

# Foamy Factory Kevlar Truss Bracing System

## Foamy Factory Kevlar Truss Bracing System –

One of the main disadvantages of building a profile airframe from Depron is the lack of torsional strength in the tail area. “Tail Twist” as it’s commonly known, has plagued these types of models for as long as they have been around. While the bracing system used here is not a new idea, we have taken the guesswork out and created a “Goof Proof” method of construction that takes the mystery and difficulty out of “trussing”. The Kevlar truss bracing system now included in the FFM Mini Series kits adds tremendous rigidity to the completed model and almost eliminates the dreaded “Tail Twist”. The Kevlar adds almost no weight and provides an incredible amount of stiffness to the airframe. This creates a plane that is very precise, crisp, and true. You will notice a big difference in how the plane “feels” as compared to others of the same type. The Kevlar eliminates almost all of the airframe bending associated with the Depron construction and allows maneuvers to be executed with extreme precision and smoothness.

While the Kevlar bracing system is not necessary to fly the model and can be left off, we highly recommend trying it out and discovering what a huge difference it will make in the way these little planes fly. Take a bit of time and study the instructions below. It really is easy! Just take your time, go one step at a time, and you will be rewarded with one of the best flying models of this type you have ever flown.

### What you will need –

**Kevlar Thread** – You can get Kevlar thread at most larger sporting goods stores. It is primarily used for tying fly fishing flies and comes in lots of colors. If you can’t find any locally, do a Google search for it and you’ll come up with several online source you can order from. It’s typically about \$2.50 to \$3.00 for a 50 yard bobbin. If you can’t find any Kevlar, a good substitute is unwaxed dental floss. Don’t use regular cotton thread as it stretches too much over time.

**A medium sized needle** – For threading the Kevlar thread.

**Plastic tubing for the hole grommets** – The inner portion of Nyrod control rod tubing works well. You can also use R/C car antennae tubing. Pretty much any small diameter plastic tubing will work well. You can also use small pieces of 1/64 ply punched with a hole punch. The ply work well, but it’s harder to tighten up the system after everything is threaded. Use your imagination, these are all just suggestions. Another easy idea for the grommets is get a ball point pen that’s out of ink, cut the metal end off, wash out the tube, sand the tube a bit to roughen it up, cut 3mm slices off, and viola!, you have quick and easy plastic grommets instead of plywood.

### Medium and thin foam safe CA

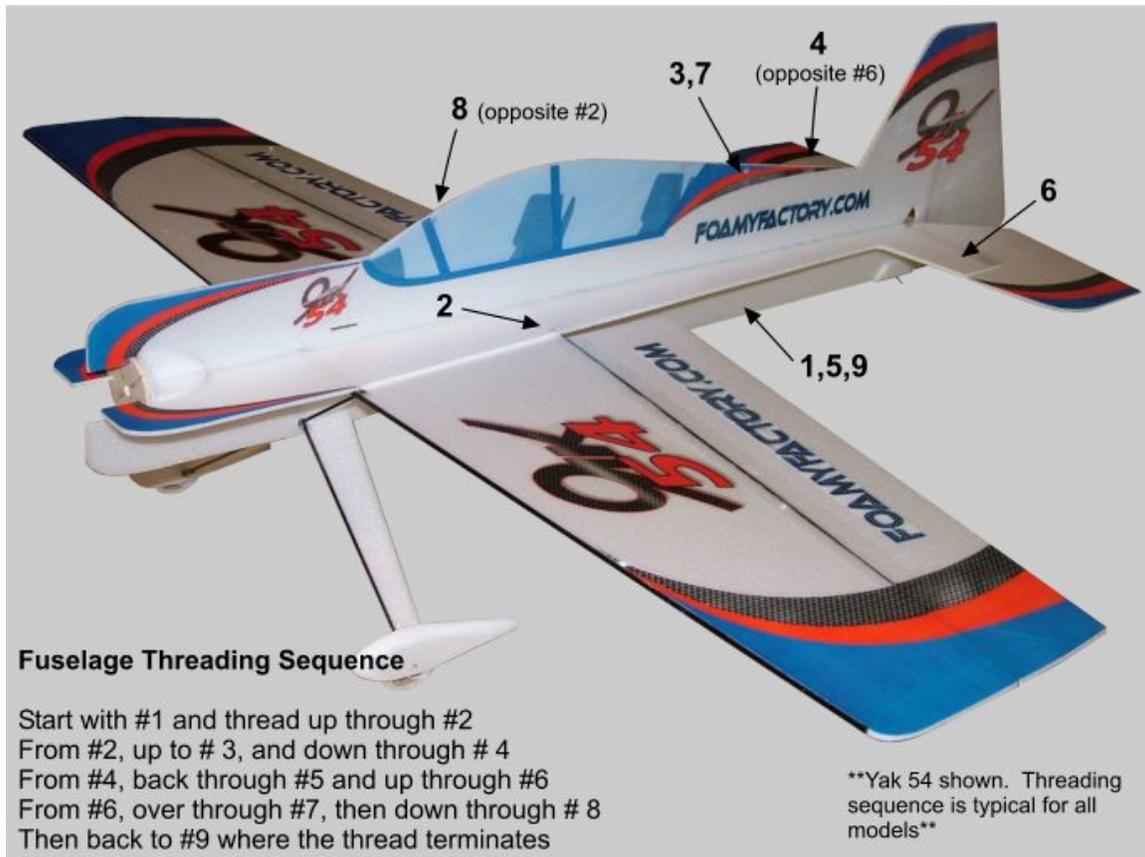
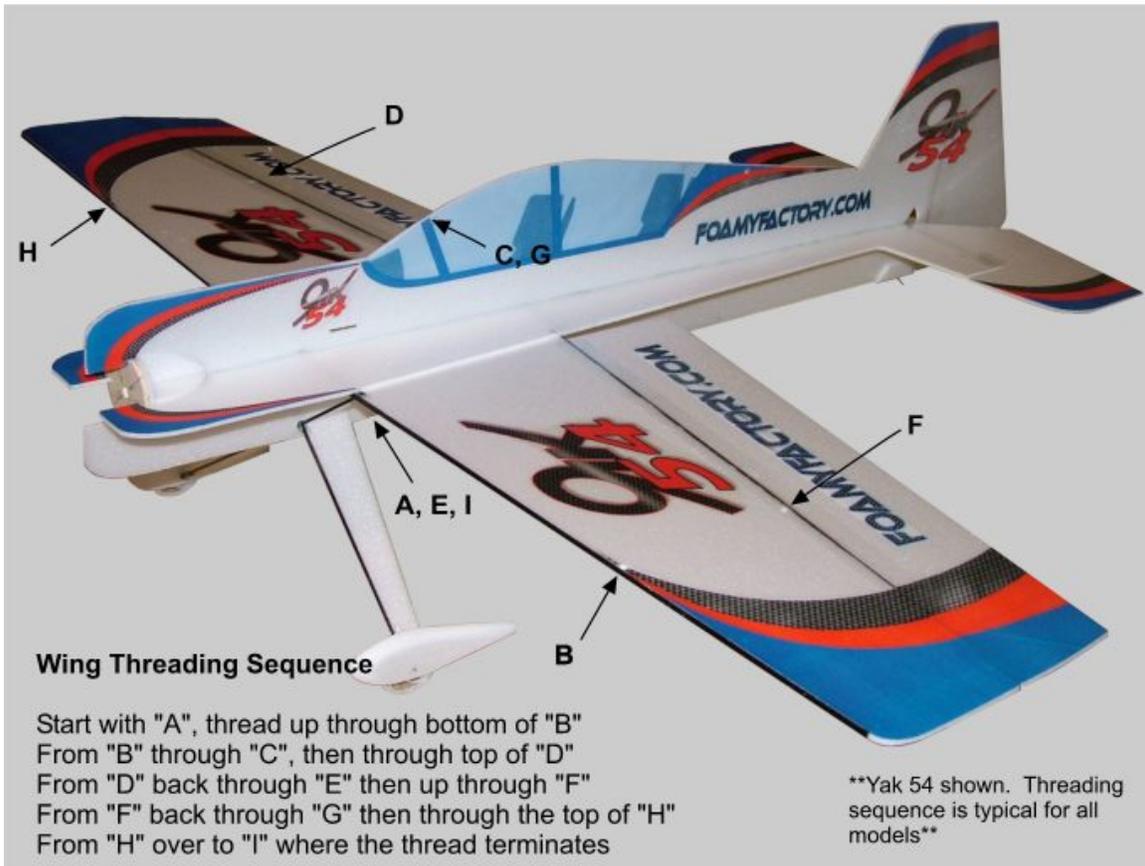
### Hole Locations –

Hole locations are not absolutely critical. However, make sure they are symmetrical on each side of the wing and fuselage. On the wings, 2/3 span is a good spot. Use the diagrams to decide where you will put the holes/grommets.

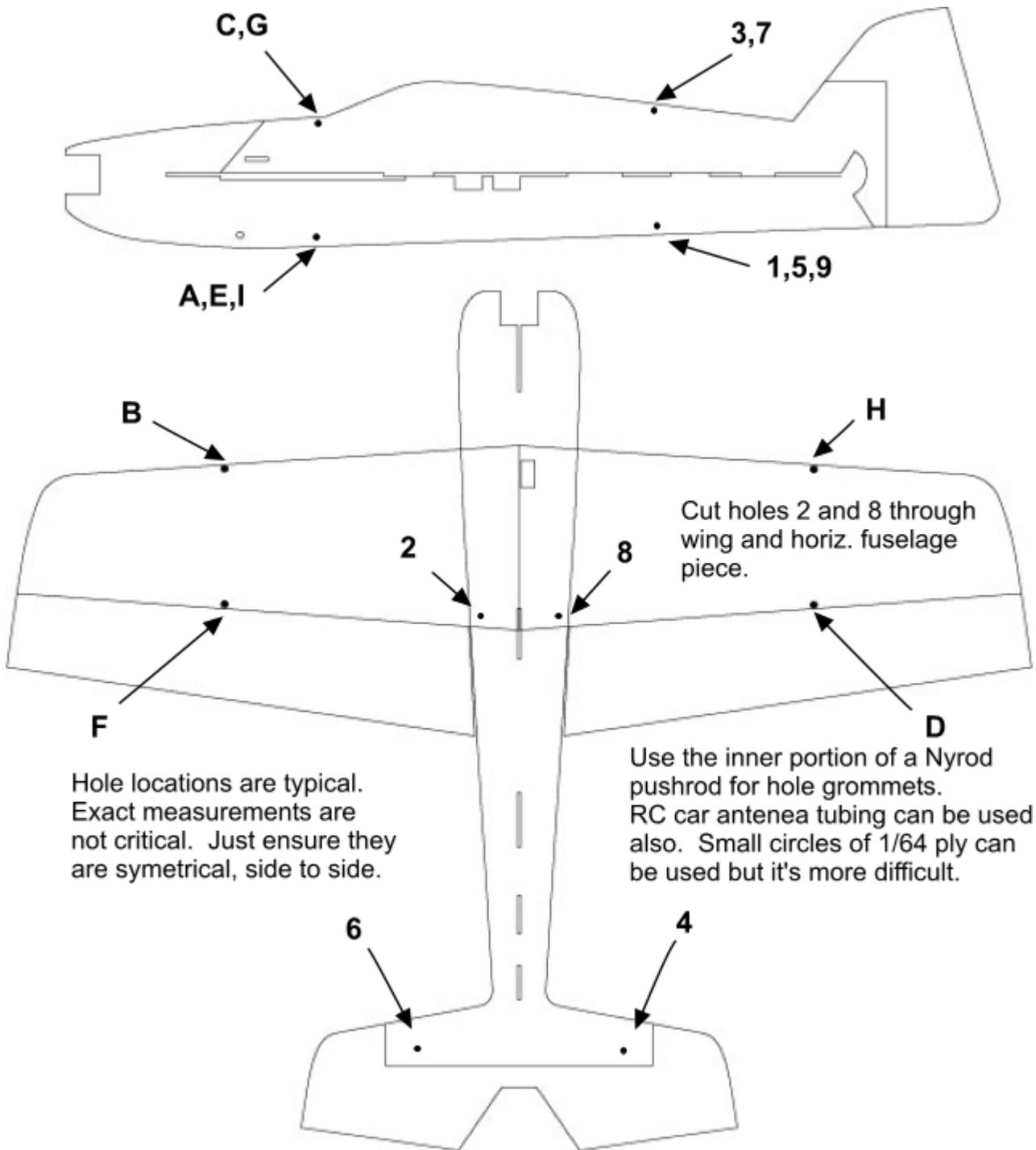
Follow the step by step instructions and have fun!

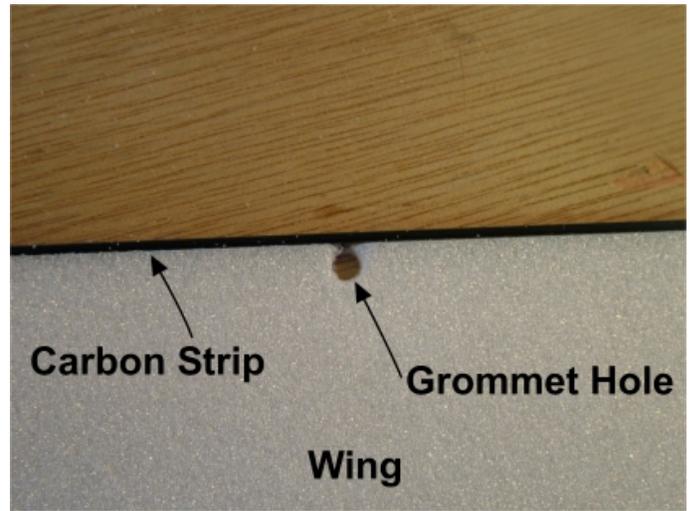
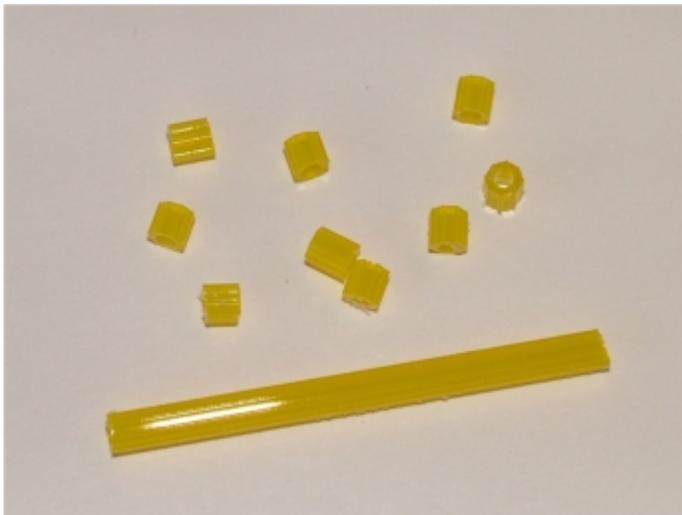
Tim Hart

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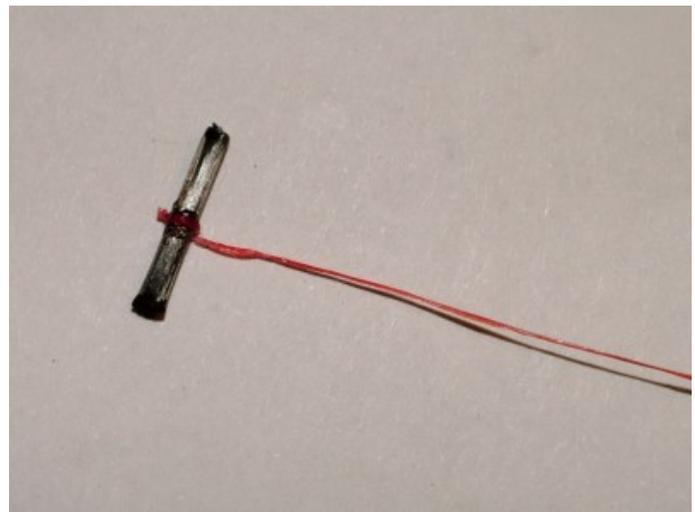
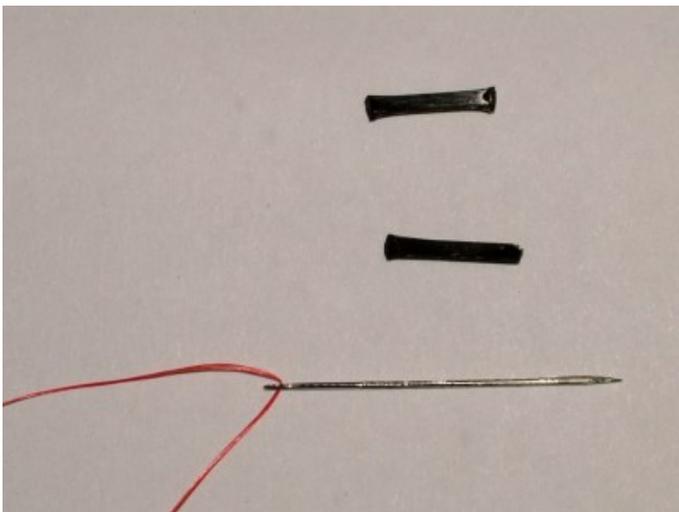
## Typical Hole Placement Diagram





Grommets: Locate the 2" piece of plastic tubing. This will be used to make 10 grommets for the Kevlar truss system. Lightly sand the tubing with fine sandpaper. This will make the glue stick better to the plastic. Cut eight pieces, 3mm long off one end of the tube. Now cut 2 pieces at 6mm long. The longer pieces will be used where the grommet passes through the wing and horizontal fuselage. The wing has 4 outboard grommet holes. Glue the plastic grommets in each of the 4 holes in the wing after the carbon strips have been glued on. The grommets can be glued into the holes with medium foam safe CA. Take care that you **DO NOT** let any glue dry in the "eye" of the grommet. If you get glue in the grommet, blow the glue out with a good "puff" of air before it dries. In order for the Kevlar truss system to function properly, it is **IMPERITIVE** that you get a good solid glue joint between the Depron and the grommets.

Locate the holes in the other fuselage pieces. There are 2 holes in the horizontal stabilizer, 2 holes mid-point on the horizontal fuselage, top and bottom, and 2 holes that are just forward of the aft wing-fuselage joint. There are 2 holes in the forward area vertical fuselage pieces. One on top, and one on the bottom. There are also 2 holes located about mid-fuselage, top and bottom. **(see the threading diagram later in the instructions for hole locations.)** Glue the grommets into all of the holes **EXCEPT** the ones where the hole goes through the wing and the horizontal fuselage (these will be glued in **AFTER** the wing is glued to the fuselage piece. Step-by-step threading instructions are provided later in the instruction manual. The Kevlar truss bracing system is very easy to rig, and provides an amazing amount of stiffness to the 3mm Depron airframe with less than a gram of weight. Don't worry... It's easy...

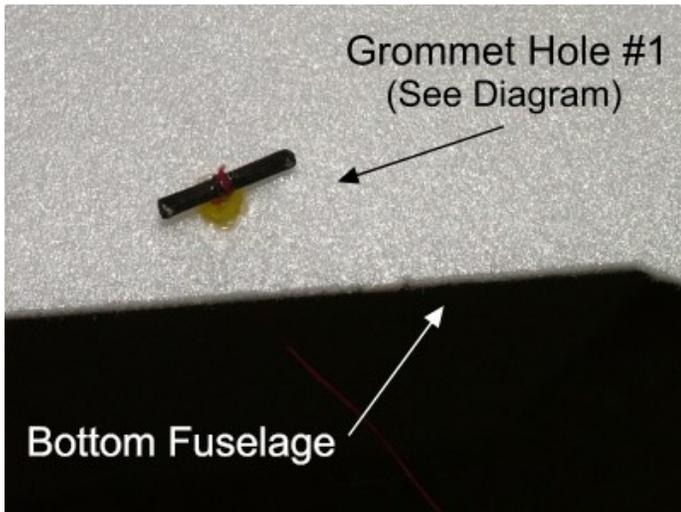


Locate a piece of the scrap carbon strip from the wing or one of the control rods. Cut off a 1/4" piece and set aside. The type and size doesn't really matter, all we want is a little piece of carbon to tie one end of the Kevlar thread to.

Thread one end of the Kevlar thread through a sewing needle (not included in kit). A fairly large needle is easier to work with than a tiny one.

Locate the Kevlar thread. It is wound up on a cardboard bobbin. Cut the Kevlar thread in half. You will use one half for the wings, and the other half for the fuselage.

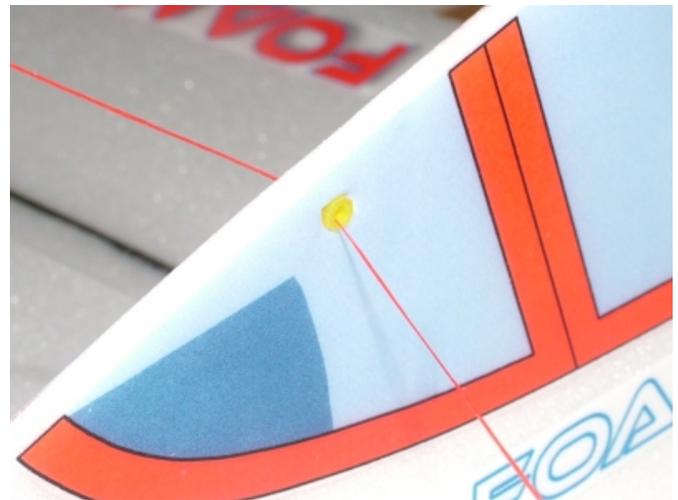
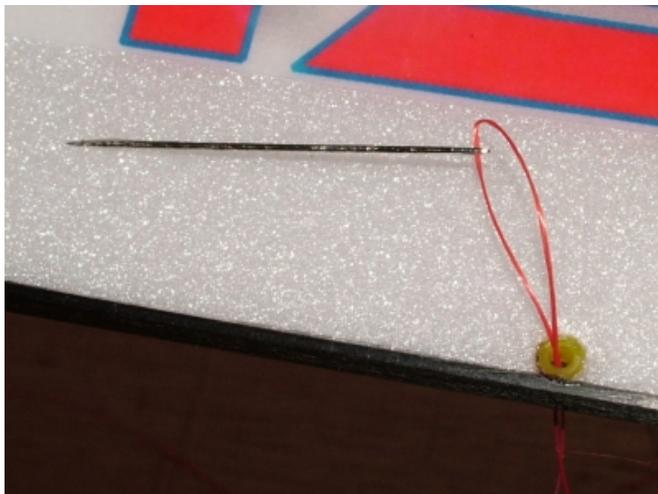
Tie the other end of the Kevlar to the piece of carbon as shown. Apply a small drop of thin CA to the knot to secure. You can use a small piece of wire or toothpick as a substitute for the piece of carbon if desired.



The Kevlar bracing system is broken down into two different areas. The first is the wings, and the second is the fuselage/tail area. Take a look at the threading diagram and you will notice the holes in the airplane are labeled with numbers and letters.

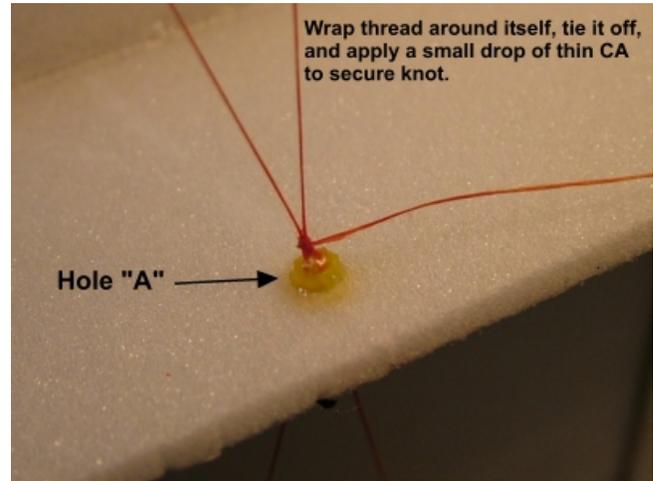
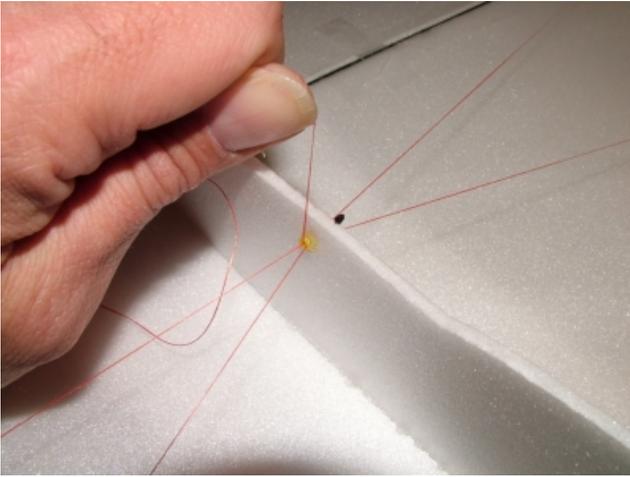
The wing bracing starts with the letter "A", this is the starting hole for the threading process. As you thread the Kevlar through the grommets, there is no need to keep everything tight as you go along. Just make sure that there are no kinks or knots in the thread and try to keep any "slack" out of the thread. Tightening will be done as one of the last steps. This is done so that you will be assured of proper airframe alignment and to ease the construction process.

Place the plane upside down on a flat surface. Thread the Kevlar through hole #A on the underside of the forward fuselage. Pull the thread all the way through and secure the carbon rod with a tiny drop of CA. **MAKE SURE** that the CA does not wick all the way into the grommet and block the hole. If it does, just clean out the hole with another needle. You want to be able to pass the Kevlar thread back through hole #1.



Follow the threading sequence shown on the wing threading diagram and thread the Kevlar through the grommets using the needle. **Be sure to follow the sequence carefully!**

Keep the Kevlar thread taut, but not too tight during the threading process. Make sure there are no kinks or knots in the thread. **DO NOT GLUE the thread at the grommets at this time!**



Once all grommets are threaded, you will end up on the opposite side of the hole you started from. Pull the thread taught. You will “hear” the tightness as you pull the thread. It doesn’t need to be “bullet proof” tight, just nice and snug. Make sure that all lines are being tightened as you pull on the thread. Once you are satisfied with the tightness, apply a small drop of CA to the grommet. Continue to hold the thread until the CA dries.

Wrap the Kevlar thread around itself a few times and tie a knot. Do it again, and tie another knot. Nothing specific here, just make sure you secure the end of the Kevlar thread neatly. Once you are satisfied, apply a drop of CA to the knot. That was easy wasn't it?

**Checking Wing Alignment** – Once you have the thread secured, turn the model right side up and check the alignment of the wing to the fuselage. Make sure that everything is square, and the wings are perpendicular to the fuselage. Once you are satisfied with the alignment. Apply a drop of CA at each of the grommets in the wing and where they pass through the fuselage. The Kevlar truss is now complete for the wings.

**Fuselage Kevlar Truss System** – Follow the above instructions, except use the fuselage threading diagram for threading sequence. The techniques and steps used are identical to the methods used on the wing. Make absolutely sure that everything is straight and true before you apply CA to the grommets. Once you do that, the alignment is locked in place.

**NOTE – DO NOT LEAVE OUT THE PLASTIC GROMMETS WHEN BUILDING!** The Depron is **NOT** strong enough alone to withstand the twisting forces of flight. Without the plastic grommets, the Depron will tear!

Hopefully, the above sequence was quick and painless. Once you do it, you will see how easy it really is. Any other plane using this construction method can benefit from the “Truss Bracing System” and can be easily retrofitted to an already built airframe. Kevlar thread can be found in nearly all sporting goods stores in the “Fly Fishing” section. It is widely used for tying “Flies” and is available in many colors. A good substitute is un-waxed dental floss.

Have fun flying and send in some pictures!