

TOWER TRAINER 40™

RADIO CONTROLLED MODEL AIRPLANE KIT
INSTRUCTION MANUAL

Wing Span: 55 in.
Wing Area: 618 sq. in. Weight: 5 to 5.5 lb.
Length: 44.5 in. Wing Loading: 18 to 21 oz./sq. ft.
Engine: .40 2-stroke



OUR ALL-TIME FAVORITE TRAINER...
NOW IN KIT FORM

TTR4P03 V 1.0

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READ THROUGH THIS INSTRUCTION BOOK BEFORE BEGINNING CONSTRUCTION. THIS BOOKLET CONTAINS WARNINGS AND PRECAUTIONS REGARDING THE USE OF THIS PRODUCT.

WARRANTY

Tower Hobbies guarantees this kit to be free from defects in both materials and workmanship at the date of purchase. This warranty does not cover any component parts damaged by use or modification. In no case shall Tower's liability exceed the original cost of the purchased kit. Further, Tower reserves the right to change or modify this warranty without notice.

In that Tower 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 buyers are not prepared to accept the liability associated with the use of this product, they are advised to return this kit immediately in new and unused condition to Tower Hobbies.

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FOLLOW THIS IMPORTANT SAFETY PRECAUTION TO PROTECT YOUR MODEL, YOURSELF & OTHERS.

Your Trainer 40 is not a toy, but rather a sophisticated, working model that functions very much like an actual airplane. Because of its realistic performance, the Trainer 40, if not assembled and operated correctly, could possibly cause injury to yourself or spectators and damage property.

To make your R/C modeling experience totally enjoyable, we recommend that you get experienced, knowledgeable help with assembly and during your first flights. You'll learn faster and avoid risking your model before you're truly ready to solo. Your local hobby shop has information about flying clubs in your area whose membership includes qualified instructors.

You can also contact the national Academy of Model Aeronautics (AMA), which has more than 2,500 chartered clubs across the country. Through any one of them, instructor training programs and insured newcomer training are available.

Academy of Model Aeronautics

5151 East Memorial Drive
 Muncie, IN 47302-9252
 TEL: (800) 435-9262
 FAX: (765) 741-0057

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

Thank you for purchasing the Tower Hobbies Trainer 40!

The Tower Hobbies Trainer 40 is an excellent trainer model designed to get you off to a great start in learning to build and fly. After you learn to fly, the Trainer 40 has enough maneuverability to perform most aerobatics and provide many hours of flying enjoyment. The easy construction, great lines and included decals make it easy for you to build a great-looking model.

The Tower Trainer 40 is designed to fly as well as it looks. Its thick, flat-bottom wing offers strong lift at slow speeds and great strength. The computer designed, interlocking structure allows you to build a straight and true model with confidence-boosting flight qualities.

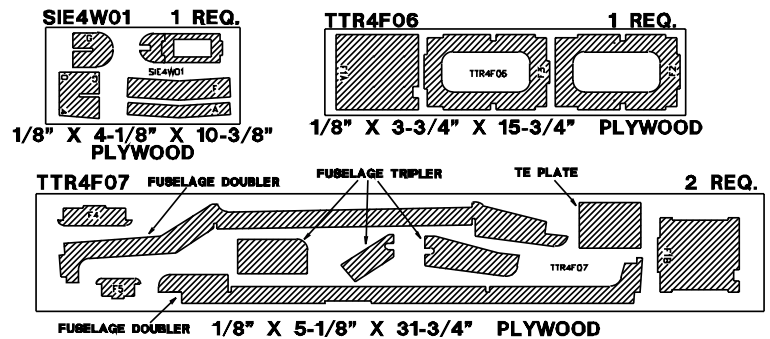
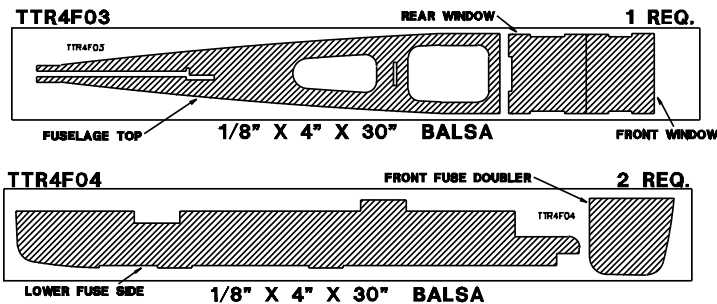
Please inspect all parts carefully before starting to build! If any parts are missing, broken or defective, or if you have any questions about building or flying this model, please call us at (217) 398-8970 and we'll be glad to help. If you are calling for replacement parts, please look up the part numbers and the kit identification number (a white sticker on the end of the carton) and have them ready when calling. Our e-mail address is: www.productsupport@hobbico.com

PRECAUTIONS

1. You must build the plane **according to the plan and instructions**. Do not alter or modify the model, as this may result in an unsafe or unflyable model. In a few cases the plan and instructions may differ slightly from the photos. In those instances you should assume the plan and written instructions are correct.
2. You must take your time to **build straight, true and strong**.
3. You must use a proper R/C **radio** that is in first class condition, the correct **engine** size and correct **components** (fuel tank, wheels, etc.) throughout your building process.
4. You must properly **install** all R/C and other components so the model operates properly on the ground and in the air.
5. You must **test** the operation of the model before the first flight and each successive flight, to insure all equipment is operating and to make sure the model has remained structurally sound. Be sure to check external nylon clevises often. Replace them if they show signs of wear.
6. You must **fly** the model **only with the competent help** of a well-experienced R/C pilot, if you are not already an experienced R/C pilot at this time.

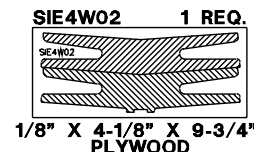
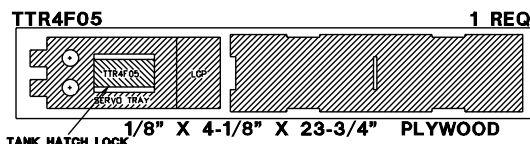
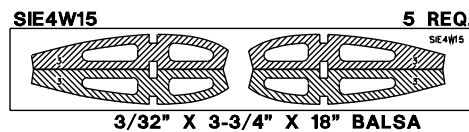
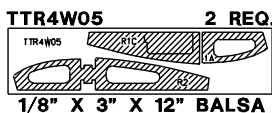
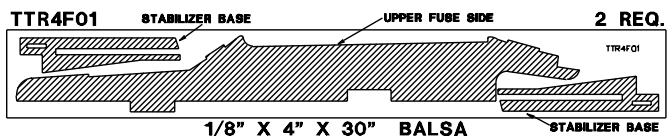
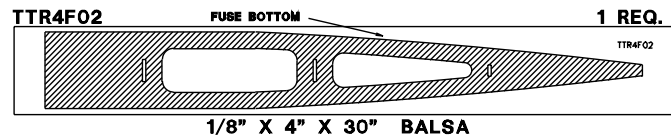
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Die Patterns



4

Die Patterns



5

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 will depend 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 directions to complete a well-built model which is straight and true.

EARLY IN THE BUILDING SEQUENCE

Engine selection:

There are several engines that will work well in the Tower Trainer 40. The following engines will provide the best all-around flight performance: O. S.[®] .40FX, Super Tigre[®] GS .40, **Tower Hobbies .40** or O. S. .52 Surpass (4-stroke). Your choice of a 2-stroke or 4-stroke engine will determine the location of the throttle servo and pushrod exit.

Note: The displacement in bold type is the most highly recommended. However, all of these engines will fly the Tower Trainer 40.

Selection of wheels

The standard recommended wheels are 2-1/2" for the main and nose wheels. If you are flying off grass or an uneven surface, you may wish to use larger wheels than those recommended. The standard wheels have been tested on grass and work fine, but 3" wheels would work even better.

"ITEMS REQUIRED FOR COMPLETION"

- 4 Channel radio with 4 servos
- Engine: .40 - .46 2-stroke or .52 4-stroke
- Propeller (Top Flite[®] Power Point[®])
- 10 oz. Fuel tank (Great Planes[®] #GPMQ4104)
- 12" Medium fuel tubing (Great Planes #GPMQ4131)
- (3) 2-1/2" Wheels (Great Planes #GPMQ4223)
- (6) 5/32" Wheel collars (Great Planes #GPMQ4306)
- 2-1/2" Spinner (Great Planes #GPMQ4520)
- (2) Rolls covering film (TowerKote[™])
- 1/2" Latex Foam Rubber Padding (Hobbico[®] # HCAQ1050)
- #64 Rubber Bands (Tower Hobbies #TOWQ1220)
- Throttle Pushrod (Great Planes #GPMQ3716)
- Steering Pushrod (Great Planes #GPMQ3700)
- Connector for Throttle (Great Planes #GPMQ3840)
- Engine Mount (Great Planes #GPMG1061)
- Hardware for engine mount (Great Planes #GPMQ3509)
- Screw-Lock connectors (Great Planes #GPMQ3870)

SUGGESTED SUPPLIES AND TOOLS

We recommend **Great Planes Pro[™] CA and Tower Epoxy**

- 2 oz. CA (Thin) (Great Planes #GPMR6003)
- 2 oz. CA+(Medium) (Great Planes #GPMR6009)
- 1 oz. CA- (Thick) (Great Planes #GPMR6014)
- CA Accelerator (Great Planes #GPMR6035)
- 6-Minute Epoxy (Tower Hobbies #TOWR3300)

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- 30-Minute Epoxy (Tower Hobbies #TOWR3350)
- ProWood glue (Great Planes #GPMR6160, optional)
- Hand or Electric Drill
- Drill Bits: 1/16", 5/64", 3/32", 1/8", 5/32", 3/16", 1/4"
- Sealing Iron (Top Flite #TOWR3250)
- Heat Gun (Top Flite #TOWR3200)
- Hobby Saw (X-acto® Razor Saw)
- Hobby Knife, #11 Blades
- Razor Plane (Master Airscrew)
- Pliers
- Screw Drivers (Phillips and Slot tip)
- Round file (or similar)
- T-Pins
- String
- Straightedge with scale
- Masking Tape (required for construction)
- Sandpaper (coarse, medium, fine grit)*
- T-Bar Sanding Block (or similar)
- Wax paper or Plan Protector
- Lightweight Balsa Filler such as Hobbico HobbyLite™
- Isopropyl Rubbing Alcohol (70%)
- Dremel Multi-Pro® or similar (optional)

***NOTE:** On our workbench, we have four 11" T-Bar sanders, equipped with #50, #80, #150 and #220-grit sandpaper. This setup is all that is required for almost any sanding task. Custom sanding blocks can be made from balsa for sanding hard-to-reach spots. We also keep some #320-grit wet-or-dry sandpaper handy for finish sanding before covering.

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GET READY TO BUILD

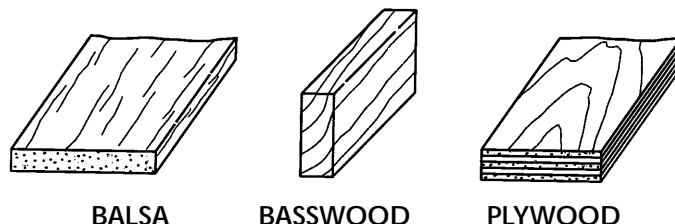
- Unroll the plan sheets. Reroll the plans inside out to make them lie flat. If you have a small building space, you may fold or cut the plans to fit onto your building surface.
- Remove all parts from the box. As you do, figure out the name of each part by comparing it with the plans and the parts list included with this kit. Using a felt tip or ball point pen, lightly write the part **name** or **size** on each piece to avoid confusion later. Use the die-cut patterns shown on pages 4 and 5 to identify the die-cut parts and mark them **before** removing them from the sheet. Save all leftovers. If any of the die-cut parts are difficult to punch out, do not force them! Instead, cut around the parts with a hobby knife. After punching out the die-cut parts, use your bar sander or sanding block to **lightly** sand the edges to remove any die-cutting irregularities.
- As you identify and mark the parts, separate them into groups, such as **fuse** (fuselage), **wing**, **fin**, **Stab** (Stabilizer), and **hardware**.

★★★★ **Pro Tip:** Zipper top food storage bags are handy to store your parts as you sort, identify, and separate them into sub-assemblies.

Common abbreviations used in this book and on the plan

- Elev. = Elevator
- Fuse = Fuselage
- LE = Leading Edge (Front of a wing)
- Ply = Plywood
- Stab = Stabilizer
- TE = Trailing edge (Rear of Wing)
- " = Inches

Types of wood



NOTES ON USING GLUES

There are two types of glue recommended for building this model, which are **CA** and **Epoxy**.

CA (cyanoacrylate) glue is used for general construction. It is available in a variety of viscosities. We recommend you have the following two types...

Thin CA: Has a viscosity similar to water and is used to glue together parts fitting together **very well and** which do not require repositioning after glue is applied. Thin CA is especially effective for gluing balsa to balsa. It can be used to glue hardwoods such as plywood, spruce or basswood, but it is usually necessary to fillet the joint later with medium CA. Thin CA has the ability to "wick" into joints. This means it will be drawn into very fine gaps between parts. This characteristic makes thin CA very useful for a lot of tasks, such as gluing seams already clamped together or installing CA hinges. Thin CA usually sets very rapidly, so do not expect to move parts at all after glue is applied. This rapid reaction may also produce annoying fumes and heat. **Always** use CA glues in a well-ventilated area.

Medium CA: Used in general construction for parts which have gaps, require slight repositioning or involve hardwoods. Medium CA can be used to make small fillets between parts in high stress areas. Medium CA is a very good general purpose glue and many people use it for the majority of their building. The Tower Trainer 40 uses Medium CA in many areas, so it is suggested that you have a 2 oz. bottle to make sure there is enough to complete the kit.

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Some medium CA glues can be slow to set, especially when used to fill gaps. A product known as **CA Accelerator** is available to speed up the curing process. It is sprayed onto the joint **after** the glue is applied and chemically reacts with the glue, causing it to set **very** rapidly. There are a few precautions when using an accelerator...

Use it in a well-ventilated area. The rapid reaction can release irritating fumes at a much higher rate than normal. Do not use CA accelerators with thin CA!

Be careful when using the accelerator around plastics. Certain accelerators will attack plastics and the vapors may **fog** clear canopies. It is best to test the glue and accelerator on a leftover piece of plastic if one is available.

Using too much accelerator may cause the CA glue to react very rapidly and literally boil. This will result in a joint with a chalky white color which is not nearly as strong as a normal joint.

Epoxy is used on high-stress joints requiring strength and vibration resistance. Epoxy also works well in areas encountering fuel. The slower cure time allows parts to be clamped, checked and realigned if necessary before it cures. Epoxy is available in many different formulas having different cure times. The single best type of epoxy to have when building your Tower Trainer 40 is one which sets up in 30 minutes, but you may also find 6-minute epoxy handy to have around.

○ 2. Place the 1/4" x 1" x 10" balsa **stick** over the portion of the plan marked "Stab Forward Center," and line up the back edge of the stick with the straight line. Draw two angled lines where you will cut this stick. Remove the stick from the plan and cut the stick along the lines using a hobby knife or razor saw. Straighten and square the cut edges with a sanding block. Trim the ends slightly to match the length shown on the plans.

○ 3. Pin the Stab Forward Center into position on the plans. Test fit the balsa 1/4" x 3" x 4" **Stab Center** into place. There should be no gaps between the center and forward pieces. After fitting, glue and pin the center to the forward using Medium CA.



○ 4. Use two 1/4" x 1/2" x 36" balsa **sticks** to build the outside framework of the Stabilizer. Start by placing the longest piece first, working until you are placing the shortest (end) pieces. Glue each piece together using Medium CA as you proceed.

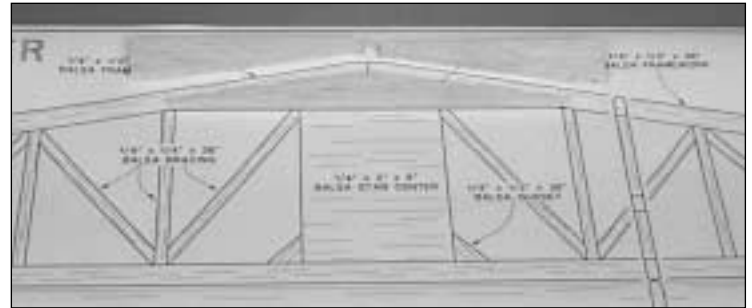
NOTES ON SANDING

Use a block or bar sander whenever possible. The flat block will "ignore" glue and variations in wood hardness and give you a true and even shape.

Always use fresh, **sharp sandpaper**. Sharp sandpaper will cut through glue and hard materials easily, giving an even surface. Older, dull sandpaper will require more pressure and may gouge the surface. Now on to building your Tower Trainer 40!

"BUILD THE TAIL SURFACES"

Build the Stabilizer and Elevator

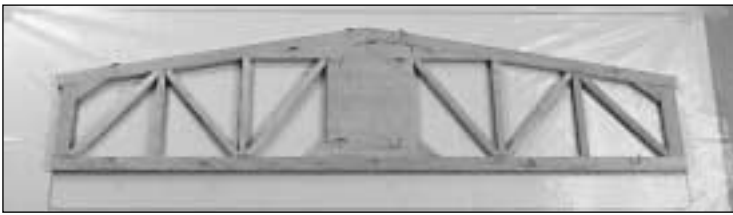


○ 1. Cut the "Stabilizer/Elevator" section from the fuselage plan sheet and tape it on your building board. Tape a piece of wax paper or Plan Protector over the plan.

★★★★ **Pro Tip:** If you are unfamiliar with "Built-up" construction, we have found that the following method is very easy and accurate.

- Position an **uncut** stick directly over the plan and pin it in place.
- Mark each side of the stick where it ends or butts with another part.
- Remove the stick from the building surface and **flip it over**. Draw a line between the marks you made previously using a straight edge.
- Using a razor saw, cut as close to the line as possible. Then, with your sanding block, true-up the ends to the line. **Flip** the part over and pin back in place over the plan.

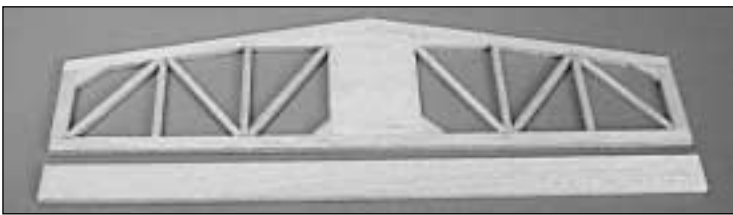
○ 5. Cut the corner gussets from the 1/4" x 1/2" balsa stick and glue them into position.



○ 6. Cut and install the Stab Bracing using 1/4" x 1/4" x 36" balsa sticks. **Note:** It is best to start with the straight pieces, then go to the angled pieces. The alignment of each piece to the plan is not critical, just as long as it is close and fits snugly into position.

○ 7. Remove the Stabilizer from your building surface. Examine and add thick CA glue to any open joints, then use your sanding block with medium (150-grit) sandpaper to sand both sides of the Stabilizer framework smooth.

○ 8. Cut the Elevator from the 1/4" x 1-3/8" x 30" balsa stick. Save the remaining section for making the Rudder.



○ 9. Use your sanding block with medium (150-grit) sandpaper to sand both sides of the Elevator smooth. Round the corners of both pieces as shown on the plan.

○ 5. Use the remaining section of 1/4" x 1-3/8" x 30" balsa to make the Rudder.

○ 6. Place the Fin, Dorsal Fin and Rudder flat on your work surface and sand them flat using a sanding block or bar sander and 120-grit sandpaper. Don't forget to sand both sides smooth. Once they are sanded, round the corners of the fin, dorsal fin and rudder to match the plans.

Note: The Dorsal Fin will be glued in place after the Fin is attached to the fuselage.

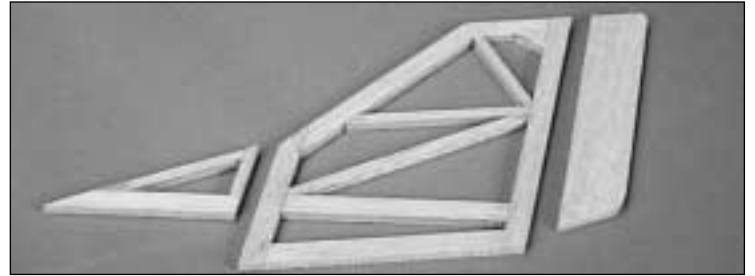
Bevel the Elevator and Rudder



○ 1. Use a smooth ball point pen to draw a **centerline** along the leading edge of the Elevator and Rudder.

BUILD THE FIN AND RUDDER

○ 1. Cut the "Fin/Rudder" section from the fuselage plan sheet and tape it on your building board. Tape a piece of wax paper or Plan Protector over the plan. Build the frame of the Fin using a 1/4" x 1/2" x 36" balsa **stick**.

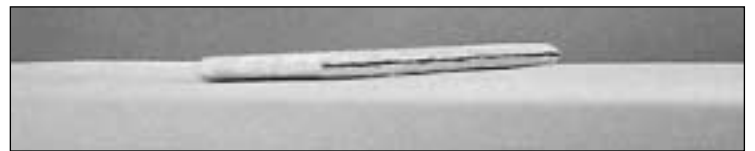


○ 2. Install the Inner Framework of the Fin using 1/4" x 1/4" x 36" balsa. Cut and install the corner gusset from the remaining 1/4" x 1/2" balsa.

○ 3. Remove the Fin from your building surface. Examine and add thick CA glue to any open joints, then use your sanding block or bar sander with medium (150-grit) sandpaper to sand both sides of the Fin smooth.

○ 4. Build the **Dorsal Fin** from the remaining 1/4" x 1/2" and 1/4" x 1/4" pieces. Examine and add thick CA glue to any open joints, then use your sanding block or bar sander with medium (150-grit) sandpaper to sand both sides of the Dorsal Fin smooth.

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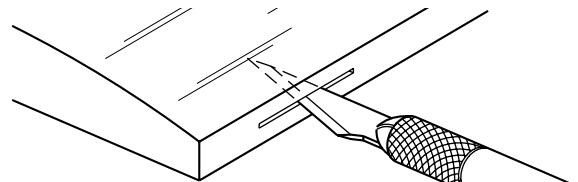


○ 2. Referring to the cross sections on the plan, carefully block sand the elevator and rudder **leading edges** to a "V" shape. The centerlines you drew earlier should remain for hinging later.

○ 3. Using 180-grit sandpaper, round the leading edge and tips of both the Fin and Stabilizer. Leave the trailing edges square.

INSTALLING THE HINGES

○ 1. Use a smooth ball point pen to draw a **centerline** along the trailing edge of the Stabilizer and Fin. Lay the Fin and Stabilizer on the plan and mark the hinge locations. Place the Rudder against the Fin TE and transfer the marks onto the Fin. Place the Elevator against the Stabilizer and transfer the marks onto the Stabilizer.



○ 2. Cut the hinge slots on the accurate centerlines which you previously drew, using a hobby knife or a slotting fork and slotting hook. (The recommended hinge slotting technique is listed below).

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CAUTION!!!: You must use extreme care when cutting hinge slots with a hobby knife, to avoid cutting yourself! If the balsa part breaks while you are pushing on the knife, the blade could go into your hand before you know it! A good precaution is to wear leather gloves while performing the following steps and always cut AWAY from yourself.

C. Trial fit the hinge into the slot. If the hinge is difficult to push in, re-insert the knife and move it back and forth in the slot a few times to enlarge the slot.

○ 3. Insert the hinges into the slots and trial fit the **Rudder** and **Elevator** in place on the **Fin** and **Stabilizer**. **Do not glue the hinges until after you have covered the model.**

BUILD THE FUSELAGE

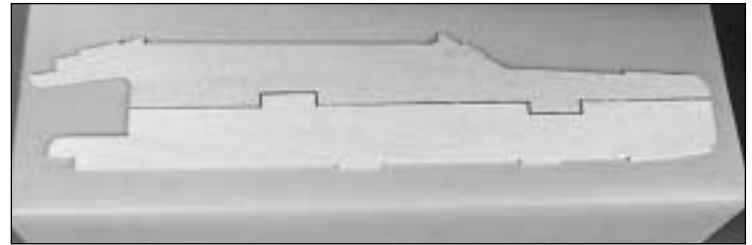
★★★★ **Pro Tip:** Hinge slotting is a procedure that is required for every model airplane. We have found that the technique described below is accurate and fairly easy. Just work slowly and carefully. **Remember: Hobby knives are extremely sharp!**

A. Begin by carefully cutting a **very shallow slit** at the hinge location. This first cut is to establish your cut in the right place, so concentrate on staying on the centerline and **don't cut too deep!**

B. Make three or four more cuts in the same line, **going slightly deeper each time**. As you make these additional cuts, work on going straight into the wood. Continue this process while **"wiggling"** the knife handle back and forth until the blade has reached the proper depth for the hinge.

Fuse Side Construction

○ 1. Cut the "Fuselage side view" section from the fuselage plan sheet and tape it on your building board. Tape a piece of Top Flite Plan Protector or wax paper over the plan.



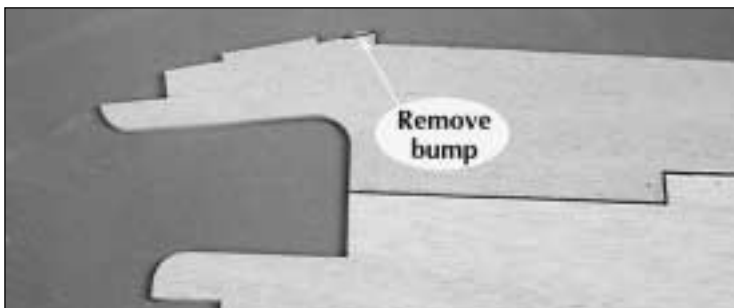
○ 2. Glue the balsa die-cut 1/8" **Upper Forward Fuse Sides** to the balsa die-cut 1/8" **Lower Forward Fuse Sides** using thin CA. Mark the inside surface of the fuse sides with the letters '**R**' and '**L**' to

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designate the inside of the Right and Left fuselage sides. **Be sure to make a RIGHT and a LEFT fuselage side.** Sand both sides of the fuse sides using 150-grit sandpaper.

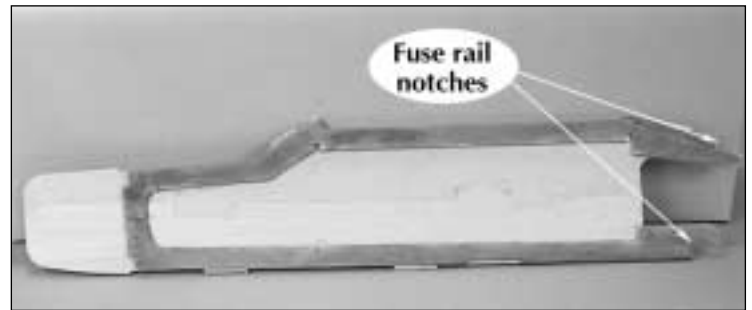


○ 3. Locate the four die-cut 1/8" balsa **Stabilizer Bases**. Carefully align and laminate two of the bases together using medium CA to produce a 1/4" thick base. Repeat the procedure for the remaining two bases. Sand the area shown in the photo using 120-grit sandpaper.



○ 4. Use a straightedge to mark a line along the top of both fuse sides, as there is a slight bump necessary for the die-cutting of the

part. Use a hobby knife and/or bar sander to remove the bump. (This bump is also on the upper fuse doubler.)

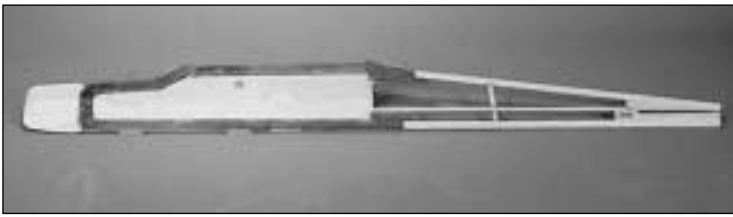


○ 5. Locate the die-cut 1/8" plywood **Upper** and **Lower Fuse Doublers**. Make sure you are making both a **Left** and **Right** fuse side. Test fit them onto the fuse sides as shown in the photo. Make any necessary adjustment to allow the doublers to fit accurately onto the fuse sides. Once all the fitting is done, glue them in position using Thin CA. Make sure to make both a left and right set. Sand the notches for the balsa fuse rails to provide a smooth glue surface.

○ 6. Place the Right Fuse Side onto the fuselage plan and pin it in position. (The doubler should be facing away from the plan sheet). Pin the Stabilizer Base into position on the plans.

○ 7. Use two of the 1/4"x 1/2" x 24" balsa sticks to make the upper and lower **Fuse Rails**. Use medium CA to glue them into position. Trim the excess extending past the Stabilizer Base.

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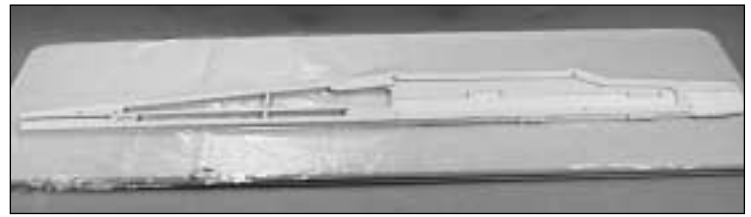


○ 8. Using a 1/4" x 1/4" x 36" balsa stick, make the **Center Stringer**. Use medium CA to glue it into position. Using leftovers saved from the assembly of the Fin and Stab, cut the center supports and glue them into position. Position the center supports as accurately as possible, as the installation of the formers as well as the top and bottom of the fuse depends on their locations.

○ 9. Once the glue sets, remove the Fuselage Side from your building surface. Examine and add thick CA glue to any open joints, then use your sanding block or bar sander with medium (150-grit) sandpaper to sand both sides of the Fuselage Side smooth.

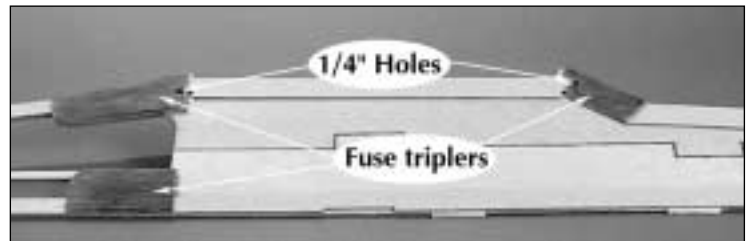
○ 10. Place the Right Fuse Side underneath the wax paper. (The side doesn't have to align with the plans for this step.) The doubler should be facing away from the wax paper or plan protector. The remaining Fuse Side will be built directly on top of our completed side to insure accuracy.

○ 11. Place the Left Fuse Side directly on top of the Right Fuse Side, carefully aligning them together. Use T-pins to lock the two sides together. Repeat the procedure for the Stabilizer Base.



○ 12. Make the Fuse Rails for the Left Fuse Side using the same technique from the right side. The Left Fuse Side must match the Right as closely as possible, or the fuselage will not be straight when you are done. Once all the parts are cut and fit, use Medium CA to glue them into position.

○ 13. Once the glue sets, remove the Left Fuselage Side from the Right Fuselage Side. Examine and add thick CA glue to any open joints, then use your sanding block or bar sander with medium (150-grit) sandpaper to sand both sides of the Left Fuselage Side smooth.

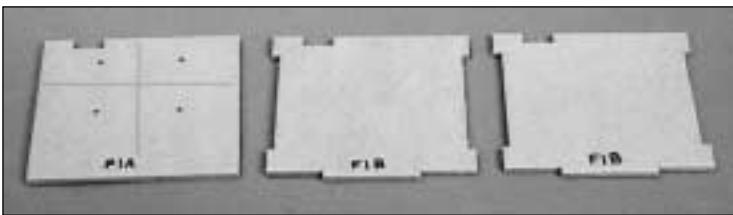


○ 14. Locate the three fuselage triplers and glue them in their proper locations on the inside of the fuselage. Make sure the alignment of the triplers doesn't interfere with the notches for the formers.

15

○ 15. Drill 1/4" holes as shown through the fuselage sides for the wing dowels using the notches in the upper triplers for alignment. Carefully sand the bottom edges of the fuselage sides flat to provide a good surface to glue the bottom of the fuse into position.

Fuse Structure Assembly



○ 1. Locate the die-cut 1/8" plywood **F1A Former** and the two die-cut 1/8" plywood **F1B Formers**. Center the F1A Former on the **F1B Formers** with the punch marks visible. The notches of all formers will align when positioned correctly. Use the plans to position the formers. Use 30-minute epoxy to glue them together. Clamp or tape the firewall formers together until the glue sets. You should have used enough epoxy so it will "ooze" out between the formers. This excess epoxy can be cleaned up before it cures using a paper towel dampened with rubbing alcohol.

Note: For the following steps, refer to the firewall cross section drawing on the fuselage plans. At this point you must know which engine and mount you will use. If you are using the recommended engine and mount, the punch marks on F1A will be in the correct locations. If you are using a different engine or mount requiring different bolt locations, you will need to determine the locations

for your installation. To determine the center of the mount, draw lines on the firewall as shown on the plan and in the previous photo. Position your engine mount so it is centered on the lines. Mark the locations for your mounting bolts. Locations for the nose gear and throttle pushrods will be determined the same way for any engine/mount combination.

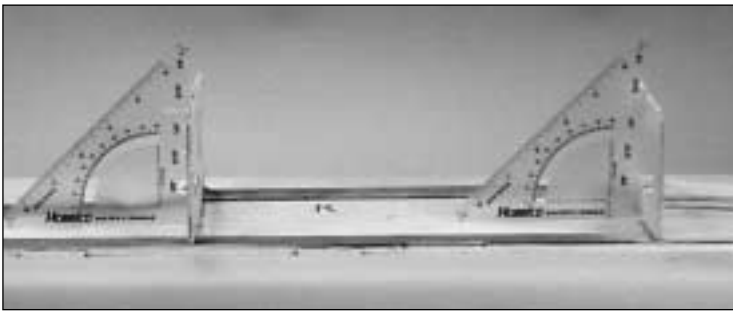
○ 2. If you are using the recommended mount, drill the four punch marks in F1A with a 3/16" drill.

○ 3. Gently tap four 6-32 blind nuts into the back (F1B) side of the firewall. Carefully apply a small drop of Thin CA to the perimeter of the flange on each 6-32 blind nut.



○ 4. Locate the die-cut 1/8" plywood **Former F2** and drill 3/16" holes at the punch marks. Use the Former F2 cross section on the fuselage plan sheet to confirm these locations.

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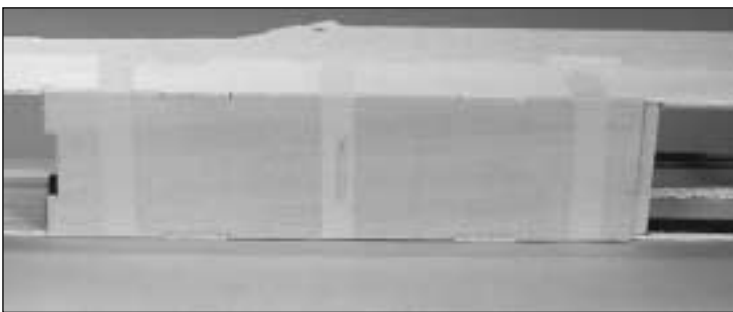


○ 5. Test fit 1/8" plywood **Former F2** in place on the Right Fuse Side. Press it down into its slot and use a 90 degree triangle to keep it perpendicular to the fuse side. Glue it in place with Medium CA.

○ 6. Test fit the die-cut 1/8" plywood **Former F3** in place on the Right Fuse Side. Press it down into its slot and use a 90 degree triangle to keep it perpendicular to the fuse side. Glue it in place with Medium CA.

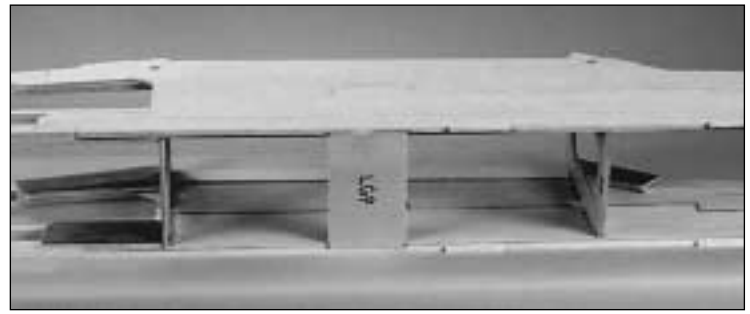
○ 7. Position the Left Fuselage Side onto the formers. Use Medium CA and glue the fuse side to the formers.

○ 10. Cut the "Fuselage Top View" section from the fuselage plan sheet and tape it on your building board. Tape a piece of wax paper or Plan Protector over the plan.



○ 11. Locate the die-cut 1/8" plywood **Forward Fuse Bottom**. Tape the Forward Fuse Bottom onto the fuselage. Set the fuselage assembly upright (in its normal position) on the waxed paper. With everything in its proper place, apply thin CA glue to all the joints, around the formers and along the bottom. Keep checking the parts fit and alignment as you glue. Wait a minute for the glue to set, then apply thick CA to the joints to make sure a good bond exists, especially in the joints that do not fit perfectly.

Note: The use of CA accelerator will be helpful when using thick CA to fill any large gaps.



○ 8. Test fit the die-cut 1/8" plywood **Landing Gear Plate (LGP)**. Once satisfied with the fit, glue it with 6-minute epoxy.



○ 9. Cut the remaining 1/4" x 1/4" x 36" balsa stick into two 12" pieces to be used as the **Servo Rails**. Position the Servo Rails so they are flush with the aft edge of the main fuse side. They will extend forward of Former F2 when installed. Wick Thin CA along the edges of the rails and fuse sides to glue them in place.

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○ 12. Locate the die-cut 1/8" balsa **Aft Fuse Bottom** and pin it over the top view. Carefully align the fuselage sides and glue the LGP to the front of the die-cut 1/8" balsa Fuse Bottom with Medium CA. Use weights and/or pins to hold the fuse sides in position. Place one die-cut 1/8" plywood Former F4 and one die-cut 1/8" plywood Former F5 in their respective positions against the Aft Fuse Bottom.

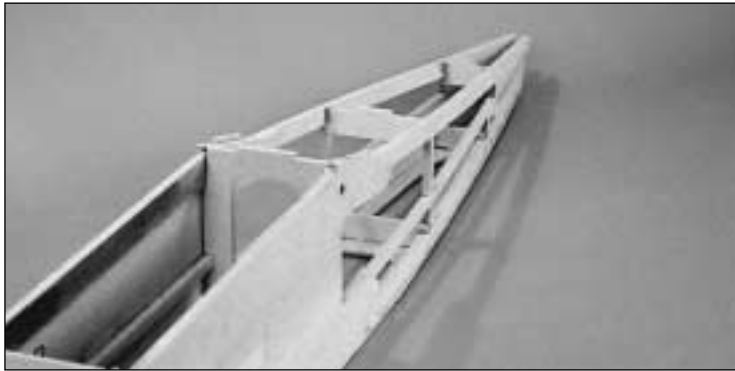
○ 13. Pull the fuse sides against Former F5. The fuselage sides should be centered on the bottom sheet. Press the Fuselage Sides down tightly against the sheet and snug against the former. Press Former F5 tightly against the Stabilizer Base. Use Medium CA to glue the Fuse Sides to the Fuse Bottom and Former F5.

○ 14. Pull the fuse sides against Former F4. The fuselage sides should be centered on the bottom sheet. Press the Fuselage Sides down tightly against the sheet and snug against the former. Press Former F4 tightly against the Balsa Center Support. Use Medium CA to glue the Fuse Sides to the Fuse Bottom and Former F4.

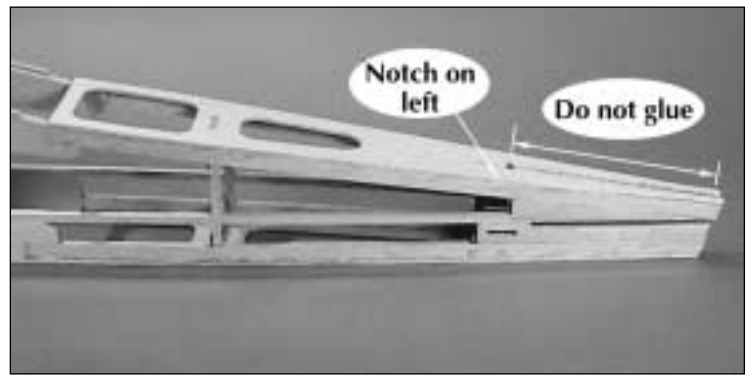
18

○ 15. With Former F4 and Former F5 glued in position, apply thin CA glue to all the joints, around the formers and along the bottom. Keep checking the parts fit and alignment as you glue. Wait a minute for the glue to set, then apply thick CA to the joints to make sure a good bond exists, especially in the joints that do not fit perfectly.

Note: The use of CA accelerator will be helpful when using thick CA to fill any large gaps.



○ 16. Place the remaining **Former F4** and **Former F5** into position inside the fuselage. Pull the fuse together against the formers and tack glue them into position with Thin CA.



○ 17. Test fit the die-cut 1/8" balsa **Fuse Top** into position, making sure the slot for the **Rudder Pushrod Exit** is on the **left** (looking from the back to the front). Once satisfied with the fit of the fuse top, remove it and run a bead of Medium CA along the top of the Upper Fuse Rails from the front of the rail to in front of Former F5. Place the Fuse Top back into position. After the CA has cured, remove the fuse from the building board and run a bead of Medium CA along the seam where the sides meet the fuse top.

Note: The section from F5 to the tail of the fuselage will be glued after the Fin has been installed.

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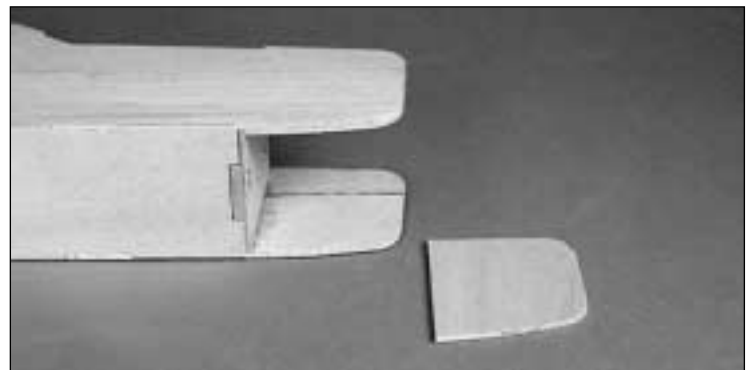
○ 18. Test fit the Firewall Assembly into position. Make sure it is fully seated against the fuse doublers. Remove the firewall and use 30-minute epoxy to glue it in position. Check the firewall periodically to make sure it remains pressed tight against the fuse doublers.

○ 19. Position the **Main Landing Gear** on the bottom of the fuse, using the plans as reference. Place one of the **Landing Gear Straps** onto the gear and mark the location of only one of the holes. Drill the mark using a 1/16" drill bit, then secure the strap with a **#2 x 3/8" Sheet Metal Screw**.



○ 20. Measure the distance from each tip of the Main Landing Gear to the tail of the fuse. Adjust as necessary to make both

measurements equal. Once the gear is in position, place and mark the locations for the remaining three Landing Gear Straps. Drill 1/16" holes at the marks and secure the Main Landing Gear. In total, you should have eight #2 x 3/8" Sheet Metal Screws and four Landing Gear Straps. The Main Landing Gear may be removed until after covering.



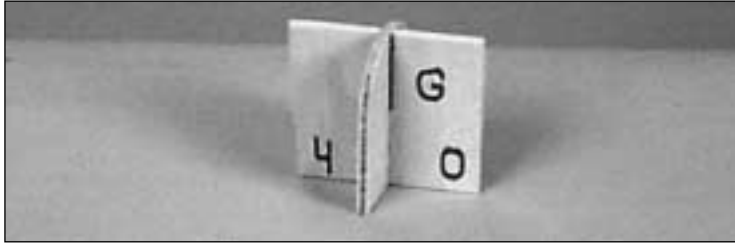
○ 21. Use Medium CA to glue the front fuse doublers to the inside of the engine compartment.

BUILD THE WING

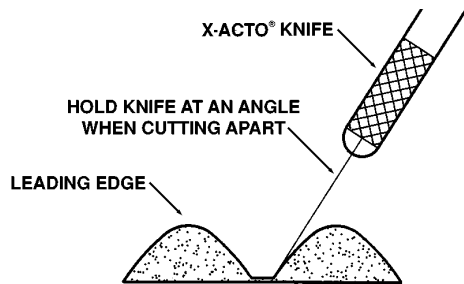
Note: The Tower Trainer 40 wing, much like the fuselage, is designed with simplicity and ease of building in mind. Always remember to test fit parts before using glue to make any adjustments for the best possible fit.

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○ 1. Cut the "Right Wing Panel" section from the wing plan sheet and tape it on your building board. Tape a piece of wax paper or Plan Protector over the plan.



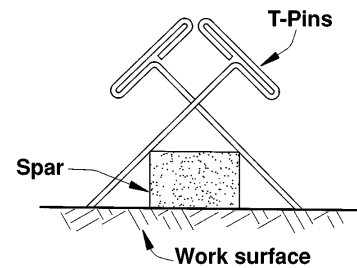
○ 2. Assemble the **Wing Guide Tool** from the plywood die-cut 1/8" pieces marked "G". The "0" degree (from vertical) side of the tool can be used to check the ribs to see if they are vertical. The "4" degree side will be used later. **Do not glue the tool together.**



○ 3. The shaped balsa **Leading Edges** and **Trailing Edges** are joined by a thin layer of balsa. These are cut apart in one of two ways –

Either break the pieces apart and clean up the rough edges with a sanding block or carefully run a knife down the edge between the parts to cut them cleanly apart.

○ 4. Remove the die-cut 3/32" balsa **Wing Ribs R-2, R-3** and the die-cut 1/8" balsa **Wing Ribs R-1** from the die-cut sheets.



○ ○ 5. Use the criss-cross pin technique shown in the illustration to pin a 3/8" x 3/8" x 30" balsa **Spar** over its location on the plan. Pin the **Bottom Spar** in 3 or 4 places.

○ ○ 6. Slide **Ten 3/32"** balsa **R-3 Wing Ribs** into place on the **Bottom Spar**.

○ ○ 7. Place the shaped balsa **Leading Edge** against the front of the ribs and pin it in place.

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○ ○ 8. Place the shaped balsa **Trailing Edge** against the rear of the ribs and pin it in place.

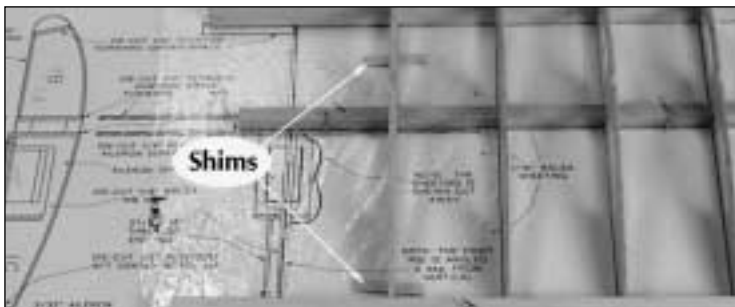
○ ○ 10. Insert the 3/8" x 3/8" x 30" **Top Spar** into the notches in the ribs.

○ ○ 11. Make sure all the R-3 Wing Ribs and the Leading and Trailing Edges are resting on the flat work surface. The "Guide Tool" is used to check that the ribs are vertical.

○ ○ 12. Apply Thin CA to all the joints involving the Ribs, Spars, Leading Edge and Trailing Edge.

Note: When gluing the spars to R-2, make sure the spars are centered between the dihedral brace notches in R-2.

○ ○ 13. Remove the pins holding the spar in place but leave the panel pinned flat on the board by the leading and trailing edges.



○ ○ 9. Lay two pieces of leftover 1/16" balsa (Cut 1/4" off one end of the 1/16" x 3" x 14-7/8" **Shear Web** material) near the **Leading** and **Trailing Edges** under the location of **Wing Rib R-2** (this will shim up the rib to allow for the sheeting later). Place **Wing Rib R-2** into position as shown on the plan.

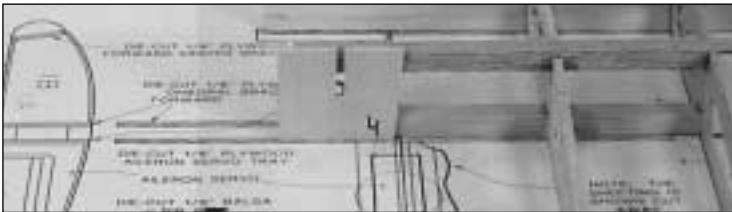
○ ○ 14. Cut the shear webs from the 1/16" x 3" x 14-7/8" balsa sheet. Use the dimensions shown on the plan to assist in making shear webs.

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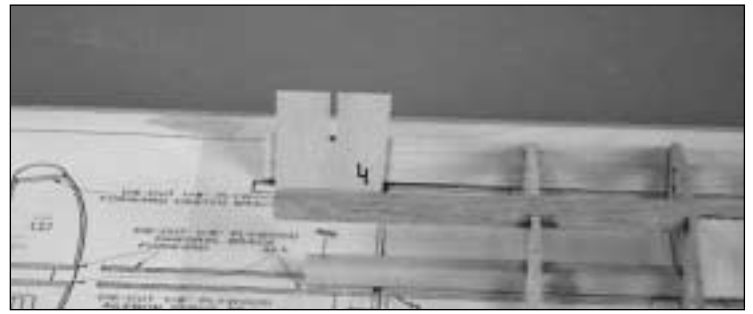


○ ○ 15. With the panel held flat on the table, use Medium CA to glue the balsa Shear Webs to the Spars, between the R-3 ribs. **Note:** The function of the shear webs is to keep the spars from collapsing. They will not touch or be glued to the ribs. They should be thoroughly glued to the spars.

○ ○ 16. Make sure the wing panel is still lined up properly over the plan.



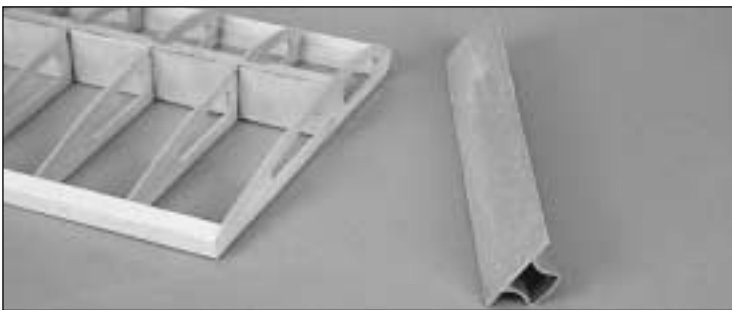
○ ○ 17. Position the "4" degree side of the guide tool exactly where the end of the bottom spar is shown on the plan. Use a pen to mark an angled line on the top and bottom spars. (The top spar will be slightly shorter than the bottom spar.)



○ ○ 18. Use the guide tool to mark angled lines on the leading and trailing edges from where their bottom ends are shown on the plan.

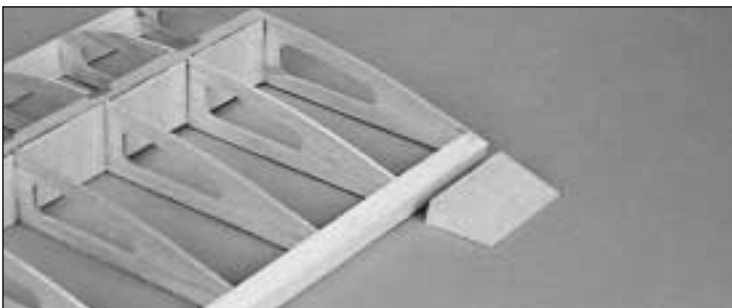
○ ○ 19. Unpin the wing and remove it from your building surface. Use a razor saw to cut off the spars and the leading and trailing edges at the marked angles. A bar sander is used to "clean up" the angled ends of the spars, leading edges and trailing edges.

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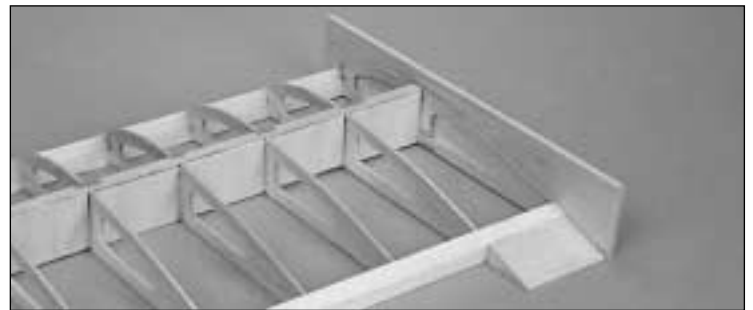
○ ○ 20. Use a razor saw and a bar sander to trim the tip ends of the spars, leading and trailing edges flush with the outermost R-3 rib.

○ ○ 21. Carefully cut a 2-1/2" long piece off the 17/32" x 1-1/2" x 30" tapered balsa aileron stock.



○ ○ 22. Glue the 2-1/2" long piece of aileron stock to the wing trailing edge at the tip as shown on the RIGHT WING PANEL drawing. (This is done to the right and left wing.)

○ ○ 23. Trim and sand the aileron stock flush with the tip of the wing.



○ ○ 24. Cut the 3/16" x 2" x 24" balsa wing tip material into two 12" lengths. Hold the wing tip up to the end of the wing. Glue the wing tip to the wing.



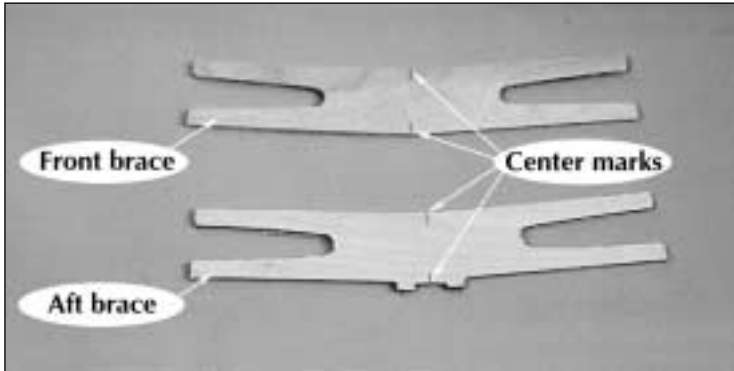
○ ○ 25. Saw or carve the wing tip to the rough shape of the wing, leaving it slightly oversized. Block sand it to final shape. **HINT:** Put masking tape over the surrounding structure when

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sanding items such as the wing tips to protect areas you don't want sanded.

Repeat steps 5-25 over the Left Wing Panel plan to build the Left Wing.

JOIN THE WING



○ 1. Punch out the plywood die-cut 1/8" **Dihedral Braces**. Put reference marks at the **center** of the braces.

NOTE: The dihedral brace with the "lock bumps" for the aileron servo tray is positioned on the **aft** side of the spars.

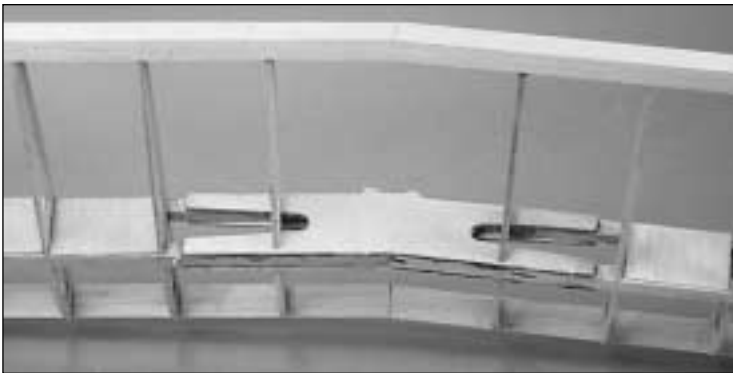
○ 2. Test fit the two wing panels together with the dihedral braces in place. Check to see the spars, leading edges and trailing edges match up well. Make adjustments if necessary.

The dihedral angle (the angle at which the wings are "bent up") is not considered critical. This angle is established by aligning the spars with the dihedral braces.

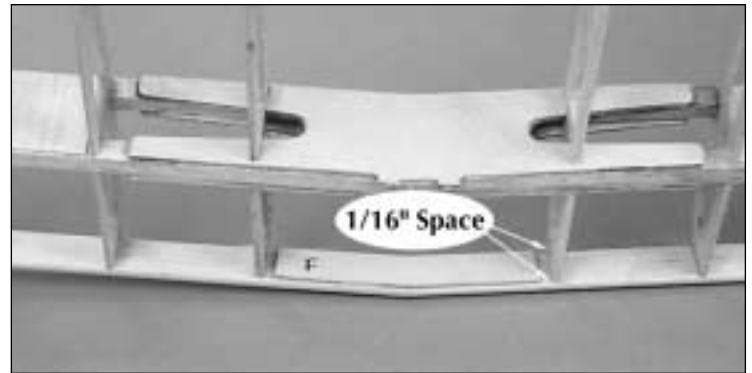
○ 3. Look ahead at the next two photos of the joined wing to see the position of the joiners. Spread a layer of 30-minute epoxy onto the matching surfaces of the Dihedral Braces and the left wing panel spars. Align the dihedral braces with the top and bottom edges of the spars. Clamp or tape the braces in position until the glue sets. You should have used enough epoxy so it will "ooze" out between the dihedral braces and spars. This excess epoxy can be cleaned up before it cures using a paper towel dampened with rubbing alcohol.

Note: If there are any small gaps between the ends of the spars or LE's or TE's, do not be overly concerned. They will not significantly weaken the structure. After the wing joining process is complete, fill them with leftover balsa and medium CA glue.

25

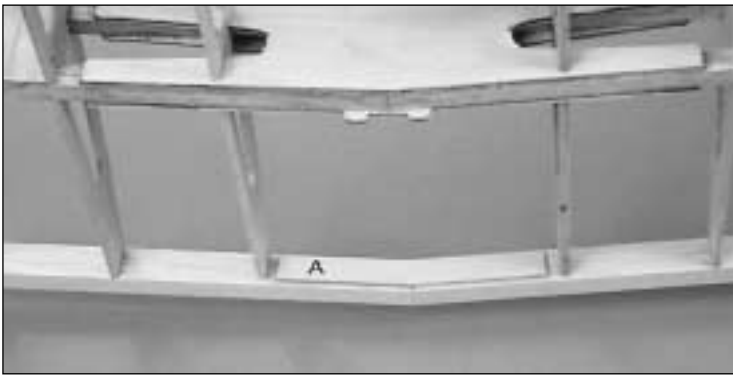


○ 4. When the epoxy has cured, apply a layer of epoxy to the Dihedral Braces and the right wing spars. Slide the two wing panels together and carefully align the spars with the dihedral braces. Use enough epoxy so it will "ooze" out between the dihedral braces and spars. Clamp or tape the braces in position until the glue sets. Clean up any excess epoxy using a paper towel and rubbing alcohol. After the epoxy is cured, if any of the dihedral brace joints do not appear to be thoroughly glued, apply an extra fillet of epoxy to them.

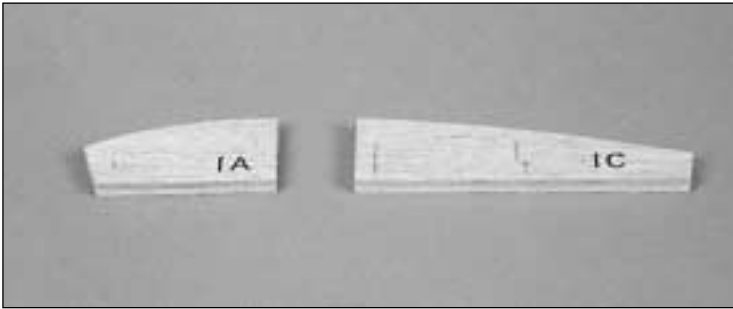


○ 5. The die-cut 1/8" plywood **Forward Center Brace (F)** is glued in next. It should be centered vertically on the leading edge so the 1/16" balsa top and bottom center sheeting will lap onto it. **Sand as necessary to get the 1/16" gap at both the top and bottom of the LE.** Align the left and right leading edges and glue the brace in place with CA or epoxy.

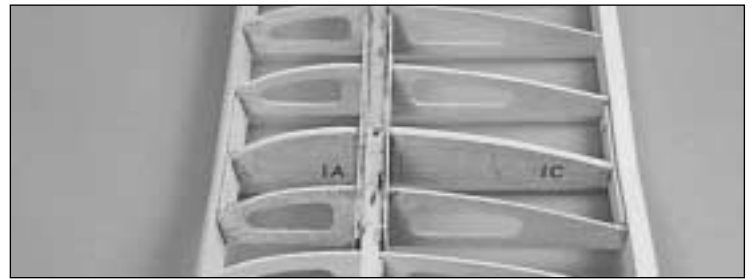
26



○ 6. The plywood die-cut 1/8" **Aft Center Brace (A)** is centered on the trailing edges. Align the left and right trailing edges and glue the brace in place with CA or epoxy.



○ 7. Glue the two balsa die-cut 1/8" **Wing Rib R-1A's (1A)** together to form a 1/4" thick part. Glue the two balsa die-cut 1/8" **Wing Rib R-1C's (1C)** together to form a 1/4" thick part.



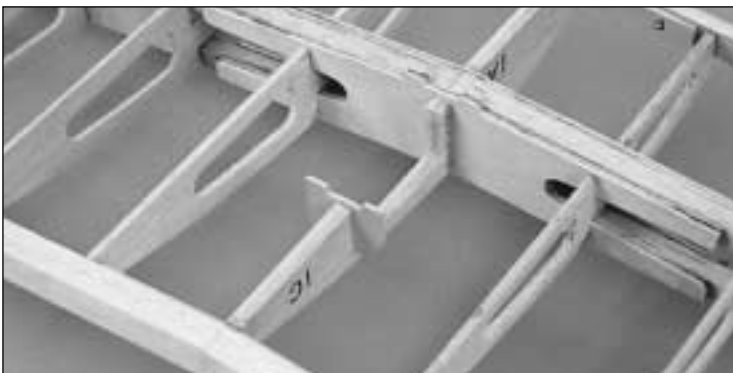
○ 8. Use Medium CA to glue Wing Rib R-1C in place. It is centered to allow for the top and bottom center section sheeting as shown in the cross-section drawing beside the right wing panel.

○ 9. Put rib R-1A in place as shown in the cross section. Align the bottom of R-1A to the forward center brace. Glue it in position with Medium CA.



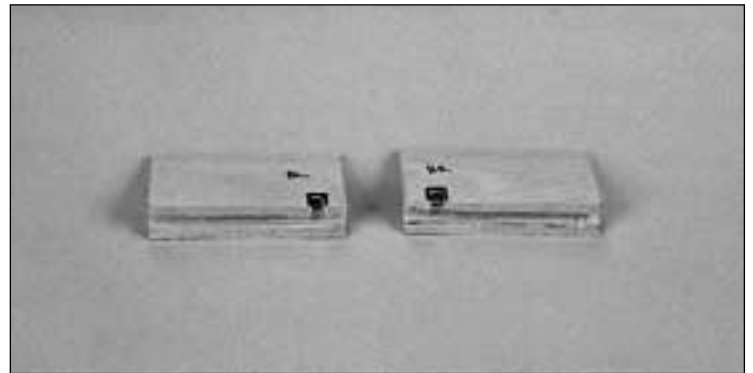
○ 10. Cut out and remove the remaining piece of balsa from across the servo bay in the bottom side of R-1C using a hobby knife or razor saw.

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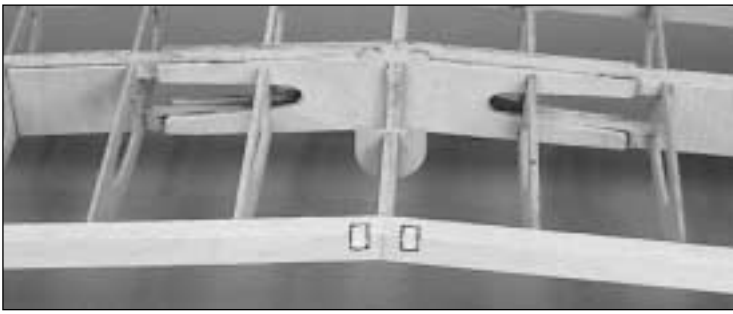
○ 11. Snap the die-cut 1/8" plywood **Aileron Servo Tray Support** in place as in the photo. Use medium CA to glue in the Servo Tray Support while using the servo tray to hold it in position. Do **not** glue the servo tray in at this time.

○ 12. Bevel the root ends of the tapered and grooved balsa **Trailing Edge Center** pieces so they will meet properly at the left and right wing junction. Mark the parts so you can identify the bottom of the left and right parts.



○ 13. Holding the **Trailing Edge Center Pieces** over the right wing panel plan, mark where the torque rod will exit the **bottom** of the trailing edge. The root cross-section gives a view of the cut-out. Cut a notch in the trailing edge center pieces to allow the torque rod to exit.

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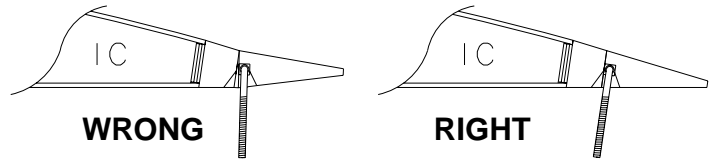


○ 14. Hold the trailing edge center pieces up to the wing. Transfer the notch locations onto the wing. Use a knife to cut small notches into the wing TE.

○ 15. Use coarse sandpaper to rough up the nylon tube on the bent wire **Aileron Torque Rod**. Apply a **small** amount of Vaseline to the ends of the nylon tube to keep glue from wicking into the bearing.



○ 16. Assemble the parts as shown in the photo. Apply a small amount of thin CA to glue the torque rod bearing tubes to the balsa trailing edge center pieces.



○ 17. Use medium CA to glue the trailing edge center assemblies to the trailing edge of the wing. Do not get glue in the bearing tube.

○ 18. Trim the left and right tapered aileron stock pieces to length so they fit between the wing tip and the center pieces with about a 1/16" gap at each end.

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○ 19. Draw a center line on the LE of the ailerons and the TE of the wing. Position the aileron against the TE and mark the location where the torque rod would enter the aileron. Carefully drill a 3/32" hole into the aileron to the depth shown on the plan. Use a hobby knife to cut a groove in the front of the aileron for the aileron torque rod.

○ 20. Use the plan as a reference to mark the location of the hinges. Make slots for the hinges using the same technique as you did for the Elevator and Rudder.



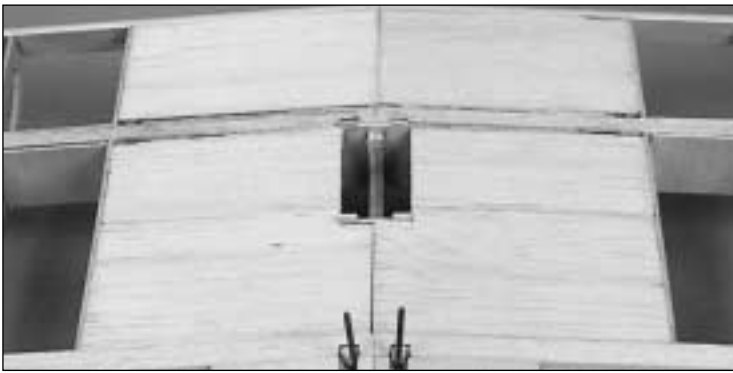
○ 21. Use a razor plane (if available) and a bar sander to sand the front edge of the ailerons to a "V" shape to match the cross section on the plan.

SHEET THE WING CENTER SECTION



○ 1. Locate the balsa 1/16" x 3" x 36" **Wing Sheeting**. Begin by sheeting the bottom of the wing center section. Start at the rear, and work toward the leading edge. The sheeting will butt against the first R-3 wing rib and be positioned halfway onto the R-1 ribs. Work slowly to get the best fit of the pieces. Start with slightly oversize pieces, as you can always cut them smaller. Remember to trim a slight notch for the servo tray brace. Glue the sheeting into position using thin CA, wicking it along the joints of the sheets.

30

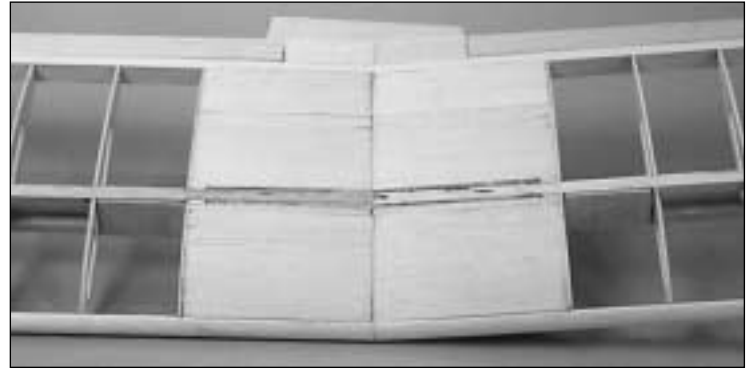


○ 2. Sheet the bottom of the other wing panel in the same manner.

○ 3. Draw a line connecting the sides of the servo tray mounts and use a sharp hobby knife to remove the sheeting to allow for the installation of the servo.



○ 4. Cut a couple of leftover 1/16" sheets and glue them inside of the wing as shown, to support and strengthen the sheeting around the servo cut out.



○ 5. Using the remaining sheet of 1/16" x 3" x 36" balsa, sheet the upper side of the wing. Sheet from the front (LE) to the rear (TE). Again, work slowly to make sure all the pieces fit well with the least amount of gaps. R-3 may be slightly higher than the leading edge. Just glue the sheeting even with the LE and we will sand everything smooth later.

○ 6. Use leftover balsa to fill areas where there may be large openings or gaps. An example would be at the ends of the dihedral braces and the R-3 ribs. Using balsa will mean using less filler later.

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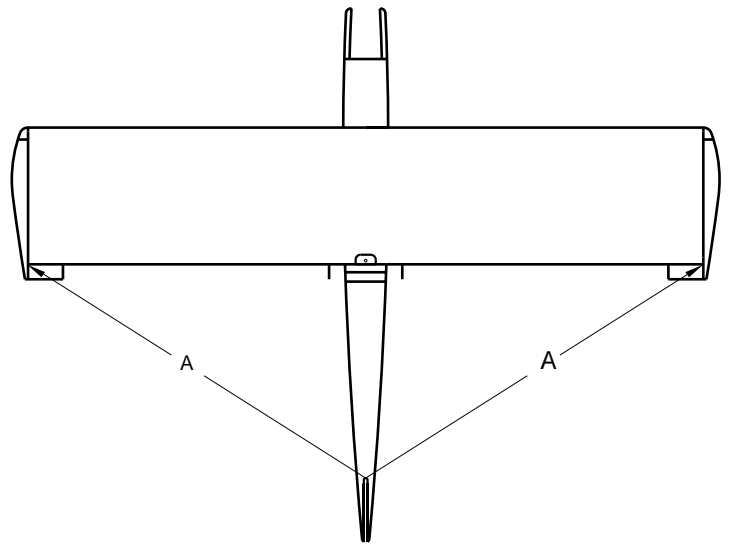
FINAL ASSEMBLY



○ 1. Insert the 1/4" x 5-1/8" **Hardwood Dowels** into the holes drilled earlier during the fuselage assembly. The holes can be enlarged in the fuselage with a round file or drill bit if the fit is too tight.



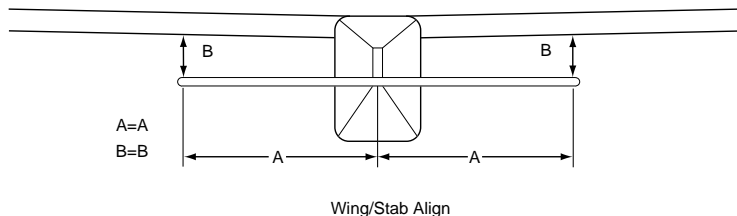
○ 2. Test fit the balsa die-cut 1/8" **Front** and **Rear Windows** into position. Sand as necessary to achieve the best fit. Glue the windows using medium CA.



○ 3. Align the wing and attach it with two #64 rubber bands. Use care not to crush the trailing edge of the wing during this process. Fit the wing on the fuselage wing saddle. Trim the aft edge of the wing trailing edge at the center with a sanding block if necessary for a good fit.

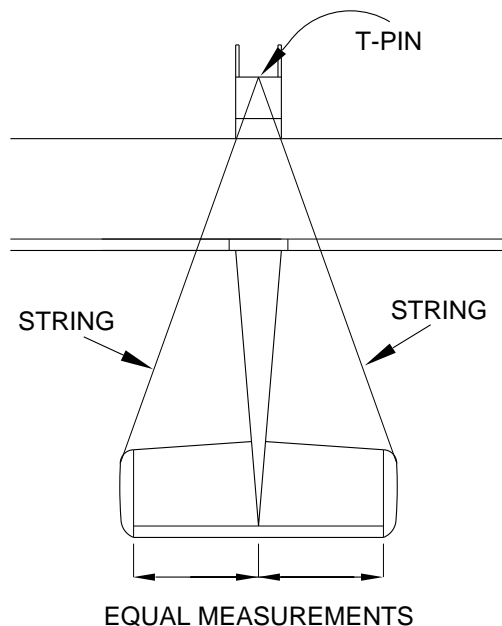
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MOUNT THE HORIZONTAL STABILIZER



○ 1. Attach the wing to the fuse (for reference) and slide the Stabilizer into its slot. Center the Stabilizer left and right in the slot. Hold a string (with one end attached to a pin centered at **F-1**) out to a wing tip. Put a piece of tape on the string to mark the intersection of the string and the Stabilizer tip. Swing the string over to the other Stabilizer tip and check to see if the distances are the same (see diagram). Make slight adjustments to the angle of the Stabilizer until the distances from F-1 to the tips are equal.

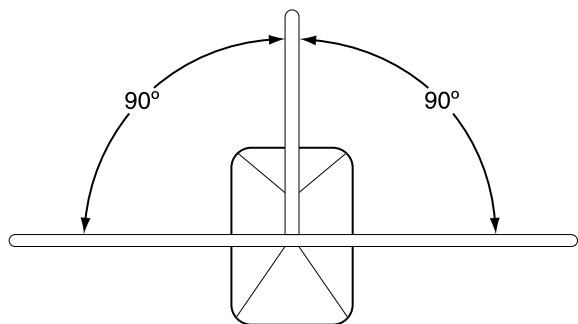
○ 2. Stand back 8 to 10 feet and view the model from the rear. The stab tips should be equally spaced below the level of the wing. If not, lightly sand one side of the stab slot to correct the problem. Work slowly and check the alignment often. Also, the trailing edge must be flush with the aft edge of the fuse.



○ 3. When the alignment looks good, use plenty of 30-minute epoxy on the **bottom** of the Stabilizer to securely glue it to the Stab Base. **Note:** Do not glue the top of the Stabilizer to the fuse sides. Hold the Stabilizer in position with pins through the sides of the fuse while the epoxy cures. Remove any excess epoxy on the outside of the fuselage with a paper towel dampened with rubbing alcohol before it cures.

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MOUNT THE VERTICAL FIN



Fin Alignment 90° Sketch



○ 1. Test fit the **Fin** into the slot in the top of the fuselage. Slide the Fin forward until the leading edge of the Fin is against Former F5. Check the alignment of the Fin with the centerline of the Fuselage. A straightedge against one side of the Fin can be used to check alignment. Make adjustments to the slot if necessary.

Pull the Fuselage Top against the Fin. Check the alignment of the Fin to make sure it remains at a 90 degree angle to the Stabilizer and also in alignment with the centerline of the Fuselage. Trim the slot for the Fin in the Fuselage Top as necessary to prevent any alignment changes in the Fin.



○ 2. Use 30-minute epoxy to glue the Fin in position. Apply epoxy to both the top of the Stabilizer as well as the bottom edge of the Fin. Insert the Fin until it touches the Stab. Check the alignment of the Fin to the Stab with a triangle, then secure it in position with masking tape until the epoxy has cured. Remove any excess epoxy with a paper towel and rubbing alcohol before the epoxy cures. Pull the fuse sides against the fin and pin them securely to the fin. Continually check the alignment of the Fin to the Stab and fuselage to make sure it doesn't shift as the epoxy cures.

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○ 3. Test fit the Dorsal Fin into position in front of the Fin as shown. The Dorsal Fin should fit flush against both the Fuselage Top and Fin. Sand as necessary to provide for a good fit of the Dorsal Fin. Use a straightedge to make sure the Dorsal Fin is aligned with the Fin. Glue it to the Aft Fuselage Top and Fin as shown using Medium CA.

○ 4. Apply Medium CA to any remaining **Fin, Stab** and **Fuselage** joints that are not thoroughly glued. Be sure to flip the fuselage over and check the joints on the bottom side in addition to those on the top.

○ 5. Sand the joints at the back of the fuselage smooth. For a nice touch, slightly round all the corners of the fuse.

MOUNT THE ENGINE

○ 1. Temporarily bolt the engine mount to the firewall using four **6-32 x 1"** screws with **#6 flat washers**. Don't tighten the screws completely until after the engine has been positioned.

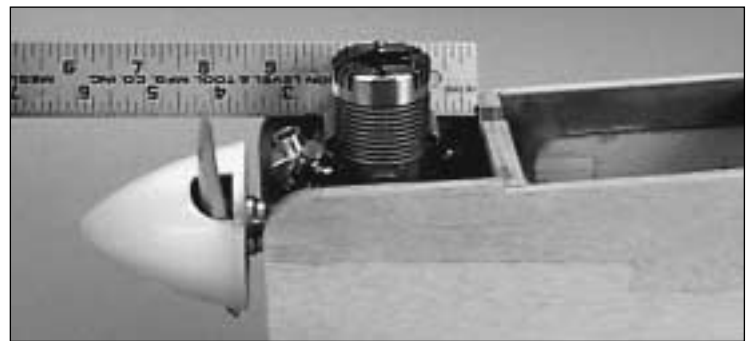
Note: You will need your engine for the following steps. From here on it is a good idea to plug the holes in your engine so balsa dust cannot get in. Stuff a piece of paper towel into the exhaust and carburetor to seal them off.

○ 2. Remove the needle valve from your engine. Position the engine on the engine mount and adjust the engine mount halves until the **engine mounting lugs** will sit flat on the rails. Position the mount so the firewall centerline is centered **between** the "tick" marks on the mount. Tighten the screws to hold the mount firmly in position against the firewall.

○ 4. Remove the engine and engine mount from the fuse. Use a center punch or sharpened nail to "dimple" the marks on the rails, then drill a 3/32" hole through the rails at each punch mark. If you have access to a drill press, this is the best tool for the job. However, if you are using a hand-held electric drill, try to keep the bit perpendicular to the rails.

★★★★ **Pro Tip:** Some modelers prefer to secure the engine to the mount with machine screws (not supplied) because they are easier to screw in. The screws recommended for this are 4-40 x 3/4". Use a #48 drill bit (3/32") to drill the holes, then tap the threads with a 4-40 tap.

○ 5. Install a **threaded ball stud** in the bottom hole of the carburetor arm of your engine and secure it with a **0-80 nut** and a drop of epoxy or thread locking compound. Fasten the engine to the mount with four **#4 x 5/8" screws**. **Hint:** Add a drop of household oil to the #4 sheet metal screws to make them a little easier to screw into the mount.



○ 3. Mount the spinner backplate on the crankshaft of your engine. Position the engine so that the spinner backplate is 3-3/4" from the firewall. **Carefully mark the engine mounting holes** on the rails with a sharpened piece of wire or a pencil.

NOTE: If installing a 4-stroke engine, the engine may be forward of the recommended position to allow for the choke mechanism. This is acceptable and will **not** cause a balance problem.

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○ 6. Carefully and neatly cut away some of the fuselage side so you can reach the needle valve if necessary. A Dremel® tool with a sanding drum works well for this.

○ 7. Use the same procedure to remove some of the fuselage side to clear the muffler. There should be approximately 1/8" clearance between the muffler and the fuselage.

NOTE: The THROTTLE PUSHROD location will vary, depending on the engine used. Plan your installation carefully!

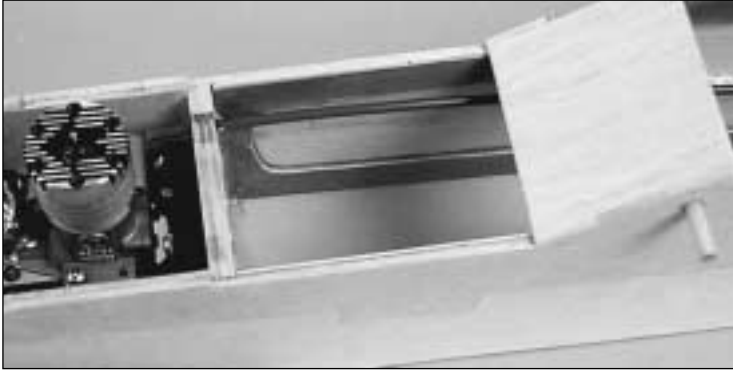
○ 8. With the engine attached to the mount, plan the throttle pushrod routing. The pushrod should be located as close as possible to the fuse side (to allow room for the fuel tank) and the guide tube should not have any tight bends. Drill a 3/16" hole in F-1 for the **throttle pushrod guide tube**.

○ 9. Cut a piece of tubing to be used for the throttle pushrod guide tube. It should extend 1/2" past the firewall and 1/2" aft of F-2. Temporarily install the throttle guide tube through the holes in the firewall and F-2.

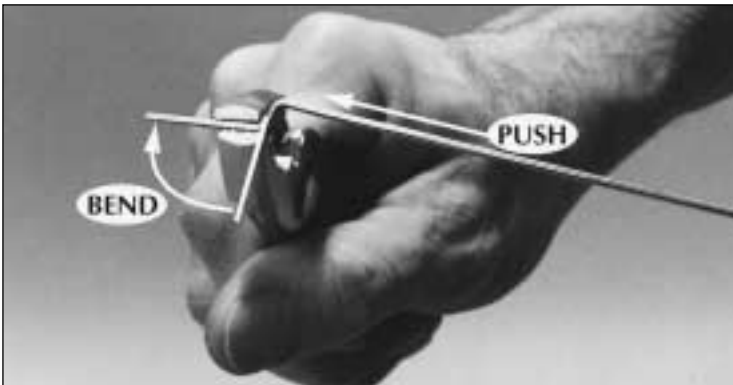
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○ 10. From another piece of outer pushrod tube, cut the **nose steering guide tube**. It should be flush with the front of the firewall and extend 1/2" aft of F-2. Temporarily install the nose steering guide tube in the firewall and F-2.

○ 11. Cut 14" from a **threaded** end of a **36" threaded wire pushrod** (after cutting you should have a 14" long piece of wire threaded at one end and a non-threaded piece 22" long). The threaded end of wire is for the **throttle** and the non-threaded piece is for the **nose wheel steering**. Screw a **ball link** about 14 full turns onto the threaded pushrod wire. Save the steering pushrod for later.



○ 12. Insert the throttle pushrod through the pushrod tube. Make one downward bend in the pushrod so that the ball link will meet the ball stud on the engine without binding. Don't snap the ball link onto the ball until later. The final adjustments will be done during the radio installation.



B. Make the second bend about 1/8" ahead of the first to form the "Z". While bending, push the wire toward the pliers.

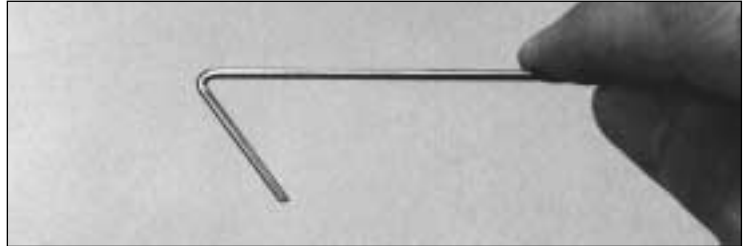
INSTALL THE NOSE GEAR

○ 1. Remove the engine from the engine mount. Slide a **5/32" wheel collar** (included with this kit) with a **set screw** installed on the **nose gear**, then install the nose gear into the engine mount so 1/4" protrudes above the engine mount.

○ 2. Position the wheel collar so it is snug against the bottom of the engine mount, then temporarily tighten the set screw to lock the wheel collar in position. *Look ahead to the photo's in some of the following steps for more information.*

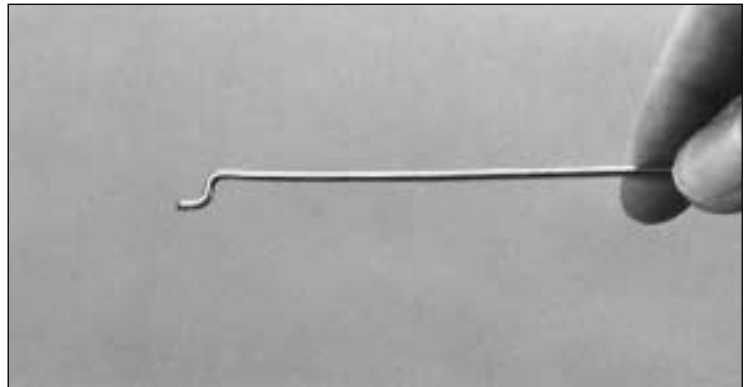
○ 3. Use your "Z-bend" pliers or follow the **Pro-Tip** that follows to make a Z-bend.

★★★★ Pro Tip: How to make a Z-bend with regular pliers.



A. Bend the wire. This bend should be about the same angle as the one shown in the photo.

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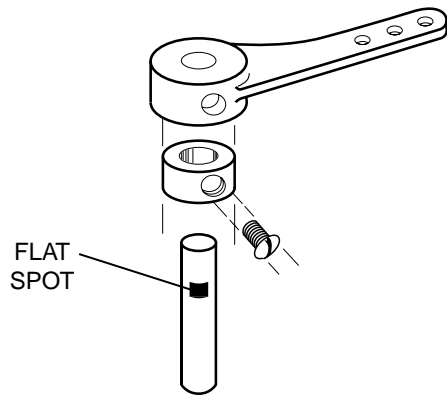


C. If there is any extra wire, cut it off so there is only 3/16" past the bend. File the burrs off. **Always wear safety glasses when cutting wire!**

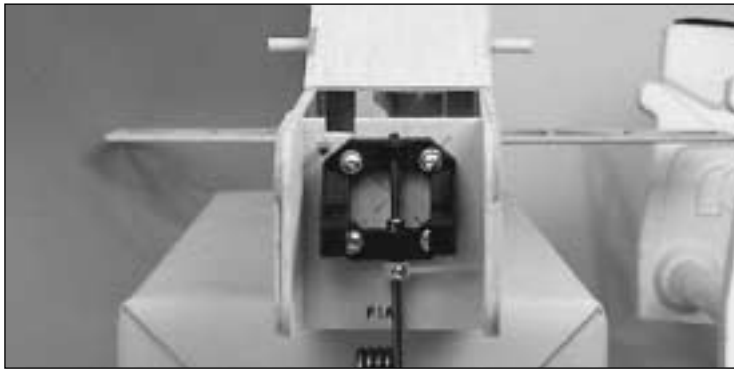
D. If you didn't like the way *that* Z-bend came out and you have enough wire, cut it off and try another.

○ 4. Place a 5/32" wheel collar inside the **nylon steering arm** and start a **6-32 x 1/4" screw** into the arm and the wheel collar (see the following sketch). Enlarge the outside hole in the steering arm with a 5/64" drill bit (#47 for perfection), then insert the wire with the Z-bend into the hole.

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NOTE: Do not file the "flat spot" until step #3 on page 51.



○ 5. Slide the wire through the guide tube and place the arm on the nose gear sticking out of the engine mount. Position the steering arm as shown on the plan, then temporarily tighten the set screw.

NOTE: The NOSE GEAR PUSHROD location will vary, depending on the engine mount used. Plan your installation carefully!

○ 6. With the nose gear steering arm installed, plan the nose gear pushrod routing. The pushrod should be located as close as possible to the fuse side (to allow room for the fuel tank) and the guide tube should not have any tight bends. Drill a 3/16" hole in F-1 for the **throttle pushrod guide tube**. A 90 degree bend in the pushrod wire is necessary to attach the wire to the steering arm.

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FINISHING

FINAL SANDING

Fill any scuffs or dents in the wing with HobbyLite™ balsa filler. After the filler has cured, final sand the wing.

FUELPROOFING

Fuelproofing may be done either before or after covering.

○ 1. Remove the engine mount, fuel tank, landing gear and any other hardware you may have installed in the model.

○ 2. Fuelproof the engine and fuel tank compartments and any other areas that may be exposed to fuel (such as the landing gear rails, the tops of formers F-2 and F-3, the inside of the fuel compartment hatch). You can use any fuel proof paint such as K&B Superpoxy, model airplane dope, or 30-minute epoxy. Pay special attention to the firewall. Refrain from allowing paint or epoxy to clog the blind nuts. Apply petroleum jelly to the threads with a toothpick. The petroleum jelly must be cleaned off the wood with rubbing alcohol before fuelproofing.

BALANCE THE AIRPLANE Laterally

SPECIAL NOTE: Do not confuse this procedure with "checking the C.G." or "balancing the airplane fore and aft." That very important step will be covered later in the manual.

Now that you have the basic airframe nearly completed, this is a good time to balance the airplane **laterally** (side-to-side). Here is how to do it:

○ 1. Temporarily attach the wing, engine (with muffler) and landing gear to the fuselage.

○ 2. With the wing level, lift the model by the engine propeller shaft and the fin (this may require two people). Do this several times.

3. If one wing always drops when you lift the model, it means that side is heavy. Balance the airplane by gluing a weight to the **inside** of the other wing tip.

NOTE: An airplane that has been laterally balanced will track better in loops and other maneuvers.

COVER THE STRUCTURE

You may duplicate the trim scheme shown on the box or use it as a "starting point" to create your own trim scheme.

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Modelers who have not used iron-on coverings should refrain from attempting complicated trim schemes. You may add stripes, graphics and various designs to your Tower Trainer 40. These are cut from different colors of covering, then ironed directly over the base color. If you are new to iron-on coverings try just a single color base (usually a lighter color such as white or yellow) with perhaps a single stripe, your AMA number, or some stick on graphics. A simple trim scheme will get you in the air faster and look much better (not to mention give you fewer headaches) than a model that was difficult to cover because of too ambitious a trim scheme.

Make sure the structure is sanded smooth with **320-grit** sandpaper. Remove as much dust as possible from the structure with a vacuum cleaner or a brush and a **Top Flite® Tack Cloth** so the covering will stick well. Cover the aircraft with **TowerKote™** covering using the sequence that follows. Make sure the TowerKote is thoroughly stuck down and all of the edges are sealed. Use a **Hot Sock™** on your covering iron to avoid scratching the TowerKote film and denting the wood.

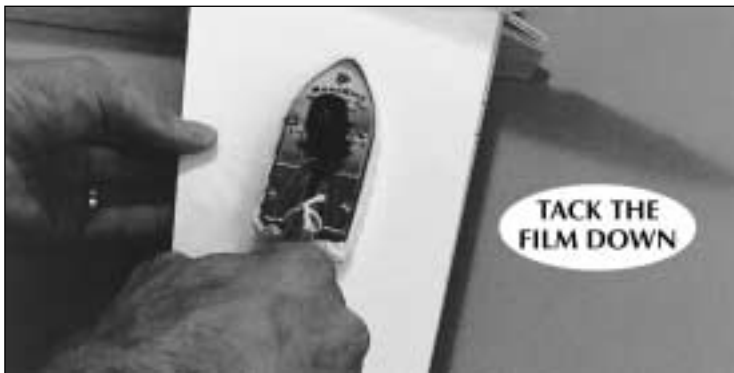
★★★★ **Pro Tip: COVERING TECHNIQUE**

By following this technique, you can practically eliminate wrinkles that sometimes occur in the covering when the model is left out in the sun or in your car.

A. Cover your sealing iron with a **Hot Sock** and set the temperature as suggested by the covering manufacturer.



B. When covering areas that involve sharp junctions, like where the tail meets the fuse, apply narrow strips (3/8" to 1/2") in the corners **before** covering the major surfaces. This is an area where the **Top Flite Trim Seal Tool™** really comes in handy. The larger pieces of TowerKote film will overlap and capture these smaller pieces. This technique also bypasses the need to cut the TowerKote film in these areas after it has been applied. **DO NOT, under any circumstances, attempt to cut the covering material after it has been applied to the fin and stab, except around the leading and trailing edges and the tip.** Modelers who do this often cut through the covering and part-way into the balsa stab.



C. Cut a piece of TowerKote film for the stab about 2" larger all around. Strip off the backing and position the film flush with the fin, over the TowerKote corner strip. Tack the film down at the center of the stab/fin junction.

D. Pull (as in stretch) the film toward edges of the stab, sealing it to the balsa from **the fin outward**, the width of your sealing iron. Work out any **wrinkles and air pockets** as you proceed with a **back and forth motion**.

E. Stretch the TowerKote film **toward the four corners, sealing it down as you proceed.** The trick is to shrink out any wrinkles before you seal the film to the surface.

F. Use a heat gun or your iron with the heat turned all the way up to heat and stretch the film around curved surfaces like the stab and rudder tips. Pull on the excess material while you apply the heat. You may need to pull hard to get out all of the wrinkles, so wear a glove if you need to. Trim off the excess, then follow-up with your sealing iron to secure the bond.

The idea behind this approach (which can be applied to any part of the model) is to **pre-stretch the TowerKote** film as it's applied removing the air pockets that can expand later causing sags and wrinkles.

RECOMMENDED COVERING SEQUENCE

Tail Surfaces

- 1. Tail Junction Strips as described above
- 2. Stab bottoms
- 3. Stab tops
- 4. Fin left side, then right side
- 5. Elevator bottom, then top
- 6. Rudder left side, then right side

Wing

- 1. Ends of ailerons
- 2. Bottoms, then tops of ailerons
- 3. TE of wing (the hinge line)
- 4. Wing tips
- 5. Bottom of left, then right wing panel (overlap the covering 1/4" at the center)
- 6. Top of left, then right wing panel (overlap the covering 1/4" at the center)

Fuselage

- 1. Fuse bottom
- 2. Fuse sides
- 3. Fuse top
- 4. Front and Rear Windows
- 5. Fuel tank compartment hatch

○ ○ A. **Without ironing it down**, place the left side of the stab covering on the stab, then position the fin reinforcement. The stab and fin TowerKote film pieces shown in these steps are cut only slightly oversize for illustration clarity though as we mentioned, you should cut most of your covering pieces about 2" oversize all the way around.

○ ○ B. Remove the stab and fin covering from the model. Place the covering on your workbench (or a cutting mat if you have one), then cut it along the outline you made of the fin reinforcement. After cutting, remove any ink left on the covering with a cloth dampened with alcohol.

○ ○ C. Cover the stab and fin with the pieces you cut earlier.

○ ○ D. Perform the same operation for the other side of the stab and fin.

Note: If you have decided to cover the stab and fin before you glue them to the fuselage, use the same procedure as described above but glue the "pre-covered" triangular fin reinforcements in position after you cover the stab and fin.



Cover the die-cut Trailing Edge plates. Position the plates onto the wing, and trace the outline onto the covered wing. Trim the covering 1/16" inside of the lines drawn using a sharp hobby knife. Use Medium CA to glue the TE Plates onto the wing.

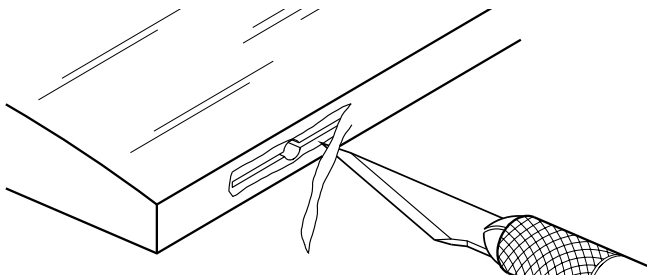
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APPLYING WINDOWS

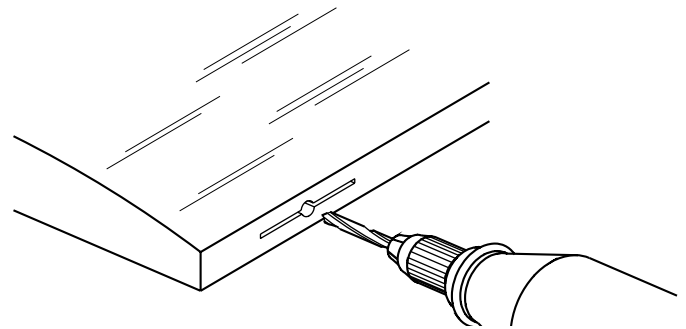
Use the patterns on the fuse plan (or make your own templates) to cut the window shapes from TowerKote film or self-adhesive TowerKote Trim Sheet. After cutting the pieces to size, wipe the area on the fuselage to be covered with soapy water. A couple of drops of dish detergent to a cup of water is sufficient. Peel the backing from the TowerKote film or TowerKote Trim Sheet, then "float" the covering into position. Use a piece of balsa wood to squeegee the solution from underneath the window. Only work in one direction, blotting moisture after each pass. Iron the film in position if you have used TowerKote.

HINGING (USING CA HINGES)

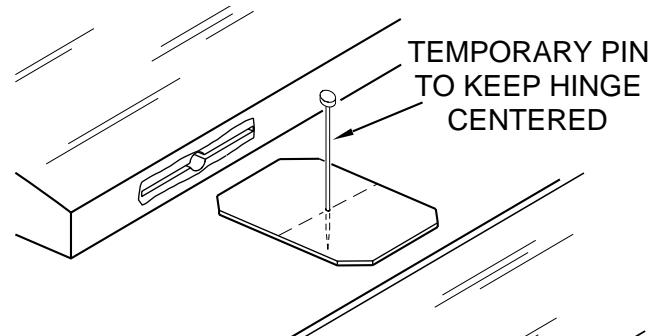
NOTE: CA hinges are hinges made specifically to be used with CA glue. These hinges have a plastic core which is laminated with fibers to allow the CA to adhere to them.



○ 1. Start with the elevator and the stab. Cut the covering from the hinge slots – don't just *slit* the covering but actually remove a small strip of covering the size of the hinge slot.



○ 2. Drill a 3/32" hole 1/2" deep in the center of each hinge slot. A high speed Dremel® MultiPro™ Tool works best for this. If you have to use a drill, clean out the hinge slots with your #11 blade.

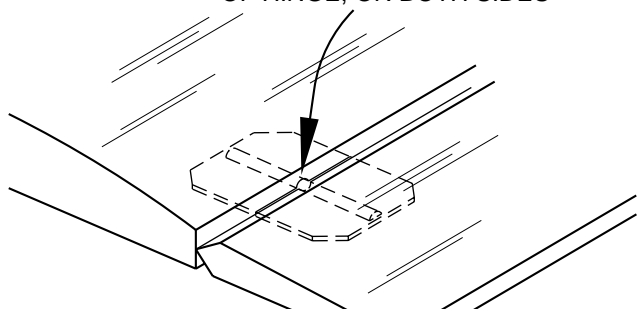


○ 3. Join the elevator to the stab with the hinges but **don't glue yet**. Confirm that the hinges are equally positioned in both the elevator and the stab. You may insert a small pin in the center of

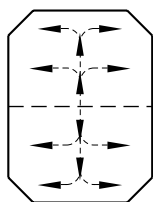
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the hinges to keep them centered. Close the hinge gap to 1/32" or less – it is better to have a *slight* gap to avoid inadvertently gluing the control surfaces together. Remove the pins if you have used any.

ASSEMBLE, THEN APPLY 6 DROPS OF THIN CA TO CENTER OF HINGE, ON BOTH SIDES



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



○ 4. Add 6 drops of thin CA to the center of all the hinges on both the top and the bottom.

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

○ 5. Join the rudder to the fin using the same procedures.

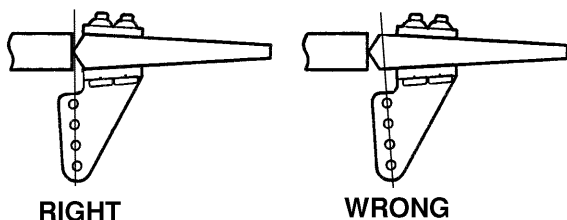
○ 6. Clean the aileron torque rod arms with rubbing alcohol to remove skin oils or smeared petroleum jelly.

○ 7. Prepare the hinge slots in the ailerons the same way as the tail surfaces.

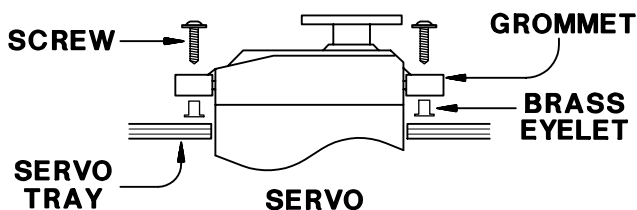
○ 8. Use a toothpick to pack the torque rod holes in the ailerons with 30-minute epoxy, then install the ailerons with the hinges and thin CA using the methods we've described. Wipe away the epoxy that is squeezed out of the ailerons with a paper towel and alcohol.

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FINAL CONTROL HOOKUPS



○ 1. Install the Elevator and Rudder small nylon control horns in line with the pushrod exits as shown on the plans. Hold the horns in position and mark the location of the mounting holes. Drill 3/32" mounting holes through the marks. Wick two to three drops of Thin CA into the holes to harden the underlying balsa. The horns are screwed in place using 2-56 x 5/8" machine screws and nylon nut plates. Do not tighten the screws as to crush the underlying balsa.



○ 2. Mount the servos into the main servo tray oriented as shown on the fuselage plan top view. Mount the aileron servo in the

aileron tray. Since the main servo tray is adjustable fore and aft for small CG corrections, do not glue it in until told to do so.

○ 3. For easy setup and good control response, we recommend you start off using servo horns resembling those on the plans. The Rudder, Throttle and Elevator horns are made using the large four armed horns. The aileron servo used the smaller, six armed horn to provide differential throw. In this case it will cause the ailerons to deflect "up" more than the deflect "down."

○ 4. Make the Rudder and Elevator pushrods: (Use the sketch on the plans to assist in making the pushrods. Both the Elevator and Rudder are made using the same sketch.)

A. Locate the two 3/16" threaded rods. Cut each of the threaded rods so there are two 10" rods with threads on one end. Save the remaining wire, as it will be used in a couple of minutes.

B. Locate the two 1/4" x 16" hardwood dowels. Cut them to a length of 14". Drill a 5/64" hole 1" from the end of the dowel. A total of four holes need to be drilled.

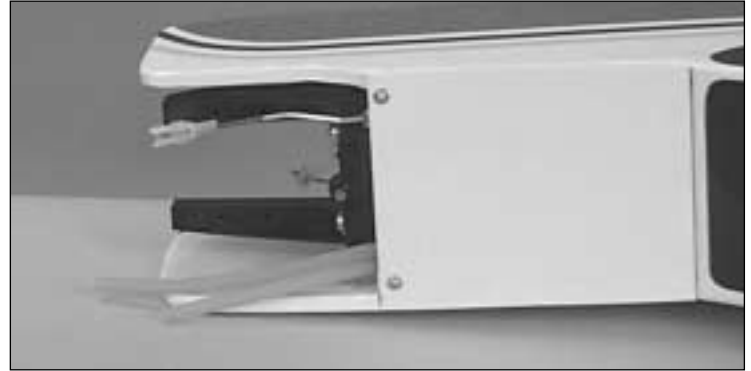
C. Using a sharp hobby knife, cut a notch from the hole to the end of the dowel as was done with the ailerons to provide access for the torque rods.

D. Bend one end of the threaded rods, and one end of the remaining wire, 1/4" from the non-threaded end. Insert the bend into the hole drilled in the dowel.

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- E. Use medium CA to glue the wire to the rod.
 - F. Cut the heat shrink into 1-1/2" lengths (four total pieces). Slide the shrink tubing onto the rods over the wire. Leave about a 1/8" overhang off the end of the dowel. Use a heat gun or cigarette lighter to tighten the shrink over the wire and dowel.
 - G. Apply thin CA inside each end of the heat shrink tubing to complete the pushrod assembly.
- 5. The Rudder and Elevator control rods need to be installed into the fuselage from the radio compartment threaded end first. Patience is the key to getting the rods in and having them exit in their proper locations.
 - 6. Screw the nylon clevises well onto the ends of the pushrods (about 14 turns). Snap the clevises onto the control horns for now, as they will be removed later to allow bending of the wire at the servo.
 - 7. Cut a notch in the bottom wing skin to provide an aileron lead exit. Use medium CA to glue the aileron servo tray (with servo) in its place as shown on the plans.
 - 8. Hook up the nylon clevis to the nylon swivel. Thread a 12" threaded end rod into each clevis. Screw these assemblies onto the aileron torque rods down to the height shown on the cross section at the centerline.

- 9. Mark the locations for the Z-Bends in the aileron pushrods by holding the ailerons neutral with tape and putting marks on the pushrods even with the holes in the servo arm. Note: When attaching the Z-Bends to the servo arms, you'll need to use a 5/64" drill to enlarge the holes in the servo arms. Make the Z-Bends as shown in the following sequence
- 10. Hook up and make final adjustments to the aileron linkage.
- 11. Mount the wire main landing gear. Install your wheels and tires using 5/32" wheel collars (not included) as shown on the plans.



- 12. Locate the die-cut 1/8" plywood **hatch retainer (HR)**. Center the hatch retainer on the 1/8" x 4" x 5" balsa **tank compartment hatch** with approximately 3/8" protruding from the edge, then glue it in position.

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- 13. Position the hatch on the fuselage. Mark a cut line on the hatch to indicate the front of the firewall. Trim the front of the hatch to fit flush with F1A. Mark the sides of the hatch and trim it even with the fuselage sides. Drill 1/16" holes as shown in the photo through the hatch and into the firewall. Remove the hatch, then enlarge the holes in **the hatch only** with a 3/32" drill bit. Temporarily mount the hatch to the fuselage with #2 x 3/8" screws.

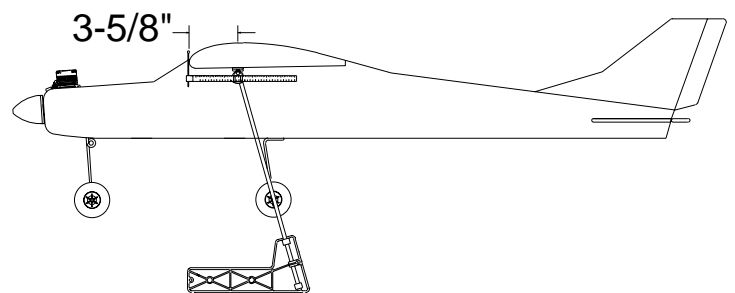
- 14. Install the nose gear steering pushrod using the plans as a reference. The exact installation will be dependent on your particular selection of the pushrod.

- 15. Install the throttle pushrod using the plans as a reference.

- 16. Install the switch harness in the location you desire. It is always best the switch be on the opposite side of the muffler to prevent fuel from damaging the switch.

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. Use a felt tip pen or a narrow strip of tape to **accurately** mark the balance point on the **bottom** of the wing near both sides of the fuselage. The balance point (**CG**) is shown on the plan. On the Tower Trainer 40 the (**CG**) is located **3-5/8" back from the leading edge**. This is the point at which your model should balance for your first flights. Later, you may experiment by shifting the balance up to **1/4" forward or back** to change the flying characteristics. Moving the balance **forward** may improve the smoothness and arrow-like tracking, but it may require more speed for takeoff and make it more difficult to slow down for

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landing. Moving the balance **aft** makes the model **more agile** with a lighter and snappier feel. **Please start at the location we recommend and do not at any time balance your model outside the recommended range.**

○ 2. Mount the wing to the fuselage with rubber bands or bolts. The engine, muffler and propeller should also be mounted for the C.G. check.

○ 3. Set the fuel tank (empty) on top of the fuel tank hatch to simulate the actual weight distribution of the finished model with the tank installed. With the wing attached to the fuselage, lift the model with your finger tips at the balance point. If the tail drops when you lift, the model is "tail heavy" and you must move the battery and/or the servo tray toward the nose to achieve balance. If the nose drops, it's "nose heavy" and you must move the battery and/or servo tray the tail to achieve balance. The C.G. is always determined with the fuel tank **empty**.

○ 4. Balance the model by shifting the receiver battery, servo tray and receiver, then re-testing. When balance is obtained note the position of the of the receiver, servo tray and the battery pack.

○ 5. If the balance cannot be achieved by positioning the battery, servo tray and receiver, you may add stick-on lead weight to the tail or nose if required.

○ 6. Confirm that the battery is securely wrapped in foam and is packed in tight enough under the tank floor so that it cannot shift during flight or a rough landing.

○ 7. If you haven't already done so, assemble the fuel tank according to the manufacturer's instructions. Connect about 6" of medium silicone fuel line to the "vent" and about 10" of fuel line to the "pickup" fittings on the tank (most modelers leave the third "fill" line closed because you can fill the tank through the pickup line).

○ 8. Cover the tank floor with 1/4" foam rubber. Insert the tank into the tank compartment as you route the fuel lines through the holes you drilled in the firewall (you may temporarily remove the servo tray – or just the throttle servo). Cut the lines to the proper length and connect them to the carburetor and muffler pressure fitting.

○ 9. Place more foam on the sides and top of the tank.

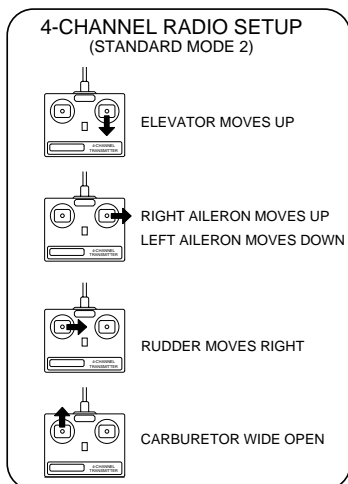
○ 10. Glue the servo tray securely to the fuse doublers and fuse sides with medium CA at the position required to achieve balance.

IMPORTANT: After the model is 100% complete, recheck the balance.

CHECKS AND FINAL SETUP

○ 1. **IMPORTANT:** Go back and check your installation. Be sure that all servo screws, horns, and other components are secure. Confirm that you have installed the retainers on the screw-lock connectors.

○ 2. Apply a strip of 1/16" thick foam **wing-seating tape** to the wing saddle. This tape provides a seal against dirt and exhaust oil, and cushions the wing from vibration.



○ 3. Check the direction of all control functions. They must all move in the direction shown in the following sketches. If not, change the position of the reversing switches on your transmitter.

CONTROL SURFACE THROWS

We recommend the following Control Surface Throws:

NOTE: Control throw (movement) is measured at the **trailing edge** of the elevator, rudder, and ailerons. Hold a ruler vertically on your workbench or block it up on books to make these measurements.

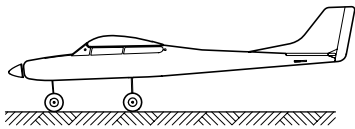
The following throws are for a transmitter that does not have Dual Rates .		
ELEVATOR:	1/2" up	3/8" down
RUDDER:	3/8" right	3/8" left
AILERONS:	3/8" up	3/8" down
NOTE: The balance and control throws for the Tower Trainer 40 have been thoroughly tested and represent the settings at which the Trainer flies best. Please set up your Tower Trainer 40 to the specifications listed. If, after a few flights, you would like to adjust the throws to suit your taste, that's fine. Remember, " <i>more is not better</i> ."		

Note: If your radio system does not feature Adjustable Travel Volume (ATV's), you will have to mechanically adjust control surface throw.

Control throw adjustment: If you move the clevis at the control horn on the control surface **toward the outermost hole**, you will **decrease** the amount of throw. If you move the clevis to a hole **nearer the control surface** you will **increase** the amount of throw. If these adjustments do not provide the desired throws, you may need to work with a combination of adjustments by repositioning the pushrod at the servo. If you move the pushrod toward the splined shaft on the servo arm, it will decrease the control surface throw – outward will increase it.

GROUND STANCE

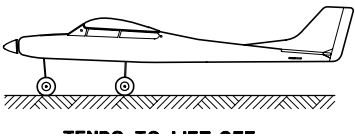
NOSE TOO LOW



MAY BE DIFFICULT TO ROTATE ON TAKEOFF

STICKS TO THE RUNWAY AFTER LANDING

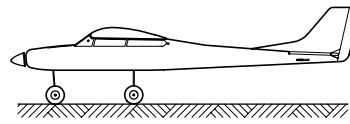
NOSE TOO HIGH



MAY BE DIFFICULT TO ROTATE ON TAKEOFF

STICKS TO THE RUNWAY AFTER LANDING

GOOD STANCE



WILL LIFT OFF EASILY ON TAKEOFF

LANDS PREDICTABLY AND STAYS PUT ON RUNWAY

○ 1. "Eyeball" the side of the fuselage from 6 - 10 feet away. If necessary adjust the height of the nose by raising or lowering the nose gear wire so that your model will sit pretty much level, as shown in the previous sketches.

○ 2. Once the correct ground stance is established, grind the flat spot on the nose gear wire to lock the bottom wheel collar in position. Use thread lock on the set screw.

○ 3. When everything is aligned and the model sits correctly, tighten the screw on the steering arm tight enough to leave a **mark** on the nose gear wire. Remove the nose gear from the engine mount and file the flat spot.

○ 4. Reassemble the nose gear and install it into the engine mount. Tighten the steering arm screw directly over the flat.

It is a good practice to periodically check the ground stance of your Tower Trainer 40 – especially after a hard landing. The wire landing gear is designed to absorb shock from rough landings but occasionally may need to be bent back into position.

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PREFLIGHT

CHARGE THE BATTERIES

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

BALANCE THE PROPELLER

Balance your propellers carefully before flying. An unbalanced prop is the single most significant cause of vibration. Not only will engine mounting screws and bolts vibrate out, possibly with disastrous effect, but vibration will also damage your radio receiver and battery. Vibration will cause your fuel to foam, which will, in turn, cause your engine to run lean or quit.



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

FIND A SAFE PLACE TO FLY

The best place to fly your R/C model is an AMA (Academy of Model Aeronautics) chartered club field. Ask your hobby shop dealer if there is such a club in your area and join. Club fields are set up for R/C flying and that makes your outing safer and more enjoyable. The AMA also can tell you the name of a club in your area. We recommend that you join AMA and a local club so you can have a safe place to fly and have insurance to cover you in case of a flying accident (The AMA address is listed on page 3 of this instruction book).

If a club and its flying site are not available, you need to find a large, grassy area at least 6 miles away from any other R/C radio operation like R/C boats and R/C cars and away from houses, buildings and streets. A schoolyard may look inviting but it is too close to people, power lines and possible radio interference.

GROUND CHECK THE MODEL

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

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RANGE CHECK YOUR RADIO

Whenever you go to the flying field, you need to check the operational range of the radio before the first flight of the day. First, make sure no one else is on your frequency (channel). With your 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 a friend 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 a helper holding the model. If the control surfaces are not always acting correctly, **do not fly!** Find and correct the problem first. Look for loose servo connections or corrosion, loose bolts that may cause vibration, a defective on/off switch, low battery voltage or a defective cell, a damaged receiver antenna, or a receiver crystal that may have been damaged from a previous crash.

ENGINE SAFETY PRECAUTIONS

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

Keep all engine fuel in a safe place, away from high heat, sparks or flames as fuel is very flammable. Do not smoke near the engine or fuel; and remember that the engine exhaust gives off a great deal of deadly carbon monoxide. **Do not run the engine in a closed room or garage.**

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.
4. I will not fly my model unless it is identified with my name and address or AMA number, on or in the model.
5. I will not operate models with pyrotechnics (any device that explodes, burns, or propels a projectile of any kind)

Get help from an experienced pilot when learning to operate engines.

Use safety glasses when starting or running engines.

Do not run the engine in an area of loose gravel or sand; the propeller may throw such material in your face or eyes.

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

Keep items such as these away from the prop: loose clothing, shirt sleeves, ties, scarfs, long hair or loose objects such as pencils, screw drivers that may fall out of shirt or jacket pockets into the prop.

Use a "chicken stick" device or electric starter; follow instructions supplied with the starter or stick. Make certain the glow plug clip or connector is secure so that it will not pop off or otherwise get into the running propeller.

Make all engine adjustments from **behind** the rotating propeller.

The engine gets hot! Do not touch it during or after operation. Make sure fuel lines are in good condition so fuel will not leak onto a hot engine causing a fire.

To stop the engine, cut off the fuel supply by closing off the fuel line or follow the engine manufacturer's recommendations. Do not use hands, fingers or any body part to try to stop the engine.

Do not throw anything into the prop of a running engine.

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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 moment of truth has finally arrived. You've put a lot of effort into building your Tower Trainer 40 and it looks great! Protect your investment by following a few simple tips:

- 1. If possible, have an experienced modeler look over your work before you head out to your flying field. It's easier to fix problems in the workshop instead of the flight line.
- 2. Become familiar with starting your engine, and break it in before going for your first flight. **Be sure the engine will stop when the trim lever is pulled all the way back.**

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○ 3. Assemble a simple flight kit which should include a starting battery and glo-plug clip (or ni-starter), "chicken stick" for flipping the prop, fuel and a means of filling the tank, a couple of small screwdrivers, #64 rubber bands (or wing bolts), spare prop and glo-plug, 6" adjustable wrench, and a pair of needle nose pliers. In addition to tools, you should also take along some paper towels and spray window cleaner to remove residue after each flight.

○ 4. When you load up to go to the flying field be sure that the batteries have charged for at least 14 hours. Be sure you have your fuselage, wing, transmitter, flight box and, most important, you have your AMA license.

○ 5. Range check the radio! See page 53.

★★★★ Pro Tip: USING RUBBER BANDS

Since you are using rubber bands to attach your wing, the rule of thumb is to use two #64 rubber bands per pound of model weight. If your model tipped the scales at 7 pounds, you need 14 rubber bands. It doesn't matter too much how many you run straight across the wing or how many are criss-crossed, so long as the last two are criss-crossed. This trick stops the other bands from popping off. Do not use oily rubber bands for more than a few flying sessions. Check each rubber band before using it and watch out for cracks. Rubber bands can be conditioned by storing the oily ones in a zip-top storage bag partially filled with talcum powder or corn starch. Both products will absorb the oil.

TAXIING

Start the engine and set the throttle trim for a slow, steady idle. Have your instructor or a helper hold the plane while you work the controls. Upon release advance the throttle slightly to start rolling, then back-off the power to prevent going too fast and possibly taking off. Stand behind the plane as it taxis away from you and note the direction it turns as you move the rudder control. One thing to keep in mind with R/C models (whether it be cars, boats, or planes) is that the steering controls may seem to "reverse" when the model is moving toward you. For example, if you are flying toward yourself, and you give a **right** control input (ailerons or rudder), the model will move off to **your left**. The fact of the matter is that the controls are not reversed and the aircraft did actually enter a right turn. The plane does move off to your left from your vantage point, but if you imagined yourself in the cockpit you would realize the plane turned to the right as commanded. All it takes is a little practice to maintain proper orientation of your aircraft, but that's why we recommend finding an instructor.

When you feel comfortable, advance the throttle a little while standing behind the plane to get the feel of a takeoff roll, but pull back on the power before the Tower Trainer 40 lifts off. Try this several times, adding a little more power each time. If the plane starts to veer off, immediately cut the power to prevent a mishap.

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Although many R/C pilots have taught themselves to fly, we strongly recommend that you find an instructor to help get you started. Although the Tower Trainer 40 series of trainers offer the greatest opportunity of success for the self-taught, there is a high probability that you will crash your airplane on the first flight. Protect your investment of time and money—obtain the assistance of an experienced R/C pilot.

TAKEOFF

Your first flights should be made in little or no wind. If you have dual rates on your transmitter, set the switches to "low rate" for takeoff. Taxi into position, pointing directly into the wind. Although this model has good low speed characteristics, you should always build up as much speed as your runway will permit before lifting off, as this will give you a safety margin in case of a "flame-out." Advance the throttle smoothly to the wide open setting. When the plane has sufficient flying speed (you won't know until you try), lift off by smoothly applying a little up elevator (don't "force" it off to a steep climb!), and climb out gradually, trying to keep it straight and the wings level. The Tower Trainer 40 will climb at a 20 or 30 degree angle under full throttle. Climb to about 100 feet before starting a VERY gentle turn by moving the aileron stick. Apply a little more back pressure on the elevator stick as the Tower Trainer 40 turns. Stop the turn by moving the aileron stick in the opposite direction until the wings are level, then return the stick to the neutral position. Pull the power back to 1/3 throttle.

FLIGHT

We recommend that you take it easy with your Tower Trainer 40 for the first several flights and gradually "get acquainted" with this great plane as your engine becomes fully broken-in. The Tower Trainer 40 is designed to fly level with neutral elevator trim at approximately 1/4 to 1/3 throttle – this is the best speed for learning to fly. On later flights, if you want the Tower Trainer 40 to maintain level flight at full throttle, you will need to give it a little down trim.

Your first flights should consist mostly of straight and level flight with gentle turns to keep the model over the field. These flights will give you practice at coordinating your control inputs and maintaining the proper orientation of the airplane. As mentioned earlier, turns are accomplished by banking the aircraft with the ailerons, then gently adding some back stick (up elevator). Enough back stick should be held in to keep the aircraft at a constant altitude. To stop turning, apply opposite aileron (or rudder) to level the wings, then release the sticks. There is a memory aid that may help keep you out of trouble when the plane is **flying toward you** – "put the stick under the low wing." In other words, move the stick in the direction of the low wing to **raise** that wing. When you are comfortable flying the aircraft, you can practice using the rudder along with the ailerons to 'coordinate' the turns – usually, a small amount of rudder applied in the direction of the turn will keep the tail following in the exact same track as the nose.

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The most common mistake when learning to fly is "over control." Think of *pressure* instead of large movements of the control sticks. Remember all Tower Trainer 40's will recover from almost any over control situation within 50 - 100 feet if you simply **let go of the sticks**.

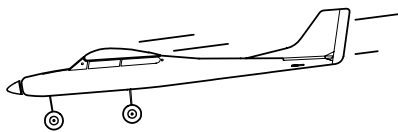
Add and practice one maneuver at a time, learning how your Tower Trainer 40 behaves in each one.

After you have several flights on your Tower Trainer 40, it's time to reward yourself with your first aerobatic maneuver – a **loop**. Climb to a safe altitude and turn into the wind. Apply full throttle, level the wings, then slowly pull back on the elevator stick to about 1/2 to 3/4 up elevator (depending on your throws), and hold this control input. After you *go over the top* and start down the back side of the loop, pull the throttle back to about half. This will keep the stresses on the airplane low and the airspeed relatively constant. Keep holding "up" elevator until the plane is level, then slowly release the sticks. You're done! It's really that easy!

CAUTION (THIS APPLIES TO ALL R/C AIRPLANES): If, while flying, you notice any unusual sounds, such as a low-pitched "buzz", this may indicate control surface "flutter". Because flutter can quickly destroy components of your airplane, any time you detect flutter you must **immediately** cut the throttle and land the airplane! Check all servo grommets for deterioration (this will indicate which surface fluttered), and make sure all pushrod linkages are slop-free. If it fluttered once, it will probably flutter again under similar circumstances unless you can eliminate the slop or flexing in the linkages. Here are some things which can result in flutter: Excessive hinge gap; Not mounting control horns solidly; Sloppy fit of clevis pin in horn; Elasticity present in flexible plastic pushrods; Side-play of pushrod in guide tube caused by tight bends; Sloppy fit of Z-bend in servo arm; Insufficient glue used when gluing in the elevator joiner wire or aileron torque rod; Excessive flexing of aileron, caused by using too soft balsa aileron; Excessive "play" or "backlash" in servo gears; and insecure servo mounting.

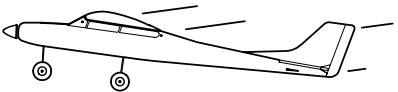
LANDING

APPROACH TOO STEEP



Apply up elevator.

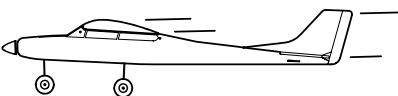
TOO MUCH FLARE



Danger of stalling!

Release elevator.

GOOD LANDING FLARE



Hold this angle until touchdown.

When it's time to land, fly a normal landing pattern and approach as follows: Reduce the power to about 1/4 and fly a downwind leg far enough out from the runway to allow you to make a gentle 180 degree turn. As you make the turn into the

wind for your final approach, pull the throttle back to idle. The Tower Trainer 40 has a lot of lift so you will need a slow, reliable idle in order to achieve a nice, slow landing. Allow the plane to keep descending on a gradual *glide slope* until you are about 3 feet off the runway. Gradually apply a little up elevator to *flare* for landing. You should apply just enough up elevator to hold the plane just off the runway while the excess speed bleeds off. The Tower Trainer 40 should settle onto the runway for a slow, slightly nose-high landing.

Good luck and have fun flying your Tower Trainer 40, but always stay in control and fly in a safe manner.

**Easy Tote™ Field Box
(TOWP1500)**



The handy, 9.75" x 7.75" x 11.75" Easy Tote features a large top tray, deep drawer, shelf for a quart jug of fuel (not included) and foam-padded cradles for model maintenance. Just glue together the interlocking ply parts and it's ready for use.

**Deluxe Heat Gun
(TOWR3200)**



A wide nozzle on Tower's Deluxe Heat Gun ensures uniform, drum-tight "shrink" over wide areas—and it can't scratch because it never touches the covering's surface. Includes heavy-duty motor and adjustable air intake for precise heat/air control.

TowerKote™ Covering (TOWQ1000-1008)



Light and bright, TowerKote makes multi-color trim schemes a breeze. Its low heat requirements are ideal for use with foam and most plastics, and the film's pliability let it conform easily to corners and curves. Available in 9 colors and 6' x 26" rolls.

**Custom Sealing Iron
(TOWR3250)**



Tower Hobbies' thermostat-controlled Custom Sealing Iron tacks covering tight anywhere. It features a tapered, upswept, non-stick sole for easy use in the tightest corners; a cool, comfortable wooden handle; and a metal stand to protect your work surface.

TWO-VIEW DRAWING

Use this two-view drawing to plan your trim scheme

