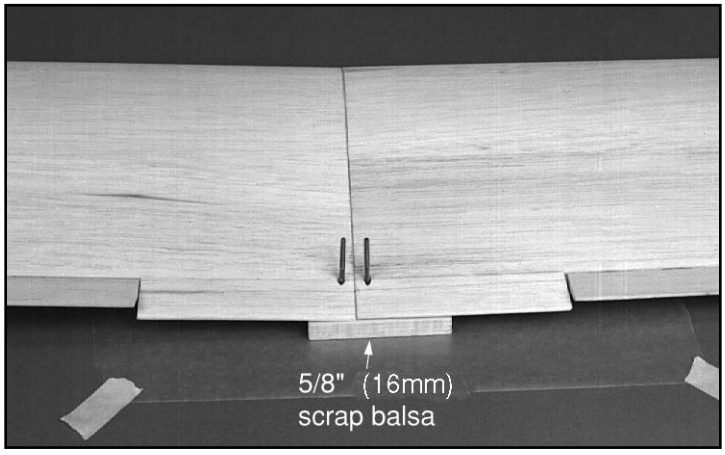
☐ **4.** Use a piece of 5/8" (16mm) or 1" (25mm) scrap balsa to block up **one** wing panel. This will account for the dihedral required for the wing. If this is your first low wing airplane, increase the dihedral from 5/8" (16mm) to 1" (25mm). Place a piece of wax paper on your building surface to prevent the wing from sticking to the surface.

Applying epoxy to wing panel



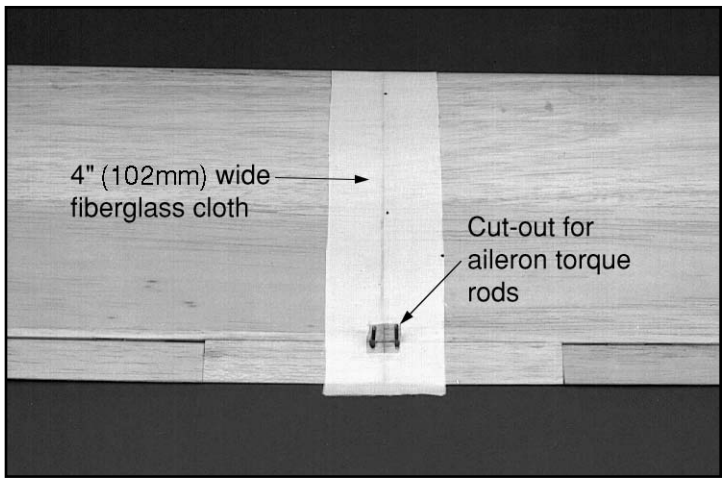
☐ **5.** Using 30- or 45-minute epoxy, apply a liberal amount of epoxy to each wing panel as shown, making sure that epoxy is applied to the balsa sheeting as well as the foam core.

Wing panel assembly



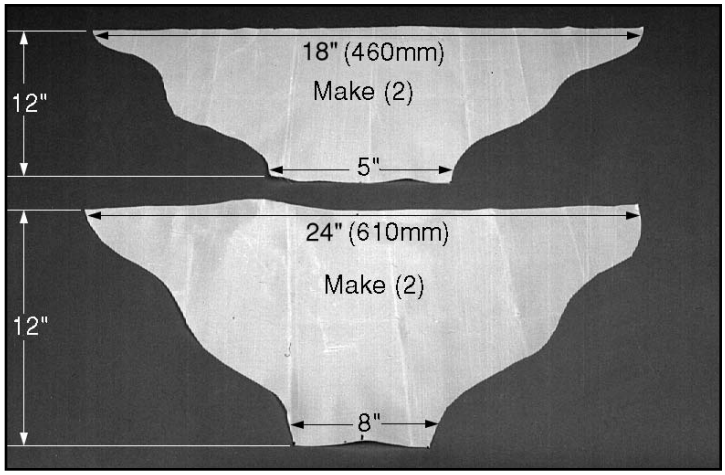
☐ **6.** Assemble the wing panels together and remove any epoxy that may have squeezed out. Block up the trailing edge using a piece of 5/8" (16mm) balsa. Masking tape should be used to hold the panels tightly together until the epoxy has fully cured. Note: Wax paper was used to prevent the wing from sticking to the building surface.

Fiberglassing the wing joint



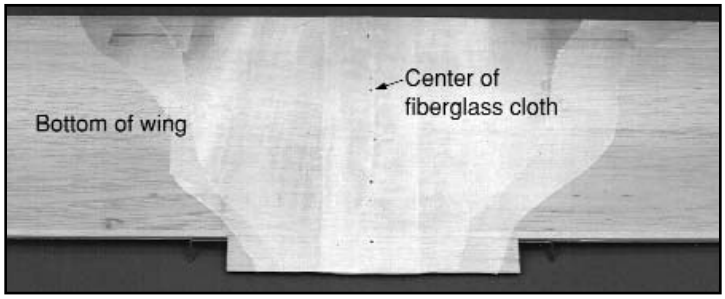
☐ **7.** Apply 30- or 45-minute epoxy and thoroughly saturate the fiberglass cloth. Once saturated, squeegee off as much epoxy as possible. Remember, this is excess weight. Once the epoxy has cured, repeat this procedure for the top of the wing. Hobbylite filler should be used to smooth the transition from the fiberglass to the wood skin. Make sure a cut out is made to fit around the aileron torque rods and that no epoxy is allowed into the torque rod openings.

Cutting the fiberglass cloth



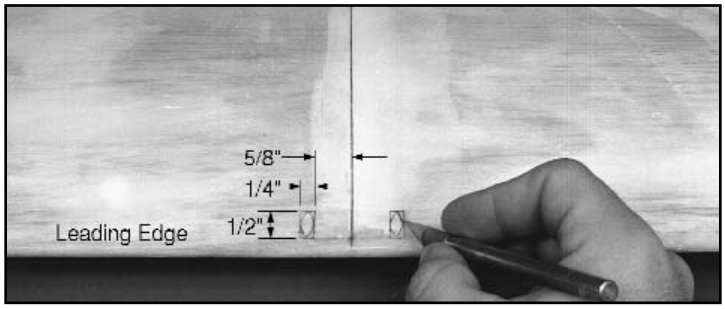
☐ **8.** Cut 2 oz. fiberglass cloth into the panel dimensions shown above. Cut two of each panel.

Applying the fiberglass cloth



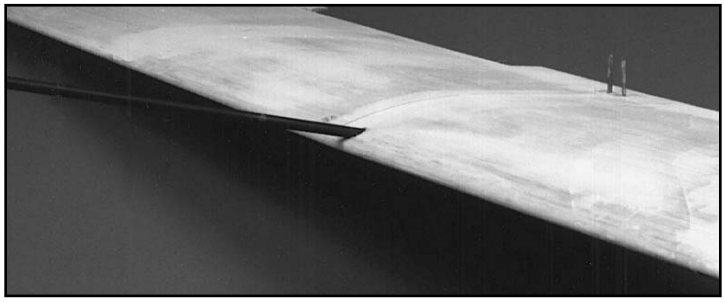
☐ **9.** Start with the bottom of the wing first. Mark the center of the fiberglass panels cut in the previous step. Apply the 24" (610mm) wide piece first and then the 18" (460mm) wide piece over the top of it, making sure that the center marks line up on the center section of the wing. Apply 30- or 45-minute epoxy and thoroughly saturate the fiberglass cloth. Once saturated, squeegee off as much epoxy as possible. Remember, this is excess weight. Once the epoxy has cured, repeat this procedure for the top of the wing. Hobbylite filler should be used to smooth the transition from the fiberglass to the wood skin. Note: The fiberglass goes right over the landing gear blocks. Once the epoxy cures, use a hobby knife to remove the fiberglass from the wire slots.

Cutting holes for hold down dowels



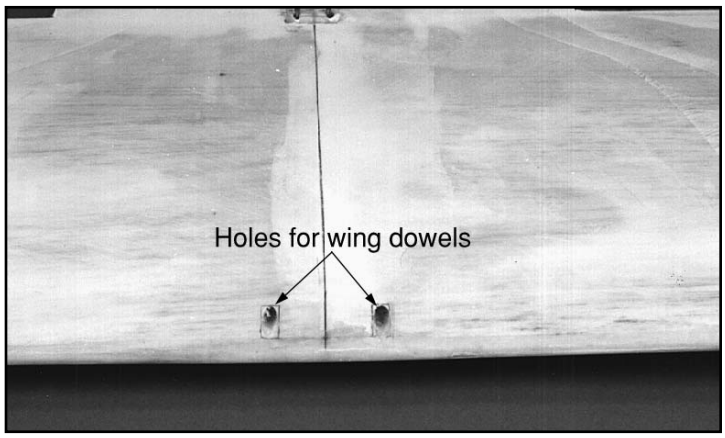
☐ **10.** Using the photo as a reference, draw 2 boxes as shown and then 2 ovals inside the boxes. Using a hobby knife, cut through the fiberglass and balsa and remove only the oval portions drawn.

Drill holes for hold down dowels



☐ **11.** With a 1/4" (6mm) drill bit, drill holes into the foam core at approximately the angle shown, 3" deep. Note: A long drill bit is shown, but is not required.

Trimming the hold down dowels

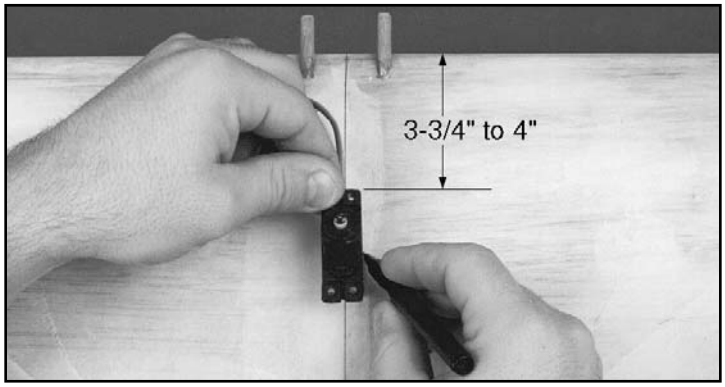


☐ **12.** Cut (2) wing hold down dowels to 3-1/2" (89mm). Round one end of each of the dowels. Insert the round end of each of the dowels into the holes in the wing. Trial fit the wing onto the fuselage, checking the fit with the first bulkhead. If necessary, adjust the bulkhead grooves or oblong the holes in the wing to achieve a good, snug fit between the bulkhead and the dowels. If necessary, adjust the wing saddle until the wing fits perfectly to the fuselage.

Installation of hold down dowels

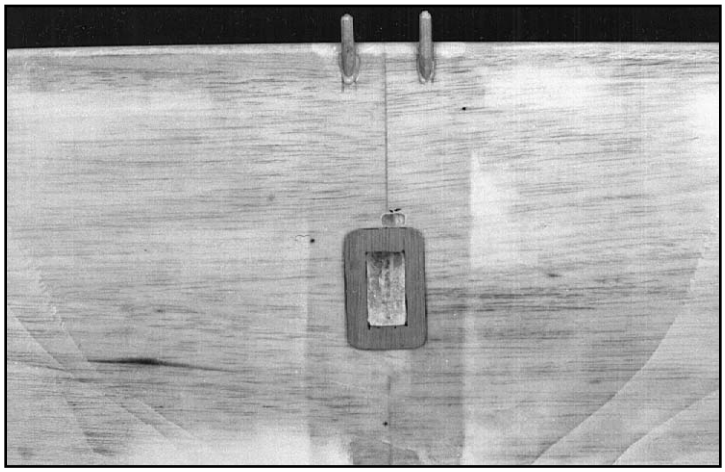
☐ **13.** Apply a generous amount of 30-minute epoxy both to the wing hold down dowels and to the holes in the wing for the dowels. Insert the dowels, with the flat end out, into the wing. Leave 5/8" (16mm) of the dowels protruding past the leading edge of the wing. Install the wing onto the fuselage and hold the dowels snug against the bulkhead until the epoxy cures. Make sure the 30-minute epoxy does not contact the fuselage.

Marking the aileron servo hole



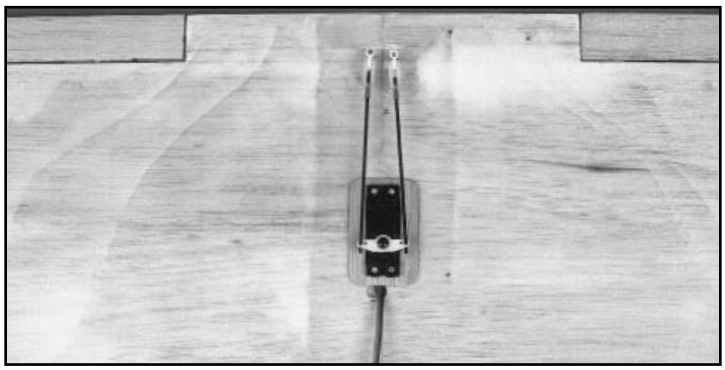
☐ **14.** Using the aileron servo as a reference, mark and cut a hole in the center section of the wing, starting the hole 3-3/4" (95mm) to 4" (102mm) from the leading edge of the wing. Make sure that the position chosen does not allow the aileron servo to interfere with the throttle servo.

Installing the aileron servo tray



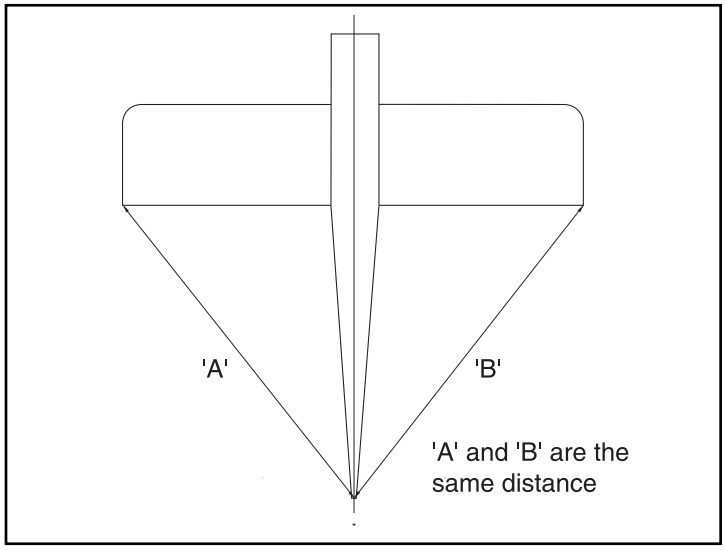
☐ **15.** Locate the aileron servo tray and adjust the size of the hole to correspond with the hole already cut in the wing. Using 6-minute epoxy, glue the aileron servo tray to the wing.

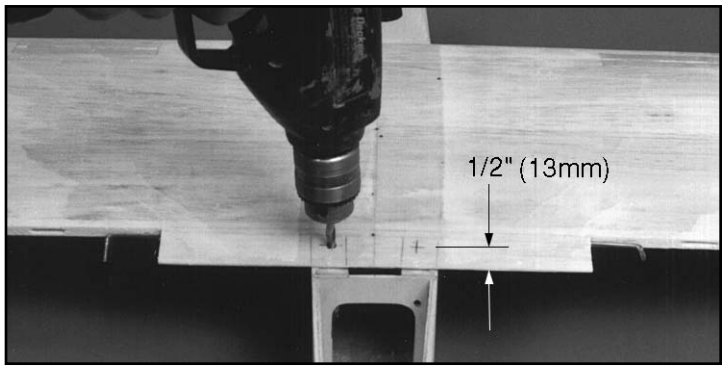
Installation of aileron servo and rods



☐ **16.** Install the servo and connect the torque rods using the (2) 8" (203mm) pushrods, (2) clevises and (2) aileron torque rod connectors. "Z" bends should be used on the pushrod ends that connect to the servo. Note: The small hole in front of the servo tray is for the aileron servo wire.

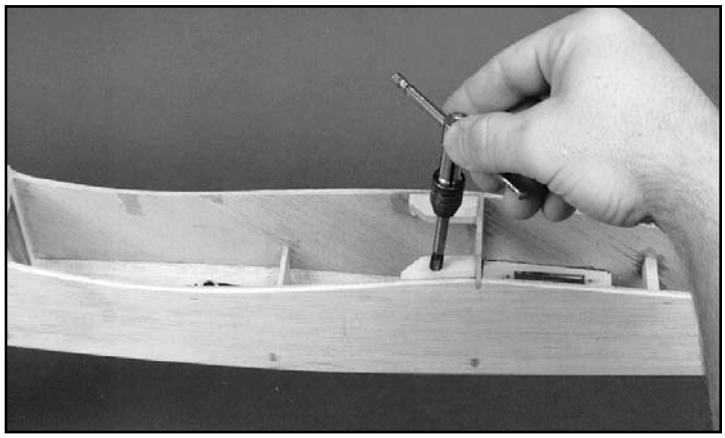
Drilling for the wing hold down bolts





☐ **17.** Install the wing onto the fuselage as shown. Check to make sure that the distance between the wing tip trailing edge and the tail of the fuselage are the same for each side. Mark the outside of the fuselage and the inside of the wing hold down block on each side. Place a mark halfway between these marks and 1/2" (13mm) ahead of the trailing edge. Drill holes through the wing and hold down blocks perpendicular to the wing at these marks using a #7 or 3/16" (5mm) drill bit. Remove the wing and enlarge the holes in the **wing** with a 1/4" (6mm) drill.

Tapping the holes

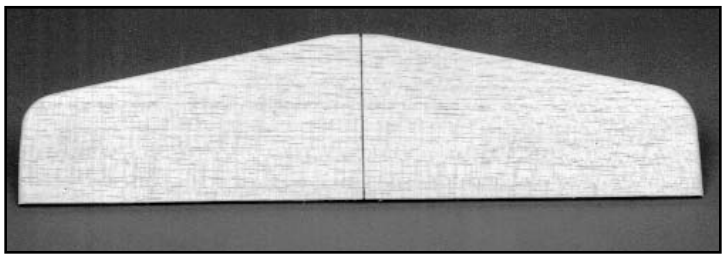


☐ **18.** Using a 1/4"-20 tap, carefully tap the holes in the hold down blocks. Once tapped, reinforce the hold down blocks using thin CA along the joint and the triangle stock.

INSTALLATION OF CONVENTIONAL TAIL SURFACES

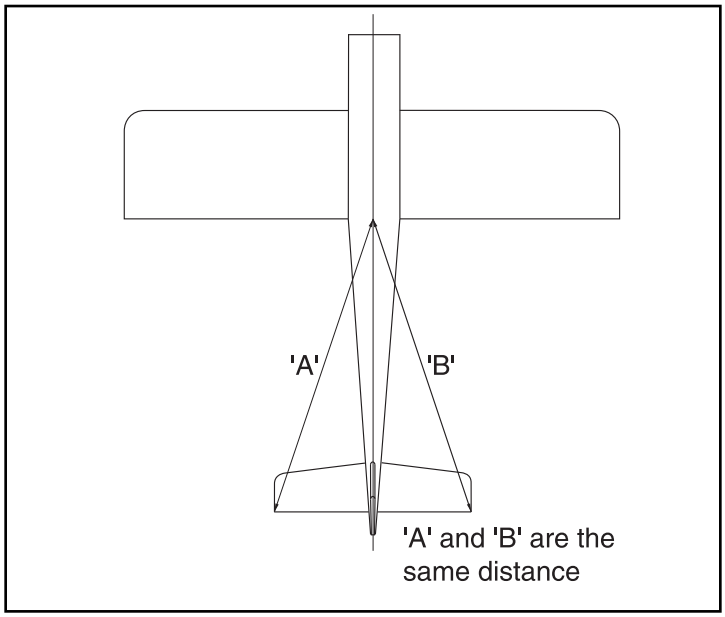
Important: Make sure this is the tail configuration you have chosen to use. If it is not, turn to page 11 for mid-tail or page 13 for V-tail.

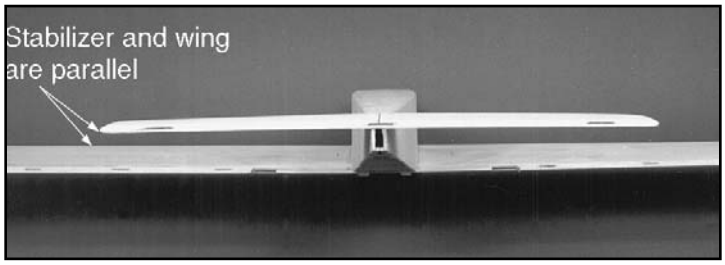
Marking the horizontal stabilizer



☐ **1.** Mark the exact center of the stabilizer and draw a center line perpendicular to the trailing edge on the top and bottom of the stabilizer.

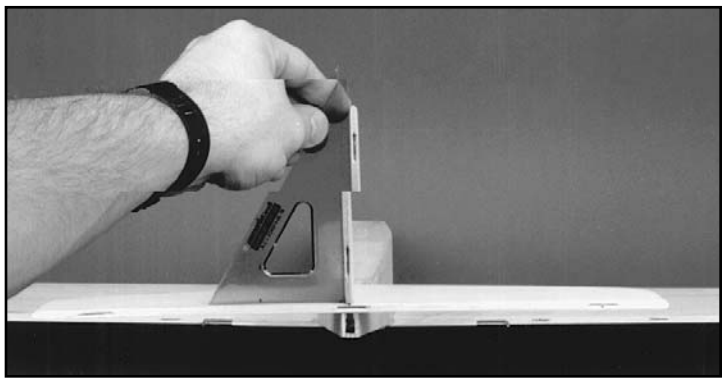
Installation of the horizontal stabilizer





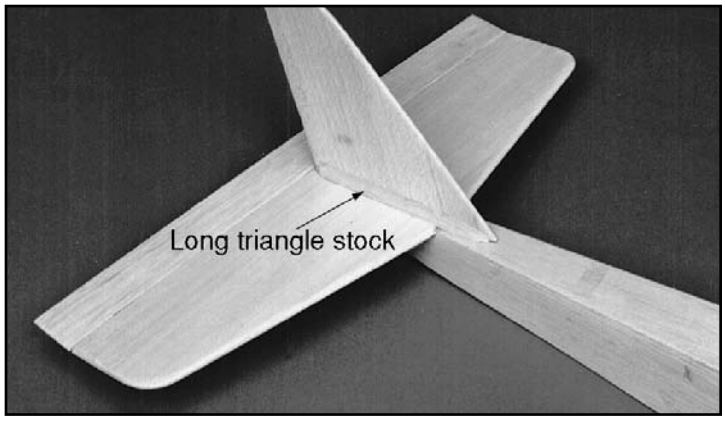
☐ **2.** Check the fit if the stabilizer in the stabilizer saddle. Sand the saddle to make a perfect fit. Apply 30-minute epoxy to the stabilizer saddle and to the bottom of the stabilizer itself. Install the stabilizer onto the fuselage and check to insure that the distance between the trailing edge of the wing tip and the trailing edge of the stabilizer are the same. Then, sighting from the rear, check to make sure the stabilizer is parallel with the wing. Set the stabilizer assembly aside to cure.

Installation of vertical stabilizer



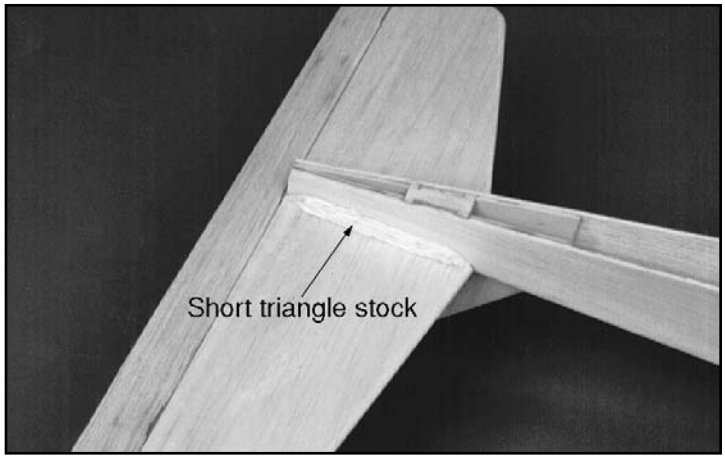
☐ **3.** Using a 90Þ triangle, install the vertical stabilizer using 30 minute epoxy. Make sure the fin lines up perfectly with the center line of the fuselage.

Bracing the vertical stabilizer



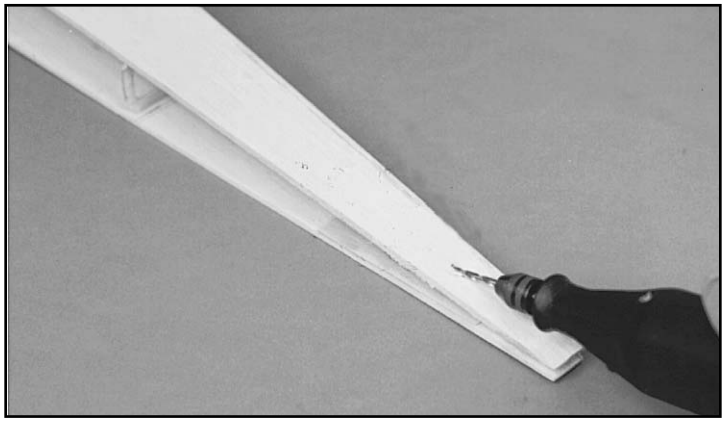
☐ **4.** Locate the (4) pieces of 1/4" (6mm) triangle stock. Sand the front and back to achieve a pointed appearance on each end. Using thick CA glue, install the (2) longer triangle stock pieces on top of the stabilizer and up against the vertical stabilizer. Do not use the 6" (150mm) piece of 1/4" (6mm) triangle stock for this step.

Bracing the horizontal stabilizer



☐ **5.** Install the (2) shorter triangle stock pieces underneath the stabilizer and against the fuselage. Skip to page 15 if you are assembling the conventional tail.

Relocating the antenna tube

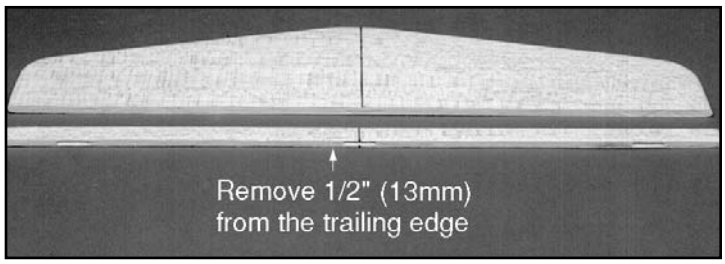


☐ **6.** Drill a 1/8" (3mm) hole and install the antenna tube and secure using thick CA. Trim the antenna tube flush to the fuselage.

MID TAIL DESIGN

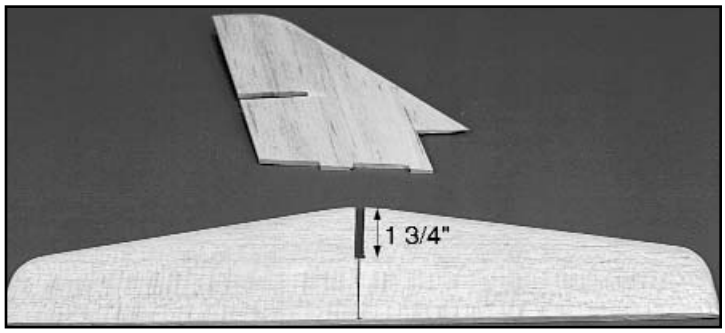
(Follow this section for mid-tail only)

Trim the horizontal stabilizer



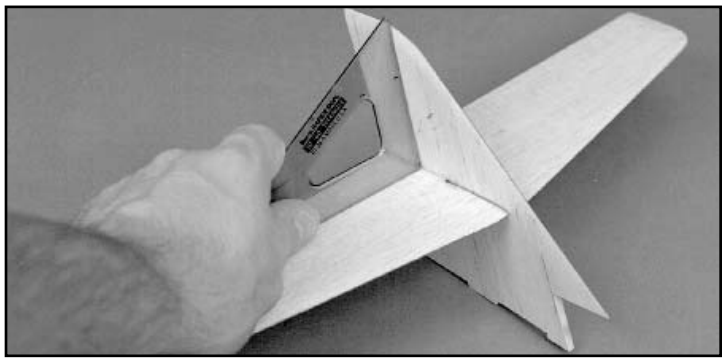
☐ **1.** Carefully remove 1/2" (13mm) of balsa from the trailing edge of the existing stabilizer. Using the elevator template on page 22 as a reference, slot the trailing edge of the stabilizer for the hinges with a #11 knife blade. This will allow using CA style hinges. CA hinges are recommended for the mid-tail design.

Cutting a new vertical stabilizer and rudder



☐ **2.** Cut out the new vertical stabilizer (3/16" (5mm) balsa is not provided) using the template provided on page 21**.** Cut a slot from the center of the leading edge of the stabilizer 3/16" (5mm) wide and 1-3/4" (45mm) deep, to form the interlock for the vertical stabilizer. Round the leading edge of the vertical stabilizer. Slot the stabilizers for hinges, using a #11 knife blade, according to the template.

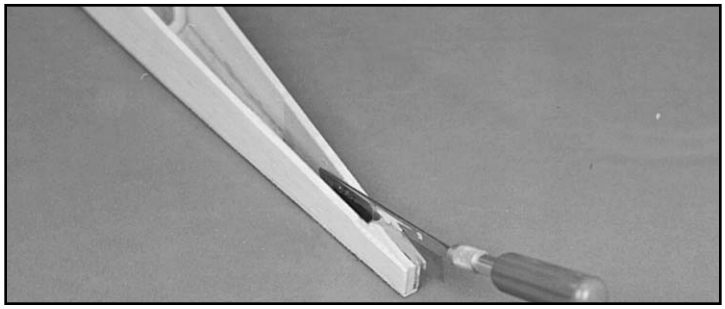
Joining the horizontal and vertical stabilizer



☐ **3.** Install the horizontal stabilizer into the vertical stabilizer. Using a 90Þ triangle to square the fins, apply thin CA glue to

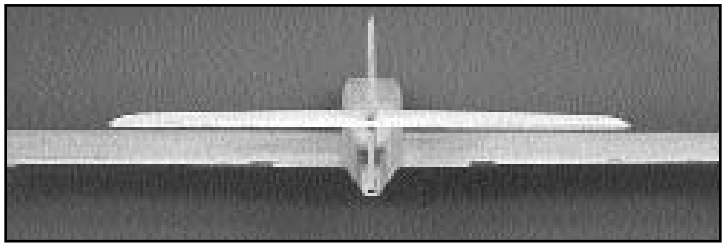
the joint. Once the fins are tacked into place, go over the joint again with thick CA glue. Cut the 1/4" (6mm) triangle stock provided into (4) pieces 2-3/4" (70mm) long. Install the triangle stock along each joint to reinforce the joints. Bevel the front and rear of the triangle stock to eliminate drag.

Remove the plywood reinforcement



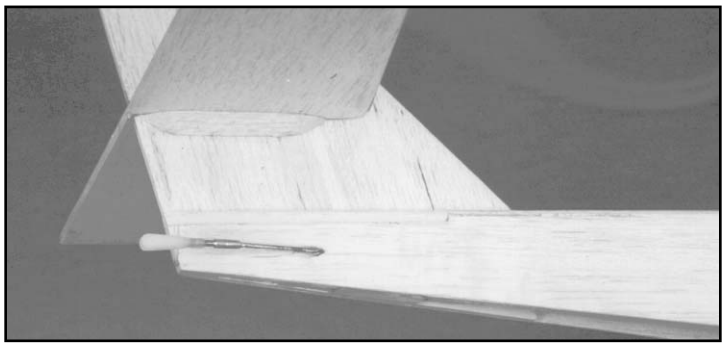
☐ **4.** Using a razor saw, remove 3/16" (5mm) of the plywood reinforcement from the aft end of the fuselage to make room for the vertical stabilizer.

Installation of the fin assembly



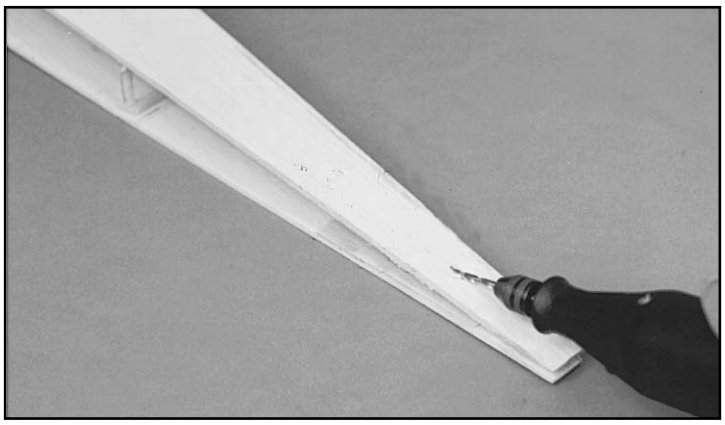
☐ **5.** Apply 30-minute epoxy to the vertical stabilizer and to the slot in the fuselage, also making sure to apply glue to the tail skid mounting plate. Install the fin assembly into the fuselage and make sure the stabilizer is square with the wing. Note: You may find it easier to cover the entire fin assembly with MonoKote®, except the bottom portion, before installing it onto the fuselage. Use scrap balsa about 3/16" (5mm) thick to fill the old stabilizer saddle of the fuselage. Drill a hole in the top left scrap piece for installation of the elevator pushrod.

Installing the rudder pushrod



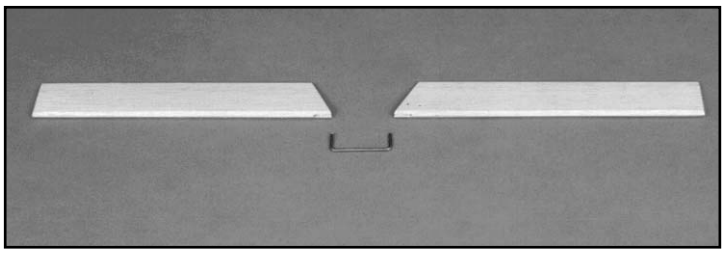
☐ **6.** Drill a hole and install the rudder pushrod according to the recommendation of the manufacturer. Great Planes™ Rod-in-Tube pushrods are recommended.

Relocating the antenna tube



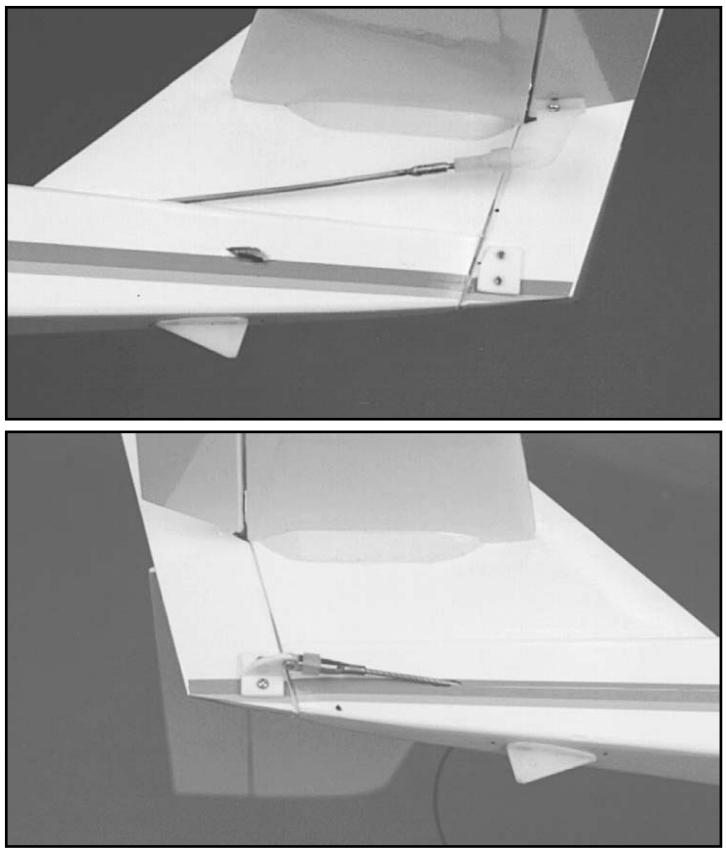
☐ **7.** Drill a 1/8" (3mm) hole and install the antenna tube and secure using thick CA. Trim the antenna tube flush to the fuselage.

Making the elevators



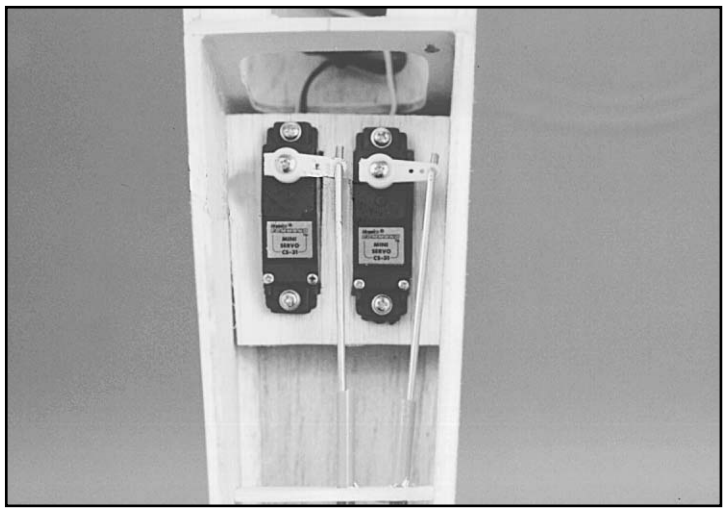
☐ **8.** Cut out (2) mid-tail elevators using the template provided on page 22. Use a #11 knife blade to slot the elevator for CA type hinges in the location shown. Drill a 3/32" (2.4mm) hole according to the template for the elevator for the interlink. Recess the elevator to receive the interlink and bevel the leading edge of the elevator. Use 30-minute epoxy to glue the interlink into the elevator halves. Make sure the elevators are perfectly level and straight across. Drill holes and attach the control horn according to the portions indicated on the template for the rudder and the elevator.

Attachment of pushrods



☐ **9.** Attach the pushrods to the controls according to the manufacturer's recommendations. Use the rudder horn with (2) holes and a full length horn for the elevator shown above.

Connecting the servos to the pushrods



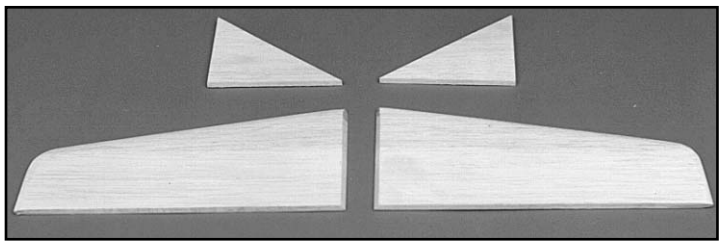
☐ **10.** Refer to page 15 steps 1, 2, and 3 to install the servo tray. With the elevator and rudder perfectly level and straight, mark the point where the pushrod passes over the servo arm about 1/2" (13mm) from the center. Make Z-bends at the marks and install the servo arms onto the Z-bends.

☐ **11.** Do not permanently install the control surfaces until after the Viper is covered.

V-TAIL DESIGN

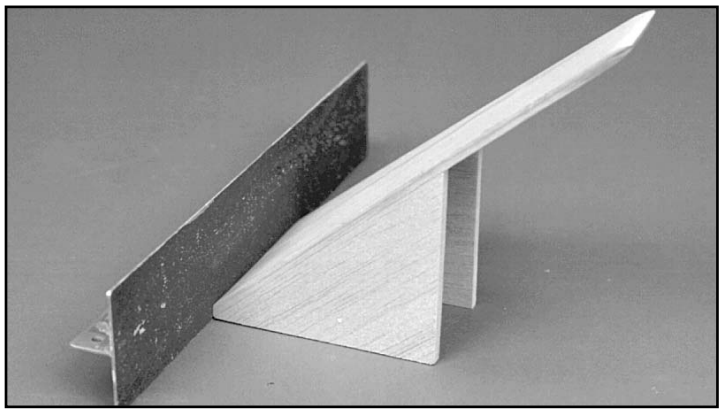
(Follow this section for V-tail only)

Cutting new stabilizers



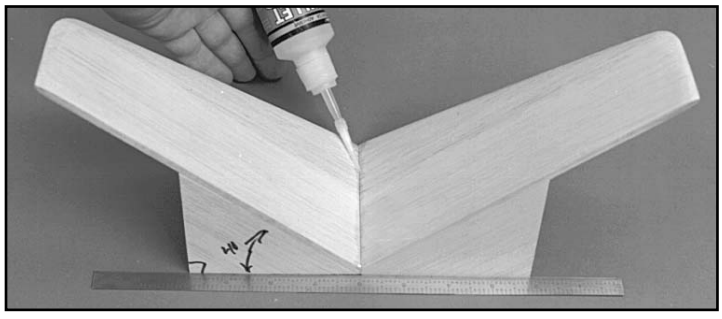
1. From hard balsa, cut (2) stabilizers, (4) triangle braces, and (2) elevators using the templates provided on page 22 and 23. Slot the stabilizers and elevators using a #11 knife blade, for CA style hinges. Use the template for hinge position.

Attach the triangle braces to the stabilizers



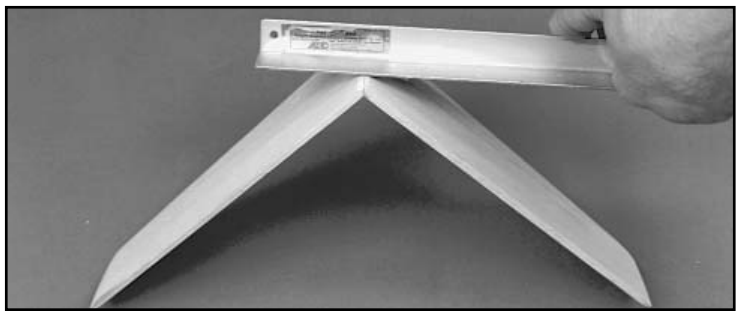
2. Using thick CA glue, tack glue one of the triangle braces to the bottom of one of the stabilizers at the trailing edge, and another brace close to the leading edge. Set the assembly on a flat surface and sand the root of the stabilizer perpendicular to the surface. Repeat this procedure for the other stabilizer. This will make a perfect joint between the two halves.

Glue the stabilizers together



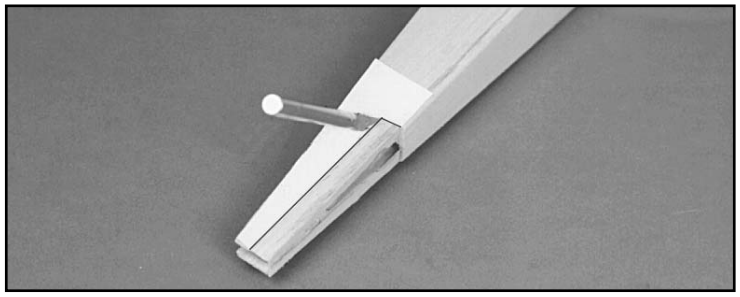
3. Trial fit the two stabilizers together and make sure the trailing edge is straight. Once the trailing edge is straight, glue the two stabilizers together.

Reinforce the stabilizer joint



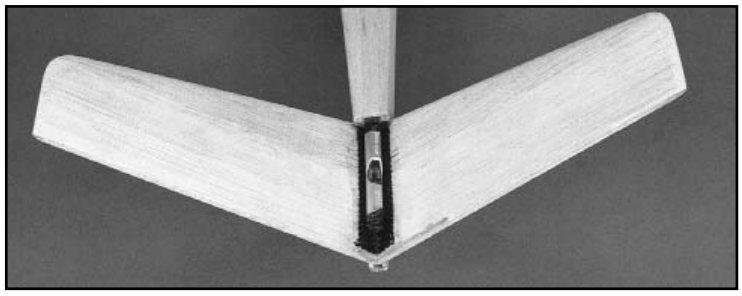
☐ **4.** Break the four triangle braces from the stabilizers and remove any excess CA with 220 sand paper. Sand the pointed joint at the bottom of the two stabilizers. Reinforce the joint on **both sides** using 1" (25mm) wide 6 oz. fiberglass or carbon fiber (not included).

Trim the tail of the fuselage



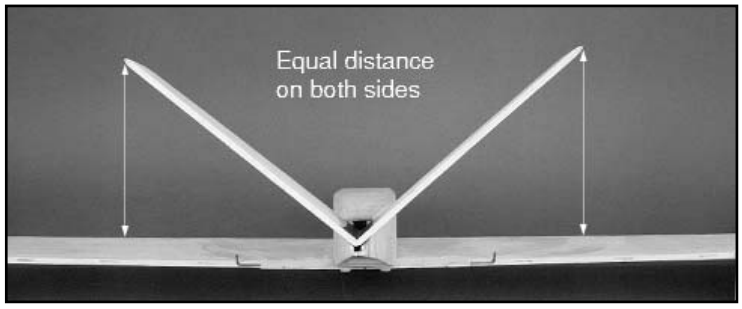
☐ **5.** Lay the template provided over the tail of the fuselage and trim the fuselage accordingly.

Checking incidence of the tail



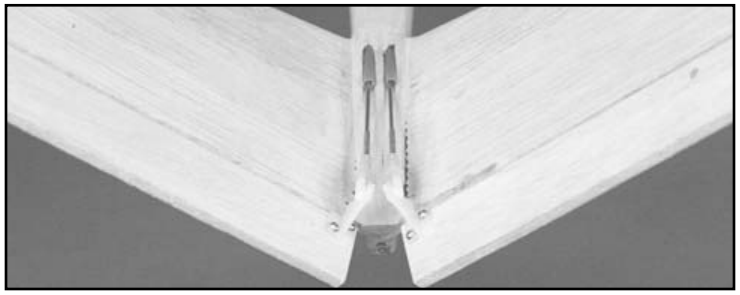
☐ **6**. Check the incidence of the stabilizer on the newly cut cradle. This should be done with the top of the fuselage as a reference and perfectly level. The top of the fuselage is the thrust line. Use of a simple line level is recommended.

Attach the stabilizer



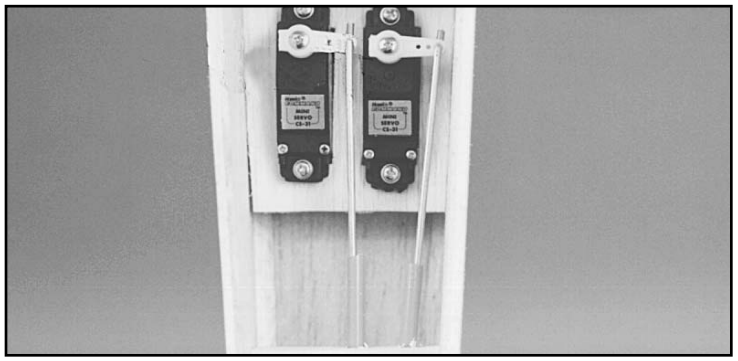
☐ **7.** Once the incidence of the stabilizer is correct, check to make sure the distance from the trailing edge of the wing tip to the trailing edge of the stabilizer is exactly the same on each side. Check to make sure it is square to the wing and tack glue the stabilizer into place using thin CA glue. Re-check the measurements and if it hasn't moved, permanently glue the stabilizer in place with 30 minute epoxy. Let stand until the epoxy cures.

Install the pushrod braces



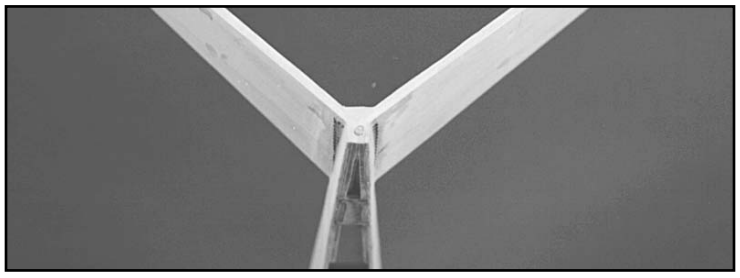
☐ **8.** Install a piece of scrap balsa over the top of the V-tail as shown. Drill (2) holes and mount the pushrods according to the recommendations of the manufacturer of the pushrod. Great Planes™ Rod-in-Tube pushrods are recommended. Cut out and drill holes in the ruddervators according to the template on page 23 and mount the control horns.

Connecting the ruddervator servos



☐ **9.** With the ruddervators level, mark the point where the pushrods pass over the servo arms about 1/2" (13mm) from the center. Make Z-bends at the marks and install the control arms onto the Z-bends. Attach the pushrods to the servos.

Install the antenna tube

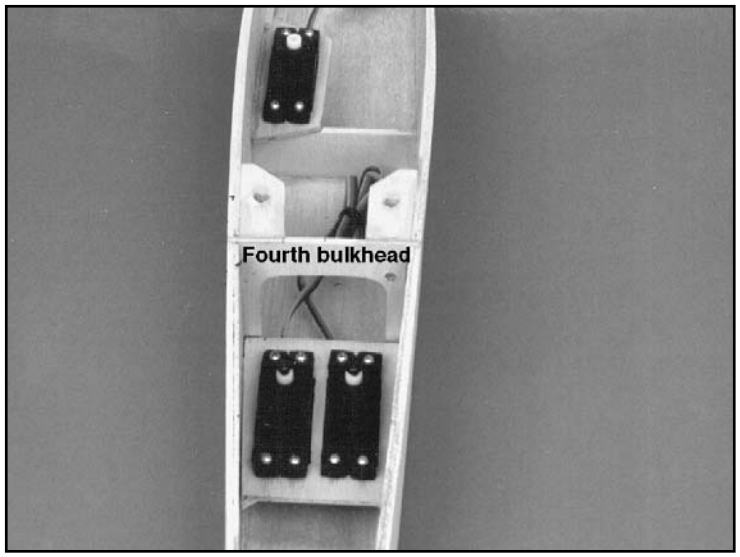


☐ **10.** The antenna tube should be routed out under the V-tail as shown.

☐ **11.** Do not permanently install the control surfaces until the model is covered.

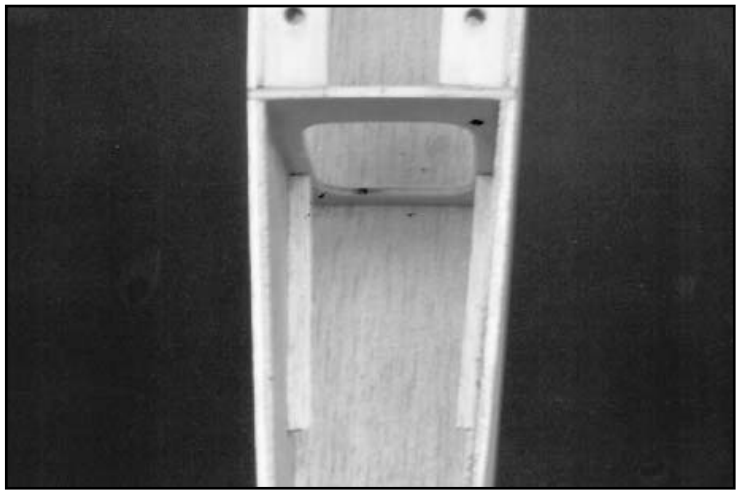
PUSHROD INSTALLATION

Trimming the servo tray



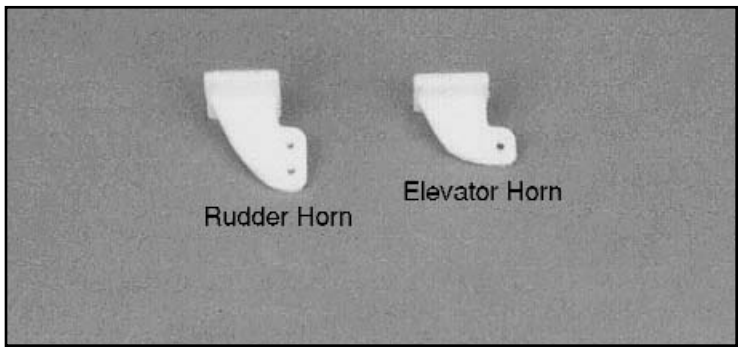
☐ **1.** Enlarge the holes in the elevator and rudder servo tray to fit the servo being used. Mount the servos in the servo tray and set the servo tray into place, with the servos resting on the top of the fuselage as shown. With a pen, place a mark on each side of the fuselage using the tray as a guide. Note: In most .25-.40 size engine applications, it is best to mount the servos aft of the fourth bulkhead. To do so, use the template on page 24 to trim the servo tray to fit. If you intend to use a .19 size engine, or a very light engine, simply mount the servo tray ahead of the bulkhead. It will be necessary to lengthen the pushrods by about 2-1/2" (64mm) over the dimensions shown on page 16.

Installation of the servo tray



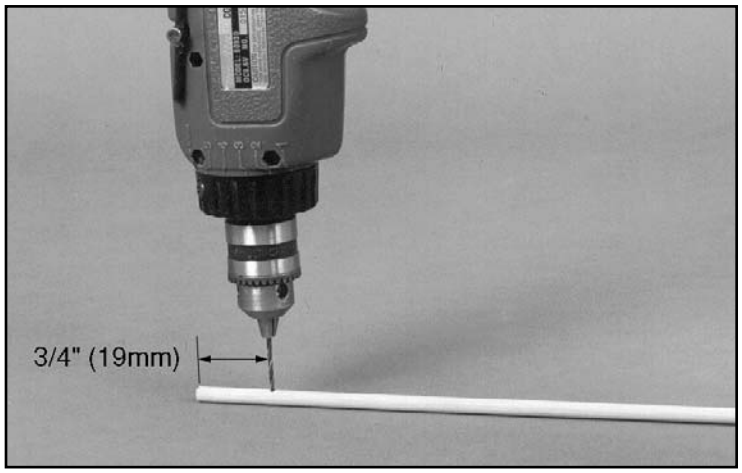
☐ **2.** Cut the 6" piece of 1/4" (6mm) triangle into (2) 3" (76mm) pieces. Using the marks as a guide, glue (2) pieces of 1/4" (6mm) triangle stock 3" (76mm) long into place on the inside of the fuselage. This will insure an 1/8" (3mm) gap between the servos and the top of the fuselage. Using thick CA glue, install the servo tray onto the triangle stock.

Trimming the control horns



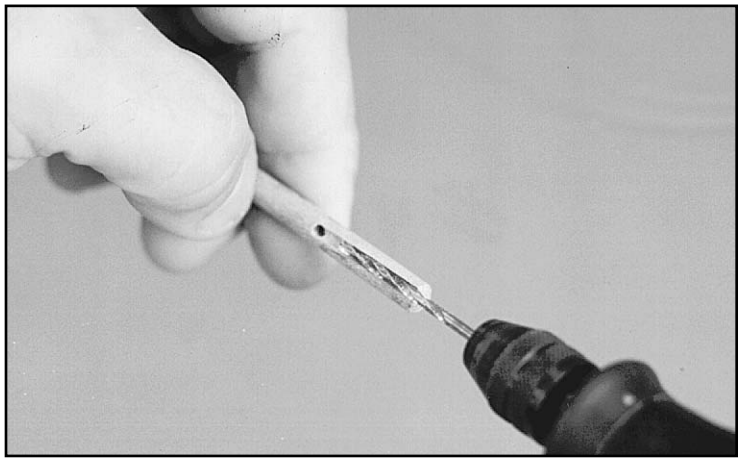
☐ **3.** Cut both of the control horns as shown. The smaller version will be the elevator control horn and the one with 2 holes will be the rudder control horn. Note: This is for the conventional tail configuration. For the mid tail, cut the rudder horn as shown, but do not cut the elevator control horn. Do not cut the control horns for the V-tail configuration. Note: For high performance .40 size applications we recommend the use of Great Planes™ Rod-in-Tube type pushrods for elevator and rudder.

Drilling the dowel rod



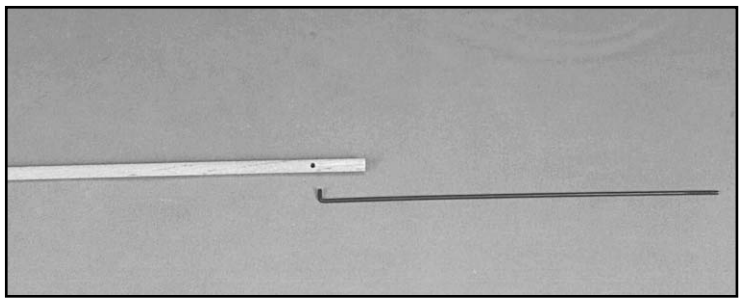
☐ **4**. Drill 1/16" (1.6mm) holes 3/4" (19mm) from each end of both the wooden pushrods.

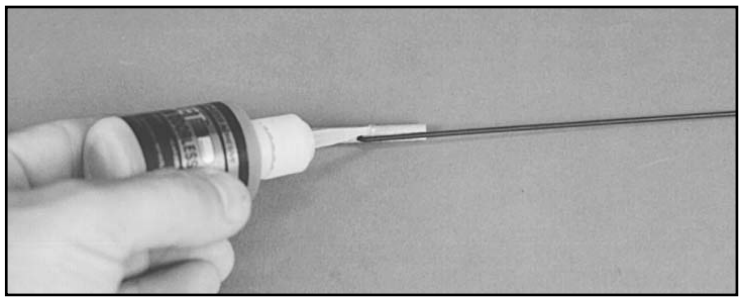
Making the V-groove



☐ **5.** Make a small groove on each end of the pushrods from the 1/16" hole to the end.

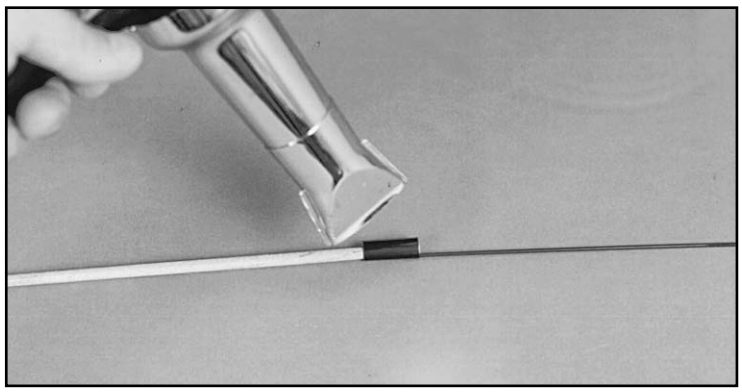
Installation of rods





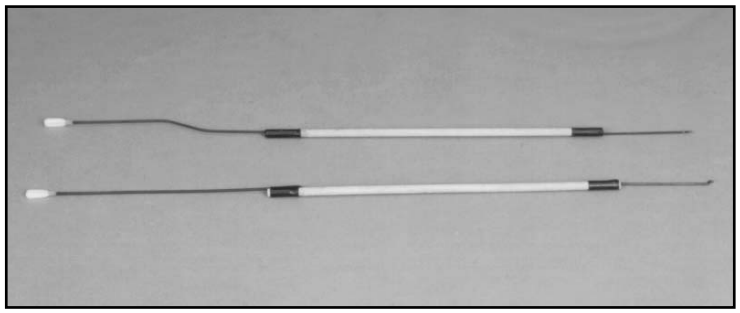
☐ **6**.Using thick CA, secure one of the unthreaded rods onto one end of the pushrod and the threaded rod on the other side.

Installation of heat shrink tubing



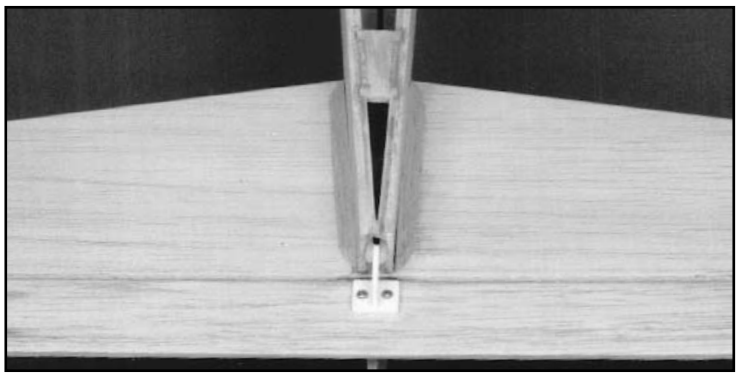
☐ **7.** Cut the black heat shrink tubing into 4 equal pieces and install on over each of the pushrod joints. Shrink the tubing with either a match or a heat gun.

Assemble the pushrods for aft mounted tray



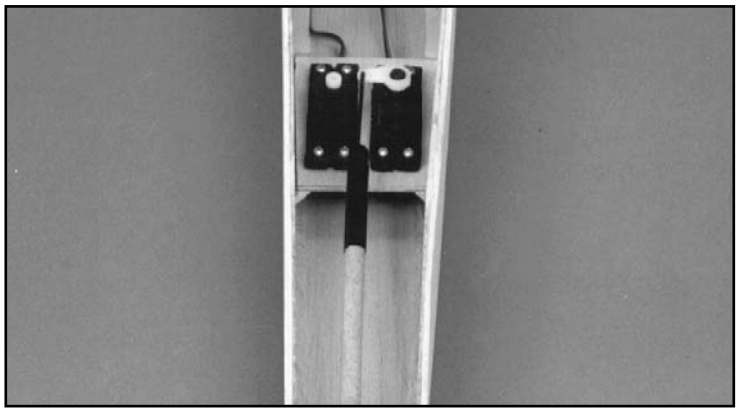
☐ **8.** Bend the pushrods as shown. Note: Trial fit before making "Z" bends and cutting off extra wire.

Installation of elevator control horn



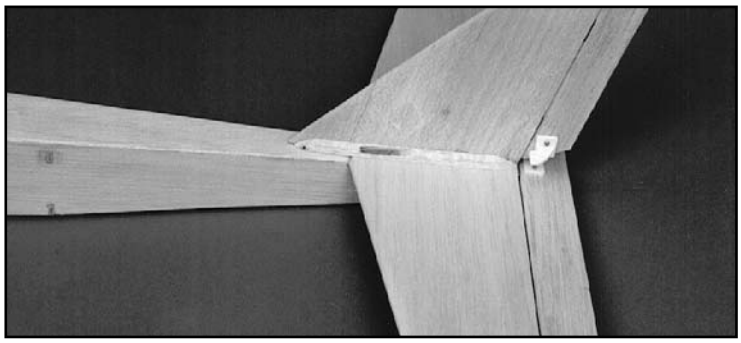
☐ **9.** Set the elevator control horn in place, centered on the hole in back of the fuselage, and mark the hole locations with a pen. Drill 5/64" (2mm) holes at the marks. Install the control horn using (2) 2mm screws and the control horn backing plate. Attach the clevis to the control horn. It may be necessary to enlarge the opening at the rear of the fuselage to allow free movement of the pushrod. If necessary, enlarge the hole using a round file.

Connecting the elevator pushrod



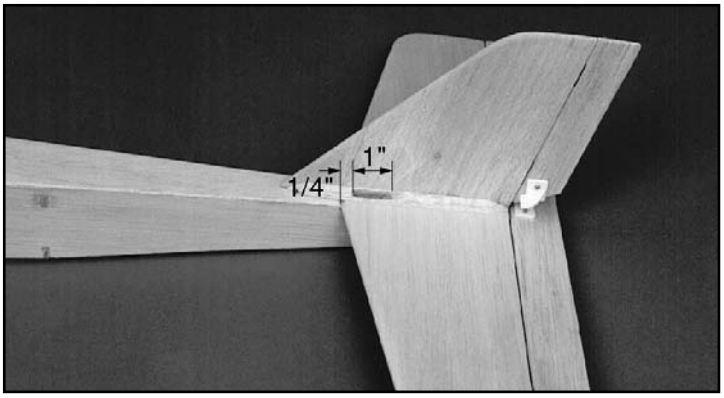
☐ **10.** With the elevator in the neutral position and the servo arm 90Þ to the servo, place a mark on the pushrod at the point it intersects the outside hole on the servo arm. This should be about 1/2" (13mm) from the center of the servo arm. Make a "Z" bend at the mark and install it onto the servo arm.

Installation of rudder control horn



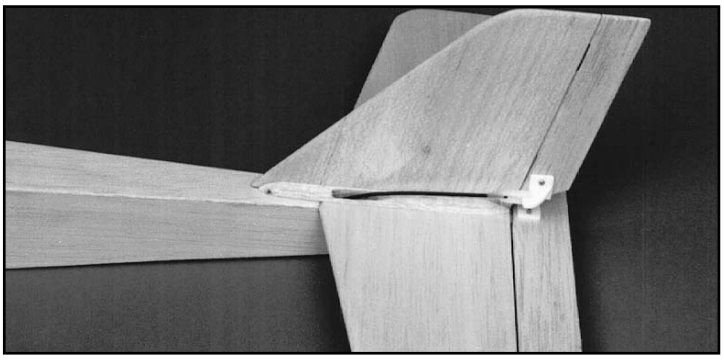
☐ **11.** Hold the control horn (with 2 holes on it) in place as low on the rudder as possible. With the 2 holes aligned over the hinge line, mark the screw holes on the rudder. Drill (2) 5/64" (2mm) holes at these marks and install the control horn using (2) 2mm screws and the control horn backing plate.

Slot for rudder pushrod



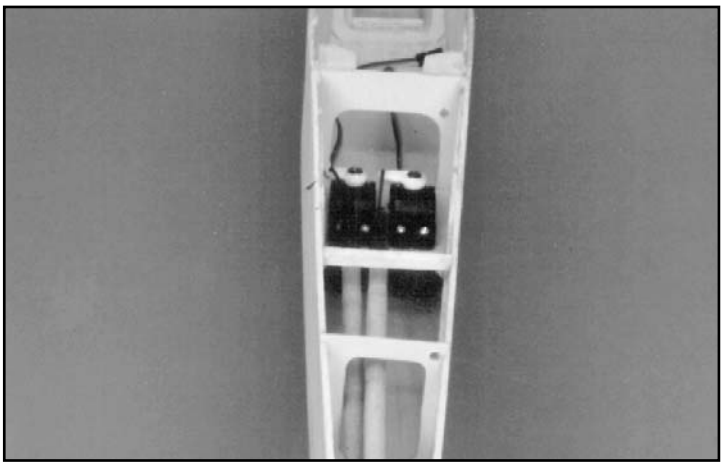
☐ **8.** Make a slot 1" (25mm) long starting 1/4" (6mm) behind the leading edge of the stabilizer. This slot should go through the triangle stock and the stabilizer.

Installation of rudder pushrod



☐ **9.** From the inside of the fuselage, insert the threaded end of the rudder pushrod through the slot in the rear stabilizer. Thread a clevis onto the pushrod and attach it to the rudder control horn.

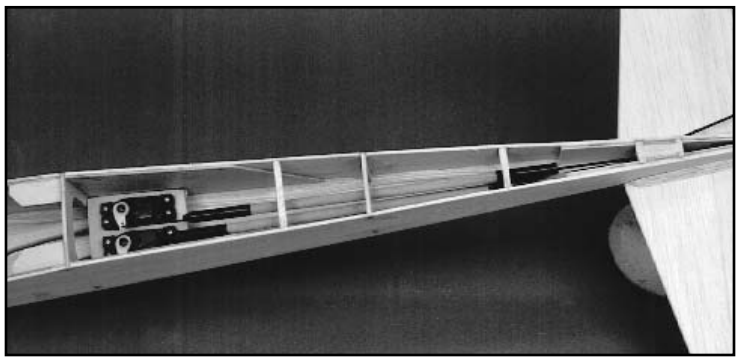
Adjustment of rudder control horn



☐ **10.** With the rudder in the neutral position and the rudder servo arm 90Þ to the servo, place a mark on the pushrod at the point it intersects the outside hole of the servo arm. This should be about 1/2" (13mm) from the center of the servo arm. Make a "Z" bend at this mark and install onto the servo arm. Make sure the elevator and rudder pushrods do not contact each other. If so, bend the rudder pushrod slightly to avoid contact.

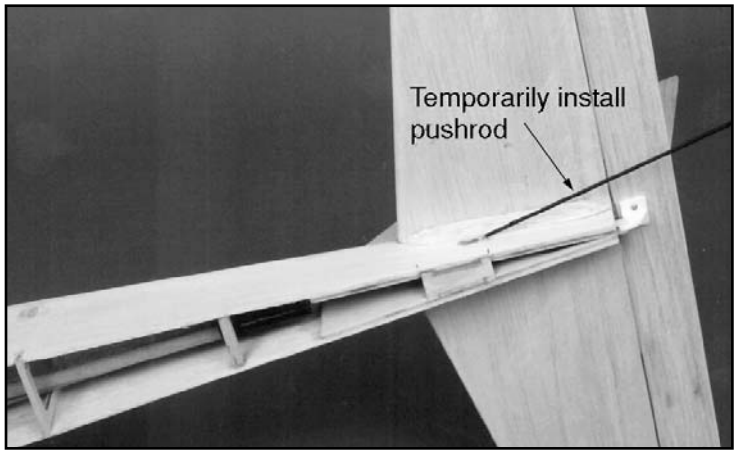
FINISHING THE FUSELAGE

Straightening the fuselage



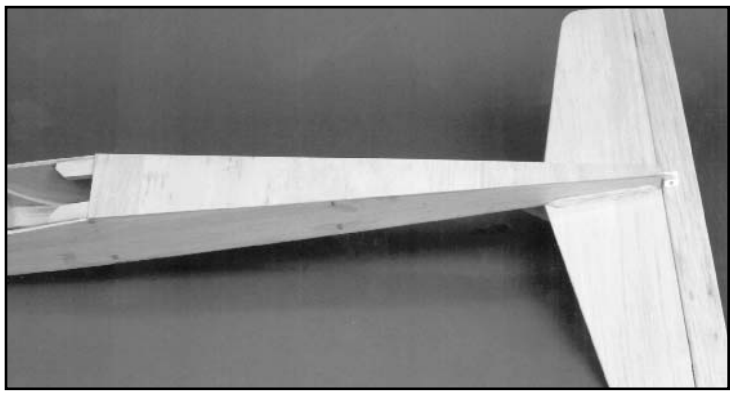
☐ **1.** In some cases the sides of the fuselage bow in slightly. If this happens, simply install a couple of scrap pieces of balsa to return the fuselage sides to their original shape.

Relocating the antenna exit hole



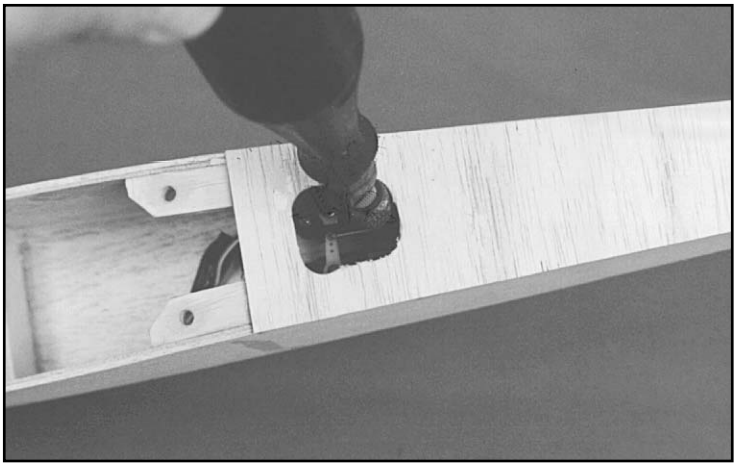
☐ **2.** On the conventional and mid-tail configurations, it is necessary to relocate the exit for the antenna tube. To do this drill a 9/64" (3mm) hole under the stabilizer about 3" (76mm) from the end of the fuselage. Glue the tube in place using thick CA. A pushrod may be used to hold the exit straight while gluing.

Installation of lower sheeting



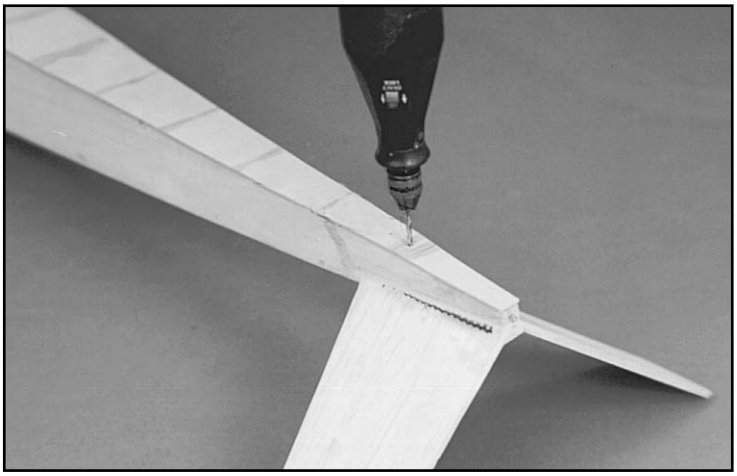
☐ **3.** Install the lower sheeting using thick CA glue and sand the sheeting flush with the fuselage sides. Then round the corners to a 1/4" (6mm) radius.

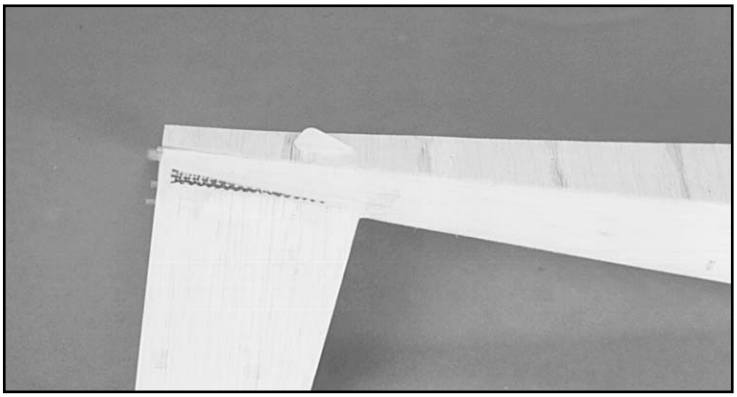
Inspection hole



☐ **4.** Use a round file or Moto-Tool™ to cut an inspection hole in the bottom sheeting of the fuselage. Make sure that the corners are rounded with at least a 1/4" (6mm) radius. This hole should be large enough to remove a servo if necessary. Cover the hole with clear tape or clear MonoKote® covering after the entire model is covered.

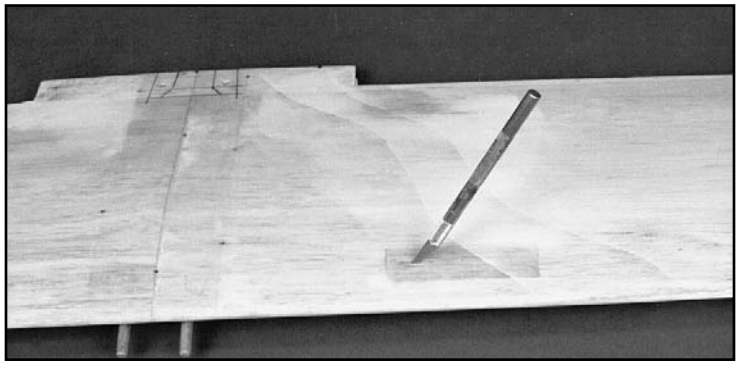
Installation of tail skid





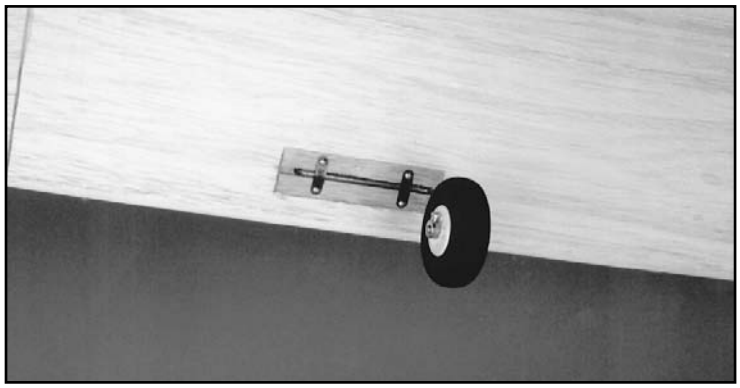
☐ **5.** Drill an 3/32" (2mm) hole for the tail skid 2-1/2" (64mm) from the end of the fuselage. Using the skid as a guide, locate the position for the front hole. After covering is complete, glue the skid in place using thick CA or epoxy.

Removing fiberglass over the gear blocks



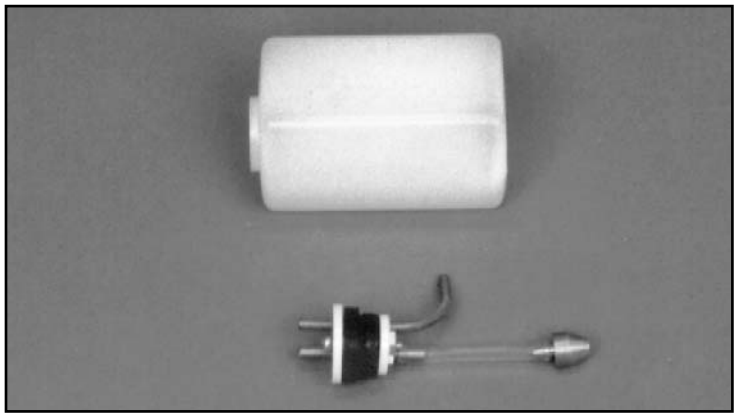
☐ **6.** Using a #11 knife blade, trim the fiberglass that is covering the landing gear slot. Use a piece of 220 grit sandpaper to trim the edges.

Installation of landing gear



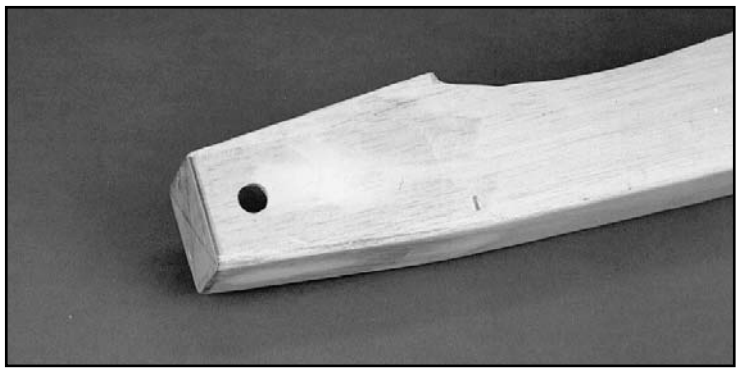
☐ **7.** Install the landing gear into the landing gear block. If the fit is too snug, run a 5/32" (4.0mm) drill bit into the hole. Make sure you do not drill through the top of the wing. Place the landing gear straps over the wire and mark the holes with a pen. Drill 1/16" (1.6mm) holes at the marks and secure the straps in place. Install a wheel and then a wheel collar to secure. Repeat this procedure for the other side.

Assemble the fuel tank



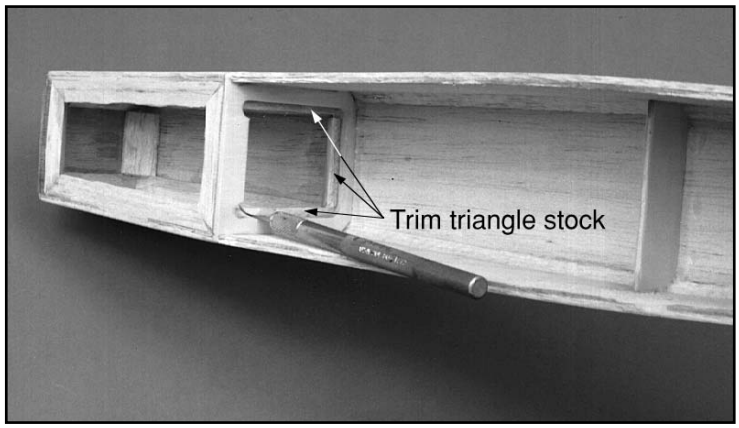
☐ **8.** Assemble the fuel tank as shown. The fuel tank supplied is about 4 oz., which is perfect for .19 to .25 engines. If you plan to race the Viper, you will want to replace this with a Hayes 6 oz. fuel tank.

Drill the fuel line exit hole



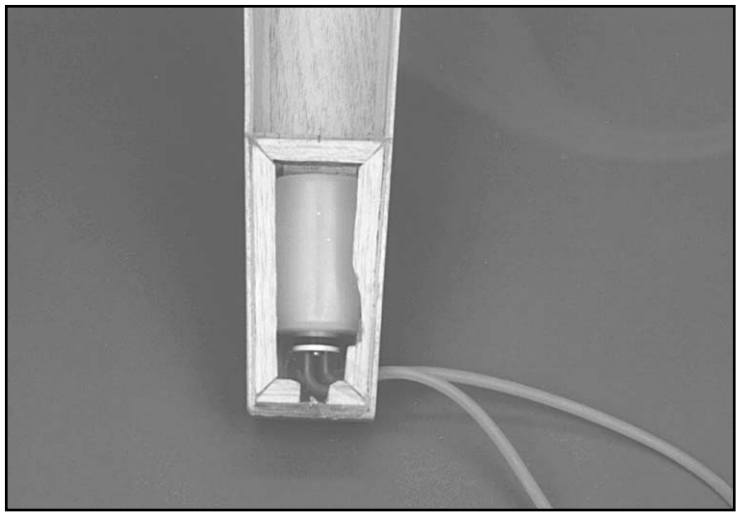
☐ **9.** Cut a 1/2" (13mm) round hole 1/2" (13mm) back from the front of the fuselage. This will serve as the exit for the fuel lines. This may seem slightly unconventional, but the advantage is, it does not weaken the firewall at all.

Trim the fuselage for the fuel tank



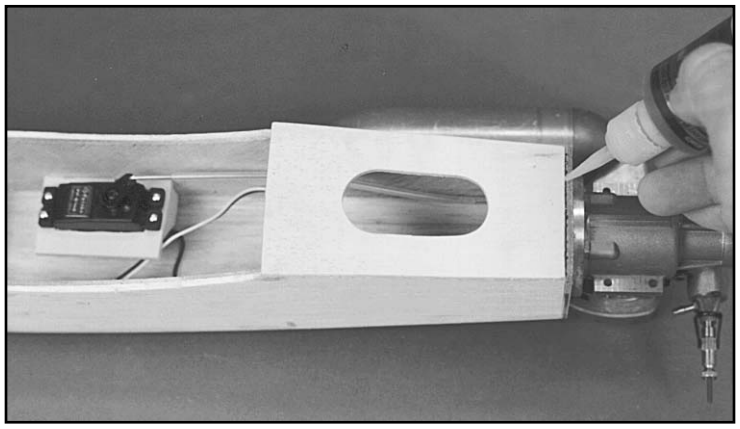
☐ **10.** With a hobby knife, trim the triangle stock flush with the number two bulkhead. This will make installation of the fuel tank easier. Thoroughly coat the inside of the fuel tank compartment with 30-minute epoxy to fuelproof the wood.

Install the fuel tank



☐ **11.** Route the fuel lines through the hole and install the fuel tank as shown. Make sure fuel lines are not pinched against the firewall. Pack 1/4" (6mm) foam around the fuel tank to isolate the fuel tank from vibration.

Installation of fuel tank compartment hatch



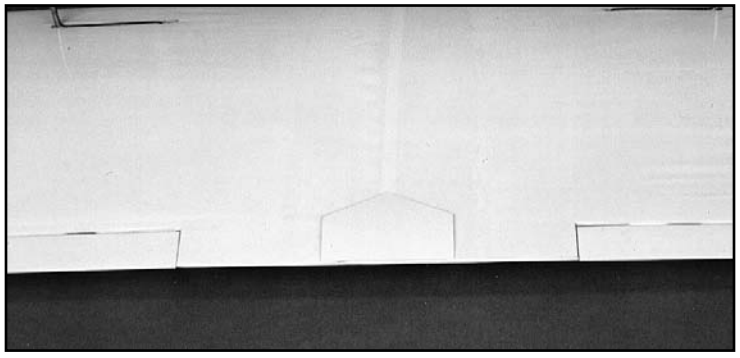
☐ **12** Using thick CA, install the fuel tank compartment hatch. Sand the edges flush with the fuselage sides and then radius to a 1/4" (6mm).

Finishing the model

Applying the covering

☐ Remove all of the fittings, pushrods and control horns. This will make covering much easier and neater. It will take about 2 rolls of MonoKote® to cover the Viper. Use your imagination and you can create a very attractive airplane. Once the Viper is covered, re-install all of the fittings. Cover the servo access hole and the fuel tank compartment hole with clear tape or clear MonoKote®. Note: Check to insure there is adquate clearance, about 1/32" (1mm) on each end of the aileron to prevent binding.

Wing bolt reinforcement plate

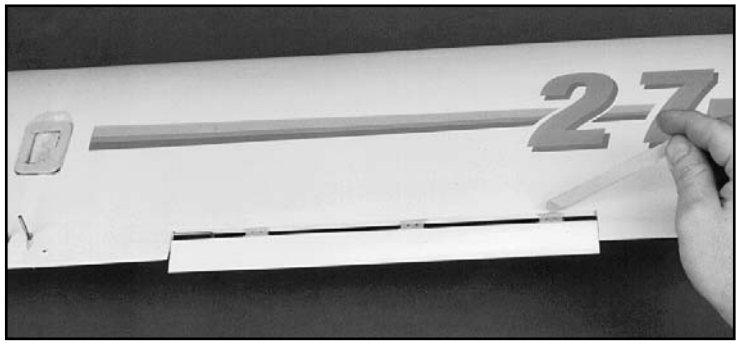


☐ Place the wing bolt reinforcement plate over the bolt holes on the **bottom** of the wing. Center it on the center line of the wing. Mark the location and remove the covering from underneath. Using thick CA, glue the plate in place. Re-drill the holes from the top of the wing using a 1/4" (6mm) drill. Apply covering to the plate.

Wing saddle seal

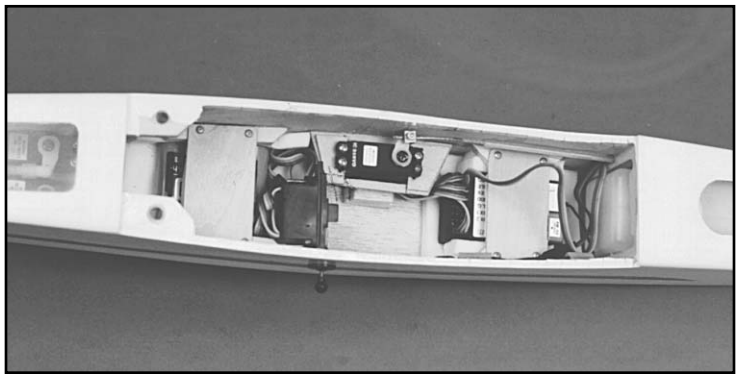
☐ Use of bathtub silicone sealer is recommended for sealing the wing to fuselage joint. This is an excellent method, used by many experts because it results in a permanent and nearly perfect wing saddle joint. Briefly, the technique is as follows: 1. Cover the top of the wing center section with waxed paper or plastic kitchen wrap. Pull out all wrinkles and tape it to the wing. 2. Squeeze out a bead of silicone sealer onto the wing saddle area of the fuselage. 3. Lay the wing in the saddle and push down gently. The excess silicone sealer will squeeze out. 4. Allow to dry without disturbing for at least 24 hours. 5. Remove the tape; then remove the wing from the saddle (leaving the waxed paper or plastic wrap in place) 6. Gently pull the waxed paper or plastic wrap away from the sealer. 7. Using a new single-edge razor blade, trim the sealer flush with the wing fillets, and along the inside of the fuselage.

Control surface installation



☐ Apply petroleum jelly to the moving portion of each of the hinges from one of the ailerons. Apply a small amount of epoxy to one side of the hinge and in the hinge slot on the aileron. Repeat this procedure for the other two hinges. Set aside to cure. Once cured, repeat this procedure on the wing, using a small stich to pack the aileron torque rod hole with epoxy. Then install the aileron onto the wing. Make sure no epoxy remains on the moving portion of the hinge. If it does, remove the epoxy quickly with alcohol. Repeat this procedure for the other aileron, rudder and elevator.

Radio installation

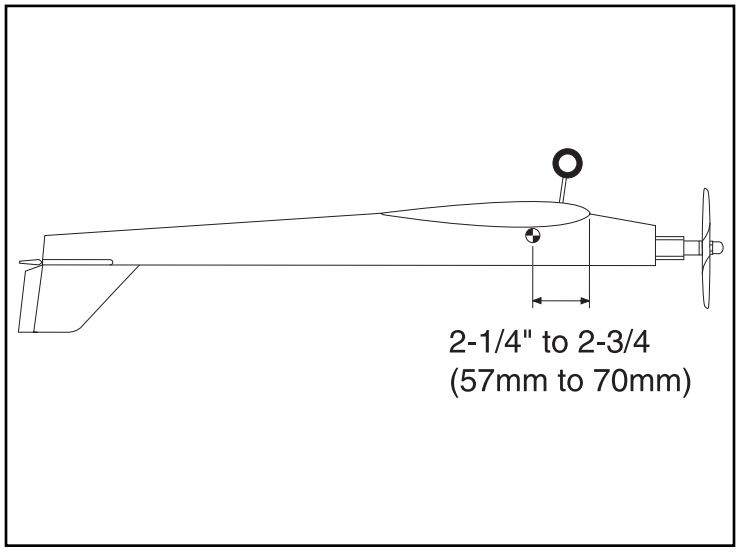


☐ Install the receiver, battery and switch according to the manufacturer's recommendations. Protect the equipment with 1/4" (6mm) foam rubber. Move the battery and receiver back and forth until the proper center of gravity is achieved. Route the antenna through the antenna tube. Use scrap balsa and foam to secure the receiver and battery pack.

Balancing the model laterally

☐ With the wing attached to the fuselage and level, lift the model by the engine propeller shaft and at the centerline of the fin. Do this several times. Notice if one wing drops when you lift. The wing that drops is the heavy side. Balance the model by gluing weight to the inside of the light wing tip. Note: An airplane that has been laterally balanced will track better in loops and in other maneuvers.

Balancing the model fore and aft



☐ Mark the center of gravity on each wing panel with a felt tip pen. This mark should be placed 2-1/4" to 2-3/4 (57mm to 70mm) back from the leading edge of the wing. This is a good, safe balance range. You may choose to try different balance points to change the performance of your Viper, but do not move the balance point more than 1/4" (6mm) at a time. Balancing should be done with the fuel tank empty.

Adjusting the control surface throws

☐ Use the surface throw gauges on page 24 to adjust the surface throws.

Sport flying

Aileron: 1/4" up and down
Elevator: 1/4" up and down
Rudder: 3/4" left and right

Quickie 500 racing

Aileron: 3/16" - 1/4" up and down
Elevator: 3/16" up
1/8" down
Rudder: 3/4" left and right

Pre-Flight

Charging the batteries

Follow the battery charging procedures in your radio instruction manual. You should ***always*** charge your transmitter and receiver batteries the night before you go flying, and at other times as recommended by the radio manufacturer.

Ground check the model

If you are not thoroughly familiar with the operation of R/C models, ask an experienced modeler to check to see that you have the radio installed correctly and that all the control surfaces do what they are supposed to. The engine operation must also be checked and the engine "broken in" on the ground by running the engine for at least two tanks of fuel. Follow the engine manufacturer's recommendations for break-in. Check to make sure all screws remain tight, the hinges are secure and the prop is on tight.

Range check the radio

Check the operation of the radio before every time you fly. This means with the transmitter antenna collapsed and the receiver and transmitter on, you should be able to walk at least 100 feet away from the model and still have control. Have someone help you. Have them stand by your model and, while you work the controls, tell you what the various control surfaces are doing.

Repeat this test with the engine running at various speeds while an assistant holds the model. If the control surfaces are not operating correctly at all times, ***do not fly!*** Find and correct the problem first.

Before you fly

1. Make sure that no other fliers are using your radio frequency.
2. Your radio transmitter must be the FIRST thing you turn ON, and the LAST thing you turn OFF.

Fuel storage and care:

1. Do not smoke near your engine or fuel.
2. Store all engine fuel in a safe, cool, dry place, away from children and pets.
3. Always wear safety glasses.
4. Make certain that your glow plug clip is securely attached to the glow plug—and cannot pop off, possibly falling into the spinning propeller.
5. Use a “chicken stick” or electric starter to start the engine—NOT your fingers.
6. Make sure that the wires from your starter and glow plug clip cannot become tangled with the spinning propeller.
7. Do not stand to the side of the propeller when you start or run the engine..
8. If any engine adjustments are necessary, approach the engine only from behind the spinning propeller.

Take-off and flying

Flying the Viper is very much like flying any other airplane. Remember to check the C.G. before your first flight. Set the control surfaces to the recommended deflection and make sure the fuel tank is full. Because there is no tail whee,l you will find it difficult to taxi the Viper. You should start the engine and carry it to the runway for take-off. While an assistant holds the tail of the Viper, advance the throttle to at least half power. With a slight bit of up elevator to hold the tail down, release the Viper. It will quickly accelerate and leave the ground. Slowly release the elevator once a gradual climb is established. Fly the Viper around and get used to the way it handles. Note the responsiveness and the feel of the controls so that changes can be made, if necessary, once you land.

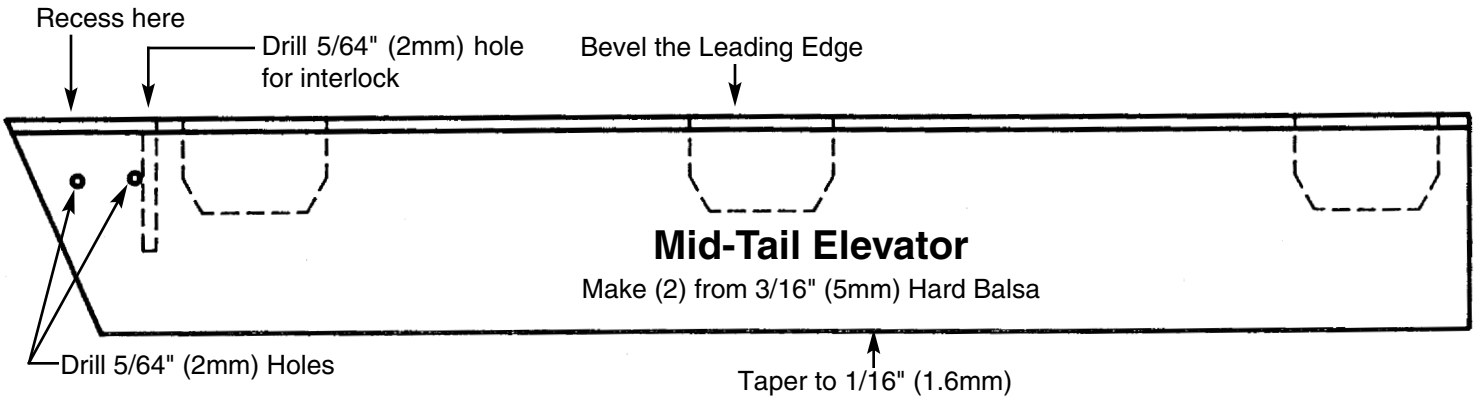
Landing

Landing is much simpler than you would expect an airplane of this type. The Viper carries speed well and glides extremely well. It actually glides so well that you may find it easier to land dead stick than with power on. Get the power off early. Start your approach about 200 feet out and about 50-75 feet of altitude. Reduce the speed using the elevator and control the lateral positioning with the rudder. You will find that the Viper is very responsive to control inputs all the way to the ground. Once the Viper is over the landing point, continue to increase the elevator pressure to flare the airplane and allow it to settle onto the runway.

Racing

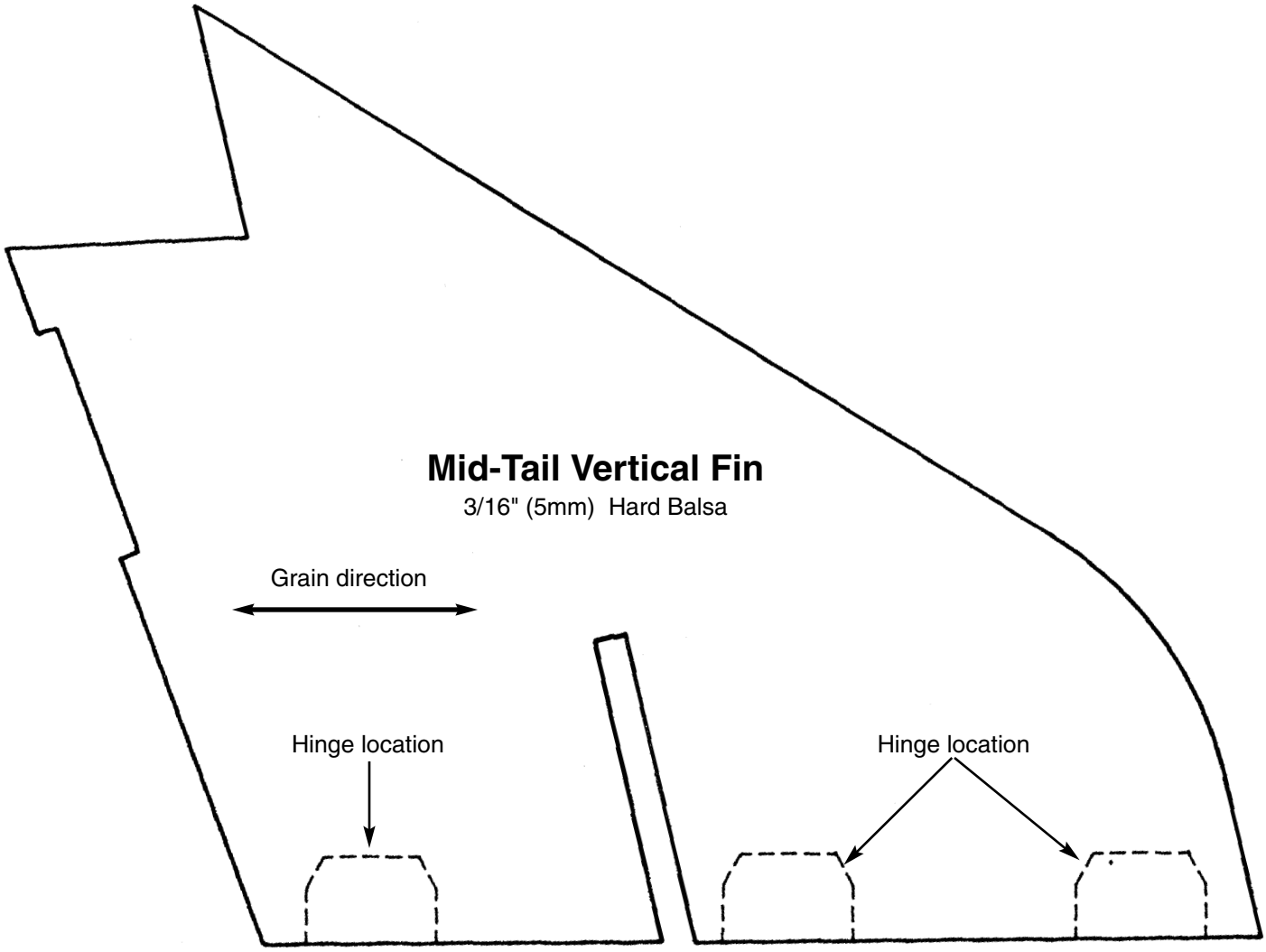
If you should decide to race your Viper, obtain a copy of the AMA rule book and become familiar with the Quickie 500 rules. The best advice anyone could ever give to someone just starting in racing is "learn to fly the airplane first". If you can do this you can race. Consistency is the name of the game in racing. You must start and finish every race to acquire points. Learn to fly the course very well before you start trying to go fast. Keep the Viper light, around 3-1/2 to 3-3/4 pounds (1.6kg to 1.7kg) and it will be a very good racer. Better performance and more accurate controls can be achieved if the control surfaces are sealed using clear tape or clear MonoKote®. This will also help reduce high speed flutter.

VIPER TEMPLATES



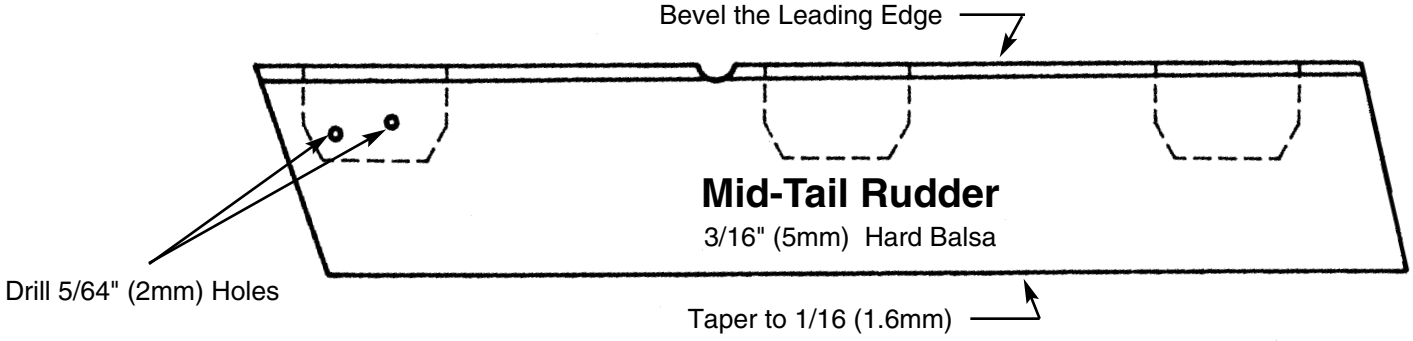
Mid-Tail Elevator

Make (2) from 3/16" (5mm) Hard Balsa



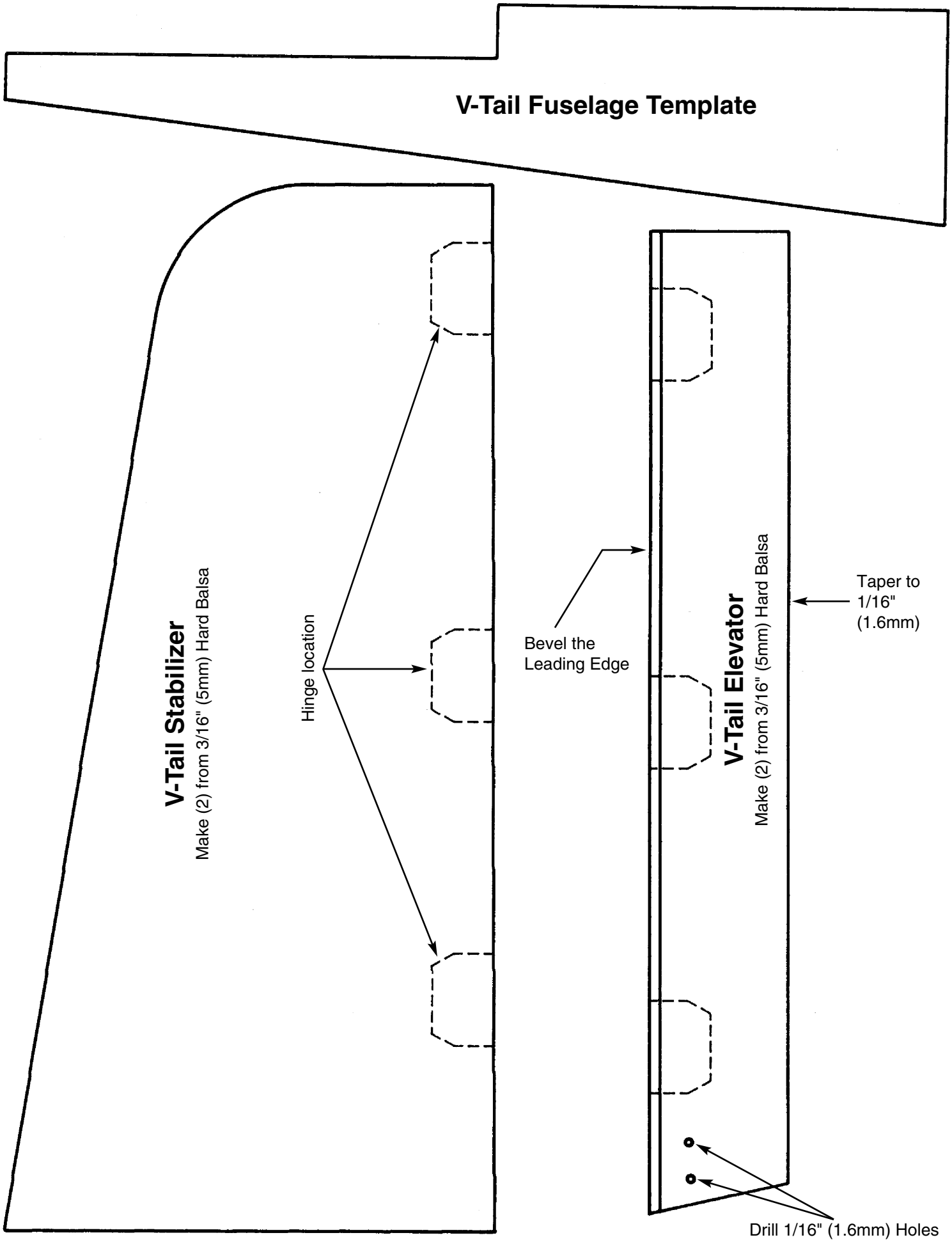
Mid-Tail Vertical Fin

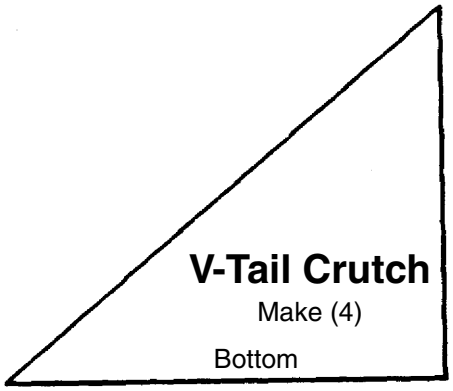
3/16" (5mm) Hard Balsa

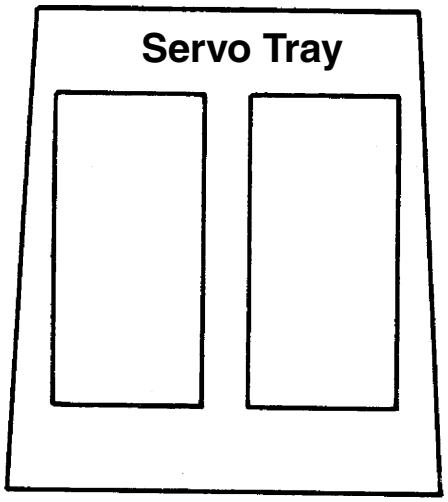


Mid-Tail Rudder

3/16" (5mm) Hard Balsa


V-Tail Fuselage Template
V-Tail Stabilizer
Make (2) from 3/16" (5mm) Hard Balsa
Hinge location
Bevel the
Leading Edge
V-Tail Elevator
Make (2) from 3/16" (5mm) Hard Balsa
Taper to
1/16"
(1.6mm)
Drill 1/16" (1.6mm) Holes

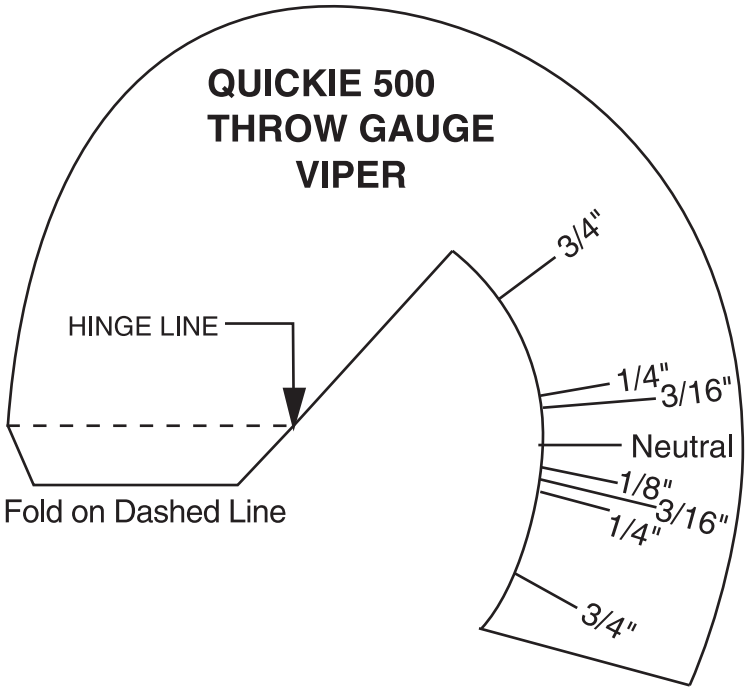




Trim the existing servo tray to size for mounting behind bulkhead #4.

Surface Throw Gauges

Cut out the gauge and Tape or glue the throw gauge to a piece of cardboard to keep it from flexing.



IMPORTANT

The threaded coupler will need to be soldered onto the end of the throttle rod. Sand 1/2" of the paint off of one end of the throttle rod. Put solder flux on the end of the throttle rod and place the coupler on the rod. Apply heat from a soldering iron on the coupler and apply solder to the rod and xoupler joint. The solder will wick into the coupler. Let the coupler cool before installing the clevis.