



# ELDER 40



**Wingspan:** 65 in [1650mm]  
**Wing Area:** 778 sq in [50.2 dm<sup>2</sup>]  
**Weight:** 5.5 – 7.0 lbs [2500 - 3182g]  
**Wing Loading:** 16 – 21 oz/sq ft  
[50–64 g/dm<sup>2</sup>]  
**Length:** 49.5 in [1257mm]

## WARRANTY.....

Top Flite Models guarantees this kit to be free of defects in both material and workmanship at the date of purchase. This warranty does not cover any component parts damaged by use or modification. In no case shall Top Flite's liability exceed the original cost of the purchased kit. Further, Top Flite reserves the right to change or modify this warranty without notice. In that Top Flite has no control over the final assembly or material used for final assembly, no liability shall be assumed nor accepted for any damage resulting from the use by the user of the final user-assembled product. By the act of using the user-assembled product the user accepts all resulting liability. **If the buyer is not prepared to accept the liability associated with the use of this product, the buyer is advised to immediately return this kit in new and unused condition to the place of purchase.**

Top Flite Models 3002 N. Apollo Dr., Suite 1, Champaign, IL 61822

Technical Assistance Call (217)398-8970 [productsupport@top-flite.com](mailto:productsupport@top-flite.com)

READ THROUGH THIS INSTRUCTION BOOK FIRST. IT CONTAINS IMPORTANT INSTRUCTIONS AND WARNINGS CONCERNING THE ASSEMBLY AND USE OF THIS MODEL.

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## INTRODUCTION

Congratulation and thank you for purchasing the **Top Flite Elder**. The Top Flite Elder is a classic design from the early years of modeling, brought back by requests from modelers just like you! This easy flying model will provide you with many hours of relaxing flight. Though it is simple to build and fly, it also has its own unique character that seems to appeal to modelers of all ages and is guaranteed to get the attention of everyone at the field. We hope you enjoy building the Top Flite Elder as much as we have enjoyed bringing it back to the modeling world and introducing it to a whole new generation of modelers.

## PROTECT YOUR MODEL, YOURSELF & OTHERS FOLLOW THESE IMPORTANT SAFETY PRECAUTIONS

1. Your Top Flite Elder should not be considered a toy, but rather a sophisticated, working model that functions very much like a full-size airplane. Because of its performance capabilities, the Top Flite Elder, if not assembled and operated correctly, could possibly cause injury to yourself or spectators and damage to property.
2. You must assemble the model **according to the instructions**. Do not alter or modify the model, as doing so may result in an unsafe or unflyable model. In a few cases the instructions may differ slightly from the photos. In those instances the written instructions should be considered as correct.
3. You must take time to **build straight, true and strong**.
4. You must use an R/C radio system that is in first-class condition, and a correctly sized engine and components (fuel tank, wheels, etc.) throughout the building process.
5. You must correctly install all R/C and other components so that the model operates correctly on the ground and in the air.
6. You must check the operation of the model before **every** flight to insure that all equipment is operating and that the model has remained structurally sound. Be sure to check clevises or other connectors often and replace them if they show any signs of wear or fatigue.
7. If you are not already an experienced R/C pilot, you should fly the model only with the help of a competent, experienced R/C pilot.

**NOTE:** We, as the kit manufacturer, provide you with a top quality kit and great instructions, but ultimately the quality and flyability of your finished model depends on how you build it; therefore, we cannot in any way guarantee the performance of your completed model, and no representations are expressed or implied as to the performance or safety of your completed model.

**Remember: Take your time and follow the instructions to end up with a well-built model that is straight and true.**

**Before starting to build, compare the parts in this kit with the Parts List, and note any missing parts. Also inspect all parts to make sure they are of acceptable quality. If any parts are missing, broken or defective, or if you have any questions about building or flying this airplane, please call us at (217) 398-8970, or e-mail us at [productsupport@top-flite.com](mailto:productsupport@top-flite.com). If you are contacting us for replacement parts, please be sure to provide the full kit name (Top Flite Elder) and the part numbers as listed in the Parts List.**

If you have not flown a model before, we recommend that you get the assistance of an experienced pilot in your R/C club for your first flights. If you're not a member of a club, your local hobby shop has information about clubs in your area whose membership includes experienced pilots.

In addition to joining an R/C club, we strongly recommend you join the AMA (Academy of Model Aeronautics). AMA membership is required to fly at AMA sanctioned clubs. There are over 2,500 AMA chartered clubs across the country. Among other benefits, the AMA provides insurance to its members who fly at sanctioned sites and events. Additionally, training programs and instructors are available at AMA club sites to help you get started the right way. Contact the AMA at the following address or toll-free phone number.



**Academy of Model Aeronautics**

5151 East Memorial Drive  
Muncie, IN 47302-9252  
Tele. (800) 435-9262  
Fax (765) 741-0057

Or via the Internet at: <http://www.modelaircraft.org>

## ADDITIONAL ITEMS REQUIRED

### Hardware and Accessories

This is the list of hardware and accessories required to finish the Top Flite Elder. Order numbers are provided in parentheses.

- ☐ **Engine** - .40 - .46 [6.5 – 7.5cc ] 2-stroke  
.52 [8.5cc ] 4-stroke
- ☐ **Radio** - Four channel radio with four,  
40 oz.-in. servos.
- ☐ **Wheels** – Two 3-3/4" Wheels. Williams Brother  
Vintage Wheels (WBRQ1306)
- ☐ **Spinner** Great Planes Brass Spinner Nut –  
choose for your engine shaft size.
- ☐ **Propellers** - Choose prop appropriate for  
your engine
- ☐ **Fuel line** - Standard 3' tubing (GPMQ4131)
- ☐ **Fuel tank** - 10 oz (SULQ1385)
- ☐ **MonoKote** - For color scheme on the box:
  - ☐ 2 - Six foot rolls "Cream" (TOPQ0212)
  - ☐ 1 – Six foot roll "Red" (TOPQ0201)
  - ☐ 1 – Six foot roll "Insignia Blue"(TOPQ0207)

## Adhesives and Building Supplies

In addition to common household tools (screw drivers, drill, etc.), this is the "short list" of the most important items required to build the Top Flite Elder. We recommend **Great Planes Pro™ CA and Epoxy glue**.

- ☐ 1 oz. Thin Pro CA (GPMR6002)
- ☐ 1 oz. Medium Pro CA+ (GPMR6008)
- ☐ CA Accelerator (GPMR6034)
- ☐ 6-Minute Epoxy (GPMR6045)
- ☐ 30-Minute Epoxy (GPMR6047)
- ☐ R/C-56 Canopy Glue (JOZR5007)
- ☐ Hobby knife (RMXR6907)
- ☐ #11 blades (RMXR6930)
- ☐ Small T-pins (HCAR5100)
- ☐ Builder's triangle (HCAR0480)
- ☐ Electric drill
- ☐ Small Phillips and flat blade screwdrivers.
- ☐ Pliers with wire cutter (HCAR0630)
- ☐ Great Planes Plan Protector (GPMR6167) or  
wax paper
- ☐ Sanding tools and sandpaper assortment (see  
Easy-Touch™ Bar Sander section)
- ☐ Sealing Iron (TOPR2100)
- ☐ Small torch or 40 watt soldering iron

## Optional Supplies and Tools

Here is a list of optional tools mentioned in the manual that will help you build the Top Flite Elder.

- ☐ Great Planes CG Machine™ (GPMR2400)
- ☐ Top Flite Precision Magnetic Prop Balancer™  
(TOPQ5700)
- ☐ Top Flite Hot Sock™ iron cover (TOPR2175)
- ☐ Straightedge with scale (HCAR0475)
- ☐ Cutting mat (HCAR0456)
- ☐ Masking Tape (GPMR1010)
- ☐ CA Debonder (GPMR6039)

- ❑ CA Applicator Tips (HCAR3780)
- ❑ Epoxy Brushes (GPMR8060)
- ❑ Mixing Sticks (GPMR8055)
- ❑ Threadlocker (GPMR6060)
- ❑ Denatured Alcohol (for epoxy clean up)
- ❑ Silver solder (GPMR8070)
- ❑ Felt-Tip Marker (TOPQ2510)
- ❑ Rotary tool such as Dremel
- ❑ Rotary tool reinforced cut-off wheel (GPMR8200)
- ❑ 1/16" to 1/4" drill bit set
- ❑ Other drill bits used: 17/64" (or 1/4"), #48 (or 5/64"), #36 (or 7/64), 6-32 tap, 1/4" tap -or-
- ❑ Great Planes tap and drill set (GPMR8108)
- ❑ Dead Center™ Engine Mount Hole Locator (GPMR8130)
- ❑ Great Planes AccuThrow™ Deflection Gauge (for measuring control throws, GPMR2405)

## EASY-TOUCH™ BAR SANDER



A flat, durable, easy to handle sanding tool is a necessity for building a well finished model. Great Planes makes a complete range of **Easy-Touch Bar Sanders** and replaceable **Easy-Touch Adhesive-backed Sandpaper**. While building the Top Flite Elder, we used two 5-1/2" Bar Sanders and two 11" Bar Sanders equipped with 80-grit and 150-grit Adhesive-backed Sandpaper.

Here's the complete list of Easy-Touch Bar Sanders and Adhesive Backed Sandpaper:

- 5-1/2" Bar Sander (GPMR6169)
- 11" Bar Sander (GPMR6170)
- 22" Bar Sander (GPMR6172)
- 33" Bar Sander (GPMR6174)
- 44" Bar Sander (GPMR6176)
- 11" Contour Multi-Sander (GPMR6190)

12' roll of Adhesive-backed:

- 80-grit sandpaper (GPMR6180)
- 150-grit sandpaper (GPMR6183)
- 180-grit sandpaper (GPMR6184)
- 220-grit sandpaper (GPMR6185)

Assortment pack of 5-1/2" strips (GPMR6189)

## IMPORTANT BUILDING NOTES

**There are two types of screws used in this kit:**

**Sheet metal screws** are designated by a number and a length.

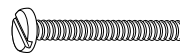
For example #6 x 3/4" long [19.1mm]



*This is a number six screw that is 3/4" long.*

**Machine screws** are designated by a number, threads per inch, and a length.

For example 4-40 x 3/4" long [19.1mm]



*This is a number four screw that is 3/4" long with forty threads per inch.*

- When you see the term **test fit** in the instructions, it means that you should first position the part on the assembly **without using any glue**, then slightly modify or *custom fit* the part as necessary for the best fit.
- Whenever the term **glue** is written you should rely upon your experience to decide what type of glue to use. When a specific type of adhesive works best for that step, the instructions will tell you what glue is recommended.
- Whenever just **epoxy** is specified you may use **either** 30-minute epoxy **or** 6-minute epoxy. When 30-minute epoxy is **specified**, it is **highly recommended** that you use only 30-minute (or 45-minute) epoxy because you will need the working time and/or the additional strength.
- **Photos** and **sketches** are placed **before** the step they refer to. Frequently you can study photos in following steps to get another view of the same parts.
- Not all die-cut parts have a name, or their complete name stamped on them, so refer to the die drawings on page 6 for identification. When it's time to remove the parts from their die sheets, if they are difficult to remove, do not force them out. Instead, use a sharp #11 blade to carefully cut the part from the sheet, then lightly sand the edges to remove any slivers or irregularities. Save some of the larger, leftover pieces of wood.

## GET READY TO BUILD

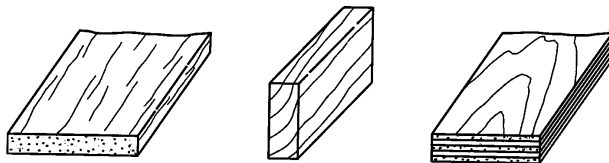
1. Unroll the plan sheets. Roll them inside out so they lie flat.
2. Remove all the parts from the box. Use a ballpoint pen (not a felt tip pen) to lightly write the **name** or **size** on each piece so you can identify it later. Use the **die-cut patterns** on pages 6 and 7 to identify and mark the die-cut parts **before** you remove them from their die sheets. Many of the parts already have



numbers stamped on them, but in some cases the number is located alongside the parts or only on the die drawings in the manual. Do not remove the die-cut parts until instructed to do so. If a part is difficult to remove, don't force it out but cut around it with a hobby knife and a #11 blade. After you remove the parts from their die sheets, lightly sand the edges to remove slivers or die-cutting irregularities. Save some of the larger scraps of wood.

3. Separate the parts into groups such as **stab**, **fin**, **wing**, and **fuse**. Store smaller parts in zipper-top food storage bags.

## TYPES OF WOOD



BALSA

BASSWOOD

PLYWOOD

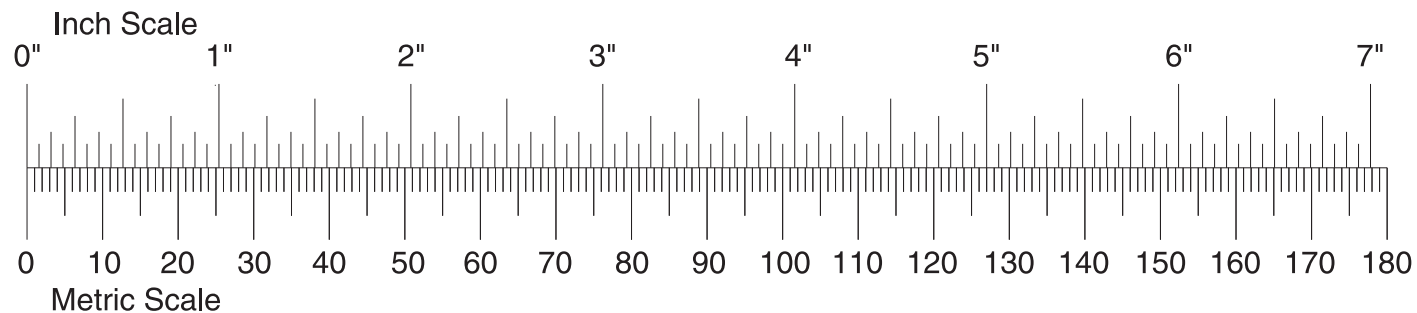
## COMMON ABBREVIATIONS

deg.	=	Degrees
Elev	=	Elevator
Fuse	=	Fuselage
LE	=	Leading Edge (front)
LG	=	Landing Gear
Lt	=	Left
Ply	=	Plywood
Rt	=	Right
Stab	=	Stabilizer
TE	=	Trailing Edge (rear)
"	=	Inches

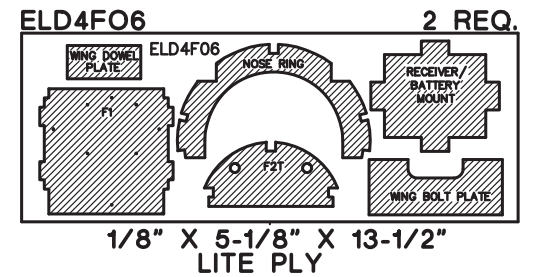
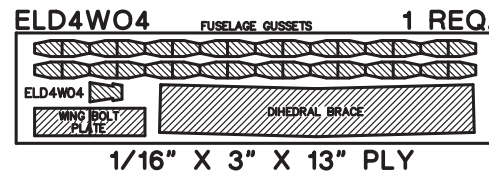
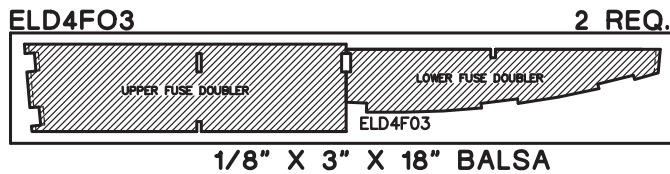
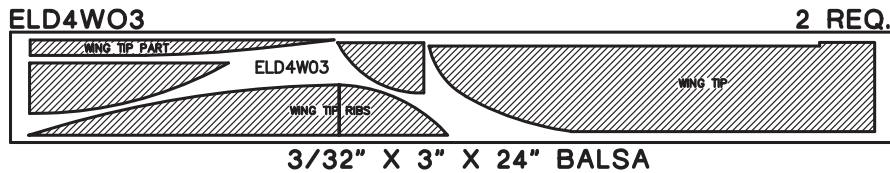
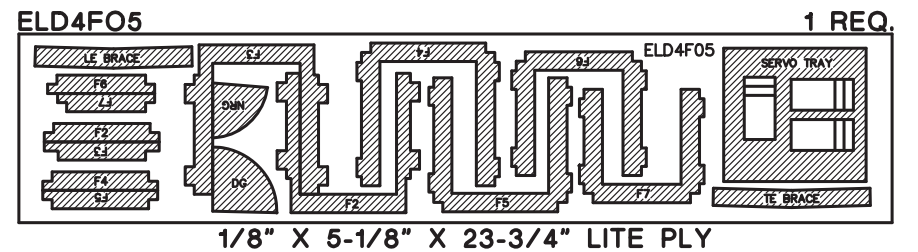
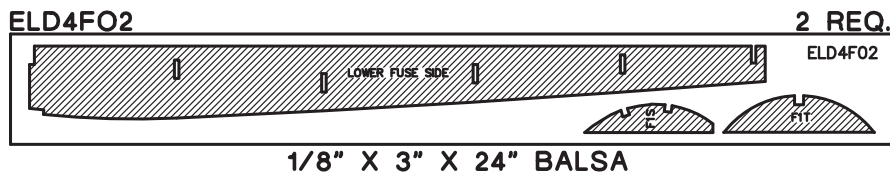
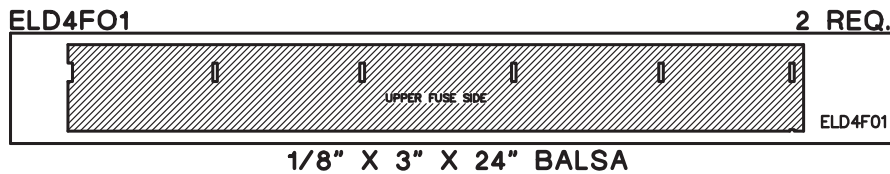
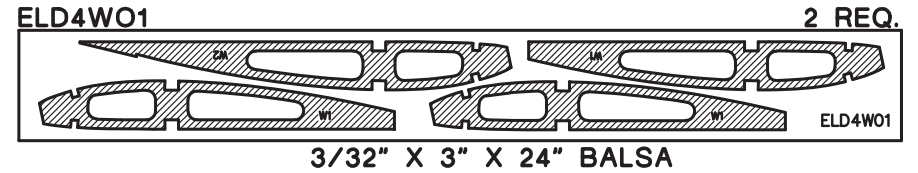
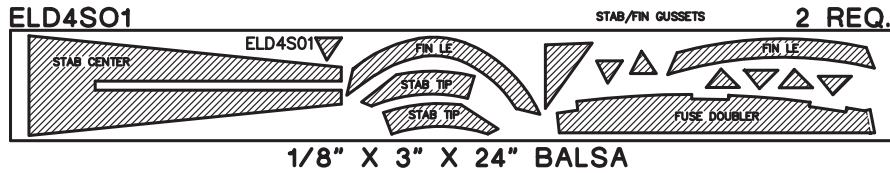
## METRIC CONVERSIONS

1" = 25.4mm (conversion factor)

1/64" = .4mm	2" = 50.8mm
1/32" = .8mm	3" = 76.2mm
1/16" = 1.6mm	6" = 152.4mm
3/32" = 2.4mm	12" = 304.8mm
1/8" = 3.2mm	15" = 381mm
5/32" = 4mm	18" = 457.2mm
3/16" = 4.8mm	21" = 533.4mm
1/4" = 6.4mm	24" = 609.6mm
3/8" = 9.5mm	30" = 762mm
1/2" = 12.7mm	36" = 914.4mm
5/8" = 15.9mm	
3/4" = 19mm	
1" = 25.4mm	



# DIE-CUT PATTERNS

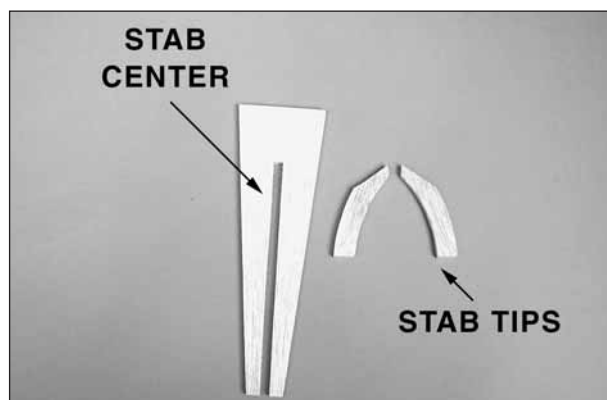


## BUILD THE TAIL SURFACES

### Build the Stab

❑ 1. Tape the Wing/Stab Plan view to your building board. Cover the plan with Plan Protector.

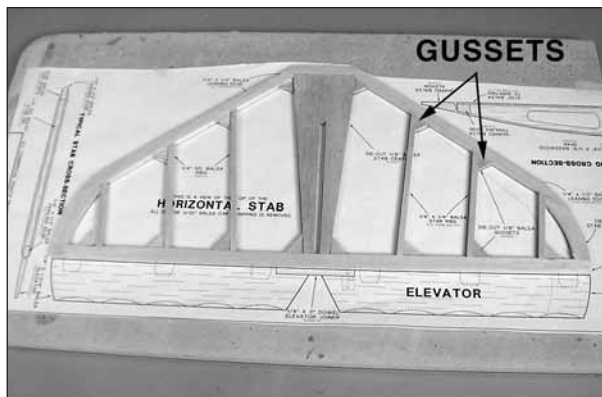
❑ 2. Locate the two die-cut 1/8" [3mm] balsa **stab center** pieces. Glue them together with medium CA to make one 1/4" [6mm] stab center.



❑ 3. Locate four die-cut 1/8" [3mm] balsa **stab tips**. Glue them together to form two 1/4" [6mm] stab tips.

❑ 4. Pin the stab center over the plan. Using your plan as a guide, build the leading edge and trailing edge of the stab from 1/4" x 1/2" x 36" [6mm x 13 x 914mm] balsa sticks. Cut 1/4" x 1/4" [6mm x 6mm] balsa sticks to the proper length for the stab ribs. Glue them in place with medium CA.

❑ 5. Glue the die-cut 1/8" [3mm] balsa **gussets** in place next to the stab tip on the left side of the stab. Center them on the 1/4" [6mm] stab parts. Repeat this for the right side of the stab.



❑ 6. Glue the remaining gussets in place as shown on the plan.

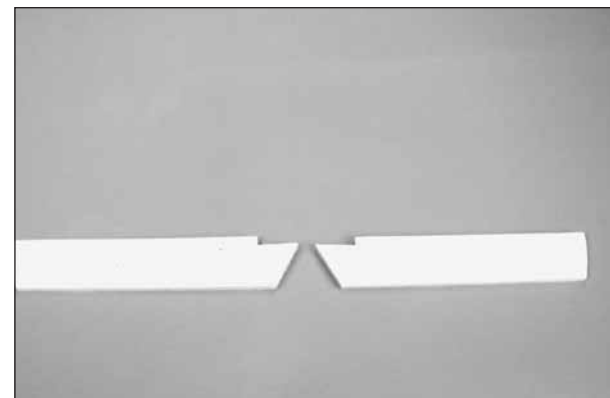


❑ 7. From 3/32" x 1/4" x 36" [2.4mm x 6 x 914mm] balsa stick, cut out **cap strips** and glue them in place on the stab ribs. Do this on both the top and bottom of the stab. **Note:** On the stab cross-section you will see that the cap strips extend across the leading and trailing edge.

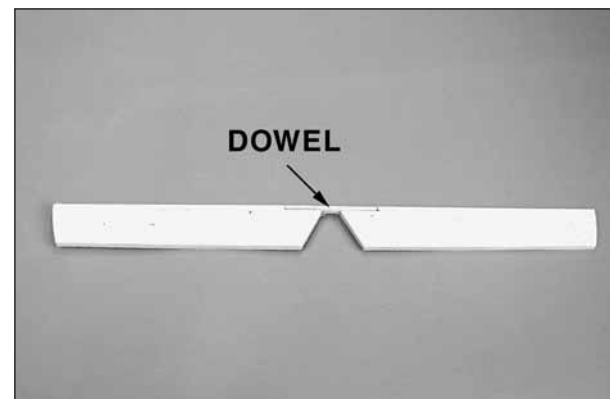
❑ 8. Sand the cap strips to the shape shown on the stab cross-section. This is also a good time to final sand the leading edge of the stab. Use the cross-section as your guide for sanding the final shape.

### Build the Elevator

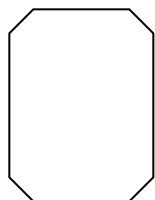
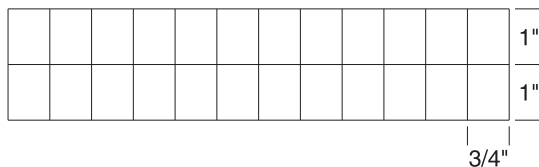
❑ 1. From the 1/4" x 1-3/4" x 36" [6 x 32 x 914mm] balsa sheet, cut two pieces 10-1/2" [267mm] in length.



❑ 2. Using the plan as your guide, cut and shape each of them to match the shape of the elevator shown on the plan.



❑ 3. Pin the elevator halves to the plan. Locate and test fit the 1/4" x 3" [6 x 75mm] dowel in place in the cut-outs on the LE of the elevator. When you are satisfied with the fit of the dowel, glue it in place with 6-minute epoxy.



- ❑ 4. Locate the 2" x 9" [50 x 230mm] **hinge material** and cut sixteen hinges as shown in the above sketch.



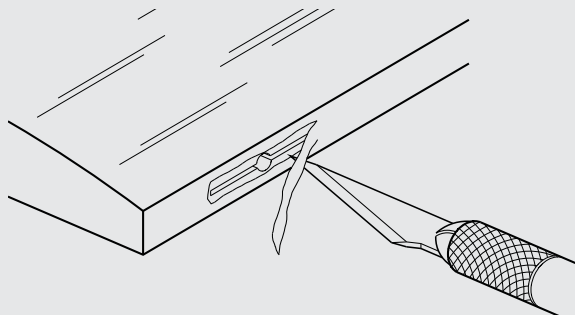
- ❑ 5. Mark a centerline down the LE of the elevator. Repeat this for the trailing edge of the stab. Using the plan as your guide, mark the location for each of the hinges on the stab and elevator, then cut matching slots in the stab and elevator. The Great Planes Slot Machine™ (GPMR4010) works very well and makes the job of cutting hinge slots fast and easy! If you do not have a Slot Machine use the Expert Tip that follows.



#### USING CA HINGES

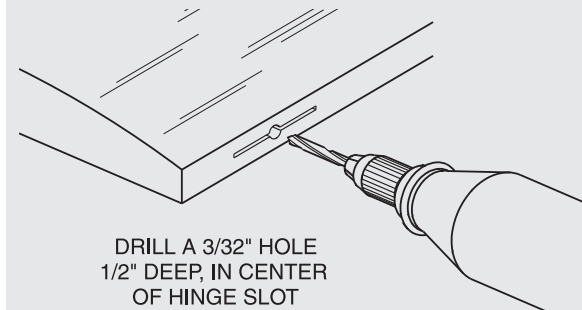
The hinge material supplied in this kit consists of a 3 layer lamination of Mylar and polyester. It is specially made for the purpose of hinging model airplane control surfaces. Properly installed, this type of hinge provides the best combination of strength, durability and ease of installation. We trust even our best show models to these hinges, but it is essential to install them correctly. Please follow the instructions carefully to obtain the best results. These instructions may be used to effectively install any of the various brands of CA hinges.

The most common mistake made by modelers when permanently installing this type of hinge is not applying a sufficient amount of glue to fully secure the hinge over its entire surface area; or, the hinge slots are very tight, restricting the flow of CA to the back of the hinges. This results in hinges that are only "tack glued" approximately 1/8" to 1/4" into the hinge slots. The following technique has been developed to help insure thorough and secure gluing.



- A. Cut the hinge slot using a #11 blade in a standard #1 knife handle. The CA hinges provided have a thickness that fits this type of slot very well.

Trial fit the hinge into the slot. If the hinge does not slide in easily, work the knife back and forth in the slot a few times to provide more clearance (it is really the back edge of the blade that does the work here in widening the slot).



- B. Drill a 3/32" [2.4mm] hole, 1/2" [13mm] deep, in the center of the hinge slot. If you use a Dremel Moto-Tool® for this task, it will result in a cleaner hole than if you use a slower speed power or hand drill. Drilling the hole will twist some of the wood fibers into the slot, making it difficult to insert the hinge, so you should reinsert the knife blade, working it back and forth a few times to clean out the slot.

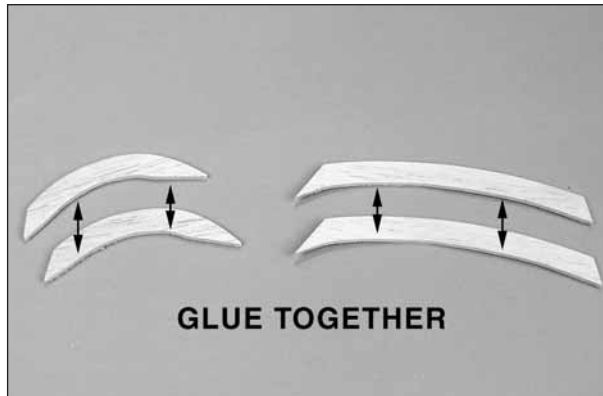
- C. Trial fit the hinges into the slots and, without using any glue, temporarily attach the control surface, to verify the fit.

#### STOP! DO NOT GLUE THE HINGES IN PLACE UNTIL AFTER THE MODEL IS COVERED!

- ❑ 6. Sand the elevator to its final shape, matching the contours you sanded on the stab and sanding the leading edge to a "V" shape as shown on the plan. You will notice on the plan that there is a dashed line on the elevator trailing edge forming a scalloped shape. This pattern is provided for you if you decide that you would like to have a scalloped TE. We did this on the model shown on the box cover. Use the plan as your guide for cutting the scalloped edge should you decide to do this option.

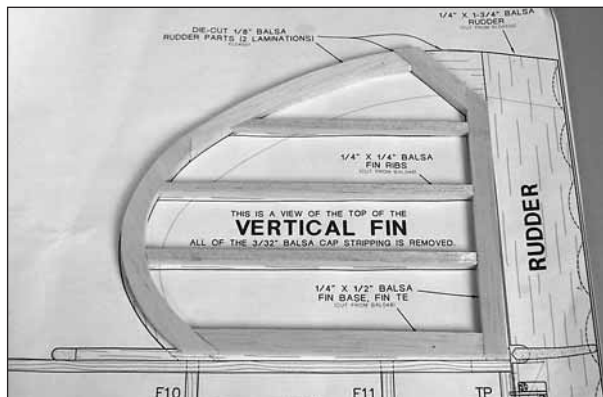


## Build the Fin and Rudder

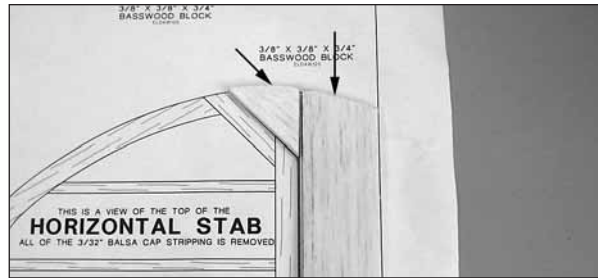


❑ 1. Tape the Fin and Rudder Plan view to your building board. Cover the plan with Plan Protector.

❑ 2. Locate two sets of die-cut 1/8" [3mm] balsa **fin leading edge** pieces. One set is short the other is long. Glue the two long fin leading edge pieces together to form one 1/4" [6mm] fin leading edge. Do the same with the short set.



❑ 3. Cut the 1/4" x 1/2" x 36" [6 x 12 x 914mm] balsa stick to make the frame structure of the fin. Glue the parts together to create the fin framework. Cut the 1/4" x 1/4" x 36" [6 x 6 x 914mm] balsa sticks to fit between the fin frame as shown on the plan. Glue them in place.



❑ 4. From the remaining piece of the 1/4" x 1-3/4" x 36" [6 x 32 x 914mm] balsa sheet, cut the rudder tip and the 1-3/4" portion of the rudder. Using leftover 1/4" x 1/2" stick, cut the stick to a length of 9". Glue the stick to 1/4" x 1-3/4" x 36" [6 x 32 x 914mm] portion of the rudder forming a 2-1/4" wide rudder.

❑ 5. Glue the two rudder parts together.

❑ 6. From 3/32" x 1/4" [2.4mm x 6mm] balsa stick, cut out cap strips and glue them in place on the fin ribs. Do this on both the left and right side of the fin the same way as you did for the horizontal stab.

**Note:** On the fin cross-section you will see that the cap strips extend across the leading and trailing edge.

❑ 7. Sand the cap strips to the shape shown on the fin cross-section. This is also a good time to final sand the leading edge of the fin. Use the cross-section as your guide for sanding the final shape.

❑ 8. Mark a centerline down the LE of the rudder. Repeat this for the trailing edge of the fin. Using the plan as your guide, mark the location for each of the hinges on the fin and rudder, then cut matching slots in the fin and rudder using the same procedure you used for the stab and elevator. Sand the rudder and the fin to the shape shown on the cross-section. Be sure to make the oval cut out in the rudder for the elevator to pass through.

❑ 9. Trial fit the hinges into the slots and without using any glue, temporarily attach the control surface to verify the fit.

❑ 10. The plan shows the option of a scalloped trailing edge on the rudder just as the elevator did. If you chose to scallop the elevator you may want to scallop the rudder as well.

## BUILD THE WING

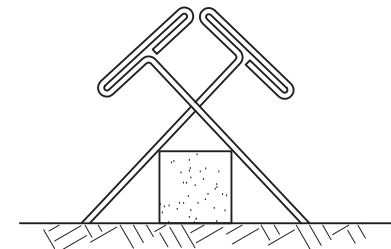
### Frame the Wing

❑ ❶ 1. Tape the Right Wing Plan view to your building board. Cover the plan with Plan Protector.

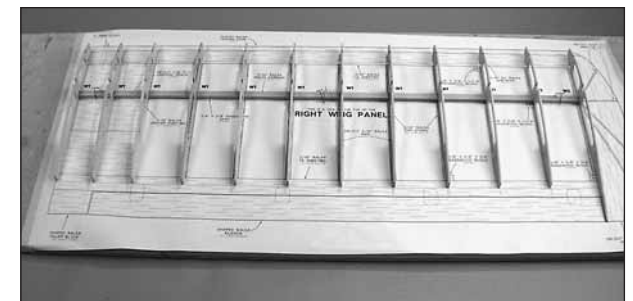
❑ ❷ 2. Locate one of the **shaped balsa leading edges** and one of the **shaped balsa trailing edges**. Cut each of them to a length of 29-3/4" [759mm]. Be sure to save the leftover pieces. They will be used as filler blocks later in the building process.

❑ ❸ 3. Locate two 1/4" x 3/8" x 30" [6 x 9.5 x 760mm] basswood **spars**. Cut each of them to a length of 29-3/4" [756mm].

❑ ❹ 4. Locate two 3/16" x 3/16" x 36" balsa [4.8 x 4.8 x 914mm] **leading edge sub spars**. Cut each of them to a length of 29-3/4" [759mm].

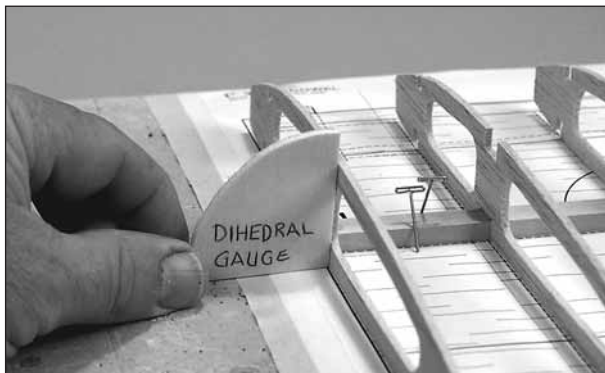


❑ ❺ 5. Pin one of the basswood spars to the plan with T-Pins.



❑ ❻ 6. Test fit the die-cut 3/32" [214mm] balsa **W1 ribs** over the basswood spar in the locations shown on the plan.

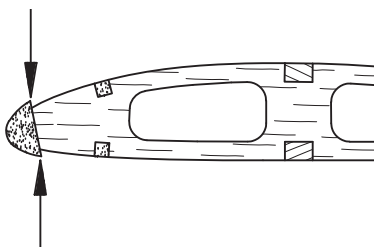
- ❑❑ 7. Test fit the W2 rib at the end of the basswood spar.



- ❑❑ 8. Locate the die-cut 1/8" [3mm] plywood **dihedral gauge**. Place the gauge flat on the building board at the root of the wing and against the side of the W1 rib. Once you are satisfied with the rib placement, use CA to glue the rib to the basswood spar. **Important!** Be sure you use the gauge to set the angle of the rib. Failure to do so will not provide the wing with the required amount of dihedral.

- ❑❑ 9. Use CA to glue each of the ribs onto the basswood spar. Make sure that each of the ribs is perpendicular to the building board.

- ❑❑ 10. Glue the 3/16" x 3/16" x 29-3/4" [4.8 x 4.8 x 756mm] balsa leading edge sub spar into the notches in the top of the wing. Glue the 1/4" x 3/8" x 29-3/4" [6 x 9.5 x 756mm] basswood top spar into the notches in the top of the wing.



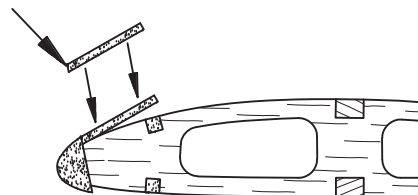
- ❑❑ 11. Beginning at one end of the wing, center the shaped balsa leading edge on the front of the rib. Glue it to the rib. Center the leading edge on the rib at the opposite end of the wing and glue it in place.

- ❑❑ 12. Glue each of the remaining ribs to the shaped balsa leading edge, centering them as you go.



- ❑❑ 13. Place the shaped balsa trailing edge in position as shown on the plan. The trailing edge should be placed flat on the building board and against each of the ribs. When satisfied with the fit, glue the trailing edge in place to the eleven W1 ribs and the W2 rib.

**BEVEL THIS  
EDGE**

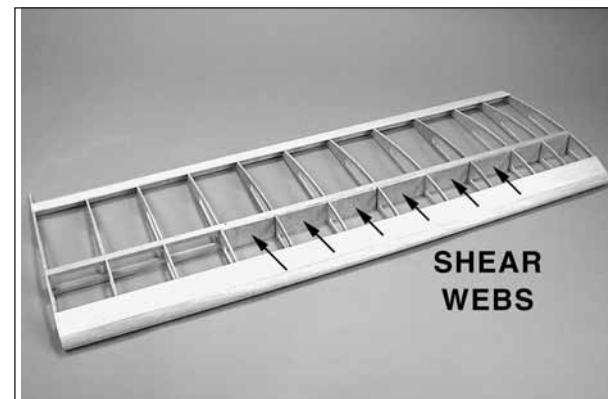


- ❑❑ 14. Locate one of the 3/32" x 1-1/8" x 30" [2.4 x 28 x 760mm] balsa **leading edge sheets**. Cut it to a length of 29-3/4" [756mm]. Using a sanding block, bevel one edge of the sheet to get a good fit between the sheeting and the leading edge of the wing.

- ❑❑ 15. Glue the leading edge sheeting in place between the leading edge and the balsa leading edge sub spar.



- ❑❑ 16. Locate one of the 3/32" x 1" x 30" [2.4 x 25 x 760mm] balsa **trailing edge sheets**. Cut it to a length of 29-3/4" [756mm]. Glue it in place on the trailing edge of the wing.



- ❑❑ 17. From the 3/32" x 3" x 24" [2.4 x 75 x 610mm] balsa sheet, cut out six shear webs. When cutting the shear web be sure the grain is perpendicular to the wing spars. Position the shear webs on the wing spars as shown on the plan. When satisfied with the fit, glue them in place.

- ❑❑ 18. From a sheet of 3/32" x 3" x 30" [2.4 x 75 x 760mm] balsa sheet, cut three pieces 4-3/8" [111mm] in length. Edge glue the three sheets together to form a sheet 4-3/8" x 9" [11 x 229mm]. Once the glue has dried, cut the sheeting to fit between the leading edge sheet and the trailing edge sheet as shown on the plan.



- ❑ 19. Place the sheeting flat on the bench and sand the joints of the sheeting smooth on the side that will be the top of the wing. When you have completed the sanding and are satisfied with the fit, glue the sheeting in place between the leading edge and trailing edge sheeting.



- ❑ 20. From 3/32" x 1/4" x 36" [214 x 614 x 914mm] balsa stick, cut and glue nine cap strips into place. Cut each one to fit between the leading edge sheeting and the trailing edge sheeting on each rib.

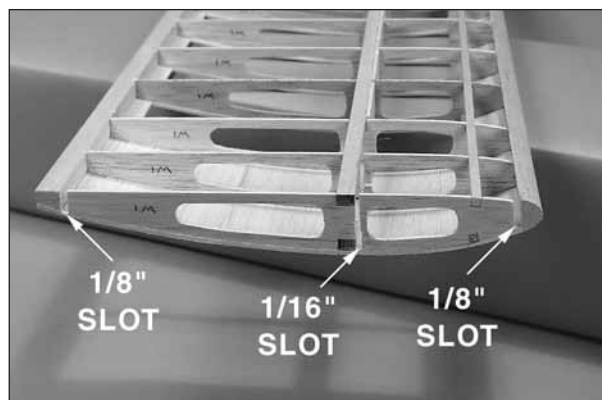
- ❑ 21. Remove the wing from the building board and turn it over. Glue the 3/16" x 3/16" x 29-3/4" balsa [4.8 x 4.8 x 756mm] leading edge sub spar in the notches in the bottom of the wing.

- ❑ 22. Repeat steps 1-21 for the left wing.

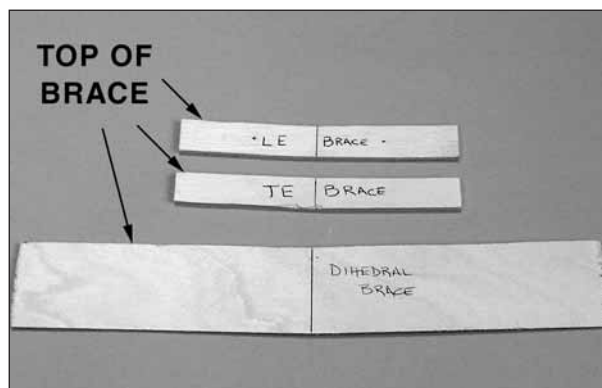
## Install the Wing Joiners

### Important!

The following steps are for the right wing panel.

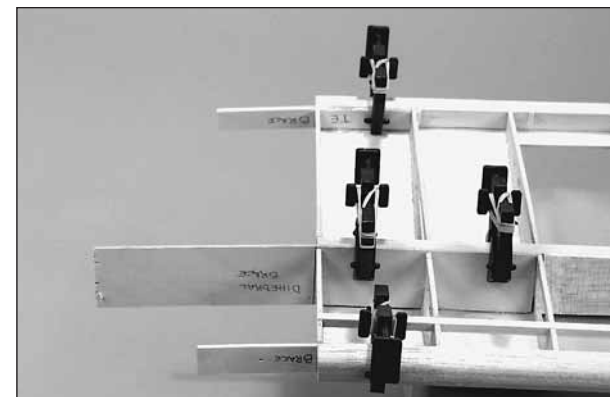


- ❑ 1. At the root rib, cut a 1/8" [3mm] slot in W1 as shown for the leading edge and trailing edge brace. Cut a 1/16" [1.6mm] slot through two W1 ribs for the dihedral brace.

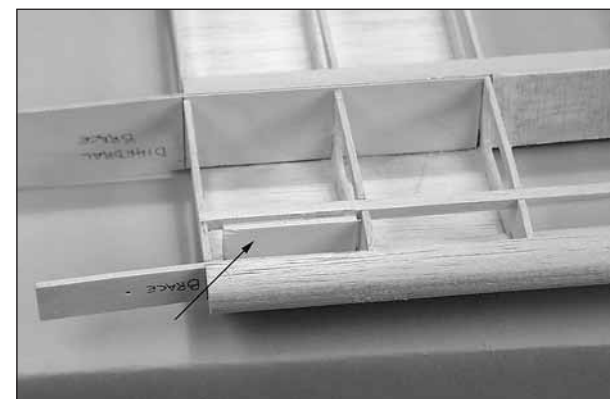


- ❑ 2. Locate the die-cut 1/8" [3mm] plywood **leading edge** and **trailing edge brace** as well as the laser-cut 1/16" [1.6mm] plywood **dihedral brace**. Mark a centerline on each of them.

- ❑ 3. Test fit each of the braces in the slots you just cut. When fitting the braces it is important that they are installed properly. **Important!** The top of the brace must be glued so that it is in contact with the top sheeting of the wing.



- ❑ 4. When you are satisfied with the fit of each brace, glue them in place with 30-minute epoxy. Use the center line you made on each brace as a guide to position the brace. It is important that exactly half of each brace goes into each wing panel. Set the wing panel aside until the epoxy has fully cured.



- ❑ 5. Glue the die-cut 1/8" [3mm] ply **sub spar dowel brace** to the balsa sub spars as shown on the plan.



## Finish the Bottom of the Wing

❑❑ 1. For the right wing panel, locate a  $3/32"$  x  $1-1/8"$  x  $30"$  [ $2.4$  x  $28$  x  $760\text{mm}$ ] balsa bottom leading edge sheet. Cut it to a length of  $29-3/4"$  [ $756\text{mm}$ ]. Bevel one edge of the sheet as you did with the sheeting on the top of the wing. When you are satisfied with the fit, glue the sheeting in place on the bottom of the wing.

❑❑ 2. Locate a  $3/32"$  x  $1"$  x  $30"$  [ $2.4$  x  $25$  x  $760\text{mm}$ ] balsa bottom trailing edge sheet. Cut it to a length of  $29-3/4"$  [ $756\text{mm}$ ]. Glue it in place on the trailing edge of the bottom of the wing.

❑❑ 3. Sheet the center section of the bottom wing following the same procedure you used for sheeting the center section on the top of the wing.

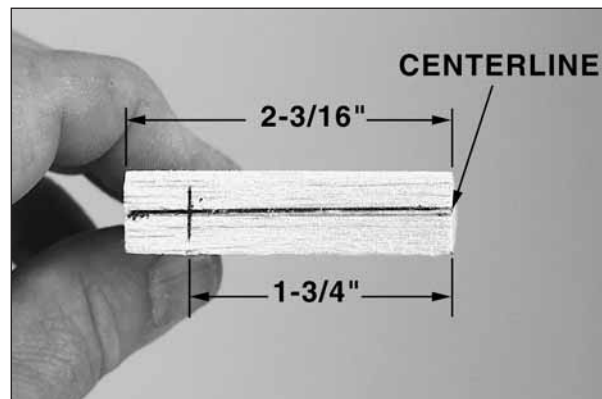
❑❑ 4. From  $3/32"$  x  $1/4"$  x  $36"$  [ $2.4$  x  $6.4$  x  $914\text{mm}$ ] balsa sticks, cut nine cap strips. Cut each one to fit between the leading edge sheeting and the trailing edge sheeting on each rib.

You now need to make a decision. When the Elder was originally introduced it had flying and landing wires on it. Though these wires are not a structural part of this model, they do add a great "Vintage" look to the model. If you have ever installed wires and turnbuckles you know there is some additional work and cost to do this. For our model we used elastic cord to simulate the flying wires. This was much easier and less expensive than using actual wire. We will give complete instructions for installing wire or elastic flying wires as we get further into the building process. If you choose not to install any of the wires skip steps 5 & 6.

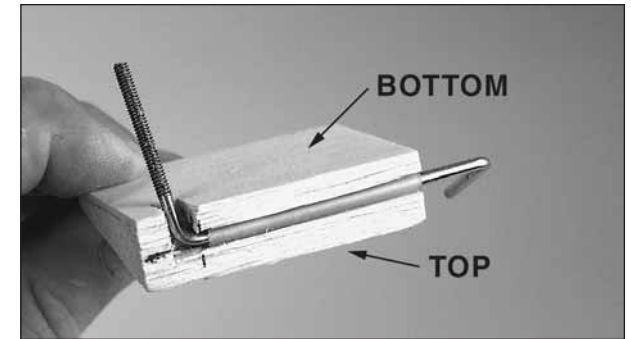
❑❑ 5. On the wing plan there are four locations shown for  $3/8"$  x  $3/8"$  [ $9.5$  x  $9.5\text{mm}$ ] basswood blocks. The blocks are provided in the kit and are cut to the lengths shown on the plan. If you plan to install wire and turnbuckles on your model, proceed with installing the basswood blocks as shown on the plan. If you choose to use the elastic cord as we did on our model then you can substitute balsa blocks for the basswood. The balsa is a little easier to work with than the basswood and will retain the elastic cord better than the basswood. Locate the  $3/8"$  x  $3/8"$  x  $18"$  [ $9.5$  x  $9.5$  x  $457\text{mm}$ ] balsa stick and cut it to the length specified on the plan for each of the four blocks. Glue the blocks on the positions shown on the plan.

❑❑ 6. Whether you have installed the balsa or basswood blocks, drill a  $1/16"$  [ $1.6\text{mm}$ ] hole through the center of the entire length of the block.

❑❑ 7. Locate the  $30"$  [ $762\text{mm}$ ] shaped balsa aileron. From one end of the aileron cut a piece  $2-3/16"$  [ $55.8\text{mm}$ ] in length.

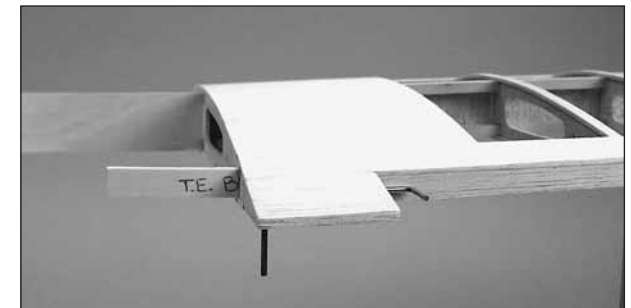


❑❑ 8. Mark a centerline on this piece of aileron stock. Make another mark  $1-3/4"$  [ $44\text{mm}$ ] from the end of the block.



❑❑ 9. Cut a slot as shown in the photo along the centerline starting at the end. The slot needs to be  $1/8"$  [ $3\text{mm}$ ] wide to accommodate the torque rod. The slot can be cut easily with the Great Planes® Groove Tube™ (GPMR8140) or the slot can be cut with your hobby knife. Notice that these blocks are not symmetrical so make the one for the left wing the mirror image of this one.

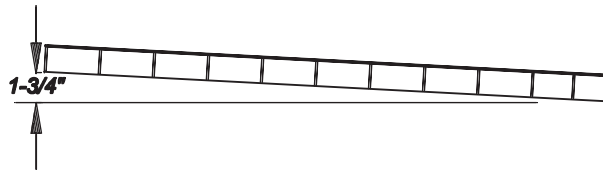
❑❑ 10. Cut another slot perpendicular to the slot you just cut to accommodate the arm of the torque rod.



❑❑ 11. Glue the block with the torque rod in place in the slot, being careful not to get any glue onto the metal wire. **Tip** – Apply a small amount of petroleum jelly to the end of the plastic bearing. This will prevent glue from getting onto the wire. **Important!** Before gluing the block in place be sure that you have the correct torque rod in place in the block. The un-threaded arm of the torque rod should protrude into the area where the aileron will be attached. The threaded end of the arm will protrude towards the bottom of the wing. Make sure that you install the correct rod for each wing half.

## Join the Wings

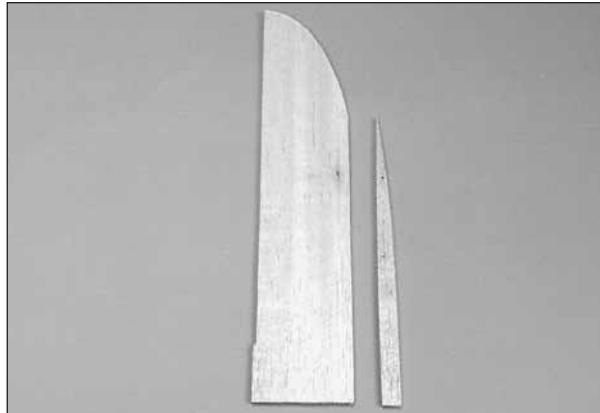
- ❑ 1. Glue the die-cut 1/8" [3mm] ply sub spar dowel brace to the balsa sub spars on the left wing panel as done on the right wing panel.
- ❑ 2. At the root rib of the left wing panel, cut two 1/8" [3mm] slots in W1 at the leading edge and trailing edge for the leading edge and trailing edge braces. Cut a 1/16" [1.6mm] slot through the two W1 ribs for the Dihedral Brace.
- ❑ 3. Test fit the two wing panels together, inserting the wing joiners from the right wing panel into the slots you just cut in the left wing panel.



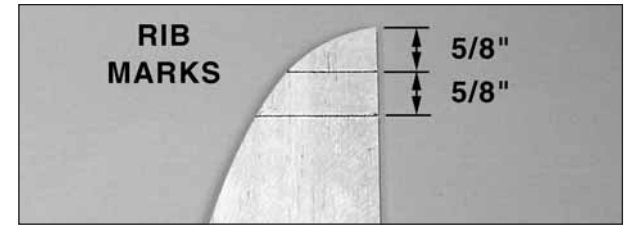
- ❑ 4. When you are satisfied with the fit, mix 1 oz. of 30-minute epoxy. Glue the joiners and the wing together with 30-minute epoxy, making sure you apply liberal amounts to the joiner and the spars. Before the glue dries, place one wing flat on the building surface and measure the distance from the table to the bottom of the wing. The distance should be 1-3/4". Block the wing to maintain this distance while the glue dries.

Now that both of the wing panels are joined, go back to the section, *"Finish the Bottom of the Wing"*. Follow the instructions to finish the bottom of the left wing the same way you did the right wing.

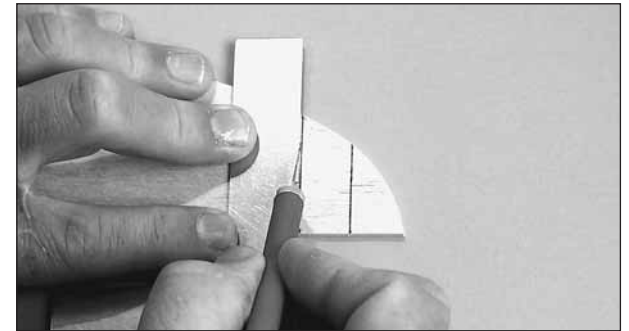
## Build the Wingtip



- ❑ ❶ 1. Locate the die-cut 3/32" [2.4mm] balsa **wingtip parts**. Glue the two pieces together to form the completed wingtip.
- ❑ ❷ 2. On the right wing test fit the wing tip in place, making sure you have a good fit between the tip and the end of the wing.



- ❑ ❸ 3. When satisfied with the fit, turn the wingtip over and make two marks on the bottom of the tip. From the tip, measure down 5/8" [15.9mm] and draw a line perpendicular from the edge of the wing tip. Measure down from that line another 5/8" [15.9mm] and draw another line perpendicular from the edge of the wing tip.



- ❑ ❹ 4. With your hobby knife, score the lines half way through the balsa. The scores will allow you to bend the end slightly when installing the wing tip.

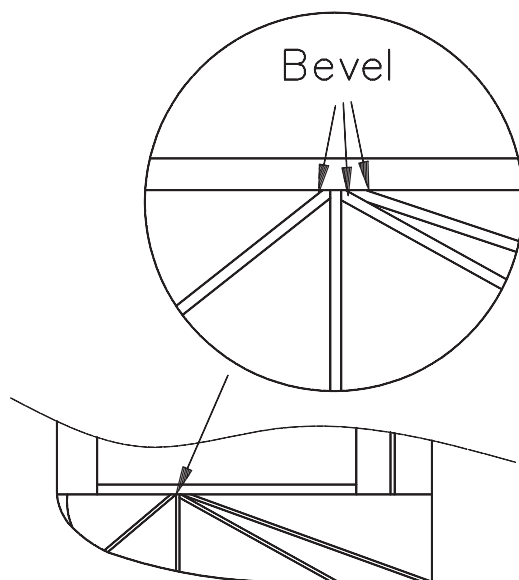
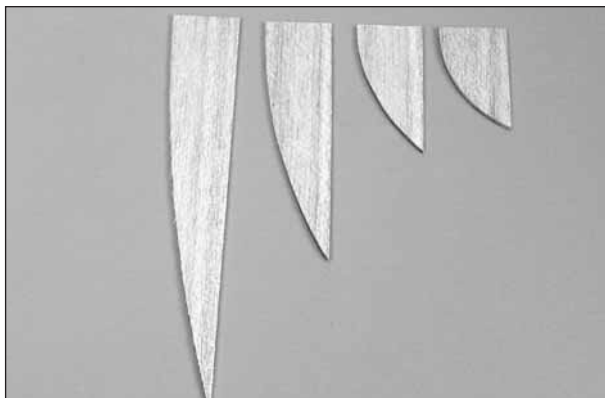


- ❑ ❺ 5. Using medium CA, glue the wingtip in place to the end of the wing. Be sure that the wingtip and the wing are flat on the building board before gluing



it in place. **Do Not Glue** the front 1-1/4" [32mm] of the tip to the wing. Proceed to the next step after the glue has completely cured.

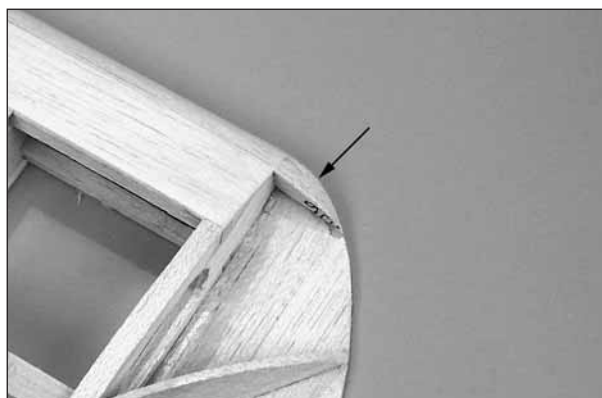
- ❑❑ 6. Carefully bend the tip of the wingtip on the score until the tip takes on the contour of the wing. When the proper bend has been achieved, use thin CA to glue the tip to the wing.



- ❑❑ 7. Locate the four die-cut 3/32" [2.4mm] balsa **wing tip ribs**. In the sketch, you can see how each of the wing tip ribs needs to be beveled where they contact the wing. Bevel each of them to the angles shown on the plan.



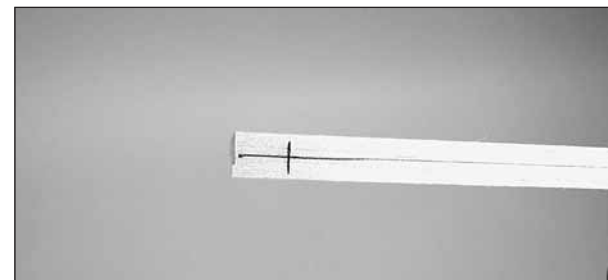
- ❑❑ 8. When satisfied with the fit, glue the wing tip ribs in place.



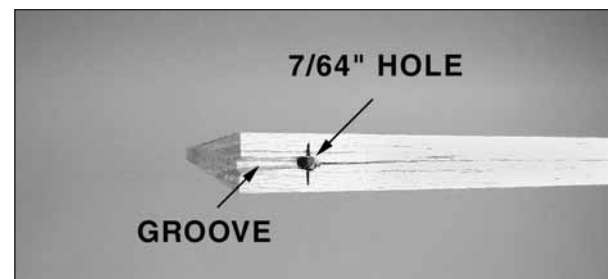
- ❑❑ 9. From the leftover balsa leading edge, fit a piece to fill in the front of the wing tip.

- ❑❑ 10. Repeat steps 1–9 for the left wingtip.

## Build the Aileron



- ❑❑ 1. Cut the ailerons to length as shown on the plans. Mark a centerline on the LE of the **aileron**.



- ❑❑ 2. Fit the aileron onto the wing panel and mark the location of the torque rod. Drill a 7/64" [2.8mm] 1/2" [13mm] hole on the mark.

- ❑❑ 3. Using your Great Planes® Groove Tube or a hobby knife, cut a 1/8" [3mm] slot from the end of the aileron to the hole you just drilled.

- ❑❑ 4. Mark a centerline down the trailing edge of the wing. Using the plan as your guide, mark the location for each of the hinges on the aileron and wing trailing edge, then cut matching slots in the aileron leading edge and wing trailing edge. Be sure to follow the same technique described earlier in the "Expert tip for using CA hinges".

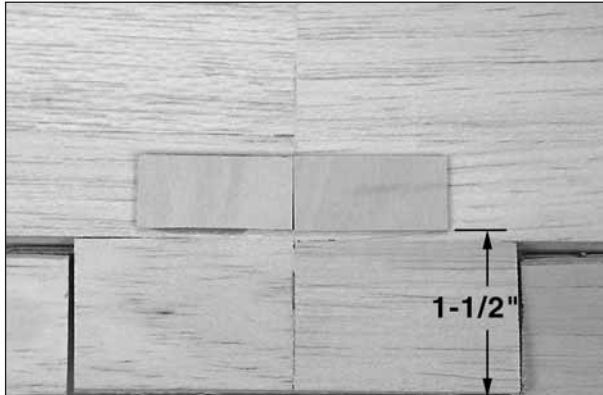
- ❑❑ 5. Trial fit the hinges into the slots and, without using any glue, temporarily attach the aileron to verify the fit.

**STOP! DO NOT GLUE THE HINGES IN PLACE UNTIL AFTER THE MODEL IS COVERED!**

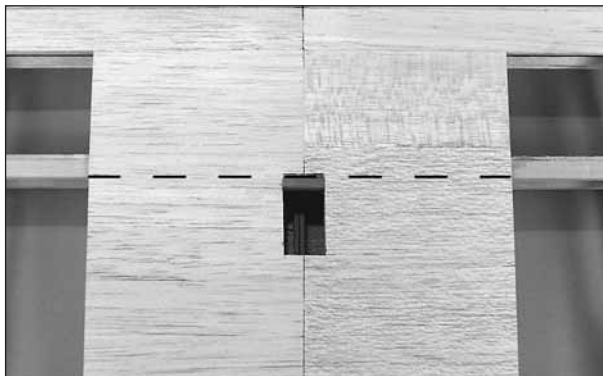
❑ 6. Sand the aileron to its final shape as shown on the cross section of the wing. Sand a “V” in the leading edge.

❑ 7. Repeat steps 1-6 for building the aileron for the left wing.

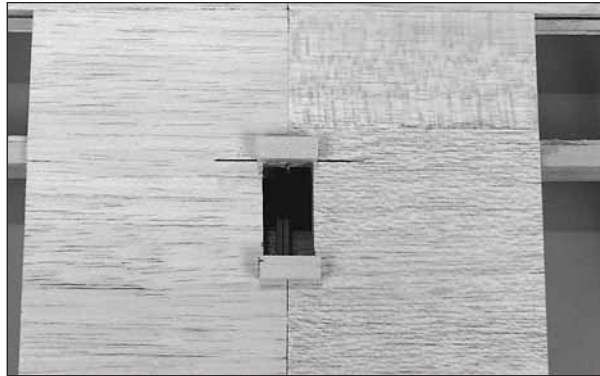
## Finish the Wing



❑ 1. Locate two laser-cut 1/16 x 3/4" x 1-1/2" [1.6 x 19 x 38mm] plywood **wing bolt plates**. Glue them in place on the top of the wing. The plates should be positioned 1-1/2" [38mm] from the trailing edge of the wing.



❑ 2. On the bottom of the wing, cut an opening for the aileron servo. Begin by drawing a line that is just behind the basswood main spar. With that line as a reference, make an opening large enough for your particular brand of servo.



❑ 3. Using a 1/4" x 3/8" x 30" [6 x 9.5 x 762mm] basswood stick, cut two pieces 1" [25mm] long for the servo mounting rails. Glue them in place on the wing skin with 6- minute epoxy.

## Make the Cockpit (Optional)

When the Elder was originally introduced we found that modelers chose to finish the plane in different ways. The original plan had a cockpit in the top of the wing. Some modelers chose not to do this. Just as you had to make a choice to scallop the elevator and rudder, you need to decide if you would like to make the cockpit. If not, skip this section.



❑ 1. Locate the cockpit pattern on the plan and cut it out. Place the pattern on the top of the wing so that the back edge of the cockpit pattern is 2-1/2" [64mm] from the trailing edge of the wing. Trace the pattern onto the wing.



❑ 2. Cut out the cockpit from the sheeting. When you remove the sheeting the W1 wing rib will be in the middle of the cockpit. Remove the rib in this area to create the open cockpit. This will not compromise the strength of the wing.

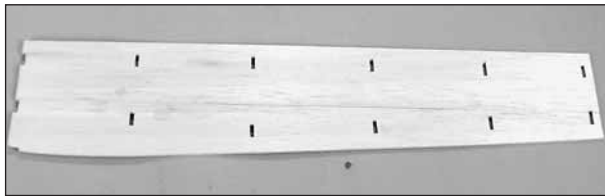
❑ 3. When you finish your model you will find that either Fourmost Cockpit Coaming (FORQ2014) or 18" of black neoprene fuel tubing makes a nice finish to the cockpit opening. Installation instructions are at the end of the construction process.

## BUILD THE FUSELAGE

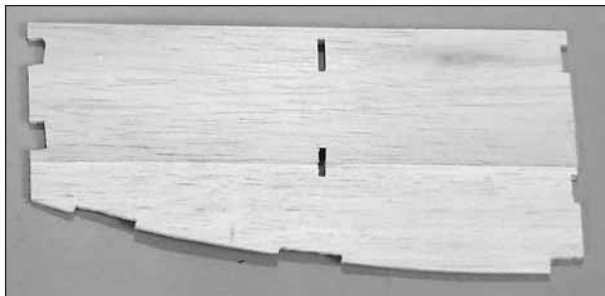
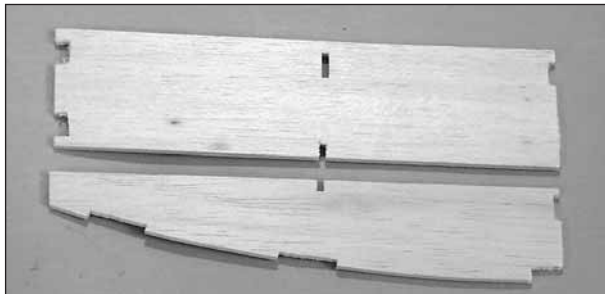
### Frame the Fuselage

Notice that you are building the right side first.

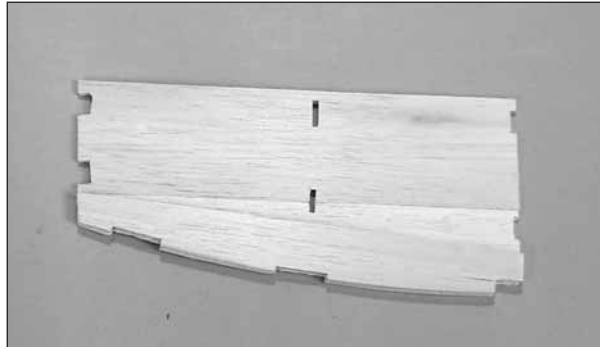
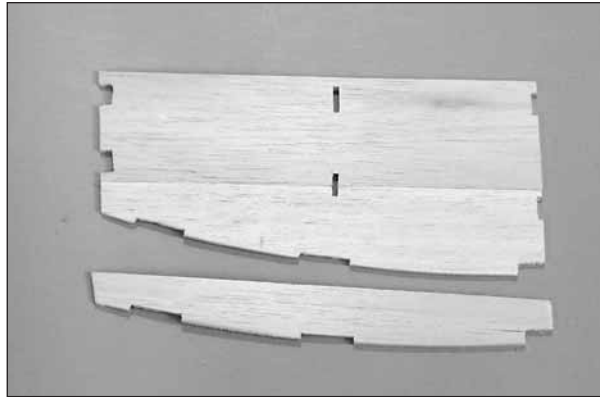
- ❑ 1. Tape the Fuselage Plan side view to your building board. Cover the plan with Plan Protector. Build the right fuselage side first.



- ❑ 2. Locate the die-cut 1/8" [3mm] balsa **fuse sides**. Edge glue the two halves together.



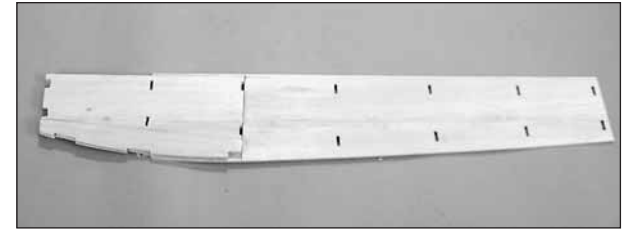
- ❑ 3. Locate the die-cut 1/8" [3mm] balsa **fuse side doublers**. Edge glue the two halves together.



- ❑ 4. Locate the die-cut 1/8" [3mm] balsa **landing gear doubler**. Glue this to the fuse side doubler. **Note:** The left fuse side will have the doubler glued on the other side.



- ❑ 5. Draw a line parallel to the top of the fuse side 1/4" [6mm] from the top. Draw another line perpendicular to this line, aligned with the back of the first set of slots in the fuse side.



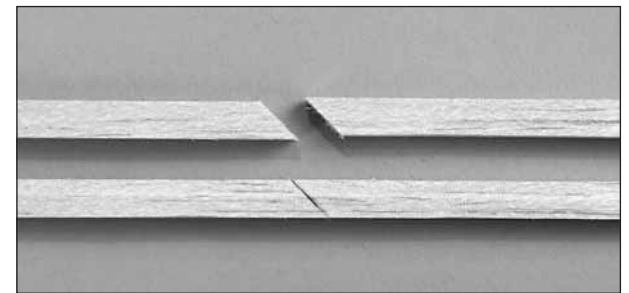
- ❑ 6. Glue the fuse doubler to the fuse side on the lines you have drawn.

**Note:** The left side will be glued to the other side.

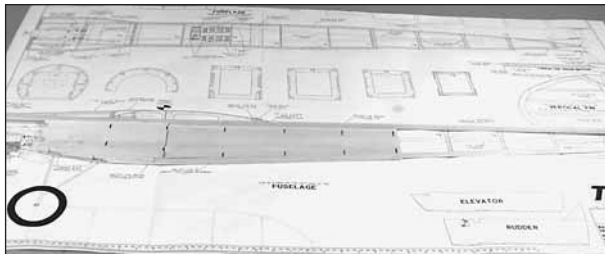
- ❑ 7. Locate six 1/4" x 1/4" x 36" [6 x 6 x 914mm] basswood sticks. These will be the **longerons** and the **longeron braces**. Because these will be part of the open tail structure it is recommended that you take some time to sand them now. Later in the construction process you will be applying a finish and you will find it much easier if you sand the sticks now before they become part of the model. Sand them being careful not to round the edges.

- ❑ 8. From one 1/4" x 1/4" x 36" [6 x 6 x 914mm] basswood stick cut two pieces 13" [330mm] long.

- ❑ 9. Locate two 1/4" x 1/4" x 36" [6 x 6 x 914mm] basswood sticks. On one end of each stick cut a 45 degree angle.

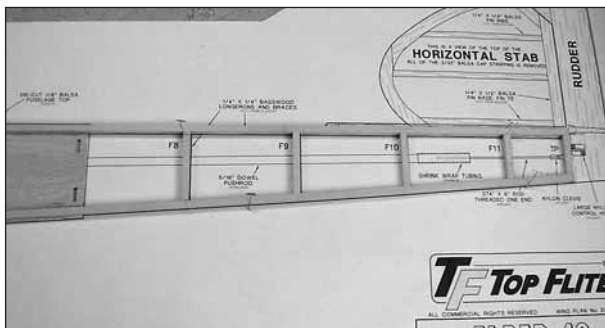


- ❑ 10. On one end of each of the 13" [279mm] sticks cut a 45 degree angle. Using 6-minute epoxy glue a 13" [330mm] stick to the 36" [914mm] stick, gluing them together on the 45 degree cut. Do this for the remaining two sticks. This will give you two longerons 48-3/4" [1239mm] long. Use a long straightedge to keep the sticks straight.

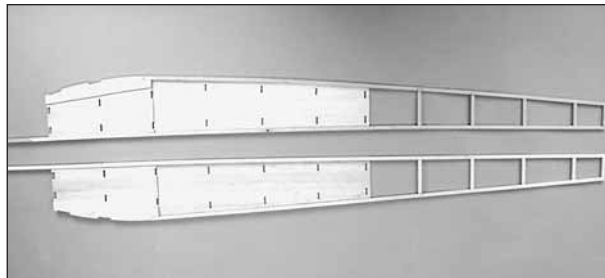


□ □ 11. Glue one of the 48-3/4" [1239mm] basswood longerons to the top of the right fuse side as shown on the plan. Glue the end of the stick where you made the splice to the fuse side. Do not have the splice at the rear of the fuselage. The 48-3/4" [1239mm] longeron is longer than shown on the plan. Place the longeron on the plan at the back of the fuselage and allow the excess longeron length to extend beyond the front of the fuselage. Set the remaining 48-3/4" [1239mm] basswood longeron aside until you do the left side of the fuselage.

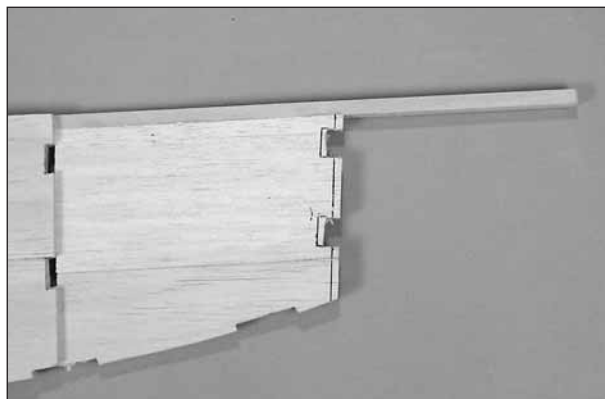
□ □ 12. Glue a 36" [914mm] basswood longeron in place on the bottom of the fuse side. After the glue has cured, cut the longeron to length as shown on the plan.



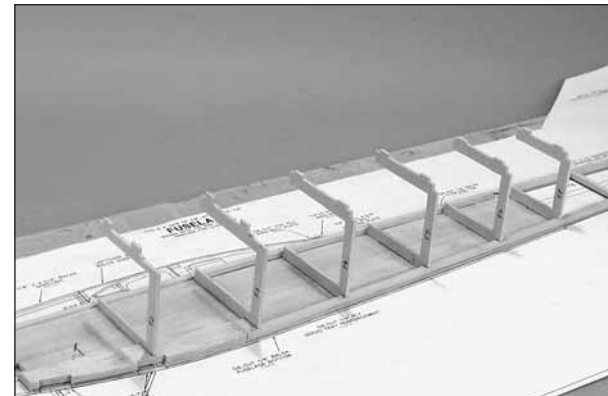
□ □ 13. From the remaining basswood stick, cut the longeron braces to fit in the locations shown on the plan. Glue them in place once you are satisfied with the fit. For maximum strength we recommend that they be glued in place with 6-minute epoxy because CA does not bond as well to basswood. You can use CA if you prefer, just be careful in handling the fuselage until you glue the gussets in place later in the building process.



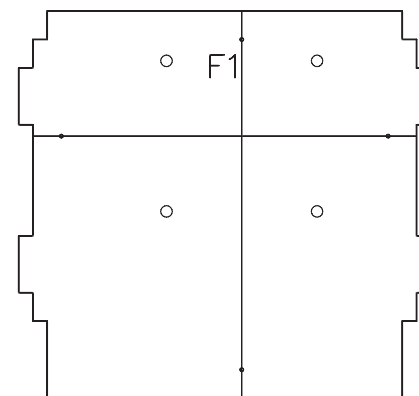
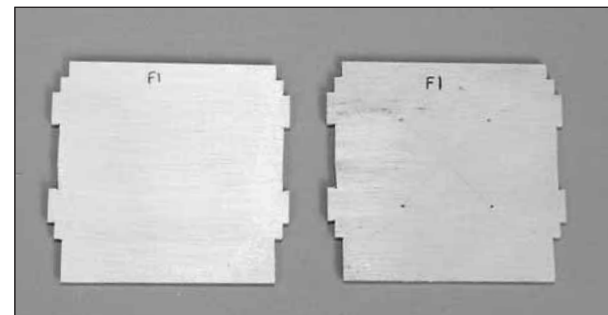
□ 14. This completes the right side of the fuselage. Now is a good time to sand the side of the fuselage while you can lay it flat on the bench. Repeat steps 2-13 for the left side of the fuselage. It is very **important** that you make a left and right side fuselage! This is easily done if you build the left side of the fuselage on top of the right side you have already made. On the right fuselage side, insert some 1/8" balsa under the longerons to keep them straight. Place Plan Protector or a sheet of wax paper on top of the completed right side and proceed building the left side on top of it.



□ 15. Locate the right fuselage side. On the front of the fuselage you will see an embossed line that is approximately 1/8" [3mm] inside the edge of the front of the fuselage. Cut the fuselage on the embossed line. This will provide you with the proper amount of right thrust when you assemble the fuse. *Do this on the **right** fuselage side only and be sure you only cut the sheeting. Do not cut the longerons!*

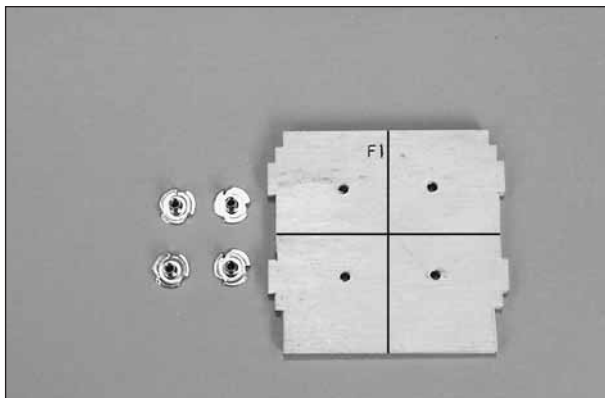


□ 16. Pin the right fuselage over the plan. Glue die-cut 1/8" [3mm] plywood **formers F2 through F7** in place in the notches on the right fuselage side. Be sure to glue them perpendicular to the fuselage.

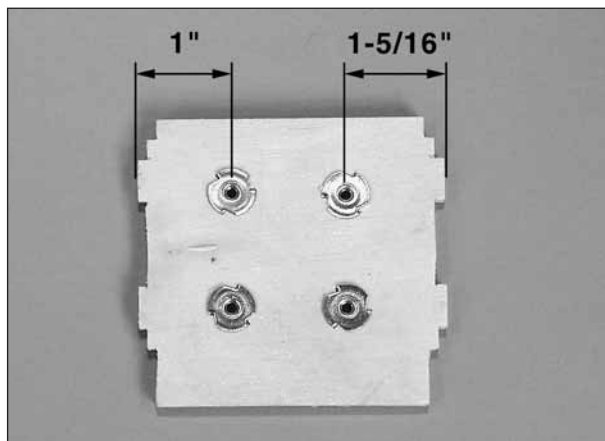


□ 17. Locate two die-cut 1/8" [3mm] plywood **F1 formers**. Glue these together to form the 1/4" [6mm] firewall. Make sure the punch marks are visible on one side.

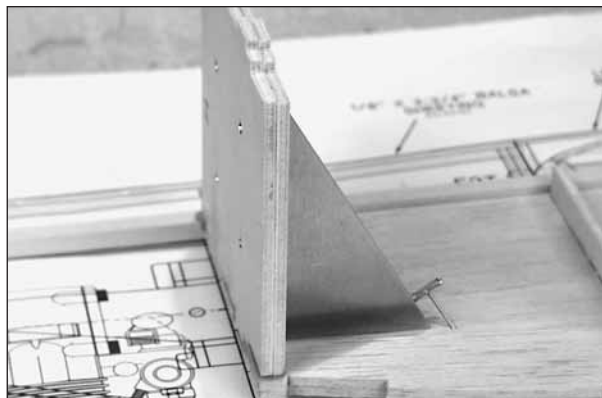




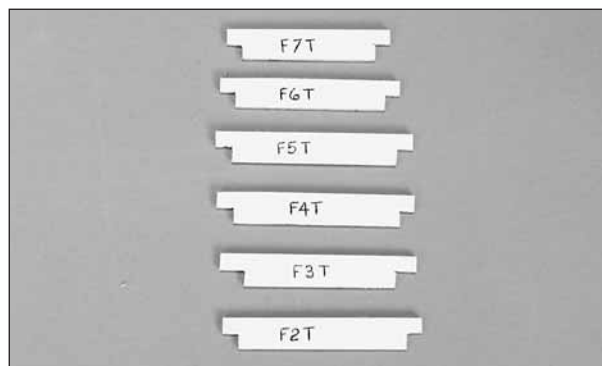
❑ 18. The firewall has eight punch marks. Draw two reference lines for mounting the engine to the firewall as shown. If you are using the O.S. FS 52 or O.S. 46 FX, the remaining four punch marks are exactly where you need to drill the engine mounting holes. If you are using a different engine you may find that you have to adjust the location of the mounting holes for your particular engine and muffler combination. Drill four 5/32" [4mm] holes on the engine mount punch marks for the 6-32 blind nuts.



❑ 19. Use a small hammer and tap the four 6/32 blind nuts into the holes you just drilled. After they are in place, put a few drops of thin CA on the blind nut being careful not to get any glue onto the threads. **Note:** The blind nuts are installed on the rear of F1. Pay special attention to the orientation of the firewall as shown above.



❑ 20. Locate the **firewall mounting gauge**. This gauge will set the proper amount of right thrust required for the engine. Glue the F1 firewall to the fuselage side with 6-minute epoxy. Be sure to use the gauge when gluing it in place. Do not glue the gauge to the firewall or fuse.



❑ 21. Locate die-cut 1/8" [3mm] parts F2T through F7T. Glue them in place on top of the formers. F3T and F4T only need to be tack glued in place as they will be removed later in the building process. The others are a permanent part of the structure.

**FOR STEPS 22-27 USE THE TOP VIEW OF THE FUSELAGE PLAN AS AN AID IN KEEPING THE FUSELAGE STRAIGHT.**



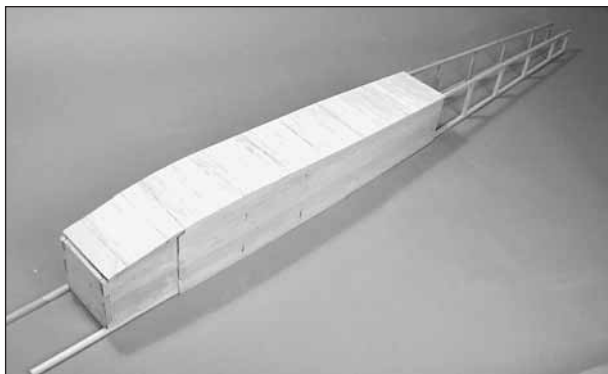
❑ 22. Glue the left side of the fuselage to the formers. Be careful to maintain the proper angle for the firewall. Use the firewall mounting gauge to verify the firewall is correct as you glue the fuselage side in place.



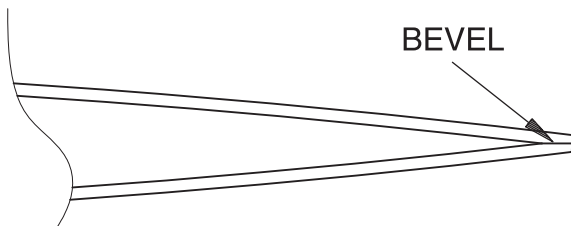
❑ 23. Lay the fuselage upside down on the bench. Locate the two 1/4" x 1" x 3-7/8" [6 x 25 x 98mm] plywood **landing gear mounting plates** and glue them in place in the bottom of the fuselage with 6-minute epoxy.

**Important!** The kit contains two of 1/8" x 3" x 30" [3 x 76 x 762mm] soft balsa sheets. These two sheets are soft balsa and should be set aside. They will be used later for the cowl construction. There are two sheets of 1/8" x 3" x 24" [3 x 76 x 610mm] medium balsa. The medium balsa sheets are to be used in the following steps.

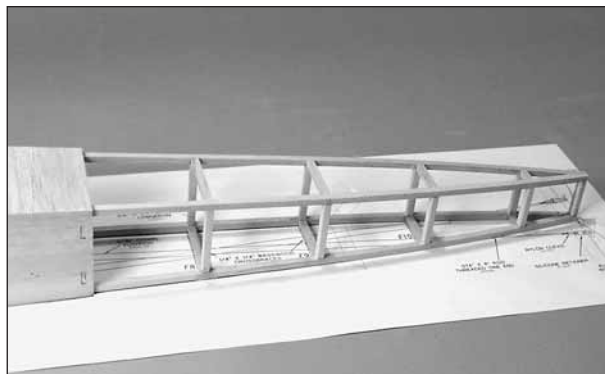




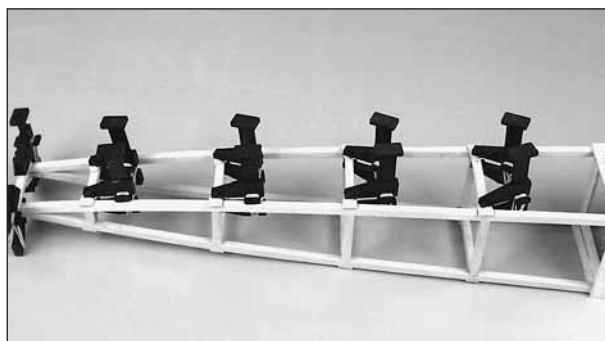
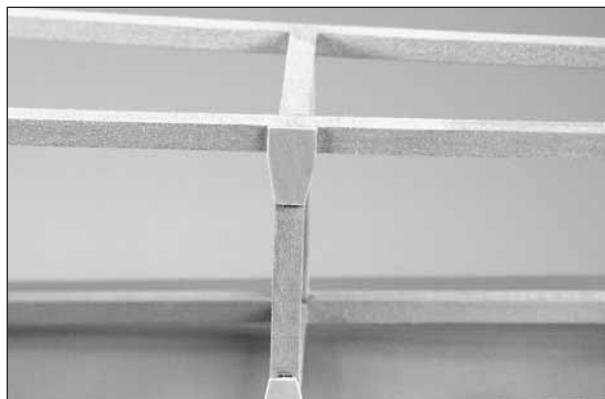
❑ 24. From the 1/8" x 3" x 24" [3 x 76 x 610mm] balsa, sheet the bottom of the fuselage. The grain of the balsa needs to run across the width of the fuselage. Once you have the fuselage bottom completed, take the time to sand the bottom of the fuselage. It will be much easier to do while the fuselage is placed flat on the bench.



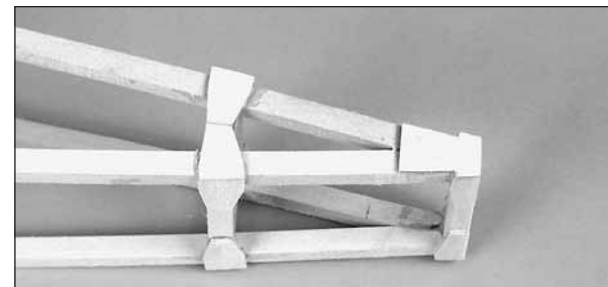
❑ 25. Cut the aft end of the longerons to the angle shown on the plan. Once the angle has been cut, glue the longerons together with 6-minute epoxy. Use small clamps to hold the tail together while the glue is curing. Be sure that you do not twist the longerons when you clamp and glue them together. The fuselage and longerons should remain completely flat to the building board during the gluing process.



❑ 26. Cut and glue the remaining cross braces in place on the top and bottom of the fuselage.



❑ 27. Locate the sheet of 32 laser-cut 1/16 [1.6mm] plywood **fuse gussets**. Use 6-minute epoxy to glue them in place over each of the cross brace joints. Refer to the plans for exact positioning. You will find it helpful to use small clamps to hold them in place while the epoxy cures.



❑ 28. Glue the 1/16" [1.6mm] tail gusset in place at the rear, bottom of the fuselage with 6-minute epoxy.



### TOP SHEETING

**The grain of the balsa must run across the width of the fuselage.**

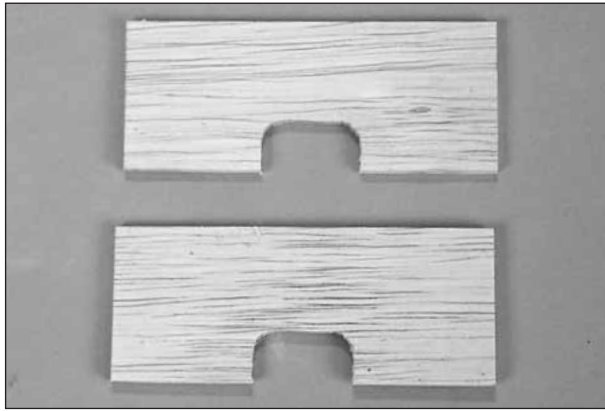
❑ 29. From 1/8" x 3" x 24" [3 x 76 x 610mm] balsa, sheet the top of the fuselage from former F5 to the rear of the fuselage. The grain of the balsa needs to run across the width of the fuselage.

❑ 30. Locate two die-cut 1/8" [3mm] plywood **F2T formers**. Glue them together to form one 1/4" [6mm] former.



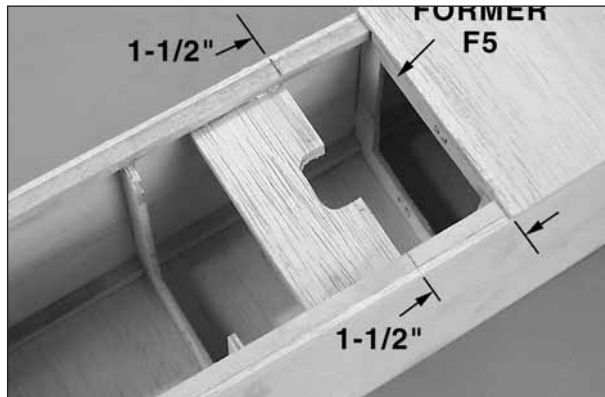
❑ 31. Trial fit the F2T former in place in front of fuselage former F2. When you are satisfied with the fit, glue it in place with 6-minute epoxy.

- ❑ 32. Earlier you temporarily glued F3T and F4T in place. Remove and discard them.



- ❑ 33. Locate the two die-cut 1/8" x 1-1/2" x 3-5/8" [3 x 38 x 92mm] plywood **wing bolt mounting plates**. Glue them together to form one 1/4" [6mm] thick wing bolt mounting plate.

- ❑ 34. From former F5 measure forward 1-1/2" [38mm]. Make a mark on both sides of the fuselage.

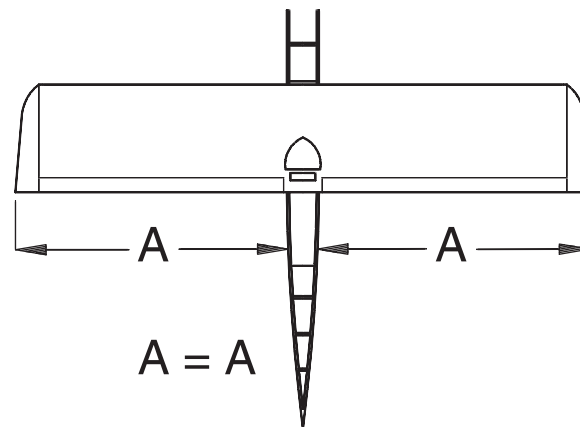


- ❑ 35. Glue the wing bolt mounting plate in position with 6-minute epoxy. The rear of the mounting plate is the side with the cut-out. This should be towards the rear of the fuselage and aligned on the marks you made on the fuselage.

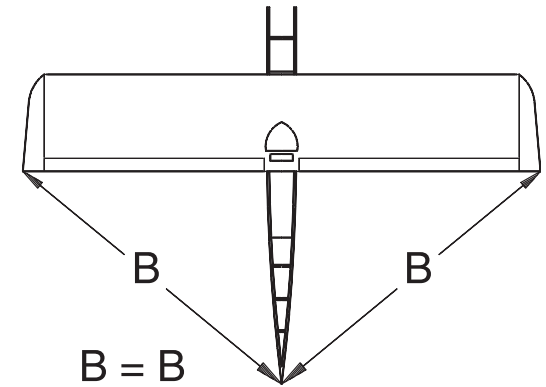
## Mount the Wing to the Fuselage



- ❑ 1. Position the wing onto the fuselage with the leading edge of the wing against former F2T.



- ❑ 2. Measure from the side of the fuselage to the wing tip. Adjust the wing as needed until the distance on the left side and right side are equal.

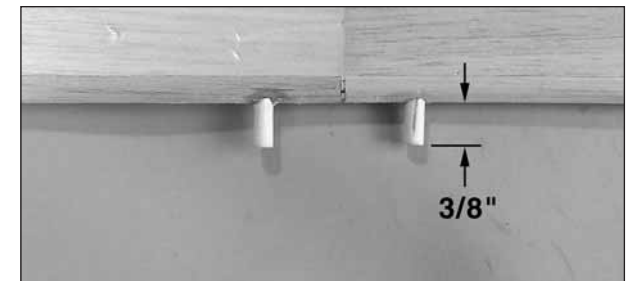


- ❑ 3. Measure from the tip of the left wingtip to the tail of the fuselage and from the right wingtip to the tail of the fuselage. Adjust the wing until the distance is equal.

- ❑ 4. When you are satisfied with the placement of the wing, mark the location for the wood dowels onto the leading edge of the wing with a pencil. Make the marks through the center of both of the holes in F2T onto the wing leading edge.

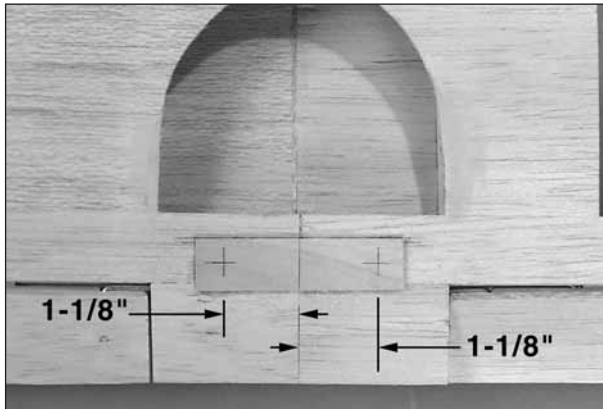
- ❑ 5. Drill a 1/4" [6mm] hole through each of the marks you made on the wing leading edge. Be sure to drill through the wing leading edge and the plywood sub-spar dowel brace inside of the wing.

- ❑ 6. Locate the 1/4" x 4" [6 x 102mm] wood dowel. Cut it into two 2" [51mm] pieces.



- ❑ 7. Apply a liberal amount of epoxy into the holes you drilled in the wing. Apply a thin layer of epoxy to the portion of the dowel that you will insert into the wing. Insert the two wooden dowels into the holes, twisting them as you insert them. Leave the dowel

extending 3/8" [9.5mm] out of the wing leading edge. Wipe any excess glue from the exposed dowel. Allow the glue to cure then round the ends of the dowels as shown on the plan. This will make it easier to insert the dowels through the holes in F2T when installing the wing on the fuselage.



❑ 8. On the top center of the wing at the aft end of the wing is the plywood wing bolt plate. Measure from the center of the wing 1-1/8" [28mm] to the left and right. Make a mark on the center of each plywood wing bolt plate.



❑ 9. Double check all your measurements to be sure the wing is still properly positioned. When you are satisfied with the positioning of the wing drill a 13/64" [5.2mm] hole through the wing on the marks you made on the wing bolt plates. Drill through the wing and the wing bolt mounting plate inside of the fuselage. When

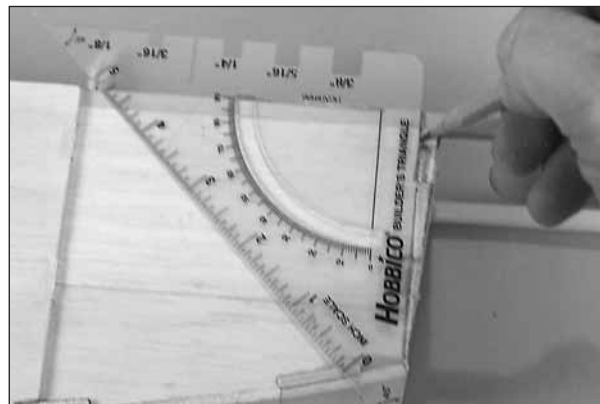
drilling be sure that the drill remains perpendicular to the top of the wing. If the drill does not remain perpendicular to the wing you may not hit the center of the wing bolt mounting plate in the fuselage.

❑ 10. Remove the wing from the fuselage. Drill a 17/64" [6.7mm] clearance hole through the wing bolt holes you drilled in the wing. Do not drill through the holes in the wing bolt plate in the fuselage.

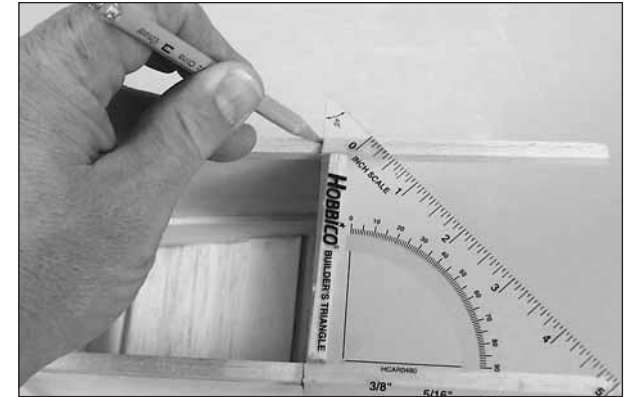
❑ 11. Using a 1/4-20 tap, tap each of the holes in the wing bolt mounting plate. After they have been tapped apply a couple of drops of thin CA onto the threads in the wing bolt mounting plate. After the CA has completely cured, run the tap through the threads again to clear out any excess glue on the threads.

❑ 12. Install the wing onto the fuselage and screw the nylon wing bolts through the wing into the threaded block in the fuselage to be sure that everything fits properly. When you are satisfied things fit well, remove the wing.

## Finish the Fuselage



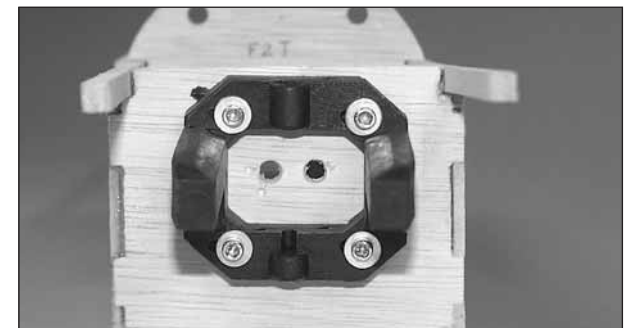
❑ 1. Place the fuselage on your bench with the right side of the fuselage facing up. Using a builders triangle or a small square, mark a line across the side of the fuselage from the bottom corner of the fuselage to the top of the fuselage, perpendicular to the top fuselage.



❑ 2. Turn the fuselage upright on the bench. Using the triangle or square, mark a line across the top of the fuselage perpendicular from the end of the line on the right side of the fuselage. Turn the fuselage and continue the line down the left side of the fuselage.



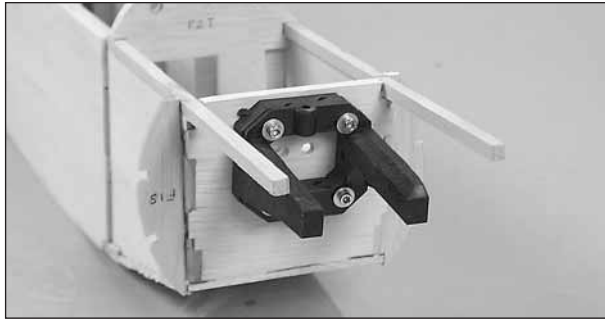
❑ 3. Prepare the engine mount by cutting off the tabs and slide the two halves together as shown.



❑ 4. Install the engine mount to the firewall with four 6-32 x 3/4" [19mm] socket head cap screws, four #6 flat



washers and four #6 lock washers. Temporarily place your engine in the mount to set the width of the mounting rails to fit your engine. Remove the engine and tighten all the engine mount mounting bolts. For our model we will be installing the engine inverted so we have installed the engine mount inverted. Be sure to properly install your engine mount for the position you choose to install your motor. Drill two 3/16" [4.8mm] holes in the firewall to accommodate the fuel line and the engine pressure line from the fuel tank.



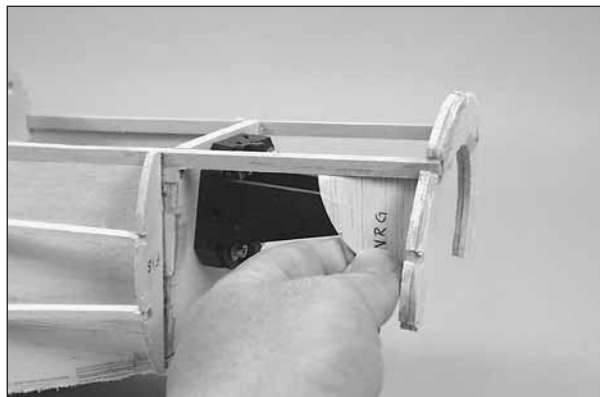
❑ 5. Locate the two die-cut 1/8" [3mm] balsa **F1S formers**. Glue them in position on both the left and right side of the fuselage. Use the lines you have drawn on the sides of the fuselage as reference for gluing them in place.



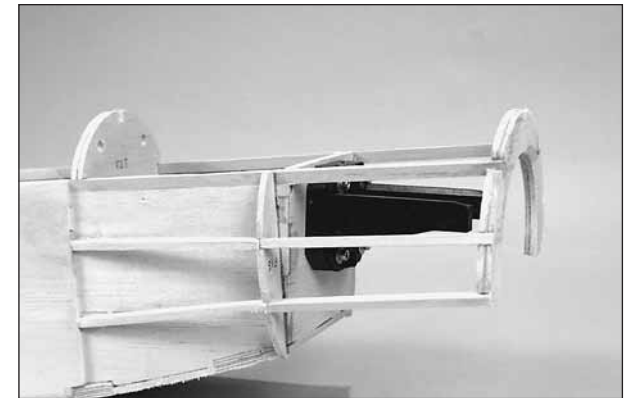
❑ 6. From a 3/16" x 3/16" x 36" [4.8 x 4.8 x 914mm] balsa stick cut the balsa side stringers. Sand a bevel on the end of the sticks that are glued flush to the fuselage side. Cut the sticks to length so they fit to the middle of former F1S and glue them in place.

❑ 7. Locate the two die-cut 1/8" [3mm] plywood nose rings. Glue them together to form one 1/4" [6mm] plywood nose ring.

❑ 8. You are now going to install the nose ring to the fuselage. The positioning of the nose ring is determined by the length of your engine. Temporarily position your engine onto the engine mount. (Do not permanently mount your engine to the mount). Determine where the nose ring will be positioned so when the engine is installed the front of the engine thrust washer is approximately 1/4" - 3/8" [6mm - 9mm] further forward than the nose ring. Mark the location of the nose ring on the basswood rails.



❑ 9. Insert the nose ring onto the basswood rails. Locate the die-cut 1/8" [3mm] nose ring gauge (NRG). Use it to set the angle of the nose ring as shown. Glue the nose ring to the rails. If there is any of the basswood rail extending beyond the nose ring, cut it off flush with the nose ring.



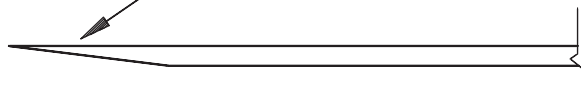
❑ 10. From the remainder of the 3/16" x 3/16" x 36" [4.8 x 4.8 x 914mm] balsa stick, cut, fit and glue the remaining side stringers from F1S to the nose ring. Do this for both sides of the fuselage.



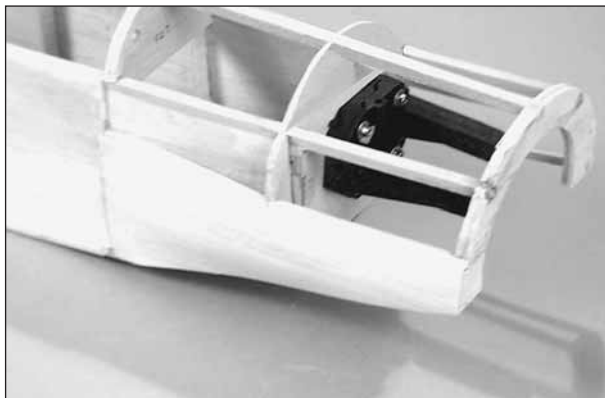
❑ 11. From a leftover 1/4" x 1/4" [6 x 6mm] basswood stick, cut a stick for the center fuselage stringer to fit from former F2T to the front of the nose ring. Glue it in position. Glue the die-cut 1/8" [3mm] plywood former F1T to the top of F1. Slide it forward or aft slightly to fit under the basswood stick.

❑ 12. You are now going to sheet the front of the fuselage. This is going to require compound bends to the sheeting. To accomplish this you **must** wet the wood before gluing it into place. Rubbing alcohol misted onto the wood with a spray bottle works best but you can also accomplish the task with water.

Bevel the sheeting  
where it contacts the  
fuselage side.

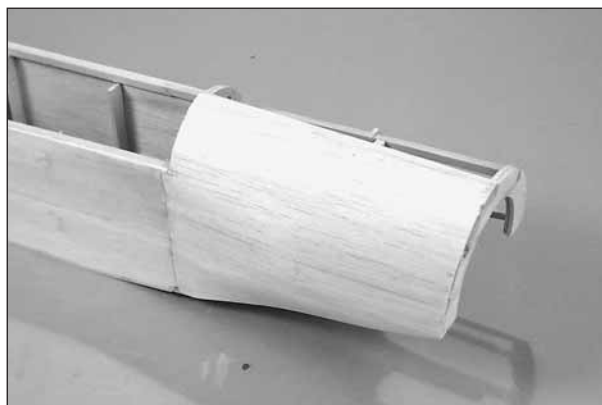


13. All of the sheeting is going to be cut from the 1/8" x 3" x 30" [3 x 76 x 762mm] soft balsa sheeting that you previously set aside when building the fuselage. Cut a piece of sheeting to fit from the sheeted fuselage side, forward to the nose ring. When glued in place the top edge of the sheeting should be aligned on the center of the middle stringer. Bevel the end of the balsa sheeting where it will contact the fuselage side. This will provide a better transition from the cowl to the fuselage. Wet the wood and allow it to soften before gluing.

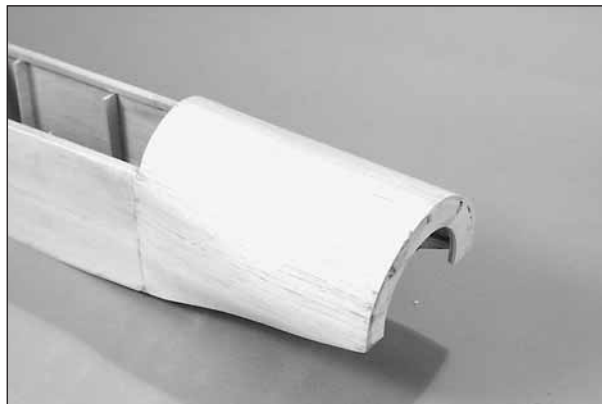


14. When sufficiently softened to bend and fit the fuselage, glue it in place with CA glue. Some CA accelerator will be helpful in gluing the sheeting in place.

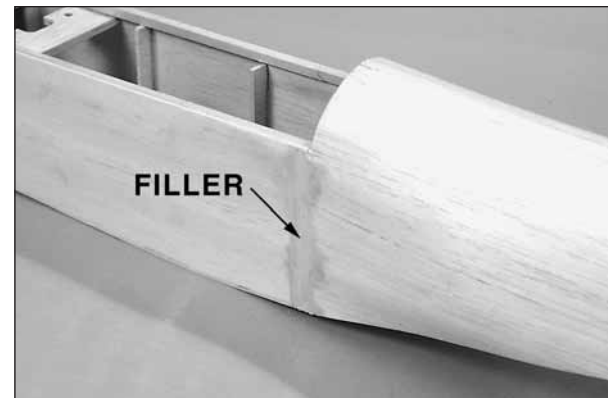
15. Cut two more pieces of sheeting long enough to fit from the fuselage side to the front of the nose ring. Cut one of the sheets to a width of 1-1/2" [38mm] (save the remaining half of the sheeting to be used when sheeting the opposite side of the fuselage). Edge glue the full sheet to the 1-1/2" [38mm] wide sheet. This will form a piece of sheeting wide enough to wrap around to the center fuselage stringer.



16. Wet the wood and allow it to soften. When it is sufficiently soft, glue the sheeting in place to the previously installed sheet and work the sheeting towards the top of the fuselage. When the sheeting is fully glued into place to all of the stringers trim the sheeting down to the middle of the center stringer on the top of the fuselage.



17. Repeat steps 13-16 for the opposite side of the fuselage.



18. Blend the sheeting from the cowl to the fuselage with a balsa filler as well as filling in any gaps in the seams where the sheeting meets. Allow it to dry and then sand the front portion of the cowl and fuselage.

## Adding the Wing Fairing

1. Install the wing back onto the fuselage and secure it in place with the nylon wing bolts.



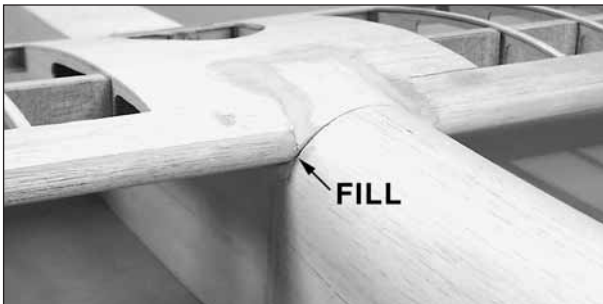
2. Locate a leftover piece of 1/8" thick sheeting. Slide it in place at the wing leading edge just behind former F2T. Use a pen or pencil to trace the shape of the top of the fuselage onto the sheeting. Remove the sheeting. Then cut the sheeting 3/32" [2.4mm] inside the line you have just traced onto the sheeting. Doing this will allow for the sheeting that will be applied in the next couple of steps. This piece becomes the former for the wing fairing.



❑ 3. From left over 3/32" x 3" [2.4 x 76mm] balsa sheeting cut two pieces to a length of 3-1/2".



❑ 4. Set the former in place against former F2T. **Do not** glue it in place! Fit one of the 3/32" x 3" x 3-1/2" [2.4 x 76 x 89mm] balsa sheets to the former and the wing. Do this for the left and right side. When you are satisfied with the fit, glue the former to the wing and the balsa sheets to the former and the wing. After they have been glued in place, feather the wing fairing sheeting and wing together with balsa filler.



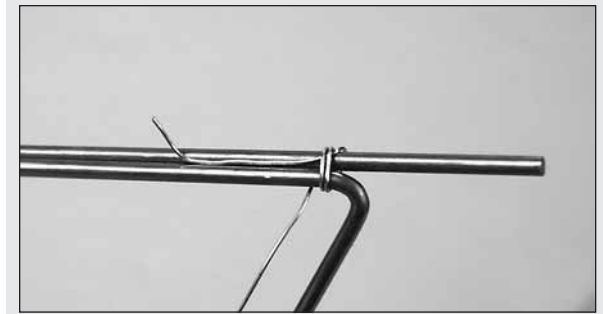
❑ 5. Fill the small open area under the leading edge of the wing with leftover balsa. Do this on both sides of the fuselage.

## Assemble and Install the Landing Gear

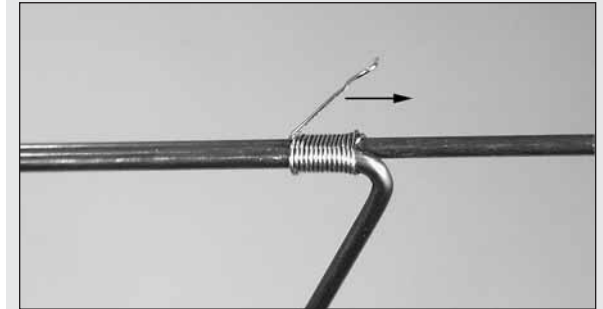
❑ 1. Locate the two prebent wire landing gear wires and one of the coils of wrapping wire. Make a wire wrapped joint at each end and the middle of the main landing gear wire where shown on the plan. If you are new to making and soldering this type of a joint, refer to the Soldering Hot Tip below.



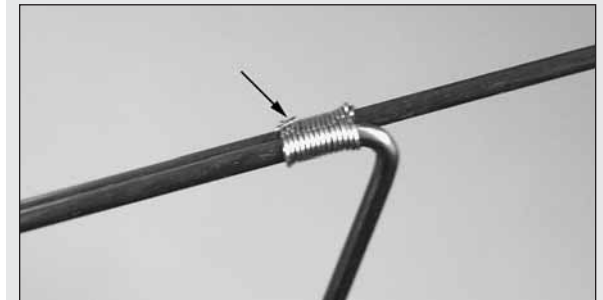
A. Bring the two pieces of landing gear wire together. Clean the wire where they make contact with each other using 300-grit sandpaper. After cleaning the wire, bring the two pieces of landing gear wire together where you want them joined. With a 6" [152 mm] piece of soft wire begin by laying the wire parallel to the landing gear wires that you will be joining. Then make a 90° bend in the end of the wire.



B. Bend the soft wire around the two landing gear wires being joined together. Continue to wrap the soft wire around the landing gear wires until you have approximately 20 turns of the soft wire around the landing gear wire.



C. Bend the portion of the wire that was lying perpendicular to the landing gear wires being joined forward towards the wraps of soft wire. This will prevent them from unraveling.



D. Cut the excess wire but leave enough folded over the wraps of soft wire to keep the wire in place.

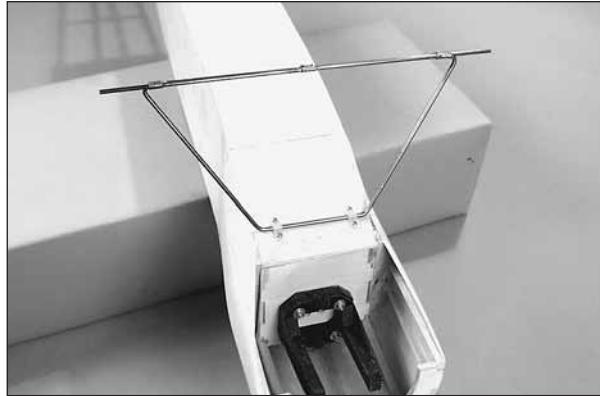


**E.** To get a good bond between the soft wrap wire and the wire landing gear it is important to use a good solder and flux. The Great Planes® Silver Solder Kit (GPMR8070) works very well and includes all the needed items for a good, strong solder joint.



**F.** Begin by applying a couple of drops of the liquid flux onto the wire joint. With a small torch begin heating the landing gear wire above and below the joint. (The best bond will be achieved if the landing gear wire gets hot enough for the solder to flow into it as well as the wire wrapped joint). Heat the wire hot enough to melt the solder but not so hot that the wires turn glowing red. Apply a small amount of solder to the wire wrapped joint and when it is hot enough you will be able to see the solder flow around the wire joint. There is no need to over apply the solder. Use just enough to flow between all of the gaps in the wire. After completing the soldering wipe away excess flux with a little water. Then, dry the joint. Washing away the flux will allow the paint to adhere better when you paint the landing gear.

With a little practice you will find soldering a very simple task.



❑ 2. After completing the three solder joints on the main landing gear wire, lay the main landing gear wire onto the fuselage so that the wire is laying across the forward landing gear mounting plate. Install two nylon humped landing gear straps over the wire landing gear. Drill a 1/16" [1.6mm] hole through the holes in the landing gear straps and into the landing gear mounting plate. Screw the straps into the mounting plate with #2 x 1/2" [13mm] sheet metal screws.

❑ 3. Position the rear landing gear wire in place over the rear landing gear mounting plate and secure it with two nylon landing gear straps the same as you did for the forward landing gear wire.



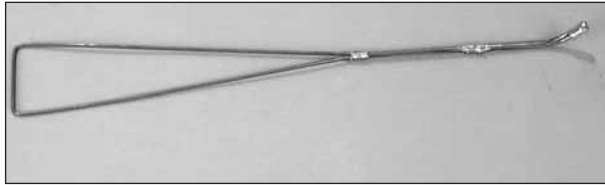
❑ 4. Bring the two landing gear wires together so the rear landing gear wire makes contact with the forward landing gear wire just below the solder joints you made at each corner of the forward landing gear wire.



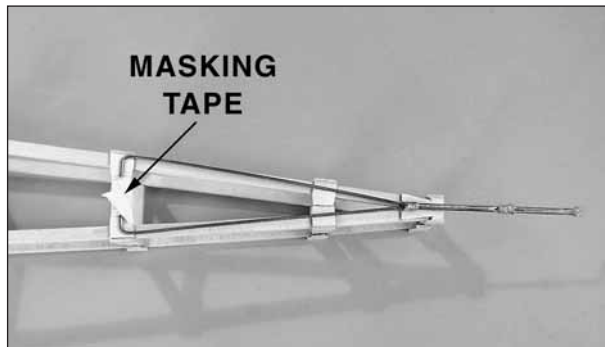
❑ 5. Wrap the two wires together with a 5" [127mm] piece of soft wire, using the same technique used for joining the forward landing gear wire. Solder the joint together. Do this for both sides of the landing gear.

You need to decide if you are going to install a tail skid wire or if you are going to install a steerable tailwheel. Both are included in this kit. Steps 6 - 9 are for the tail skid construction and installation. Skip to the Tail Wheel Wire Installation after step 9 if you are using a tailwheel.

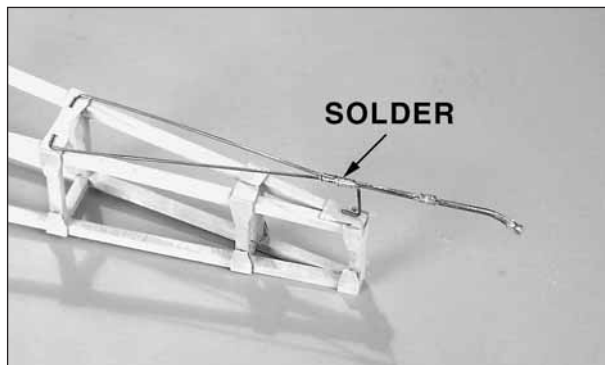
## Tailskid Installation



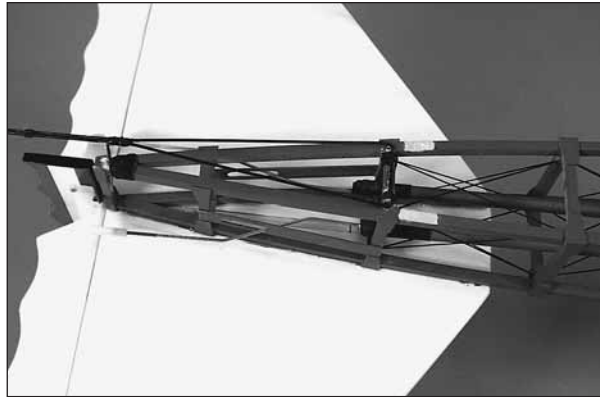
❑ 6. Locate the pre-bent wire tail skid. Wrap and solder it together in the three locations shown on the plan. Once the solder has cooled, bend the end of the wire to a slight angle as shown on the plan.



❑ 7. Lay the wire tail skid in position on the bottom of the fuselage, making sure the bend you made in the wire is pointed toward the top of the fuselage. Tape the skid in place by wrapping some masking tape around the wire and the wood cross brace.

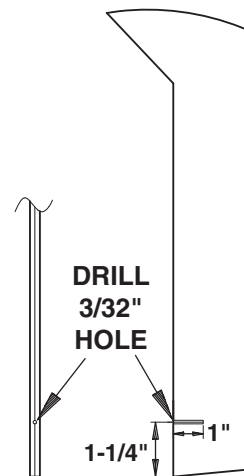


❑ 8. Wrap and solder the wire tail skid support in place as shown on the plan. When you are finished remove the tailskid from the fuselage.

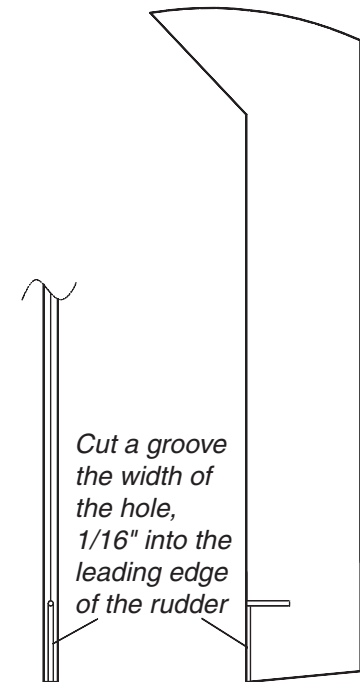


❑ 9. You may wish to paint your tailskid before installing it onto the fuselage. If so, do it now. This would also be a good time to paint the main landing gear. When the paint has dried place the tailskid in position on the bottom of the fuselage. Secure it to the fuselage with cotton cord or string (not included) by wrapping the cord around the wire and the cross braces on the fuselage. Once you have it secured with the cord, apply thin CA to the cord and the cross brace. When the glue has dried you may want to paint the cord the same color as the landing gear skid.

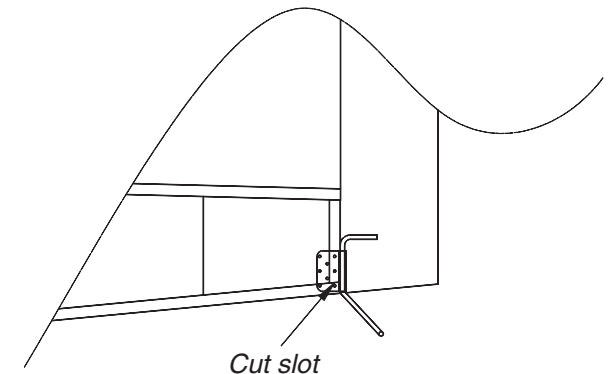
## Tail Wheel Wire Installation



❑ 1. Drill a 3/32" [2.4mm] hole at the location shown in the center of the rudder leading edge.



❑ 2. Cut a groove into the leading edge of the rudder the width of the hole you drilled. The groove needs to be cut 1/16" [1.6mm] into the leading edge of the rudder.

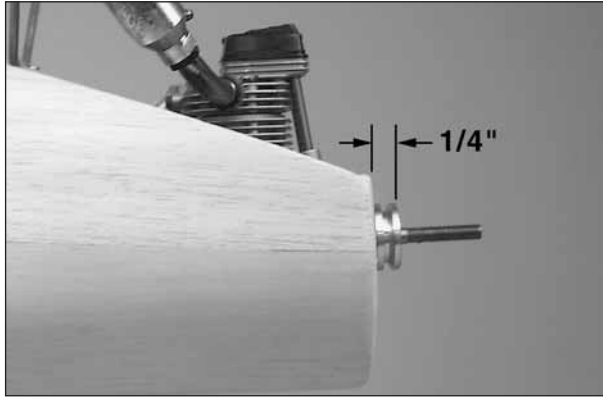


❑ 3. Cut a 1/16" x 15/16 [1.6 x 23.8mm] slot into the center of the tail brace as shown.

Set the assembly aside until instructed to permanently install it in the "Join the Control Surfaces" section of the manual.

## FINAL CONSTRUCTION

### Mount the Engine



❑ 1. Set your engine onto the engine mount. Position it so that there is approximately 1/4" [6mm] clearance between the front of the cowl and the front of the thrust washer on the motor. If you have a small C-clamp use it to hold the engine to the mount.

❑ 2. Mark the location of the engine bolt holes on the engine mount. This can easily be done with a Great Planes® Dead Center™ tool. If you do not have this you can also heat the end of a pointed wire with a torch and dimple the engine mount in the center of each hole.

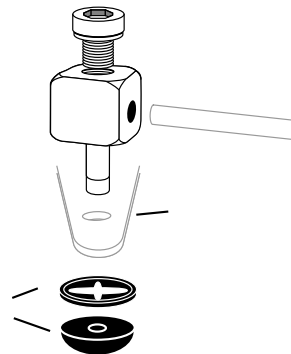
❑ 3. Remove the engine from the mount and drill four #36 (or 7/64) [2.8mm] holes in the engine mount on the marks. Tap 6-32 threads into the holes and mount your engine with four 6-32 x 3/4" [19mm] socket head cap screws, #6 flat washers and #6 lock washers.

❑ 4. Make a mark on the firewall to locate the position that the throttle pushrod comes through. Remove the engine and drill a 3/16" [4.8mm] hole through the firewall.

❑ 5. Cut the 11-3/4" [298mm] gray outer plastic pushrod guide to a length of 9". Use sandpaper to roughen one end of the 9" plastic tube. Insert the smooth end of the tube through the firewall back into the radio compartment. Apply a couple of drops of CA to the roughened end of the tube. Then finish inserting the rest of the tube flush with the firewall.

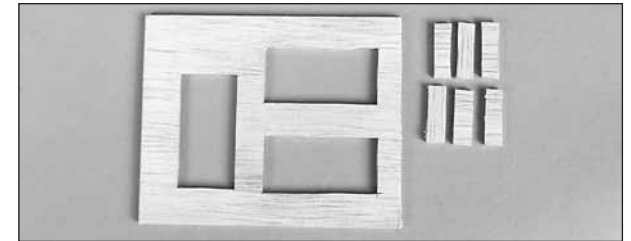
❑ 6. Before permanently installing the engine, assemble the fuel tank following the manufacturer's instructions. Then mount the fuel tank inside the fuselage. Run the carburetor and vent lines through the holes in the firewall.

❑ 7. Permanently mount the engine to the mount and connect the fuel and vent lines.

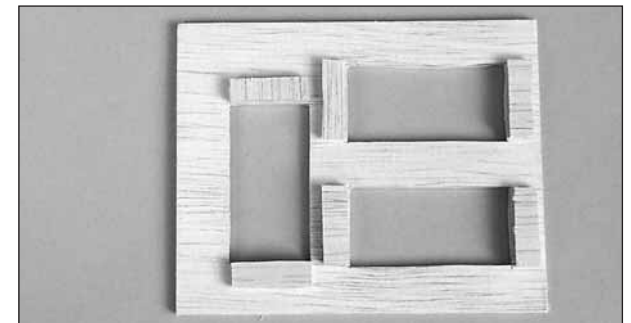


❑ 8. Install the brass screw lock connector onto the carburetor. You will complete the throttle installation when you install the radio system.

### Install the Radio

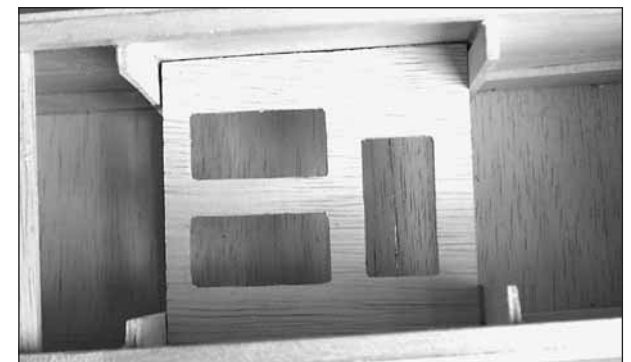


❑ 1. Locate the 1/8" [3mm] die-cut plywood **servo tray** and the six 1/8" [3mm] die-cut plywood **servo tray reinforcements**.



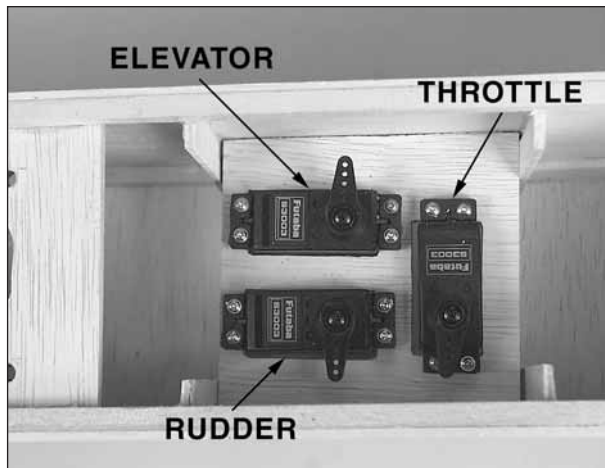
❑ 2. Glue the plywood reinforcements to the bottom of the servo tray.

❑ 3. From left over 1/4" x 1/4" [6 x 6mm] basswood stringer material, cut two servo mounting rails 3-7/8" [98mm] long. Glue them in position inside of the fuselage at the location shown on the plan.



❑ 4. Glue the servo tray on top of the rails.





❑ 5. Install the servos as shown following the radio manufacturer's mounting instructions. Before screwing the servos in place, drill a 1/16" [1.6mm] hole through each of the servo mounting holes, drilling into the plywood servo tray and the reinforcement strips on the underside of the servo tray. Skipping this step may cause the servo tray to split when you screw the servos into position. Apply a couple of drops of thin CA to harden the holes and then screw the servos in place.

❑ 6. Permanently secure the receiver and battery in place where shown on the plan. Be sure that you wrap each of them in 1/4" [6mm] foam and secure them so they are not able to move around inside the fuselage. Connect your servos to the receiver following the manufacturer's instructions. Route your receiver antenna through the fuselage, attaching it to the fuselage longerons at the rear of the model.

❑ 7. Mount your on / off receiver switch in a location that does not interfere with the rest of the radio system. It is good practice to mount your switch on the side of the model opposite the exhaust.

❑ 8. Locate the .072 x 17-1/2" [445mm] pushrod wire threaded on one end. This is the throttle pushrod wire. Insert the unthreaded end of it through the screw lock connector on the carburetor and into the tube in the firewall. Feed the wire into the tube until

the end of the wire is over the throttle servo control horn. Once the throttle pushrod wire is over the throttle servo arm continue feeding the pushrod wire into the tube an additional 1" [25mm]. At the screw lock connector on the carburetor, cut the excess throttle pushrod wire. When you cut the wire you will be cutting off the threaded portion of the wire. This is correct. Tighten the 4-40 set screw on the screw lock connector to hold the throttle pushrod wire in place. Connect the other end of the throttle pushrod to the servo with a screw lock pushrod connector and the 4-40 set screw.

## FINISHING

### Fuelproofing

Remove the engine, engine mount and the throttle pushrod. Fuelproof the entire engine compartment including the firewall. Use epoxy, epoxy paint, finishing resin or other fuelproof model paint.

### Prepare the Model for Covering

❑ 1. Inspect all surfaces for uneven glue joints and seams that require filler. Apply filler where needed. Many small dents or scratches in balsa can be repaired by applying a few drops of water or moistening the area with a wet tissue. This will swell the wood so you can sand it when it dries.

❑ 2. Final sand the entire model with progressively finer grits of sandpaper, finishing with 320 or 400-grit sandpaper.

❑ 3. Use a large brush, air pressure or a Top Flite Tack Cloth (TOPR2185) to remove dust from the model.

### Balance the Model Laterally

*Laterally balancing the model now will allow you to install weight on the wingtip before covering the wing, hiding the weight inside the wing. Other components of the aircraft like the pushrods and landing gear should not have any effect on the lateral balance when they are installed in future steps.*

❑ 1. Mount your wing and the engine.

❑ 2. With the wing level, carefully lift the model by the engine propeller shaft and the aft end of the fuselage at the bottom of the wire tail skid (this may require two people). Do this several times.

❑ 3. If one wing always drops when you lift the model, that side is heavy. Balance the airplane by gluing weight inside the other wing tip. Glue the weight in place with epoxy. An airplane that has been laterally balanced will track better in loops and other maneuvers.

### Cover your Model with MonoKote

It is assumed that you are an intermediate to advanced modeler, so we won't go into many details on covering techniques, but here are some tips you should consider:

**A. Most importantly, NEVER CUT THE COVERING DIRECTLY ON THE SHEETING.** The Elder depends upon the wood sheeting for some of its strength. Modelers who cut through the covering tend to cut into the sheeting and this will weaken the structure.

**B. Use a Top Flite® Hot Sock™** to minimize dents in the wood from your covering iron.

**C. Some modelers have three irons going at once:** one on high heat without a Hot Sock for stretching the covering around curves like wingtips; one on medium heat with a Hot Sock for bonding the covering to large sheeted areas like the wing and stab; and a Trim Iron for small areas.



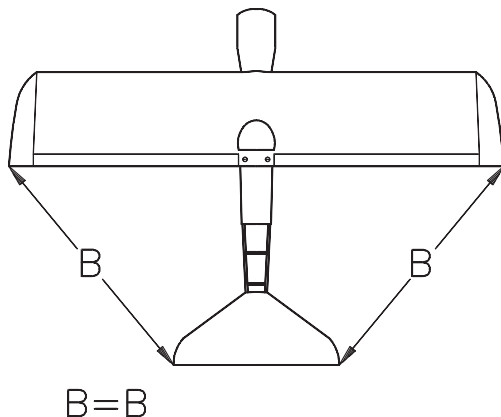
**D.** When you cover large sheeted surfaces such as the wing, bond the covering in the middle and work outward, pushing out air as you proceed. Do not move the iron in a circular motion, but move it lengthwise with the grain of the wood.

**E.** When you cover smaller parts with square edges such as the elevators and ailerons, cover the ends first with separate pieces of covering. Then, all you have to do is wrap the covering around the top and bottom and iron it down.

**F.** When you cover sharp junctions like where the stab meets the fuse, cut narrow strips of covering (3/8 to 1/2" [10 to 13mm] wide) and apply them in the corners before you cover the major surfaces. The larger pieces of covering will overlap the smaller pieces. This technique also eliminates the need to cut the covering after it has been applied.

## Installing the Stab and Fin

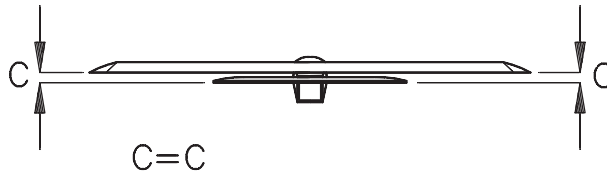
❑ 1. Before beginning the installation of the stab and fin you will most likely find it more convenient to cover them before installing them to the fuselage. Apply the covering to them now if you haven't already. It is also a good idea to cover the elevator and rudder at this time too.



❑ 2. Attach the wing to the fuselage. Place the stab into position on the fuselage making sure it is centered.

Measure from the tip of the wing to the tip of the stab; adjusting the stab until the distance between the wing and the stab is equal on both sides.

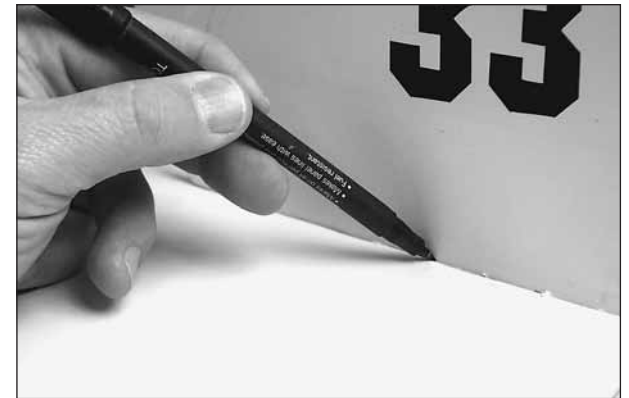
❑ 3. Carefully mark the location of the fuselage basswood stringers where they make contact with the bottom of the stab. Cut away the covering on the bottom of the stab where you have marked the stringer locations.



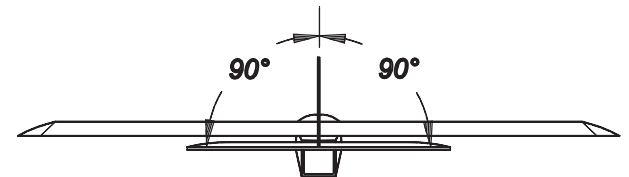
❑ 4. Place the stab back onto the fuselage. Stand back 15' [381mm] and view the stab from the back of the fuselage. Look at the alignment between the stab and the wing. Be sure that the stab and wing are aligned with each other. If they are not, sand away some of material on the fuselage on the side of the stab that is slightly high. Make these adjustments until the stab is aligned with the wing.

❑ 5. Set the stab aside. Now would be a good time to paint or stain the open structure of the fuselage. Ours was painted with Top Flite LustreKote® paint. If you choose to spray paint the structure, mask the portion of the fuselage that you do not want paint on. Spray on a couple of coats of primer, sanding between coats. When you are satisfied with the finish apply the color. You may also choose to brush on a paint or stained finish. Just be sure that you use a fuel proof paint.

❑ 6. After the paint is completely dried, lightly sand the area of the stringers that will be in contact with the bottom of the stab. Glue the stab to the fuselage with epoxy. Double check the distance from the stab to the wing to be sure the stab and the wing are aligned. Set it aside until the epoxy cures.

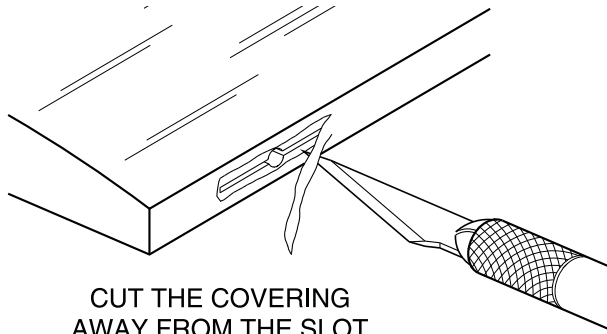


❑ 7. Cut away the covering from the slot in the stab for the fin. Insert the fin into the slot. Mark a line on the fin where it contacts the stab. Remove the fin and cut away the covering below the line you have made on the fin.



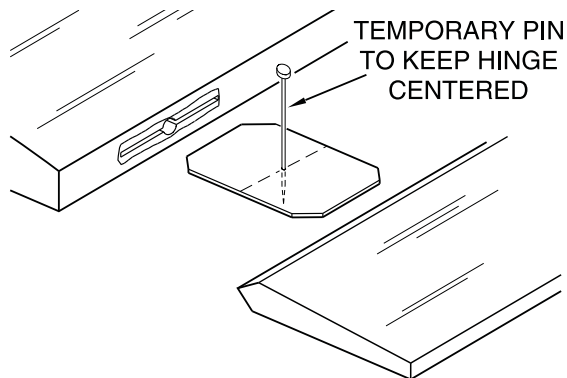
❑ 8. Put the fin back into the slot. With a builders triangle, check to be sure that the fin is 90 degrees to the stab. When you are satisfied with the fit and alignment glue the fin into the slot in the stab with epoxy.

## Join the Control Surfaces



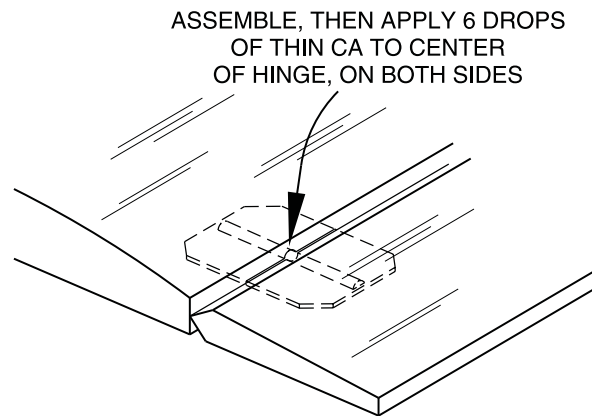
❑ 1. Start with the stab and elevator. Remove a small strip of covering from the hinge slots.

❑ 2. Test fit the hinges in only the stab or elevators (without glue).

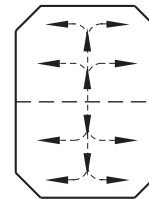


❑ 3. Join the elevators to the stab with the hinges. If the hinges don't remain centered as you join the elevators to the stab, remove the elevators and insert a pin in the center of the hinges to keep them centered. Make sure there is approximately a 1/64" [.5mm] gap between the elevators and the stab so you do not glue them together.

Do not use CA accelerator on any of the hinges and do not glue the hinges with anything but thin CA. Do not attempt to glue one half of the hinge at a time. The hinges will not be properly secured and could come out while the model is in flight.



THE CA WICKS ALONG THE "TUNNELS" TO THE ENTIRE HINGE SURFACE



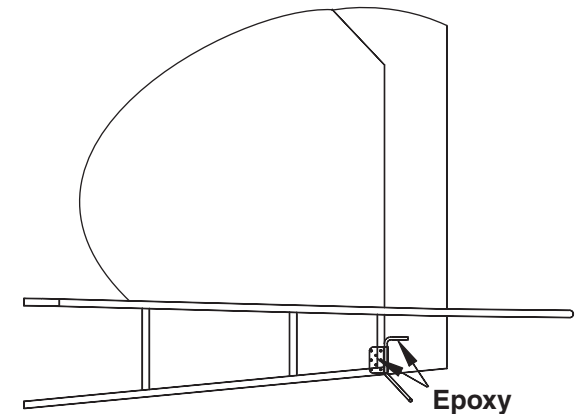
❑ 4. Cut a paper towel into 2" [50mm] squares. Add six drops of thin CA to the center of the hinges on both the top and bottom. The tunnels you drilled will wick the CA into the entire hinge surface. Use the paper towel squares to absorb excess CA from the hinge gap before it cures.

If you have chosen to install the tailwheel assembly instead of the tail skid, skip step 5 and follow steps 6-10. If you chose the tail skid, step 5 completes the instructions for joining the control surfaces.

❑ 5. Use the same hinging method to join the rudder to the fin and the ailerons to the wing. When installing the ailerons be sure the aileron torque rod wire is firmly glued into the hole in the aileron with 6-minute epoxy.

The following steps are used only if you are using a tail wheel.

❑ 6. Trial fit the hinges and the tail wheel wire into the rudder. Trial fit the rudder to the stab inserting the hinges into the hinge slots and the nylon tail wheel bearing into the slot in the fuselage cross bracing.



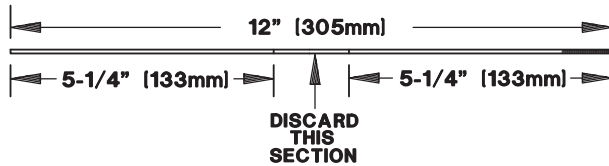
❑ 7. When you are satisfied with the fit remove the rudder from the fin. Apply epoxy to the portion of the tail wheel wire that fits into the rudder then slide the wire into the rudder. Be careful not to get any epoxy into the tail wheel bearing. Hint: A small amount of petroleum jelly applied to the area where the wire passes through the bearing will prevent glue from getting into the bearing.

❑ 8. Apply epoxy onto the nylon bearing where it will be inserted into the cross bracing. Apply some epoxy in the slot in the cross bracing as well. Insert the rudder assembly into the fin. When you are satisfied with the fit, wipe away any excess epoxy and then apply thin CA to the hinges the same as you did for the elevator.

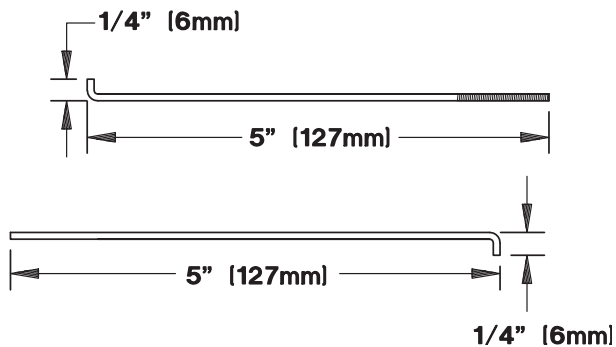
❑ 9. Install the 1" [25mm] tail wheel (not included) onto the wire with two 3/32" [2.4mm] wheel collars and two 4-40 set screws.

## Install the Elevator, Rudder Pushrods and Control Horns

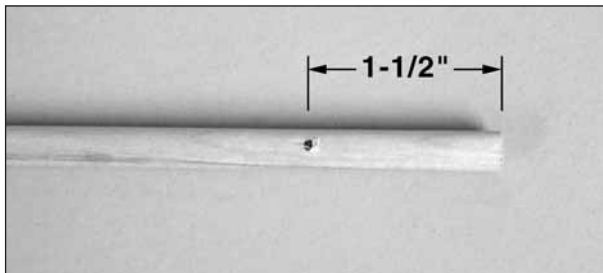
- ❑ 1. Locate the two 5/16" x 36" [7.9 x 914mm] wood dowels. These will be the elevator and rudder pushrods. Cut each of them to 24-1/2" [623mm] in length.



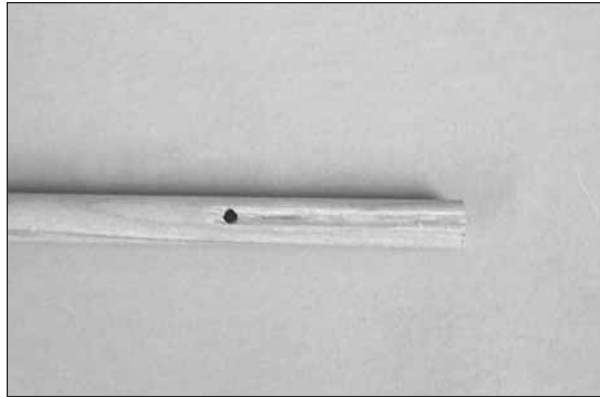
- ❑ 2. Locate two .074 x 12" [1.9 x 305mm] wires threaded on one end. Cut them as shown in the sketch.



- ❑ 3. Bend each of the wires as shown, making two sets of wires as shown in the sketch.



- ❑ 4. From each end of the dowel measure in 1-1/2" [38mm]. Drill a 5/64" [2mm] hole on the mark, drilling through the dowel.



- ❑ 5. From the end of the dowel to the hole, cut a slot the width of the hole.



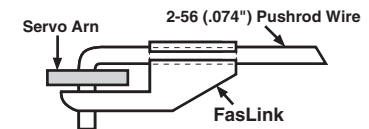
- ❑ 6. Insert the end of the rod with the 1/4" [6mm] bend into the dowel. Insert the threaded rod into one end and the un-threaded rod into the other. Apply a small amount of thin CA to the rod and the dowel. Then allow it to cure. Cut two pieces of heat shrink tubing to 2" [51mm] in length, slide the heat shrink tubing over each end of the dowel and then shrink it tight onto each of the pushrod wires. Do this for both pushrods.

- ❑ 7. If you would like the pushrods to match the rear structure of the fuselage, paint or stain them to match. If you will be painting them, mask off the heat shrink tubing. Paint will not stick to it very well.

- ❑ 8. Reference the plan to locate the position for the nylon control horn on the bottom of the elevator. Mark the location for the screw holes for the control horn. Drill a 3/32" [2.4mm] hole through the elevator on each of these marks then harden the holes with a couple of drops of thin CA.

- ❑ 9. Install the control horn onto the bottom of the elevator. Install the two 2-56 machine screws through the control horn and the control horn plate on the top of the elevator.

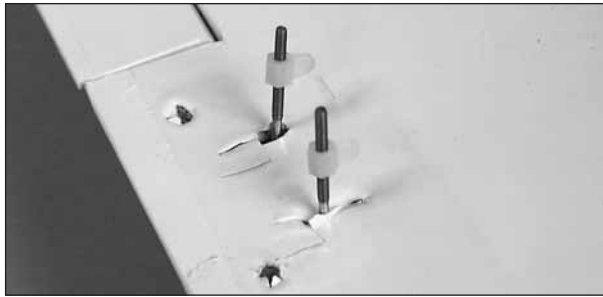
- ❑ 10. Repeat steps 9 and 10 for installing the control horn on the rudder.



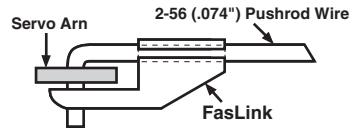
- ❑ 11. Put a silicone clevis keeper over the threaded end of the elevator wire then install the clevis onto the wire approximately 20 turns. Connect the clevis to the control horn. Center the elevator and the servo arm. Align the wire under the arm of the servo horn, mark the location where it crosses the hole in the arm and then bend the wire on the mark. Install the wire onto the servo horn arm with a nylon Faslink. Cut off any excess wire extending beyond the Faslink more than 1/16" [1.6mm].

- ❑ 12. Repeat step 11 for the rudder pushrod.

## Install the Aileron Pushrods and Control Horns



- ❑ 1. Locate the two nylon torque rod connectors. Screw them onto the aileron torque rods approximately half way down the threaded rod.

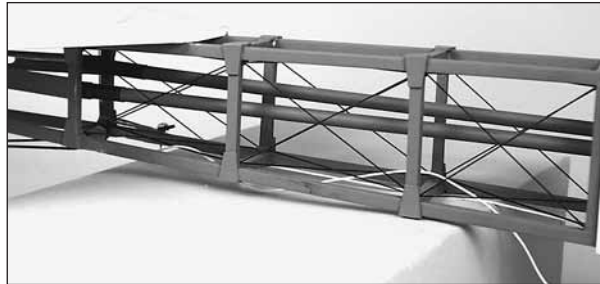


- ❑ 2. Locate two 6" [152mm] .072 wire pushrods threaded on one. Put a silicone clevis keeper over each of the wires. Install a nylon clevis on each wire approximately 20 turns and then install the clevis onto the torque rod connector. Center the ailerons and the servo arm. Align the wires under the arms of the servo arm, mark the location where it crosses the hole in the arm and then bend the wire on the mark. Install the wire onto the servo arm with a nylon Faslink. Cut off any excess wire extending beyond the Faslink more than 1/16" [1.6mm].

## Scale Details

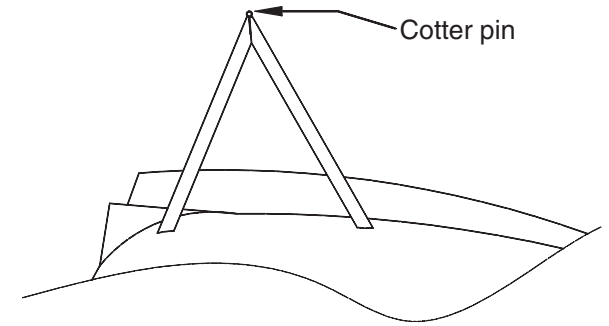
Looking at the photo on the box you will see that we added a few extra details to our model. They are not necessary for any structural integrity but we felt they added a bit of nostalgic detail that you might want to consider adding to your model.

## Kingposts and Flying Wires

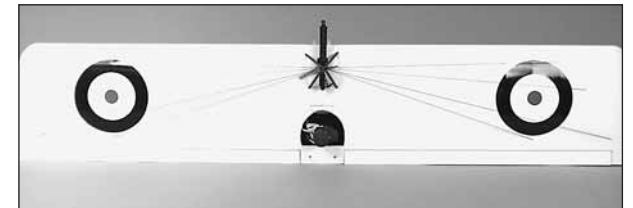


- ❑ 1. The open area at the rear of the fuselage has the appearance of being rigged with wire. You could choose to actually rig this area with a lightweight wire but we used an elastic cord that you can easily obtain from a fabric store. (This round cord is often used for making elastic cuffs in a sleeve or pant leg). The benefit of the elastic is that they always stay under tension and do not sag like wire can, plus they are much easier to install. Start by gluing one end of the elastic cord to one corner with CA glue. With a little tension, pull the cord to the next corner and glue it in place. Continue this until you have formed an "X" pattern inside each of the formers on the top, bottom and side.

- ❑ 2. On the top of the wing and the bottom of the fuselage we have installed the kingposts. The kingpost on top of the wing are made from four 1/4" x 4-1/2" [6mm x 115mm] hardwood dowels (not included in the kit). The kingpost on the bottom of the fuselage is made from four 1/4" x 2-1/2" [6mm x 64mm] dowels. The dowels are cut at an angle and glued together where the four dowels meet. The bottom of the post is sanded to match the surface of the wing/fuselage. The dowels should be glued together and glued to the wing/fuselage with 6-minute epoxy.

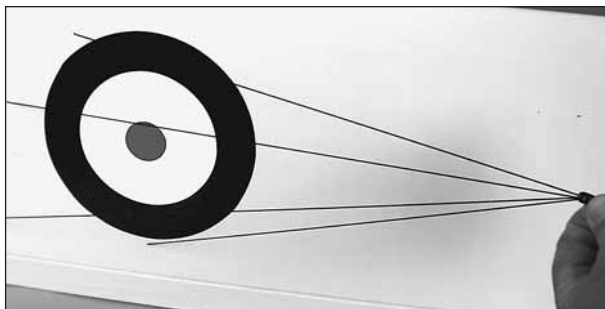


- ❑ 3. The flying wires are also made from the same elastic cord and the installation is similar to the tail structure. Drill a small hole in the top of the kingpost on the wing. Make the hole large enough to accept a small cotter pin. We used a small brass cotter pin from a Robart hinge but you can also find small ones in a hardware store. Glue the cotter pin into the Kingpost so that the small loop faces out towards each wing tip.



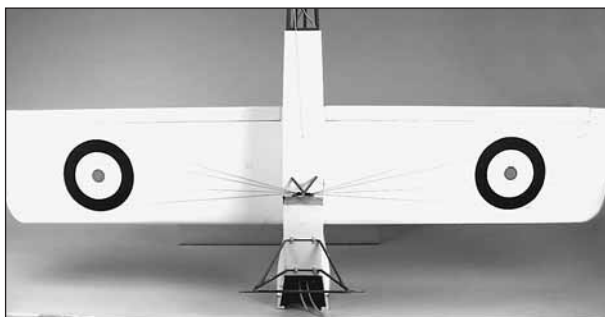
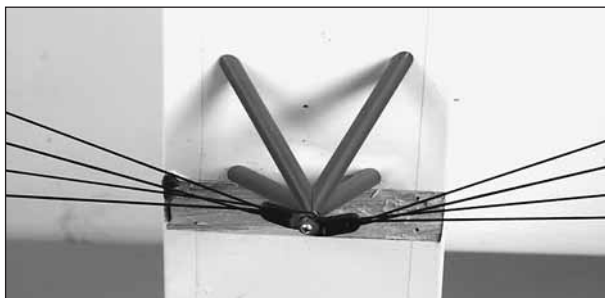
- ❑ 4. You may recall when building the wing that there were four blocks installed in each wing half to attach the wire to. Locate the previously drilled 1/16" [1.6mm] hole in each of the blocks in the top of the wing. Punch a hole in the covering with a T-pin through the hole in each of the four blocks. Cut a piece of the elastic cord that is long enough to reach from the blocks closest to the leading edge of the wing. Apply a drop of thin CA to the tip of the elastic cord and roll the tip in your finger. The cord will stiffen from the glue and can then be easily inserted into the hole in the block. Insert the stiffened cord into the hole you drilled in the block. Apply a drop of thin CA to keep it in place. Feed the cord through the cotter pin in the top of the kingpost and then stiffen the end of the cord and insert it into the hole in the other wood block. Repeat this for all four wires in the top of each wing half.





❑ 5. Turn the wing over and locate the 1/16" [1.6mm] holes in each of the blocks in the bottom wing. With a T-pin, punch through the covering into each of the holes in the blocks. Insert and glue the cord into one of the blocks in the right wing. Feed the cord through a nylon landing gear strap (not included) or something similar. Then glue the opposite end of the cord into another block on the same side of the wing. Repeat this for the two remaining blocks in the right wing.

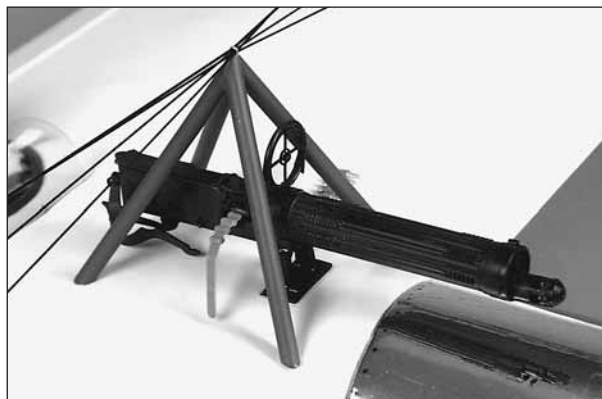
❑ 6. Repeat step 5 for the left wing.



❑ 7. Drill a 1/16" [1.6mm] hole through the center of the kingpost on the bottom of the fuselage. Pull the

cord towards the center of the fuselage. Join the left and right wing wires by inserting a #2 sheet metal screw into the two landing gear straps and then screwing them into the kingpost.

## Machine Gun



❑ 1. The machine gun is a nice touch! We used the Williams Brothers 1/6 scale Vickers machine gun (WBRQ3560).

## Cockpit and Pilot

❑ 1. Cockpit coaming gives a finished look to the cockpit. This can be made from black neoprene fuel tubing (DUBQ0455) or Fourmost Cockpit Coaming (FORQ2014). If you choose neoprene fuel tubing, simply cut a slit in the tubing. Slide the slit tubing onto the edge of the cockpit and then glue it in place with CA.



❑ 2. Cut the windshield as shown on the pattern on the plan. Glue it in place with a white aliphatic glue like Pacer canopy glue (PAAR3300).

❑ 3. Glue the pilot in place. We trimmed the shoulders from a Williams Brothers 1/6-scale Standard pilot (WBRQ2476) and glued him directly to the floor of the cockpit.

## Final Hookups and checks

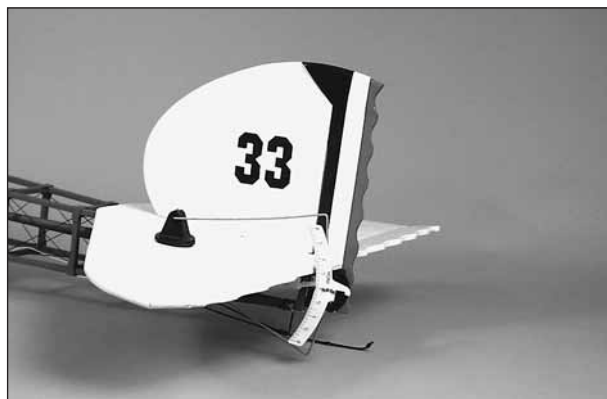
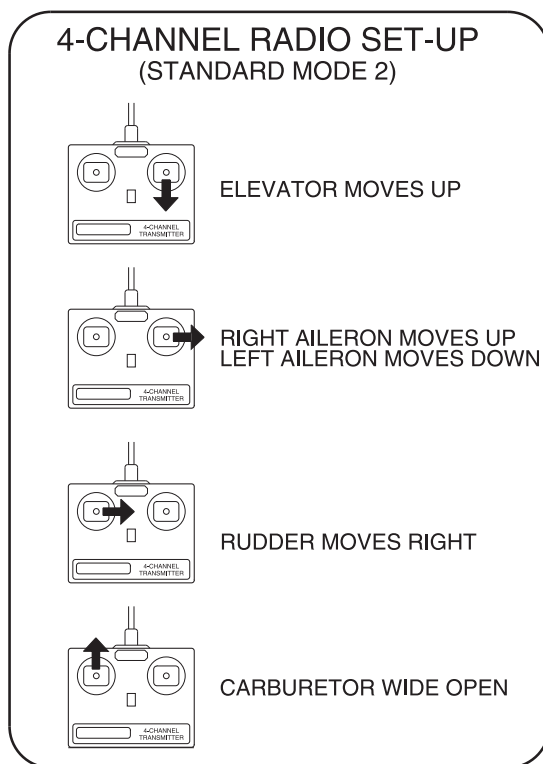
❑ 1. Mount your wheels to the landing gear with a 1/8" [3mm] wheel collar on both sides of both wheels. Secure the wheel collars with a drop of thread lock on the set screws. Note: We recommend you file a small flat spot on the landing gear wire where the set screws are located.

❑ 2. Take the servo arms off the servos and turn on your transmitter and receiver. Then, center all the trims. Reinstall all the servo arms and secure them with the screws.

❑ 3. Double-check all the servos and make sure the servo arms are secure and all the clevises have a silicone retainer.

❑ 4. Be sure the tank is securely in place. A scrap balsa stick glued across the width of the fuselage works well.

❑ 5. Make sure the control surfaces move in the proper direction as illustrated in the following sketch.



❑ 6. Adjust your pushrod hookups and set up your radio to provide the control surface movements as follows. Use a ruler or a Great Planes AccuThrow Control Surface Deflection Meter (GPMR2405) to measure the throws.

## CONTROL THROWS

	High rate	Low Rate
<b>Aileron</b>	3/8" [9.5mm] Up 3/8" [9.5mm] Down	1/4" [6mm] Up 1/4" [6mm] Down
<b>Elevator</b>	5/8" [16mm] Up 5/8" [16mm] Down	7/16" [11mm] Up 7/16" [11mm] Down
<b>Rudder</b>	3/4" [19mm] Right 3/4" [19mm] Left	1/2" [13mm] Right 1/2" [13mm] Left

## GET YOUR MODEL READY TO FLY

### Balance your Model

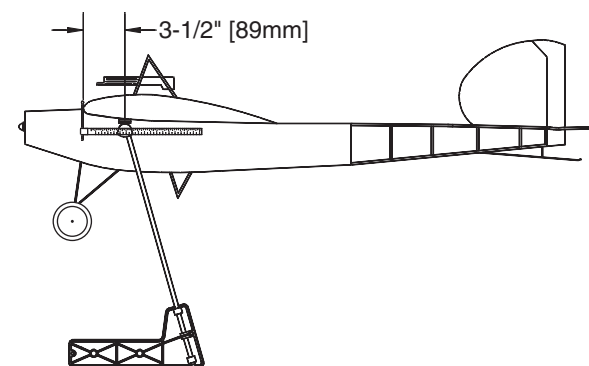
NOTE: This section is VERY important and must NOT be omitted! A model that is not properly balanced will be unstable and possibly unflyable.

❑ 1. See the Expert Tip that follows to accurately mark the balance point on the bottom of the wing on both sides of the fuselage. The balance point is shown on the plan (CG), and is located 3-1/2" (89mm) back from the leading edge at the wing root as shown in the sketch and on the plans. This is the balance point at which your model should be balanced for your first flights. Later, you may experiment by shifting the balance up to 1/2" [13mm] forward or 1/2" [13mm] back to change the flying characteristics. If you move the balance point forward it may improve the smoothness and tracking, but your Elder may then require more speed for takeoff and become more difficult to slow for landing. If you move the balance aft it may make your Elder more agile with a lighter feel and allow you to slow the model more for landing. In any case, please start at the location we recommend and do not at any time balance your model outside the recommended range.



### HOW TO MARK THE BALANCE POINT

The balance point is measured from the leading edge down the bottom center of the wing. Mark the balance point outward a few inches so you can see where to lift the wing when it's bolted to the fuse. To do this, mark the balance point with a felt tip pen or tape on both ends of the center section. Place a straightedge across the marks. Mark the balance point along the straightedge further out on the wing. Mount the wing to the fuselage.



❑ 2. With the wing attached to the fuselage and an empty fuel tank, lift the model at the balance point. We use the Great Planes C.G. Machine™ (shown in the sketch). If the tail drops, the model is tail heavy and you must shift your battery pack or other components forward or add weight to the nose. If the nose drops, it is nose heavy and you must shift your battery pack or other components aft or add weight to the tail. In order to save weight, relocate your battery pack and/or receiver or other components before you add additional weight to arrive at the correct C.G. You may install nose weight by using a spinner weight or gluing lead weights to the firewall.

You may add tail weight by sticking on Great Planes (GPMQ4485) stick-on lead weights on the bottom of the fuselage under the tail. Later, if the balance proves to be OK, you can glue these in permanently. Our prototype required 12 oz. [340g] of weight to be added to the nose.

## PREFLIGHT

### Identify your model

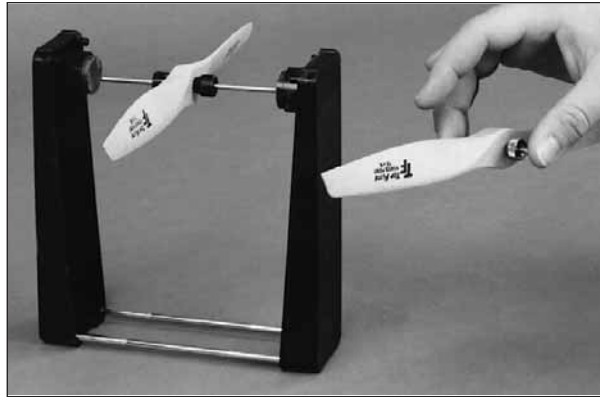
No matter if you fly at an AMA sanctioned R/C club site or if you fly somewhere on your own, you should always have your name, address, telephone number and AMA number on or inside your model. It is required at all AMA R/C club flying sites and AMA sanctioned flying events. Fill out the identification sticker included in the manual and place it on or inside your model.

### Charge your 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.

### Balance your propellers

Carefully balance your propellers before you fly. An unbalanced prop is the single most significant cause of vibration that can damage your model. Not only will engine mounting screws and bolts loosen, possibly with disastrous effect, but vibration may also damage your radio receiver and battery. Vibration can also cause your fuel to foam, which will, in turn, cause your engine to run hot or quit.



We use a Top Flite Precision Magnetic Prop Balancer™ (TOPQ5700) in the workshop and keep a Great Planes Fingertip Prop Balancer (GPMQ5000) in our flight box.

### Find a safe place to fly

The best place to fly your model is an AMA chartered R/C club flying field. Contact the AMA (their address is on page 3) or your hobby shop dealer for the club in your area and join it. Club fields are intended for R/C flying, making your outing safer and more enjoyable. The AMA also provides insurance in case of a flying accident. If an R/C flying field is not available, find a large, grassy area at least six miles from buildings, streets, and other R/C activities. A schoolyard is usually not an acceptable area because of people, power lines and possible radio interference.

### Ground check your model

If you are not thoroughly familiar with the operation of R/C models, ask an experienced modeler to inspect your radio installation and control surface set-up. Follow the engine manufacturer's instructions to break-in your engine. After you run the engine on your model, inspect your model closely to make sure all screws remain tight and your pushrods and connectors are secure.

## Range check your radio

Ground check the range of your radio before the first flight of the day. 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 an assistant stand by your model and, while you work the controls, tell you what the control surfaces are doing. Repeat this test with the engine running at various speeds with an assistant holding the model, using hand signals to show you what is happening. If the control surfaces do not respond correctly, do not fly! Find and correct the problem first. Look for loose servo connections or broken wires, corroded wires on old servo connectors, poor solder joints in your battery pack or a defective cell in your battery pack, or a damaged receiver crystal from a previous crash.

## CHECK LIST

During the last few moments of preparation your mind may be elsewhere anticipating the excitement of your first flight. Because of this, you may be more likely to overlook certain checks and procedures that should be performed after your model is built. To help avoid this, we've provided a checklist to make sure you don't overlook these important areas. Many are covered in the instruction manual, so where appropriate, refer to the manual for complete instructions. Be sure to check the items off as you complete them (that's why we call it a *check list!*).

- ☐ 1. Fuelproof all areas exposed to fuel or exhaust residue such as the firewall, engine compartment, fuel tank compartment, wing saddle area, trailing edge of the wing and the flap area and wheel wells (if your model has flaps and retracts), etc.
- ☐ 2. Check the C.G. according to the measurements provided in the manual.

- ☐ 3. Secure the battery and receiver with a strip of balsa or plywood. Simply stuffing them into place with foam rubber is not sufficient.
- ☐ 4. Extend your receiver antenna and make sure it has a strain relief inside the fuselage to keep tension off the solder joint inside the receiver.
- ☐ 5. Balance your model laterally as explained in the instructions.
- ☐ 6. File flat spots on landing gear wires and axles for the set screws to lock onto.
- ☐ 7. Secure critical fasteners with thread locking compound (the screws that hold the carburetor arm, set screws on wheel collars and slip-on type axles, screw-lock pushrod connectors, etc.).
- ☐ 8. Add a drop of oil to the axles so the wheels will turn freely.
- ☐ 9. Make sure all hinges are securely glued in place.
- ☐ 10. Reinforce holes for wood screws with thin CA where appropriate (control horns, servo hatches, etc.).
- ☐ 11. Confirm that all controls operate in the correct direction and the throws are set up according to the manual.
- ☐ 12. Make sure there are silicone retainers on all the clevises.
- ☐ 13. Fasten all servo arms to the servos with the screws included with your radio.
- ☐ 14. Secure connections between servo wires and servo extensions, and the connection between your battery pack and the on/off switch with vinyl tape or heat shrink tubing.
- ☐ 15. Make sure any servo extension cords you may have used do not interfere with other systems (servo arms, pushrods, etc.).
- ☐ 16. Secure the pressure tap to the muffler with high temp RTV silicone, thread locking compound or J.B. Weld.
- ☐ 17. Use nylon ties on both ends of the silicone tube connecting the muffler to the header.
- ☐ 18. Make sure your fuel lines and pressure lines are connected and are not kinked.
- ☐ 19. Use an incidence meter to check the wing for twists and attempt to correct before flying.

- ☐ 20. Balance your propeller (and spare propellers).
- ☐ 21. Tighten the propeller nut and spinner.
- ☐ 22. Place your name, address, AMA number and telephone number on or inside your model.
- ☐ 23. Cycle your receiver battery pack (if necessary) and make sure it is fully charged.
- ☐ 24. If you wish to photograph your model, do this before your first flight.
- ☐ 25. Range check your radio when you get to the flying field.

## ENGINE SAFETY PRECAUTIONS

NOTE: Failure to follow these safety precautions may result in severe injury to yourself and others.

Store model fuel in a safe place away from high heat, sparks or flames. Do not smoke near the engine or fuel as it is very flammable. Engine exhaust gives off a great deal of deadly carbon monoxide so do not run the engine in a closed room or garage.

Get help from an experienced pilot when you learn to operate engines.

Use safety glasses when you operate model engines.

Do not run the engine near loose gravel or sand; the propeller may throw loose material in your face or eyes.

When you start and run the engine, keep your face and body as well as all spectators away from the plane of rotation of the propeller.

Always be aware and very conscious of hand movements and be deliberate in your reach for the needle valve, glow plug clip, or other items near a spinning propeller.

Keep loose clothing, shirt sleeves, ties, scarves, long hair or loose objects away from the prop. Be conscious of pencils, screw drivers or other objects that may fall out of your shirt or jacket pockets.

Use a chicken stick or electric starter and follow the instructions to start your engine.

Make certain the glow plug clip or connector is secure so that it will not pop off or get into the running propeller.

Ask an assistant to hold the model from the rear while you start the engine and operate the controls.

Make all engine adjustments from behind the rotating propeller.

The engine gets hot! Do not touch the engine during or immediately after you operate it. Make sure fuel lines are in good condition so fuel will not leak onto a hot engine and cause a fire.

To stop the engine, close the carburetor barrel (rotor) or pinch the fuel line to discontinue the fuel flow. Do not use your hands, fingers or any body part to stop the engine. Never throw anything into the prop of a running engine.

## AMA SAFETY CODE (excerpt)

Read and abide by the following Academy of Model Aeronautics Official Safety Code:

### GENERAL

1. I will not fly my model aircraft in sanctioned events, air shows, or model flying demonstrations until it has been proven to be airworthy by having been previously successfully flight tested.

2. I will not fly my model aircraft higher than approximately 400 feet within 3 miles of an airport without notifying the airport operator. I will give right of way to, and avoid flying in the proximity of full scale aircraft. Where necessary an observer shall be used to supervise flying to avoid having models fly in the proximity of full scale aircraft.



3. Where established, I will abide by the safety rules for the flying site I use, and I will not willfully and deliberately fly my models in a careless, reckless and/or dangerous manner.

7. I will not fly my model unless it is identified with my name and address or AMA number, on or in the model.

9. I will not operate models with pyrotechnics (any device that explodes, burns, or propels a projectile of any kind).

## RADIO CONTROL

1. I will have completed a successful radio equipment ground check before the first flight of a new or repaired model.

2. I will not fly my model aircraft in the presence of spectators until I become a qualified flier, unless assisted by an experienced helper.

3. I will perform my initial turn after takeoff away from the pit or spectator areas, and I will not thereafter fly over pit or spectator areas, unless beyond my control.

4. I will operate my model using only radio control frequencies currently allowed by the Federal Communications Commission...

## FLYING

The Top Flite Elder is a great flying sport plane that flies smoothly at all flying speeds. Though the plane has a nostalgic “slow fly” look to it, it is capable of performing mild aerobatics as well.

### Takeoff

Because the Elder uses a tail skid (if you installed the skid) instead of a steerable tailwheel, you may find taxiing a little different than you are accustomed to. For the first flight we recommend that you carry

the plane to the runway and point it directly into the wind. Once pointed into the wind, slowly accelerate the airplane until the tail comes up. Once the tail has come off of the ground apply a small amount of elevator and the plane will do a nice climb out.

### Flight

The Elder has a reputation of being a gentle flying sport plane, which it is. You will find it very enjoyable to fly around at slow speeds and for making slow passes right down the runway. You will also find that the plane will perform mild aerobatics with ease. Loops, rolls, hammerheads and inverted flight are all within the capabilities of the Elder.

### Landing

Landings are quite easy for the Elder. Start your approach from approximately 50' [152m], lined up with the runway. Gradually reduce power, allowing the nose to settle. When the plane is approximately 3' [3m] above the runway, gradually begin to flare until the plane settles in for a nice three point landing. You will find that the Elder does not have any bad habits when landing. However, if you find yourself landing in a cross wind, the wire tail skid will not provide the ground control that you may otherwise have in a steerable tail wheel. If a crosswind landing is the only option, keep the airspeed slightly higher on your landing approach to keep more air flowing past the fin. You will also find that grass is much more forgiving than asphalt when landing in a crosswind.

Good luck and have a great time flying!

This model belongs to:

Name

Address

City, State Zip

Phone number

AMA number





