



ENGINEERING DIRECTIVE	
FROM:	Office of Chief Engineer
VEHICLE(S):	FRE02
EFFECTIVE DATE:	25-January-2004
Chief Ordinance Engineer <i>James M Flis</i>	Chief Deployment Engineer <i>Brian McCarthy</i>
Effective immediately, the attached procedures will be used in the assembly and deployment of Launch Vehicle FRE02, known as "CAUTION! Rocket Launch In Progress!"	



### Assembly Instructions

The **Caution! Rocket Launch In Progress** model rocket kit is a FREE download kit available from FlisKITS, Inc. These instructions, and available pattern sheets are copyright 2004, FlisKITS, Inc. and can not be reproduced in any way, by any means, electronic or otherwise without the expressed written permission of FlisKITS, Inc.

The "Caution! Rocket Launch In Progress" will provide you with hours of building and flying fun while showing that very non-conventional materials can be used to build a very conventional looking model rocket. Other than the recovery device (Shock Cord and Streamer), there are NO standard model rocket materials used in this kit. The entire model (body tube, fins, launch lug and nose cone) is made entirely from two sheets of card stock!

The "Caution! Rocket Launch In Progress" will show you techniques that you can apply to other models, both kits and scratch built models. You will learn how to fabricate tubes, cones and fins, each with surprising strength, from very simple and readily available materials.

One set of patterns comes pre-printed with the "Caution! Rocket Launch In Progress" artwork. A second pattern sheet is available that has just the outline of all of the parts needed for this model. You are encouraged to use your imagination and decorate this model in any way you choose! You may wish to color/decorate this other kit before assembly, as you may find it easier to do so while the parts are flat (something you can't do with conventional model rocketry materials!) You can use paints, markers, pencils and even crayons to get just the look you want for your paper model rocket!

To construct your "Caution! Rocket Launch In Progress", you will need the following: Pencil, razor knife, white glue, cellophane tape, motor casing and a new C6-5 model rocket motor (for balancing), patience and your imagination! You will also need the following components to add to these patterns, to complete this FREE kit:

- o 18" – 24" Shock Cord material
- o 12" Cotton Button Thread
- o Masking Tape or tape disk
- o 18" Crepe Paper Streamer
- o Clay Weight or other nose weight material

Please read these instructions through, to become familiar with each step, before beginning construction. You must go to <http://fliskits.com/> and go to the **FREE STUFF** section to obtain the pattern sheets for the "Caution! Rocket Launch In Progress".

1. Using a straight edge and razor knife, cut out the **Body Tube** from the provided pattern. Referring to **Figure 1**, **CAREFULLY** score all 3 fold lines as indicated. Do **NOT** cut all the way through the pattern. Just enough to aid in creasing the body at these lines.

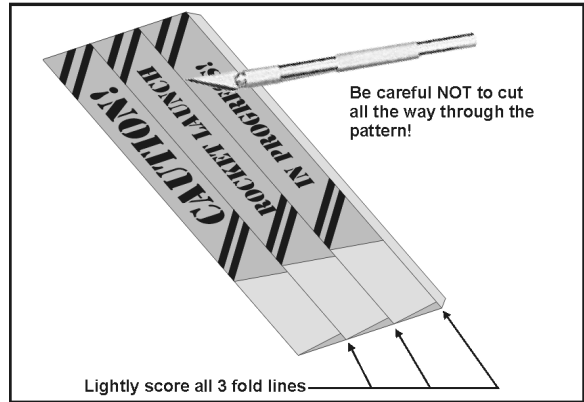


Figure 1

2. Referring to **Figure 2**, crease the Body Tube along these score lines. Apply a film of glue along the full length of the Glue Tab and complete your Body Tube by gluing this Tab to the inside of the other edge of the Body Tube. Your finished tube should look like a long triangular tube as seen in the right of Figure 2.

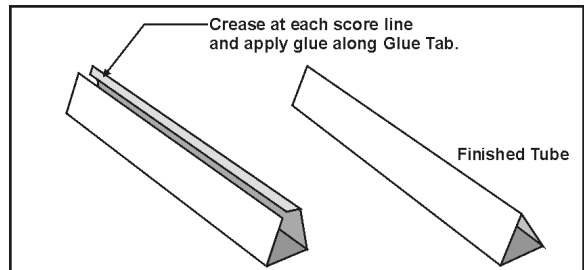


Figure 2

3. Cut out the Engine Tube and, referring to **Figure 3**, flip this over and lightly score a line opposite the horizontal line that defines the "Second Glue Area". Score this the full length of the pattern.

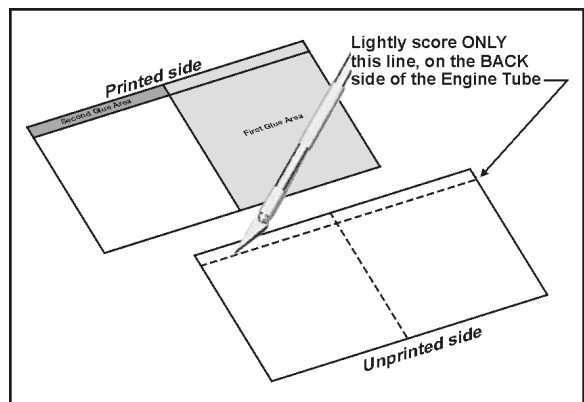
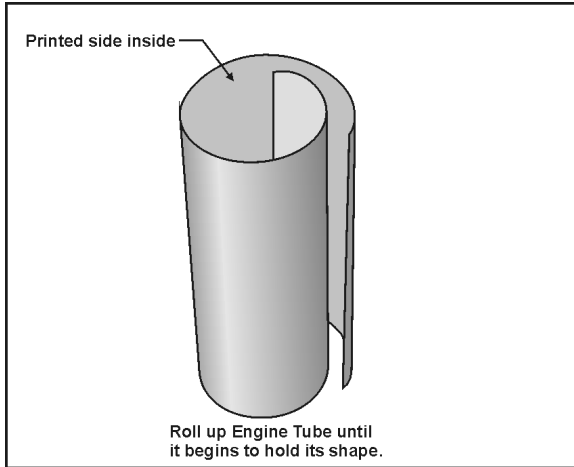


Figure 3

4. Roll the Engine Tube pattern, print side inside, such that it begins to hold its shape, as shown in **Figure 4**. An easy way to begin this curling of the paper is to hold it in the palm of your hand, print side up, and firmly rub it along a sharp corner, like the underside

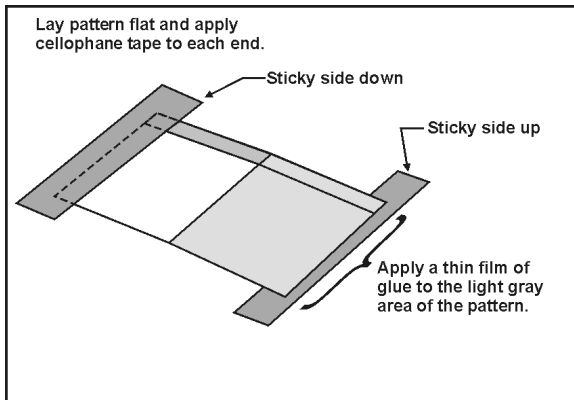
of a tabletop. This will force the paper to begin curling in the desired direction.



**Figure 4**

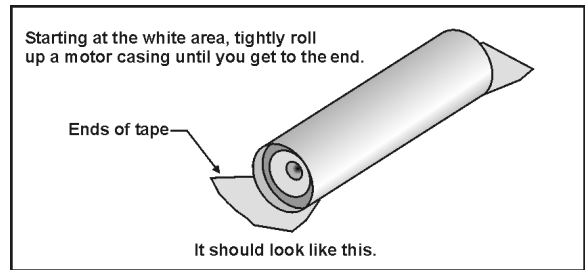
**NOTE: Read steps 5 & 6 and be sure that you understand the steps that you need to take in rolling up and forming the Engine Tube.**

- Apply two lengths of cellophane tape to the ends of the Engine Tube pattern as shown in Figure 5, and described here. Each piece of tape should be an inch or two longer than the pattern is wide, so that there is ample overhang at each end of the tape. With the pattern printed side up, place one length of tape, sticky side down, at the end with the white background that has the area identified as "Second Glue Area". This tape should overhang the end of the pattern by half the width of the tape. Place the second length of tape, sticky side **UP**, at the other end, overhanging the end of the pattern as before. Now, apply a thin film of glue to the entire light gray area identified as "First Glue Area" then quickly move onto Step 6.



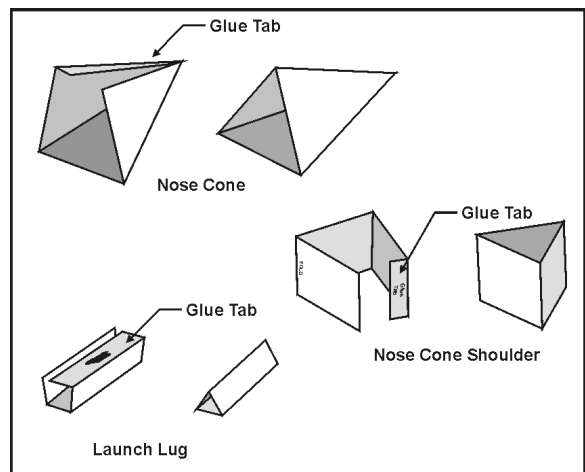
**Figure 5**

- Using an 18mm motor casing (A8-3, for example), and starting from the **WHITE** end of the Engine Tube Pattern, begin to tightly roll the motor casing in the Engine Tube Pattern. As you roll the motor casing up, the first piece of tape will stick itself to the inside of the forming tube, preventing glue from oozing onto the motor casing. Continue rolling for one more full revolution, resulting in the second piece of tape securing the end of the Engine Tube pattern in place while drying. The final formed tube should look like that shown in **Figure 6**. Check to make sure that no glue oozed onto the motor casing then set aside to dry.



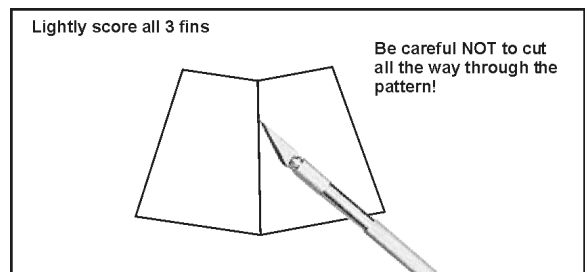
**Figure 6**

- Cut out the patterns for the Nose Cone, Nose Cone Shoulder and Launch Lug. From the printed side, lightly score along the 3 score lines found on each pattern, being very careful not to cut all the way through the pattern. Referring to **Figure 7**, crease each pattern at all 3 score lines, apply a film of glue along the glue tab and join the ends together as shown, forming your Nose Cone, Shoulder and Launch Lug. Set aside to dry. **NOTE:** Refrain from using tape to hold these items together while drying as the tape may spoil the finish on the part.



**Figure 7**

- Cut out all 3 Fins and all 3 Fin Inserts. Referring to **Figure 8**, lightly score the centerline on the printed side of each Fin pattern, being careful not to cut all the way through the pattern. Crease each Fin at this score line.

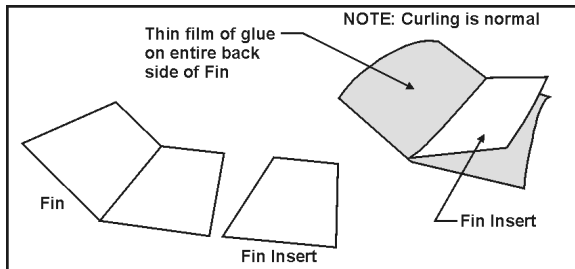


**Figure 8**

**NOTE:** The next 2 steps have you gluing the Fin and Fin Insert Patterns to make the fins. You can use either white glue or aerosol adhesive. There are advantages and disadvantages to both. **WHITE GLUE:** Advantage: More working time as the glue doesn't set up instantly. Disadvantage: Can result in fin warping. **AEROSOL ADHESIVE:** Advantage: Little or no warping of fins. Disadvantage: Will grab paper **instantly** so Fin Insert must be placed exactly the first time.

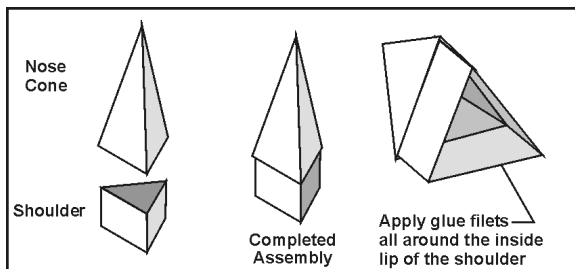
- Using **Figure 9** as a guide, If using **White Glue**, spread a thin film of glue to the entire back side of one Fin. Carefully place the Fin Insert onto one-half of this fin, lining up the

edges. Carefully fold the fin over, trapping the Fin Insert in place. Press flat and work out any air bubbles and excess glue. Wipe away the excess glue and repeat for the other two Fins. If using **Aerosol Adhesive**, spray the entire back side of one Fin and spray **both** sides of one Fin Insert. **Carefully** place the Fin Insert onto one half of the back of the Fin, making sure that the edges of the Fin and the Insert are properly aligned. Fold the Fin in half, trapping the insert inside. Repeat for the other two Fins. **NOTE:** While performing this gluing action, some curling of the fin material is normal and will be dealt with in the next step.



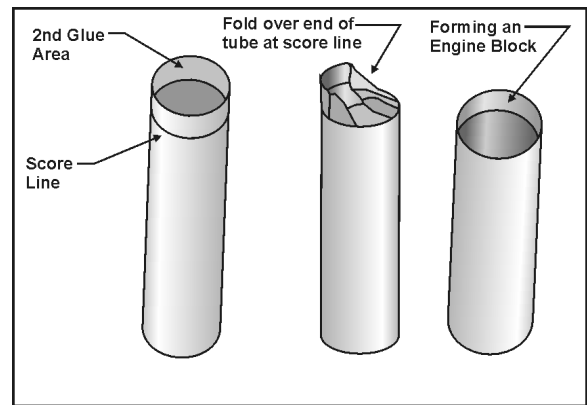
**Figure 9**

- Layering small sheets of wax paper between each fin, stack the Fins on a flat surface and place a heavy flat object (like a book) on top of them to keep them flat as the glue dries. Leave fins to dry, preferably overnight. If some curling is still evident, you can further flatten them using an iron on a low-medium setting with OUT steam.
- Returning to the Nose Cone and Shoulder from Step 7, place a bead of glue along one end of the Shoulder, along all 3 edges, and glue this inside the bottom of the Nose Cone, as shown in **Figure 10**. Be sure that it is evenly recessed inside the base of the Nose Cone so that the cone stands straight up when set on the table. Using your finger, apply a filet of glue on the inside of the Nose Cone where the Shoulder comes into contact with it. Set aside to dry.



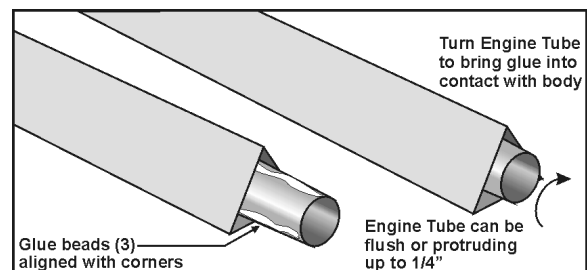
**Figure 10**

- Returning to the Engine Tube from Step 6, remove the engine casing and the tape that was used to hold the edges down while drying. Run a thin film of glue just inside the end of the Engine Tube with the score line (where it is marked "Second Glue Area", covering  $\frac{1}{4}$ " inside the tube). Using your finger, and referring to **Figure 11**, carefully fold the edge of the Engine Tube into the inside of the tube as shown. This will form your Engine Block.



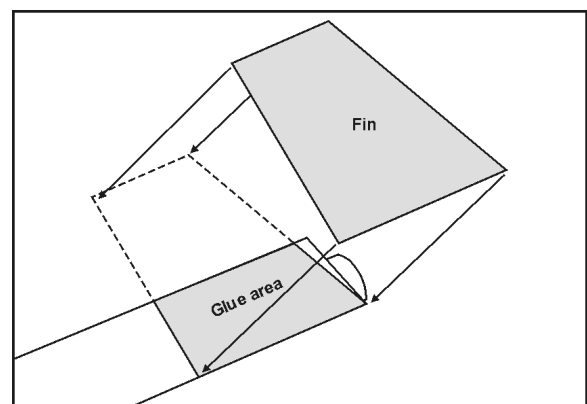
**Figure 11**

- Run 3 equally spaced thin beads of glue along the length of the Engine Tube, as shown in **Figure 12**. Slide the Engine Tube (with the Engine Block forward) into the bottom of the Body Tube with the glue beads aligned with the **corners** of the Body Tube, until the bottom of the Engine Tube is flush with the bottom of the Body Tube. **NOTE:** If you prefer, you can have the Engine Tube protrude from the bottom of the Body Tube by as much as  $\frac{1}{4}$ ". Twist the Engine Tube until the 3 beads of glue come into contact with the flat sides of the Body Tube. Set aside to dry



**Figure 12**

- Taking one of the Fins, verify that it has dried flat and correct as needed. Spread a film of glue along the gray area of the fin and the matching glue area of the Body Tube. Attach this Fin to the Body Tube as shown in **Figure 13**.



**Figure 13**

- Lay this assembly, Fin side down, on a smooth flat surface and press this glue area flat until the glue sets. Repeat with the remaining 2 Fins, as shown in **Figure 14**.

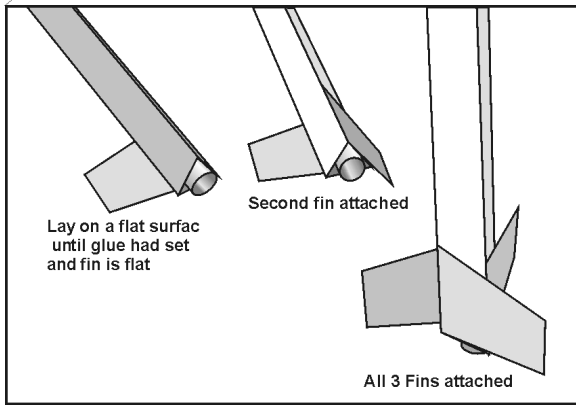


Figure 14

16. Spread a film of glue to the bottom of the Launch Lug and glue onto the Body Tube on the indicated spot and as shown in **Figure 15**. Also, plug the 3 corner holes (voids) around the Engine Tube using the **Gusset** pattern provided or using small pieces of glue soaked tissue paper. All voids must be completely blocked.

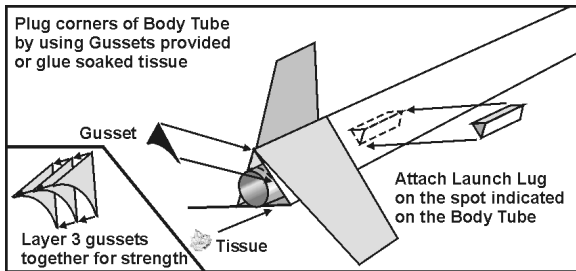


Figure 15

17. For a Shock Cord, you can use either an 18" length of sewing elastic or 24" length of 35# Kevlar cord. Cut out the Shock Cord Mount and glue the Shock Cord into it as shown in **Figure 16** by applying glue as shown and folding the Shock Cord Mount over the Shock Cord twice, to trap it inside.

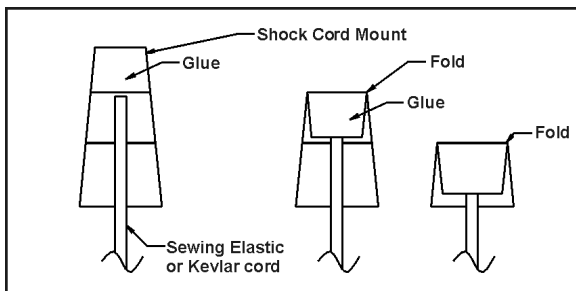


Figure 16

18. Tightly crease the Shock Cord Mount as shown in **Figure 17**, and apply a film of glue to the outside area of this creased shock cord mount. Glue this inside the top of the Body Tube at least 1" inside the tube, as shown.

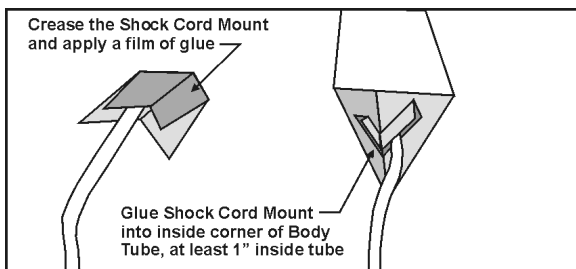


Figure 17

19. Tie a knot in the other end of the Shock Cord and anchor this into the tip of the Nose Cone with a liberal drop of glue as shown in **Figure 18**.

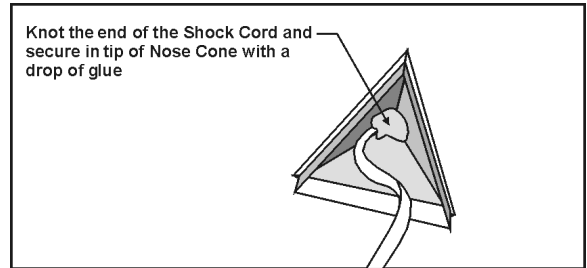


Figure 18

20. Referring to **Figure 19**, attach the **Shroud Line** to the **Streamer** by tying a small knot in the end of the Shroud Line and securing it to the end of the Streamer with a **Tape Disk** or a square of **Masking Tape**. Firmly press the tape into place. Tie the free end of the Shroud Line to the Shock Cord, near the Nose Cone.

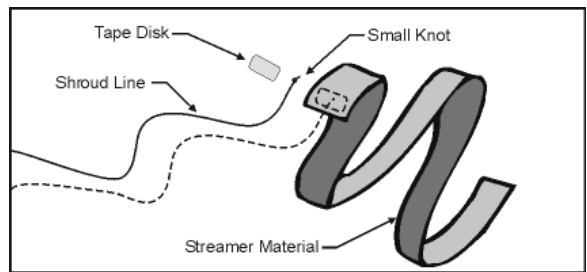


Figure 19

21. Taking the **Clay Weight**, roll it into an irregular ball and insert into the tip of the Nose Cone. **NOTE: Do NOT omit this added weight. This model rocket will NOT be stable without this added weight!** To verify the proper amount of nose weight, pack the streamer into the body, place the Nose Cone onto the Body Tube and place a **new C6-5** motor into the Engine Tube and balance it as shown in **Figure 20**. The balance point should be about 3 1/2" from the bottom of the Body Tube (+/- 1/2"). Add or remove clay, as necessary, to achieve this balance point. Once you've found the proper balance point, apply a film of glue over the clay, securing it inside the Nose Cone.

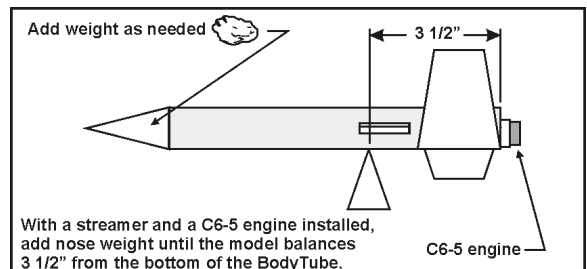


Figure 20

**Congratulations!** You have completed the assembly of your **CAUTION! Rocket Launch In Progress** model rocket from **FlisKits!**

Recommended motors for this model are the A6-4, A8-3, B6-4 and C6-5. With these motors, you will enjoy impressive flights and safe returns via its brightly colored streamer for many more enjoyable flights.

Save these instructions for building your second paper rocket!