

# Sturdy Birdy

## INSTRUCTION BOOK



**WARNING! THIS IS NOT A TOY!**

Assembly and operation of this aircraft must be done by or under the direct supervision of a responsible adult. If not handled correctly, this model is capable of inflicting serious bodily harm. It is your responsibility and yours alone to assemble this model correctly, properly install all R/C components, and to test and operate it in a safe and responsible manner.

**HOBBICO®**

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## INTRODUCTION

Congratulations on your purchase of the HOBBICO STURDY BIRDY, THE FIRST REAL SUPER TRAINER You now own the BEST FLYING durable trainer available By following these instructions as you assemble the model you will have a great flying plane that will not only teach you how to fly but it will stick with you while you learn, no matter how long it may take!

The first thing you should do after reading this paragraph is check the parts in this kit against the parts list on the next page to make sure everything is here

We strongly recommend that you join AMA, The Academy of Model Aeronautics Being an AMA member entitles you to liability insurance, puts you in touch with your local flying club and includes a subscription to MODEL AVIATION magazine which has a monthly listing of all "goings on" in model aviation

The insurance is the most important advantage of the AMA membership because if your model hits someone **or** something you are liable for any damage it causes.

The address for the AMA is.

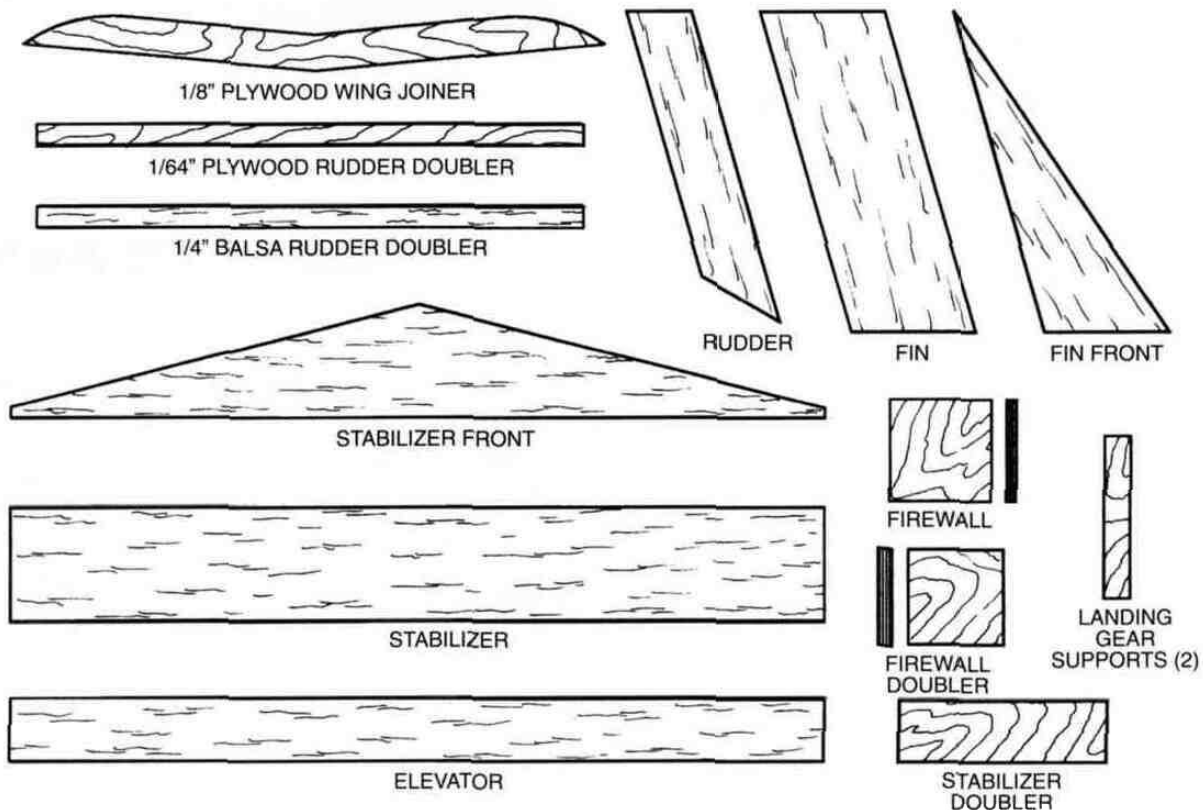
*Academy of Model Aeronautics*  
5151 East Memorial Drive  
Muncie, IN 47302  
(800) 435-9262

We also recommend that you join your local flying club There you will find people who can help you learn to fly and teach you the safe ways of handling your aircraft.

# PARTS LIST

Stock #	Description	Qty
ARF1F01	Plastic Fuse Tube	1
ARF1F02	Aluminum Channel	1
ARF1P01	Instruction Book	1
ARF1R05	1/64" Ply Fin Doubler	1
EM2040	Engine Mount (Left & Right)	1
ARF1W02	Plastic Wing Protector	1
FWING01L	Molded Foam Wing - Left	1
FWING01R	Molded Foam Wing - Right	1
L-6U	Aluminum Landing Gear	1
PLTB009	24" Inner Pushrod	2
PLTB011	24" Outer Tube	2
PLTB012	12" Inner Pushrod	1
PLTB013	12" Outer Tube	1
NYLON87	CA Hinge Strip	1
<b>ARF1A01 ....Stab &amp; Wing Sub-Pack</b>		
ARF1R04	Balsa Fin Doubler	1
ARF1S01	Stab Front	1
ARF1S02	Stabilizer	1
ARF1S03	Elevator	1
ARF1W01	Birch Wing Joiner	1
<b>ARF1A02 ....Fin &amp; Rudder Sub-Pack</b>		
ARF1R01	Fin Front	1
ARF1R02	Shaped Fin	1
ARF1R03	Rudder	1
<b>ARF1A03 ....Small Wood Parts Sub-Pack</b>		
ARF1F03	Firewall Doubler	1
ARF1F04	Firewall	1

Stock #	Description	Qty
ARF1F05	Landing Gear Strips	2
ARF1S04	1/16" Ply Stab Doubler	1
DOWEL030	1/4" Dowel	4
<b>ARF1M01 ....Hardware Sub-Pack</b>		
NUTS001	4-40 Blind Nut	6
NUTS002	4-40 Hex Nut	2
NUTS010	6-32 Hex Nut	4
NUTS014	8-32 Hex Nut	2
NYLON03	Control Horn	2
NYLON17	Nylon Clevis	3
NYLON52	5-1/2" Nylon Tie	2
SCRW002	2-56 x 5/8" Bolt	4
SCRW010	#4 x 5/8" Sheet Metal Screw	4
SCRW024	#2 x 3/8" Sheet Metal Screw	8
SCRW055	6-32 x 1-1/2" Bolt	2
SCRW052	4-40 x 5/8" Bolt	4
SCRW053	8-32 x 1/2" Bolt	2
SCRW104	4-40 x 1-1/4" Bolt	4
WBNT146	Pre-bent Tailskid	1
WIRES16	12" Threaded Link Rod	3
WIRES20	1" Threaded Link Rod	3
WSHR002	#4 Lock Washer	2
WSHR004	#6 Flat Washer	1
WSHR005	#4 Flat Washer	4
WSHR010	#8 Lock Washer	2
WSHR011	#8 Flat Washer	1



# ADDITIONAL ITEMS NEEDED

Here is a description of some of the additional items you will need to assemble your STURDY BIRDY.

## GLUES

C/A (Cyanoacrylate) glues will be used to glue the wood parts together because they are strong and very fast curing. Do not use C/A glues for any of the wing construction because most C/A glues will attack and dissolve the foam wing. They come in different viscosities. Thin C/A glue can be used when gluing parts with a good tight joint. When using this type of C/A, assemble the parts first and then add the glue. It will penetrate the joint and cure in a couple of seconds. Thick C/A glue has a longer curing time that gives you more time to get the parts assembled accurately before the glue cures and the thicker consistency helps fill poor fitting joints. C/A Accelerator spray can be very handy for speeding up the curing process of the thick C/As.

Epoxy is a two part adhesive that has to be mixed before it will cure. We will use epoxy glue for the wing assembly since it takes a little longer to cure and does not attack foam. Epoxies come in several different types with many different curing times. We recommend Great Planes Pro 30 Minute Epoxy (#GPMR6047).

## ENGINE

The STURDY BIRDY is designed to fly with a standard 20 size 2-cycle engine. The OS 20 FP is a great, inexpensive engine that provides plenty of power. This combination is ideal for the average beginner. A 25- 30 size engine can be used if you would like snappier performance especially at higher elevations where the air is thinner. We recommend that you **do not** use an engine larger than a 30 as the additional weight makes the plane more difficult to fly at slow speeds. The Great Planes adjustable engine mount provided with the STURDY BIRDY will fit most .20-.30 engines.

## RADIO

The STURDY BIRDY requires 3 channels to fly but there are not many 3 channel radios produced anymore. Therefore you will more than likely end up purchasing a 4 channel radio with 3 or 4 servos which usually costs less than the three channel radios anyway. Your next plane may require four channels since it will probably have ailerons. The radio system you purchase should have standard size servos so they will fit into the fuselage channel. Mini or micro servos will also work but they will require some modifications to fit properly. **Large servos will not work in the STURDY BIRDY.**

## FUEL TANK

The **STURDY BIRDY** was designed to hold a square tank. We recommend a Great Planes 6 oz. tank (#GPMQ4102).

## COVERING

Although not absolutely necessary, the "tail feathers" and the wing should both be covered with a "low heat" type iron-on covering. Top Flite Econokote is perfect for your **STURDY BIRDY**. The covering will not only make your plane look nicer, but it will also add strength and make it last longer.

## HERE IS A HANDY LIST OF THE ADDITIONAL ITEMS YOU WILL NEED.

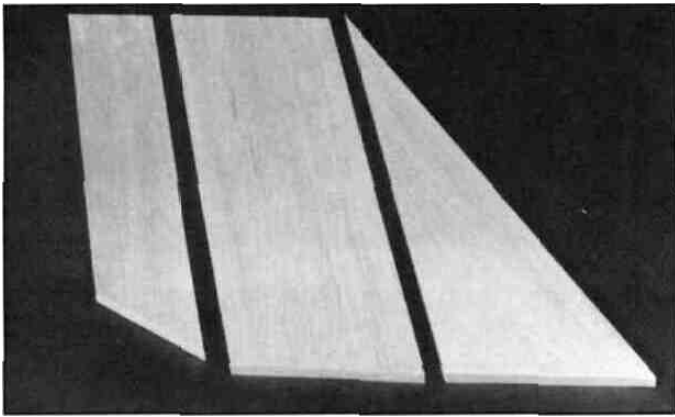
- 1 .20 - .30 2-Stroke Engine
- 1 3-4 Channel Radio with Standard Servos
- 2 or 3 9x4 or 9x6 Propellers
- 2 2-1/2" Wheels (Great Planes #GPMQ4223)
- 1 6 oz Tank (Great Planes #GPMQ4102)
- 1 box #64 Rubber Bands (Hobbico #HCAQ2020)
- 1/2 oz. Thin CA (Great Planes #GPMR6001)
- 1/2 oz. Thick CA- (Great Planes #GPMR6013)
- 1 30 Mm. Epoxy (Great Planes #GPMR6047)
- 1 roll Low Heat Iron-on Covering (Top Elite Econokote)
- 1 1/4" Foam Rubber (Hobbico #HCAQ 1000)
- 1 12" Medium Fuel Tubing (Great Planes #GPMQ4131)

## TOOLS NEEDED FOR ASSEMBLY

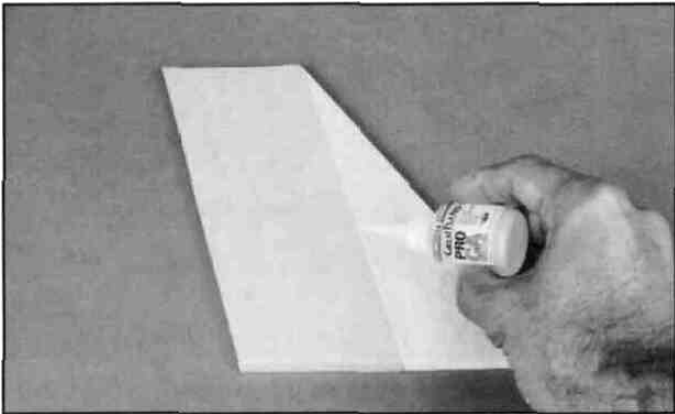
- Hand or Electric Drill
- Drill Bits (3/32", 1/8": 3/16": 5/32", 7/32")
- Sanding Block or T-Bar Sander
- Sealing Iron
- Razor Saw
- Hobby Knife
- Pliers
- Screwdrivers
- T-Pins
- Hammer
- Waxed Paper
- Nylon Reinforced Strapping Tape

# CONSTRUCTION

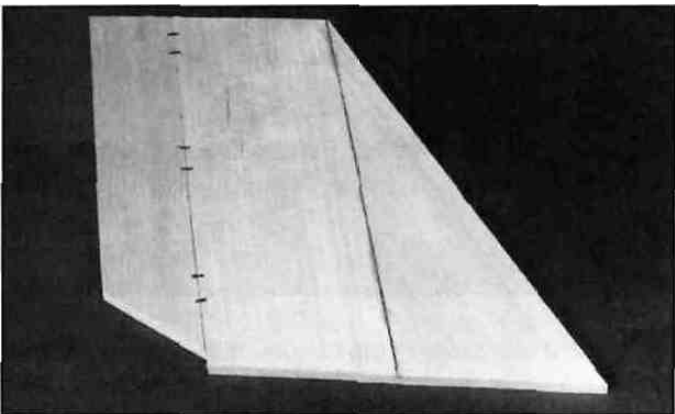
## FIN/RUDDER



D 1. The fin is made up of the three pieces shown above. Locate these three pieces and lay them out.

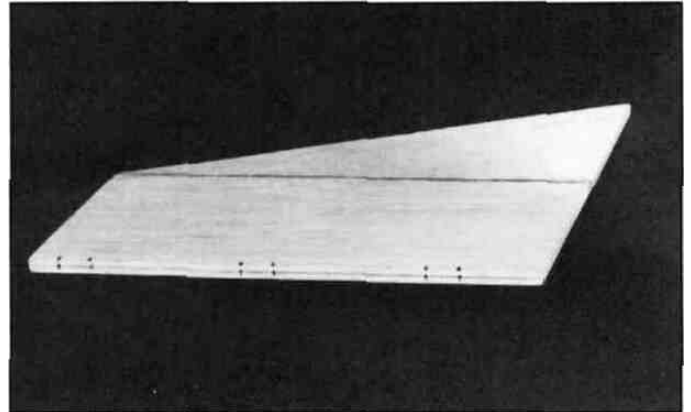


D 2. Glue the front part of the fin to the main part using thin C/A. Assemble the two parts and check to make sure they fit properly and then apply a line of C/A along the joint. When the glue has cured, flip the pieces over and add a little glue to the other side.

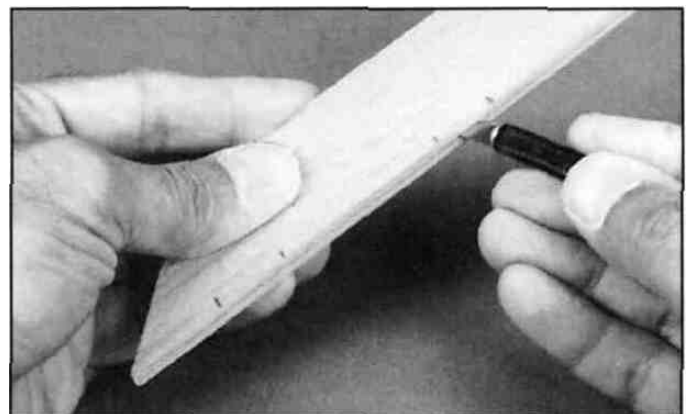


D 3. Lay the rudder in place against the trailing edge of the fin and, using a hinge (see step 29, p. 9) as a template, mark the hinge locations. They are spaced out

so that the outer hinges are approximately 1" from the ends of the rudder and the middle hinge is in the center.



D 4. Draw a line down the middle of the trailing edge of the fin and also down the middle of the leading edge of the rudder. A sheet of wood (or anything) 1/8" thick laid down next to the piece makes it easy to do this. Transfer the hinge locating marks from the side to the edges as shown above.

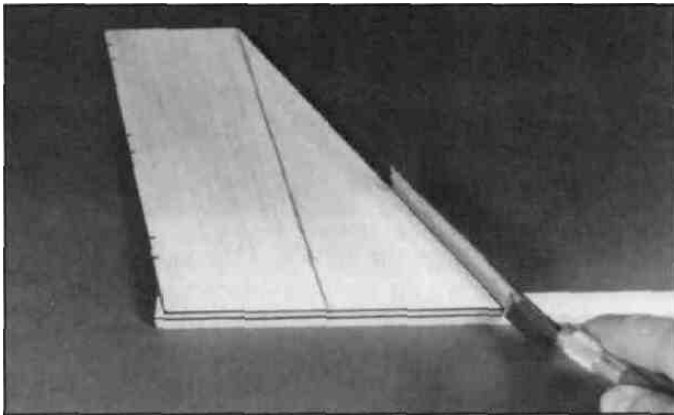
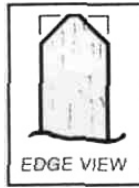


D 5. Use your hobby knife with a #11 blade to cut the hinge slots in both the fin and the rudder. The slots should go straight into the balsa without coming out the side and should be about 3/4" deep.

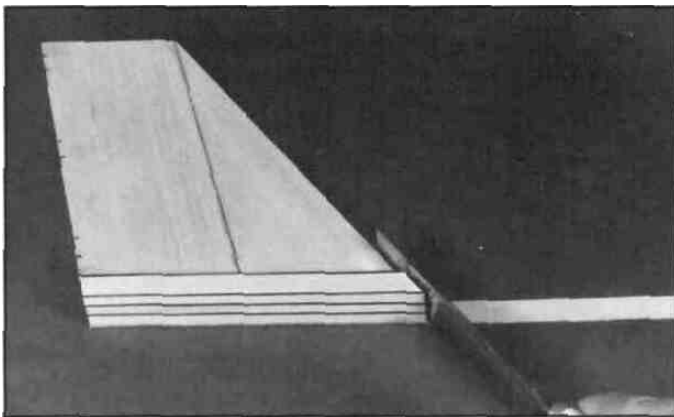
**CAUTION!!!: You must use extreme care when cutting hinge slots with an Xacto knife, to avoid cutting yourself! If the balsa part breaks while you are pushing on the knife, the blade could go into your hand before you know it! A good precaution is to wear leather gloves while performing this step.**

D 6. Trial fit the fin and rudder together using the hinges to check for proper alignment. **Do not** glue the hinges in place yet! Sand the rudder and/or fin so they match each other at the top.

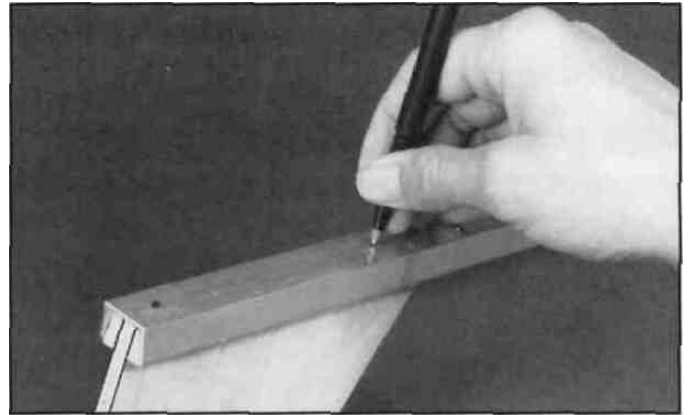
D 7. Remove the hinges from the rudder and bevel the leading edge with your sanding block as shown in the sketch. This is to allow the rudder to swing either direction once the hinges are glued in.



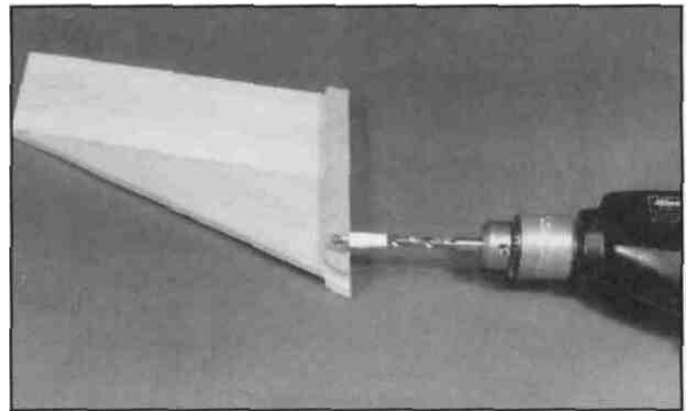
D 8. Add the 1/4" x 1/2" balsa doubler to each side of the fin as shown in the photo above. Use a razor saw to cut the excess off at the leading and trailing edges.



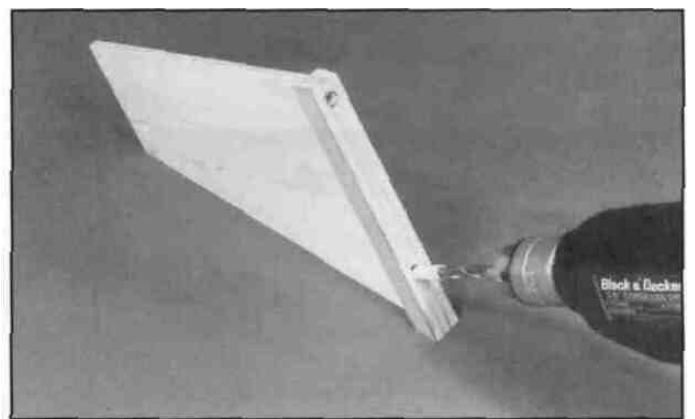
D 9. Check the fit of the fin assembly into the aluminum channel. It will most likely be a little loose and we want a nice tight fit. Add a strip of the 1/64" plywood doubler to **ONE** side of the fin gluing it to the balsa doubler. Check the fit again and if it is still a little loose, add a plywood doubler to the other side. If you need to you can sand the plywood slightly to help the assembly fit. Also, you can have the covering material continue down over the doublers if you need the additional thickness.



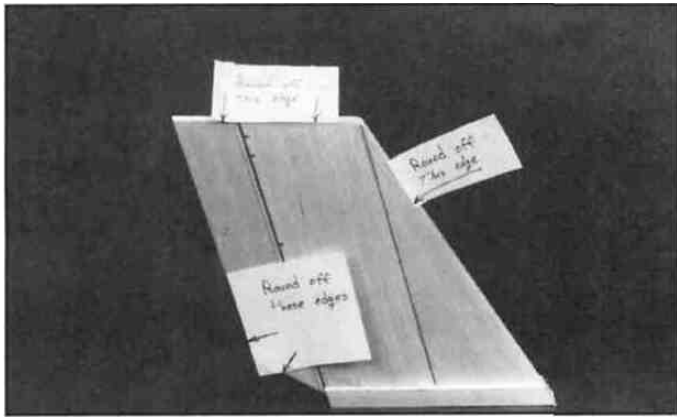
D 10. Position the fin assembly in the channel with the trailing edge of the fin even with the end of the channel and press it in place. Mark the location of the stabilizer bolt holes on the bottom of the fin and then remove the fin from the channel.



D 11. Wrap a piece of masking tape around a 7/32" drill bit about 1/2" from the end of the bit.

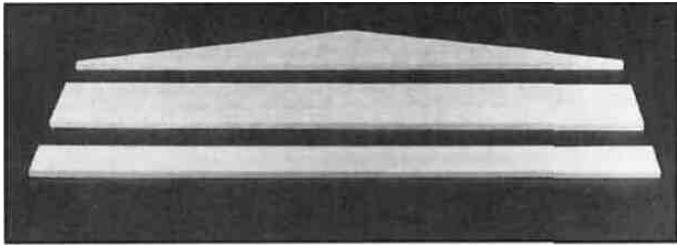


D 12. Drill two holes in the bottom of the fin assembly to make a space for the stabilizer bolts. Be careful not to drill any deeper than the masking tape or you may punch through the side of the fin.

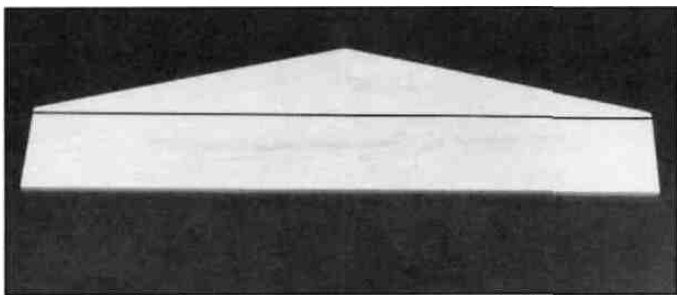


D 13. Use a sanding block to round the edges of the fin/rudder assembly as shown above. Give the sides a quick sanding with some fine sandpaper to get it ready for the covering. This completes the basic assembly of the fin and rudder. The hinges and control horn will be installed after everything is covered.

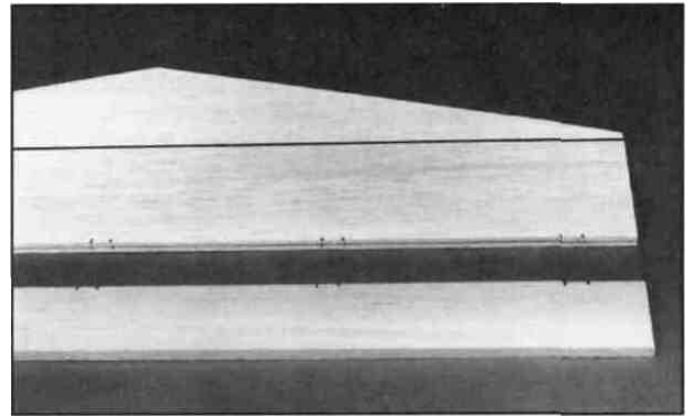
## STABILIZER



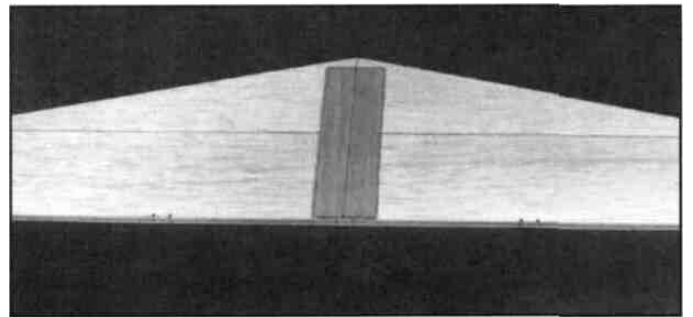
D 14. The stabilizer and elevator are assembled from these three main pieces. Locate these and let's get started.



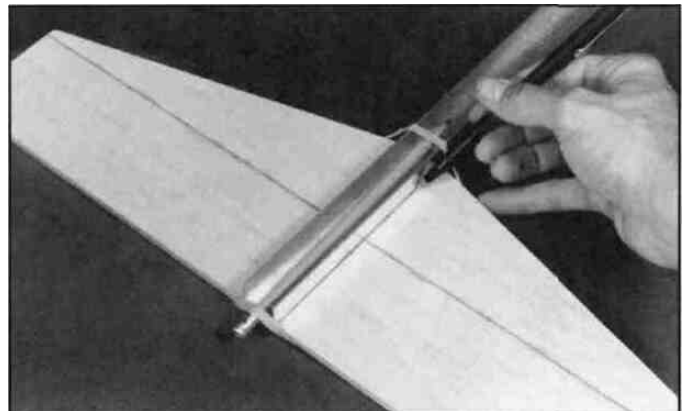
D 15. Glue the front of the stabilizer to the back using thin C/A just as you did for the fin in step #2.



D 16. Mark the hinge locations using the same technique you used in step #4. There are five hinges used here. The outer hinges are approximately 1" from the edge. The middle hinge is in the center and the other two hinges are centered between the outer hinges and the middle hinge. These hinge locations are not critical but proper placement makes it easier to find the slots after the parts are covered. Cut the slots for the hinges and test fit the stabilizer and the elevator together to check for proper alignment between the two parts.

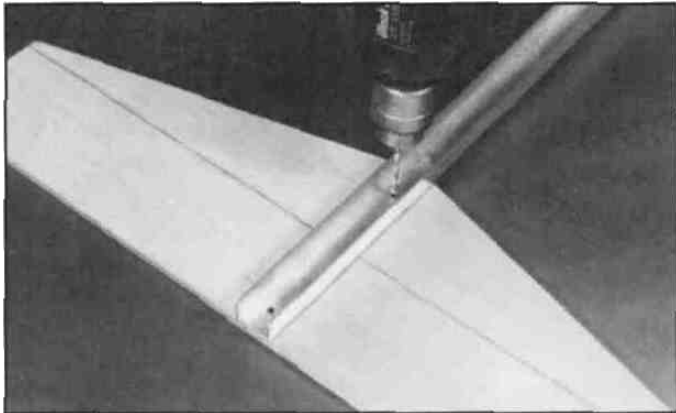


D 17. Use some thick C/A to glue the 1/16" plywood doubler in place on the stabilizer. This side is now the bottom of the stabilizer. Use a ruler to get this piece centered as close as possible. Use a drafting triangle or carpenter's square to draw a line perpendicular to the stabilizer trailing edge and through the center of the stabilizer to the point where the leading edges meet.



D 18. Use a pencil and a rubber band to hold the stabilizer in place as shown in the photo. Sight down the

bottom of the channel and line the stabilizer up with the channel (using the line you just drew) When you are satisfied with the alignment draw a line down both sides of the channel on the top of the stabilizer.

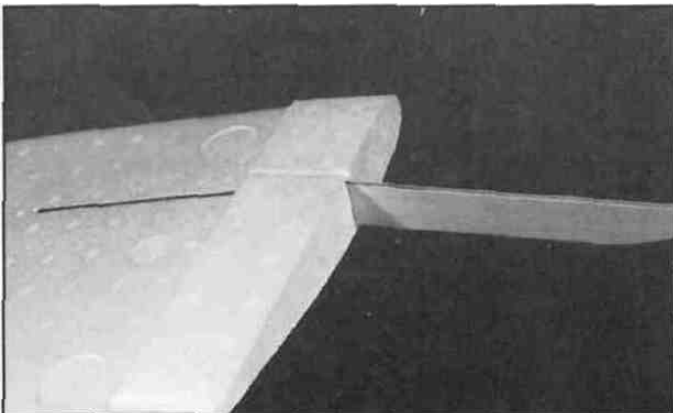


D 19. Remove the pencil and rubber band and with the stabilizer centered over the lines, drill two 1/8" holes through the stabilizer using the holes in the channel as a guide The trailing edge of the stabilizer should be slightly past the end of the channel.

D 20. Use a sanding block with some fine sandpaper to round off the leading edges, trailing edge and the tips as you did for the fin and rudder Also sand the top and bottom surfaces smooth This completes the basic assembly of the stabilizer and elevator The control horn and the hinges will be installed after the tail is covered

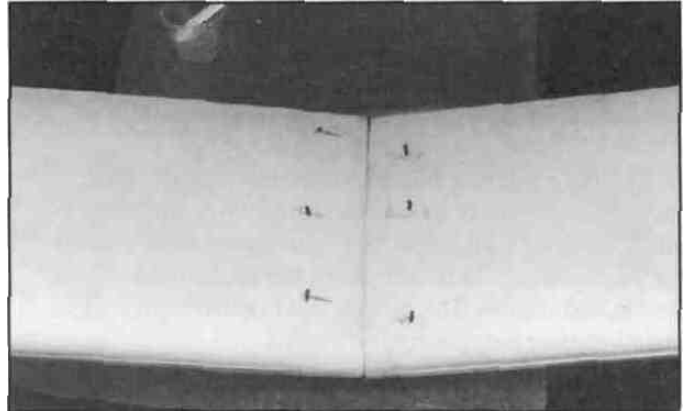
## WING ASSEMBLY

D 21. Using a sanding block with some fine grit sandpaper, (240-320 grit) remove the little nubs and any mold lines left on the wing from the molding process.

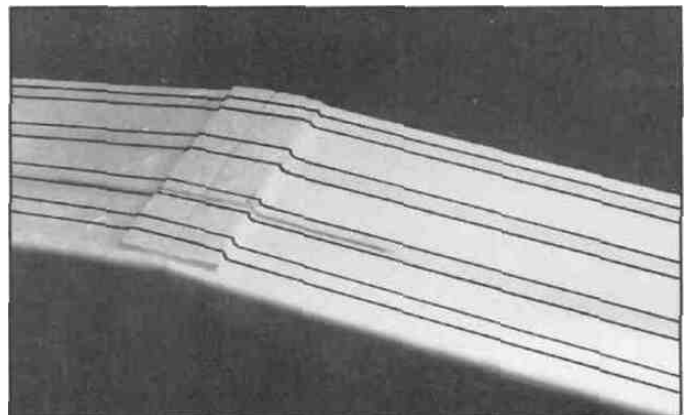


D 22. Test fit the 1/8" plywood dihedral joiner in the

slots in the wing to make sure it fits nicely Mix up about 1/2 oz of epoxy and spread it throughout the slot in one wing panel With the wing panel upside down, insert the joiner in place and squeeze out all the excess epoxy so that the joiner is flush with the bottom of the wing (which is facing up) Try to use enough epoxy so that the slot is completely full and level with the surfaces of the wing



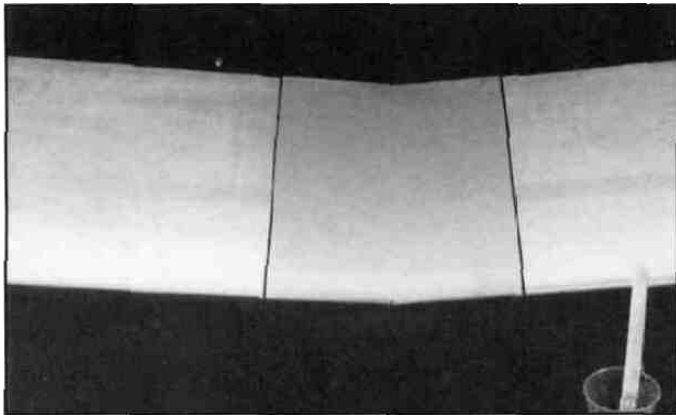
D 23. Lay some waxed paper down on the work surface and mix up another ounce or so of epoxy Spread the epoxy throughout the slot and on the root (middle end) of the other wing panel Slide the two wing panels together and line them up as close as possible Use several T-pins and masking tape to help hold them in alignment Flip the wing assembly over so that the bottom of the wings are facing up and make sure that the joiner is seated properly in the slot Wipe off any excess epoxy before it starts to cure It is important that the wings are joined with both panels being accurately aligned with each other.



D 24. After the epoxy from the last step has fully cured, place the wing upside down on the edge of a table so that only 1/2 of the wing (from one wing tip to the center joint) is resting on the table Starting at the wing tip that is resting on the table, lay a strip of nylon reinforced strapping tape down so that it crosses over the center joint directly over the **w i n g** joiner Press the tape firmly onto the wing and down into the fillet (where the bottom of the wing meets the mounting platform) and then flip the wing around and continue the strip of tape out to the



other wing tip. Apply two more strips of tape between this strip and the trailing edge of the wing and the fourth strip should be added between the first strip and the leading edge of the wing. The photo shows where the strips should be located. Try to get this tape stuck down as tightly as possible because it adds a tremendous amount of strength to the wing when properly applied. Make sure you do not change the washout (twist) or dihedral of the wing when applying the tape strips. If you are planning on doing some aerobatics or combat with your **STURDY BIRDY** you should also put three strips of tape on the top surface of the wing.



D 25. Trim the plastic center section protector to size by using either scissors or your hobby knife to cut along the scribe lines. Use some coarse grit sandpaper to scratch up the inner surface of the protector so the glue will adhere better. Test fit it on the wing and then use epoxy to glue it in place.

## COVERING

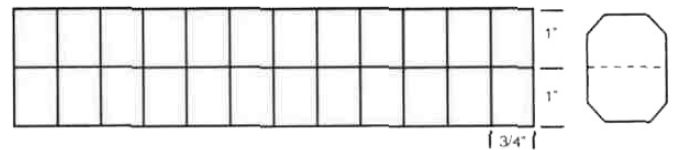
D 26. The tail surfaces (fin, rudder, stabilizer and elevator) should be covered with one of the iron-on coverings to help protect them from becoming fuel soaked and ruined. If you are also going to cover the wing, which will help it look nicer longer (and add a small amount of strength), you can save a little money by only buying one roll of low temperature covering (Top Flite Econokote is recommended) and using it for both the wing and the tail surfaces. Otherwise you can use any type of covering for the tail surfaces, but, remember to use a low heat covering for the wing. A few stripes or your AMA number can really add to the looks of your **STURDY BIRDY**.

D 27. Follow the instructions that come with the covering and cover the tail surfaces at this time. It is a good idea to cover the bottom surfaces first to get familiar with the covering since these surfaces will normally not be seen. When covering the wing, cover right over the tape and plastic wing protector, just try to use as little heat as possible.

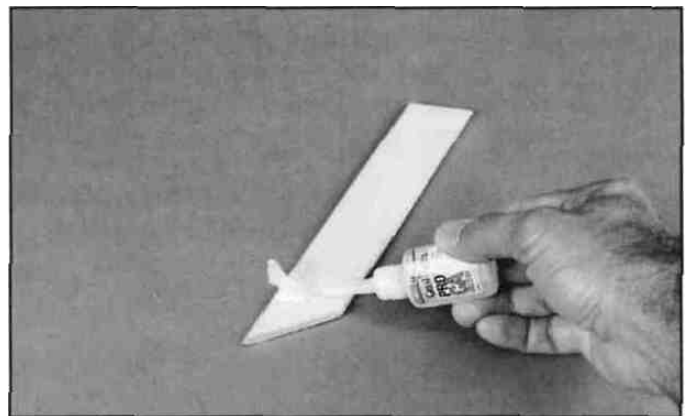
## INSTALLING THE HINGES

D 28. After covering the tail surfaces, the hinges can be installed. Use your hobby knife to find the slots you cut earlier and make slits in the covering so you can push the hinges into place and trial fit the pieces together again.

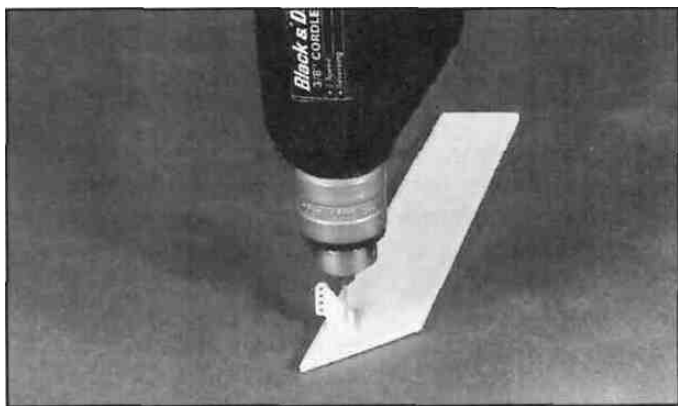
D 29. Cut the supplied 2" x 9" CA Hinge Strip into 24 individual 3/4" x 1" hinges and bevel the corners as shown in the sketch. Install the control surfaces with the hinges centered in place. Make sure the surface operates smoothly. Deflect the surface all the way in one direction, then apply several drops of thin CA onto the center of each hinge. The CA will wick throughout the entire hinge joint and into the wood. Deflect the surface the other direction and glue the same way. Flex the surface to loosen it up.



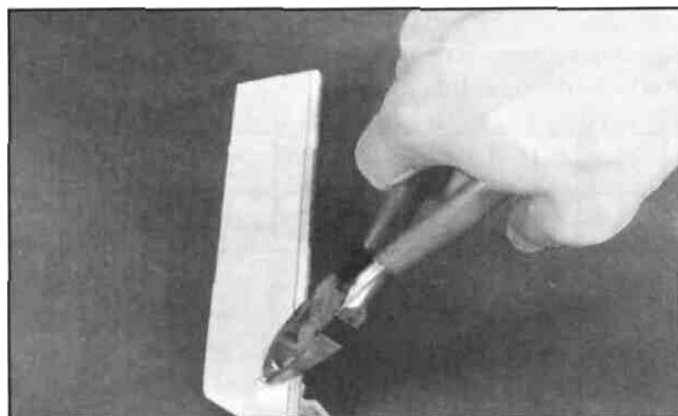
## ATTACHING CONTROL HORNS



D 30. Position the nylon control horn on the left side of the rudder about 1" up from the bottom with the four holes lined up with the leading edge. Use a drop of **Thin** C/A to tack glue the horn in place.



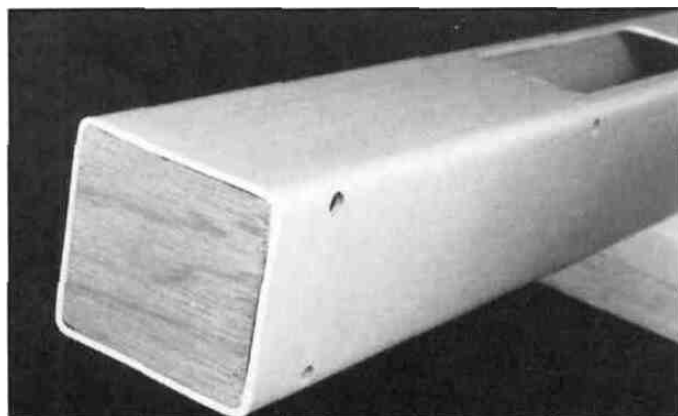
D 31. Drill two 3/32" holes through the rudder using the control horn as a guide.



D 32. Secure the horn to the rudder with two 2-56 x 5/8" machine screws. The screws should thread into the nylon "nutplate" on the opposite side of the rudder. Although not necessary, you may use some wire cutters or an abrasive cutoff wheel to cut the screws off even with the plate.

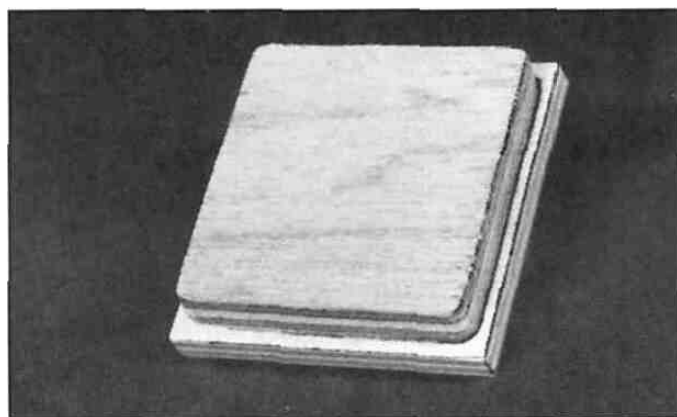
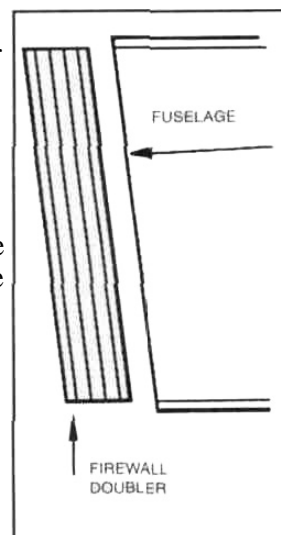
D 33. The other control horn should be installed on the top surface of the elevator about 1" to the right of the centerline. Follow the same procedure for installing this control horn.

## FUSELAGE

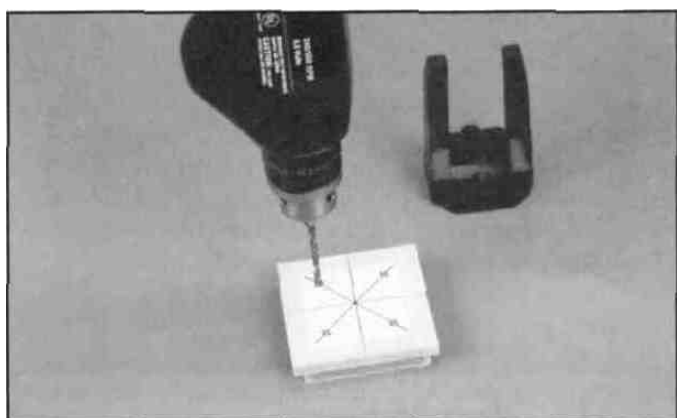


D 34. Locate the 3/8" plywood firewall doubler and

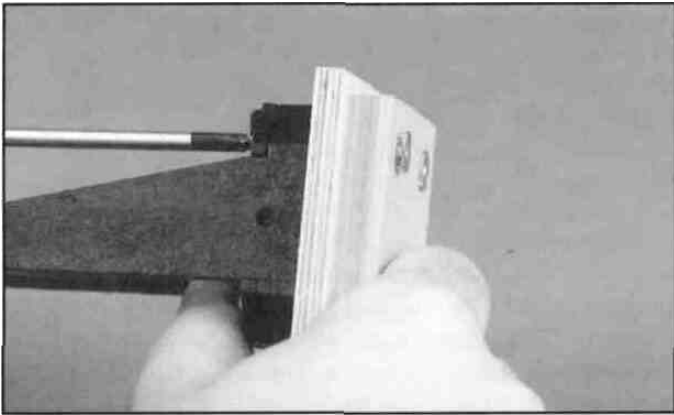
round off the corners with a sanding block. Test fit the doubler into the front of the plastic fuselage tube as shown in the photo. The firewall doubler should fit into the fuselage with a snug but not tight fit. The front of the fuselage is cut at a slight angle so the firewall and thus the engine will point down slightly. Because of this angle the top and bottom edges of the firewall doubler are also cut at a slight angle. Make sure you install the firewall doubler so all of its sides match up nicely with the sides of the fuselage as shown in the sketch.



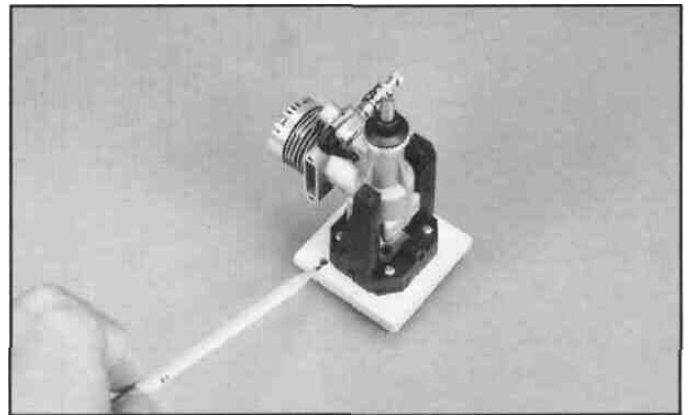
D 35. The 3/8" plywood firewall doubler is now glued to the 1/4" plywood firewall front. Use either **Thick C/A** or epoxy and make sure that the **front** of the **firewall doubler** is centered on the **back** of the **firewall**. Wipe away all excess glue that squeezes out.



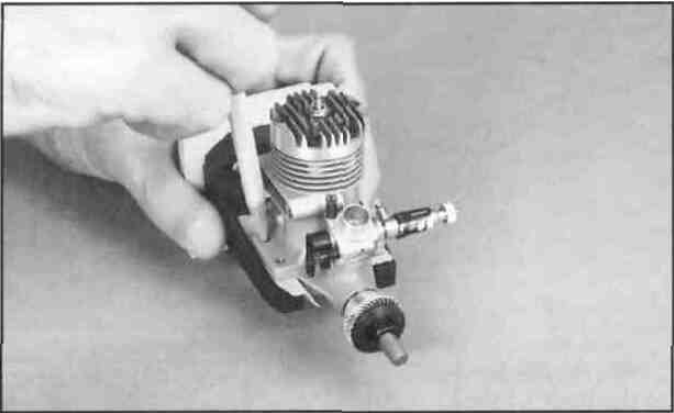
D 36. Draw a vertical and horizontal centerline on the 1/4" plywood firewall. Cut the engine mount template from the back of this booklet and tack glue it to the firewall, aligned with the centerlines. Drill a 1/8" bolt hole at each of the marked locations.



**D 37.** Cut the "spreader bar" off each mount half. Trim off any burrs or flashing, then snap the mount halves together. Bolt the mount to the firewall with four 4-40 x 1" screws and 4-40 blind nuts. Tightening the screws will draw the blind nuts into position.

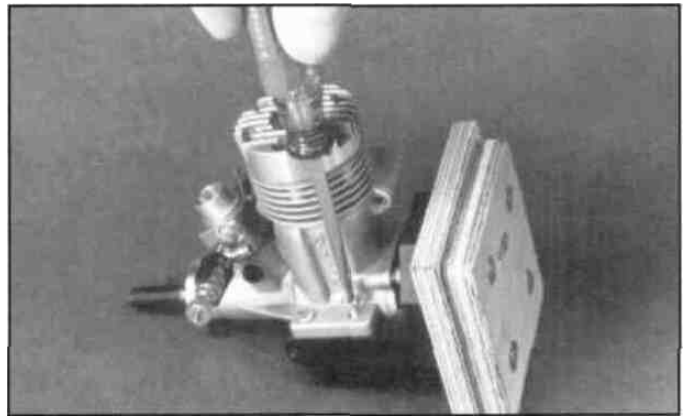


**D 40.** Temporarily install the engine on the mount with two #4 x 1/2" sheet metal screws. Mark the location of the throttle pushrod. Remove the engine and drill a 3/16" hole for the outer pushrod tube.

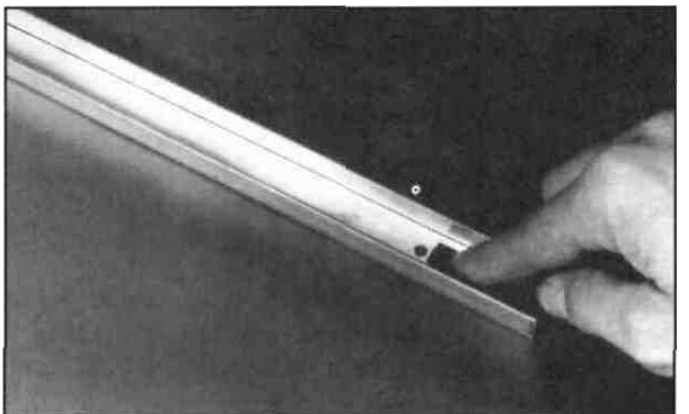


**D 38.** Test fit your engine to the mount. Adjust the width of the rails to fit the engine. Tighten the mounting screws securely. Apply a couple of strips of masking tape to the rails, position the engine, then mark the engine's mounting holes onto the rails (masking tape) with a pen or pencil.

**D 39.** Remove the engine and drill the rails where marked with a 3/32" drill bit. Try to keep the holes straight and vertical. You may use #4 x 1/2" sheet metal screws to mount the engine, or tap the holes with a 4-40 tap.



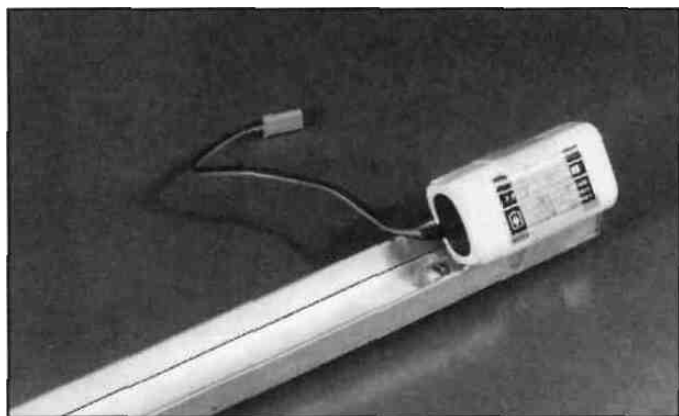
**D 41.** Secure the engine to the mount with four #4 x 1/2" sheet metal screws.



**D 42.** Use a small piece of coarse sandpaper to scuff up the inner floor of the aluminum channel in the area around the front 11/64" bolt hole.

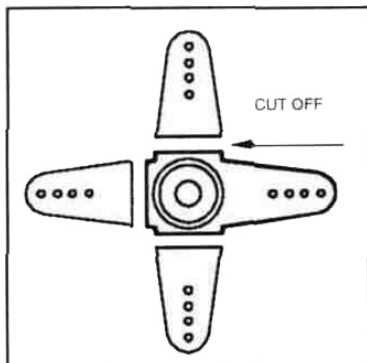


D 43. Insert one of the 8-32 x 1/2" machine screws into the hole so that it sticks out the bottom of the channel and glue it in place with plenty of thick C/A or epoxy. This screw will be covered by the battery pack prohibiting a screwdriver from being used to keep it from turning, so glue it securely but be very careful not to get any glue on the threads.

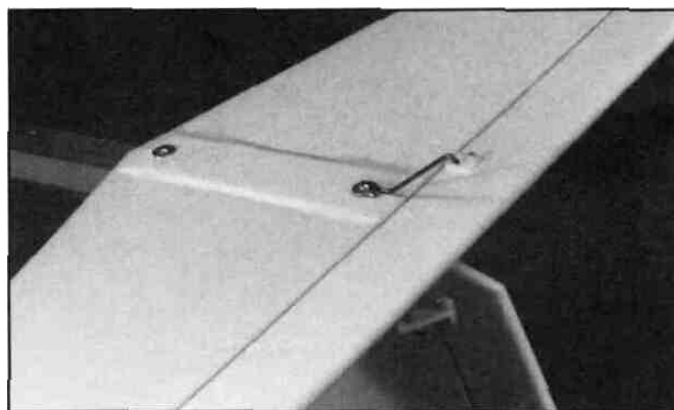


D 44. Use some nylon reinforced strapping tape to securely hold the battery pack on the front end of the channel. Square battery packs fit very nicely but most flat packs will also fit, just tape them flat onto the channel. The battery should protrude approximately 1/8" past the end of the channel to keep the fuel tank from rubbing against the end of the channel.

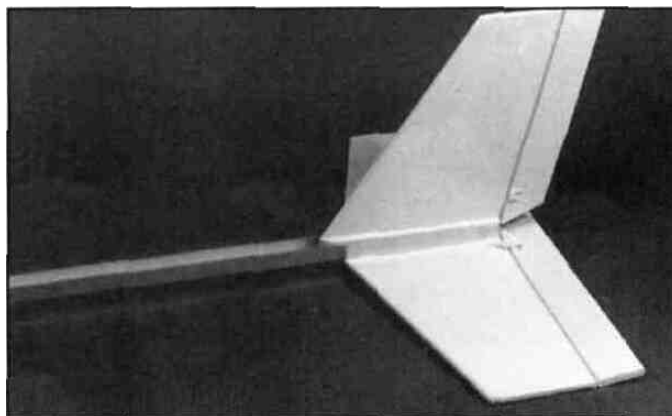
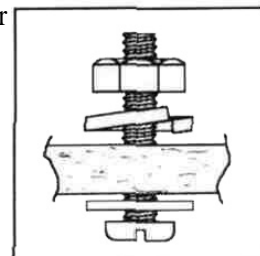
D 45. The servos are "press fit" into the aluminum channel and then held in place with nylon strapping tape. Standard size servos should fit very nicely and smaller servos can be held in place by using a piece of wood to fill the space between the servo sides and the channel. **Large servos will not work in the STURDY BIRDY.** The servos should be placed as far forward in the channel as possible and right next to each other, but do not overlap the servo mounting lugs. the front two servos should be



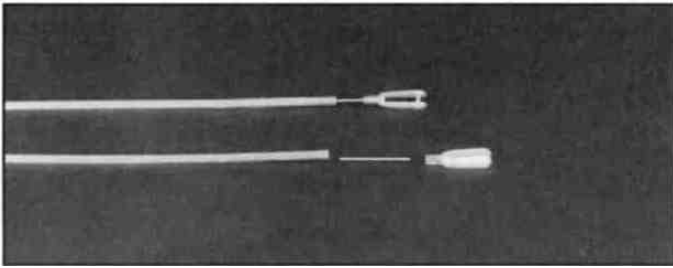
mounted with their servo output shafts towards the back of the plane and the back servo should have its output shaft towards the front of the plane. The servo wires should be routed out to the side of the servo without going under any servos. Wrap two layers of nylon strapping tape all the way around each servo and the aluminum channel to hold it in place. Hook up the entire radio system and turn it on (see the instructions included with your radio). Adjust the transmitter trims so they are in the middle of their slots. Remove the screws that hold the servo horns in place and adjust the horns so that they are perpendicular to the servo. This will be their neutral position. It is a good idea to use single arm servo horns rather than the round horns most servos come with. The sketch shows how to cut a horn for use here. Replace the screws that hold the horns in place. (See the photo at step 49).



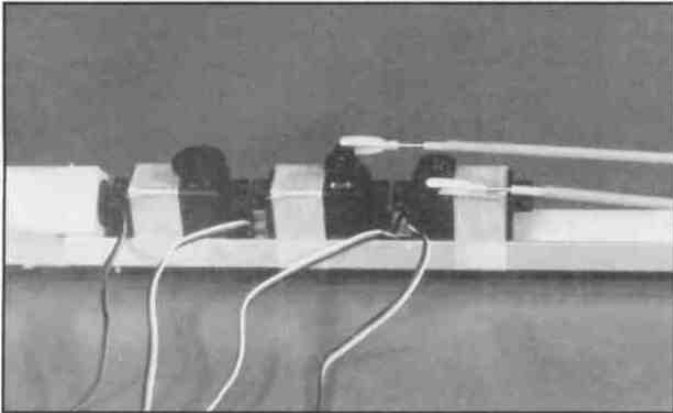
D 46. Attach the stabilizer/elevator to the back of the channel using two 4-40 x 5/8" machine screws, two #4 flat washers, two 4-40 lock washers, and two 4-40 nuts. The sketch shows how the pieces are installed. The pre-bent tail skid is held in place by the rear screw.



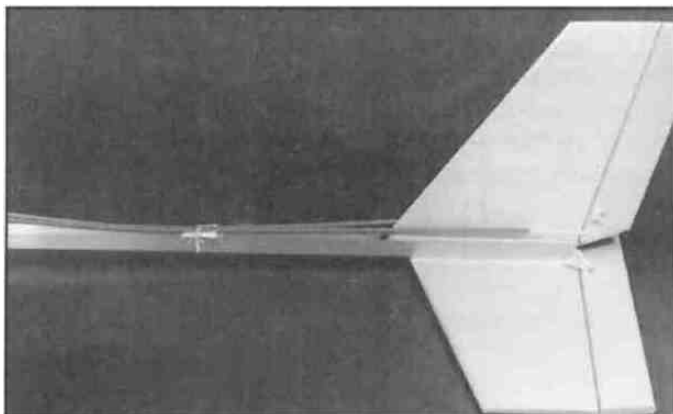
D 47. Press the fin/rudder into the channel with the back edge of the fin even with the back edge of the channel as shown in the photo.



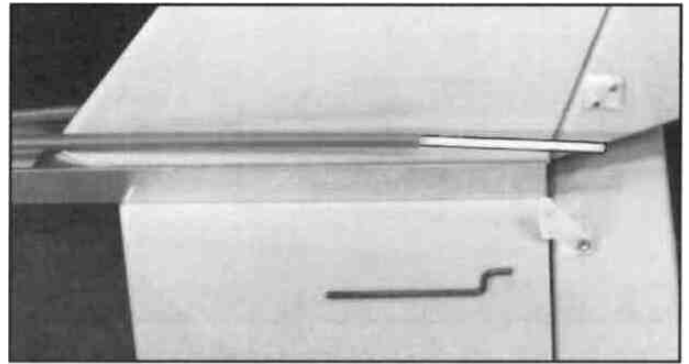
D 48. Assemble the two pushrods by screwing a 1" threaded rod into one end of each inner pushrod and then screwing a nylon clevis onto each threaded rod. The rod should thread into both the pushrod and the clevis at least 1/4".



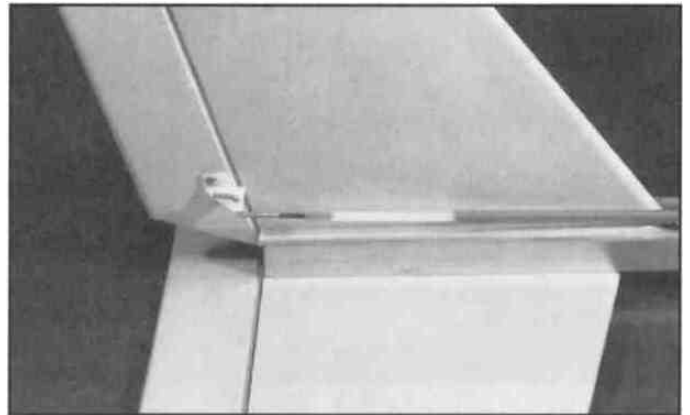
D 49. Attach the two long pushrods to the back two servos as shown in the photo. Slide the outer pushrod tubes over the inner pushrods until they are about 1/2" from the servo end of the inner pushrod.



D 50. Press the balsa pushrod holder into the channel about 6" in front of the fin and secure the pushrods to it with the nylon tie wrap. It is a good idea to seal the balsa pushrod holder with a light coat of epoxy, it will also help hold it in place. **Note:** The rudder pushrod goes to the left side of the fin and the elevator pushrod goes to the right side (as viewed from the back).

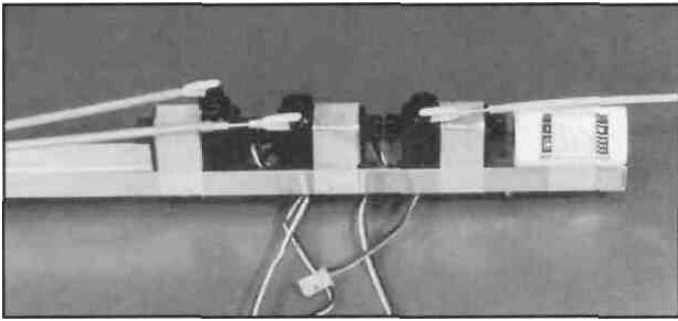


D 51. Cut 2" off the threaded end of two of the 12" long link rods. Use a pair of long nose pliers to bend the "Z" in the **unthreaded** end of the 2" pieces.

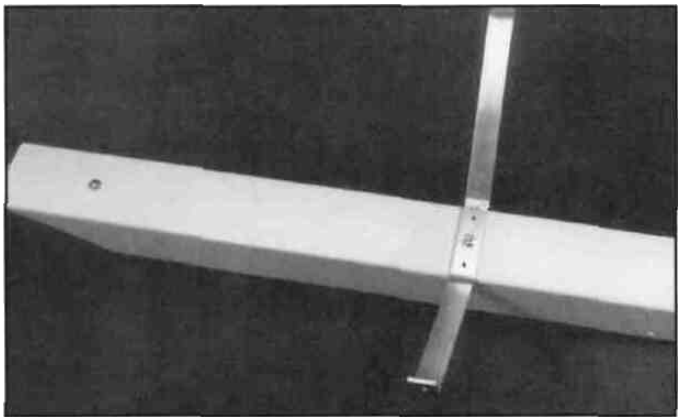


D 52. Install the link rods in the 2nd hole from the outer end of each control horn. With the control surfaces and the servo horns in their neutral positions cut the inner pushrod so the link rod will thread into the inner pushrod approximately 2/3 of the way. Install the link rods into the inner pushrods and adjust so that the control surfaces are at neutral positions.

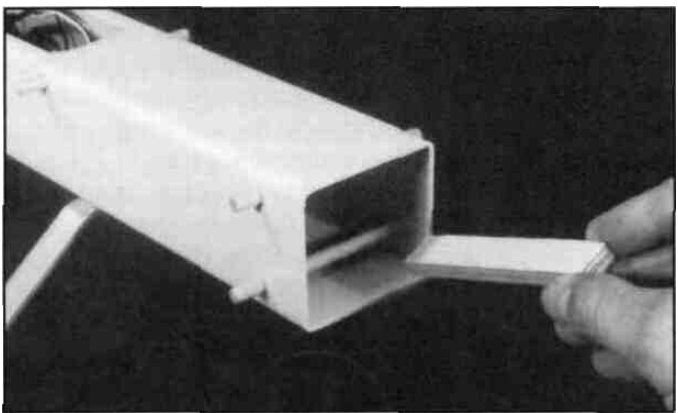
D 53. Wrap the receiver in at least 1/4" thick foam rubber to protect it from vibration, hard landings, etc. and use two rubber bands to hold the rubber in place. Disconnect the rudder and elevator pushrods from the servos and slide the pushrods under the rubber bands on the top of the receiver. Position the receiver behind the servos and reattach the clevises to the servo horns. The switch can be taped (using double-sided tape GPMQ4442) to the fuselage behind the receiver so it can be reached from the back of the fuselage. The receiver antenna should exit out the back of the fuselage without encountering any other wires if possible. Use a small rubber band to hold the antenna on a T-pin inserted in the top of the fin.



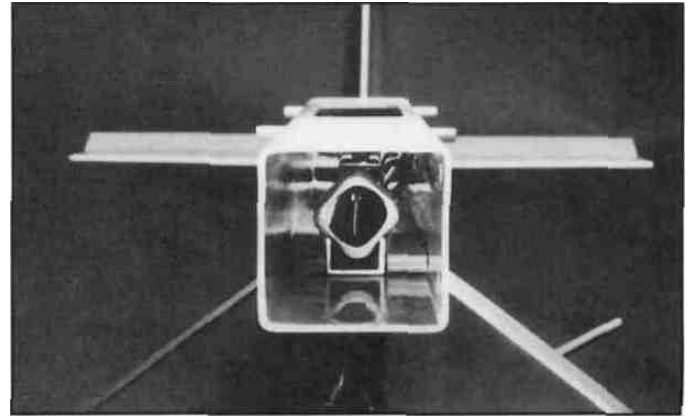
**D 54.** Assemble the short throttle pushrod by screwing the remaining 1" long threaded rod and nylon clevis into one end of the 12" long inner pushrod and snapping this assembly onto the throttle servo horn.



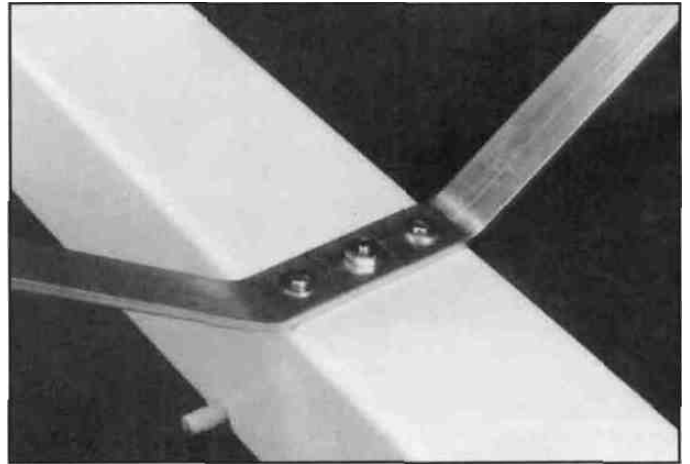
**D 55.** Attach the plastic fuselage tube to the channel by sliding it over the channel assembly and pushing the front 8-32 screw through the middle hole in the bottom of the tube. Put the aluminum landing gear in place on the 9-32 screw and secure the whole assembly with a #8 lock washer and an 8-32 hex nut. Insert the remaining 8-32 screw in the rear hole from the bottom and secure it with a #8 lock washer and an 8-32 hex nut in the channel. It is a good idea to use some medium strength thread locking cement on these bolts.



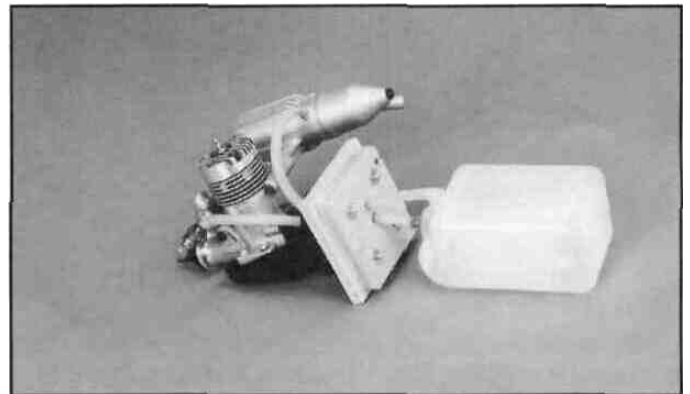
**D 56.** Slide the two 1/4" plywood landing gear supports into the fuselage, one on each side of the aluminum channel. The front of the supports should be even with the front of the aluminum channel.



**D 57.** Tack glue or hold these in place for the next step.

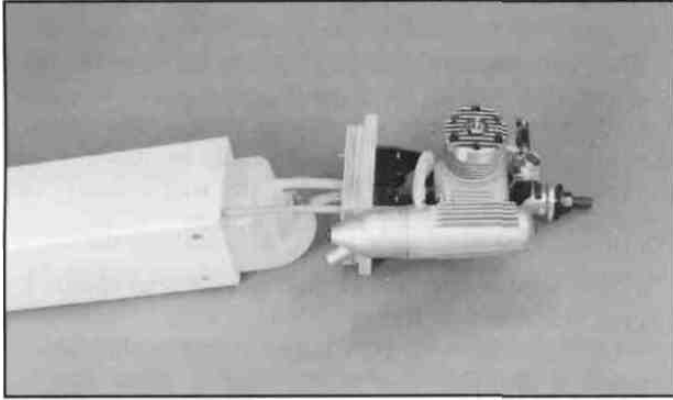


**D 58.** Drill a 1/8" diameter hole in each support using the attached landing gear as a guide. Remove the supports from the fuselage and enlarge the holes to 5/32". Insert a 4-40 blind nut in each hole and use a hammer to seat the blind nut in place. Replace the supports into the fuselage with the blind nut facing up and use the 4-40 x 5/8" machine screws to hold everything together.



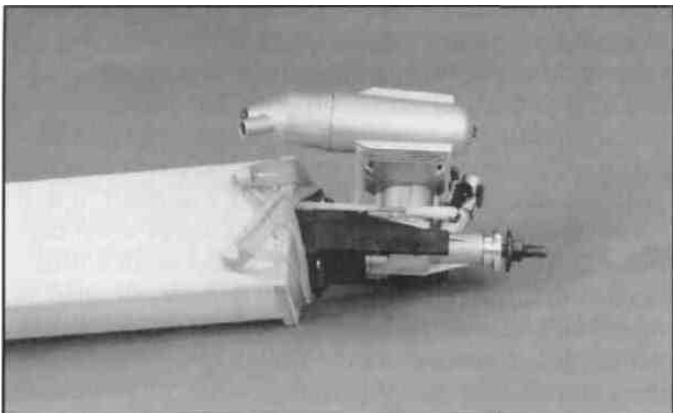
**D 59.** Assemble your fuel tank according to the manufacturer's instructions. Connect the fuel tank to the engine by threading the fuel tubing through the two holes in the middle of the engine mount and attaching the pickup line to the carburetor and the

vent line to the pressure tap on the muffler. Make the fuel lines long enough so that there is a 1" gap between the fuel tank and the back of the firewall. Also make sure that the fuel lines are not kinked.



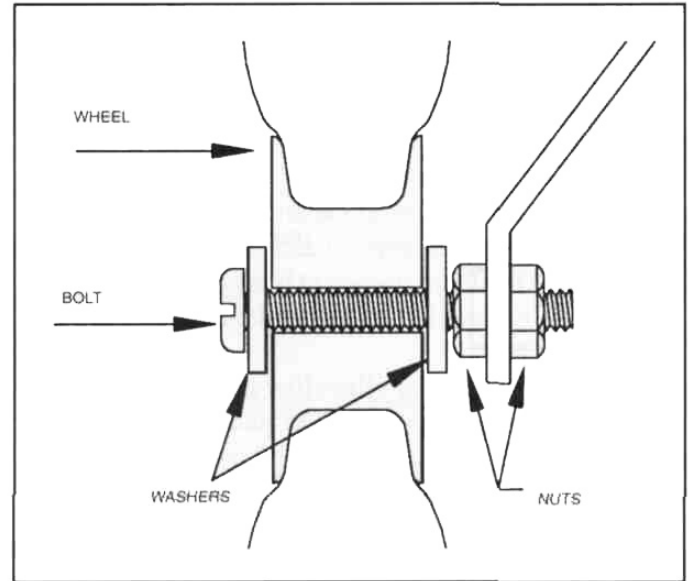
D 60. Slide the whole engine assembly into place in the front of the fuselage with the 12" throttle pushrod tube protruding through the hole in the firewall. Cut the outer pushrod so it starts about 1/2" from the 1" threaded rod and extends about 1/4" past the front of the firewall. Remove the engine assembly from the fuselage and glue the pushrod tube in position.

D 61. Re-install the engine assembly into the fuselage and push the four 1/4" x 3-1/2" dowels into place in the four sets of holes. The dowels should be a nice tight fit. If they are too tight you can enlarge the holes slightly with your hobby knife, and if they are too loose you can use a drop of glue to hold them in place. Do not use very much glue on the front dowels since you will need to remove the dowels to get the fuel tank out of the fuselage. Secure the engine assembly to the fuselage with four #62 or #64 rubber bands as shown in the next photo. **NOTE:** There are eight #2 x 3/8" sheet metal screws provided if you would rather screw the firewall in place instead of using the rubber bands to hold it on. Tests have shown that the rubber bands work extremely well and help eliminate damage to the front end in crashes.



D 62. Cut the inner pushrod to length, then cut and install the remaining 12" threaded link rod to hook up

the throttle control. Make sure you can achieve both full throttle and idle without binding of any kind. It is also nice if you can shut the engine off at low throttle and full down throttle trim. Bend the link rod if necessary to make this possible. The entire engine/fuel tank assembly can be removed at any time by simply removing the rubber bands, the throttle clevis from the servo horn and the two front dowels. This makes adjustments and checking of the fuel system quick and easy.



D 63. Each wheel axle is made up using a 6-32 x 1-1/2" machine screw, two 6-32 hex nuts, and two #6 washers. The sketch above shows how these parts are assembled. It is a **very good idea** to use some medium strength thread locking cement between the screw and the hex nuts. Also make sure that the wheel can turn freely.

## FINAL ASSEMBLY

D 64. With the fin positioned correctly, apply a few drops of thin C/A around the base to hold it in place. This type of gluing method will keep the fin/rudder in place unless the plane is crashed pretty hard, in which case the fin will come out of the channel, usually without breaking.

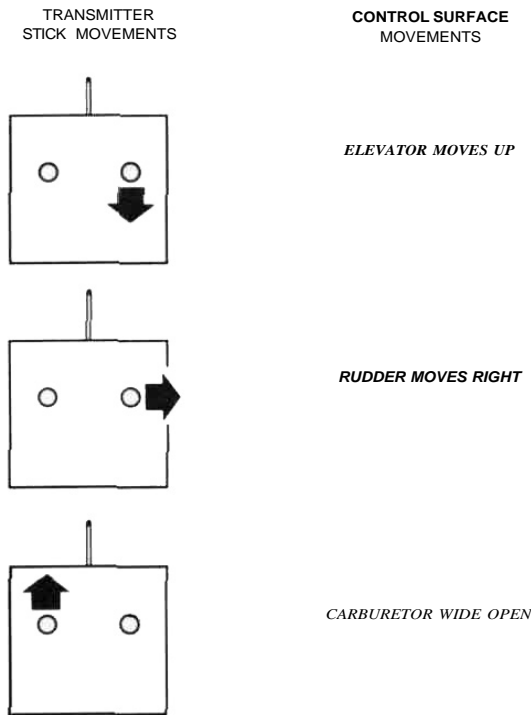
D 65. Turn the radio system on and adjust all of the trims on the transmitter so that they are in the middle of their slots.

D 66. Check the following: The sketch helps explain it.

A. The rudder moves to the right when the right transmitter stick is moved to the right (looking at the plane from the rear).

B. The elevator moves up when the right transmitter stick is moved down (back).

C. The throttle is closed almost all the way when the left transmitter stick is down (back) and is open completely when the stick is up (forward).



D 67. Check to make sure that the tail control surfaces are in a neutral (straight) position and the servo arms are perpendicular to the aluminum channel when the transmitter sticks at neutral. Also check the control throws on the tail surface. You should be able to move the rudder 3/4" both directions and the elevator should move 1/2" both directions. This should give you a plane that is fairly responsive but not too radical.

D 68. Install the second nylon tie wrap around the aluminum channel and the pushrods right in front of the tail surfaces. This will help keep the control surfaces from fluttering.

## BALANCING

**D 69.** With the wing rubber banded to the fuselage, the fuel tank empty, and everything else in its place, lift the model by placing one finger tip on the bottom of each wing at the approximate location of each end of the wing joiner which is 3" back from the leading edge. The **STURDY BIRDY** should hang just slightly nose down or level. If the plane hangs with the nose pointing up then you will need to add some weight to the nose of the plane. There are several ways you can add this weight including stuffing lead weight around the fuel tank or using one of the heavy prop nuts available. **Under no circumstance should you try to fly the plane if it does not balance correctly!**

## GETTING READY FOR FLYING

D 70. Use at least four rubber bands to hold the engine/firewall in place and use eight #64 rubber bands to hold the wing in place.

D 71. We recommend that you use a nylon propeller for your first flights since it will not break as easily as wood. Sand the edges of the prop before you use it. The edges of nylon props are very sharp and should be dulled before use. If a prop is damaged in **any way** it should be discarded and a new prop used in its place.

D 72. Be sure to conduct a range test on your radio system before **every** flying session. The instruction manual that came with your radio should explain how to properly do this.

D 73. If you are using a new engine in your plane, break it in on the ground according to the manufacturer's instructions before attempting to fly the plane.

D 74. Never try to start the engine by flipping it over with your finger. Always use either an electric starter or a "Chicken Stick".

D 75. Always adjust the needle valve on the engine from the back of the plane. **Never reach over a rotating prop!** Treat these engines with the utmost respect, they are not toys!

D 76. After each flight, check the propeller, engine bolts, control surfaces, control linkages, hinges and rubber bands for damage or looseness and correct if necessary. An ounce of prevention here will keep you happily flying longer.

## FLYING

The **STURDY BIRDY** is a very stable flying airplane with a unique self-recovering system designed into it. This makes it one of the easiest-flying planes available. However, it is highly recommended that you consult an experienced pilot to help trim out the plane and help you with your first flights. The most important thing to remember when learning to fly is that you need to be able to relate to the control inputs as if you were sitting in the plane. If you don't, it will seem like the rudder is working backwards when the plane is flying towards you. It may also seem a little strange that you pull the stick down (back) in order to make the plane go up, but this is how it works in real planes. It is a good idea to keep facing the same direction that the model is flying.



The **STURDY BIRDY** should be hand launched into the wind for your first flights. Have a helper hold the plane firmly behind the landing gear with the wings level while you check the controls. Advance the throttle to full throttle and your helper should then take a few running steps and let the plane fly out of his hand with a slight push (being careful to keep the wings level). A strong throw is not necessary. Be prepared to make any initial controls to keep the plane climbing slightly and flying straight.

Your control inputs should be very gentle until the plane has climbed high enough to be out of danger of hitting any ground based objects (especially the ground). Once you have reached a safe altitude, trim the plane for straight and level flight with the engine running about half throttle. If you get disoriented or the plane does not seem to be doing what you think it should, just release the control sticks and the plane will right itself. If you see that the plane is heading for danger which you can not prevent, reduce the throttle to idle and pull the elevator stick back (up elevator) to reduce the impact speed.

When the plane banks into a turn it is normal for the nose to drop down so be prepared to put in a little up elevator to keep it flying level.

Once you are familiar with how the **STURDY BIRDY** handles under power, pull the throttle back to near idle and slow the plane down. Be sure to do this at a safe altitude! Feed in up elevator to try to keep the plane flying at the same altitude. If the plane stalls (falls off to one side abruptly) just release the control sticks, advance the throttle to at least 1/2 and **gently** pull in some up elevator. Try to determine the slowest speed the plane will fly at and remember that you need to stay above that speed when landing and taking off to avoid a stall.

If you find the plane getting too high and it is hard to determine what it is doing, reduce the throttle to idle and be patient. The **STURDY BIRDY** will lose altitude fairly quickly and you can resume control.

When preparing to land it is a good idea to make several practice passes from a safe altitude and gradually get lower until you feel comfortable with your approach. Then on one of your next passes, just decrease the throttle and the plane will land by itself. Landing is really not very tricky if you just concentrate on guiding the plane with the rudder where you want it to go and let it settle to the ground. Of course it helps to fly at a field that is big enough so you don't have to worry about where you need to land.

The **STURDY BIRDY** also handles very nicely on the ground despite the fact that it is a tail dragger without a steerable tail wheel. When taxiing in grass, hold in up elevator until the plane is moving pretty well to help keep it from nosing over. To steer the model when it is moving slow, throw in full rudder and use bursts of throttle to move the plane around.

## REPAIRING

The **STURDY BIRDY** is very tough, but there may be crashes hard enough to break parts of the plane.

The fuselage should not be repaired. It is inexpensive and very easy and quick to replace. Due to the nature of plastics it is very hard to properly mend if cracked or broken and should be replaced for safety's sake.

The foam wing will really take a beating and survive. Small dents and dings can be removed by patching or re-heating the covering material. A broken wing can be quickly repaired with epoxy, but check the nylon tape and replace it if needed. If the wings get bent you can straighten them by bending them the opposite direction and adding a couple more strips of strapping tape. It is important that the wings are kept in their original configuration with the molded-in washout (wing twist). This gives the **STURDY BIRDY** it's exceptional recovery characteristics.

The tail surfaces can be repaired with C/A glues, or new surfaces can be cut from 1/4" balsa available from your local hobby shop.

If dirt gets into the carburetor or onto the engine it should be cleaned off before it has a chance to get inside the engine and cause damage.

*Good Luck  
and  
Happy Flying!*

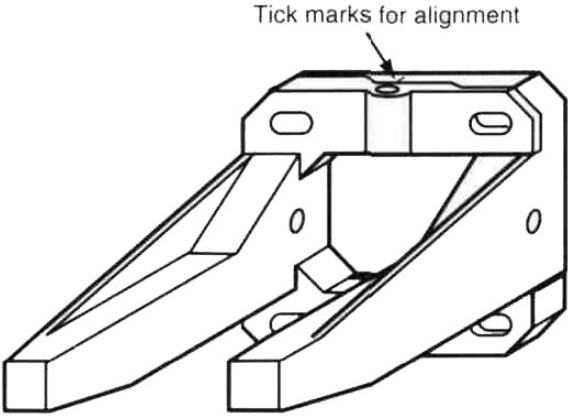
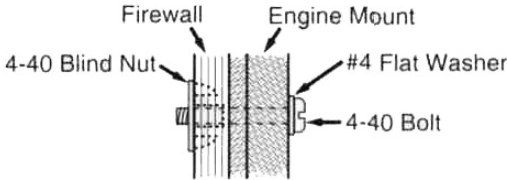
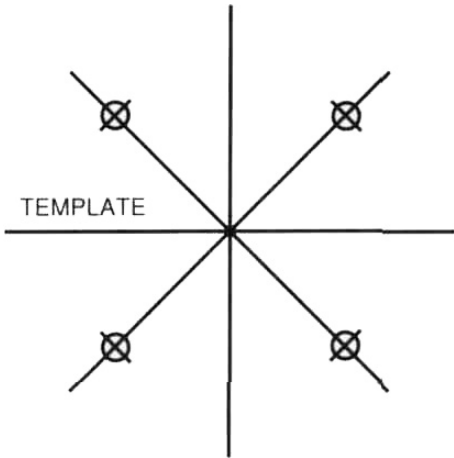
# Pilots Log

Use this to record your flights, it's fun to look back on!

Date	Flight Time	Conditions	Comments

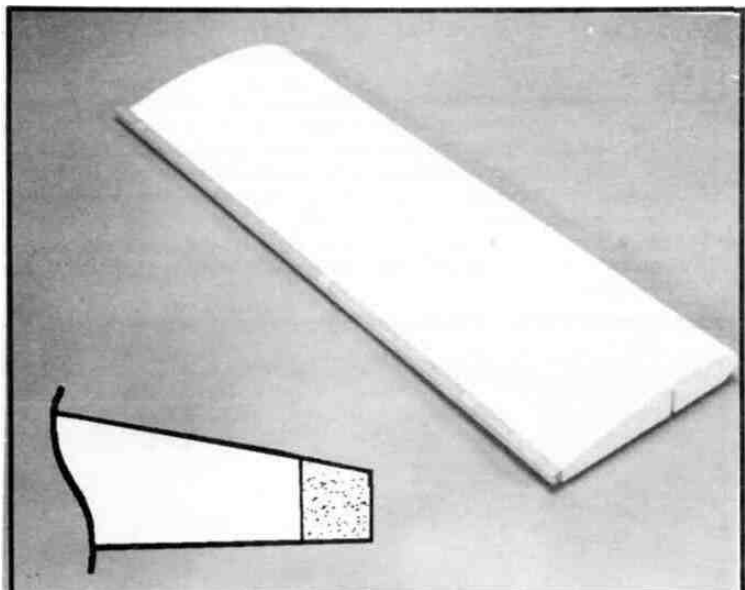
Date	Flight Time	Conditions	Comments

Engine Mount Template for 20-48 Adjustable Mount

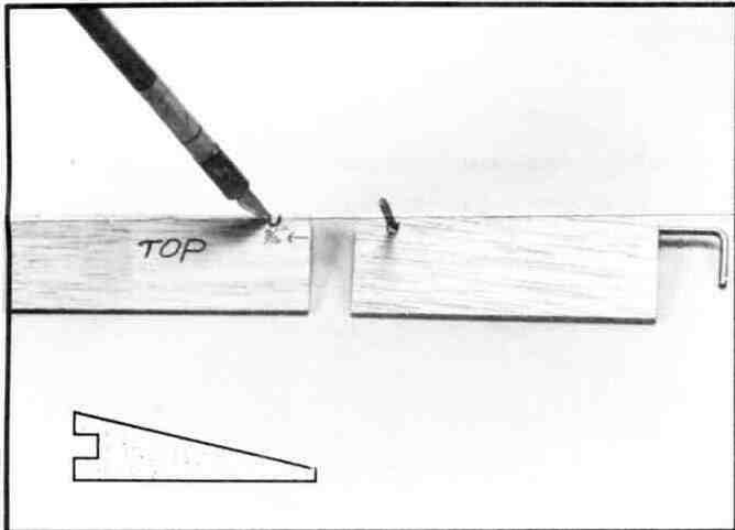


**HOBIBICO**®

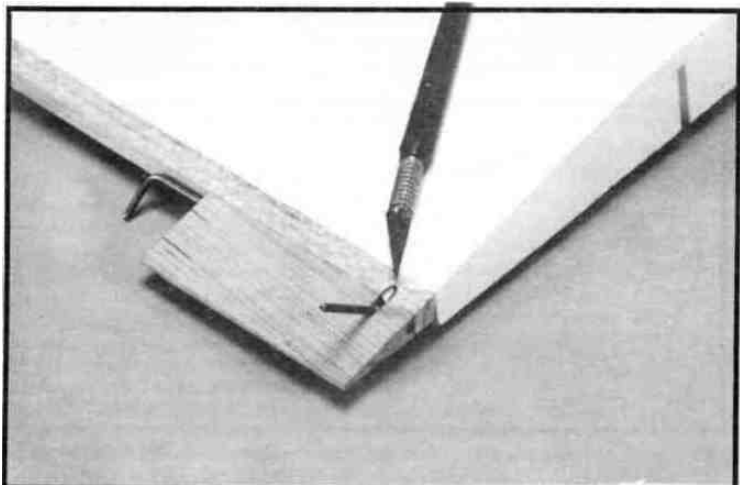
**Sturdy Birdy™ III**  
**WITH AILERONS**



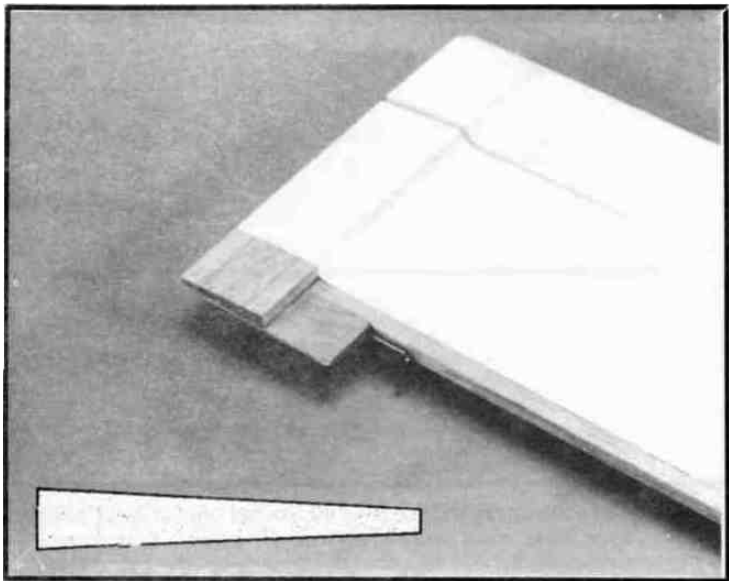
1. Locate the two  $15/32$ " x  $3/8$ " x  $26-1/2$ " Sub Trailing Edge pieces (Sub T.E.). Trial fit the Sub T.E. against the trailing edge of each wing half. The Sub T.E. should be oriented as shown in the sketch with the 90 degree corners along the bottom of the wing. Epoxy the Sub T.E. to the trailing edge of each wing half - Pins or tape can be used to help hold the Sub T.E. in place while the glue cures.



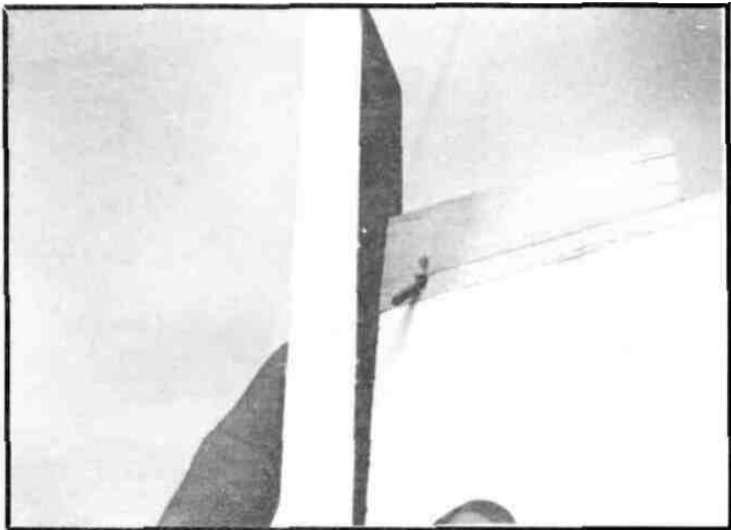
2. Locate the two  $\frac{3}{8}$ " x  $1\text{-}1/4$ " x  $37/8$ " **Tapered Center Trailing Edge** pieces. Use the inset sketch above to help you determine which side is the top and mark the top side of each piece. Make another mark  $7/16$ " from the "inboard" end of each piece. Notch each piece to make a slot for the torque rod. **Note: the threaded portion of each torque rod should stick out the top of each wing. Also there will be a "right" and a "left" center trailing edge piece so don't make two exactly alike.**



3. Use 150-200 grit sandpaper to roughen the outer surface of the torque rod bearing. Slide the bearing toward the threaded end of the torque rod and put a small amount of petroleum jelly around the ends of the bearing tube to prevent epoxy from seeping in. Spread some epoxy in the slot and on the leading edge of the center trailing edge pieces. Do not apply any epoxy within 1/4" of the notch or you may glue the torque rod. Insert the torque rods into the slots with the threaded portions sticking out through the notches and position the center trailing edges against the wing sub trailing edge. Align the center trailing edges and pin or tape them in place while the glue cures.

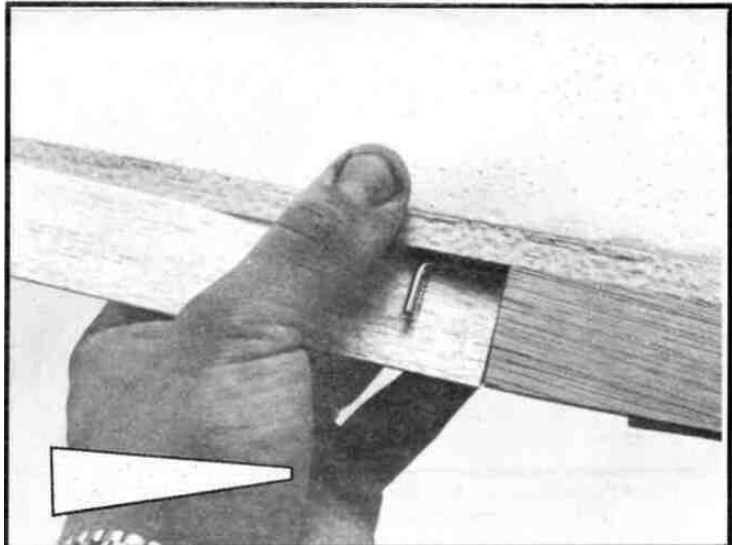


4. Epoxy the two  $11/32$ " x 2" x  $1-5/8$ " **Tapered T.E. Supports** to the inboard bottom of each center trailing edge as shown in the photo.

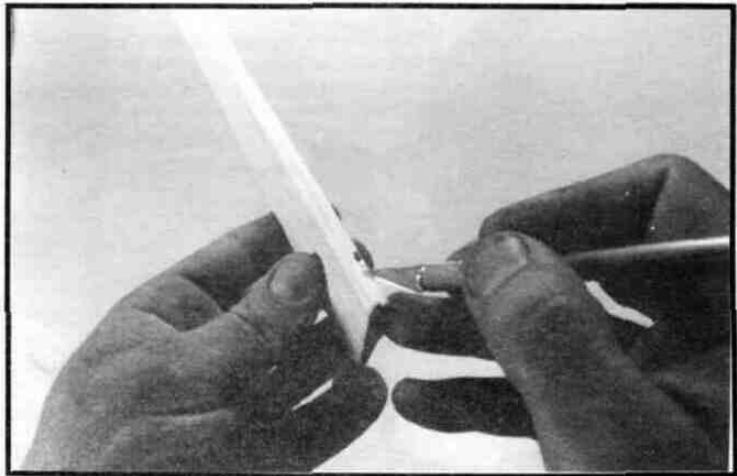


5. Use a sanding block with 150 grit sandpaper to sand the inner ends of the sub trailing edge, center trailing edge and the tapered trailing edge to match the angle of the foam wing end. **Be careful not to change the angle of the foam wing.**

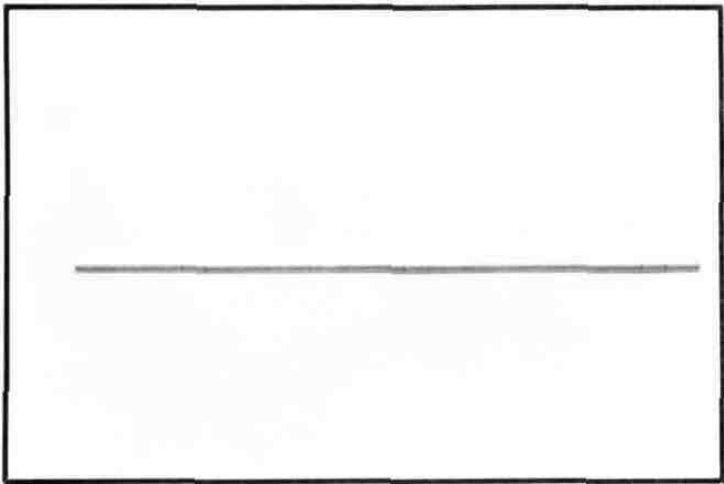




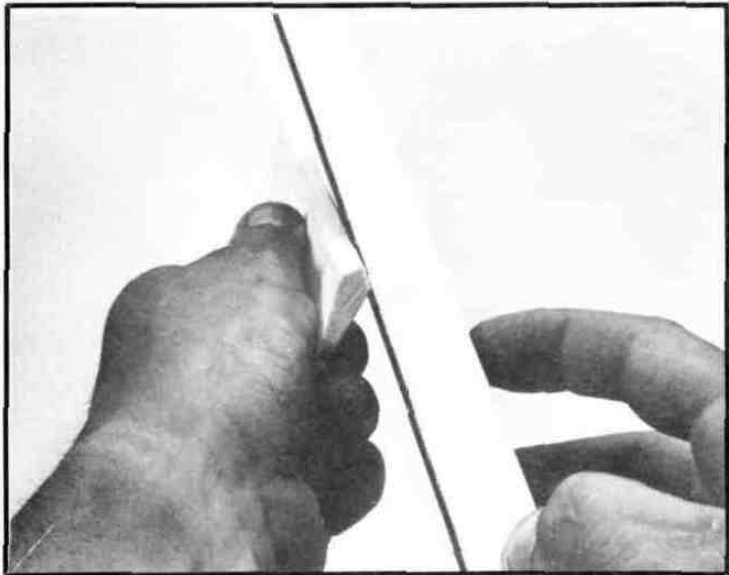
6. Hold the  $\frac{3}{8}$ " x  $1\frac{1}{4}$ " x  $22\frac{1}{4}$ " **Ailerons** in place against the sub trailing edge and under the torque rods. Mark the location where the torque rods will enter the ailerons. Drill a  $\frac{3}{32}$ " hole in each aileron to accept the torque rods.



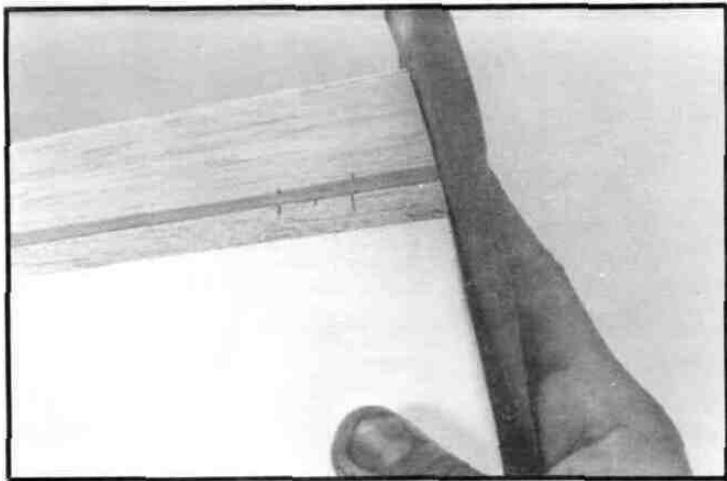
7. Cut a groove in the leading edge of the aileron to allow clearance for the torque rods. Trial fit the ailerons in place and cut as necessary until they fit.



8. Draw an accurate **centerline** along the leading edge of the aileron and cut three hinge slots in each aileron. The hinge slots should be approximately 1-1/2", 10" and 18" from the wing tip. Place the ailerons against the sub trailing edge and mark the hinge locations on the wing. Draw a center line down the sub trailing edge and cut the hinge slots to match the ailerons.

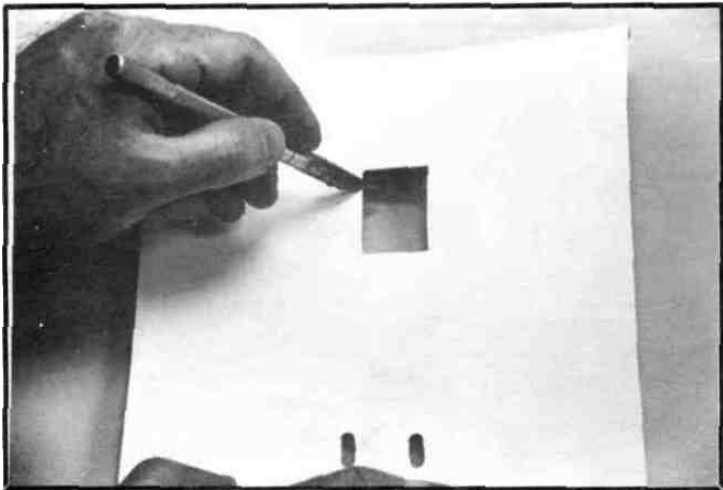


9. Using a sanding block, sand the leading edge of each aileron to a "V" shape as shown in the photo above.

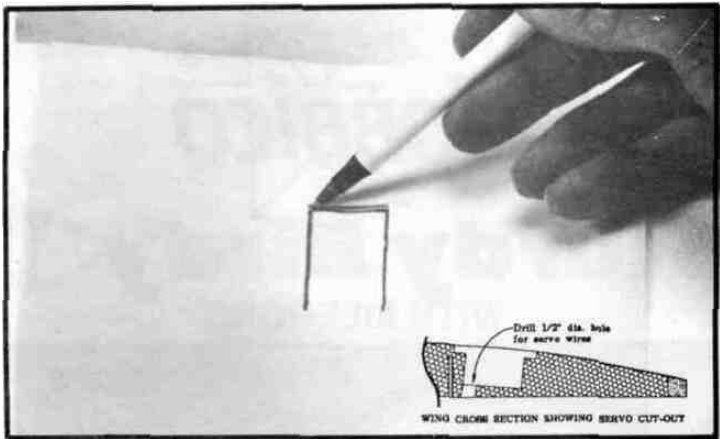


10. Insert the hinges into the slots and trial fit the ailerons in place on the wing. **Do not glue the hinges until after you have covered the wing.** Sand the outboard edge of the sub trailing edges and the ailerons to match the foam wing tips.

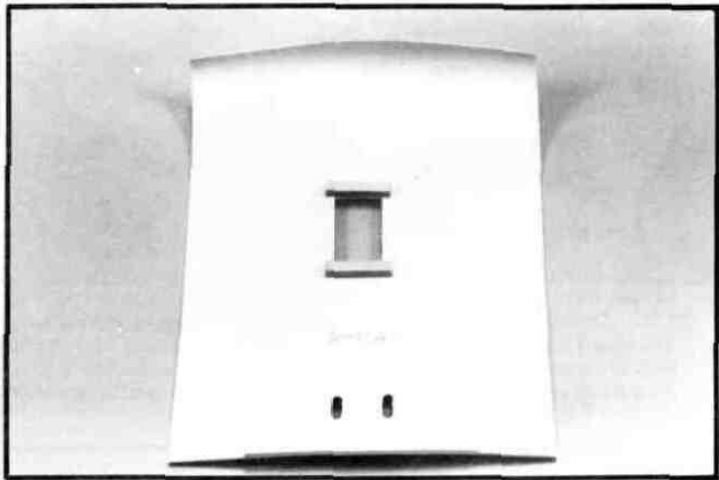
**Now skip to step 21 on page 8, WING ASSEMBLY, to join the wing halves, then resume below after step 24 on page 9.**



11. Use a sharp hobby knife or a Dremel Tool with a tapered cutting bit to trim out the servo and torque rod cut outs in the **Plastic Center Section Protector**. There are scribe lines on the bottom surface of the protector to help guide you. Trial fit the aileron servo in place and trim as necessary to make it fit properly. Use scissors or your hobby knife to trim the outside edges of the wing protector along the remaining scribe lines.

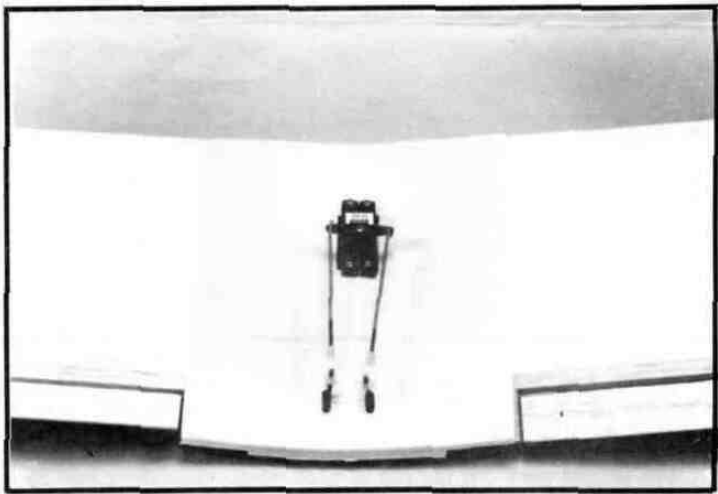


12. Place the wing protector on the center of the wing so the torque rods fit through their holes and draw a line on the wing around the servo cut-out. Remove the protector and carve out a hole in the foam wing to fit your servo. Carve out an extra  $1/4$ " square groove in front and behind the servo cut-out for the servo rails. Drill a  $1/2$ " diameter hole for the servo wires down through the front edge of the servo cutout. **Be careful not to cut the plywood wing joiner when performing these operations.**

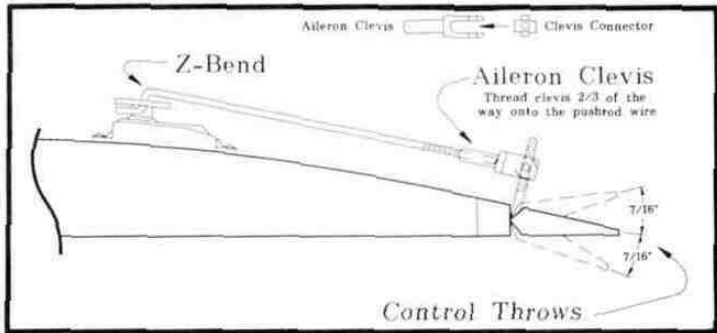


13. Glue the  $\frac{3}{16}$ " x  $\frac{1}{4}$ " x  $1\text{-}\frac{1}{4}$ " Basswood Servo **Rails** in place along the front and back edges of the servo cut-out. Put the aileron servo in place and mark on the plastic protector where the servo mounting screws should be. Drill  $\frac{1}{16}$ " diameter holes on the marks you just made and mount the servo using the screws provided with your radio





14. Trial fit the wing protector assembly on the wing and enlarge the cutouts in the foam wing if necessary to make the protector lie flat against the wing. When satisfied with the fit, remove the servo and use coarse sandpaper to scratch up the bottom of the wing protector so the glue will hold better. Use epoxy to glue the protector in place.



- 15 Mount the aileron servo with the screws provided in the radio system and assemble the pushrods as shown in the sketch above. Attach the pushrods to the torque rods by screwing the Aileron Clevis Connector onto the threaded portion of the torque rod. Use a pair of needle nose pliers to make the Z bends and attach them to the servo horn. Turn on your radio, plug in your aileron servo and adjust the centering of the servo horn until it is centered and the right aileron moves up when you move the transmitter stick to the right. Adjust the nylon clevis until each aileron is in a neutral position when the transmitter sticks and trims arc centered. Also adjust the position of the nylon clevis connector on the torque rod to achieve  $7/16$ " of up and down movement.