

19 steps to a Legal Eagle frame build!

For great photos and information on actual building of various components see:

<http://home.hiwaay.net/~sbuc/legaleagleXL/>

By Sam Buchanan

A brief introduction for laying out tubes the the great project of the Legal Eagle XL

For plans and information contact:

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This plans-built aircraft is designed to be easily constructed with conventional aircraft techniques and is powered by a half-VW engine. The **Legal Eagle** was designed by [Leonard Milholland](#), and plans are [available from Leonard](#) in Brookshire, Texas.



About me:

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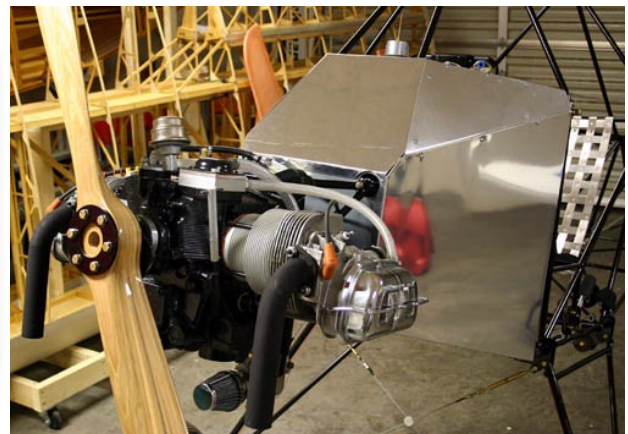
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<http://www.irondesign-airparts.com/Tailwheels.htm>

"If you don't have time to do it right, when will you have time to do it over?"

John Wooden, UCLA Basketball Coach

I do CAD work on the side as well as provide tail wheels for great many aircraft and variety. I also make a variety of aircraft parts. If hard to design and build, we can come up with a way to get it done.– See above web site.



Leonard and his plane **above**.
And Sam's great engine details and mounting **right**.

Disclaimer

This site is intended for entertainment purposes only. This site is not affiliated with Leonard Milholland in any way. The construction info on this site pertains only to the fabrication of a Legal Eagle XL

It was set up to show “one possible” way to layout tubing for the frame build. If you use this site as a guide for building your Legal Eagle, take it for a example only. This is not a consult-direction or advice! Merely an example of how one person chose to build and construct this aircraft. All aircraft projects should be overseen and inspected by folks who know something about aircraft construction.

Disclaimer Part B

This is also showing one way only, as with all build projects there are many ways to get to the same result. Not shown here are time saving factors in tube profiling, tube holding, fixture building and the like.

These photos were shown for the best viewing ways and steps that I deemed correct to relay the process. There are always several steps that can be changed with same ending results. Largest of these changes is that all base cross pieces at the known stations have dimensions called out in the plans. It may be deemed best to have the inside blocks laid out for the two longerons to maintain that shape and width through the 19 steps shown here.

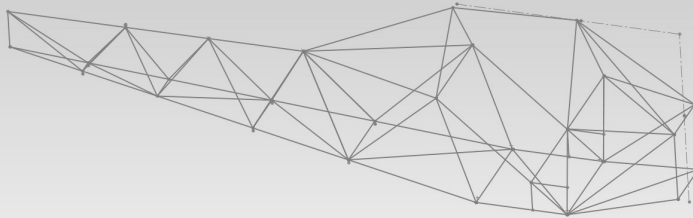
If this provides at least one “ah-hah” moment, it has served its purpose.

Thank you for your interest– Scott Weinberg

Printing– This should print exactly with no cut edges on standard printers with 8.5 x 11 paper.

Print directly from your pdf file on screen.

**19 trips to the shop
= a Legal Eagle XL build
A step by step layout of tube progress.**

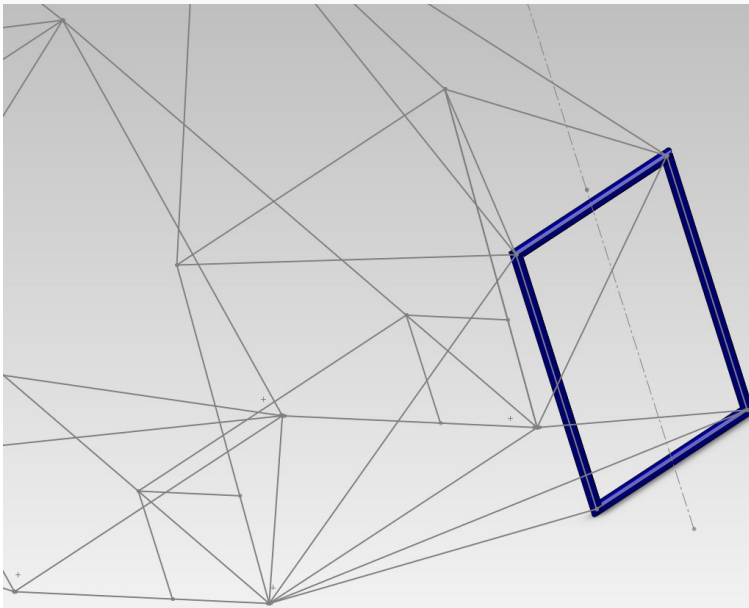


Start with your plans and visualize the entire build as a sketch in space... Know what will be flat on the table and what you will have to support.

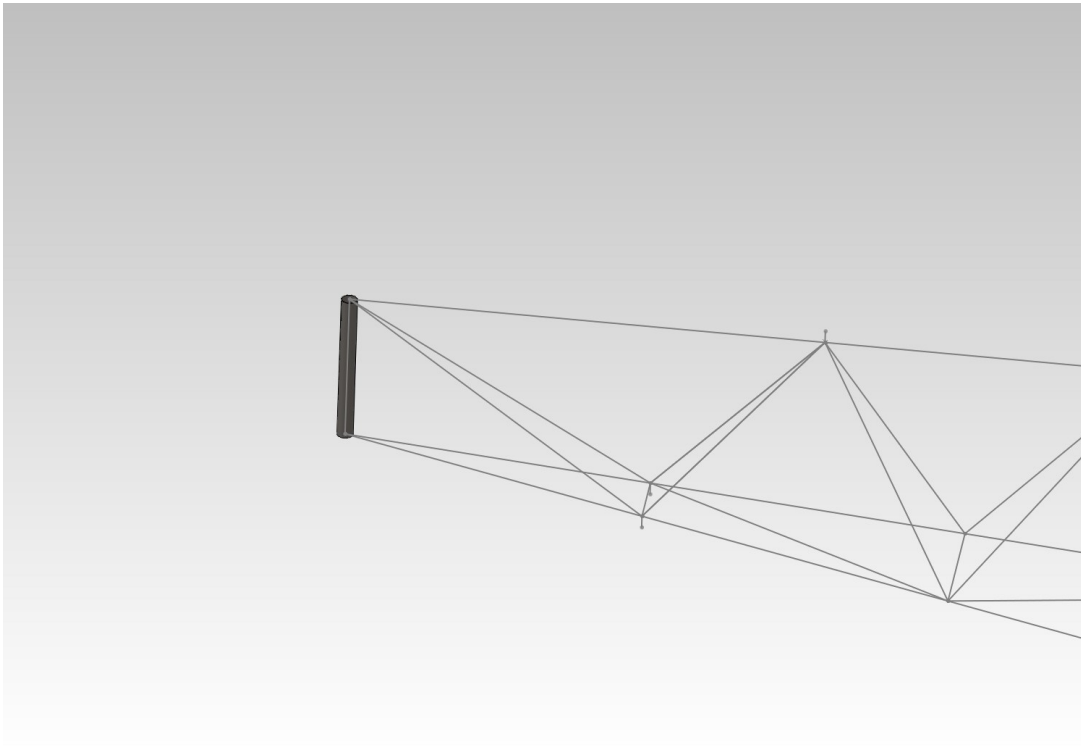
Shown here is just a drawing in space...3-D

Lets put in pieces...and have fun doing it.

If you do 1 step per day, you will be done in 19 days or less.

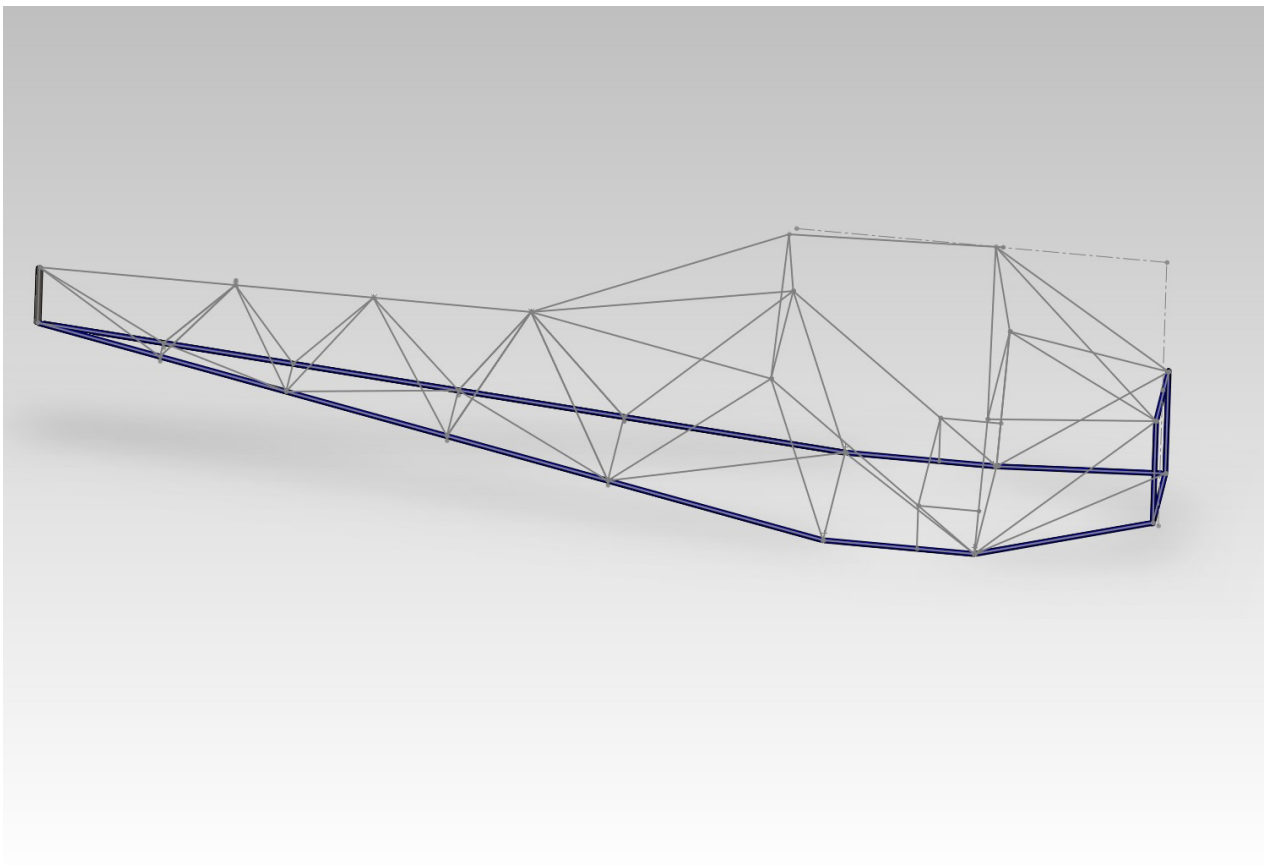


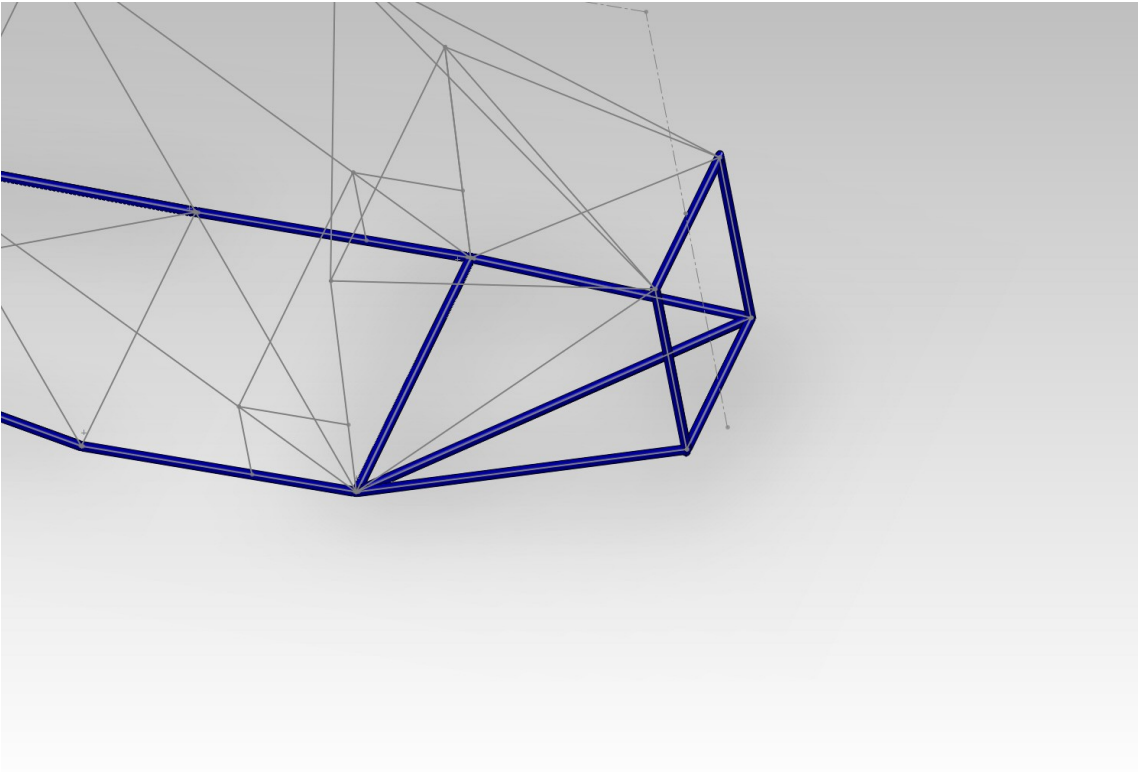
Step 1– nose station. Your best chance of getting this airplane square! Make it right! Then measure where it needs to be located and lock into place.



Step 2- a short day, do step 2 and 3...Above: Tail post supported in place at rear, see plans for height and position.

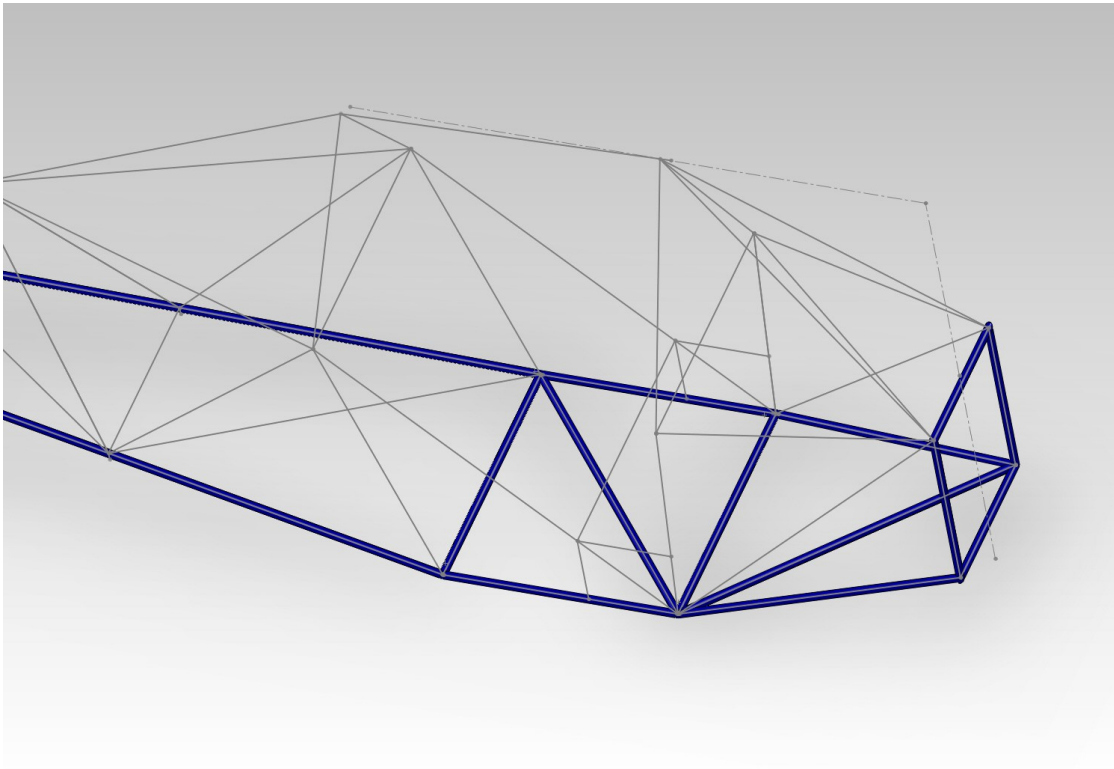
Step 3- Below- your two longest runs and your only bends. About 160" long front to back.

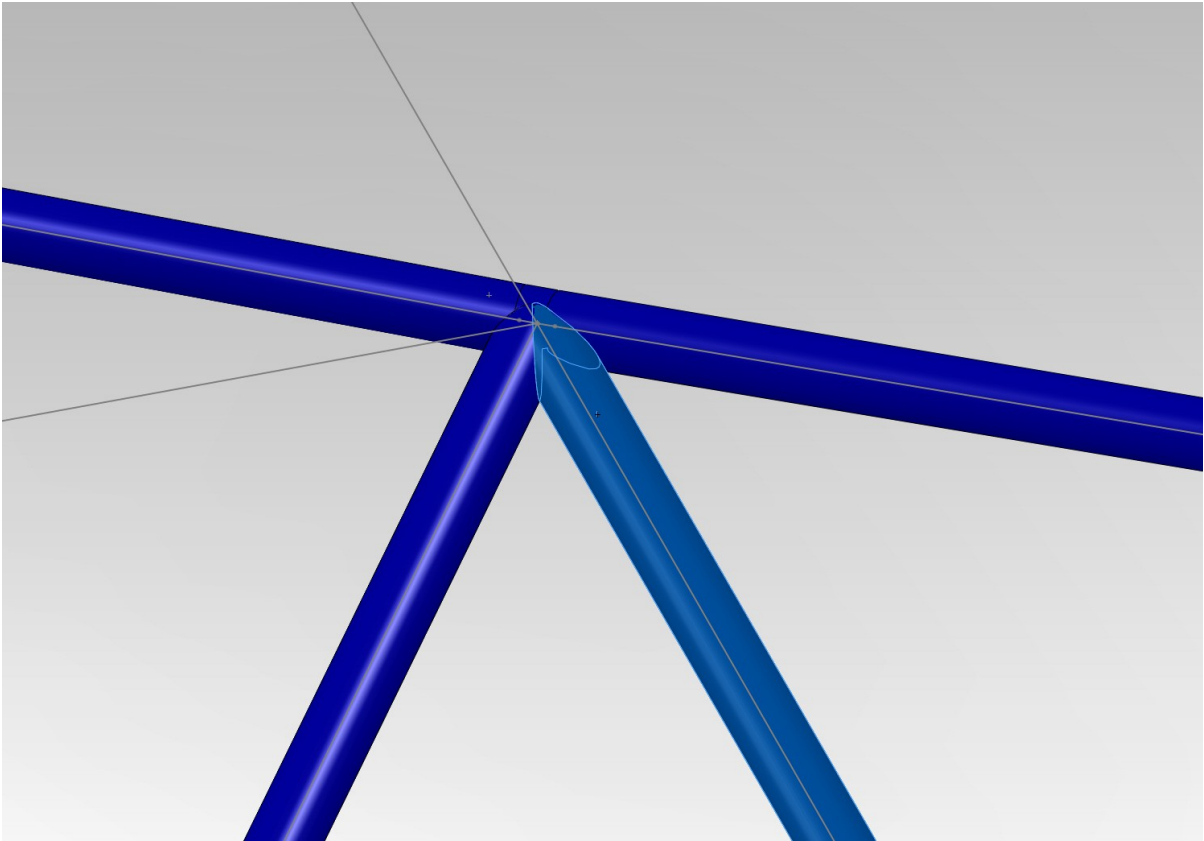




Step 4—Above— a cross and brace fit. That didn't take long, lets do step 5 too.

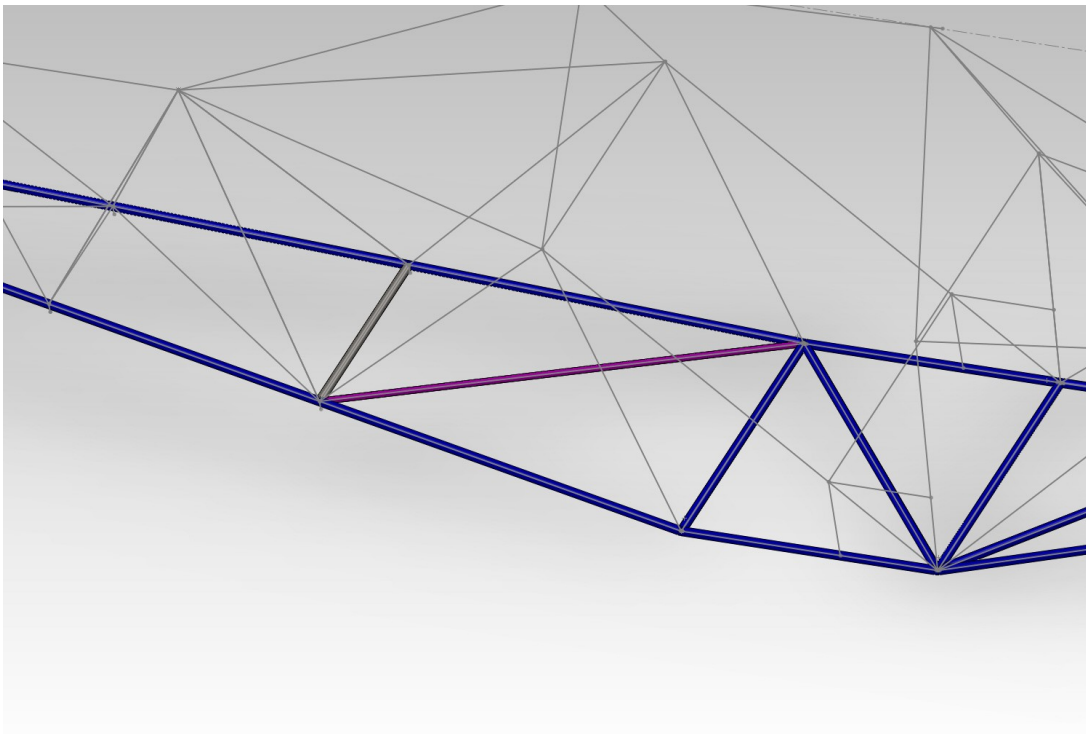
Step 5—Below— second brace and cross. When you know your right and nothing else to be worked in, I do 4 light tacks, keeping in mind tubes that will be coming into the cluster later on. Thus the reason for the Sketch lines in your mind.

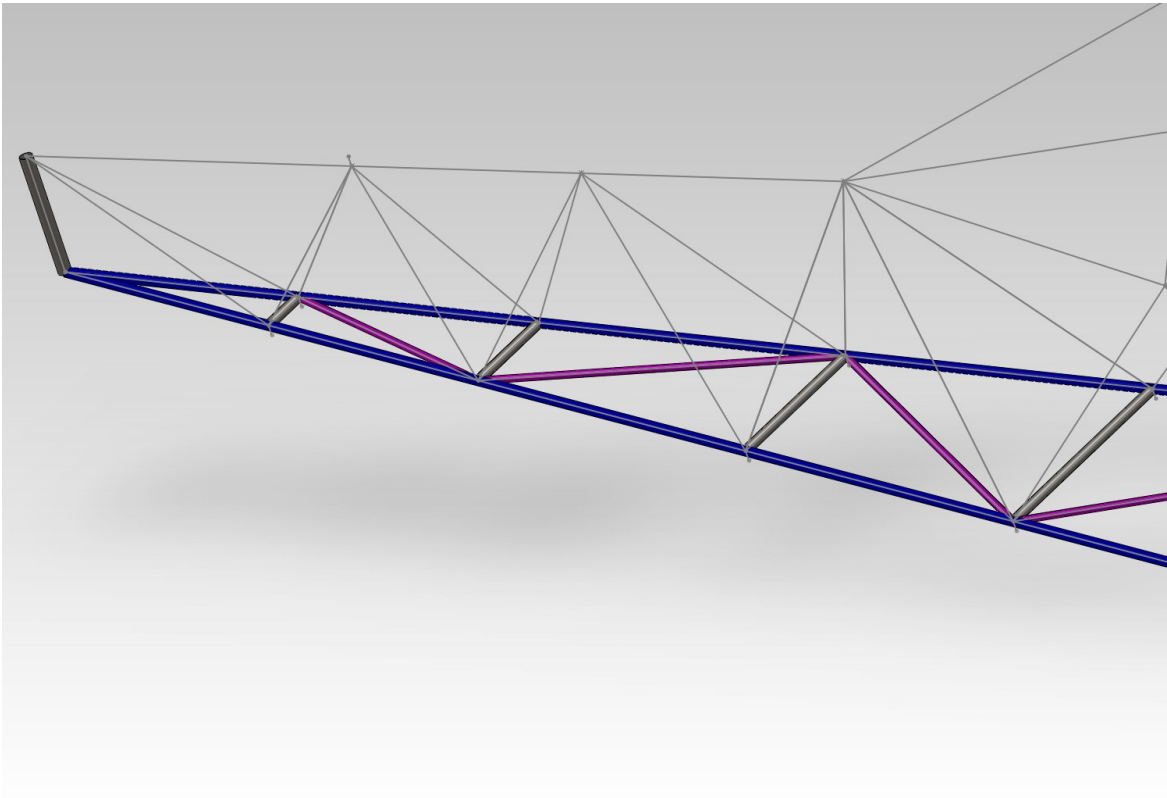




Step 4 Above- close up of profile. See lightest colored line at top. You will get the hang of it.

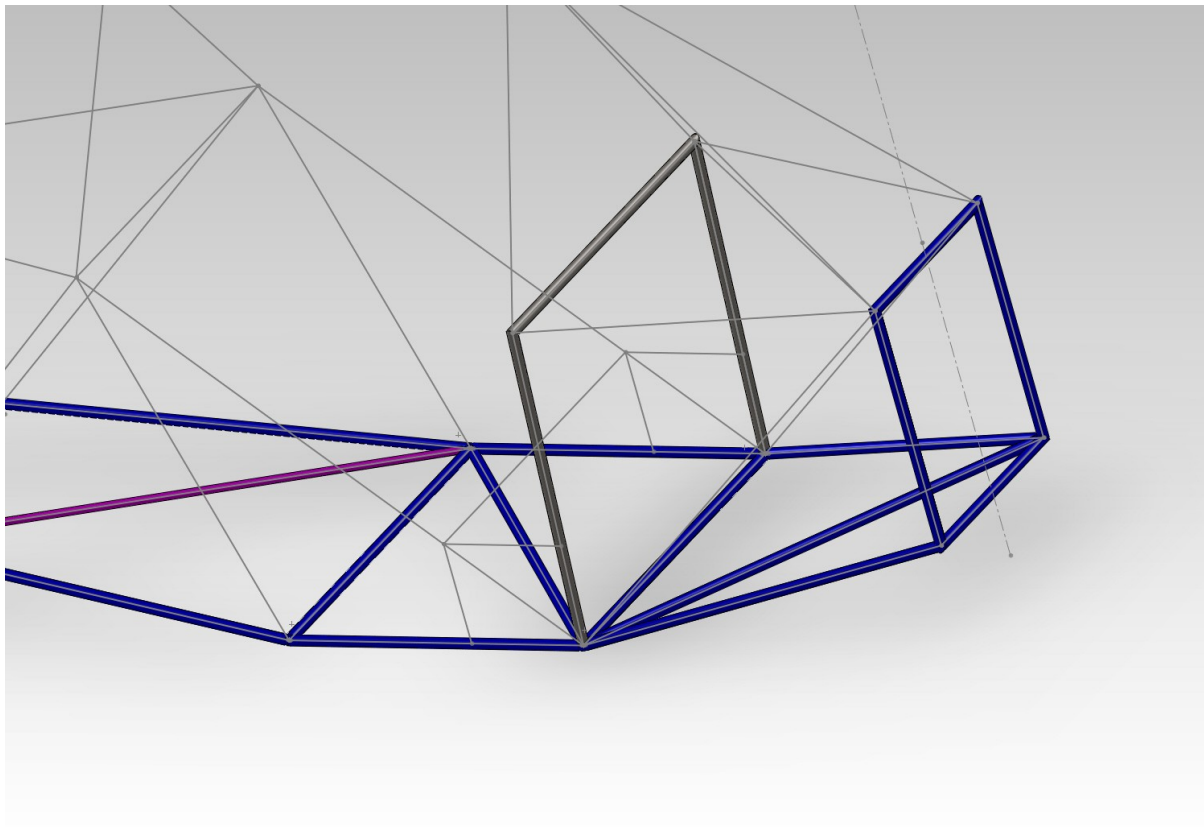
Step 5 Below- smaller brace tube and cross tube, easy day, lets do Step 6 too. Don't tack in a cross before the brace is fitted for good. Done right it won't come back out.

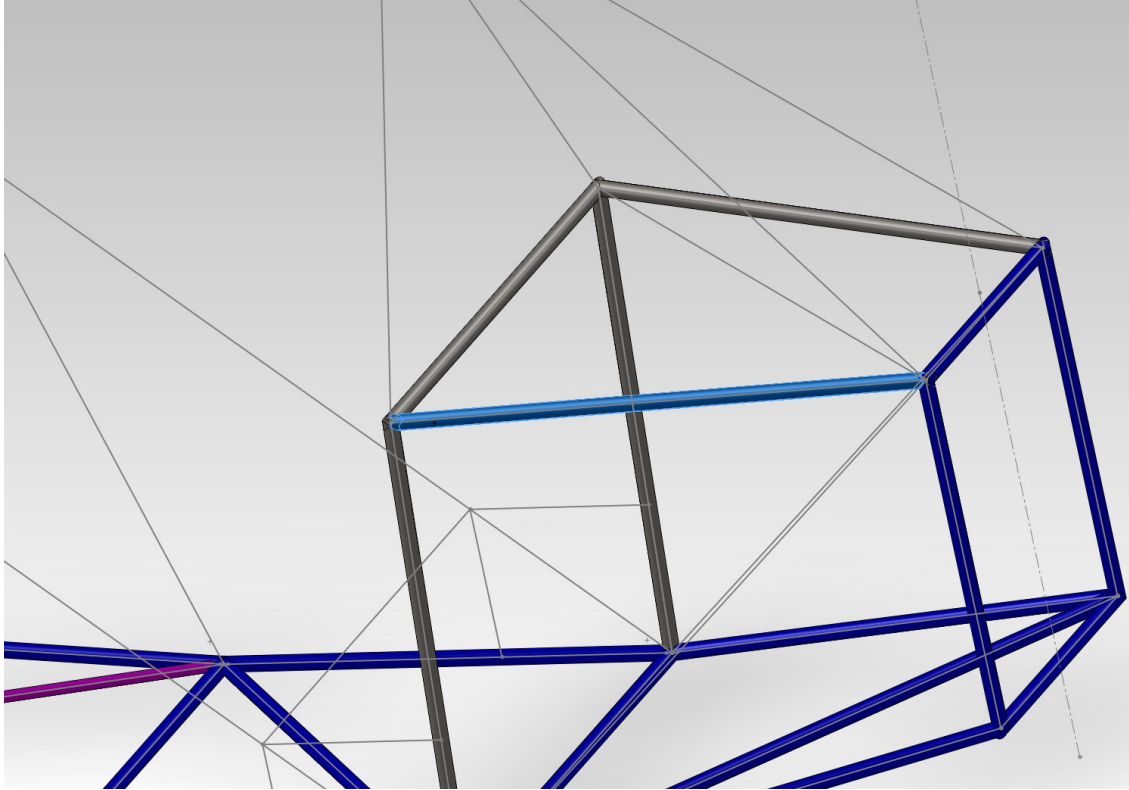




Step 6 Above– finish brace and cross work to tail. You now have a fully tacked bottom. Now back to the front.

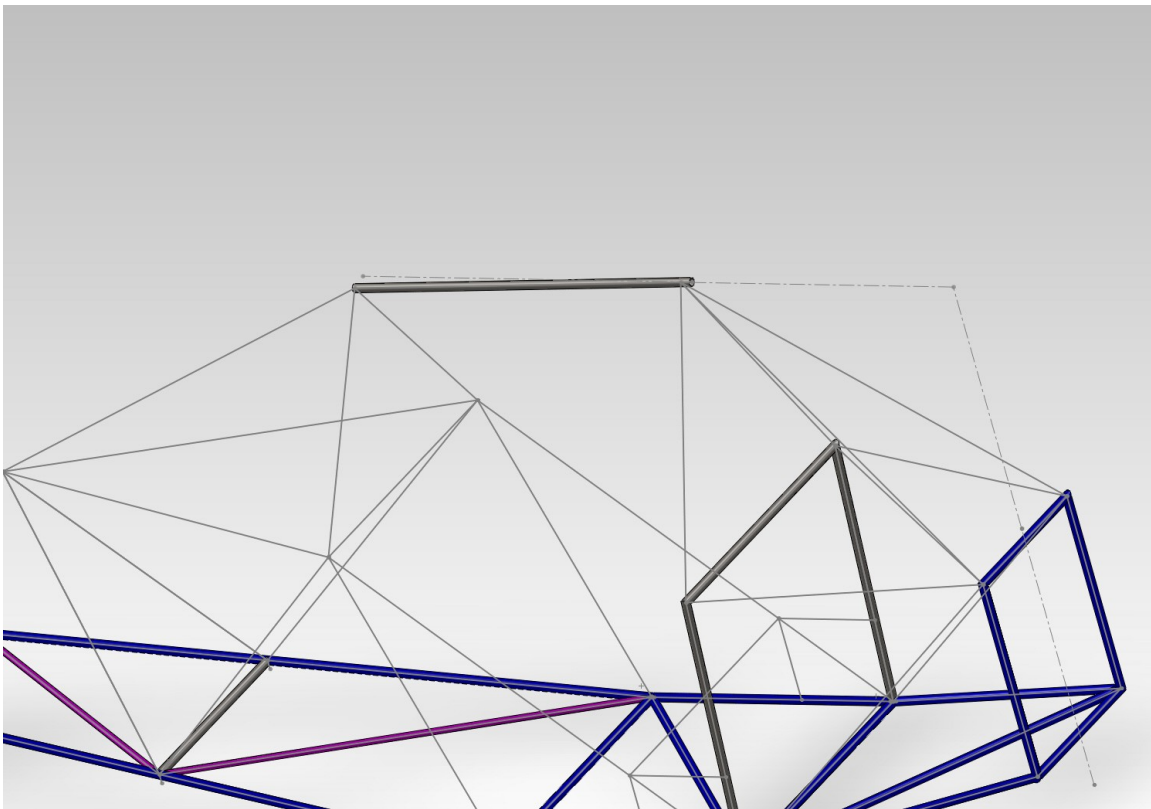
Step 7 Below– B station square. Things really coming together now. Again, make square and your hours ahead of the game. You can really tack the top and lightly tack the bottom.

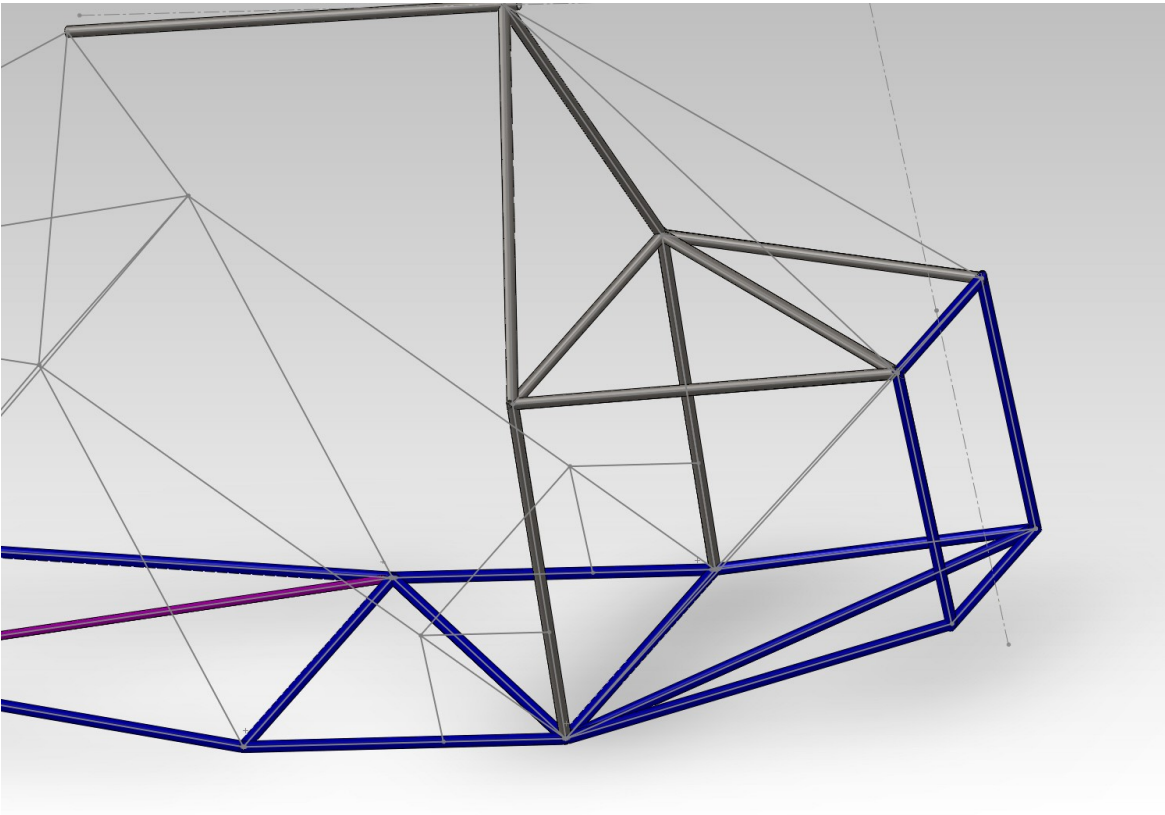




Step 8 Above— keeping the two stations in place and even. Here is where the strength comes in. Keep in mind the braces work that is going to follow.

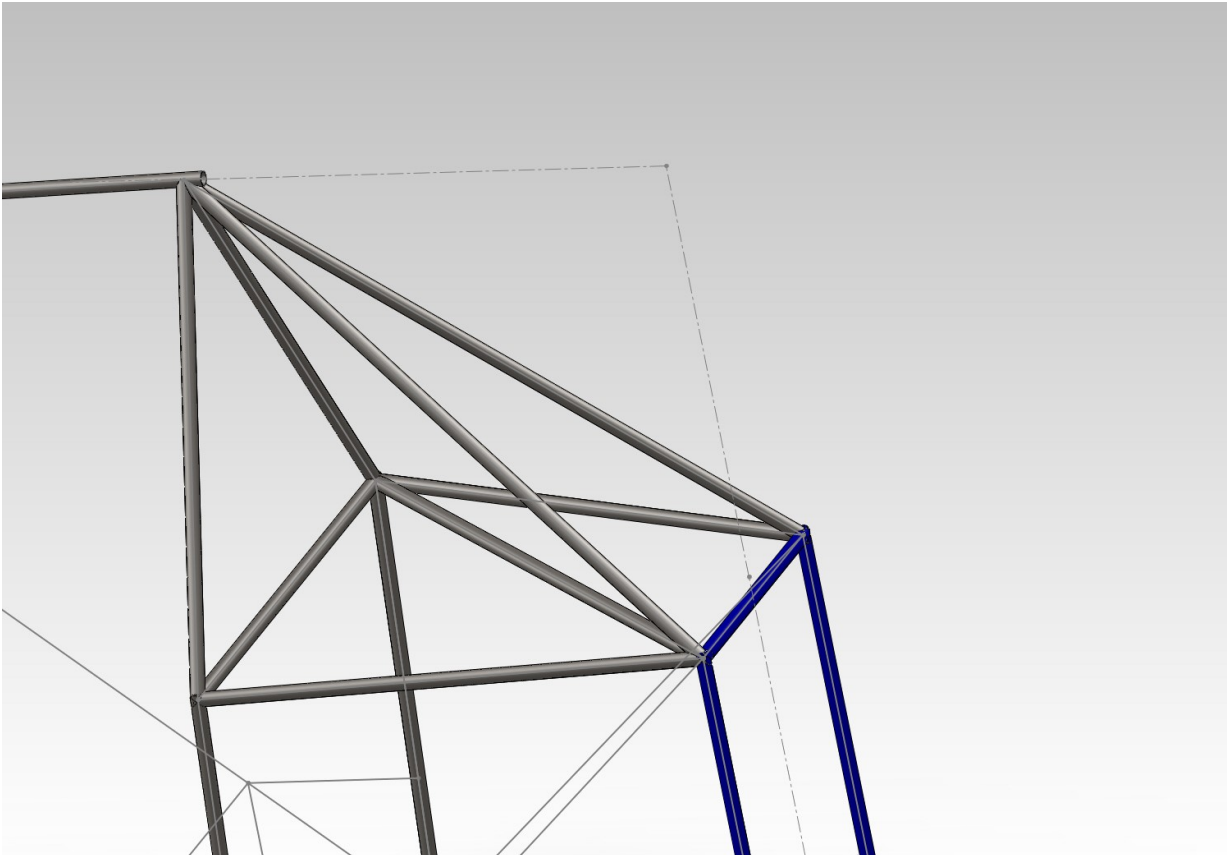
Step 9 Below— yep that tube is just up there, but you know where it has to be and how long. Make it and fit the rest to it. Plumb bob will tell you if your right on the center line with it. Use two bob's. Fore and aft.

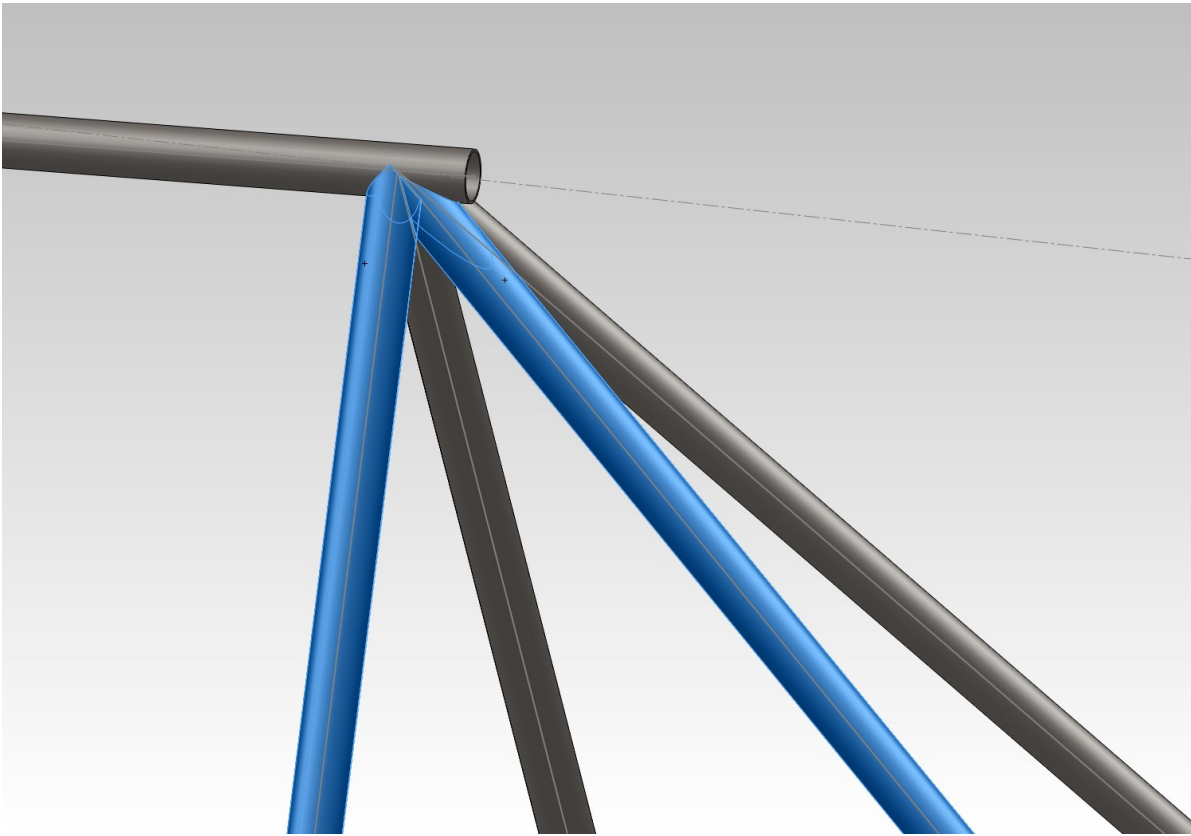




Step 10 Above– tying the top line into the box frame below.

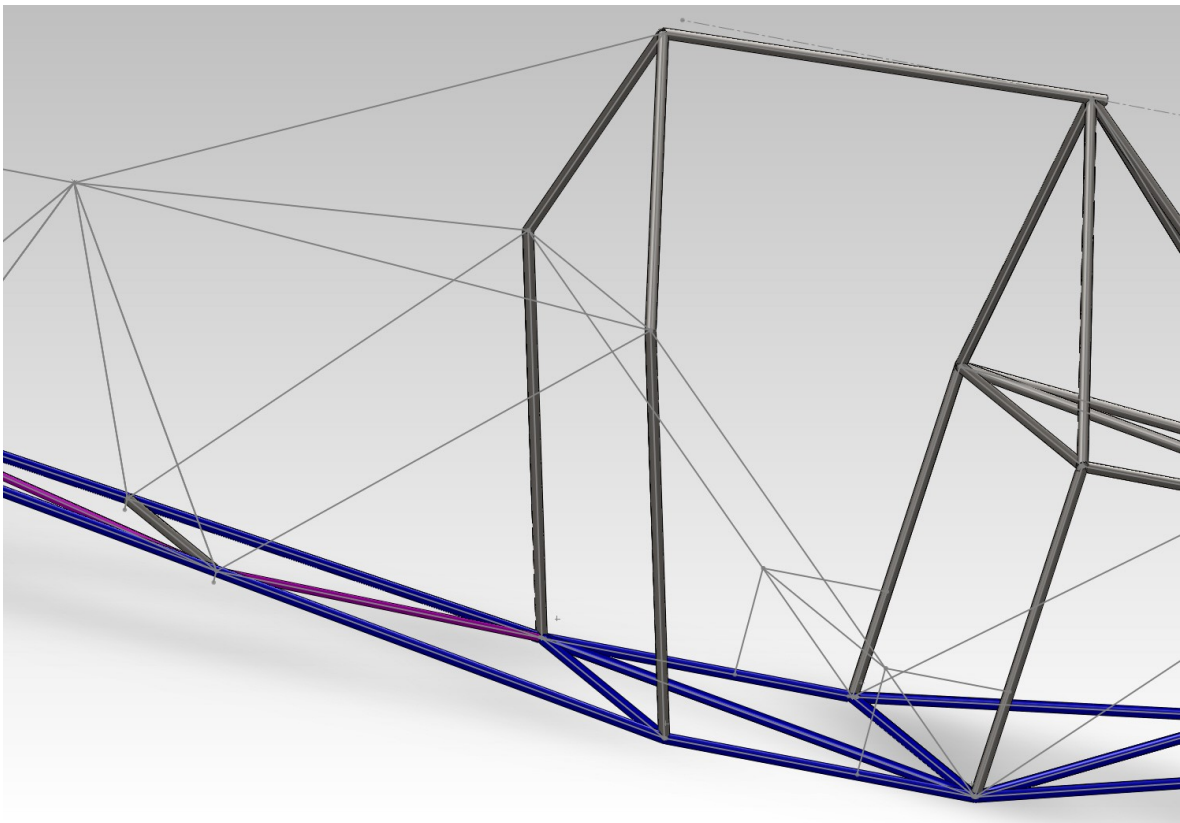
Step 11 Below– bracing back to the top. Some like the bottom braces to made by now. You can do that too.

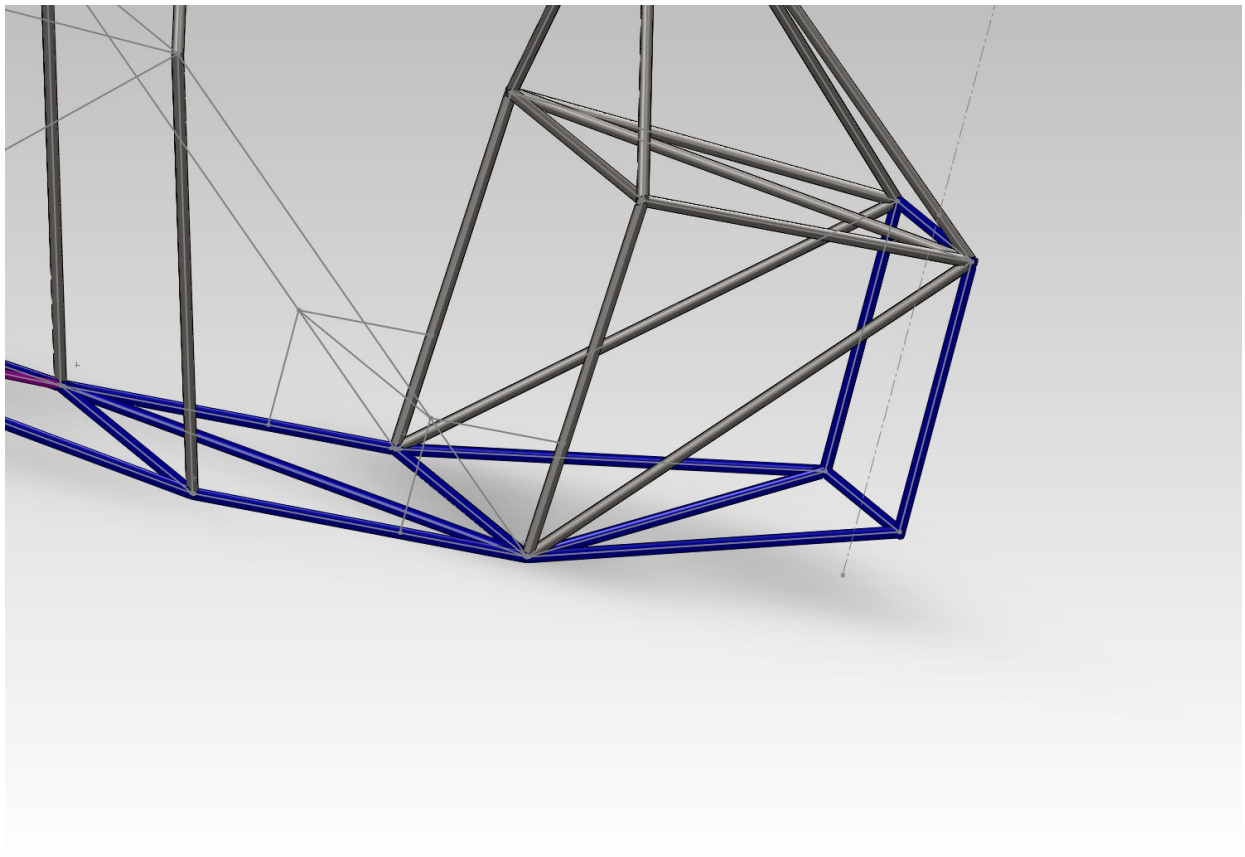




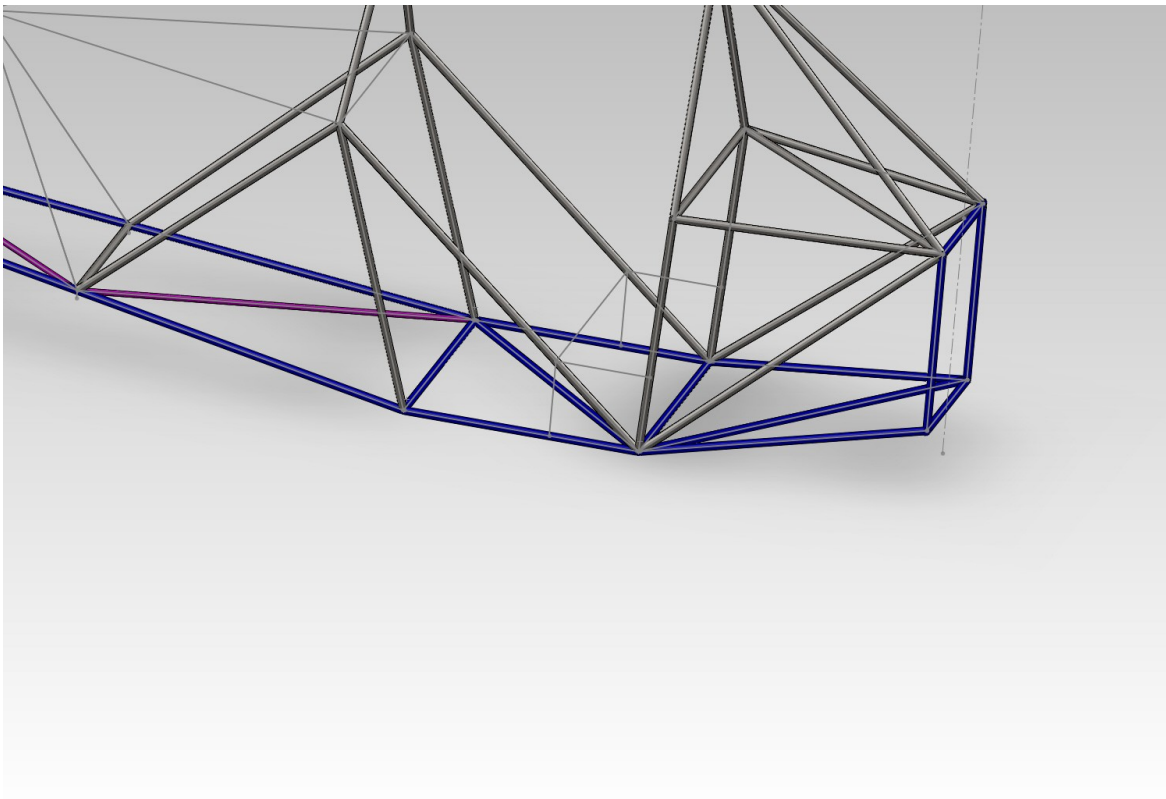
Step 11 close up Above– cluster profiles close up.

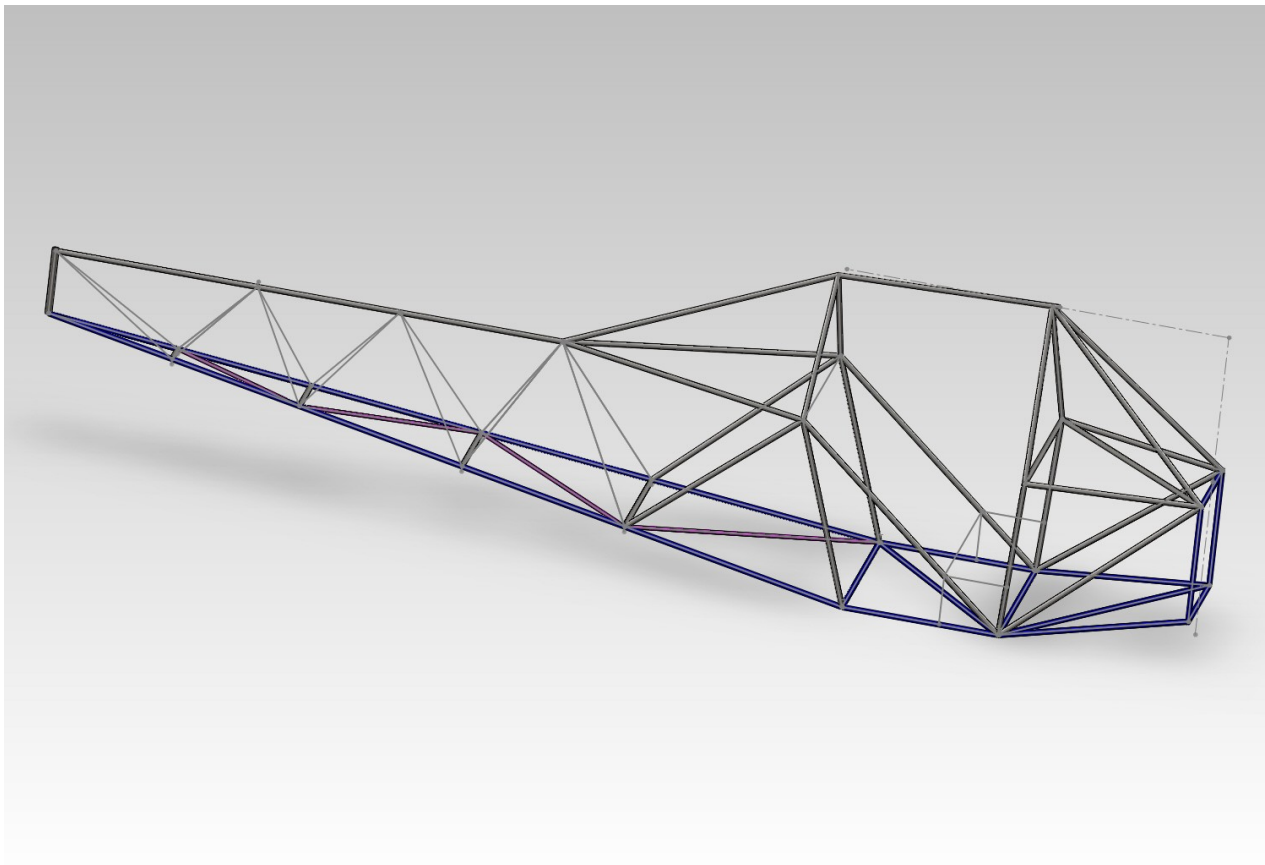
Step 12– Below– Tying the back into place. 4 tubes Not bent. Some have bent here. Bends need to be dead center of bracing.





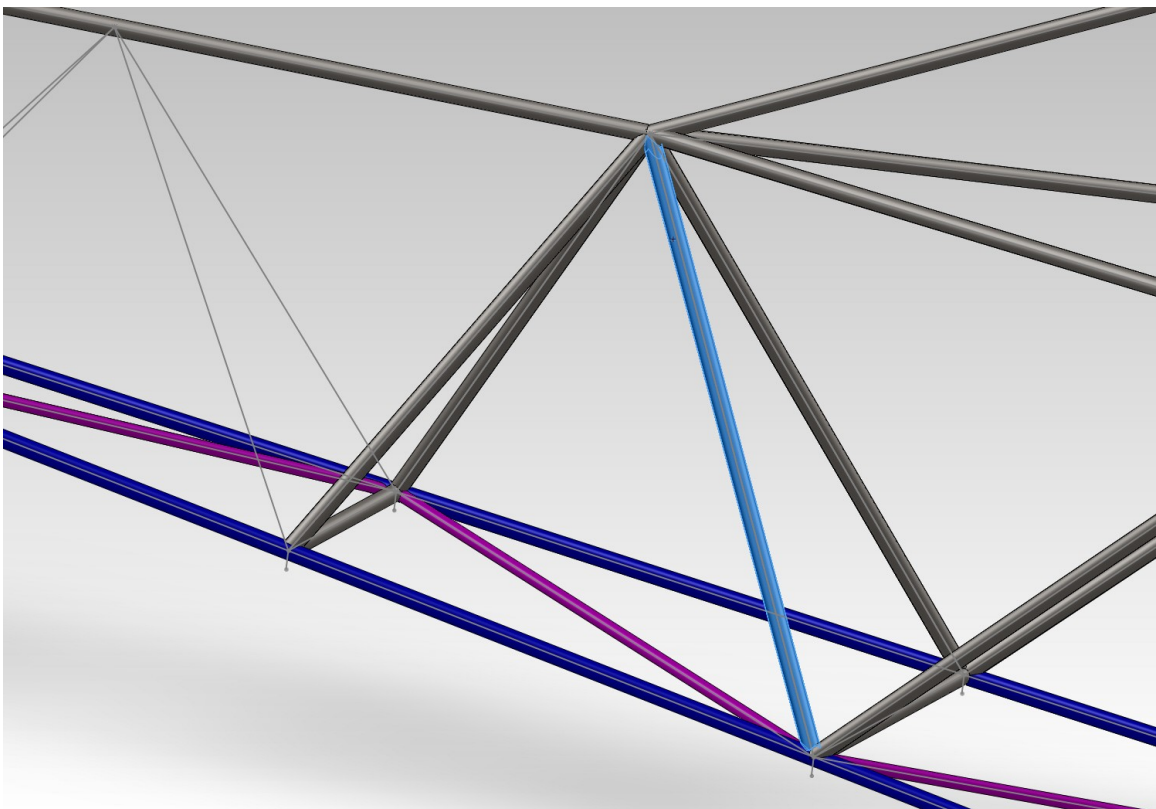
Step 13 Above— you may have done the front braces already that is fine. The tubes above have been cut but not tacked. With the two braces made, they fit in and the rest follow then tack. The front become tight then.
Step 14 Below— cabin braces go in with no other tubing to worry about.

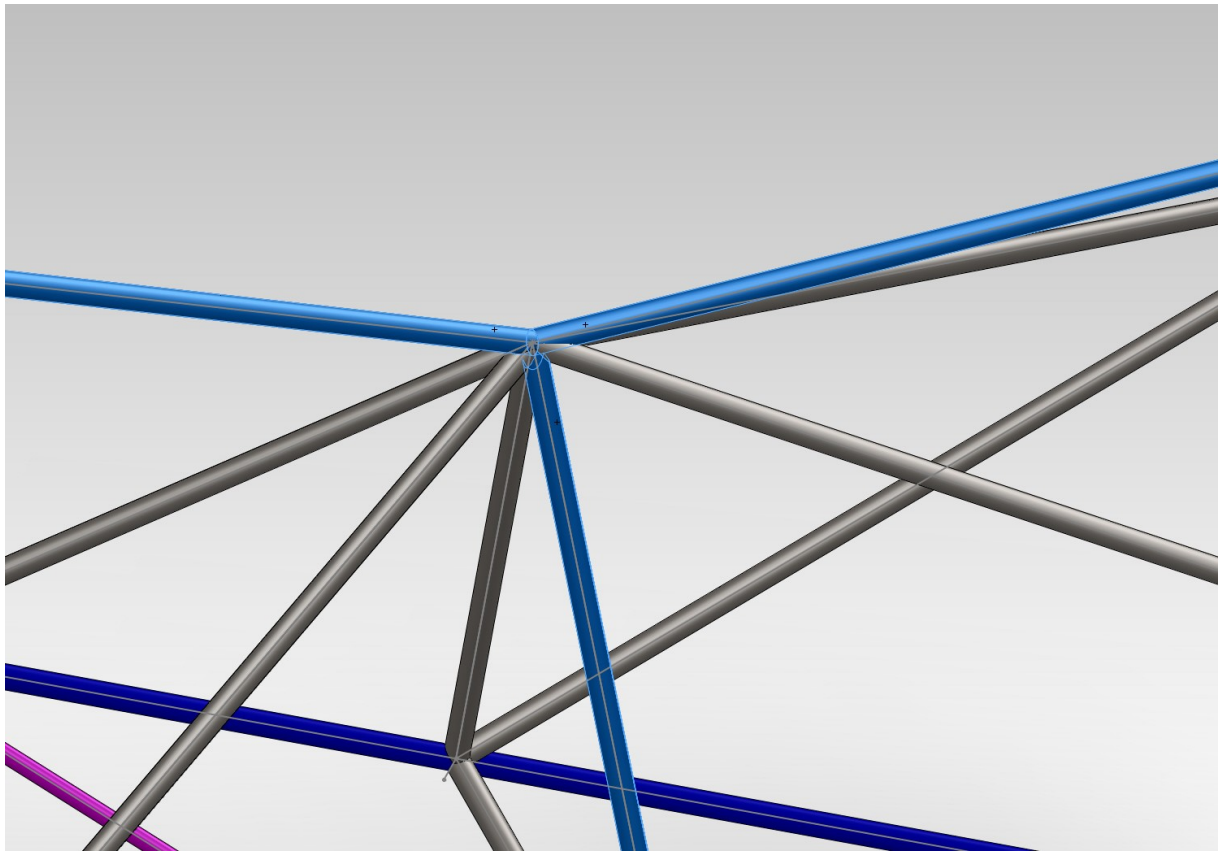




Step 15 Above– behind cabin bracing, things getting tighter now...be thinking of getting those tubes in right and tight. By now you're a pro at cutting them and this is easy.

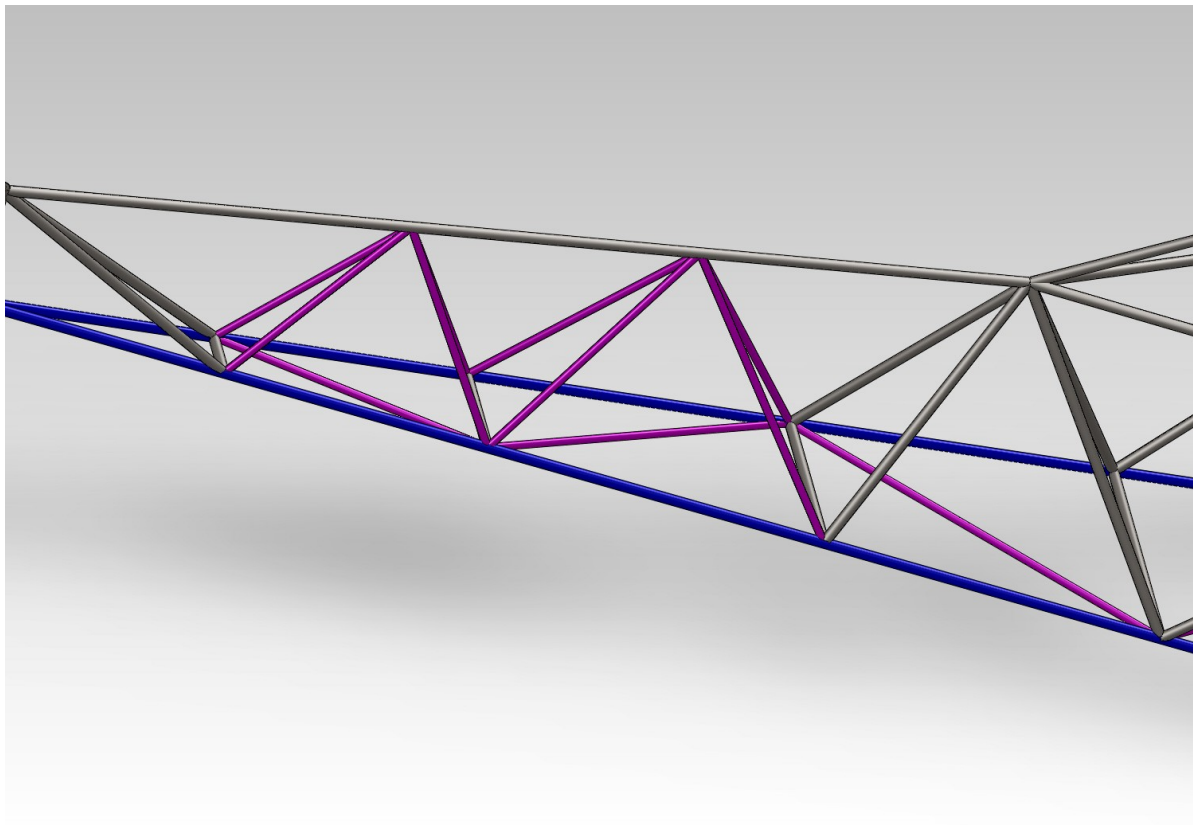
Step 16 Below– a cluster of 4 tubes on the bracing.. Depending on your trusting of your numbers, you can do the front and tack and then make the back to fit the front. Don't do the other way around.

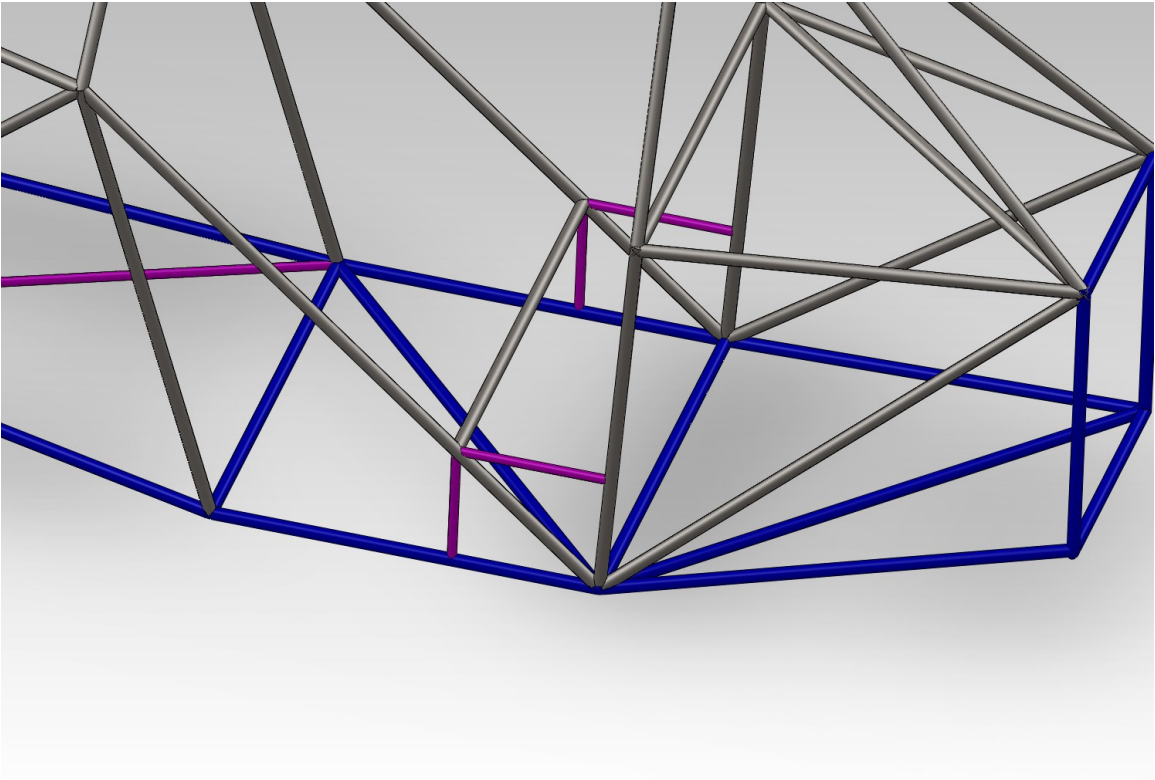




Step 16 close up Above– I would make your top two blue tubes a nice single cut profile and then bring in the brace tubes below it secondly. This is just showing all of them coming together. Once all in place and held, tack all over.

Step 17 Below– Finish out the bracing two are going to have to come in from the sides– I would make them The last two pink ones, by now your comfortable with the fitting, you will know what works best.





Step 18 Above– The seat cross tube and the 4 90 degree tubes (2 each side) The latter should look the same from side to side.

Step 19 Below– the bow back seat tube. Can be done on a roller or gradual on a die. That is it, you have a frame and done in 19 easy days for forming and tacking. Really tack well and it will stay in shape during welding process.

