

CURTISS XP-40Q

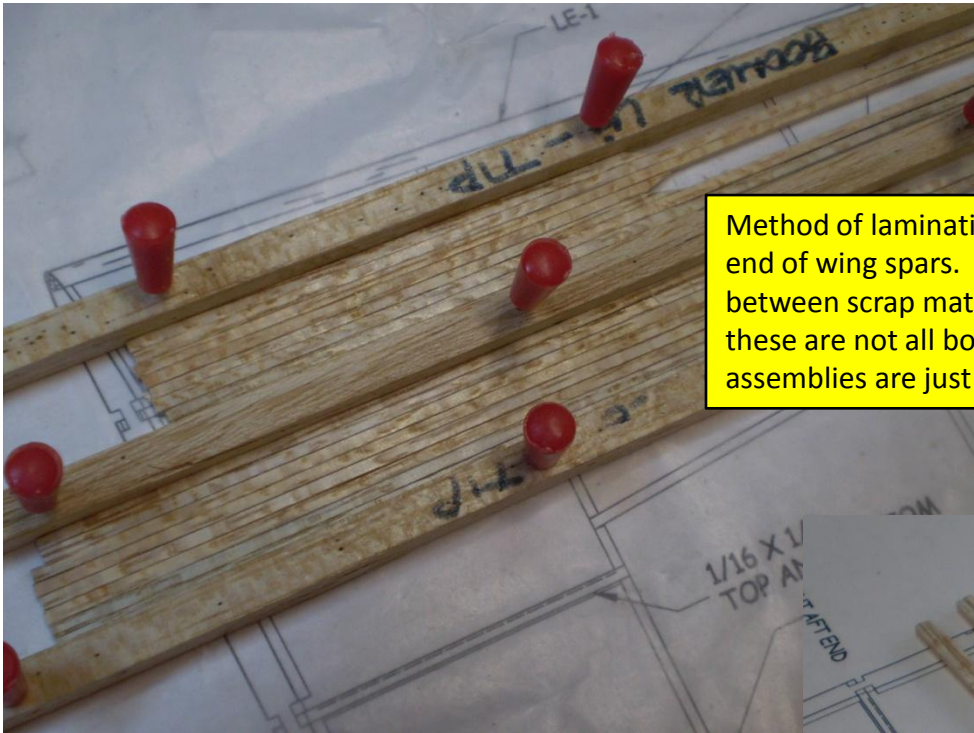
Kit No. CBMD-003

Construction Detail

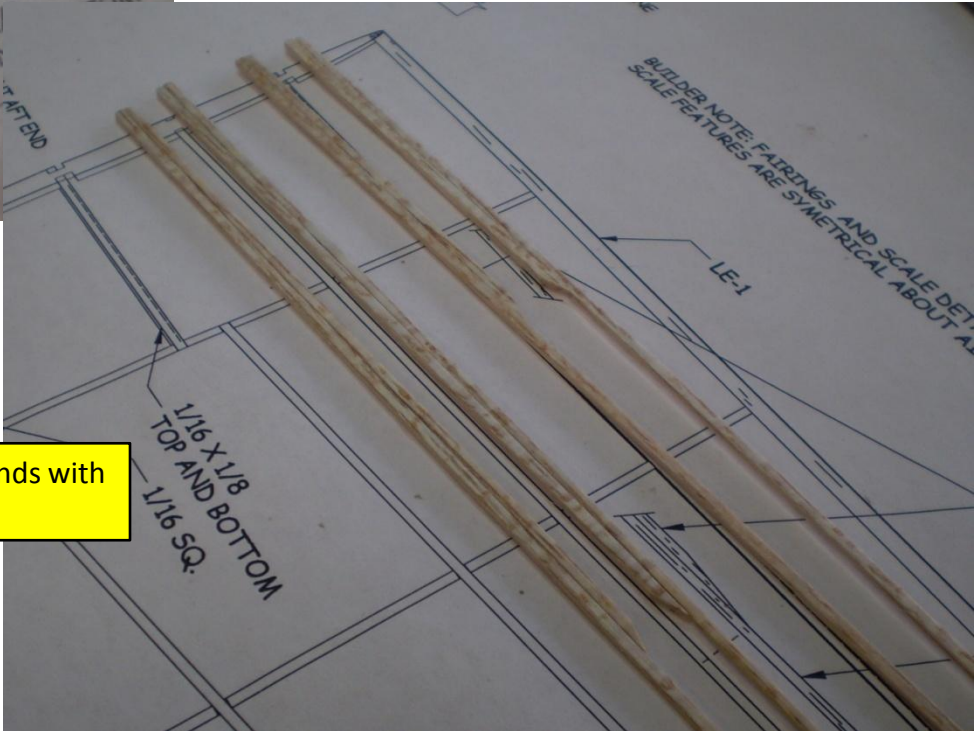
Part 2 of 3: Wing and final assembly

CB Model Designs

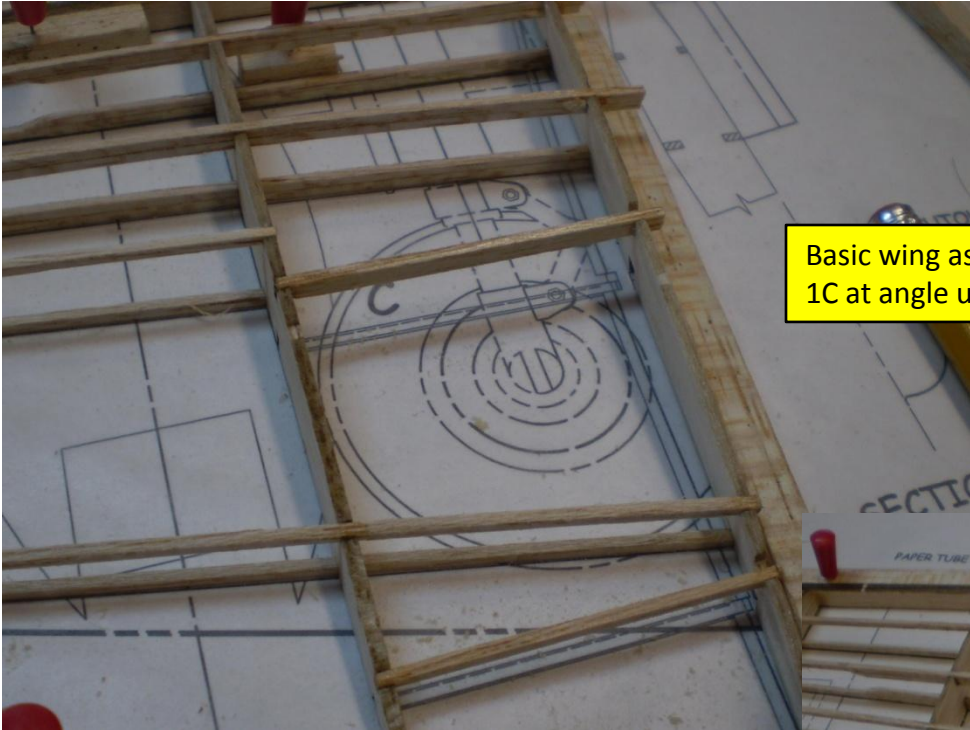
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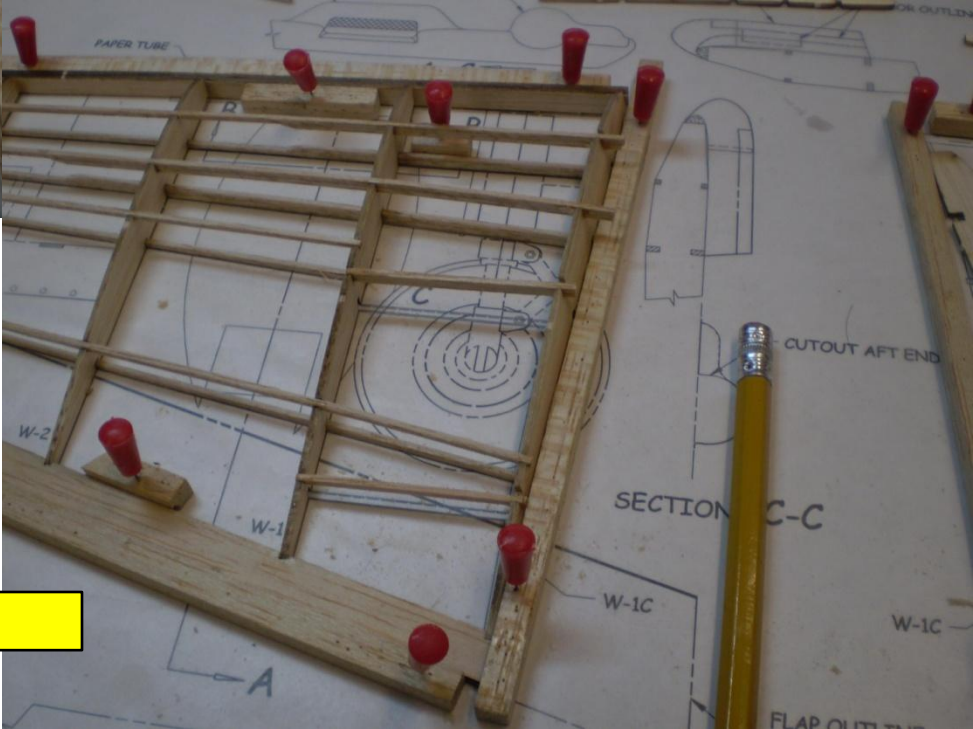
Method of laminating doublers onto inboard end of wing spars. Pieces are clamped together between scrap material while glue dries. Note- these are not all bonded together- the individual assemblies are just nested in one clamp setup.



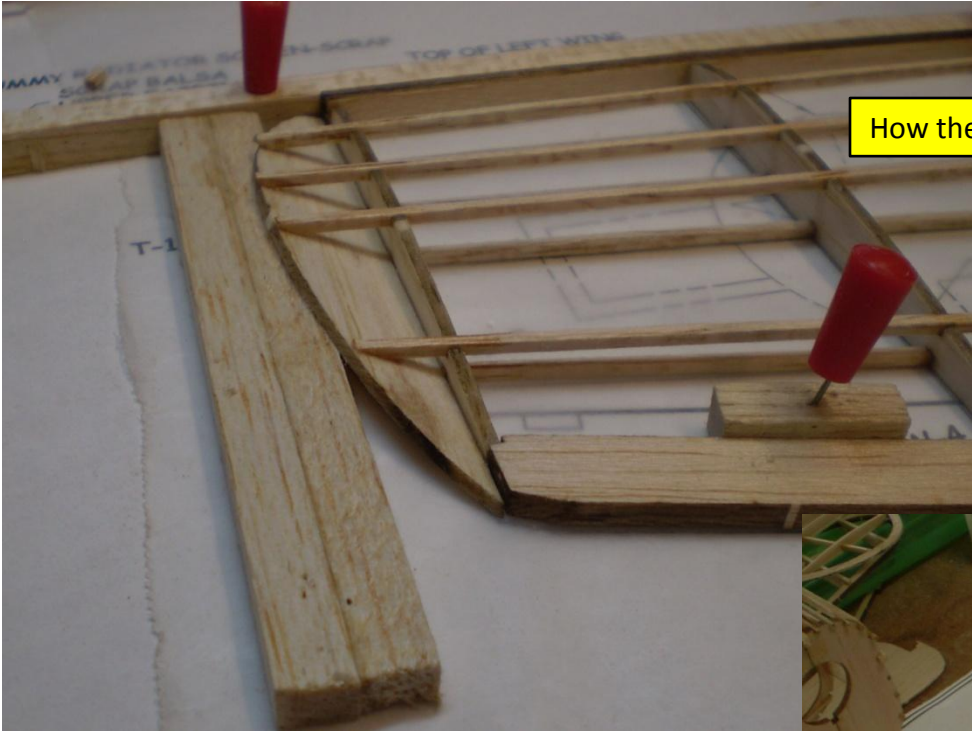
Wing spar bond assemblies at inboard ends with respect to plan location



Basic wing assembly at root (W-1C) end. Set W-1C at angle using gauge shown on draw sheet.

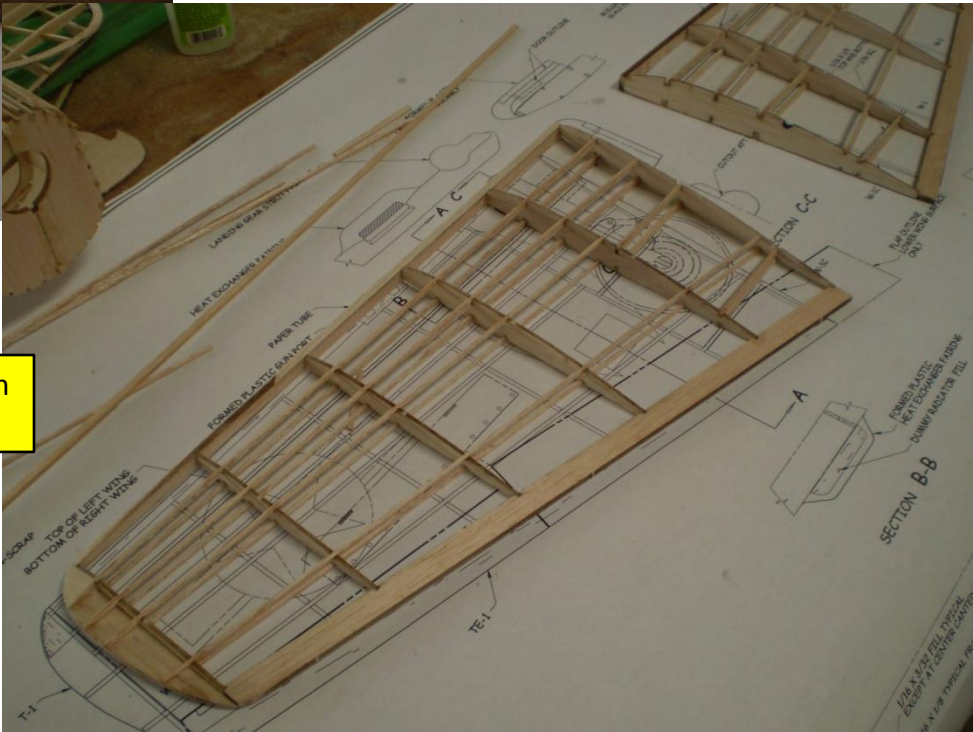


Another view of wing root area



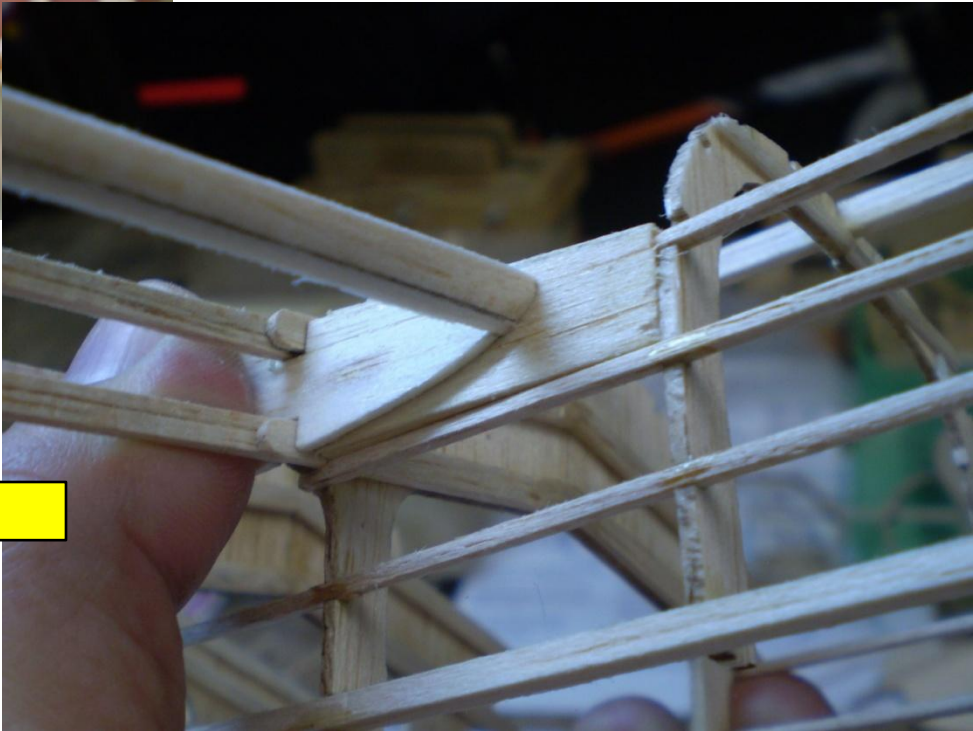
How the wing tip is set

Basic wing panel assemblies ready to shape with sanding block.





Fitting the scrap balsa filler at the wing leading edge and fuselage joint



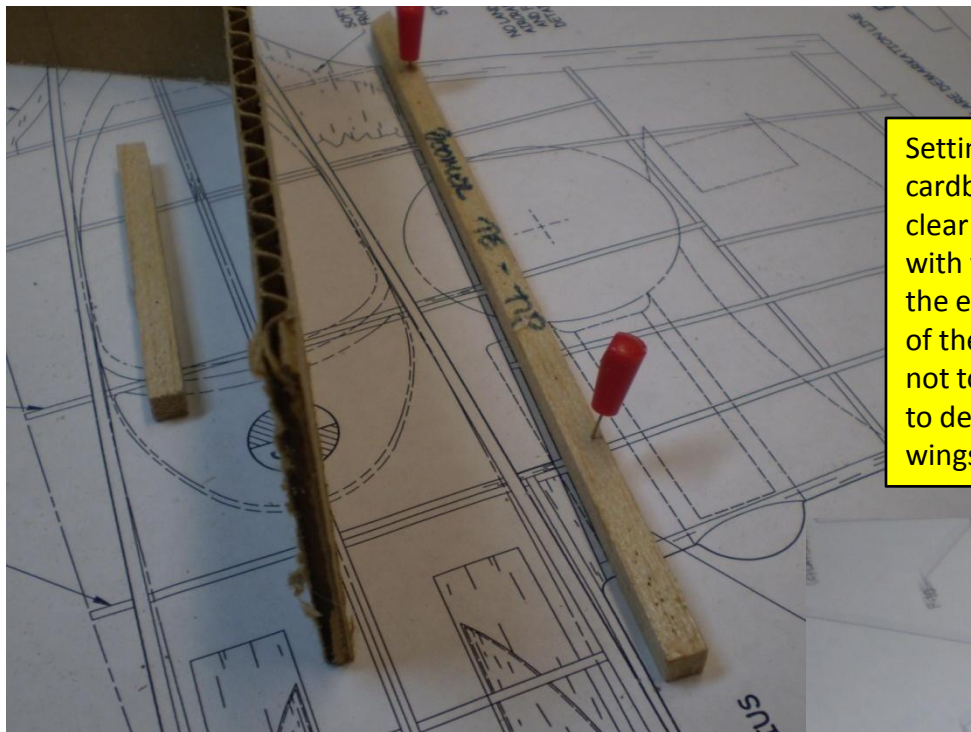
Another view of this area



How the filler looks when installed

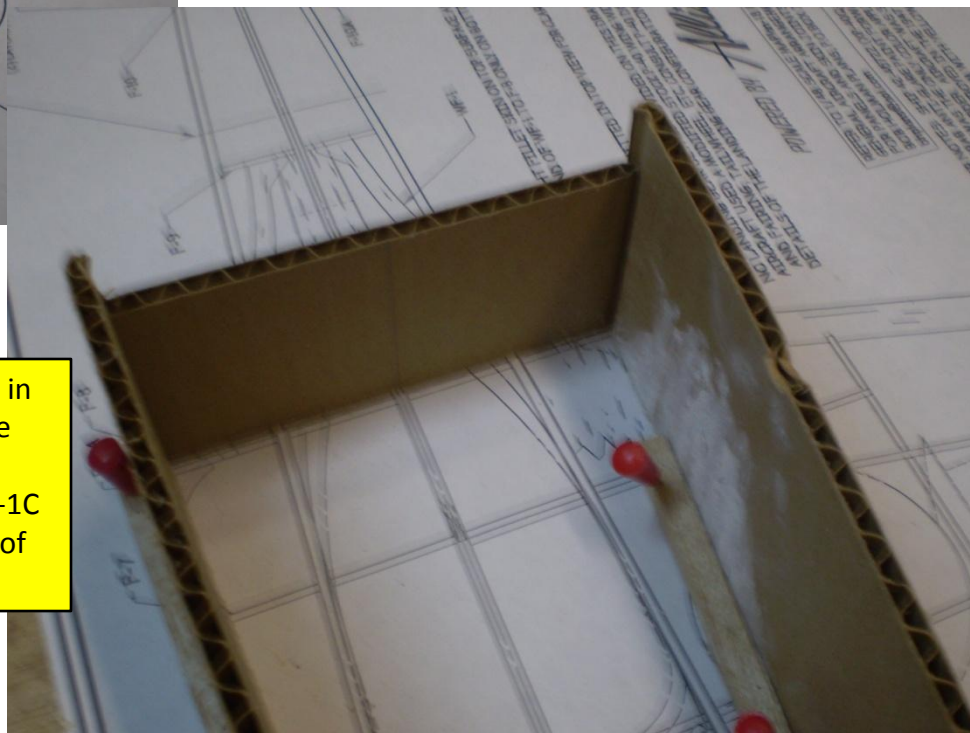


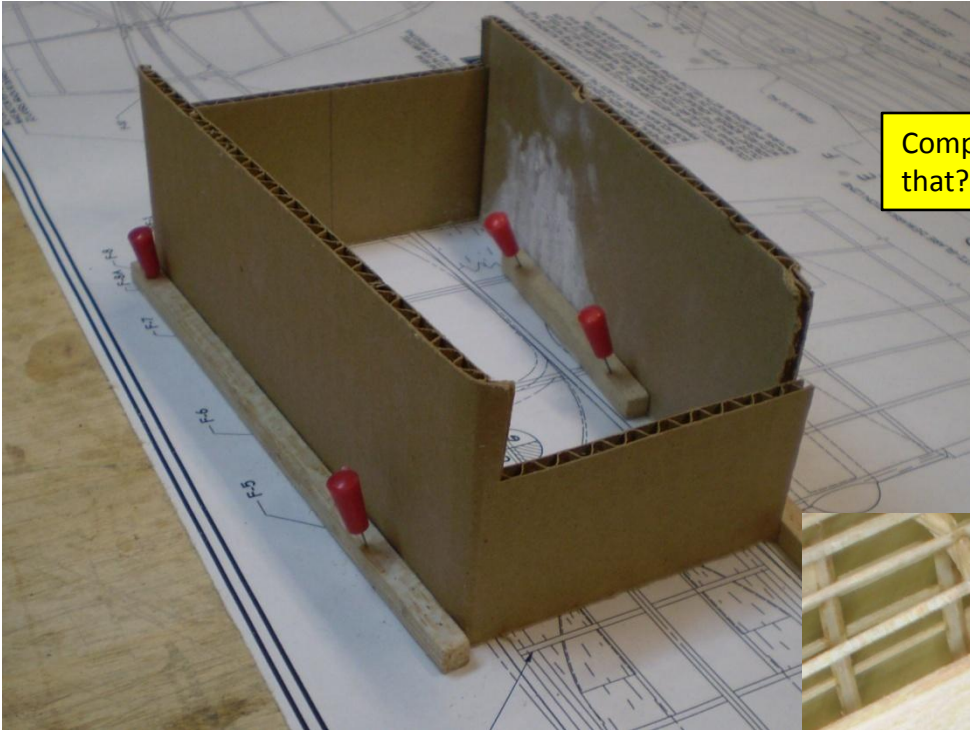
Fillers installed on both sides



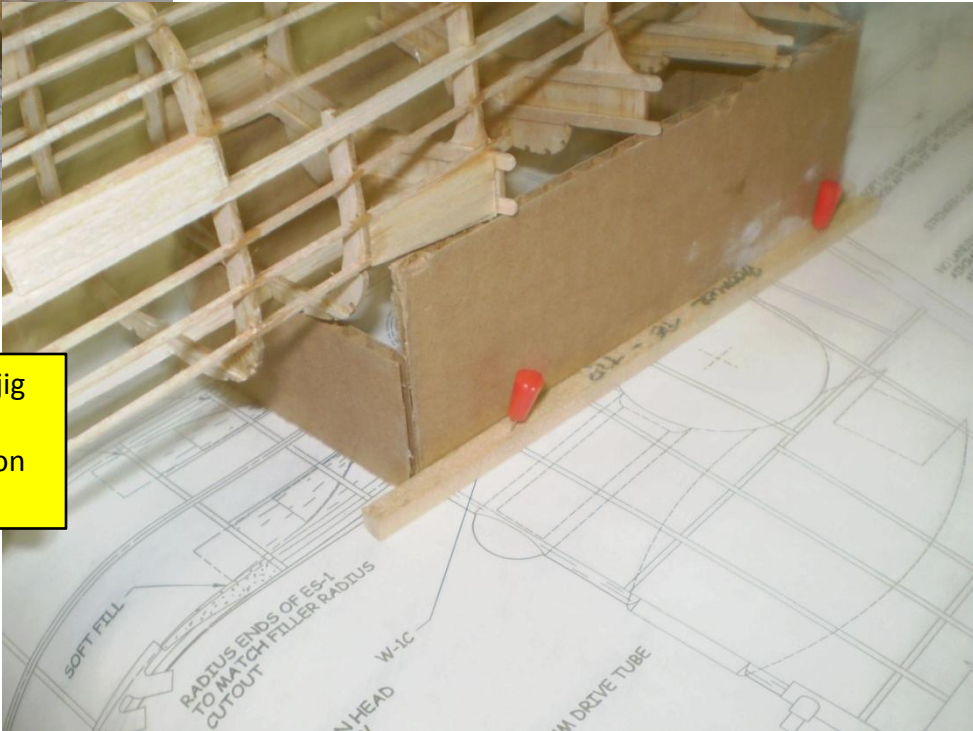
Setting up the jig for wing installation. I used a cardboard strip that is folded and notched to clear the fuselage. You can do the same thing with wood strips or whatever, provided they are the exact same dimension (height) on both sides of the airplane center line. The fuselage must not touch the board, etc., as you are attempting to deal with the incidence settings between the wings only.

The cardboard strip jig base in position as controlled by the blocking pinned to the plan sheet. This should allow W-1C to rest directly on the edge of the jig.





Completed wing installation jig-how hard was that?

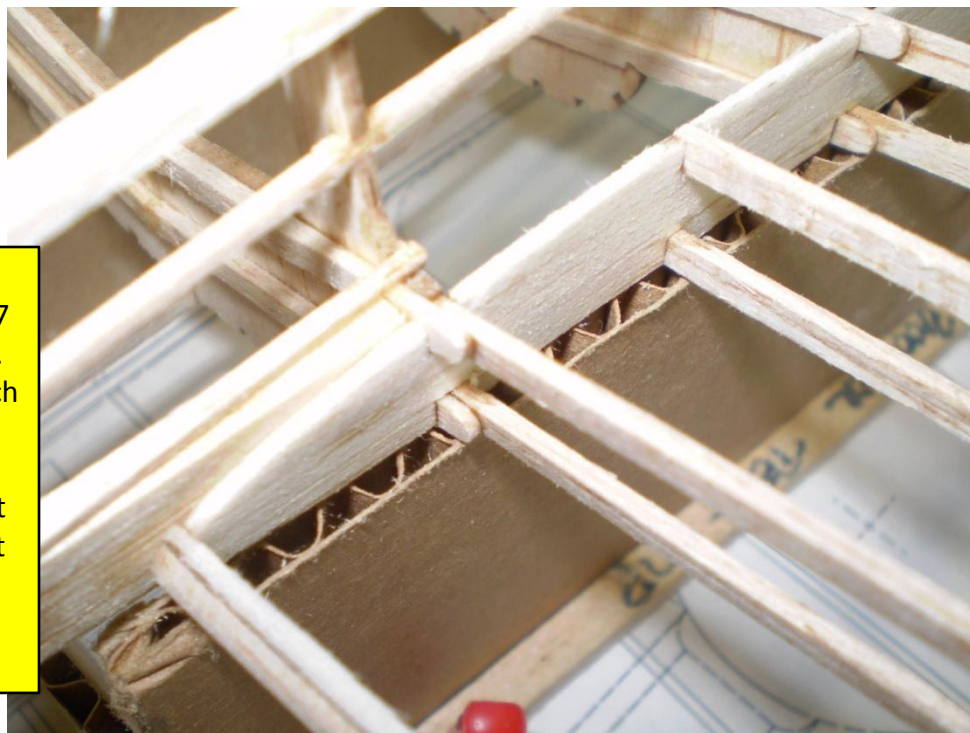


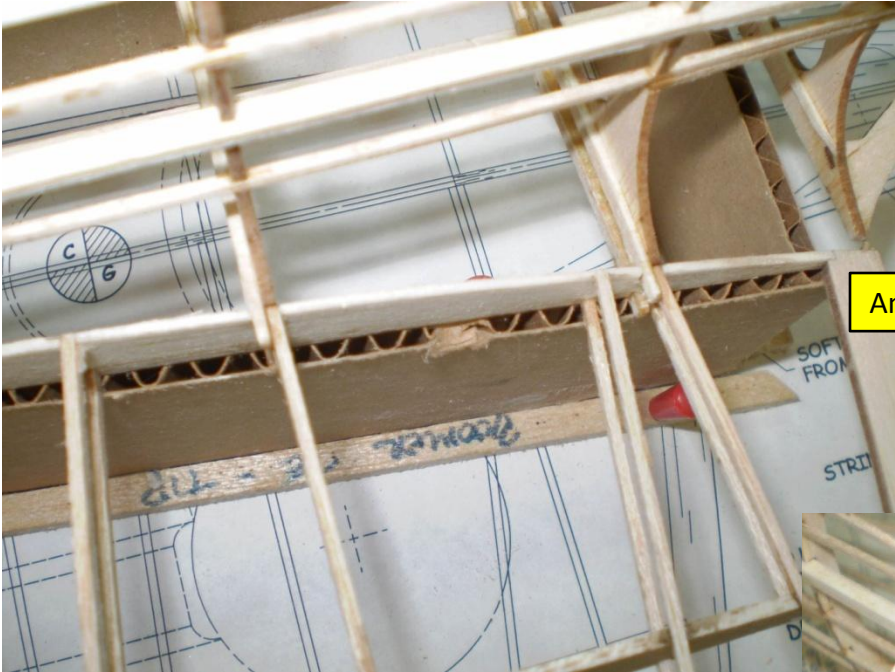
The fuselage resting on the jig to show how this contact looks. Should be the same on the opposite side.



Looking down on the fuselage in position on the jig base

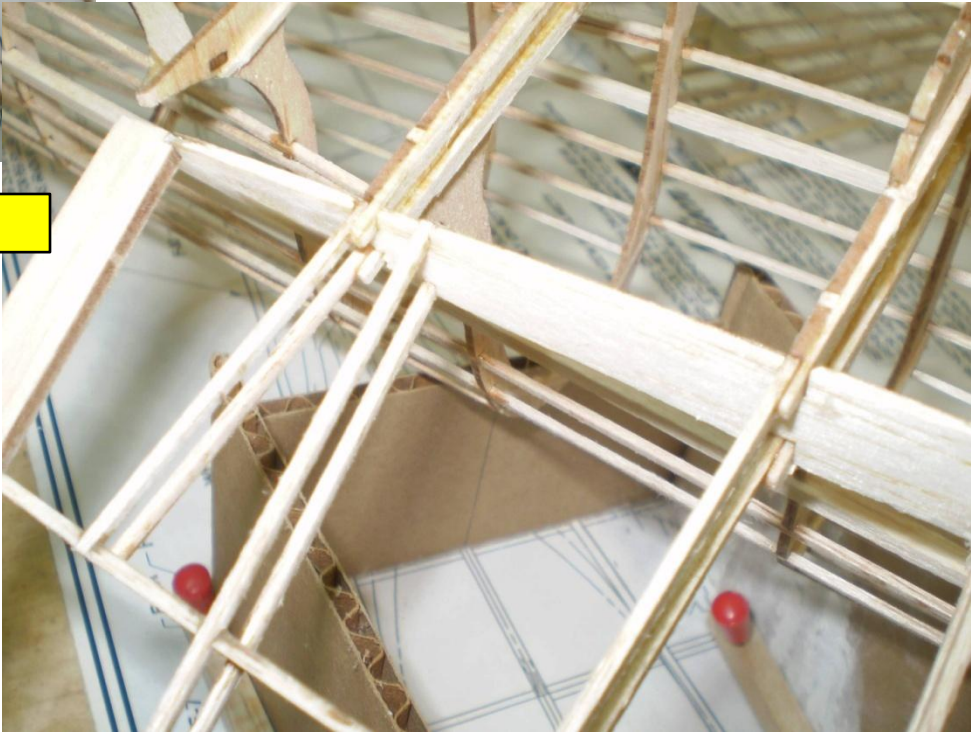
I start by installing the left wing panel-make sure the bottom of W-1C is set flush to the bottom of wing frames F-5, F-6, F-7 and the inside surface is contacting the ends of these frames. Once positioned, hit the stub spar joints with thin CA to attach everything. Go back and hit the ends of the frames lightly too. Most of the wing load is going through the stub spars-a perfect joint between W-1C and the ends of the frames is not necessary. Hopefully all your W-1C prefitting resulted in tight joints between the stub spars and wing spars for maximum strength. If not, make shims to take up the difference and improve the joint





Another view of the left wing installation

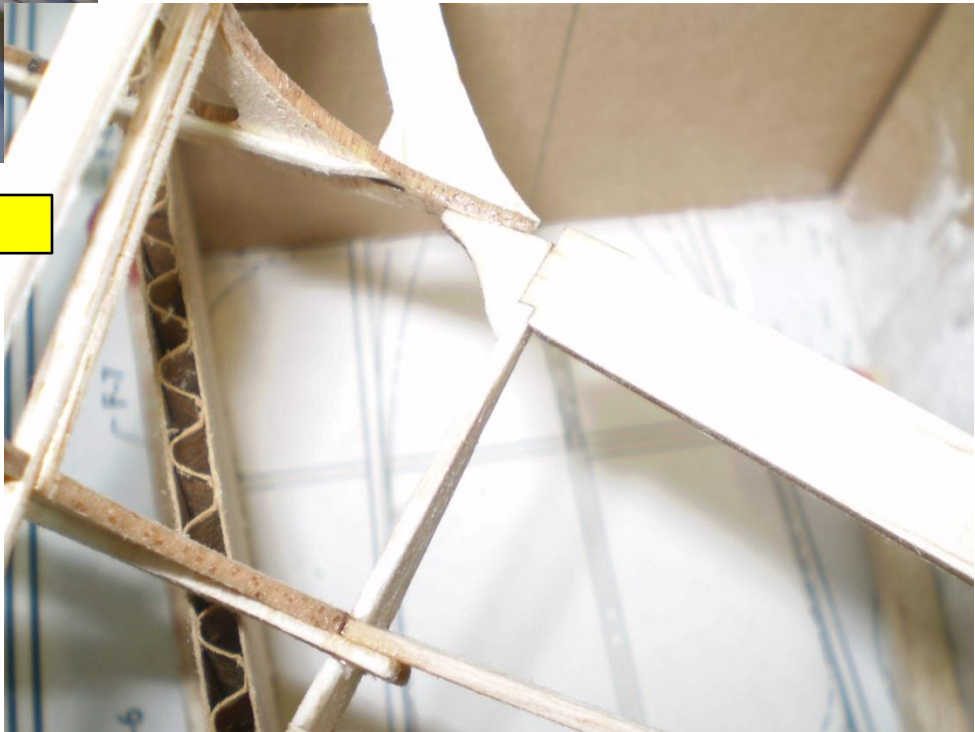
Area near former F-8 and wing T.E.

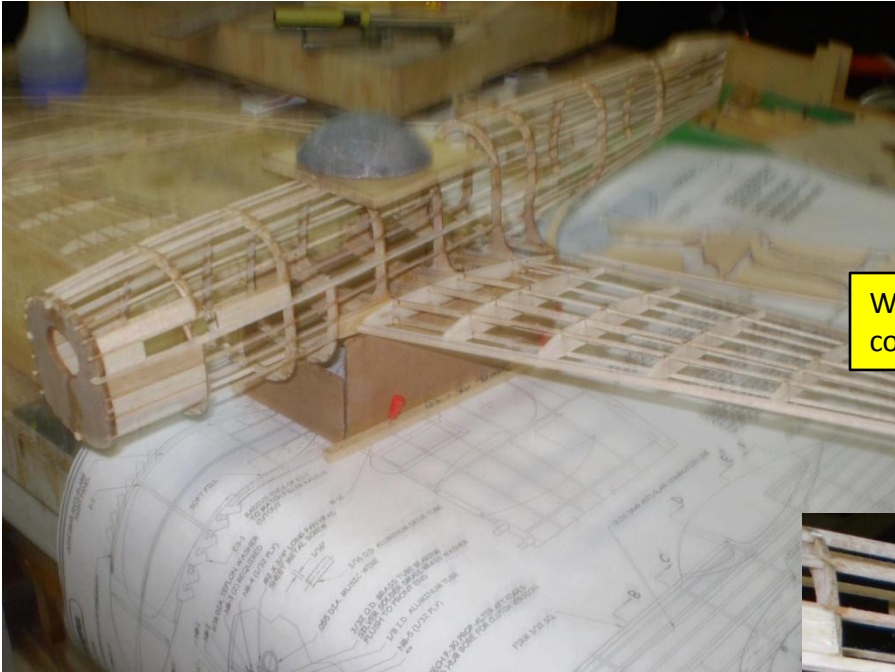




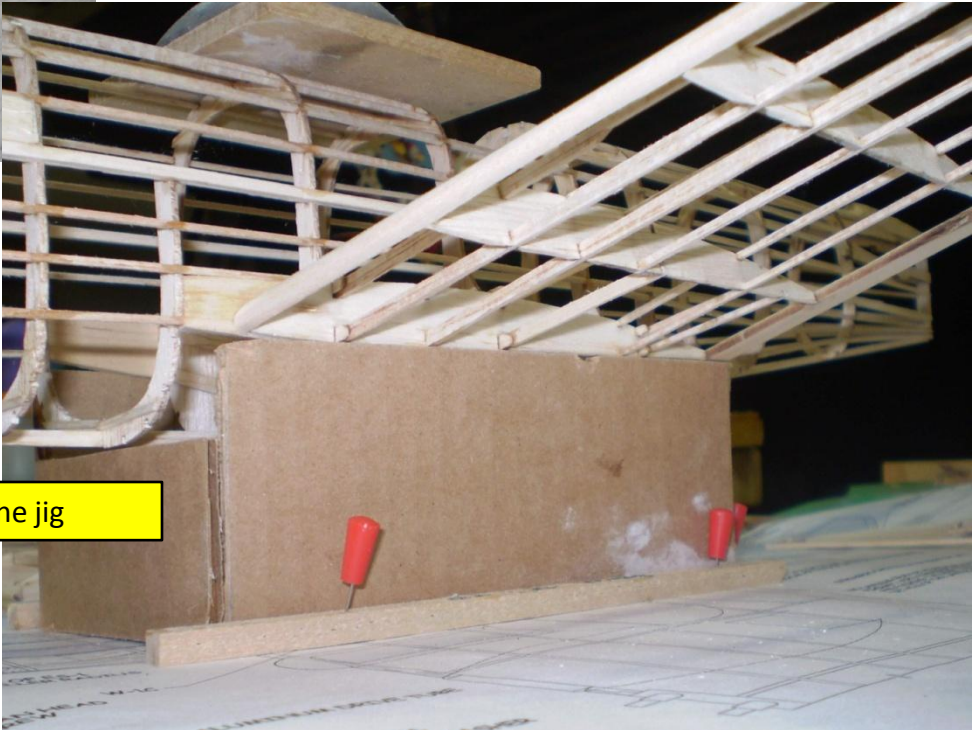
Gusset F-8A ties this area together

Another view from the top

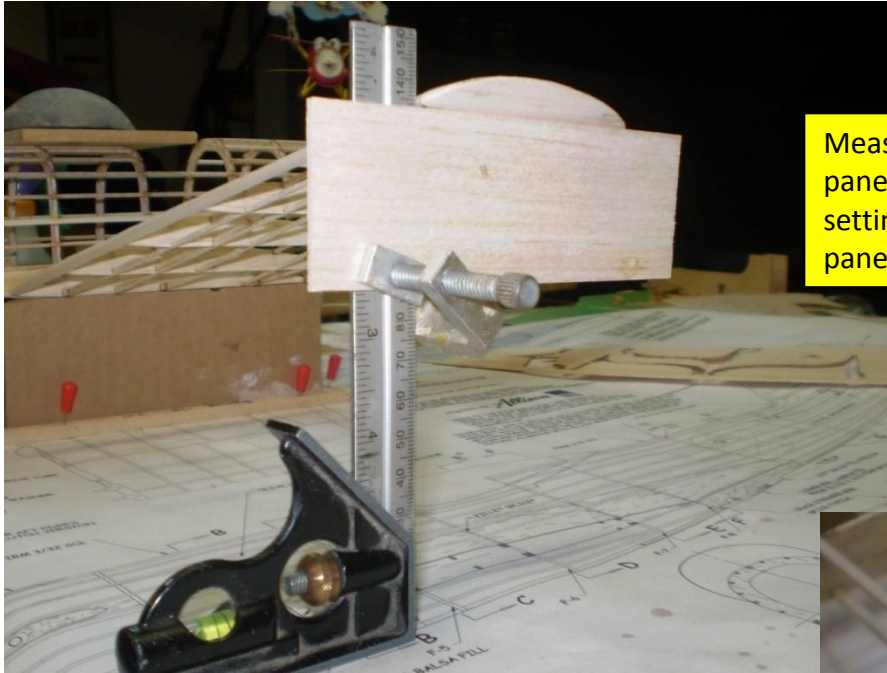




Weight the fuselage down in the jig to maintain contact with top edge of jig



Contact with the top edge of the jig



Measure and set to the location of the left wing panel as held by the jig. You will use this same setting to establish the location of the right wing panel in the next step.



Make a mental note of where your jig is set for the same position on the opposite wing



Prefit the right wing to the jig and stub spars, etc. and also the jig used to hold the dihedral angle the same as the left side. Then use thin CA to set all the joints. This completes wing installation with the bottom of both panels set to the identical incidence angle!

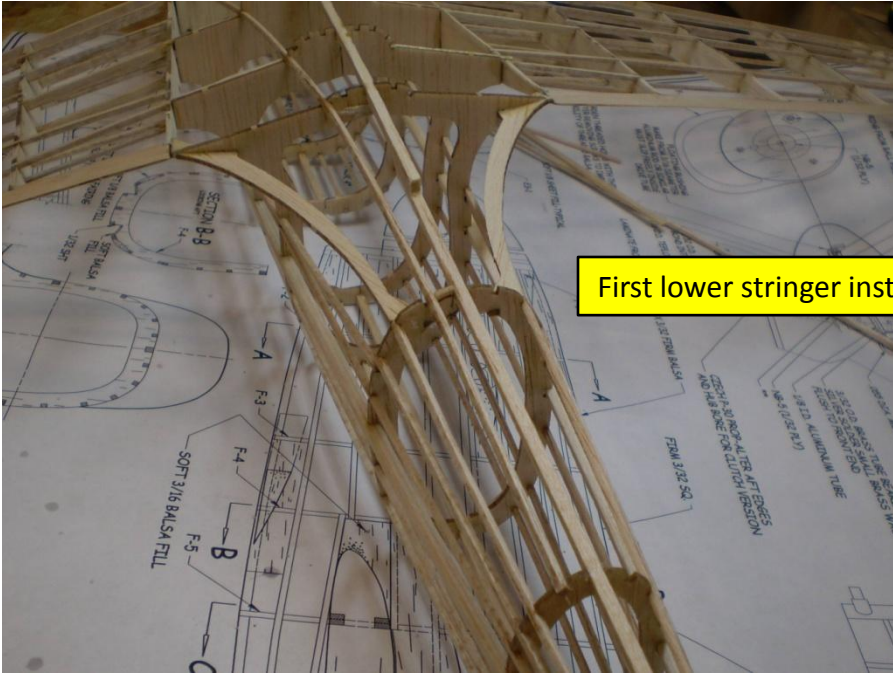
Completed tie-in at the wing root/T.E.



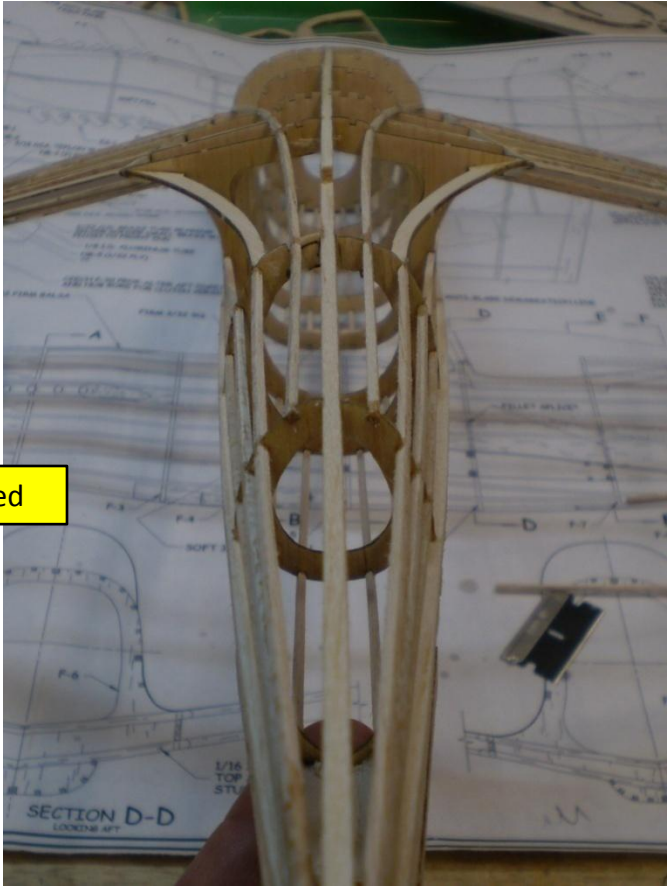


First lower stringer installation

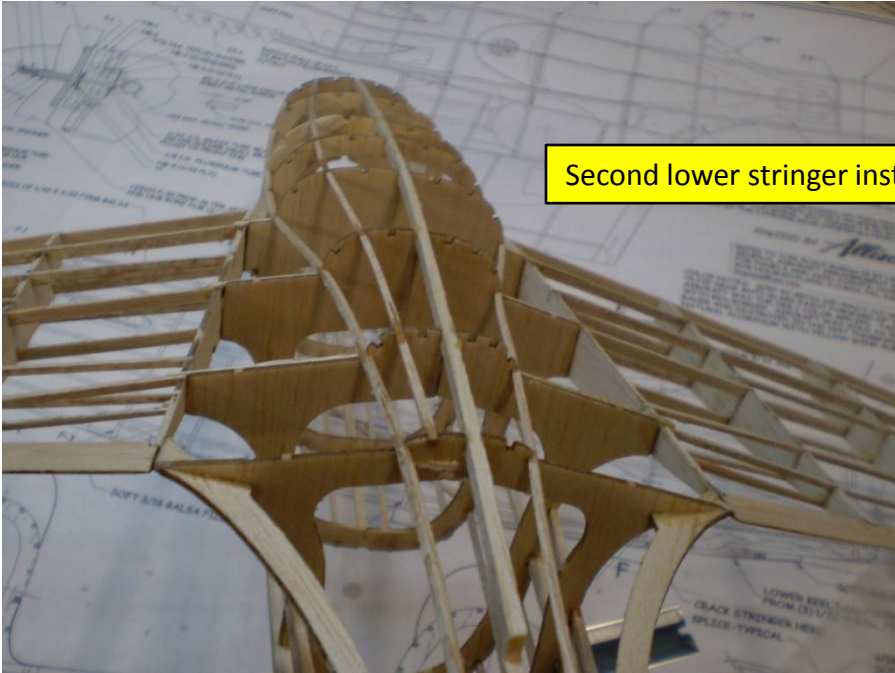




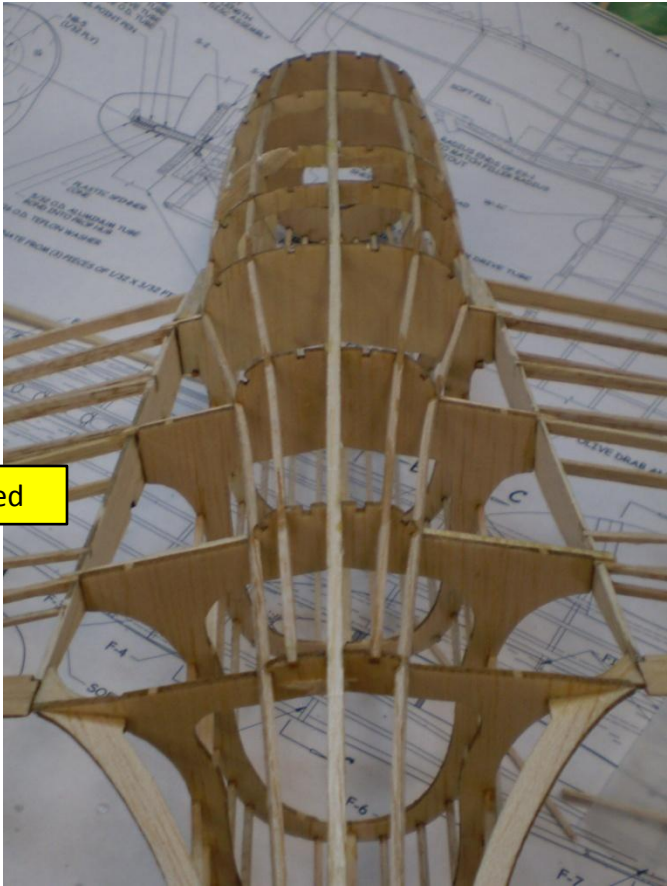
First lower stringer installation



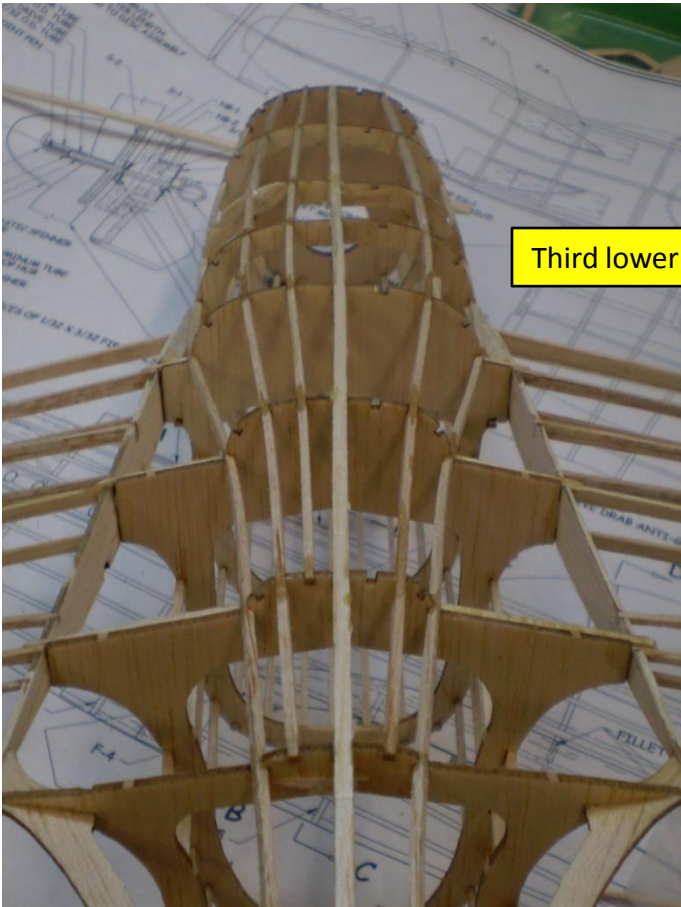
Opposite side stringer installed



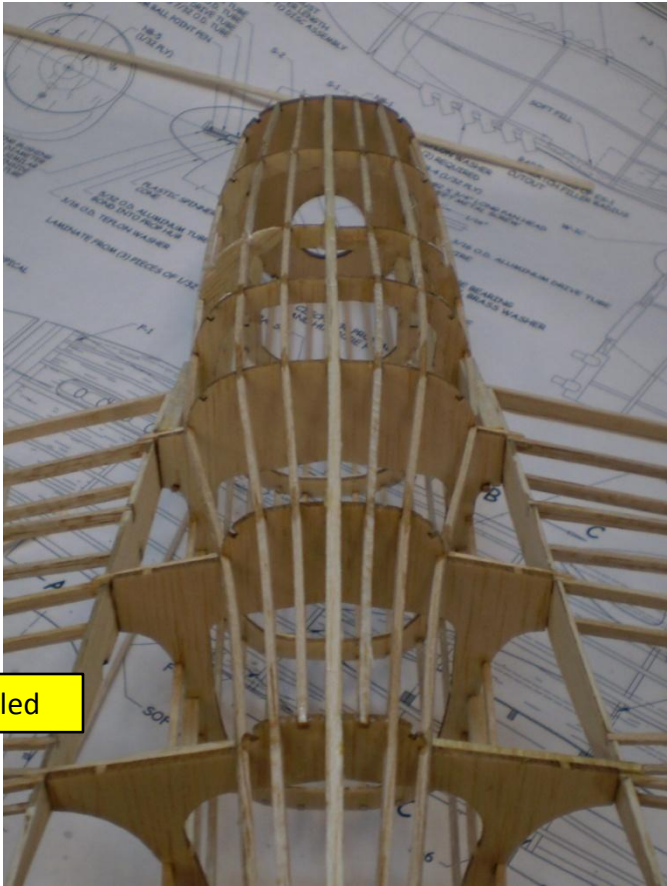
Second lower stringer installation



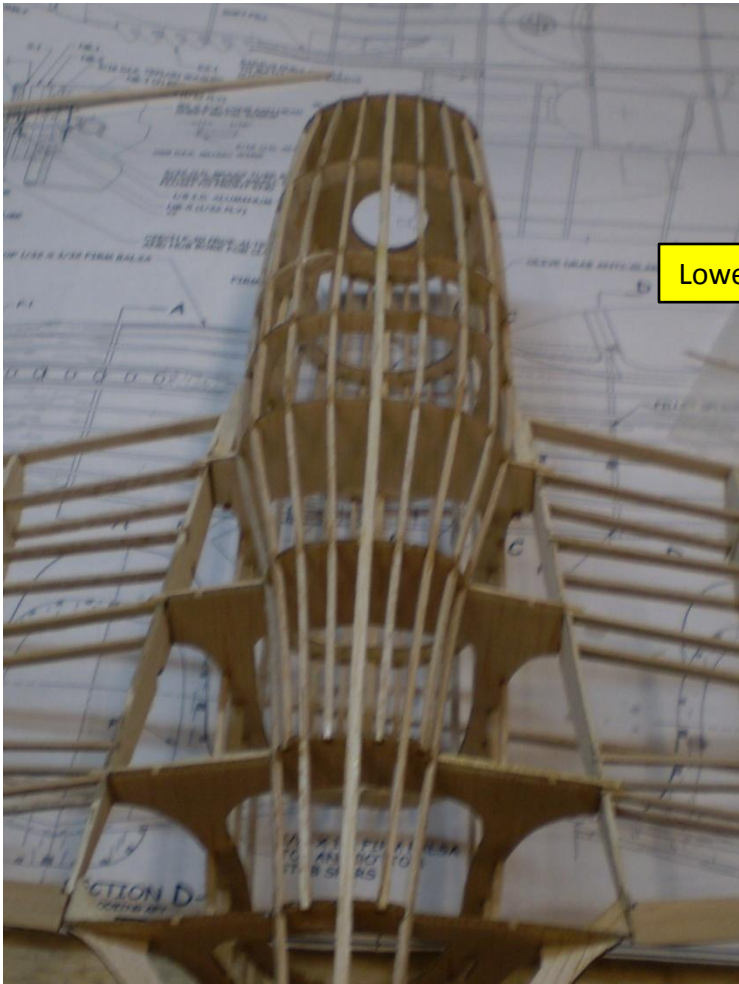
Opposite side stringer installed



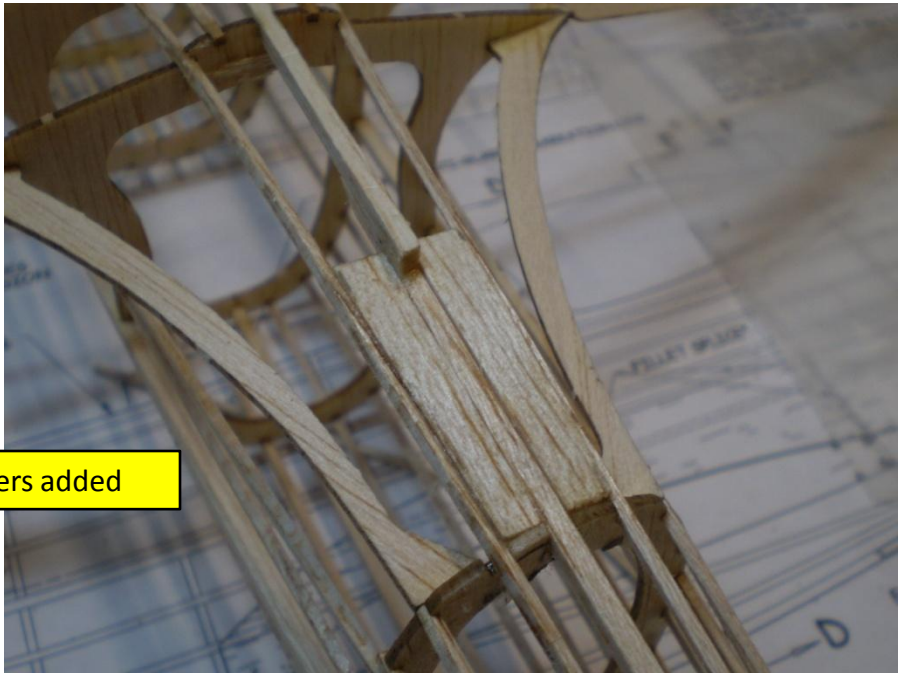
Third lower stringer installation



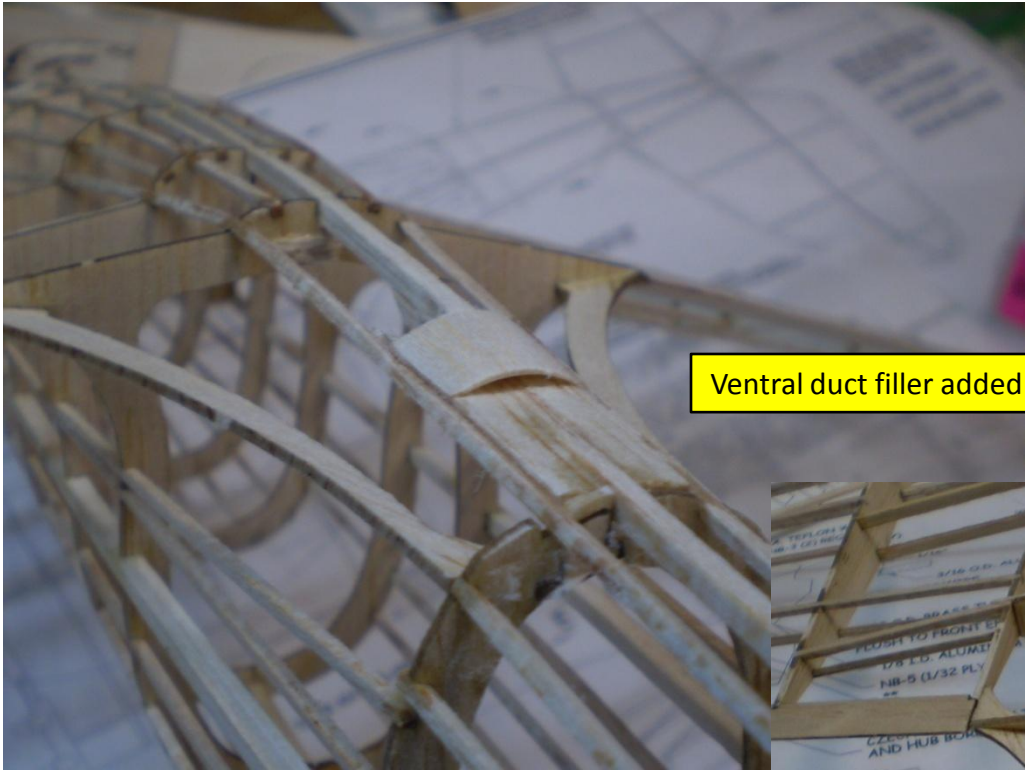
Opposite side stringer installed



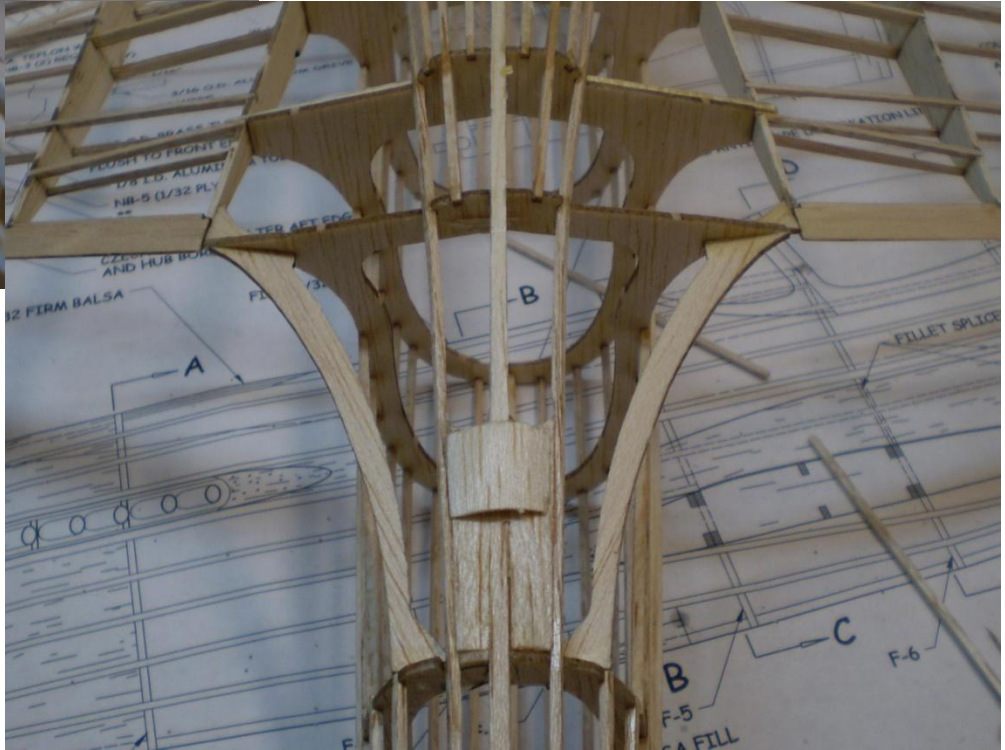
Lower stringer installation complete

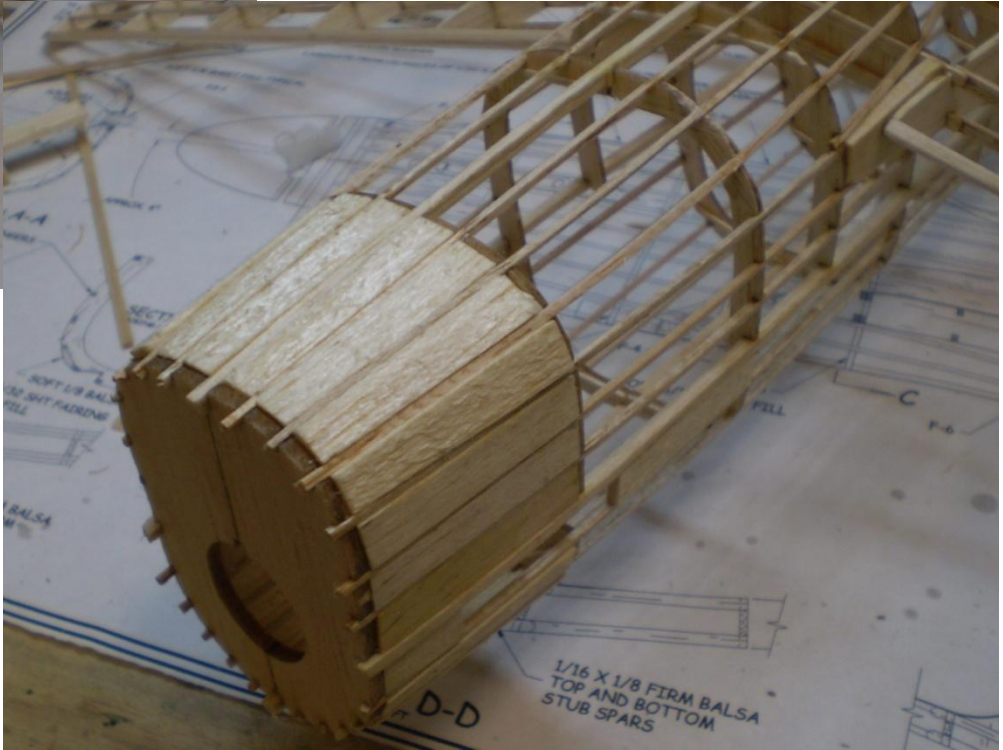
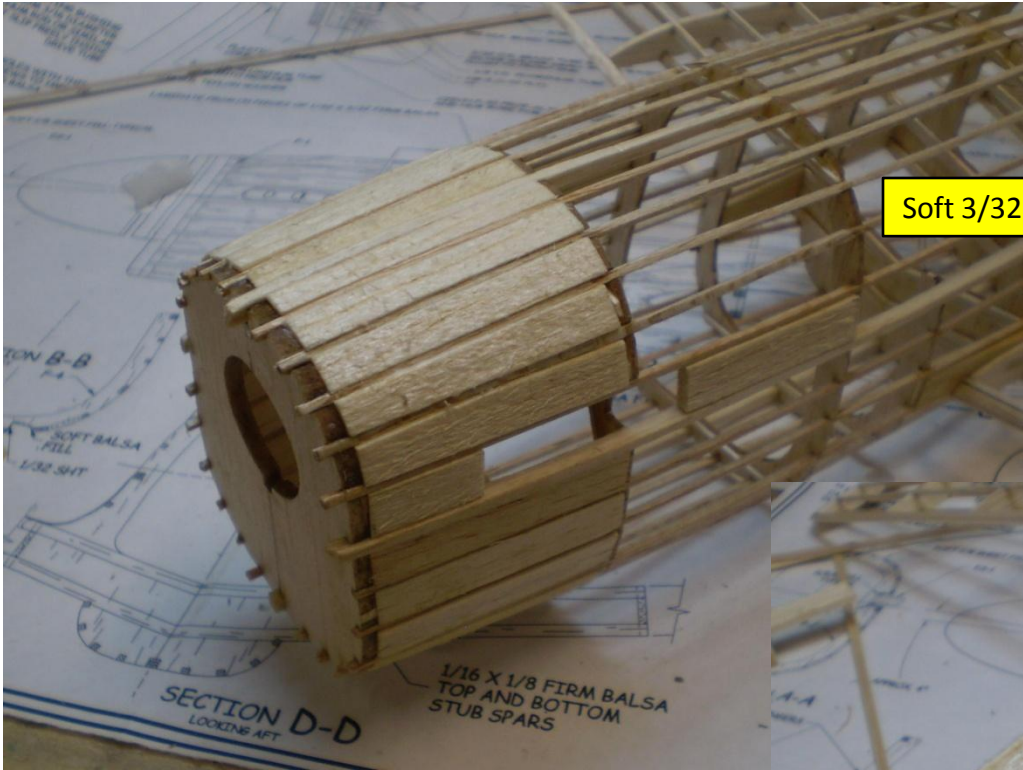


Ventral area to be faired in-fillers added



Ventral duct filler added and shaped



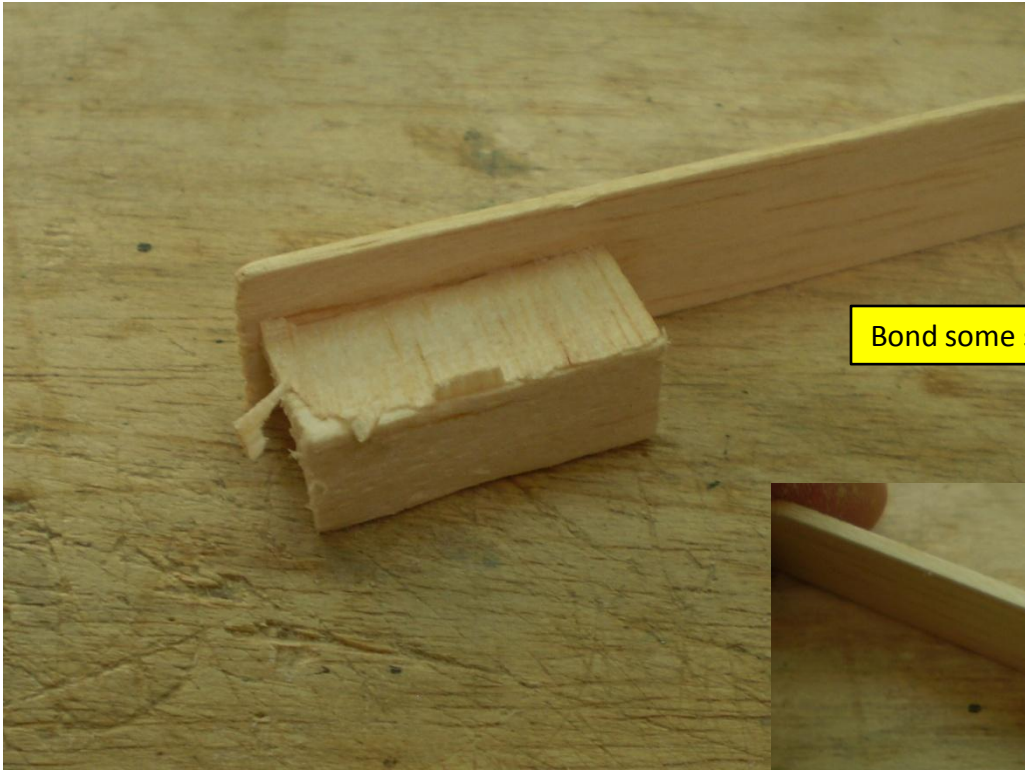




Soft 3/32 fillers added

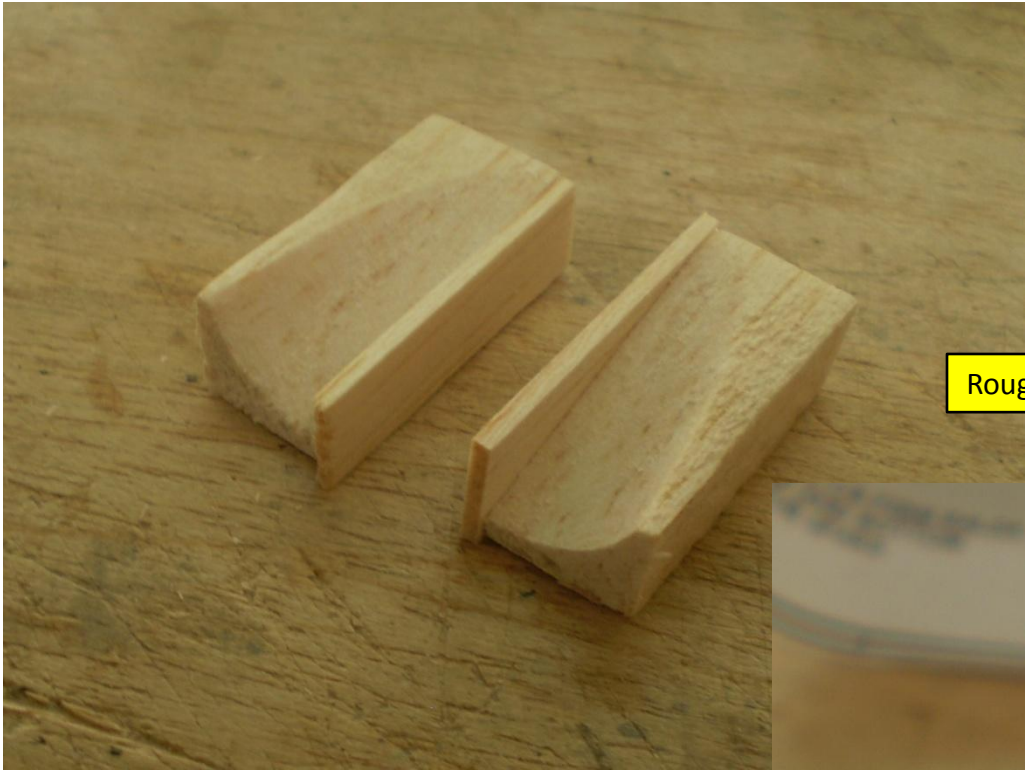


Cooler duct filler-recess a single block then split in half



Bond some scrap balsa to create the bifurcation wall





Rough shaped duct insert





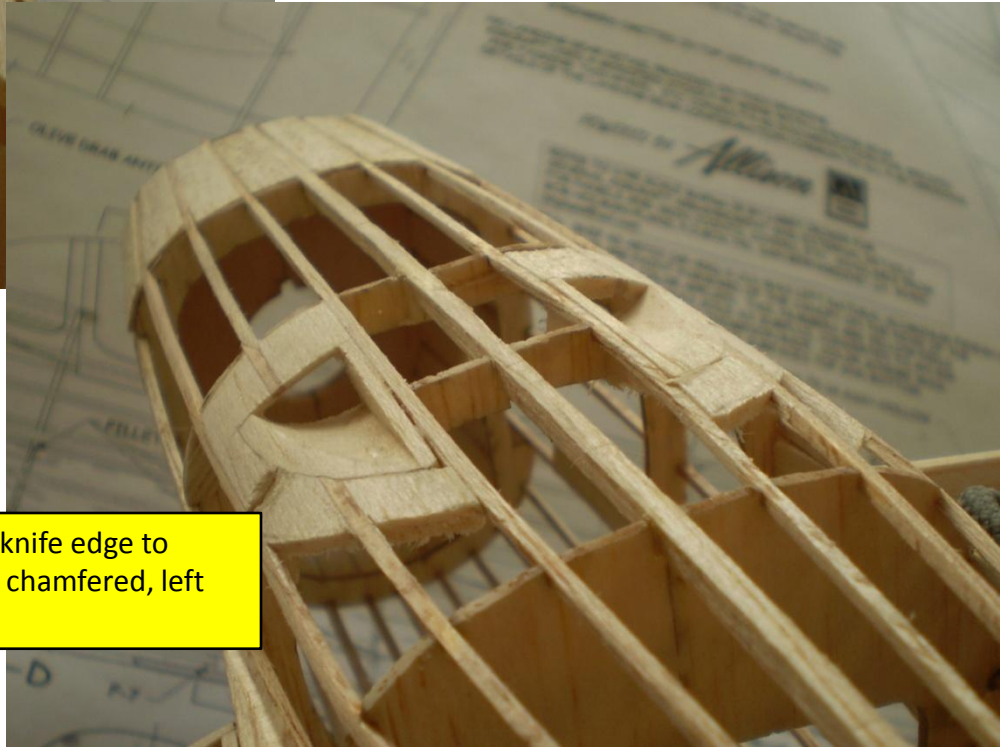
Make template of top profile and use to cut out filler to accept the duct insert



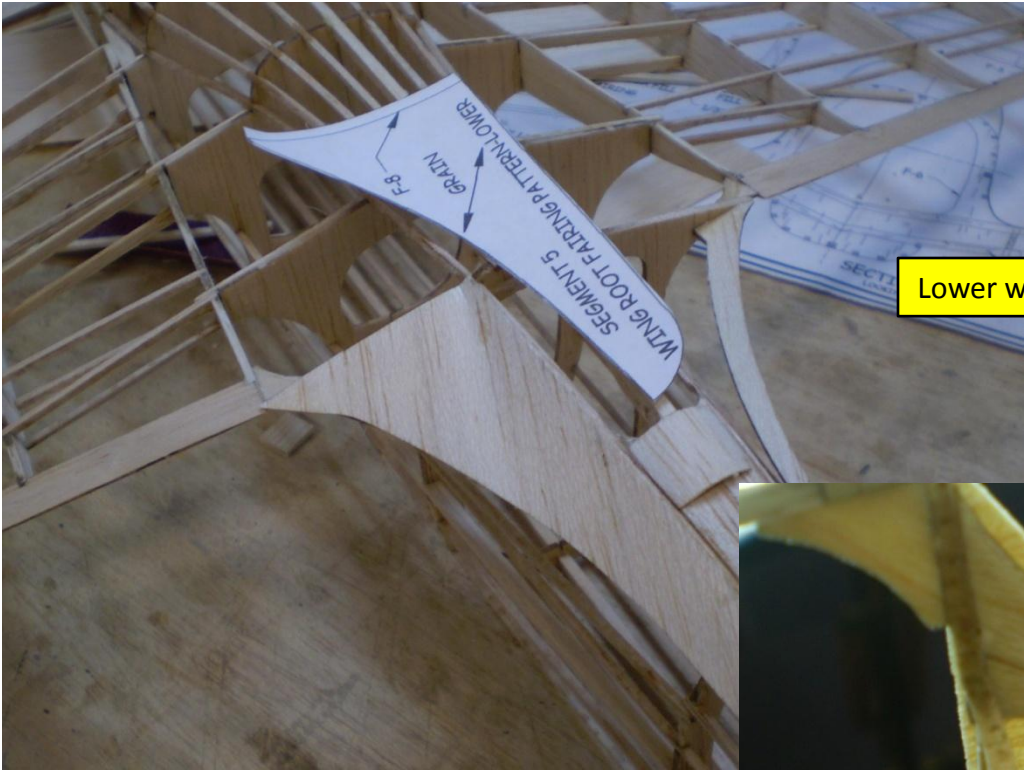
Duct insert installed



Completed duct insert installation



File forward edge of duct opening to a near knife edge to improve effect of skin thickness-right side is chamfered, left side shown unfinished for comparison.



Lower wing fillet skin installation



Light penetration gives indication of how thin the fillet skins should be....



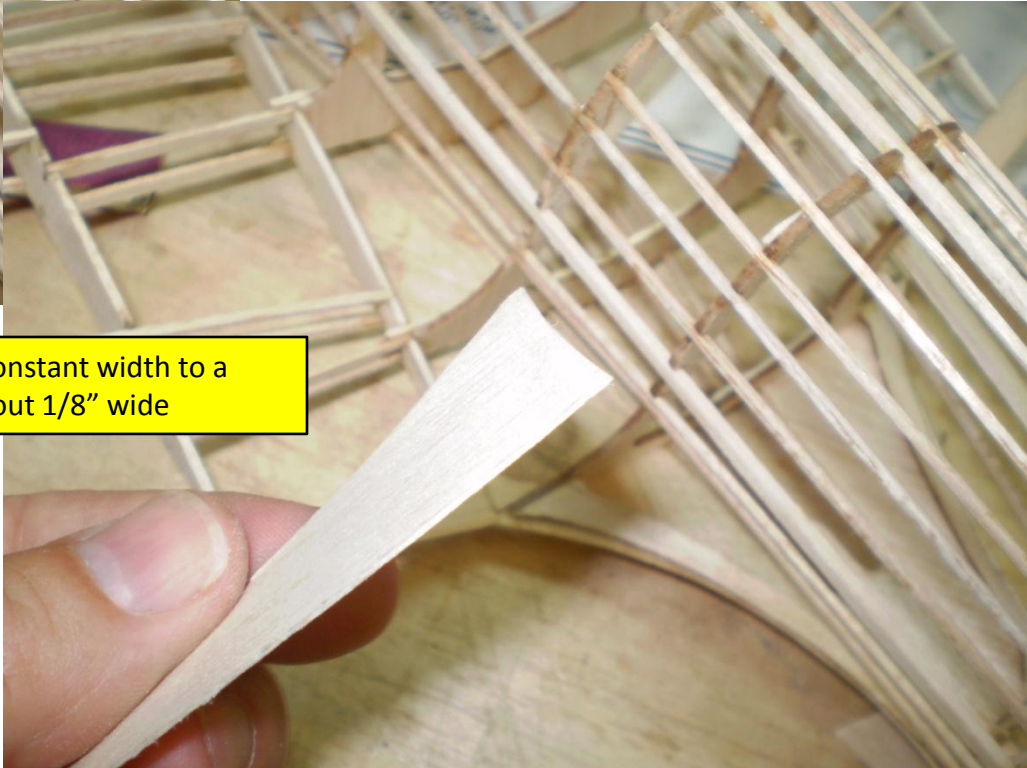
View from the top of the fuselage-inside of lower fillet skin attached to stringer and WF-1



Lower wing fillet skins installed



Aft upper wing fillet skin-showing scarf joint prep added before installation



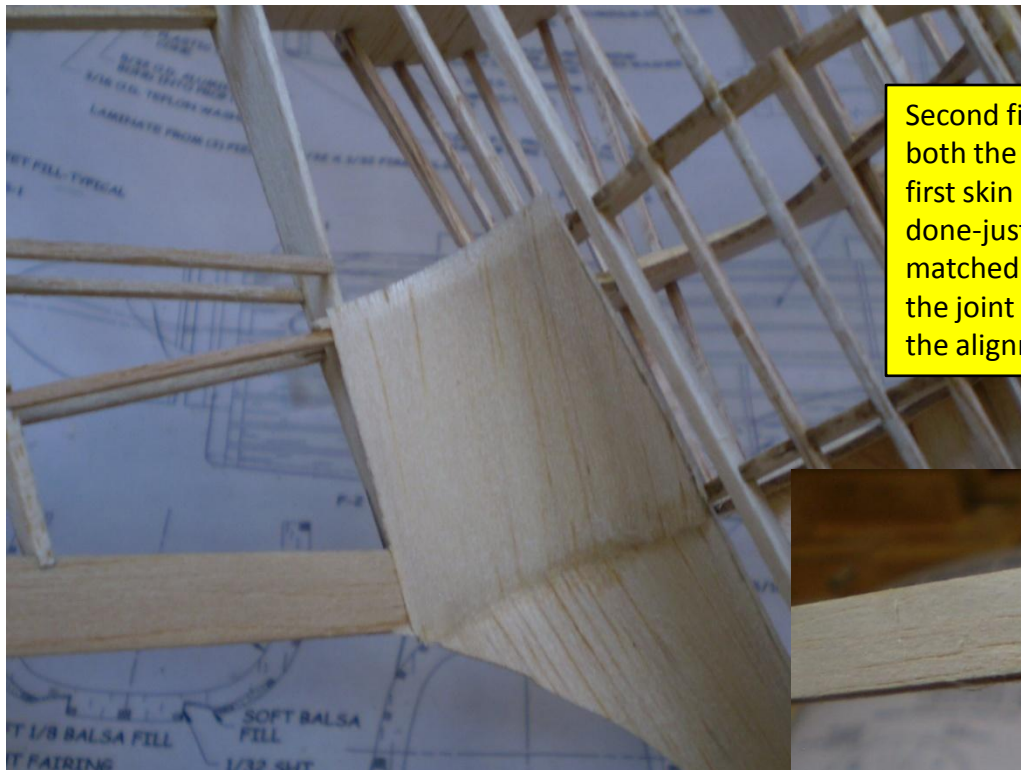
Scarf area is constant width to a knife edge-about 1/8" wide



Aft upper wing fillet skin installation-note scarf area approximately on edge of F-8



Aft end joint-looks pretty realistic doesn't it? Leave excess edge trim on until all is done.



Second fillet skin installation. This skin has a scarf area on both the forward and aft edges-note the overlap onto the first skin at the scarf area. This cleans up nicely when all done-just make sure the scarf area is more or less matched so the skin thickness is about the same through the joint area-that is the goal with this technique. Note the alignment to the edge of F-7 for the next scarf joint.



Second skin installation showing the bond to the root wing rib, stringers, frame edge, etc. The fillet area adds a lot of structural integrity to the model.



Continue the skin installation using scarf joints and careful dry pre-fitting before bonding. The upper edges of the fairing skins can be smoothed up and faired together after assembly.



Underside view showing structural tie-in for fillet skins



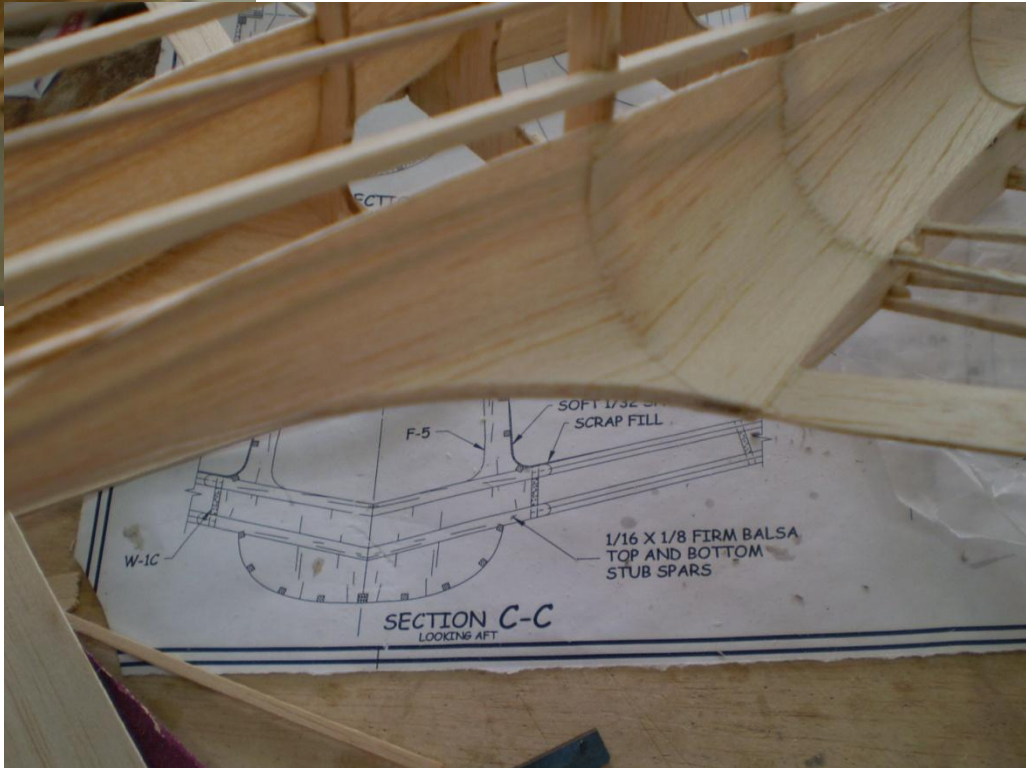
Forward fillet skin-note how the lower edge terminates against the L.E. filler. This skin should be water soaked to aid forming and torturing into location. Spend some time doing an accurate pre-fit and trim prior to bonding in place. It will likely crack a bit near the stub spar-fill the gap or just ignore-it gets covered with tissue anyway.



Your model should hopefully look something like this or better-give yourself a pat on the back at this point!



Clean up the fillet edges and carefully sand the edges of the scarf joints flush



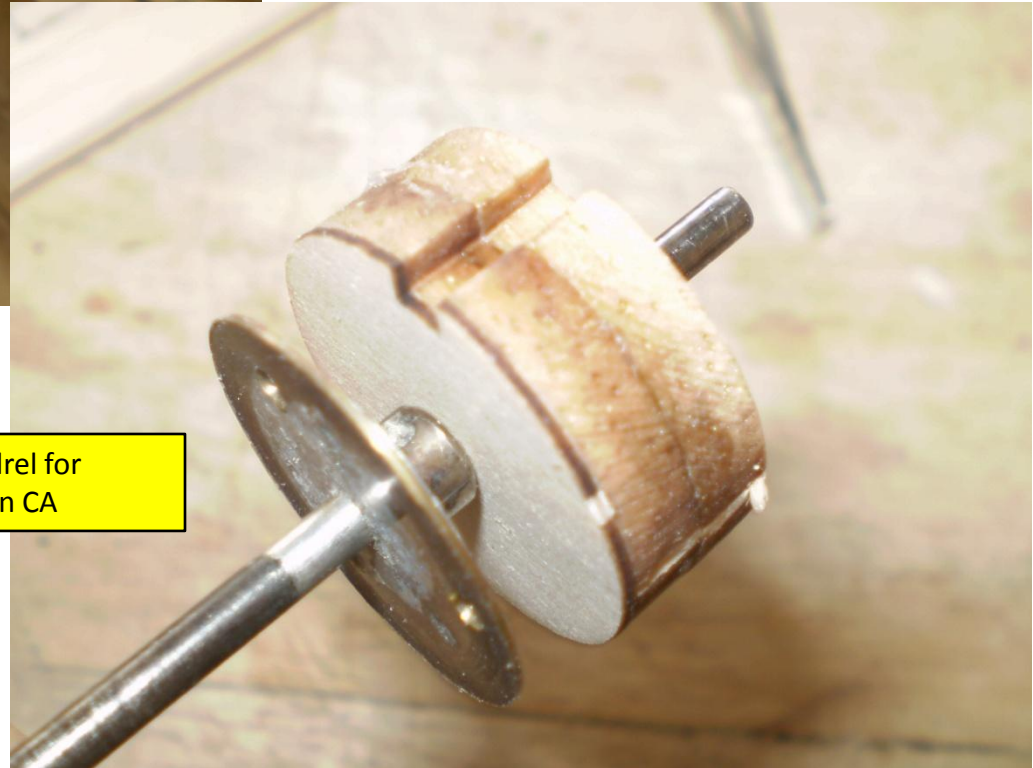


Create some right thrust angle into the front of F-1. I use a large sanding block and carefully draw the structure back and forth until I achieve the canted plane. The right side of F-1 adjustment during power trimming and also make it less obvious the right thrust is all in the noseblock. It's a subtle technique to fool the eye.





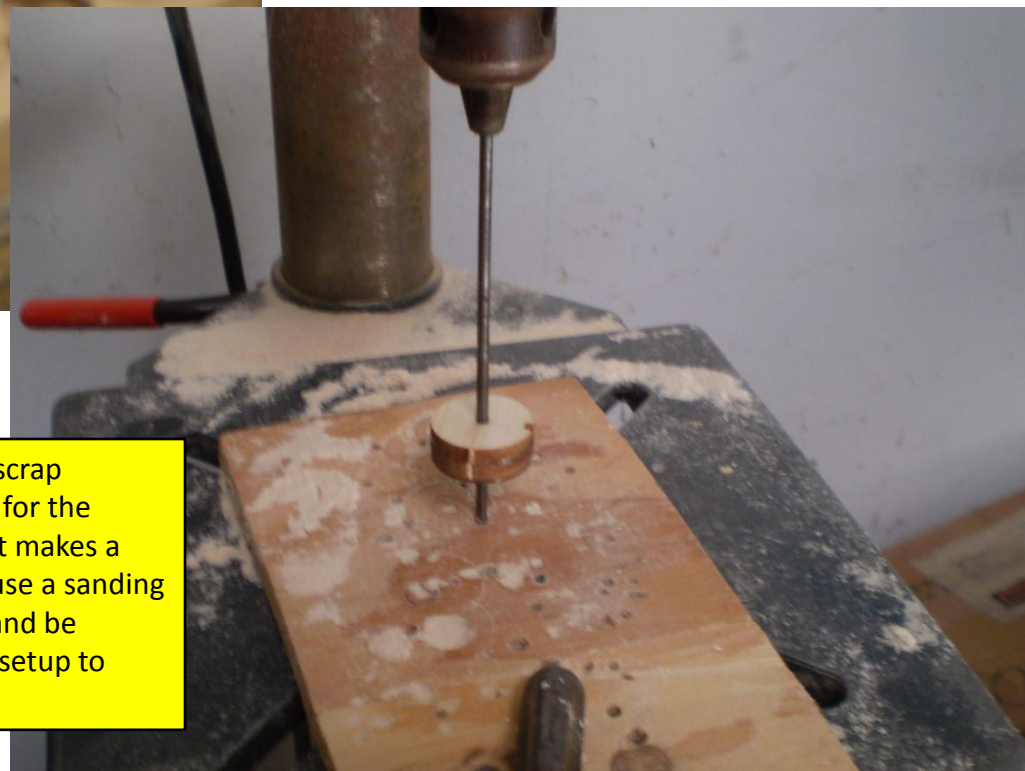
Install F-1A to the front of the fuselage using a piece of 1/8" stock to key align the noseblock hole.



Assemble the noseblock plug and install on a mandrel for turning. Shown being stacked and bonded with thin CA



Ready for turning down to final size for a slip fit into the F-1A and front end of the fuselage.



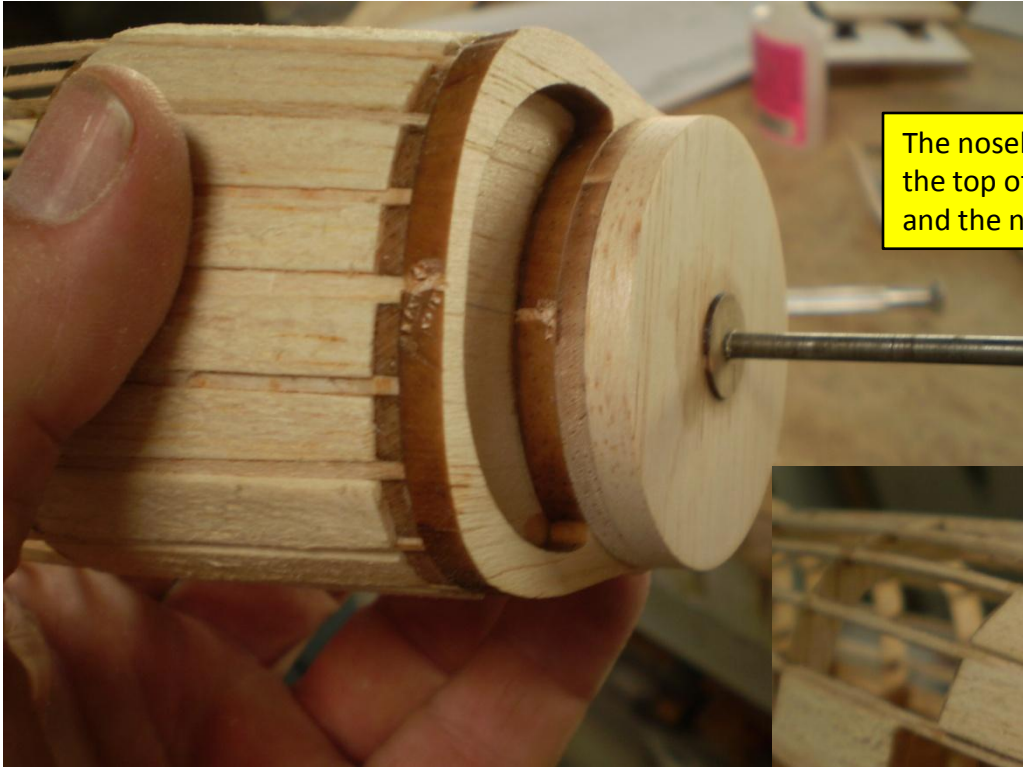
This is one way I turn items. There is a hole in the scrap plywood that one end of the wire mandrel fits into for the turning process. Put a drop of 3 in 1 oil there and it makes a good running bearing for performing this chore. I use a sanding block, files etc. to shape parts. Use light pressure and be careful about things coming loose! I use the same setup to turn down the noseblock assembly.



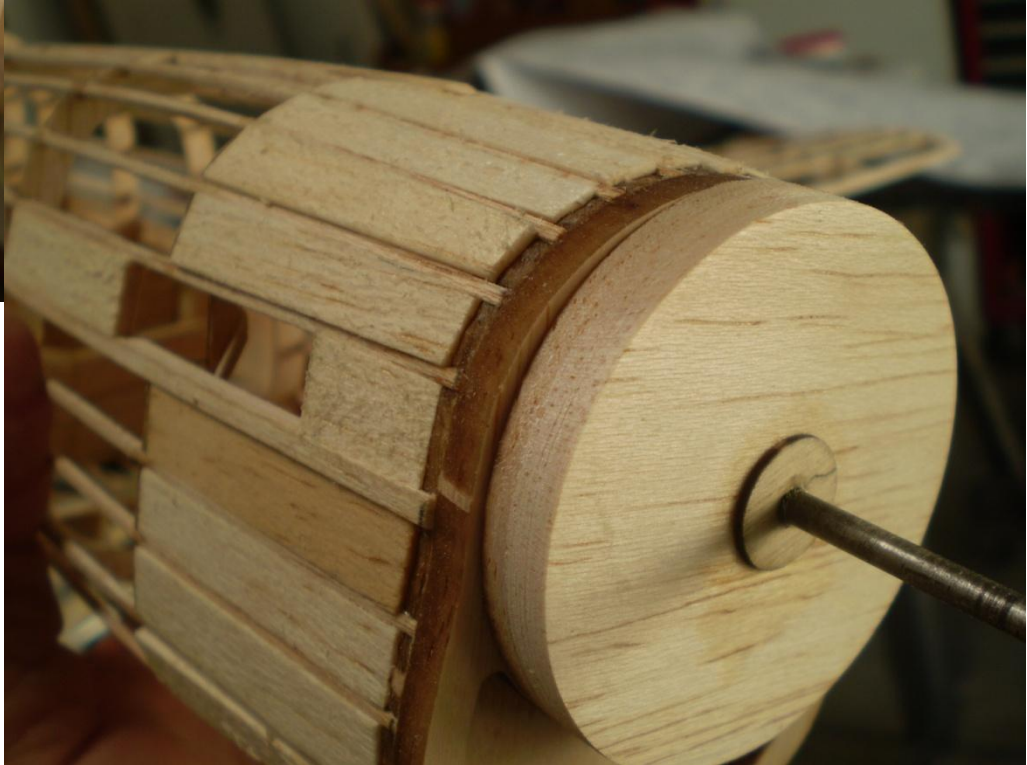
Check the nose block plug for a good slip fit into the nose formers. Some looseness is desired as this block will need to float in a spherical motion to allow fine tuning of the thrust angle using the 3 screws. So check for about a 2-3 degree slop in the fit to accommodate this.



After turning the noseblock assembly use the mandrel to align the plug and bond together.



The noseblock should be turned down to match the radius at the top of the intake cutout for proper sizing. The rest of F-1A and the nose get faired into the noseblock diameter.

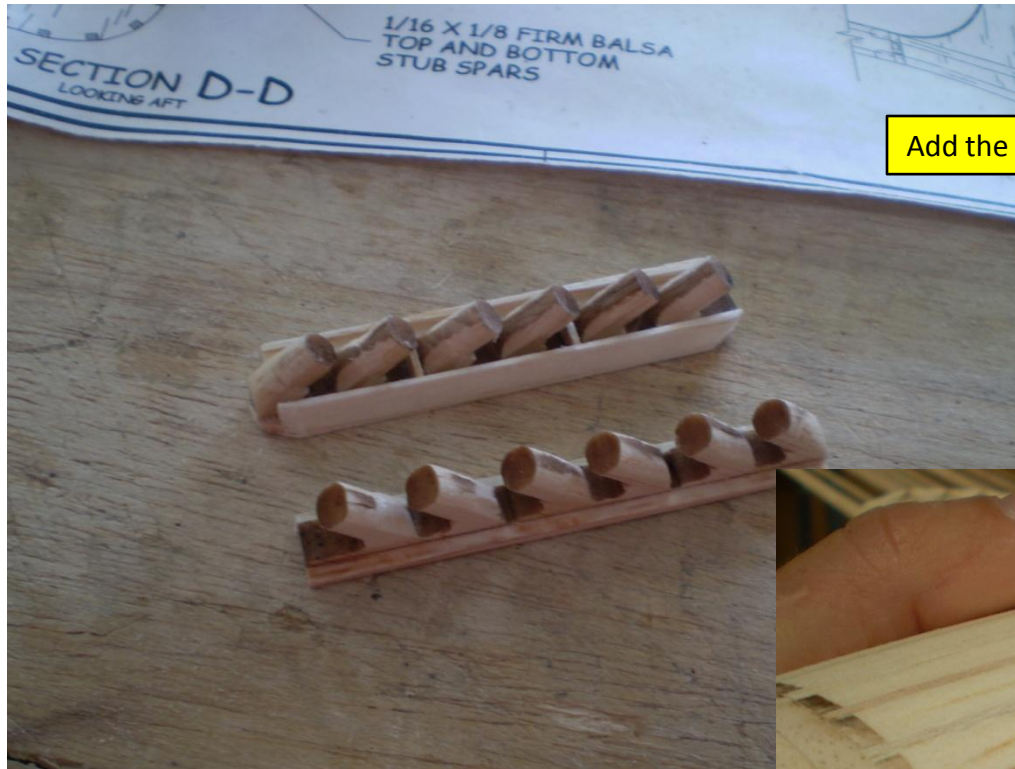




Prepare the exhaust manifold cutout area

Use a piece of sharpened 3/16" OD brass tubing and shave the exhaust manifold headers to profile into a rounded shape. Use a razor to nick off the scrap at the end of the tubing. You can shave or sand off the remaining square corner if you find it objectionable, but it really doesn't show once the manifold is installed in the fuselage cutout.





Add the fillers and webbing between the manifold headers

You can either prefit and then remove the manifold assemblies for covering or install and fair in prior to covering. I've done it both ways-it's a bit easier to cover without them installed.



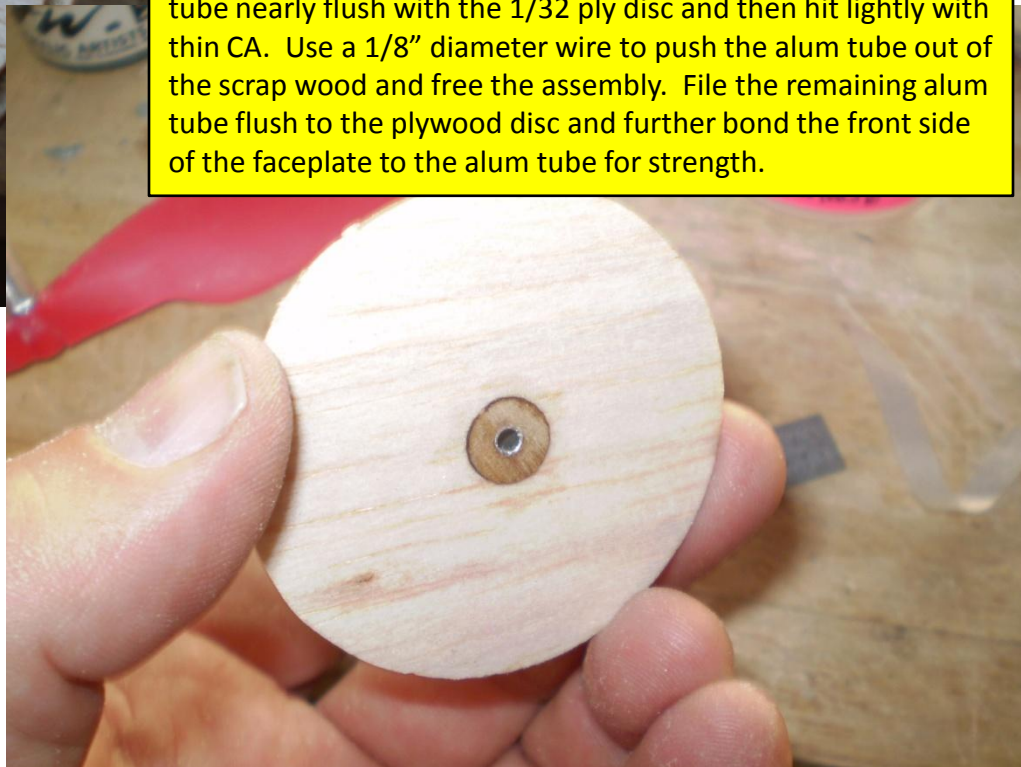


Install the nose bearing assembly into the noseblock assembly.
Note the alum sleeve tube is already installed-the brass bearing tube is being installed.



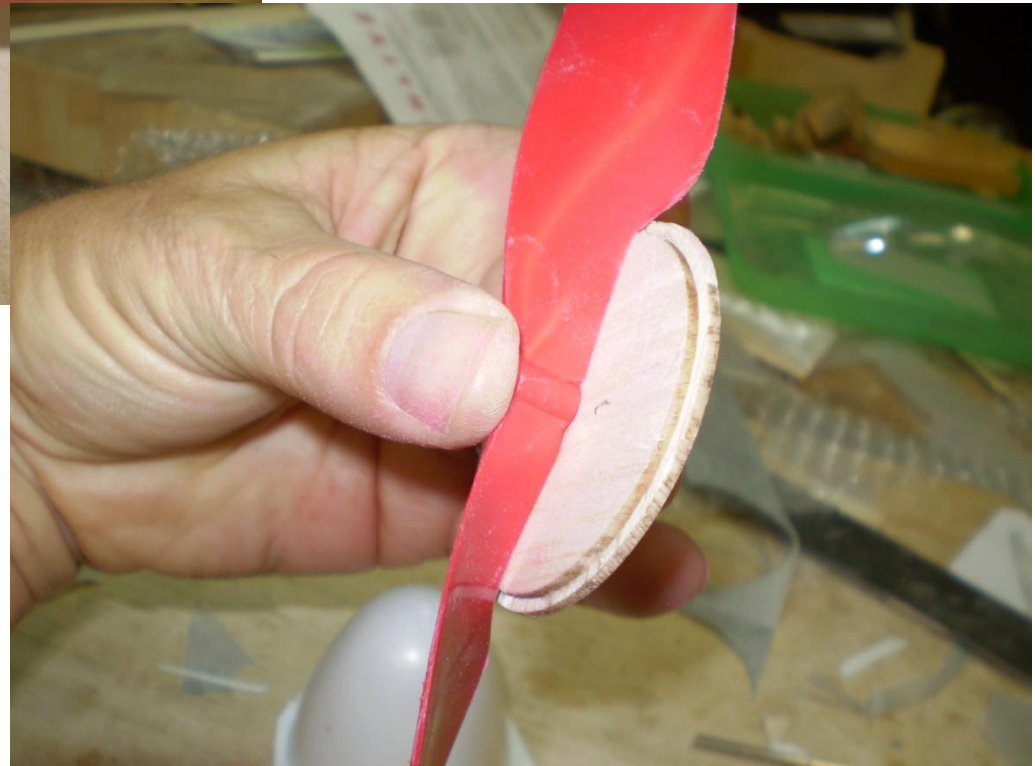


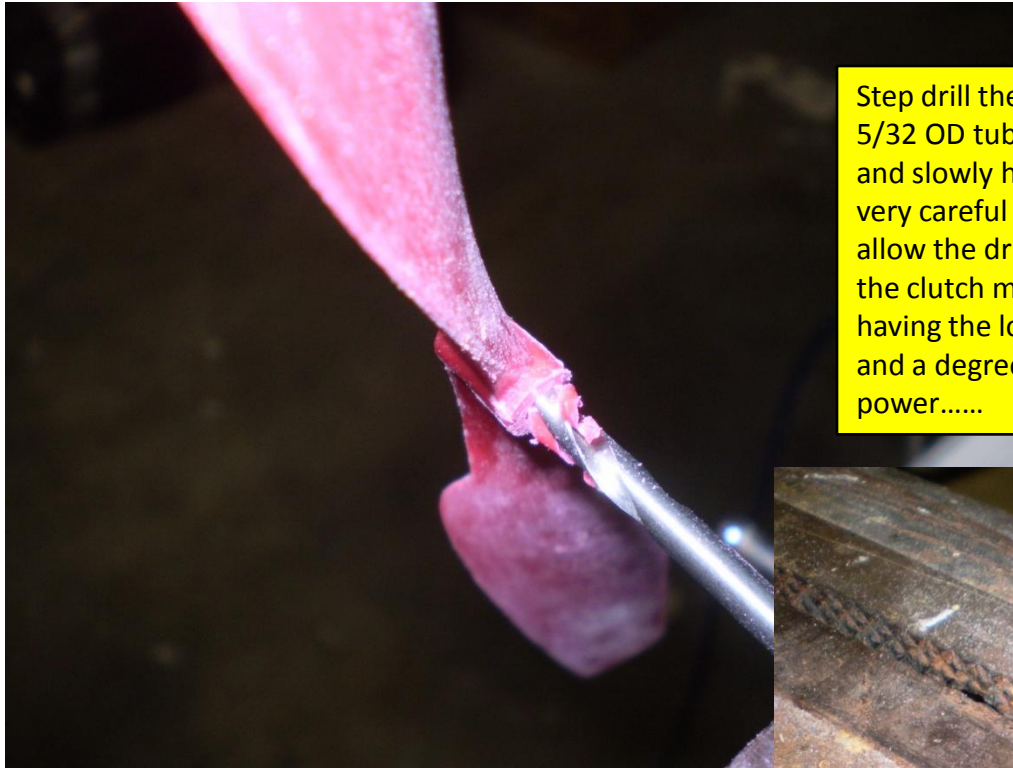
Assemble the spinner backplate discs and turn the rear disc profile lightly to reduce the step to slightly thicker than the plastic spinner cone thickness. Some final fairing with the spinner cone will occur once this step is reached. Install the 1/32 ply disc on the aft surface of the backplate for support of the alum tube. This tube must be installed perpendicular to the backplate plane. I do this by drilling a 1/8" diameter hole in scrap wood (all the way through) using the drill press to maintain perpendicularity. Then I push the alum tube into the hole leaving about 3/16" exposed. The backplate is pushed onto the tube until seated against the scrap wood. I push the tube nearly flush with the 1/32 ply disc and then hit lightly with thin CA. Use a 1/8" diameter wire to push the alum tube out of the scrap wood and free the assembly. File the remaining alum tube flush to the plywood disc and further bond the front side of the faceplate to the alum tube for strength.



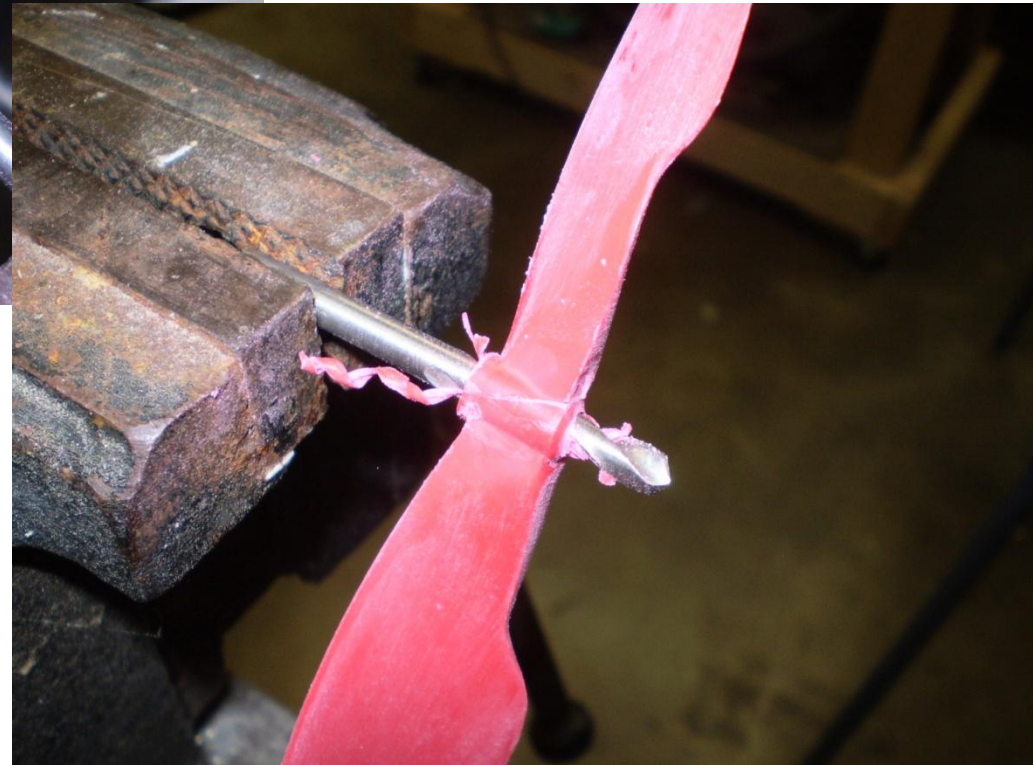


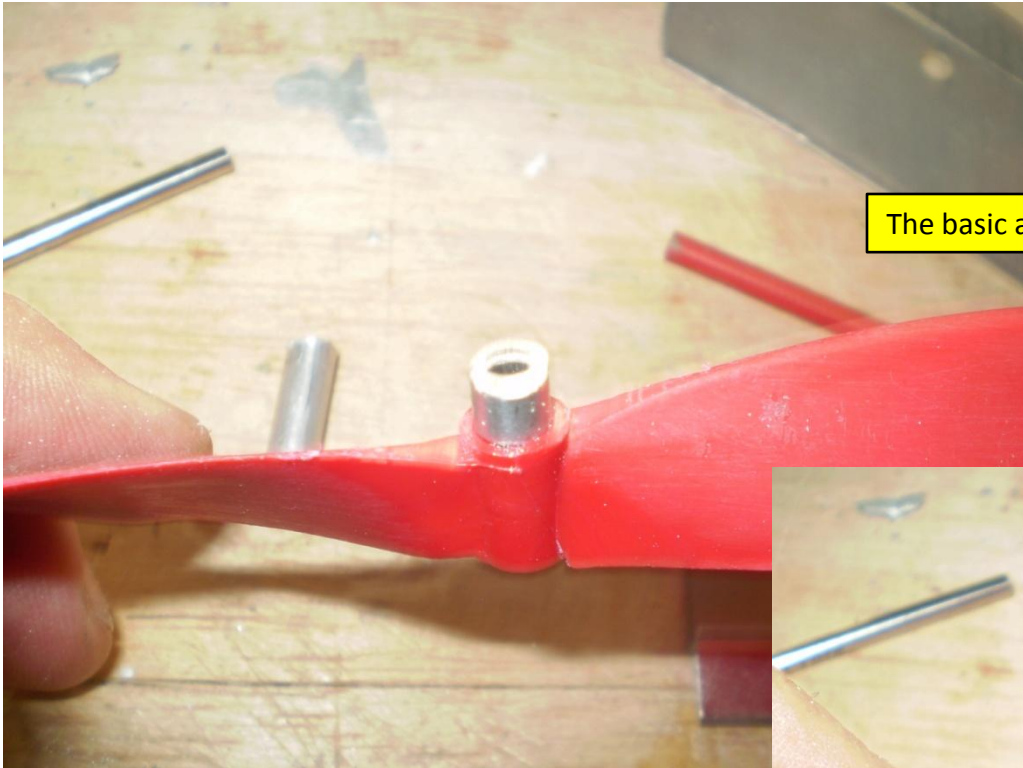
Alter the Czech P-30 prop by removing the aft edge of the blade to clear the spinner backplate. Note the hub area remains as molded.



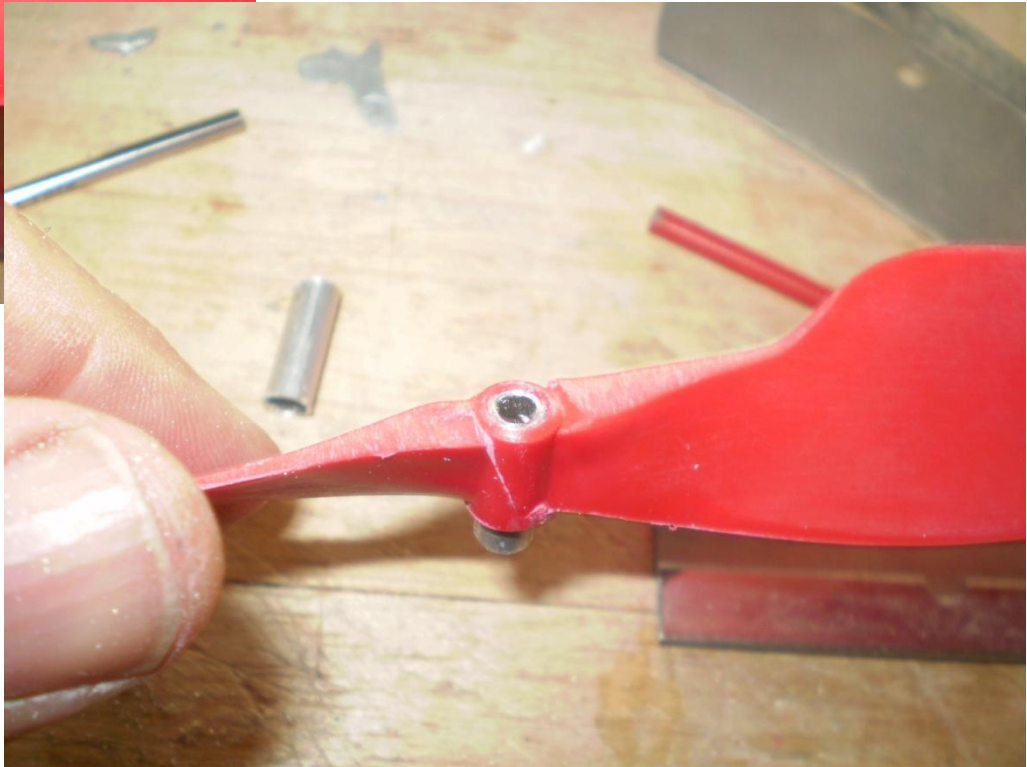


Step drill the hub of the prop using a series of drills until the 5/32 OD tube will fit into the hole. I mount the drills into a vise and slowly hand turn the prop to allow the cutter to work. Be very careful at the start of each hole as the soft plastic can allow the drill to drift. Of course if you don't want to mess with the clutch mechanism you can just skip all this. However, having the locking freewheel setup allows a much longer motor and a degree of CG control not to mention longer time under power.....





The basic aluminum tube hub insert assembly installed

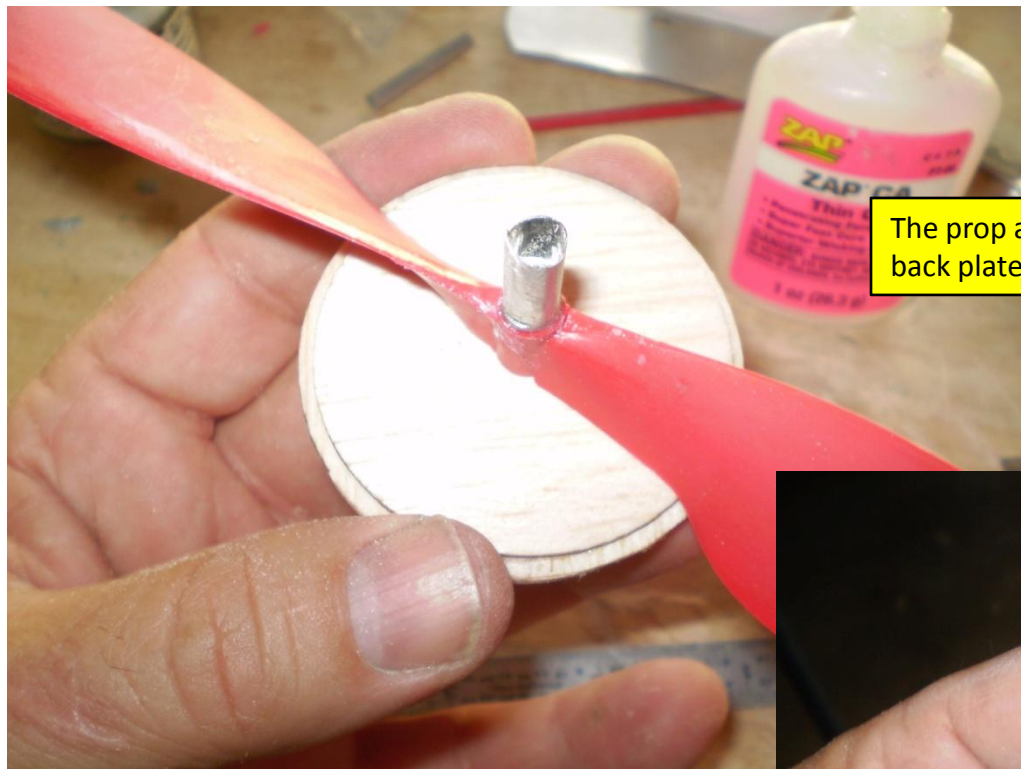




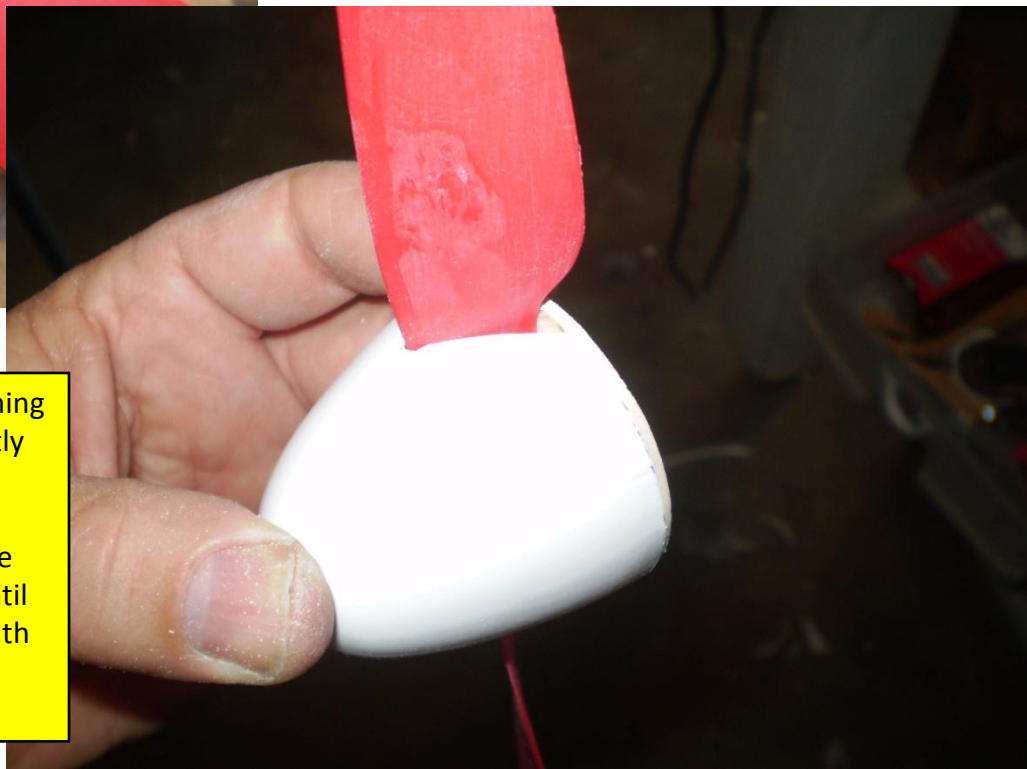
The aluminum drive tube. This can be made from brass for a more durable product. Aluminum works well but if there is any slippage with the wire tang of the prop shaft the sharp edges are quickly removed!



Drive tube installed-checking for centering using drill rod. You might want to install the drive tube using a rod and spacer to make sure it is bonded in place with perfect concentricity to the axis of the prop shaft. It's important the spring installed later does not rub on the sides of the tube during freewheel mode as this will cause the prop to resist air flow and creates drag that reduces glide performance.



The prop assembly installs over the alum tube bonded to the back plate.



Use a sharp razor and trim the spinner cone to the line defining the aft edge. Prefit to the backplate and sand the edge lightly to get a good fit to the step in the backplate. Holding it together with your fingers lightly sand the edge of the backplate to be flush with the spinner contour. After, cut the slots for the prop in the spinner and pre-fit with the prop until the spinner cone seats the same way it did prior to fitting with the prop. Set the spinner cone aside until flight trimming is established.



Jumping ahead-the prop is painted black and the noseblock assembly is finished, etc. Here you see the 3/16 diameter Teflon washer between the backplate and noseblock, the one at the bottom of the spring, the light compression spring. Not shown is the bushing noted on the plan. I made those from aluminum rod, but have also substituted with another Teflon washer on top of the spring, followed with a short piece of 3/32" diameter alum tube, about 3/16" long. You can adjust the compression on the spring a bit after the tang is formed by pushing the tube down the wire shaft and touching with some medium CA to hold location. Do this if the spring is not compressed enough to release the tang from the drive tube.

The tang is formed very carefully-you can see the 3/32 diameter tube directly under the tang. The spring should very lightly release the tang from the drive tube. An aggressive release will likely result in a pre-release under power which will be evident with a loud buzzing sound! You want the motor to run almost completely limp before the clutch releases-the rubber is still suspended between the hook and motor peg, but not very tightly. If it's slack and laying in the fuselage, correct by backing out the stop screw until you hit that sweet spot of just enough tension left to keep the motor in place and still release the clutch. It works-keep playing with adjustments. Usually problems are due to the spring being too strong under compression at the end of the motor run.

