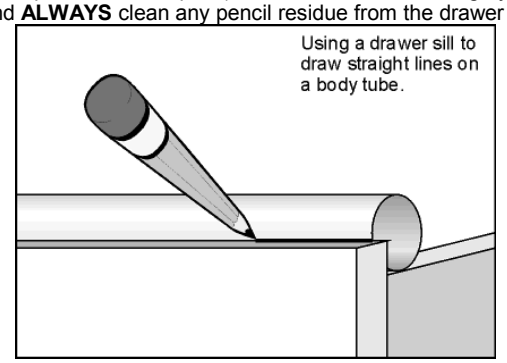
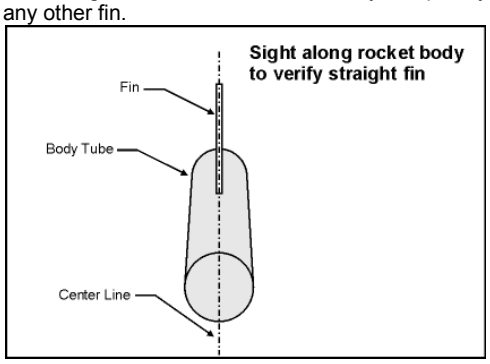
Assembly Tips

Drawing lines on tubes: Drawing lines on round tubes can be very difficult to do unless you know a few little tricks. You do not need any special tools, but you do need some "special knowledge". Referring to the figure below, you can draw perfectly straight lines by placing the body tube in the crevice of a drawer sill or door sill. This pre-made angle of wood provides the perfect holding device to keep your tube steady while also providing a long straight edge that goes right down the length of the body tube. Simply run your pencil along this edge, against the body tube for a perfect line. **Two important points:** Always use pencil, never a pen (as the ink will bleed through your paint) and **ALWAYS** clean any pencil residue from the drawer or door!

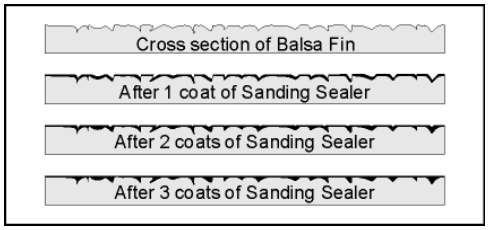


Getting your fins on straight: Getting your fins on straight is one of the most important parts of model rocket construction. Please take extra care when attaching your fins and you will be rewarded with straight flights time after time. When applying your fins, run a bead of white glue along the root edge of the fin. Press this against the fin line on the body tube then remove. By doing this, and letting the glue that is on the fin and the body tube set up for a minute or two, you will notice that the glue will set a lot faster, making fin attachment easier.

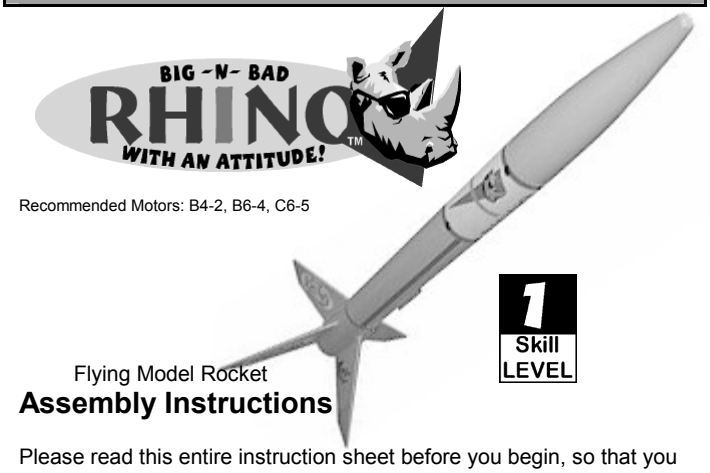
The figure below shows you a simple way to make sure that your fins are straight. With the fin in place, look down the length of the body tube. If the fin is crooked, you will easily see this and be able to correct it while the glue is still wet. Let this fin dry completely before attaching any other fin.



Sanding Sealer: Sealing your fins is the best way to protect them from water damage as well as providing a smooth surface for better painting. The figure below shows a close up cross section of a balsa fin and the effect of applying several layers of sanding sealer. Be sure to lightly sand your fin between each coat with 600 grit sandpaper.



ENGINEERING DIRECTIVE	
FROM:	Office of Chief Engineer
VEHICLE(S):	SP006
EFFECTIVE DATE:	25-March-2003
Chief Ordinance Engineer: James M Flis	Chief Deployment Engineer: Brian McCarthy
Effective immediately, the attached procedures will be used in the assembly and deployment of Launch Vehicle SP006, known as **"Rhino".**	



Recommended Motors: B4-2, B6-4, C6-5

Flying Model Rocket

1 Skill LEVEL

Assembly Instructions

Please read this entire instruction sheet before you begin, so that you become familiar with each step in constructing the Rhino. Refer to the **Hints and Tips** section (at the end of the instruction sheet) for helpful information!

1. Mark the **Engine Tube** ¼" from one end. Using a hobby knife, make a small slit at this mark. Referring to **Figure 1**, insert the **Engine Hook** into this slit as shown. Next, place a bead of white glue on the inside of the Engine Tube, on the same end as the slit, and insert the **Engine Block** until it touches the Engine Hook. The end of the Engine Block should be flush with the end of the Engine Tube.

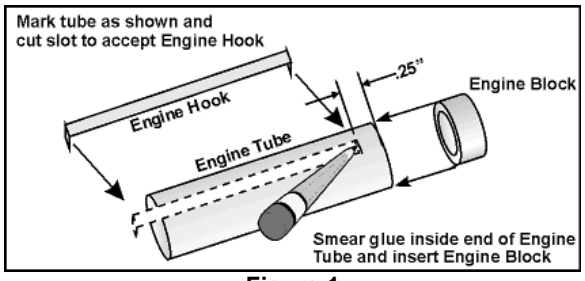


Figure 1

2. Make a mark on the Engine Tube, 1.0" from the end of the tube with the protruding Engine Hook, as shown in **Figure 2.** Place several wraps of masking tape around the Engine Tube, securing the Engine Hook in place. Run a thin film of white glue along the edges of the masking tape.

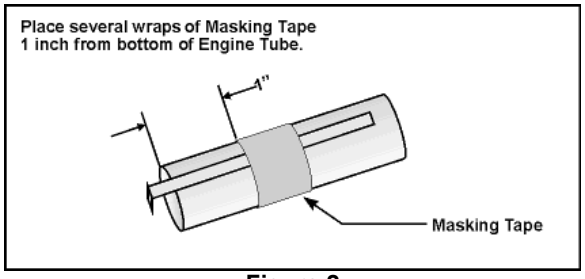


Figure 2

3. Modify one of the two Centering Rings by cutting a small notch on the inside circle, large enough to clear the Engine Hook, as shown in **Figure 3.**

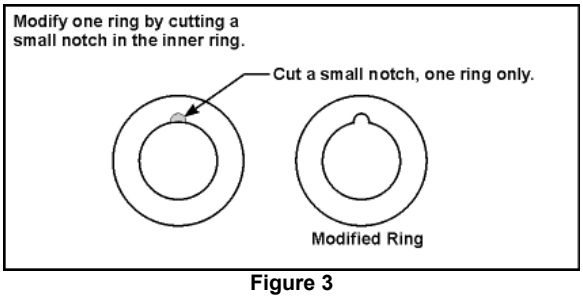


Figure 3

4. Make a mark on the Engine Tube ½" from the end where the hook is protruding. Glue the modified Centering Ring in place at the ½" mark with the engine hook centered in the cutout area, and the remaining ring at the other end, against the Engine Hook, as shown in **Figure 4.** Be sure that the ring with the cutout for the Engine Hook goes in the proper position. Run a bead of glue on both sides of each Centering Ring. Let this dry.

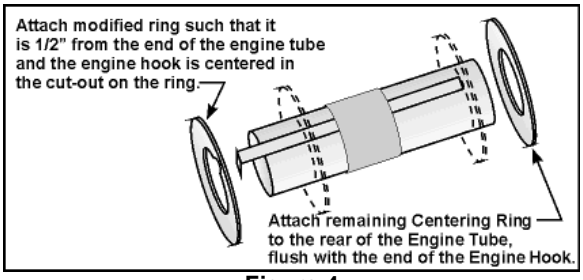


Figure 4

5. The **Rhino** kit comes with **Laser-Cut Fins.** In addition to this, your kit also comes with two fin patterns that can be used to cut other shaped fins from the laser-cut fins, to allow you to construct your model with a different look. These instructions assume that you are going to use the fins as is, but the other shaped fins will work just as well. Once you have decided on the fin design that you want, remove the fins and/or cut out new ones and decide how you want to shape the edges of the fins. Referring to **Figure 5**, you can leave the fin edges flat or sand them rounded, tapered, or air foiled, depending on the appearance you want for your model. Just be sure to leave the **Root Edge** (identified below and on the Fin Pattern Sheet on the back of the cover art) FLAT.

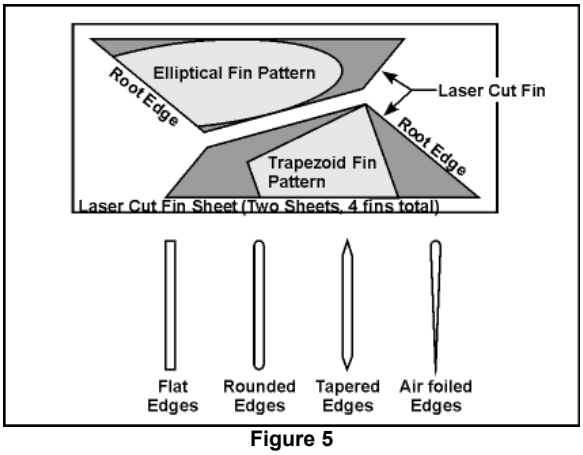


Figure 5

6. Cut out the Fin Marking Guide and wrap it around one end of the **Body Tube.** Mark off the locations of the 3 or 4 fins and the Launch Lug, on each end of the marking guide. Extend these lines as shown in **Figure 6**, the full length of the body tube**.**

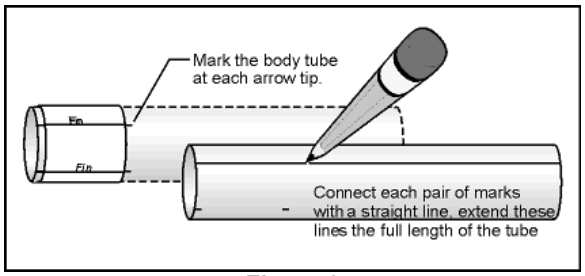


Figure 6

7. ***NOTE:*** *You may wish to practice this step before using glue.* To install the Engine Mount, smear a thin film of white glue about 1½" inside one end of the Body Tube. **QUICKLY** slide the Engine Mount Assembly into the tube until the end of the Engine Tube is flush with the bottom of the Body Tube, as shown in **Figure 7.** *Perform this step swiftly to prevent having the Engine Mount glued in the wrong position!* When done, use a toothpick to run a bead of glue along the inside joint between the Engine Mount and the inside of the Body Tube.

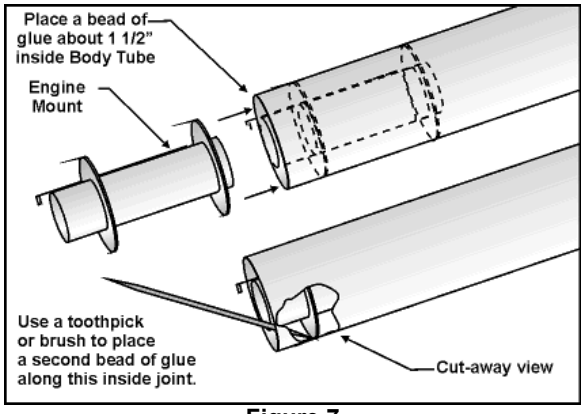


Figure 7

8. Attach the four (or three) Fins *(From Step 5)* to the Body Tube (Same end as the Engine Mount) such that the end of the fins are flush with the bottom of the Body Tube, as shown in **Figure 8.** When dry, place a bead of glue (glue filet) on each side of the fin at the Fin/Tube joint.

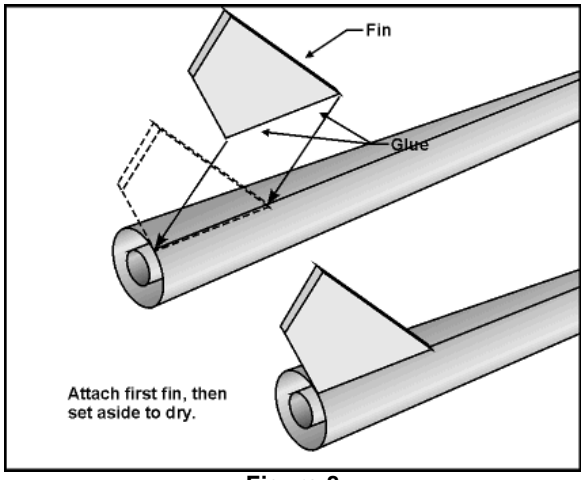


Figure 8

9. Attach the two **Launch Lugs** to your model, on the Launch Lug Line, as shown in **Figure 9.** One Launch Lug should be 1" from the bottom of the Body Tube while the second one is 6" from the bottom of the Body Tube.

NOTE: It is critical that these Launch Lugs line up with each other and are straight on the Body Tube!

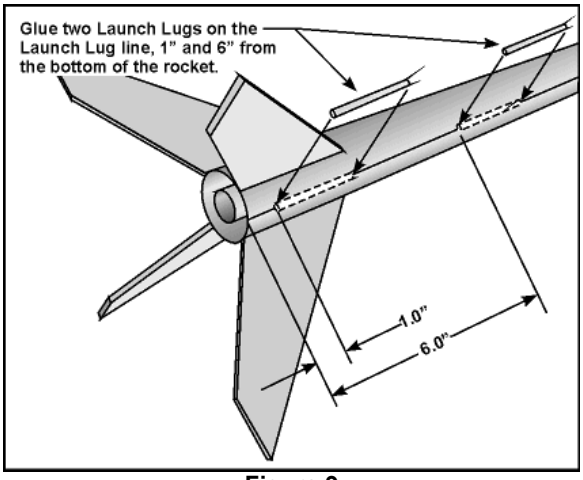


Figure 9

10. Screw the **Screw Eye** into the base of the **Nose Cone,** remove the screw eye, place a drop of glue into the hole and re-insert the screw eye, as shown in **Figure 10.**

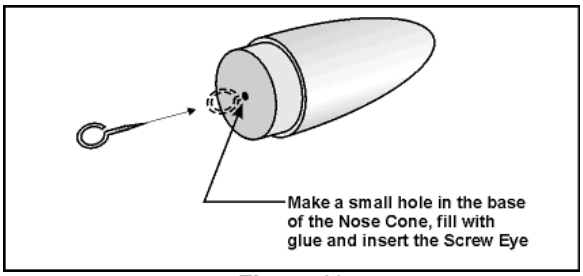


Figure 10

11. Cut out the **Shock Cord Mount** and assemble as shown in **Figure 11.** Glue this inside the top of the Body Tube at least 1.0" inside the tube.

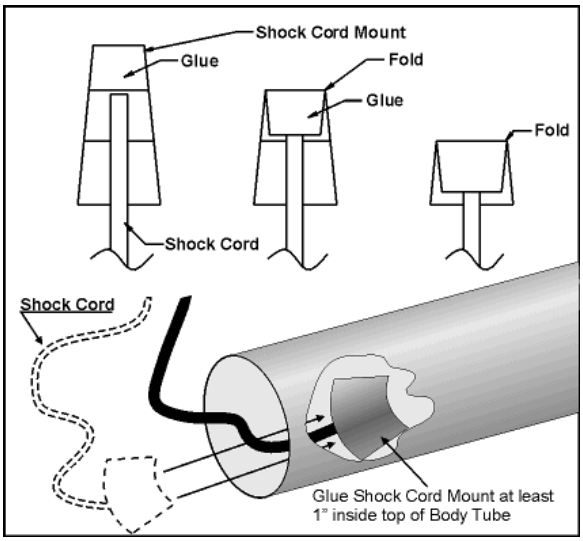


Figure11

12. Referring to **Figure 12,** tie the free end of the Shock Cord to the Screw Eye in the Nose Cone. Also tie the gathered Shroud Lines of the Parachute to the Screw Eye.

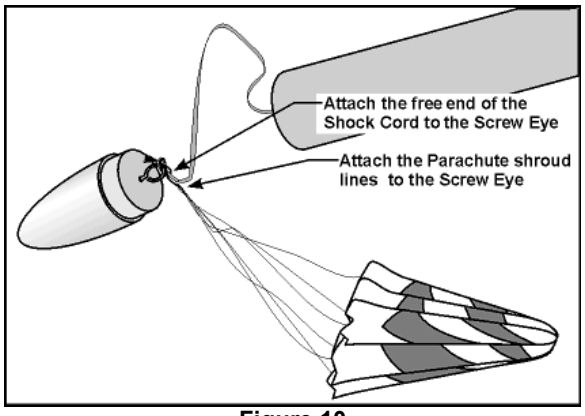


Figure 10

Congratulations! You have just completed building the Rhino model rocket from FlisKits!

To finish your model, seal all balsa parts with 2-3 coats of **Sanding Sealer,** sanding with 400 – 600 grit sand paper between coats. Before painting, apply 1-2 coats of primer to your model. Paint your model any color that strikes your fancy! You can use the cover art for painting ideas.

Refer to the following **Flight Preparation** sheet for all you will need to know about getting your Rhino on the launch pad and into the air!

Rhino Flight Preparation!

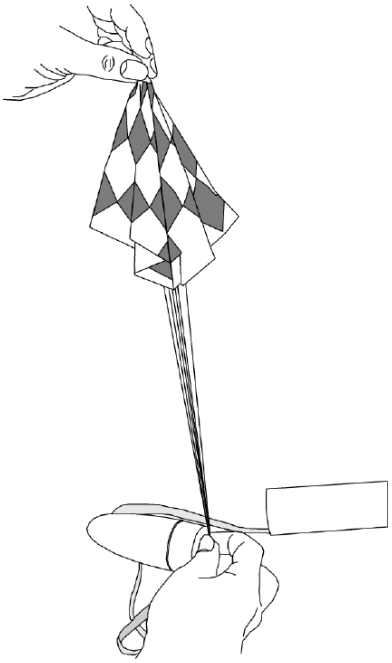


FIGURE A

1. Holding the center of the parachute and the end of the shroud lines, draw the parachute into a spike as shown in **Figure A.**

2. Fold the parachute over to make a thinner spike as shown in **Figure B.**

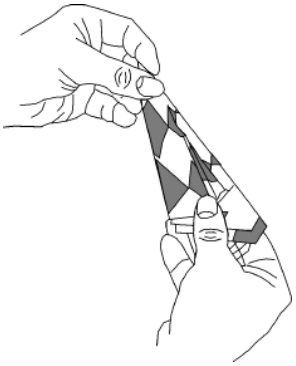


FIGURE B

1. Fold this spike in half then roll it up as shown in **Figure C.** Loosely wrap 2-3 wraps of the shroud lines around the parachute.

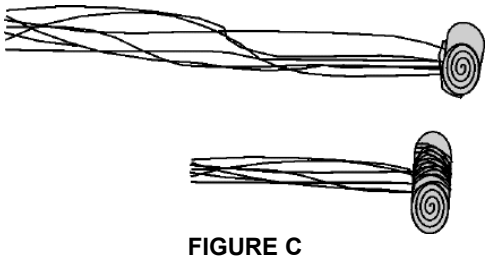


FIGURE C

2. Referring to **Figure D,** take 2-3 squares of flameproof recovery wadding, crumple up lightly and push into body tube from the nose cone end**.** The wadding should fill the tube about 1½ to 2 times the body tube diameter. **NOTE:** Do ***NOT*** use tissue! The ejection gasses from the model rocket motor are ***HOT*** and will ignite tissue. After inserting the wadding, slide the rolled up parachute into the body, then gather up the shroud lines and shock cord and push these into the body tube and place the nose cone back onto the model.

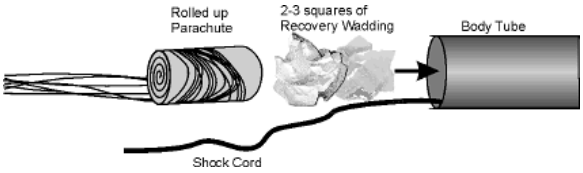


FIGURE D

3. Select a recommend model rocket motor (per kit instructions) and install it into the bottom of your model rocket as follows and as shown in **Figure E:**

   a. Insert the motor into the motor tube with the nozzle facing the rear or bottom of your rocket.
   b. Push the motor into the tube until it stops and the engine hook engages and holds the motor in place

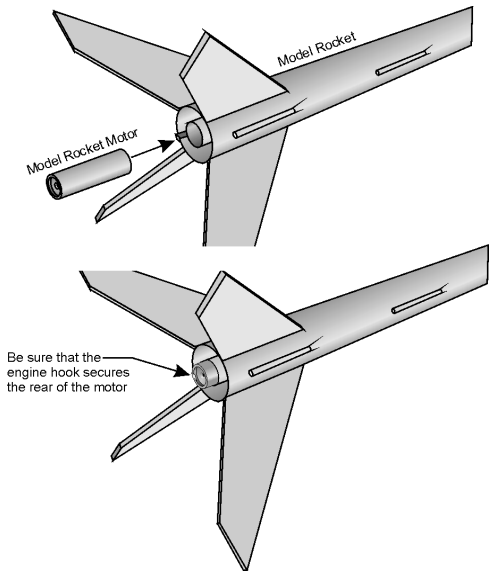


FIGURE E

4. Install the igniter per the manufacturers instructions. Many motors sold today include an "igniter plug", used to hold the igniter in place. It is highly recommended that you use this plug per instructions and they result in the highest reliability. If, however, you do not have such a plug, you can refer to **Figure F and G**, and the steps below for a very reliable alternate method.

   a. First, make sure that your igniter is intact with no wires touching each other.
   b. Place igniter into the motor nozzle until it will go no further (when it stops, the tip of the igniter is in contact with the propellant)
   c. Take a small square of recovery wadding, roll it into a tight ball and, using a pencil or other pointed object, push this into the nozzle, securing the igniter in place, as shown in **Figure F.**
   d. **NOTE:** Do **NOT** use tissue paper as this can cause fires at the launch pad.
   e. **Figure G** shows a cut-away view of the motor with the igniter properly installed.

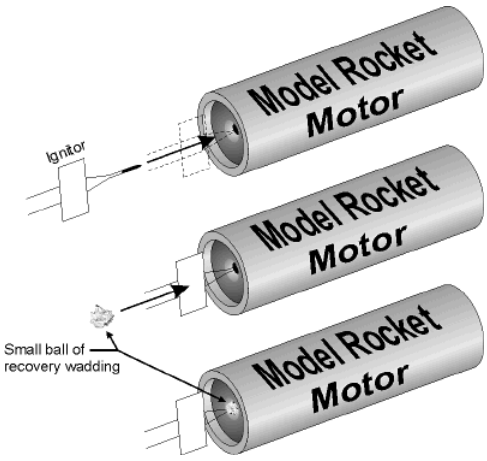
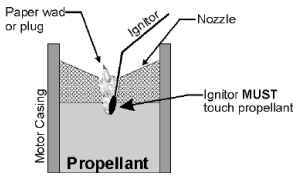


FIGURE F



Cut-Away view showing ignitor installation

FIGURE G

5. Place your model on the Launch Pad and attach the two micro clips to the igniter wires (**NOTE:** Be sure that these clips do not touch each other)
6. Clear the launch area and alert your recovery crew!
7. Check for low flying aircraft and any unauthorized persons in the launch and recovery areas!
8. Arm the launch panel and verify continuity, then **BEGIN YOUR COUNTDOWN!**

5 4 3 2 1 **LIFTOFF!**