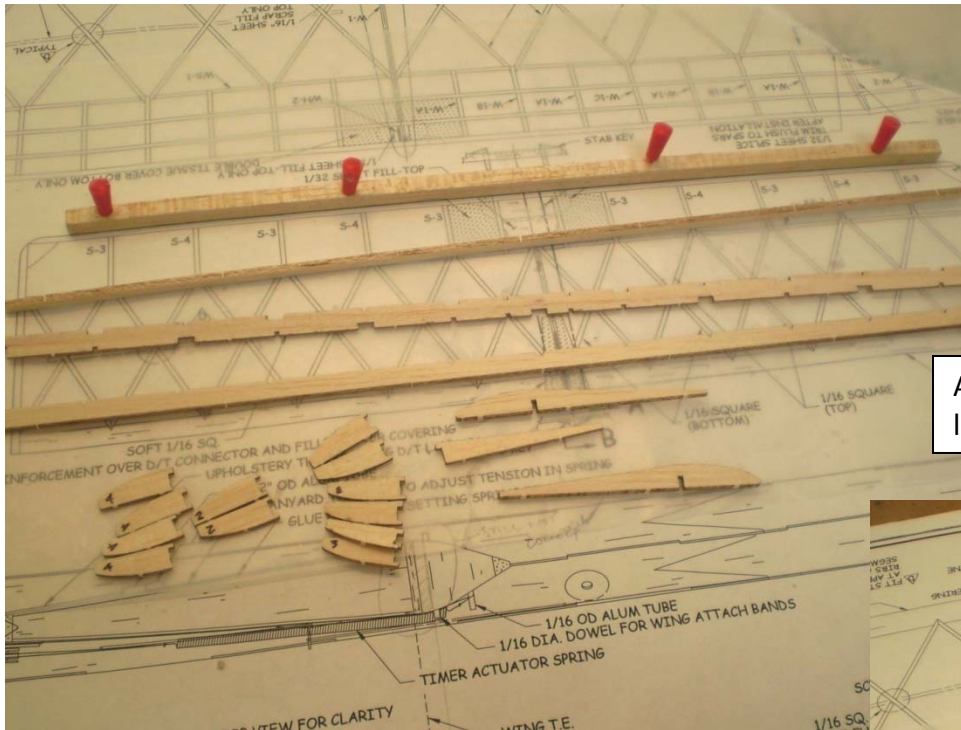


Kit No. CBMD-005
Construction Detail

Part 2 of 2: Wing and Horizontal Stabilizer Construction

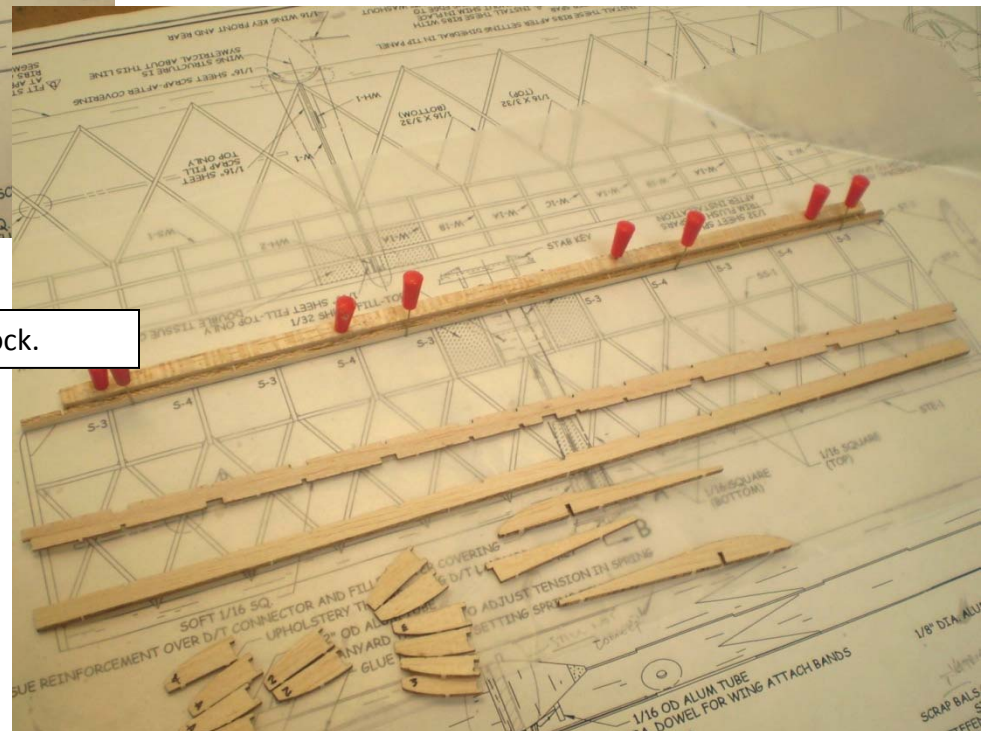
CB Model Designs

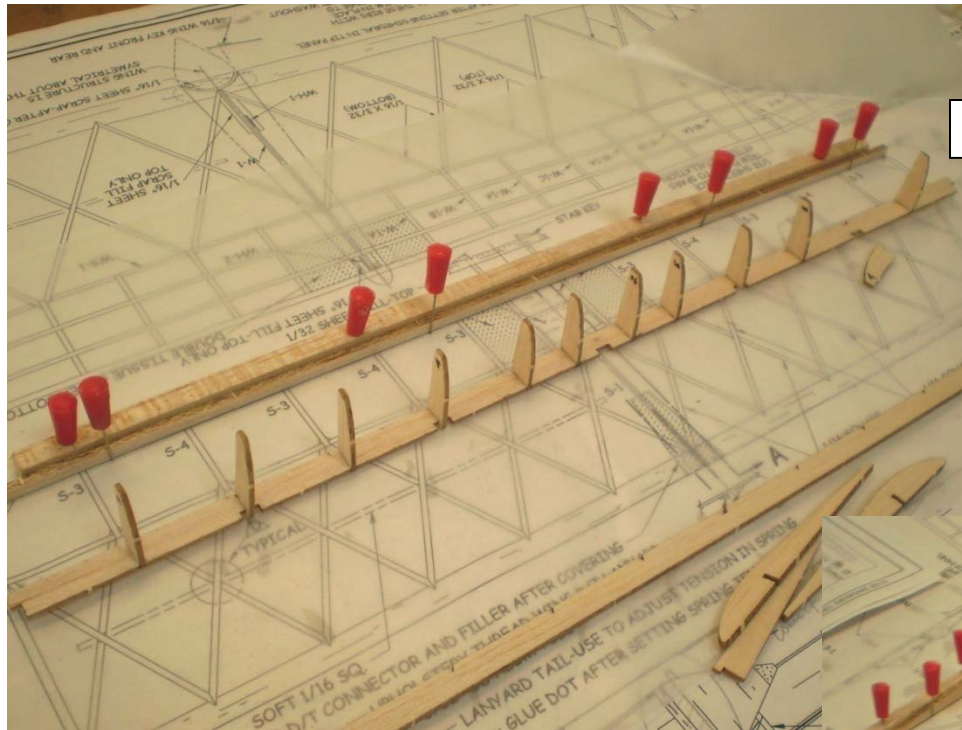
www.cbmodeldesigns.com



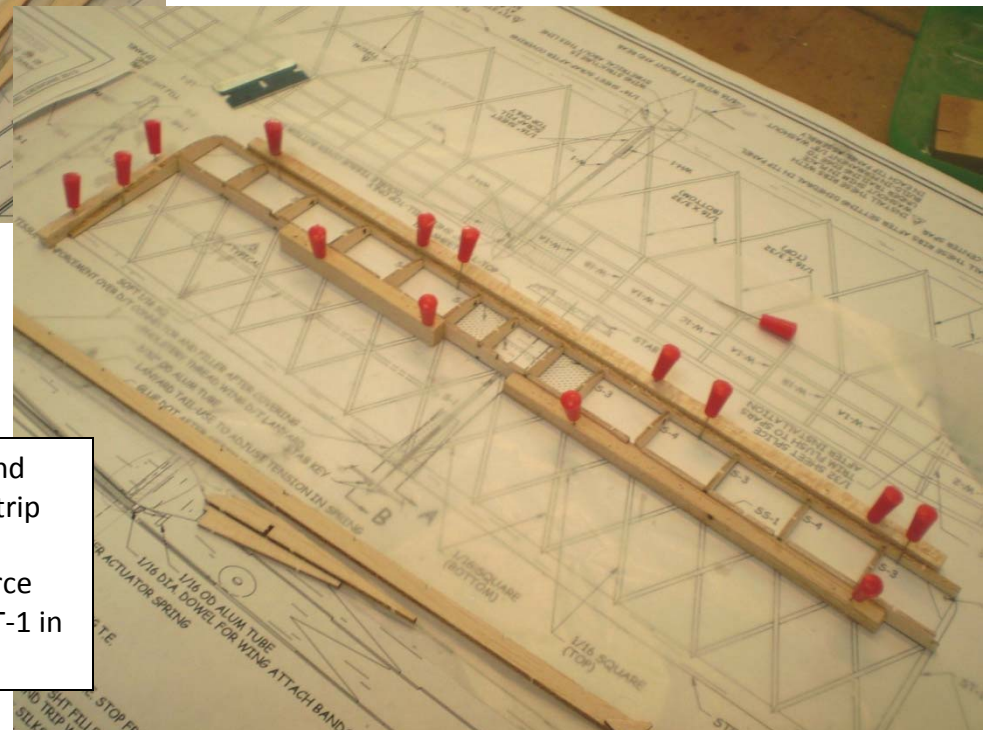
All the stab parts ready to assemble with leading edge plan form control stock in place.

SLE-1 held against plan form control stock.

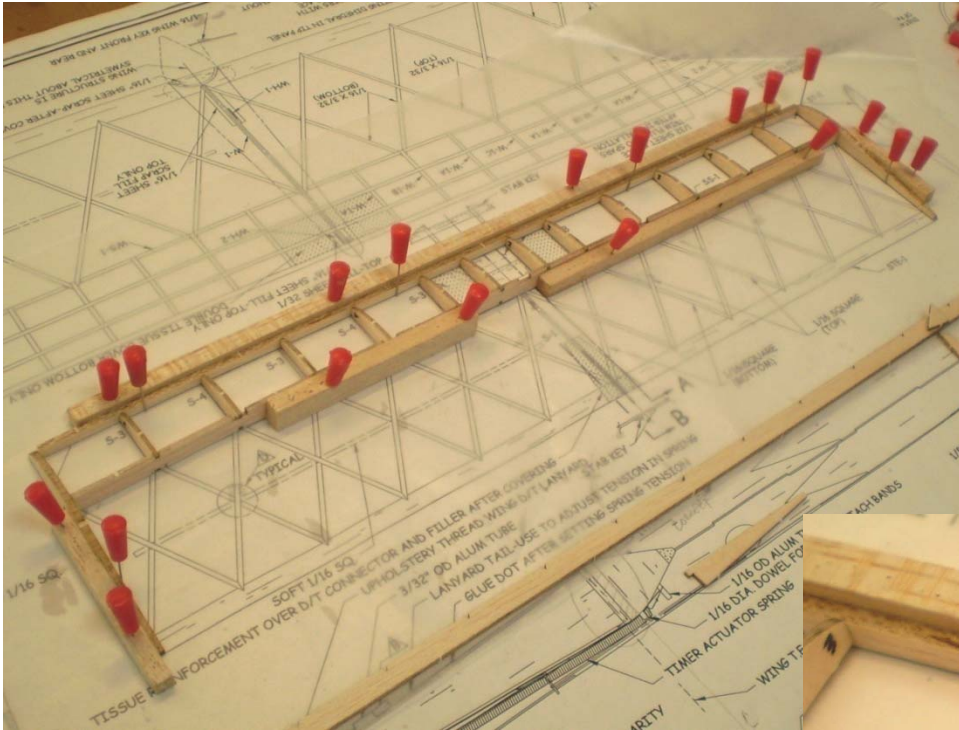




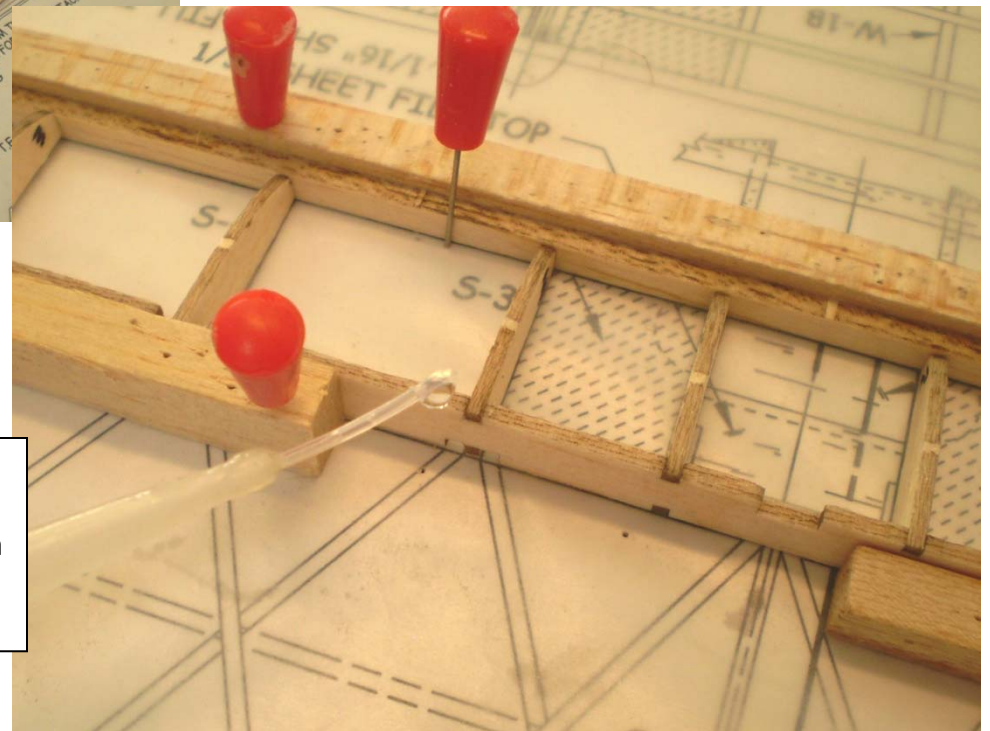
Dry install the nose ribs to SS-1



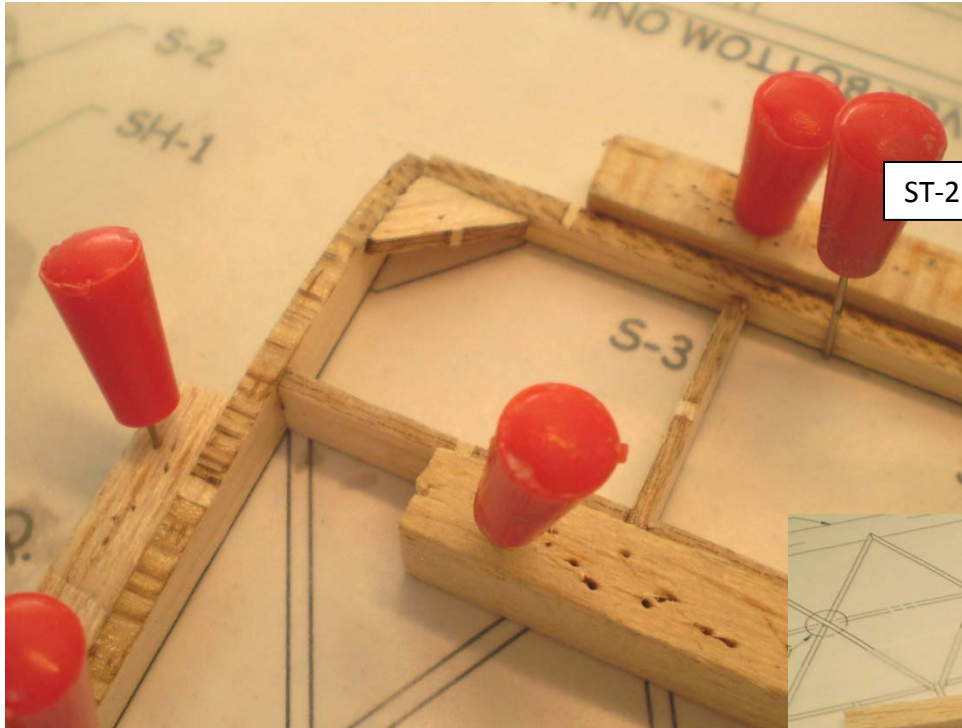
Position the nose ribs and spar assembly and align to the drawing locations. Use scrap strip stock to maintain alignment to the spar location and also provide light clamping force against SLE-1 for all the rib ends. Tip rib ST-1 in place against a plan form control strip.



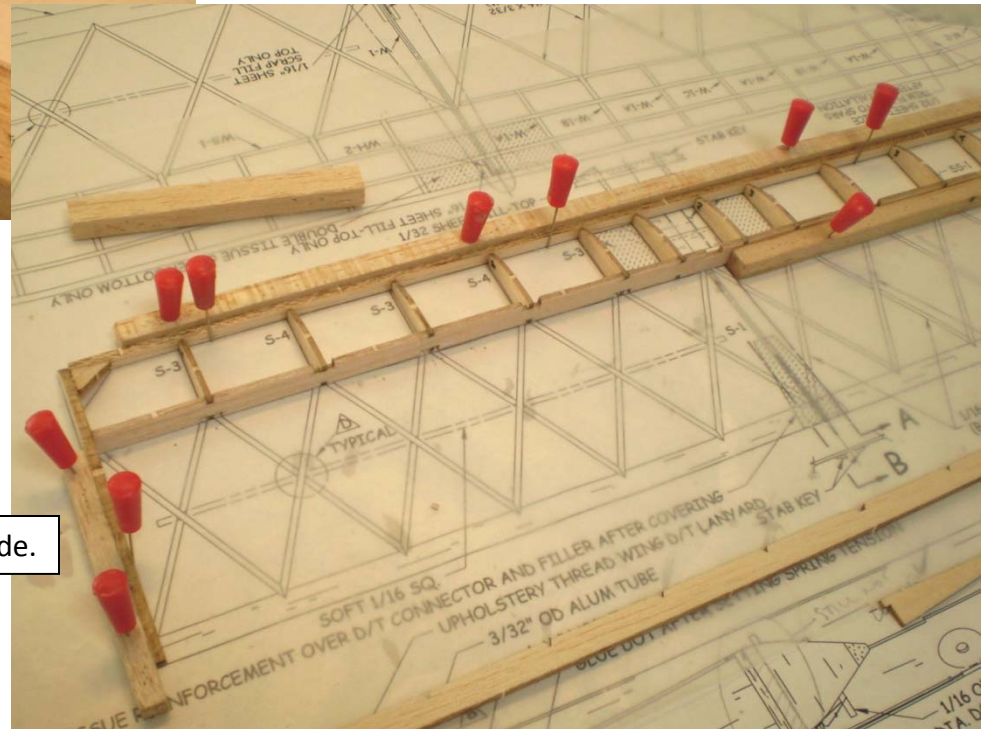
All rib assembly elements in place-bond to the spar and leading edge.



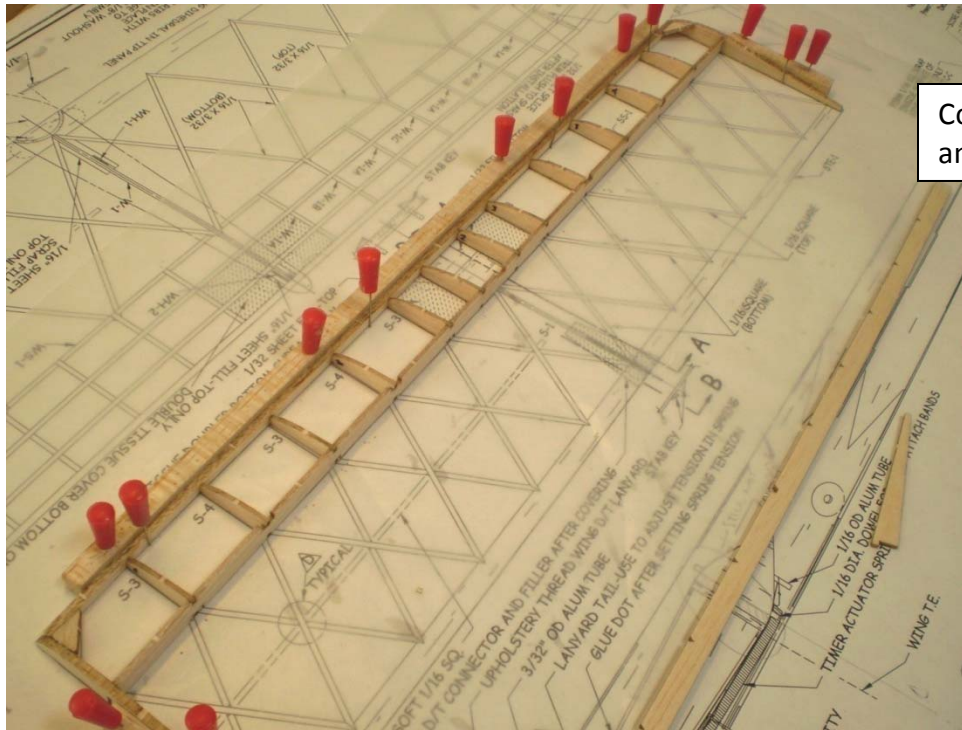
Way too much glue in this posed image, but most important for thin CA use is to move the control stock to the side when bonding this area to prevent accidental attachment of the control stock to the spar.



ST-2 gussets installed-do not omit.

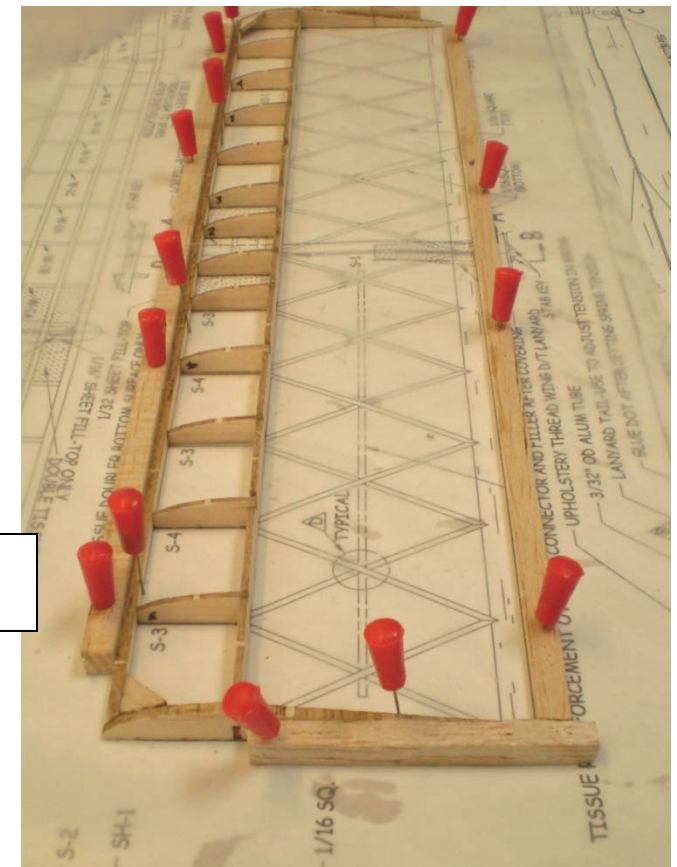


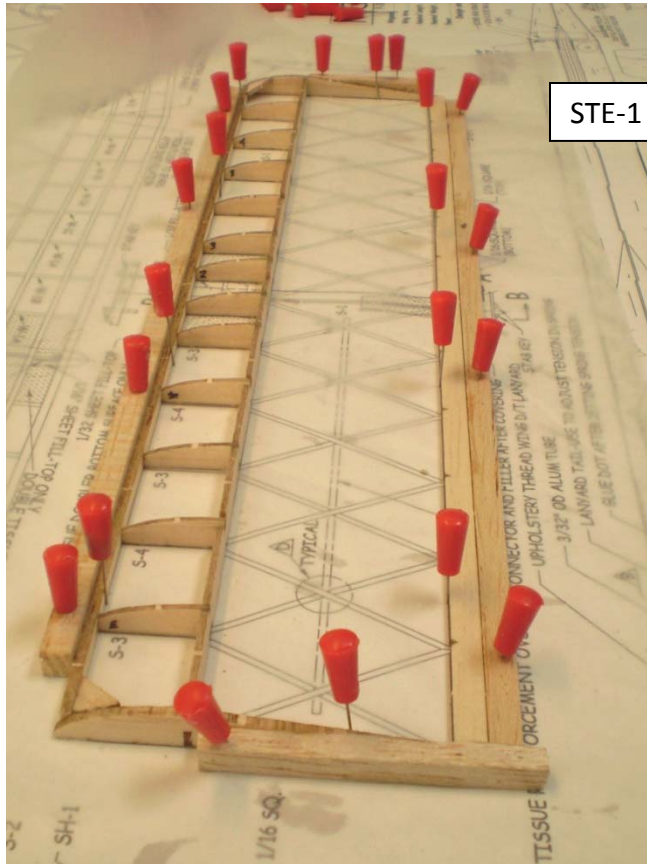
Left side bonded-working the right side.



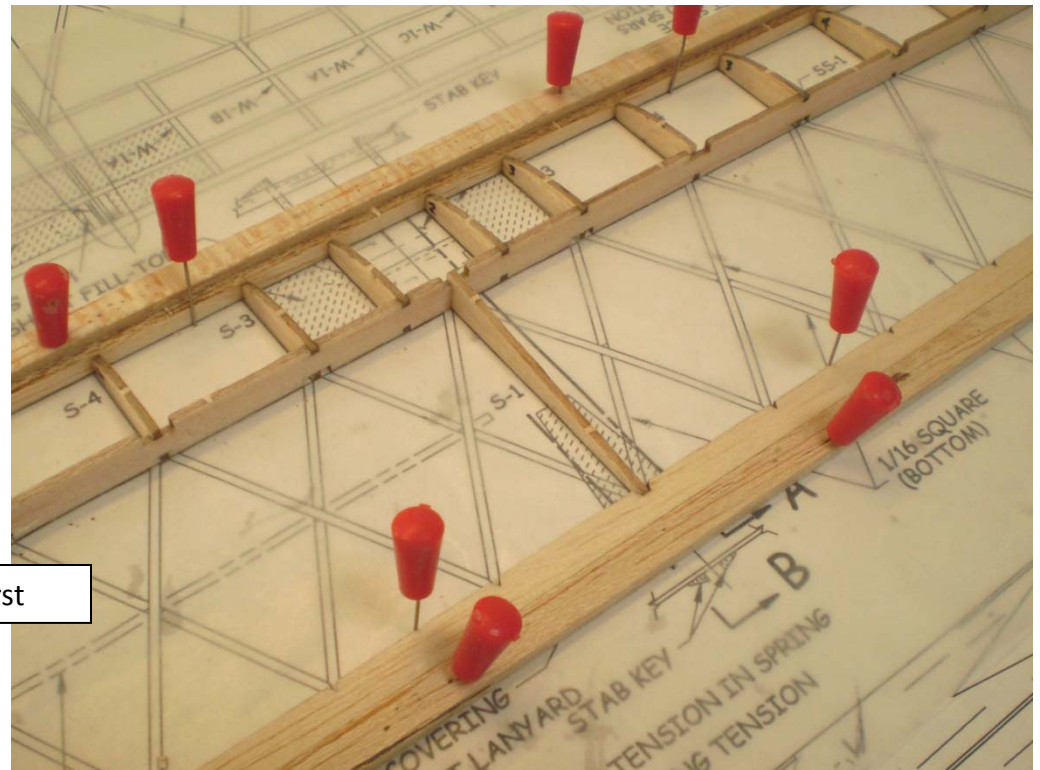
Completely bonded-ready to add the truss ribs and trailing edge.

Plan form control stock applied to prevent waviness in the trailing edge during assembly.

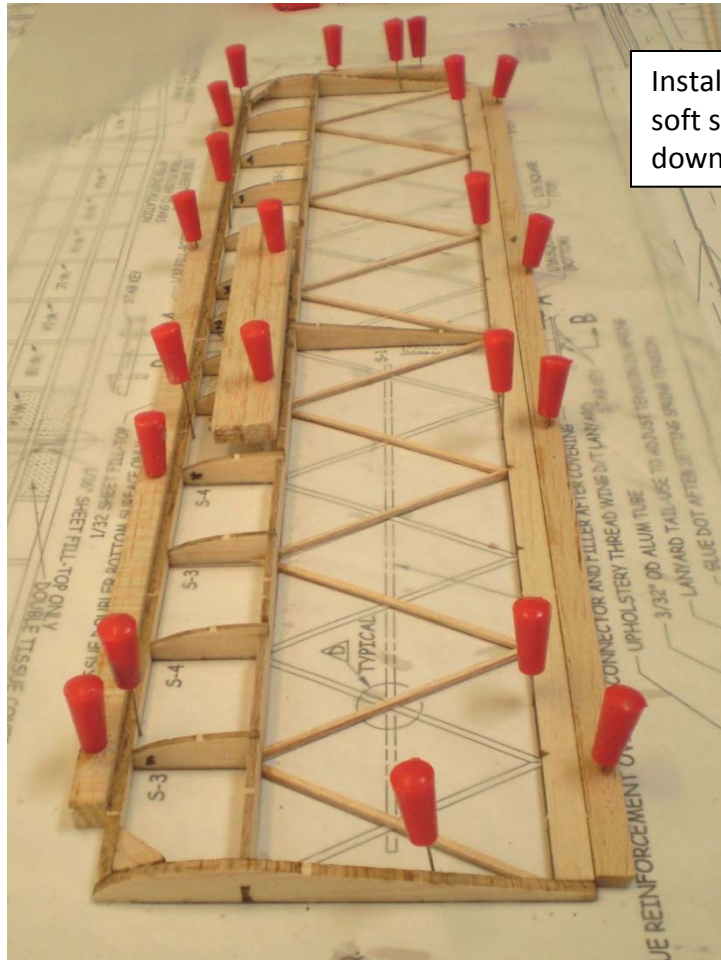




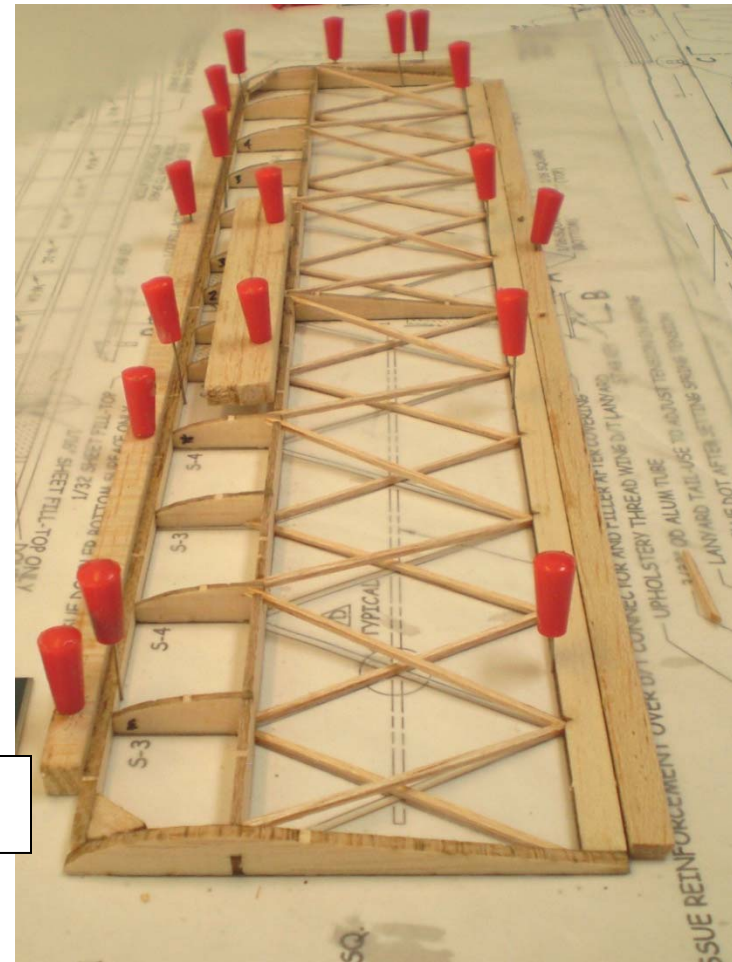
STE-1 positioned and best fit to the drawing.



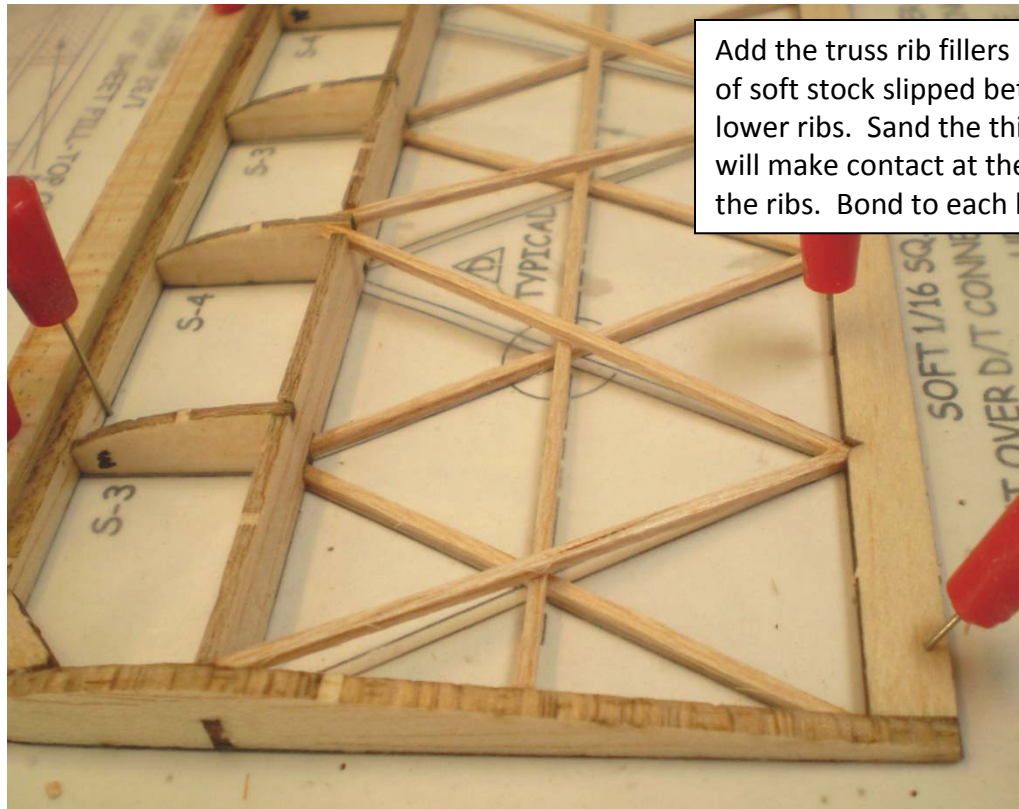
Rib S-1 installed first



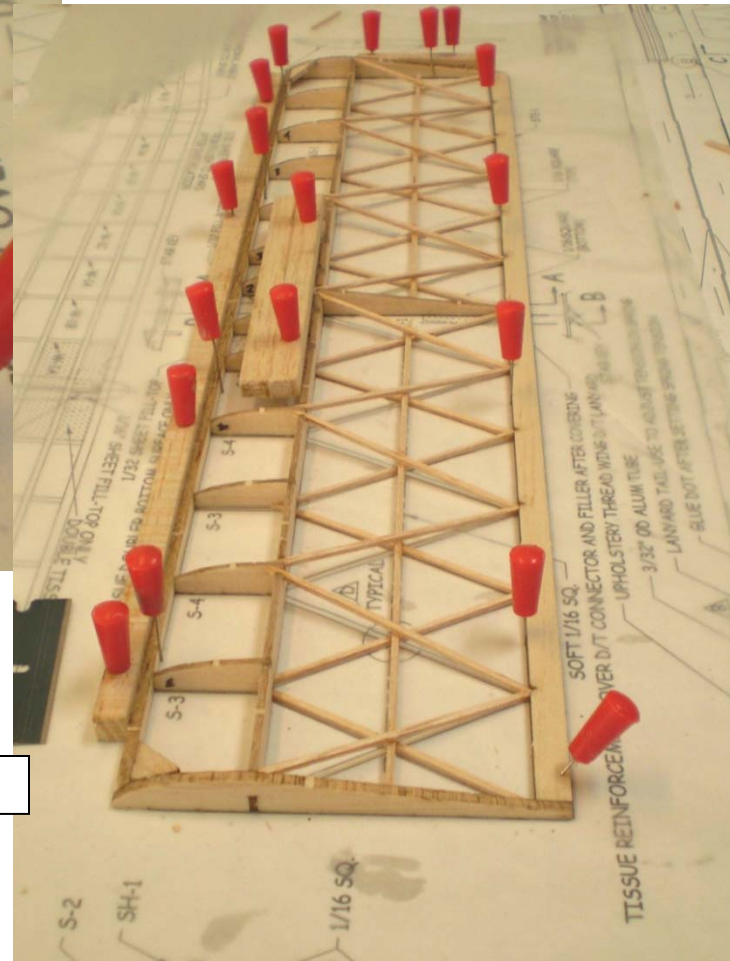
Installing the lower truss ribs. I used a piece of soft scrap material to provide a clamping force down to keep the assembly flat during this step



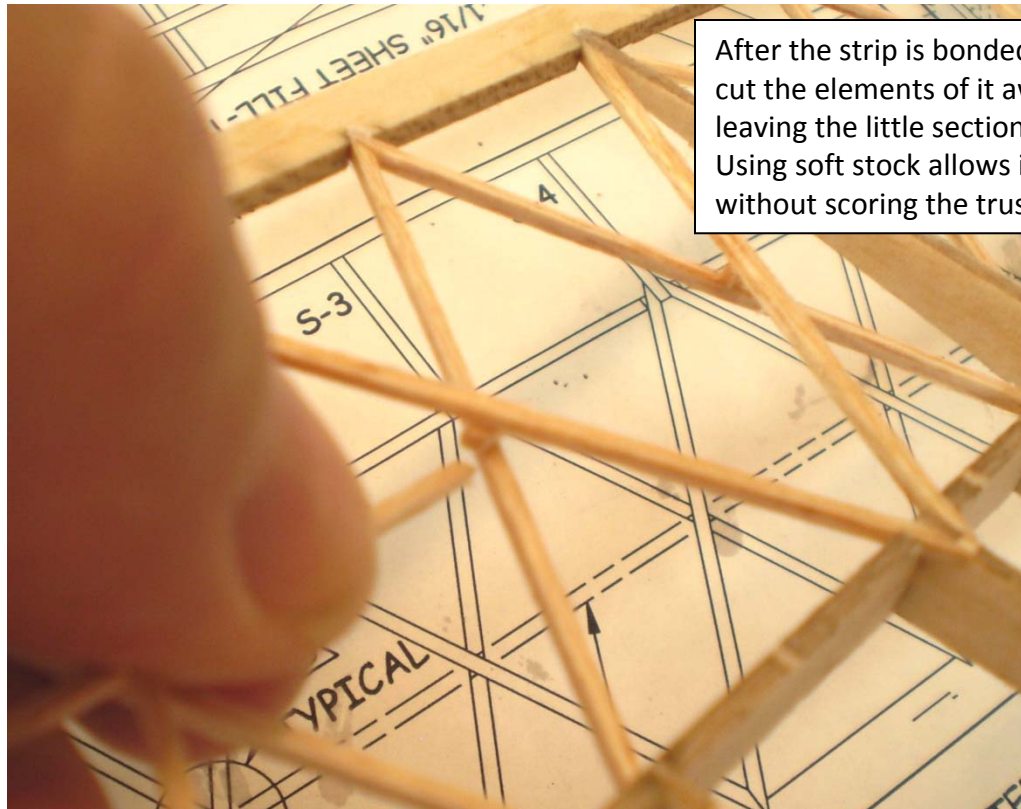
Adding the upper truss ribs-goes quick, doesn't it?



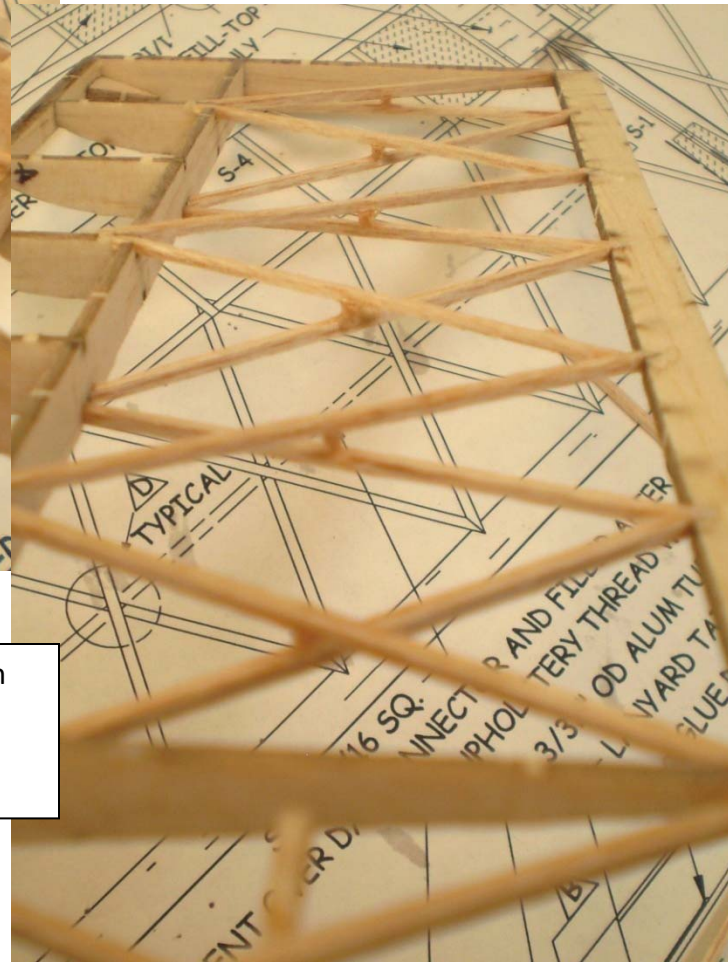
Add the truss rib fillers by starting with a piece of soft stock slipped between the upper and lower ribs. Sand the thickness until the stock will make contact at the cross-over location of the ribs. Bond to each location using thin CA.



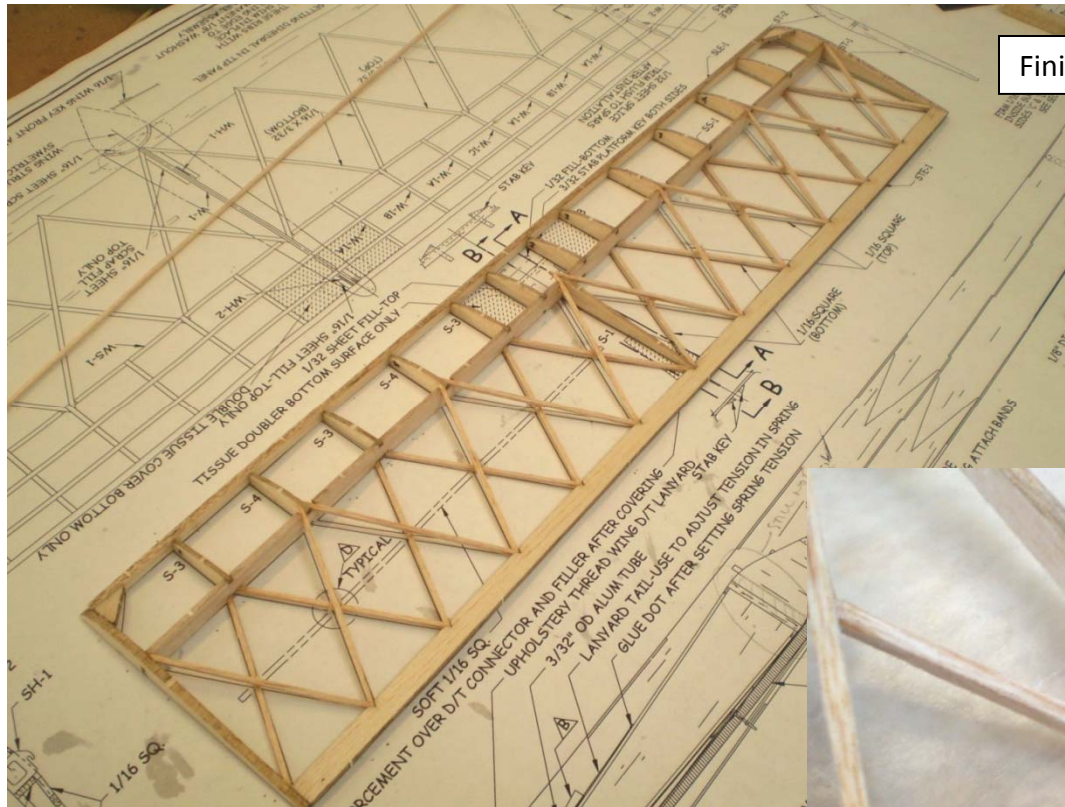
Another view of the filler stock in position.



After the strip is bonded between the truss ribs cut the elements of it away between the ribs, leaving the little sections bonded in place. Using soft stock allows it to be easily cut without scoring the truss ribs.

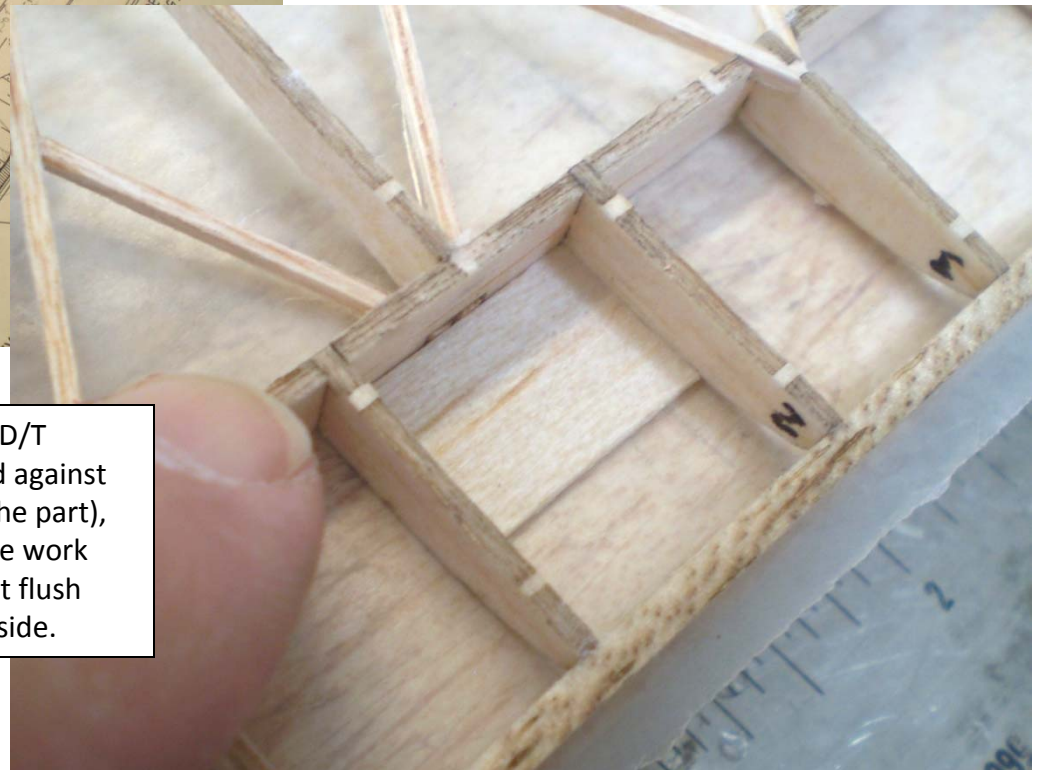


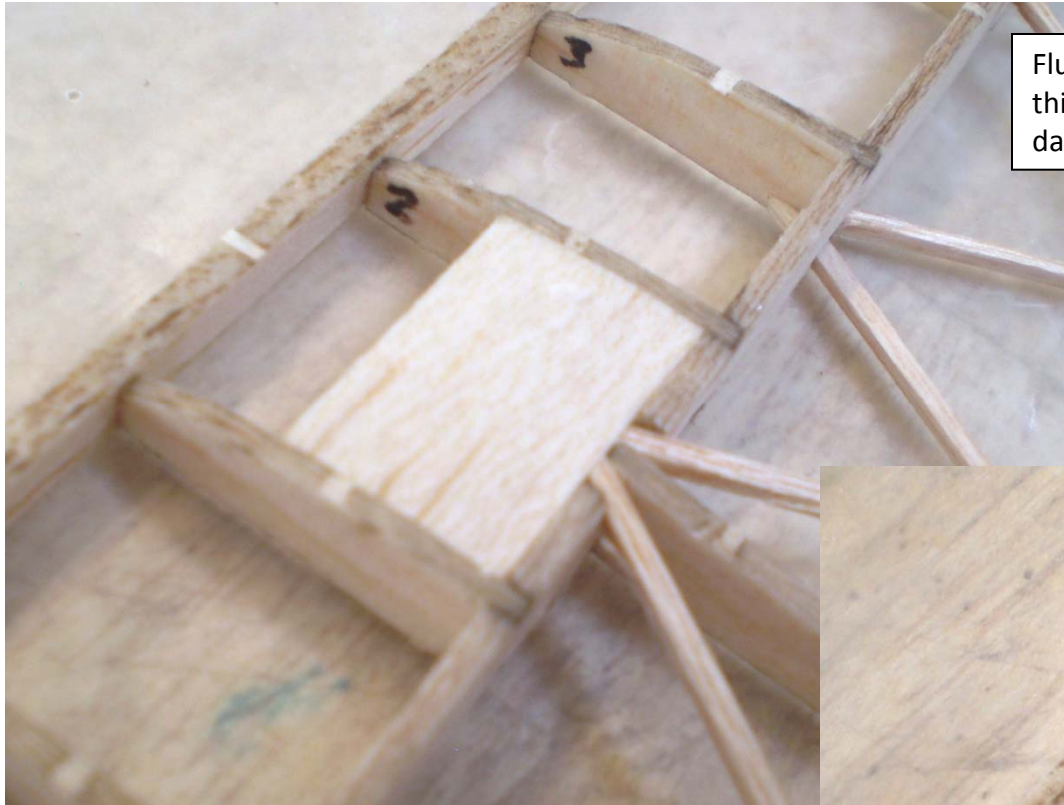
Another view of the remaining fillers between each truss rib set. I hit these little fillers with thin CA after this trim operation to add some rigidity in the easily crushed soft material.



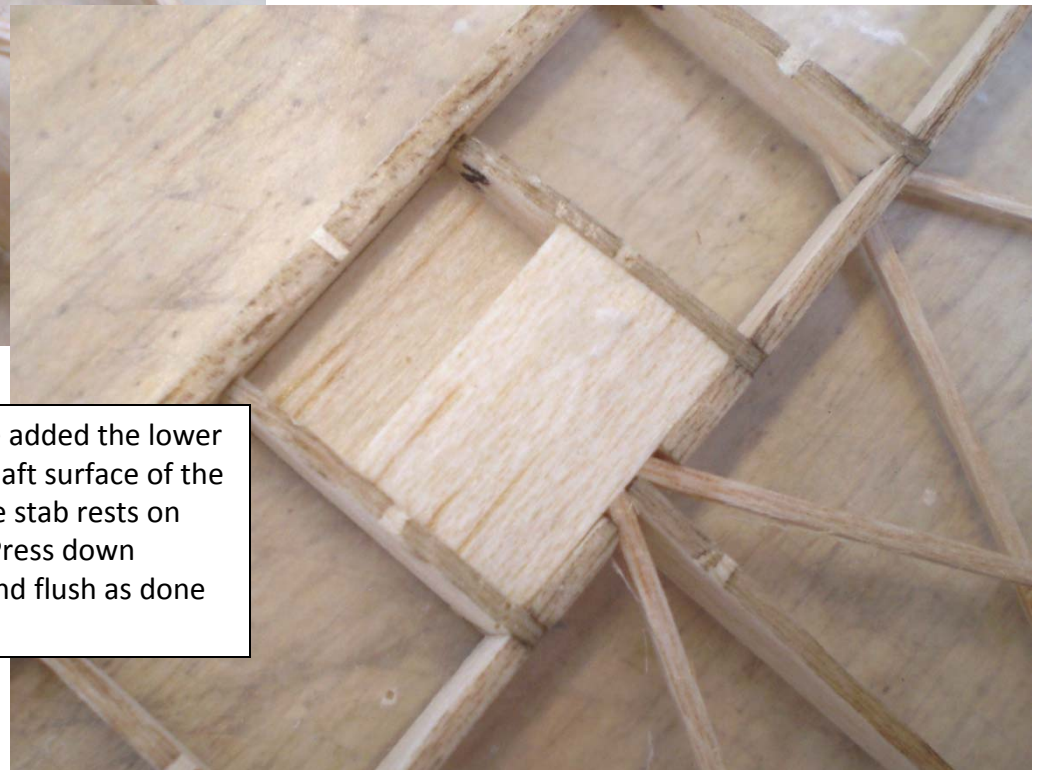
Finished rough stab assembly.

Add the scrap 1/32 sheet filler for the D/T hooks-I hold the stab upside down and against the building board (wax paper under the part), then slide the stock in place against the work surface. A few drops of thin CA bond it flush with the tops of the S-2 ribs on either side.

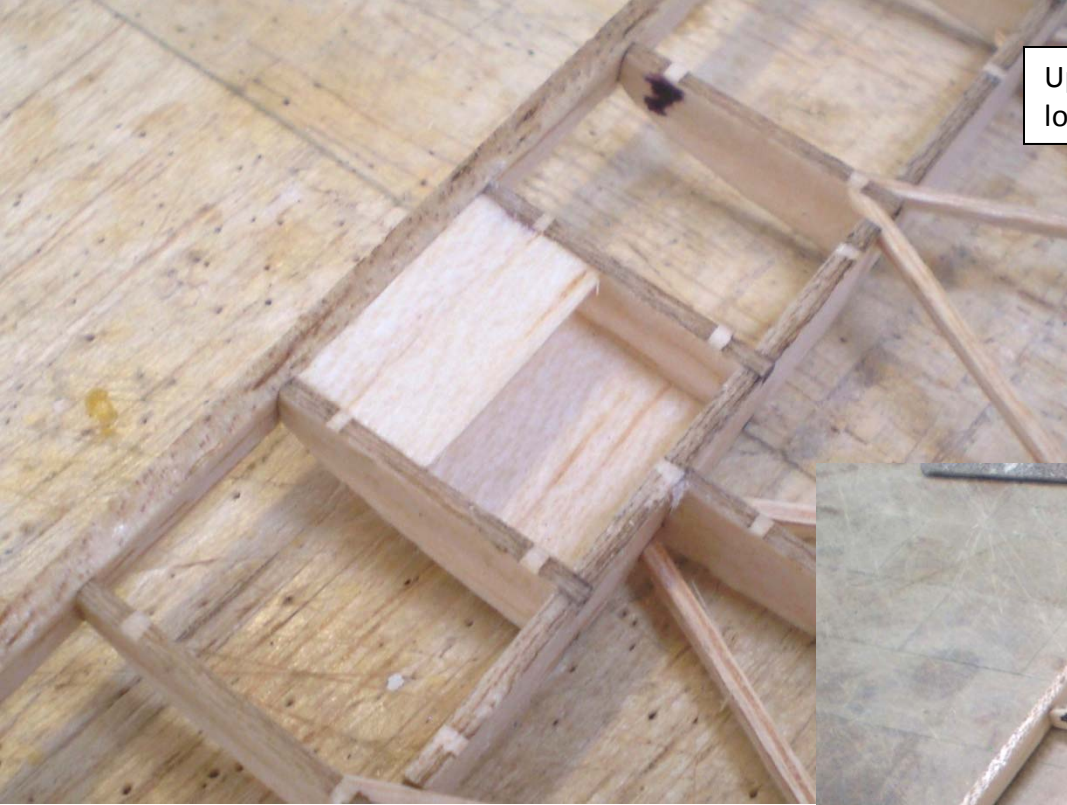





Flush condition of the hook filler-I leave it like this while finish sanding the stab to avoid damage to the hook ends during that step.



It's kind of hard to see, but I've added the lower 1/32 scrap filler up against the aft surface of the leading edge. This is where the stab rests on the platform of the fuselage. Press down against the work surface to bond flush as done for the upper filler.



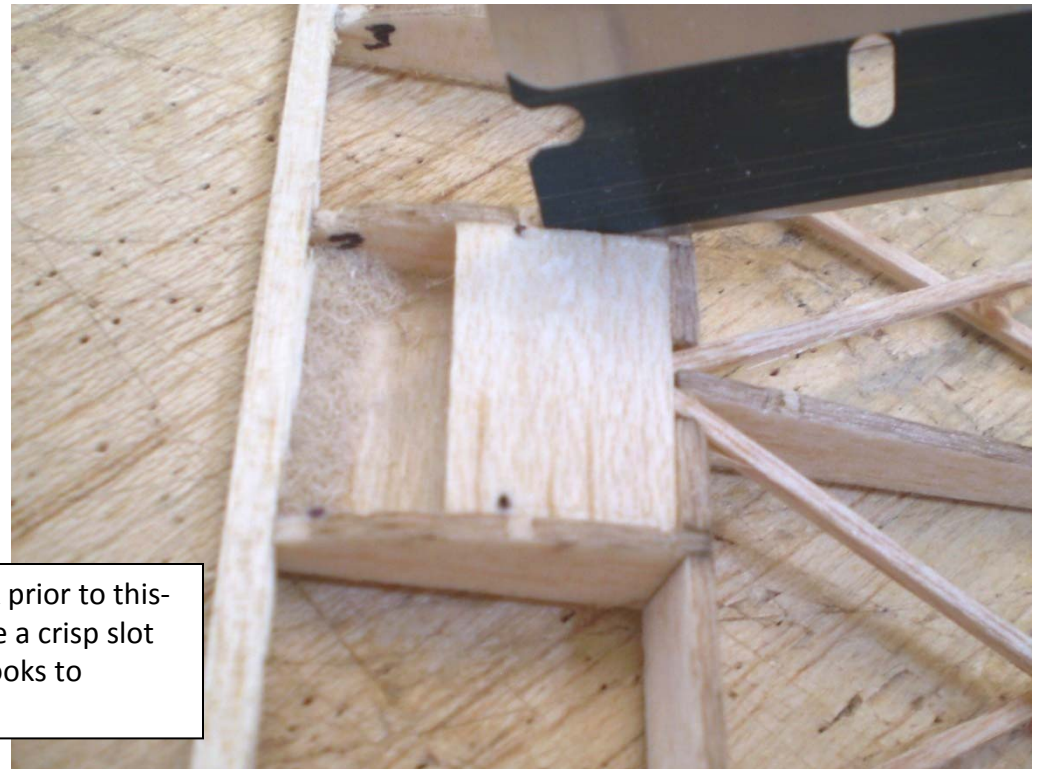
Upside down, showing the flushness of the lower filler.



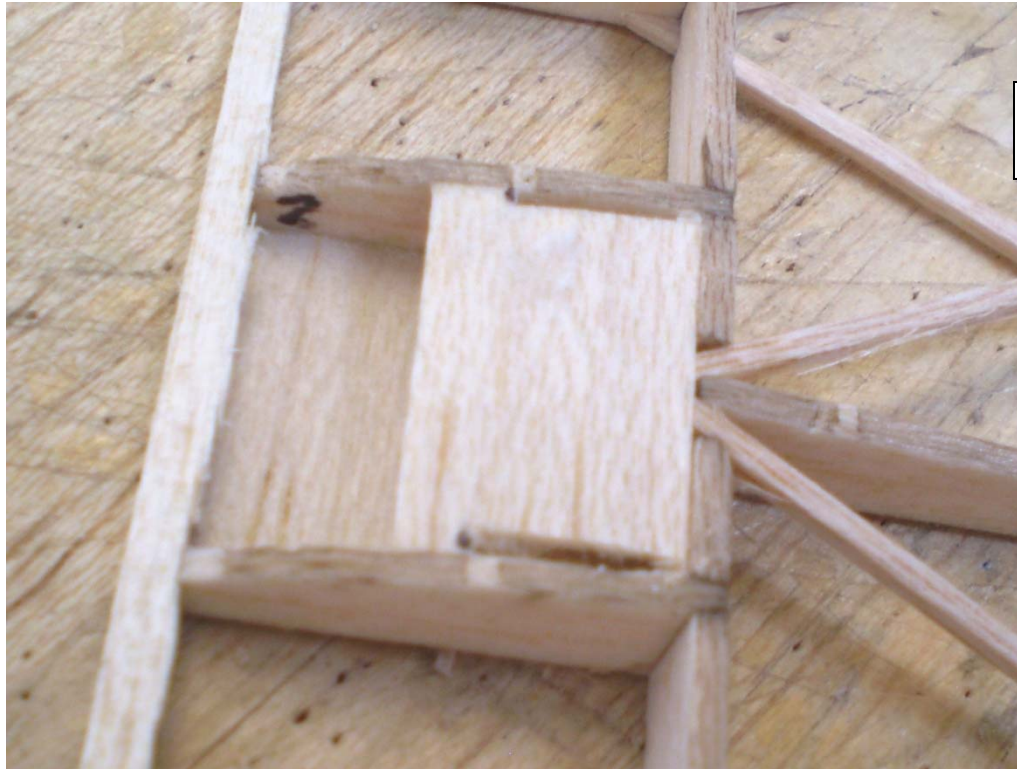
I like to shape the trailing edge at the assembly level just to get everything flush. I use a fairly coarse grit sanding file you can see partially in the upper edge of the image. If not, use a 100 grit sanding block and keep it local to the trailing edge stock to avoid eroding the ends of the truss ribs-goes quick but you have to be careful. Working near the edge of a work surface is the key to doing this successfully.



I'm rough profiling the leading edge here-taking it down flush to the tops of the ribs-again being very careful to localize the sanding to the leading edge stock only and trying not to erode the ribs.



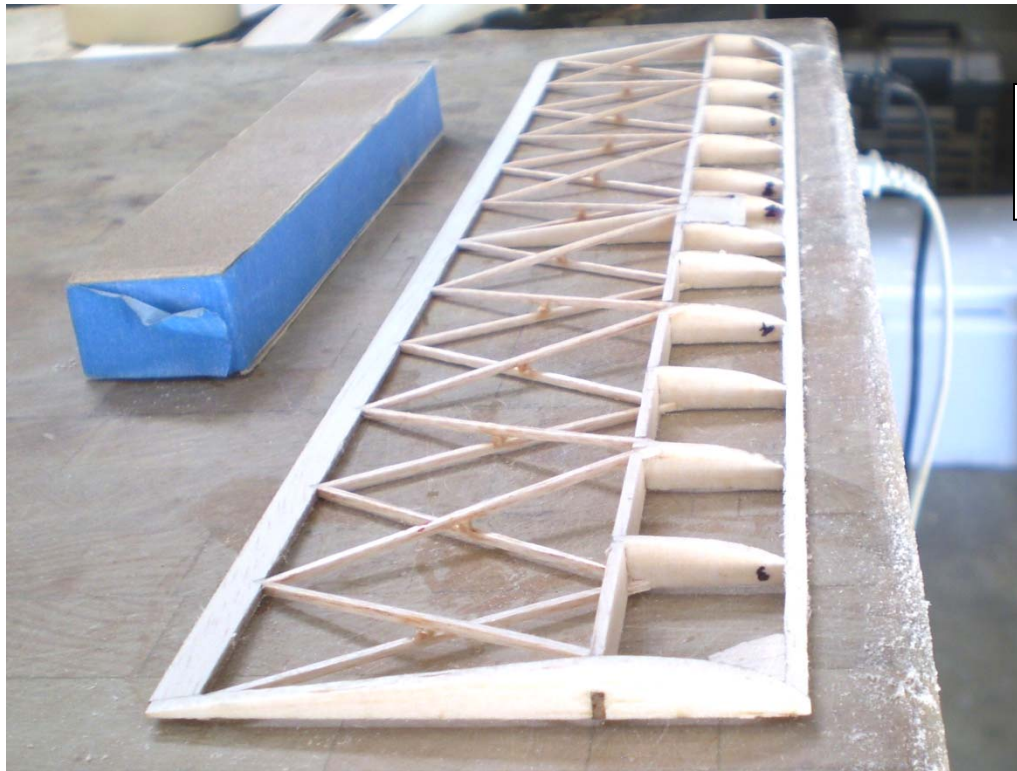
You can add slots for the D/T hook prior to this-but use a new sharp razor and slice a crisp slot on either side for the top of the hooks to protrude through.



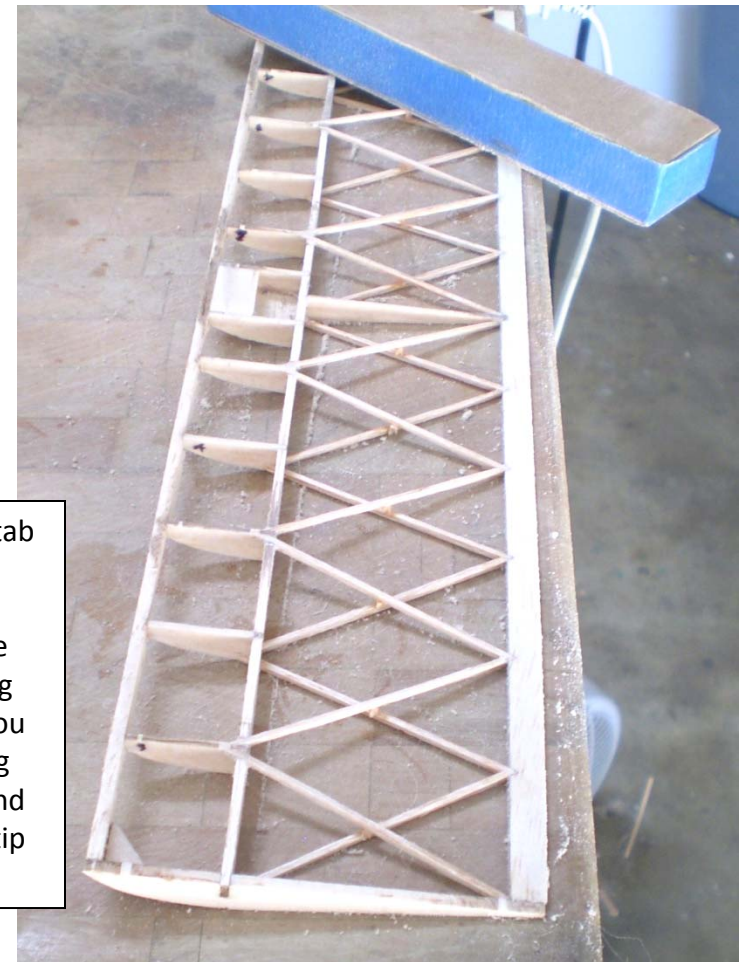
Slots completed-ready for hooks after final sanding of the stab contours.

I clean up everything using a sanding block with 180 and 220 grit. Here is where you level everything out lightly, and get it all smoothed up. The flat top airfoil is very easy to work.

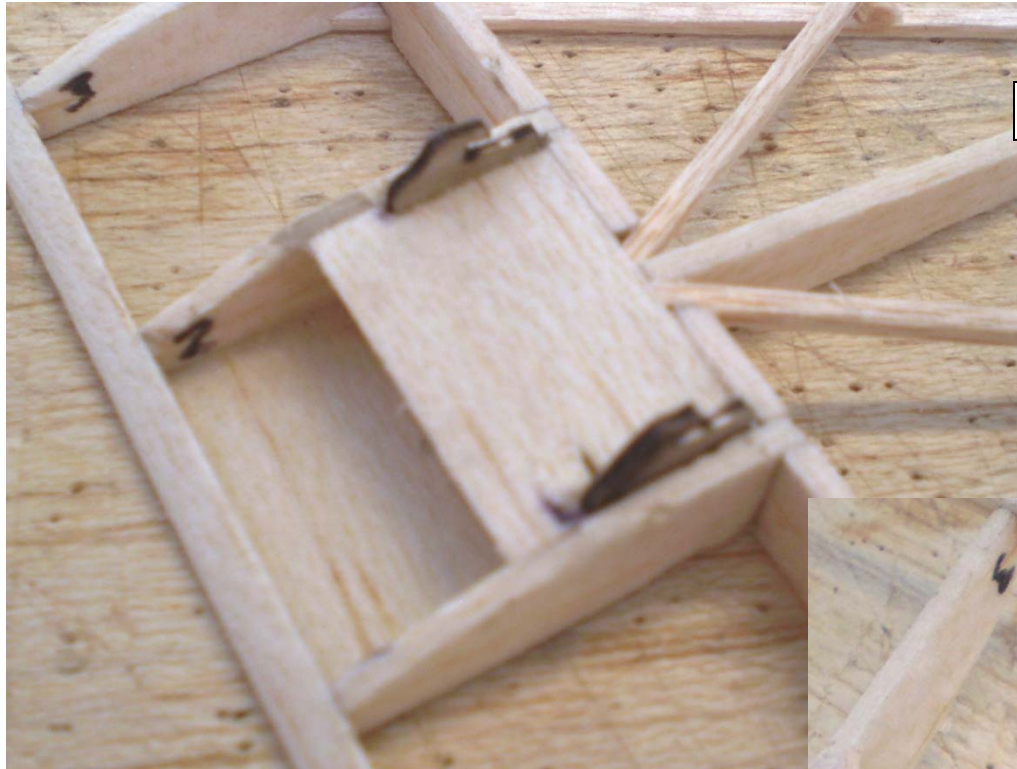




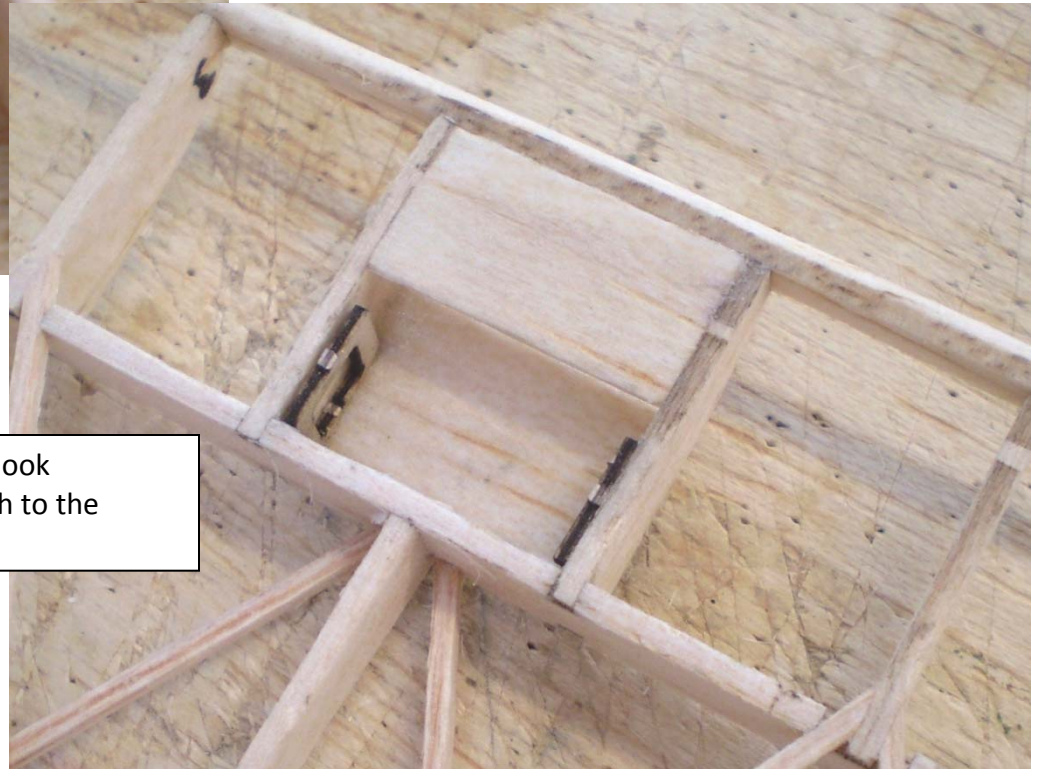
I've lightly block sanded the tops of the ribs and spar and fine contoured the leading edge flush to the ribs.



I lightly block sand the lower surface of the stab to remove imperfections, mismatches, etc. After this basic shaping is done sand the final profile into the forward tip corners to add the radius to the tip ribs. I don't finish the leading edge radius until the profiling is complete. You can save some weight by blending the leading edge radius into the tip rib and sanding a blend radius into the top and bottom edges of the tip ribs.



D/T hooks installed



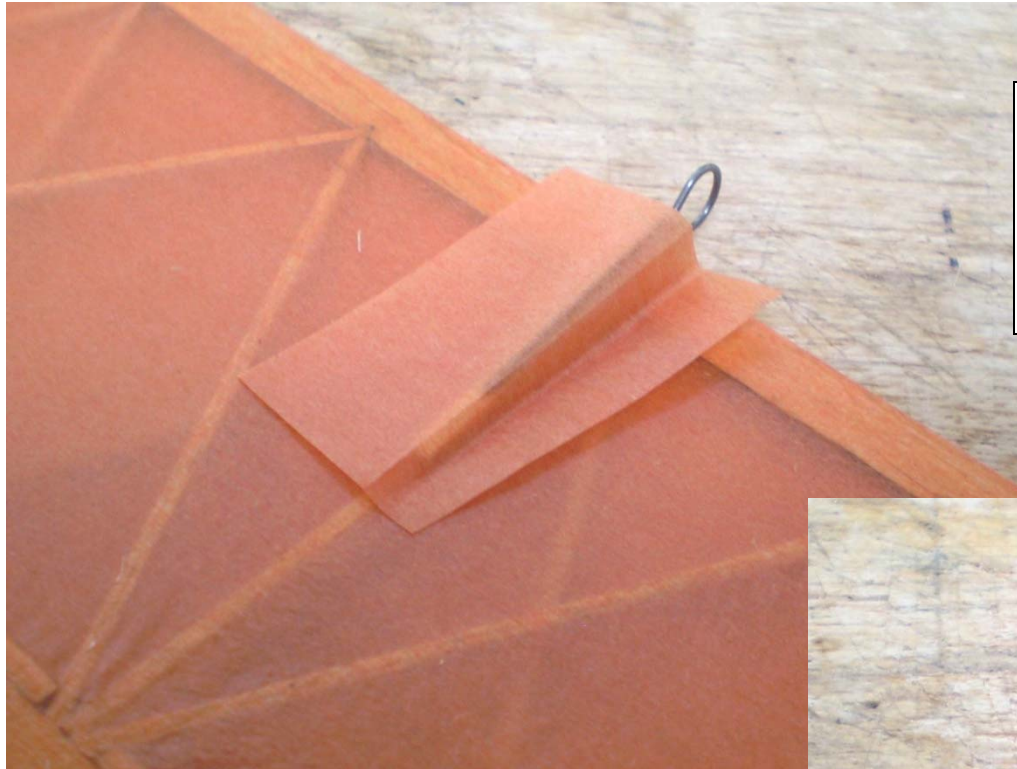
View from the bottom of the D/T hook installation. Hooks need to be flush to the bottom of the S-2 ribs..



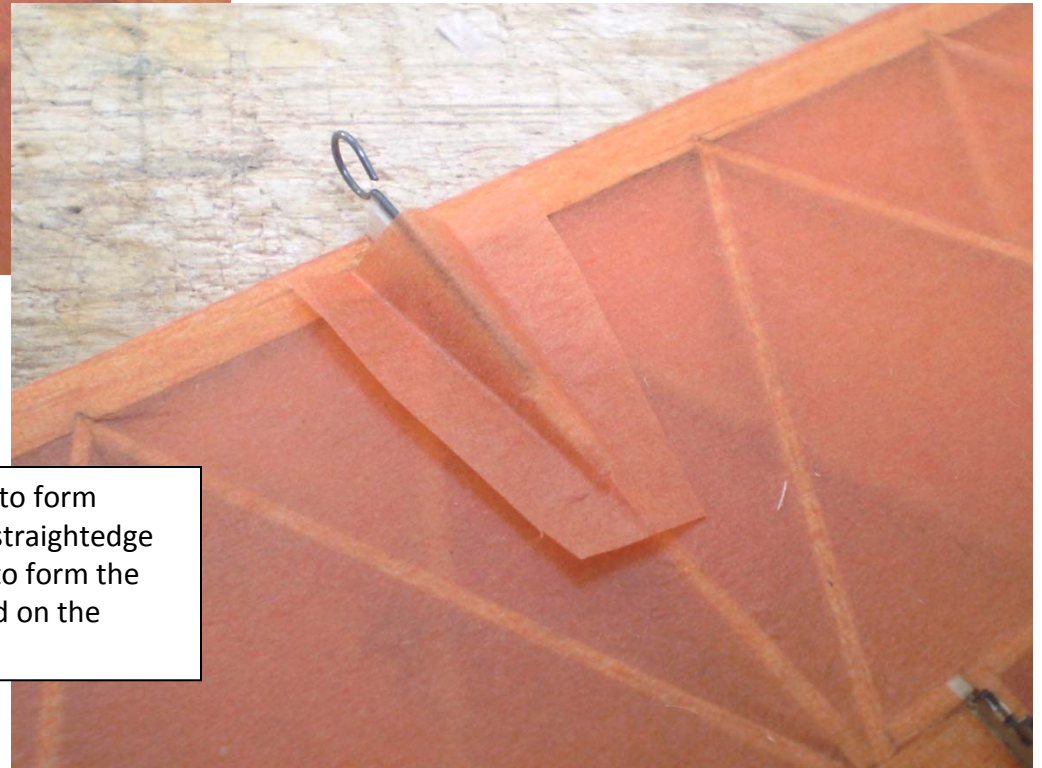
After covering, install the D/T connector eye filler-make from scrap 1/16" balsa. Pinprick the covering to allow glue to seep into the S-1 rib under the covering. I install this part with cellulose cement just because I think it does a neater job with my dope sealed covering.



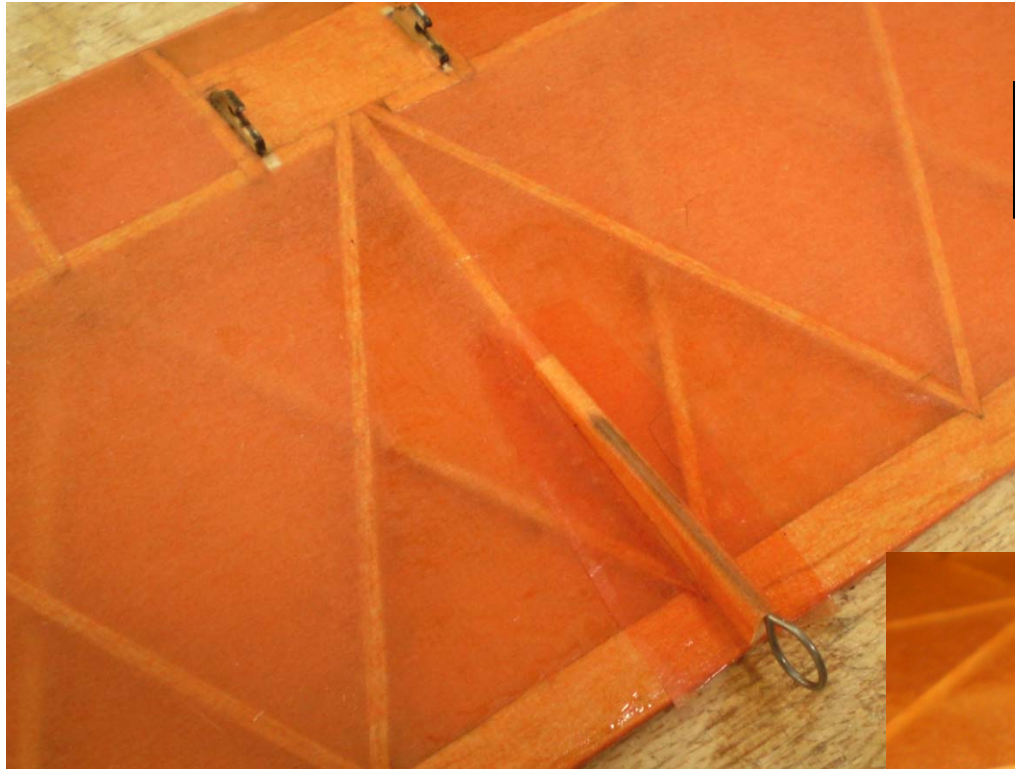
D/T line connector eye installed. I use thick CA for this joint, and dusting the wet CA with microballons helps secure it well.



Here is the installation of the tissue reinforcement over the D/T connector eye installation. I fold down the middle and make one side fit as centered on this crease. Then fold together and trim the opposite side of the reinforcement paper to match.



Now the reinforcement is creased to form around the filler. Just use a small straightedge to push the tissue into the corner to form the crease location with the paper held on the center line crease against the part.



The reinforcement is secured with clear dope and allowed to dry-trim off any tissue flash remaining.

Attach the stab to the fuselage as using the D/T line and pop-up rubber bands. Install 3/32" balsa keys to trap the stab position to the ends of the stab platform and also the incidence adjustment screw head. You can see the tissue doubler on the bottom of the stab at the platform. I use cellulose cement to bond the keys to the tissue. When dry, remove the stab and with a sharp razor bevel the the keys off to the outboard sides to reduce weight and offer some streamlining. I usually seal them with dope for improved durability. Make sure the stab will pop-up easily with the keys in place.



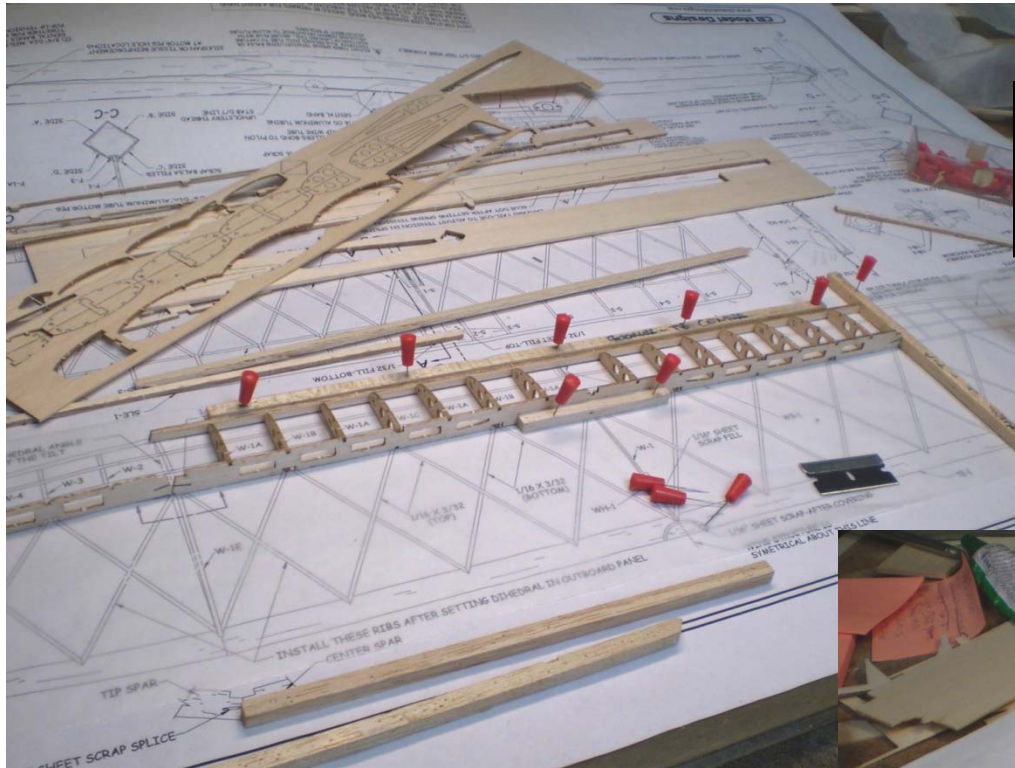


This view is to show the D/T rubber bands installed over the stab hooks.

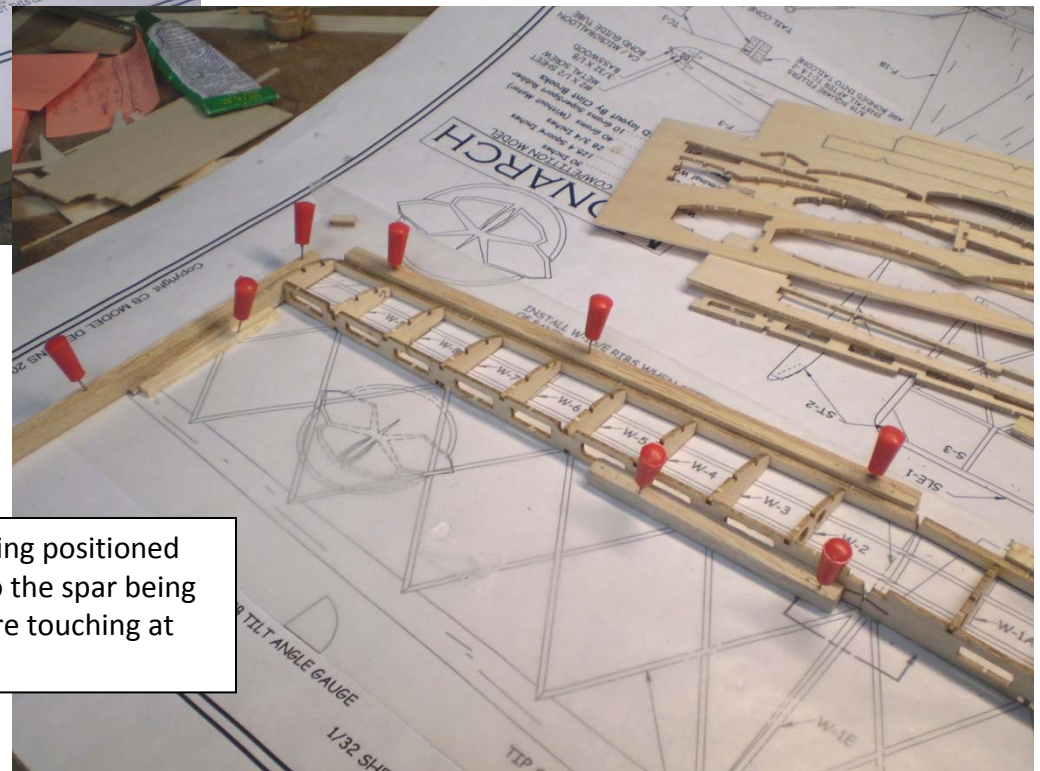
This view is showing the D/T rubber bands trapped by the barb to keep tensioned in the correct direction.

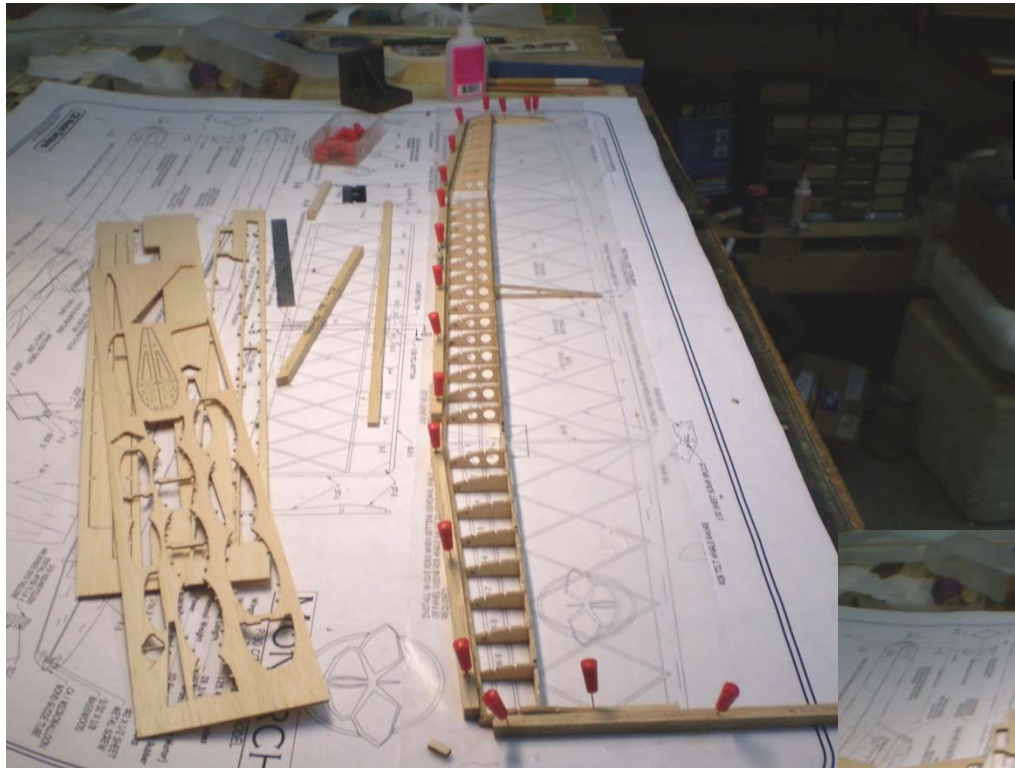


Wing construction utilizes the same method of construction as the stab. Assemble the spar sections with the nose ribs, LE-1 and tip ribs T-1 and tip gussets T-2.

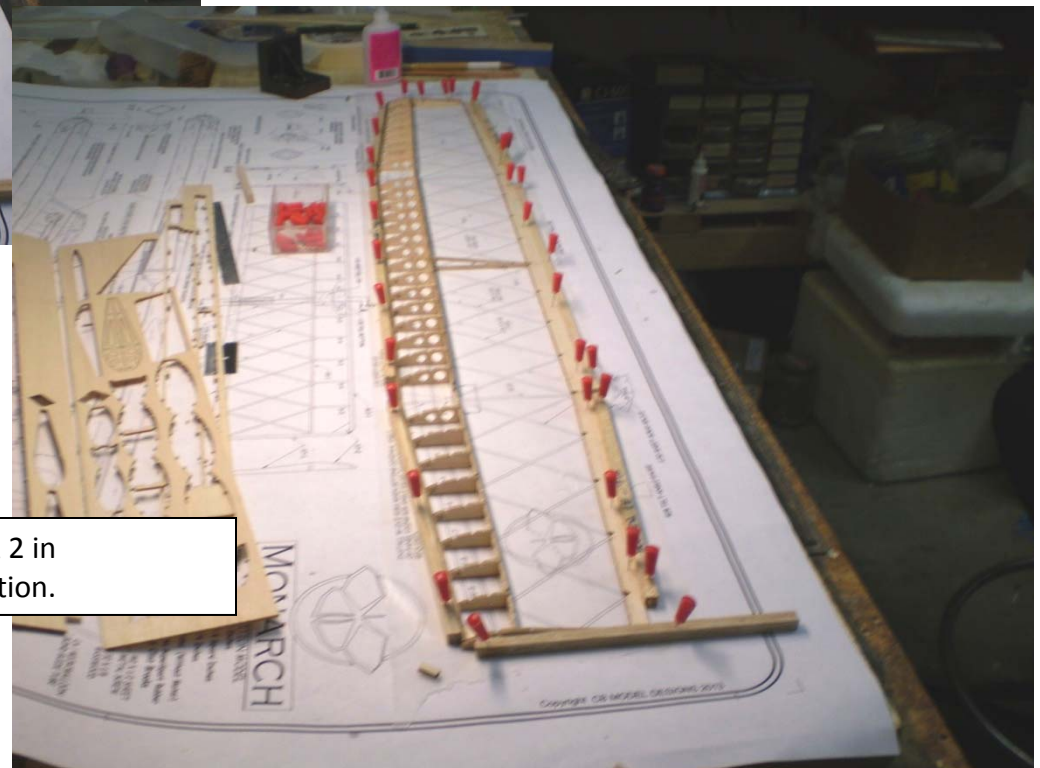


Tip panel nose rib and tip rib being positioned for bonding. Align everything to the spar being best fit to the plan-note spars are touching at the dihedral joint.

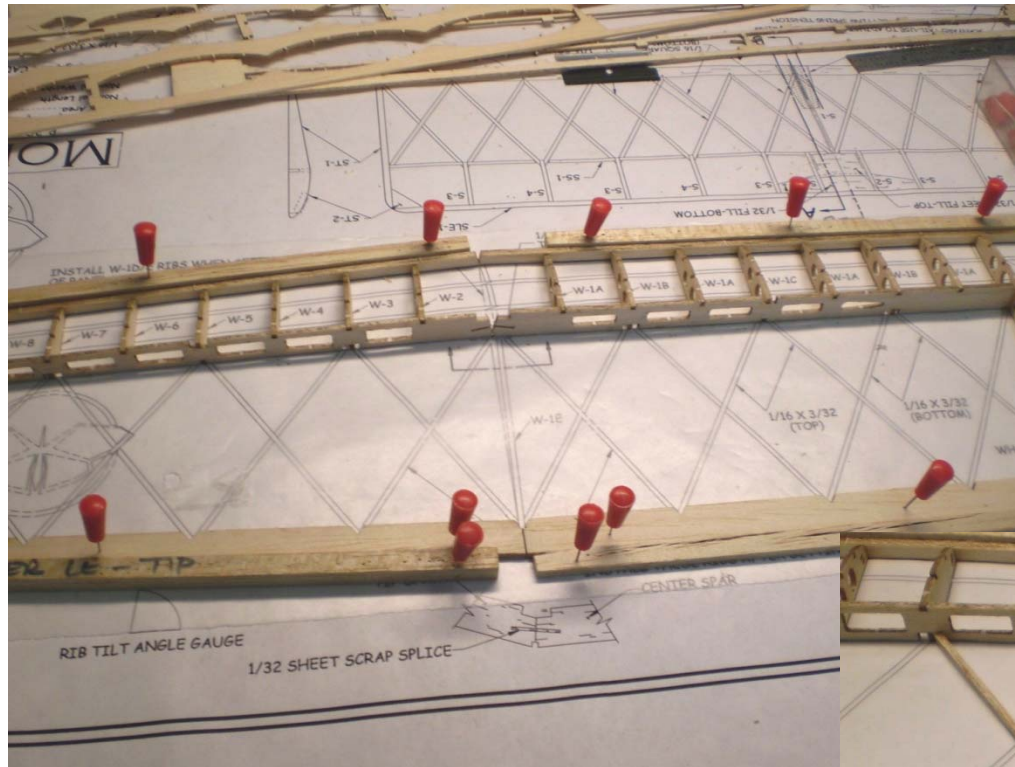




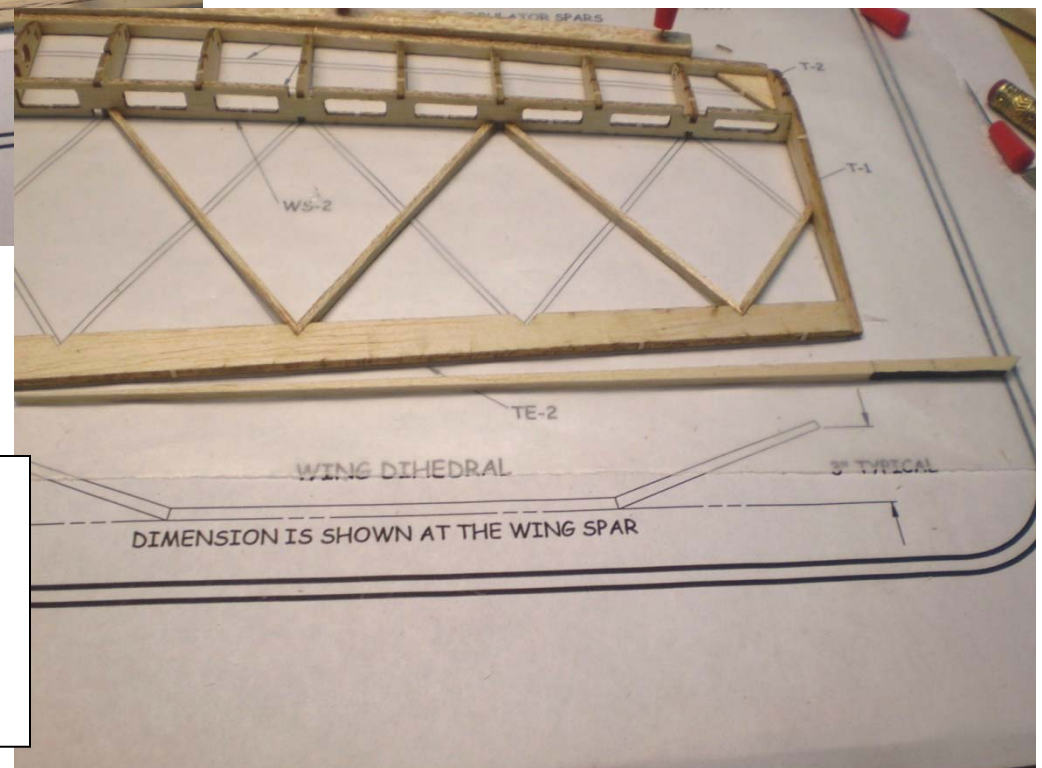
A view looking at all the nose ribs installed and one piece center rib W-1 in place.



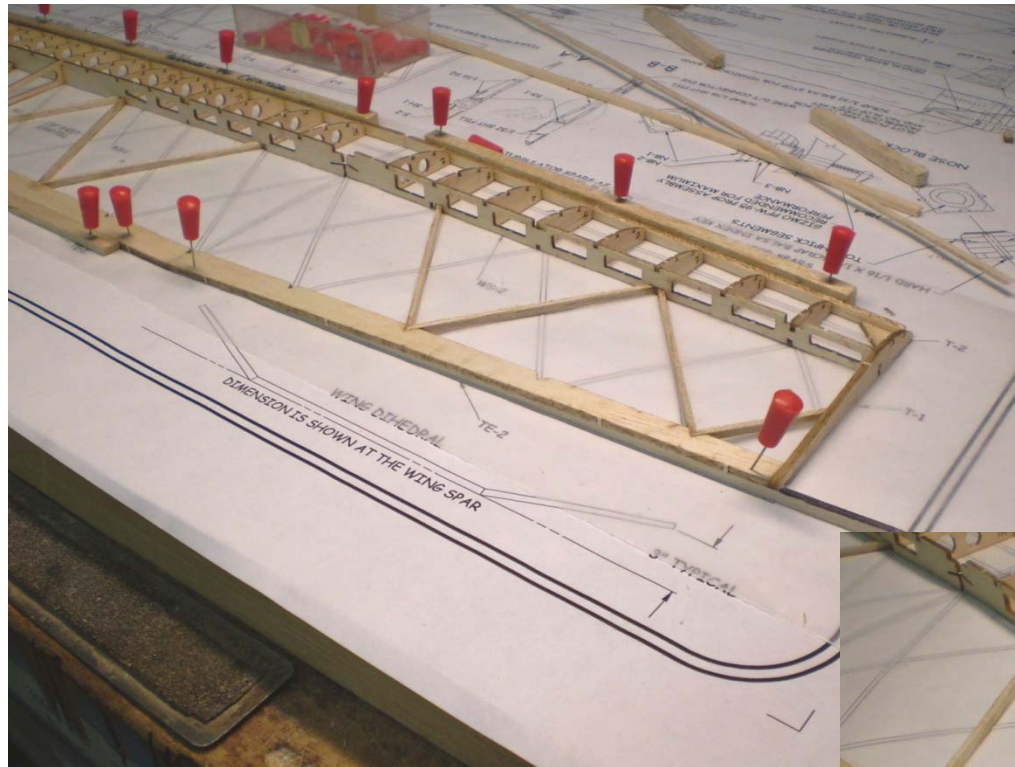
Adding the trailing edges TE-1 & 2 in preparation for truss rib installation.



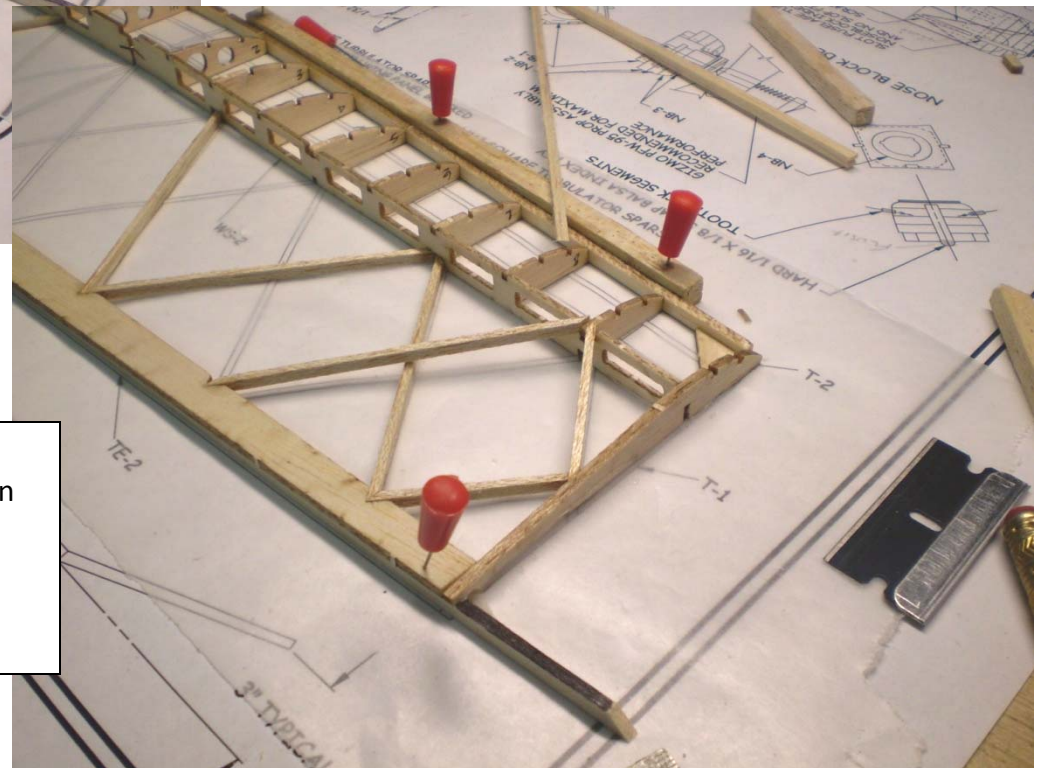
Another view of the wing tip panel dihedral joint area.



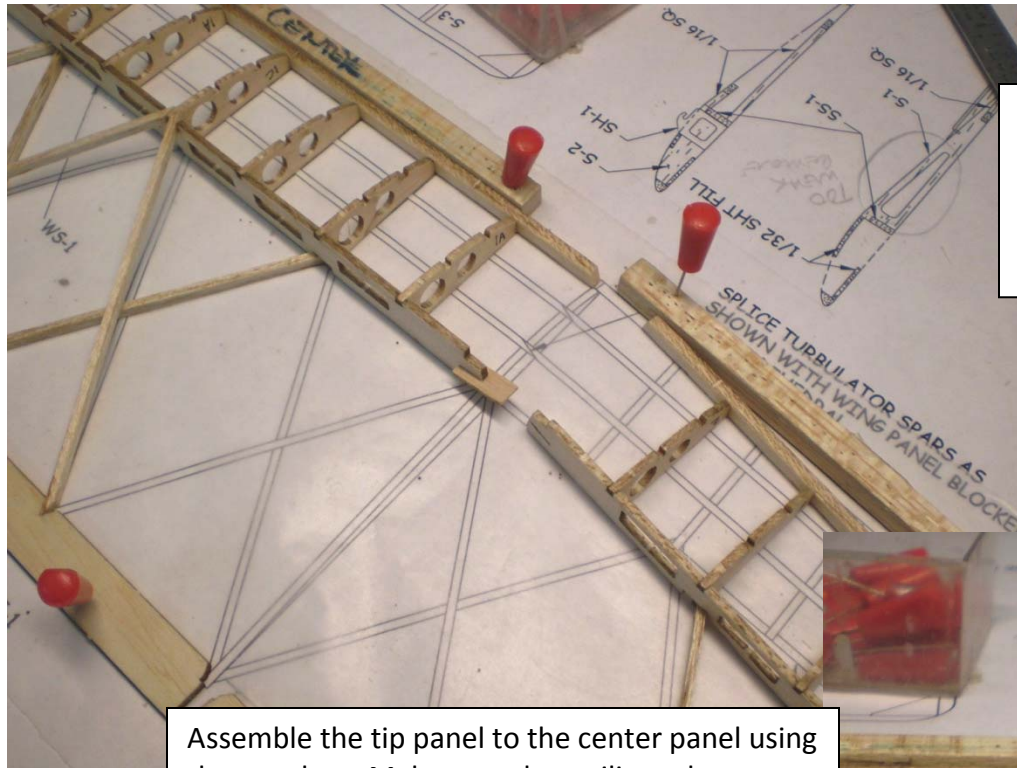
Install the lower truss ribs for the center and tip panels. Note the omission of some truss ribs to allow installation of ribs W1-D & W1-E. Also note the washout shim made from scrap 3/32" sheet. I highlight the area beyond the 1/8" offset to indicate the depth of the shim installation under TE-2.



Unpin everything on the tip panel and slip the washout shim under the aft edge of TE-2 and pin to the building board. You can see the lower truss ribs that have been left out for installation of ribs W-1D & W-1E. Keep the tip panel leading edge in contact with the building board with the washout shim installed.

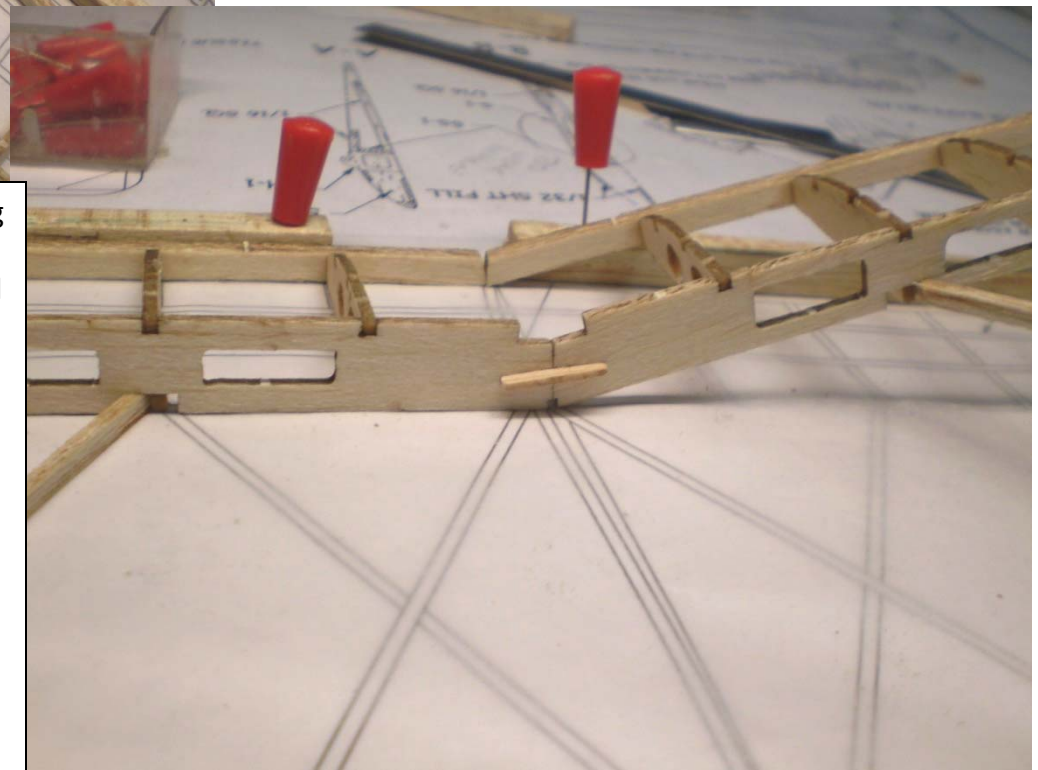


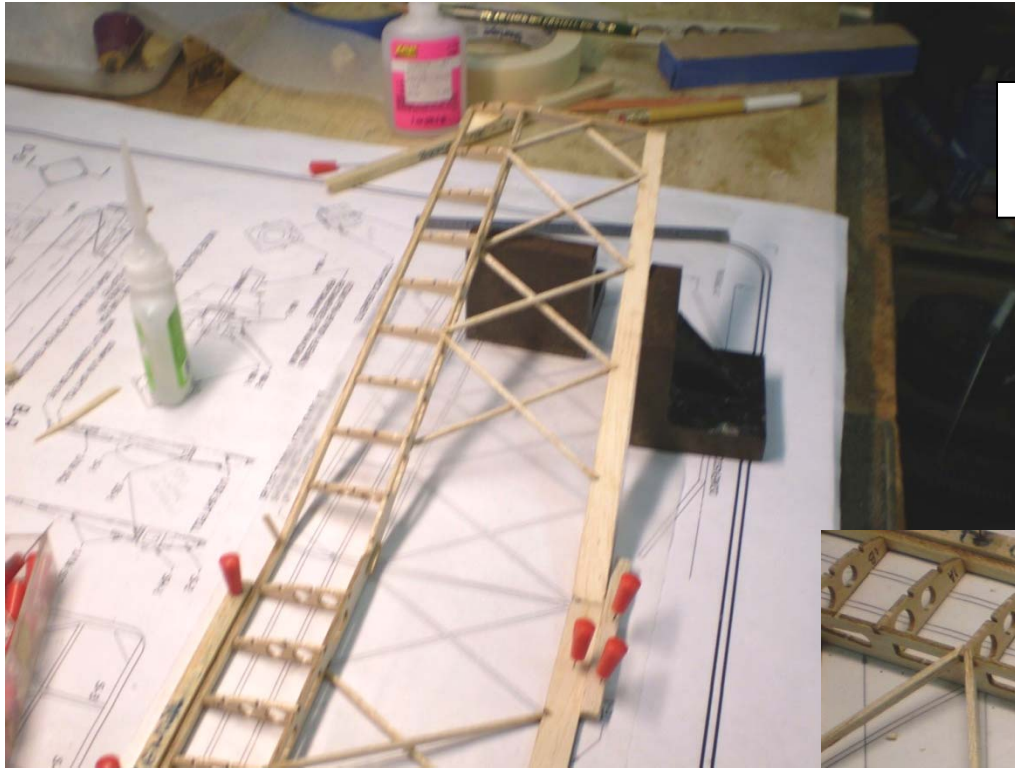
Install the upper truss ribs with the washout shim in place. This locks in the desired twist in the wing tips. You will not be able to steam warp the washout in-this is the best method and washout will remain regardless of temperature changes and covering tension.



Cut a small piece of the hardest 1/32" scrap in the parts sheet, 1/2" long by about 3/16" wide for the spar dihedral keys. Install dry in the center panel slot. The tip panel has been lifted from the drawing to position for setting the dihedral.

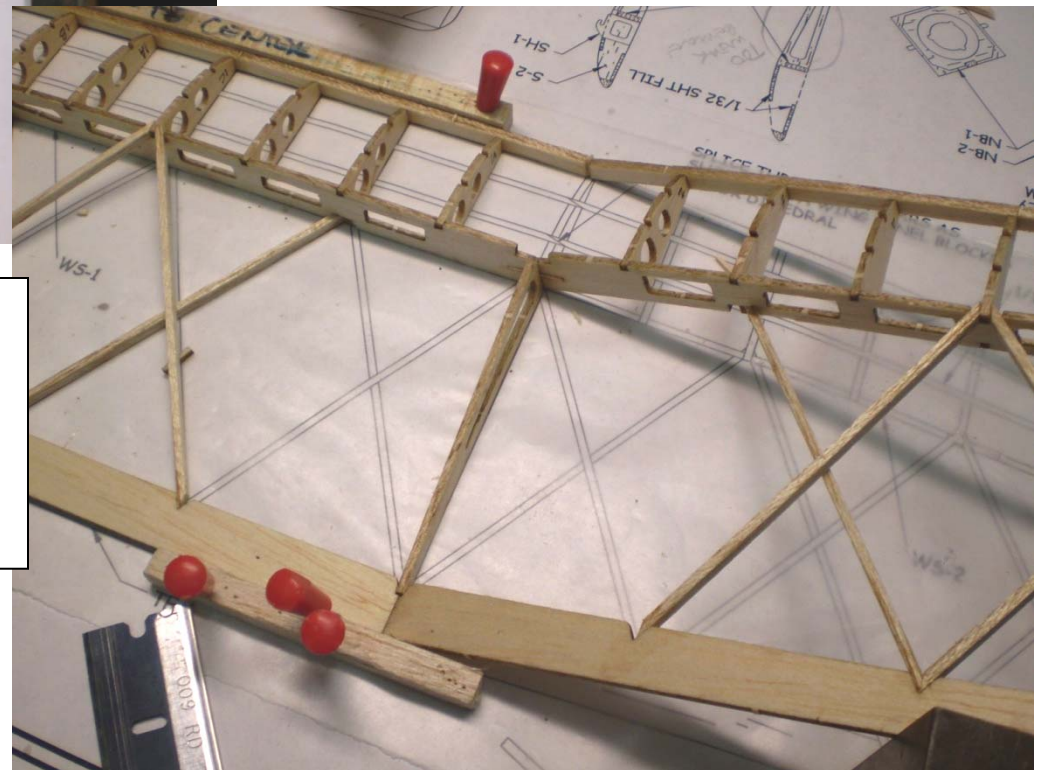
Assemble the tip panel to the center panel using the spar key. Make sure the trailing edges are touching at the dihedral break. You should sand in a slight bevel in the tip panel to match the dihedral angle, but hardly any sanding is required so go easy here. The leading edge is pre-beveled and requires very little additional bevel to fit well enough to do the job. Make sure the leading and trailing edge joints are at the surface of the building board as is the spar joint. Bond the trailing edge joint first with thin CA, then the spar key followed by the leading edge. The wing tip should be blocked up 3" from the building board while performing this step.

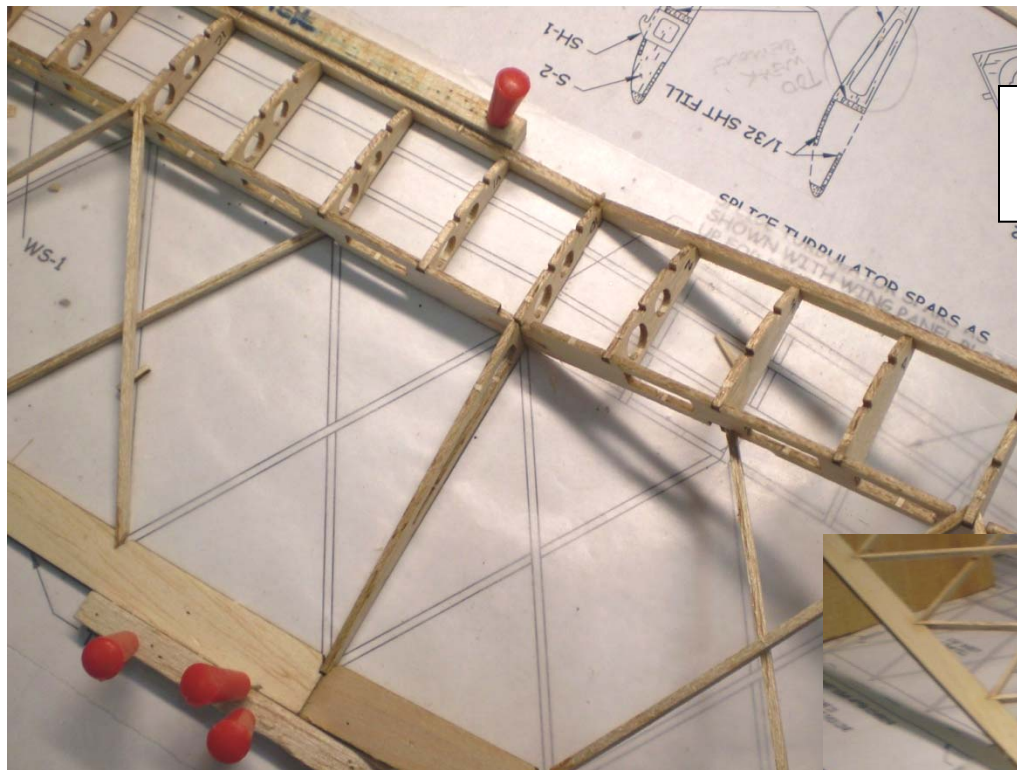




This view shows the tip blocked up 3" and another angle block used to maintain/check plan form alignment while setting the dihedral.

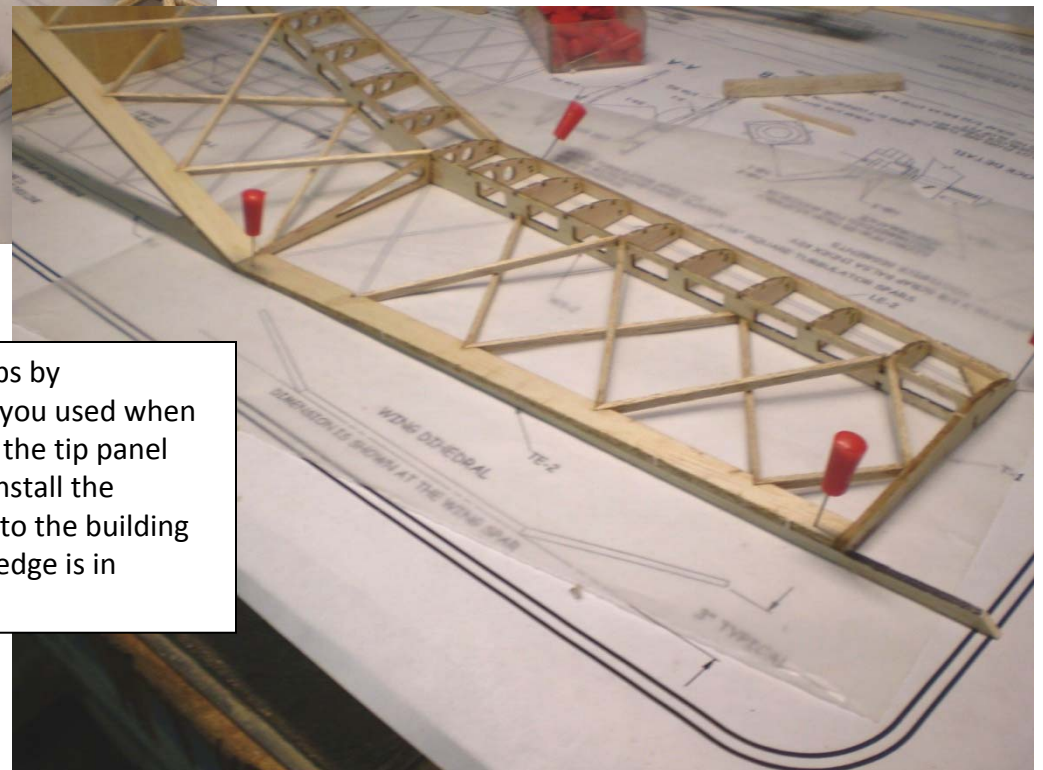
Once the joints are bonded, trim the spar index key flush to the spar and add the dihedral break rib segments. W-1E shown; make a scrap balsa angle gauge from the gauge layout on the drawing to tilt the rib to the proper angle. Align the bottom edge to match the drawing for location.

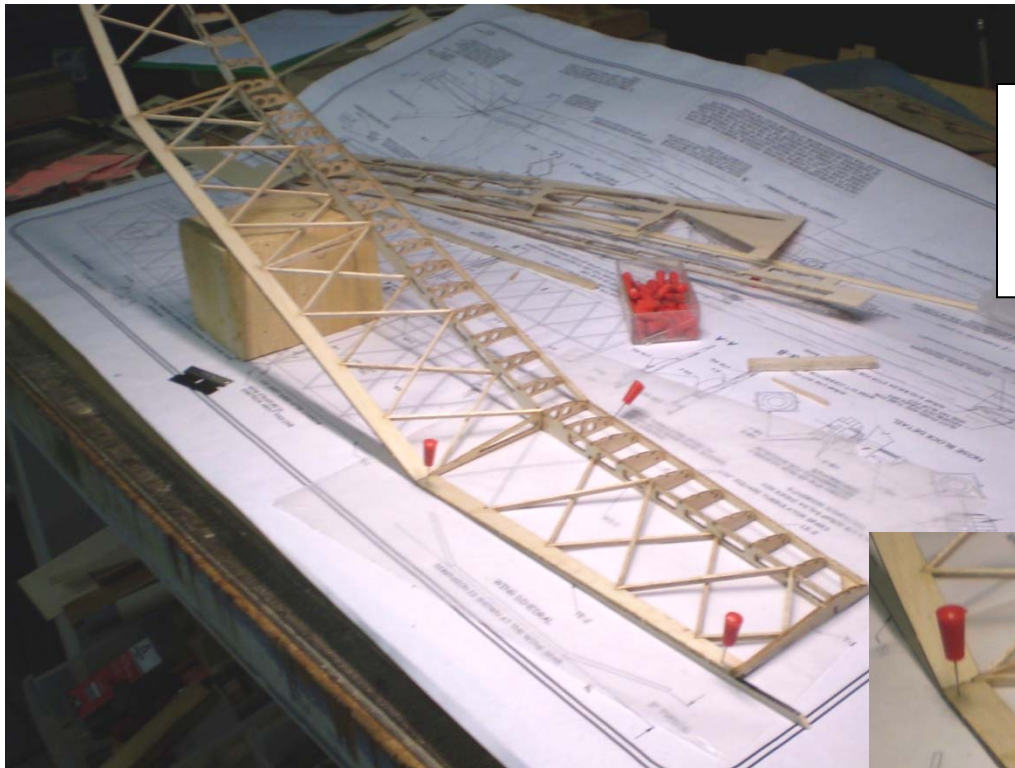




Install the W-1D nose rib using the same angle gauge you set the W-1E rib with. Same operation applies to the opposite tip of course.

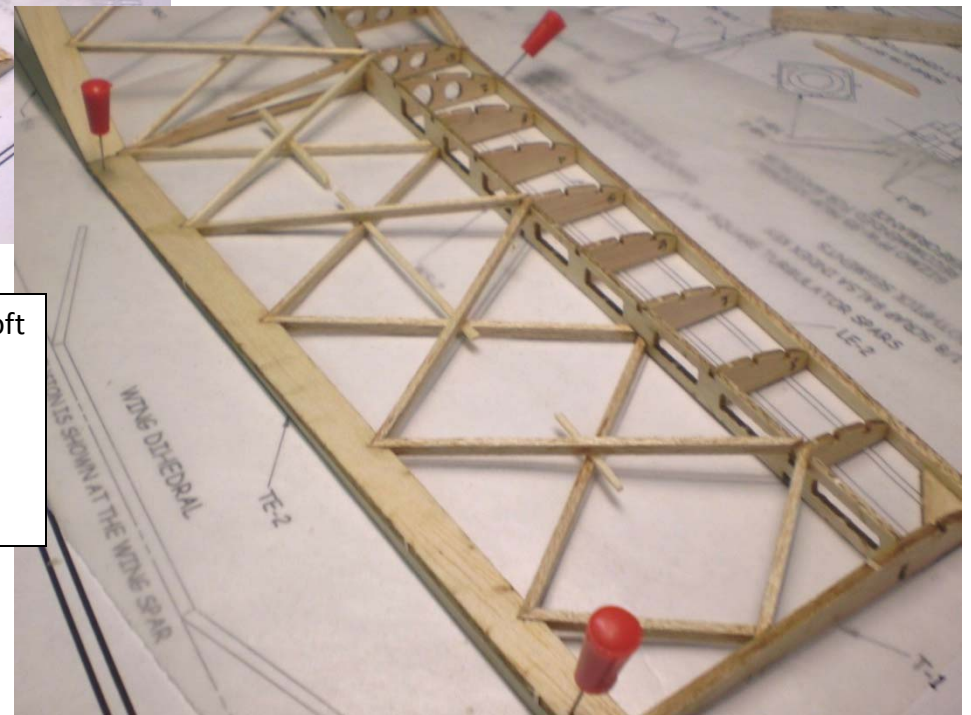
Finish installation of the truss ribs by reproducing the washout setup you used when building the tip panel. Relocate the tip panel and support the center panel. Install the washout shim again and secure to the building board, making sure the leading edge is in contact with the building board.

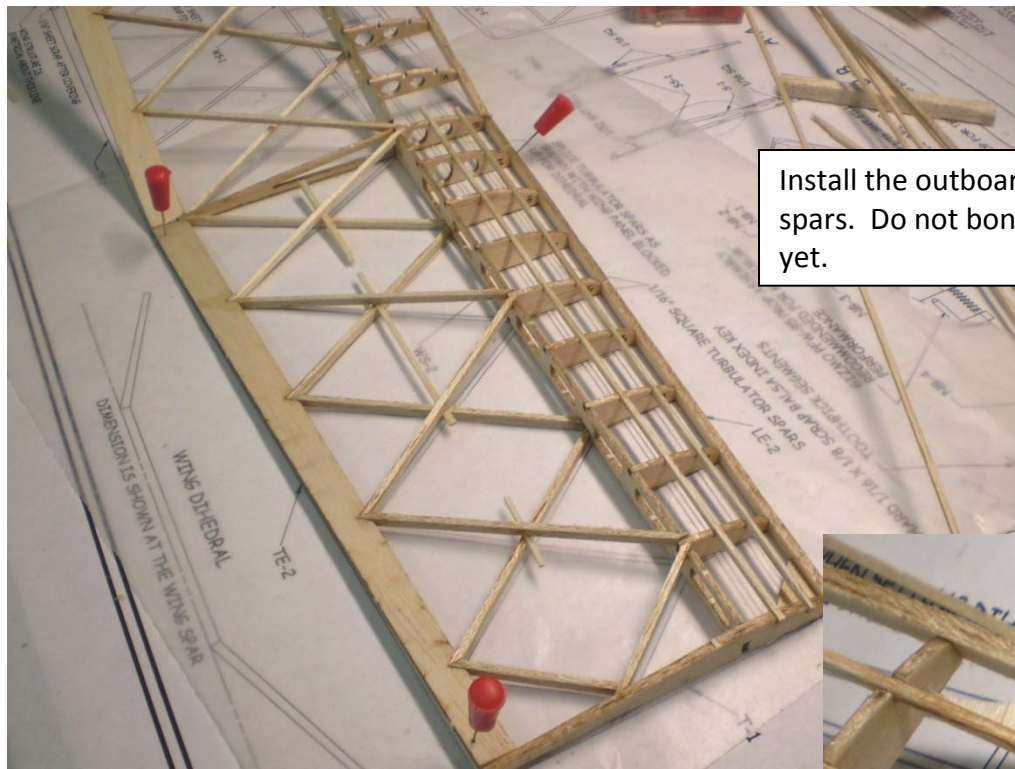




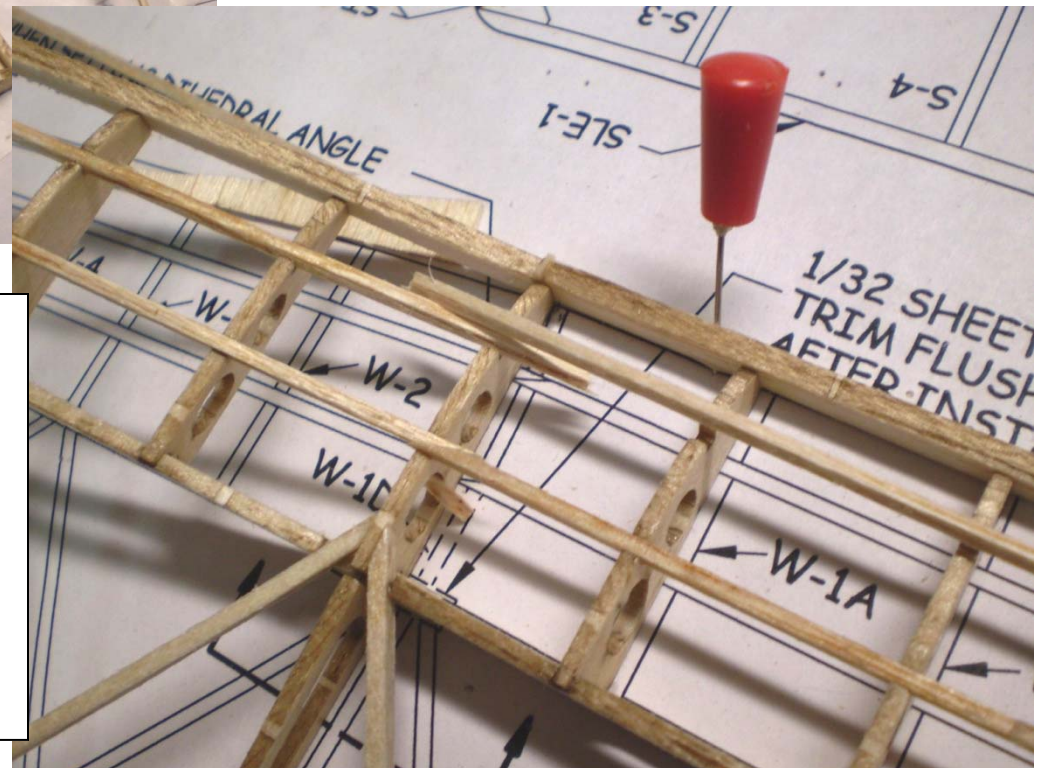
Another view of the final truss rib installation setup. I have installed the last upper truss rib common to the rib W-1E prior to this setup. Best to do that with the center panel still flat on the building board.

After all the truss ribs are installed place the soft scrap filler material as done for the stabilizer. Trim off at the crossing points as illustrated in the stab construction. Best to do all this structural tie-in with the wing shimmed for washout.

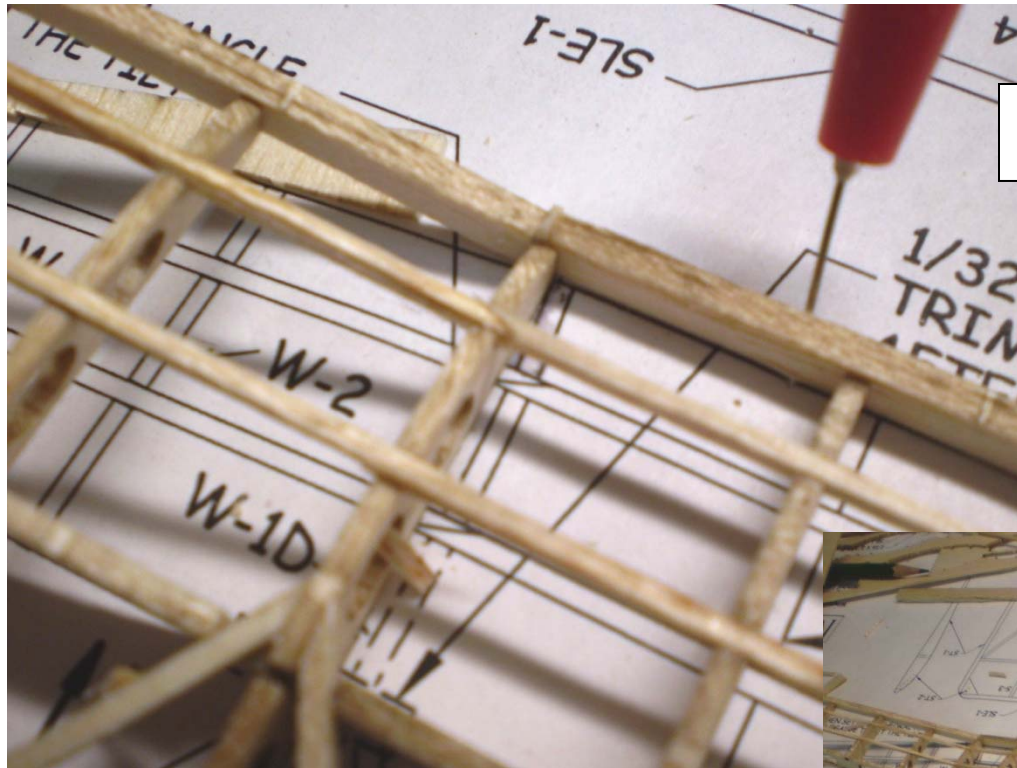




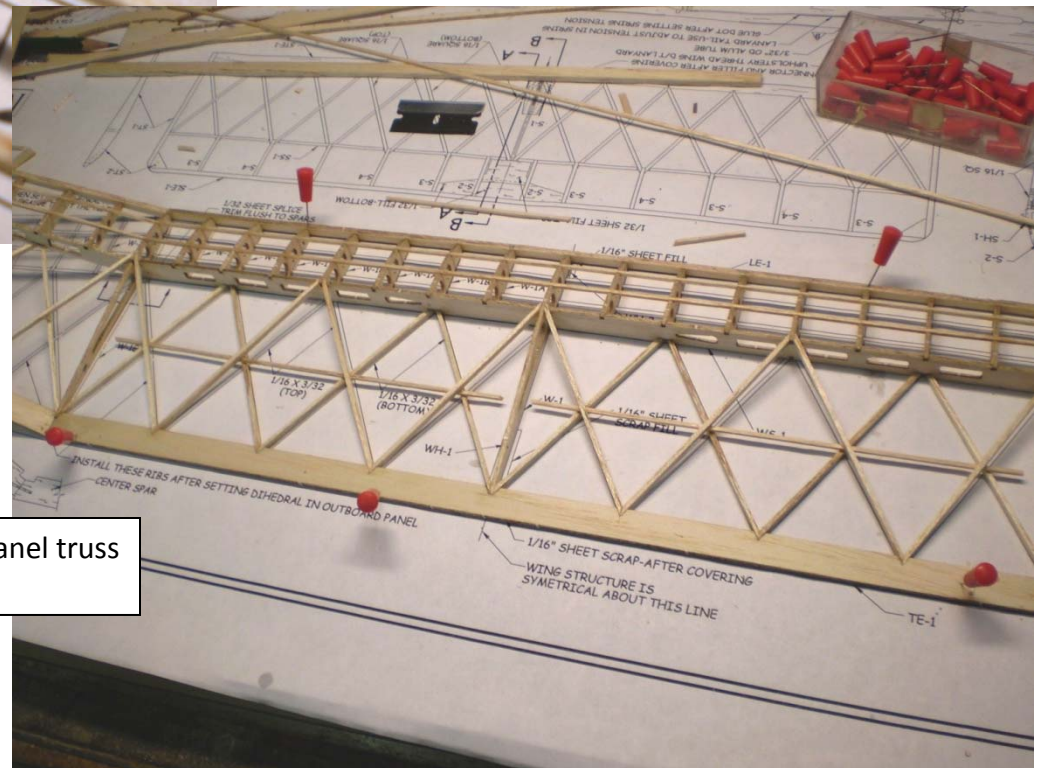
Install the outboard 1/16" square turbulator spars. Do not bond into the notches in W-1D yet.



Install the center panel turbulator spars-note the overlap excess on all the turbulator spar ends to allow for scarf splicing. The aft spar has been simultaneously cut for the splice using a new, sharp razor. The cut ends are tucked into the rib notch and bonded with thin CA. The forward spar is waiting for the same operation to complete the joints. This splice adds significant strength needed to solidify the dihedral joints. I've never had a wing structurally fail when built this way.



A view of finish scarf splicing on the turbulator spars at the dihedral joint.



If not already done, install the center panel truss rib fillers as done for the wing tips.



Finished wing assembly ready for final shaping, same as performed for the stab assembly. Once you have the basic contours sanded, install the wing D/T hooks WH-1 & WH-2 with associated fillers for covering attachment.

Jumping ahead to show a covered wing with the trailing edge stop fairing installed and the wing D/T hooks in use. Be sure to install the wing index keys to maintain position to the pylon with the wing in flight position. These are installed in the same manner as the stab keys.

