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NEWSLETTER

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Replaceable Kevlar Lines in Minimum Diameter Models

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Replaceable Kevlar Lines in Minimum Diameter Models

By Chris Michielssen

My last article in the Apogee Peak Of Flight Newsletter was about how to replace the Kevlar line in BT-50 diameter and larger models.

Can you make a replaceable line in a BT-20 or ST-7 model? Yes, and like the last article, it's easier than you might think.

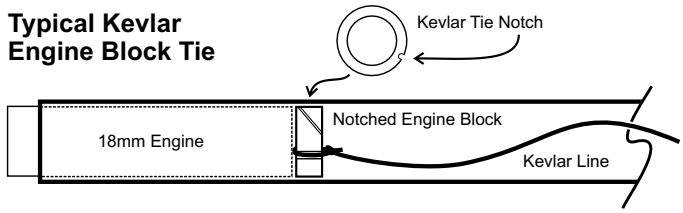

Figure 1: Typical Kevlar tie in a small diameter low power rocket

To make a replaceable Kevlar line:

Instead of tying the Kevlar around the engine block with a permanent knot you can't untie, we'll use a simple noose style knot that can be removed with long tweezers. You'll be able to check the condition of the line between flights and replace it if needed.

To start, you'll need thicker engine blocks such as those shown in the top row of Figure 2.

Figure 2: Different thicknesses of engine block rings

The three engine blocks at the top are thicker. The engine block will be still be notched to allow the Kevlar line to be tied around it.

The single thinner block at the bottom (Estes EB-20 style) is too thin to allow a notch for the Kevlar tie loop.

Here's the parts and tools you'll need for the replaceable Kevlar install:

From left to right:

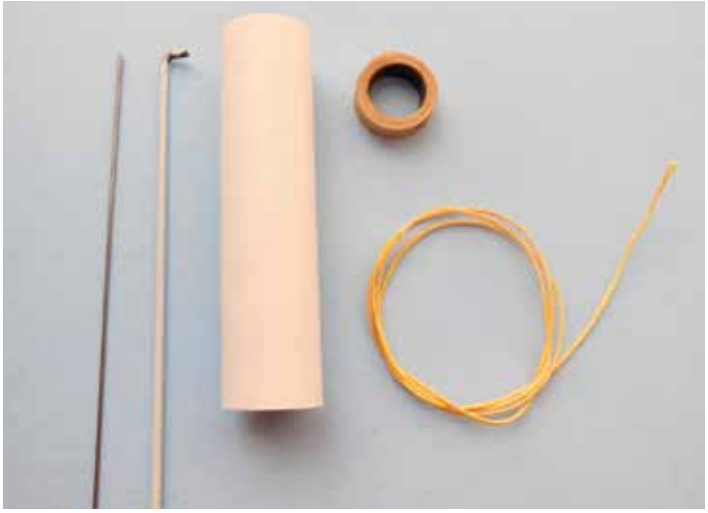

Figure 3: Tools needed to install a replaceable Kevlar line

- A .045" diameter wire to clear the notch of glue
- An "L" shaped hook cut from a coat hanger wire
- The main airframe body tube from the kit (For this demonstration, the tube is cut short right above the engine block. You'll need to see both sides of the tube to understand the installation of the tie.)
- A thick engine block (this one cut from an engine casing)
- A 18 - 24" length of stiff, not braided Kevlar (this line is 135 lb. Kevlar)

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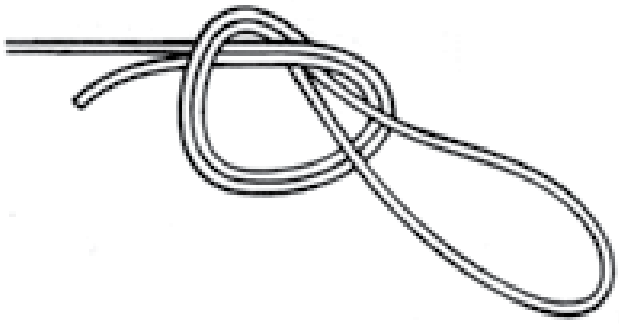

Figure 4a & 4b: Simple overhand loop knot used in the replaceable mount

Tie an Overhand Loop Knot (as seen in figures 4a and 4b) on one end of the Kevlar.

The size of the loop is about 5/8" wide from the knot to the outside of the loop. This makes a loop that easily slips around the engine block.

Figure 5: Add glue to the end of the Kevlar line to stiffen the end and keep it from fraying

To start, apply some white glue to the last inch of the open end of the Kevlar. Wipe off the excess.

The dried glue will stiffen the line and keep the ends from fraying. You'll want the end stiff and wound tight to feed through the notch in the engine block.

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Figure 6: Notched side of Engine Block

While the Kevlar glue end is drying, notch the engine block for the Kevlar loop. You can use a sharp knife or a small file. Make the notch large enough so the Kevlar diameter can slip through when the block is glued in place.

Glue the only the block (no Kevlar yet) in place in the main airframe tube as normal. Before the glue dries you'll have to clear the glue out of the notch for the Kevlar to pass through.

From the rear, use the .045 wire to push the glue out of the notch.

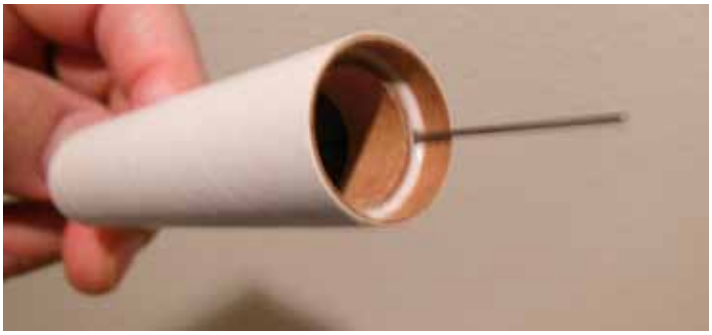
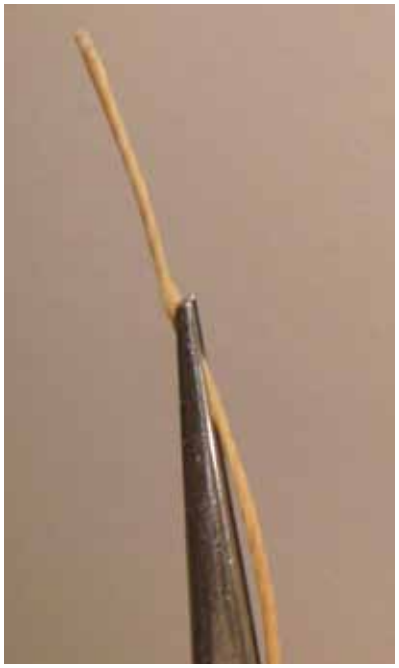


Figure 7: With the engine block installed, make sure the notched area is clear of any glue by pushing a wire through the spot.

(Figure 7 shows a short tube so you can see the top of the engine block. A BT-20 sized model tube would of course be much longer.)



After the engine block glue has dried, run the wire through the notch again to be sure it is clear.

Pick up the dried glue end of the Kevlar with the long tweezers.

Match the tweezer and Kevlar position in the picture to easily feed the Kevlar through the notch (Figure 8).

Figure 8: Hold the glue-stiffened end of the Kevlar with a tweezers or needle nose pliers

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Look through the rear and push the stiff loose Kevlar end through the engine block notch. The tied loop is out the back end.

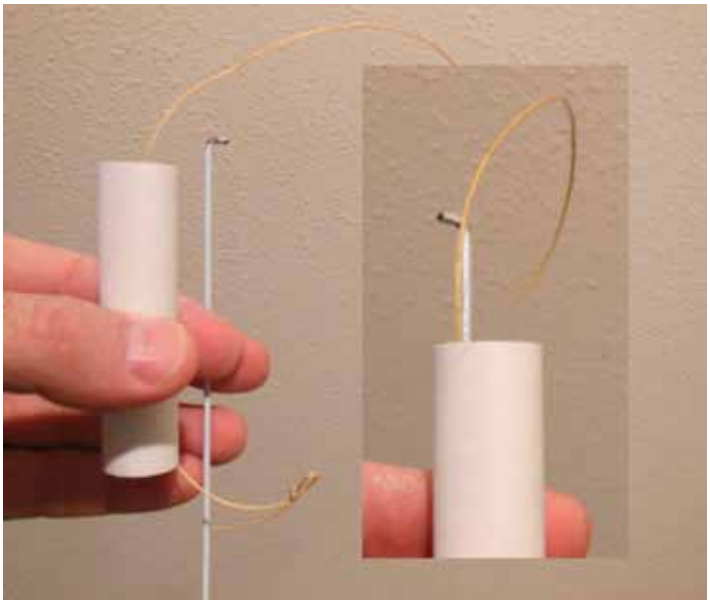

Figure 9: Pushing the Kevlar through the notch

Push the Kevlar through the notch until a few inches extend out the top.

The loose end of the Kevlar has been slipped through the notch in the engine block from the rear. Now pull the loose end out the back of the engine mount tube.

Push the bent coat hanger in from the bottom and through the center of the engine block. Turn the coat hanger hook until the Kevlar is looped around the end of the bent hanger. Remove the coat hanger and pull the loose end of the Kevlar down and out the back of the body tube.

Pull the loose end of the Kevlar until the tied loop is raised up like the left side of Figure 9.

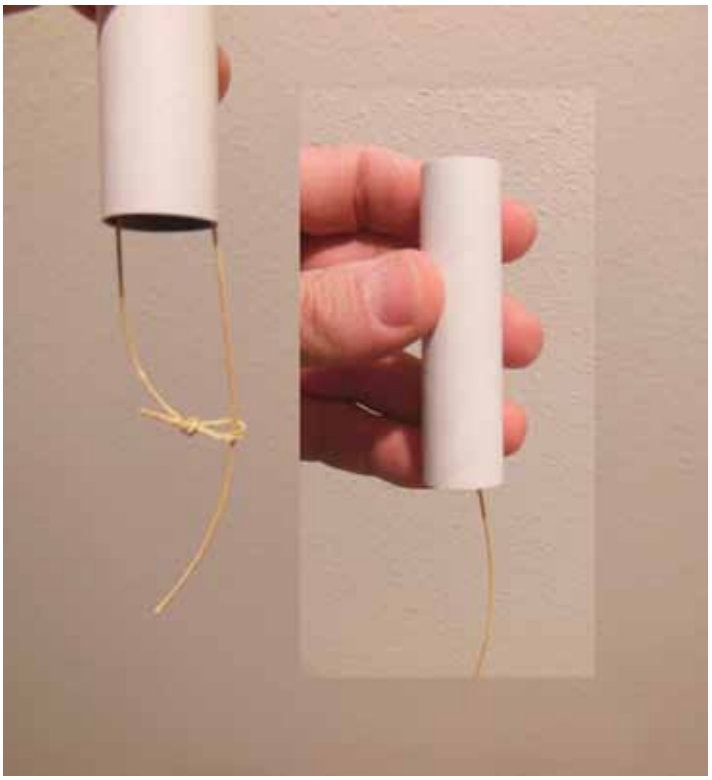

Figure 10: Looping the Kevlar around the engine block

Put the loose end through the tied loop as in Figure 10.

Figure 11: Tightened Loop

Pull down on the loose end raising the loop up and to the top of the engine block. Your body tube should look like the right side of Figure 10.

In Figure 11, looking down from the top, this is how the loop sits through and next to the engine block. Again, this

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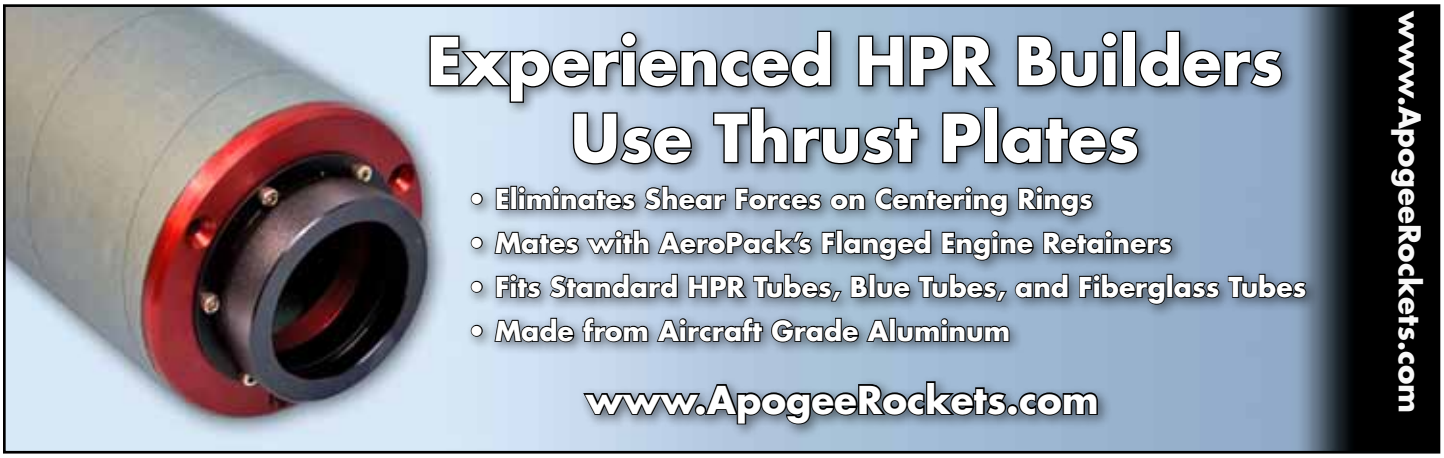

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is a short body tube for illustrative purposes.

Feed the Kevlar back up through the top of the rocket and you can tie on the elastic end of the shock cord.

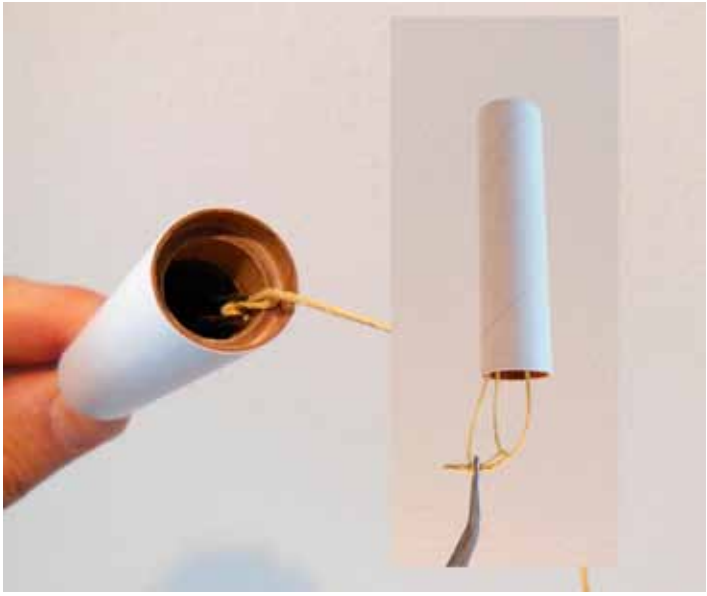

Figure 12: Loosening the Loop

To check the condition of the Kevlar line between flights – or replace a Kevlar line.

Using the long tweezers, reach inside from the rear and grab the knot. (Figure 12, Left side)

Pull down and the Kevlar loop knot will release. Pull the line out the back. (Figure 13, Right Side)

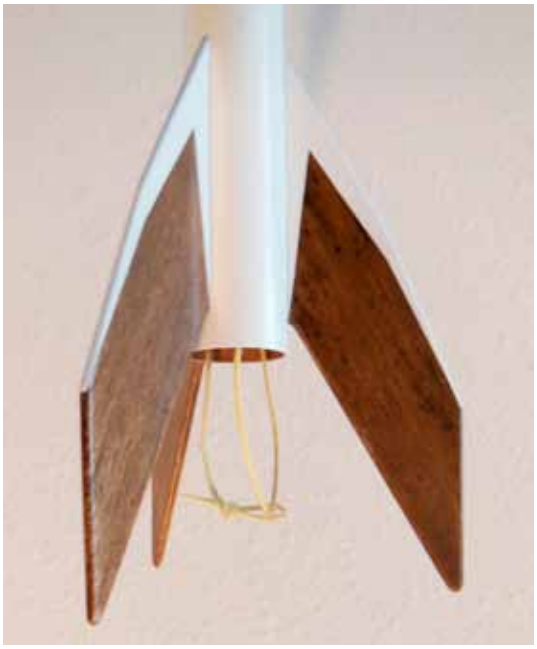

Figure 13: Here's how the line looks pulled out the back of an Estes Sky Hook

About the author:

Chris Michielssen is an avid builder and flyer of low power model rockets. He produces Odd'l Rockets and accessories, available from Apogee Rockets.

His building blog: www.modelrocketbuilding.blogspot.com is followed by 650 people each day worldwide.