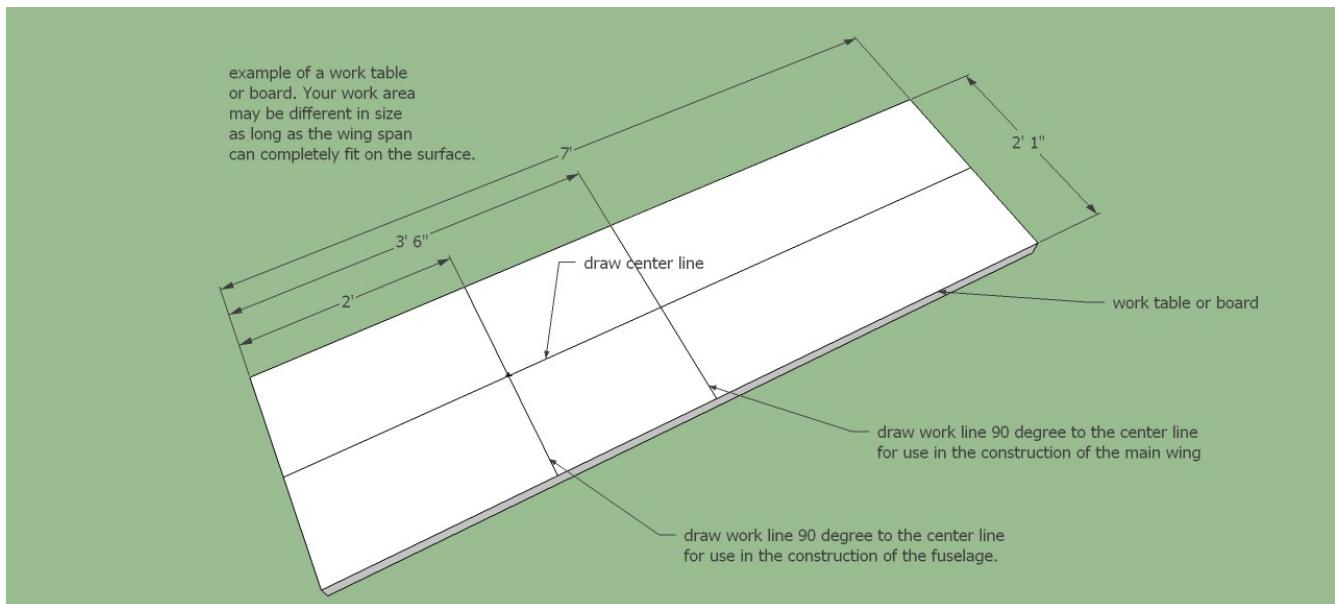


RCCD 2014 CLUB PROJECT

“STICK 2 IT”

Main Wing Construction

The main wing is constructed without the use of a set of plans. The wing should be constructed on your previously prepared work surface while following these instructions and photos.



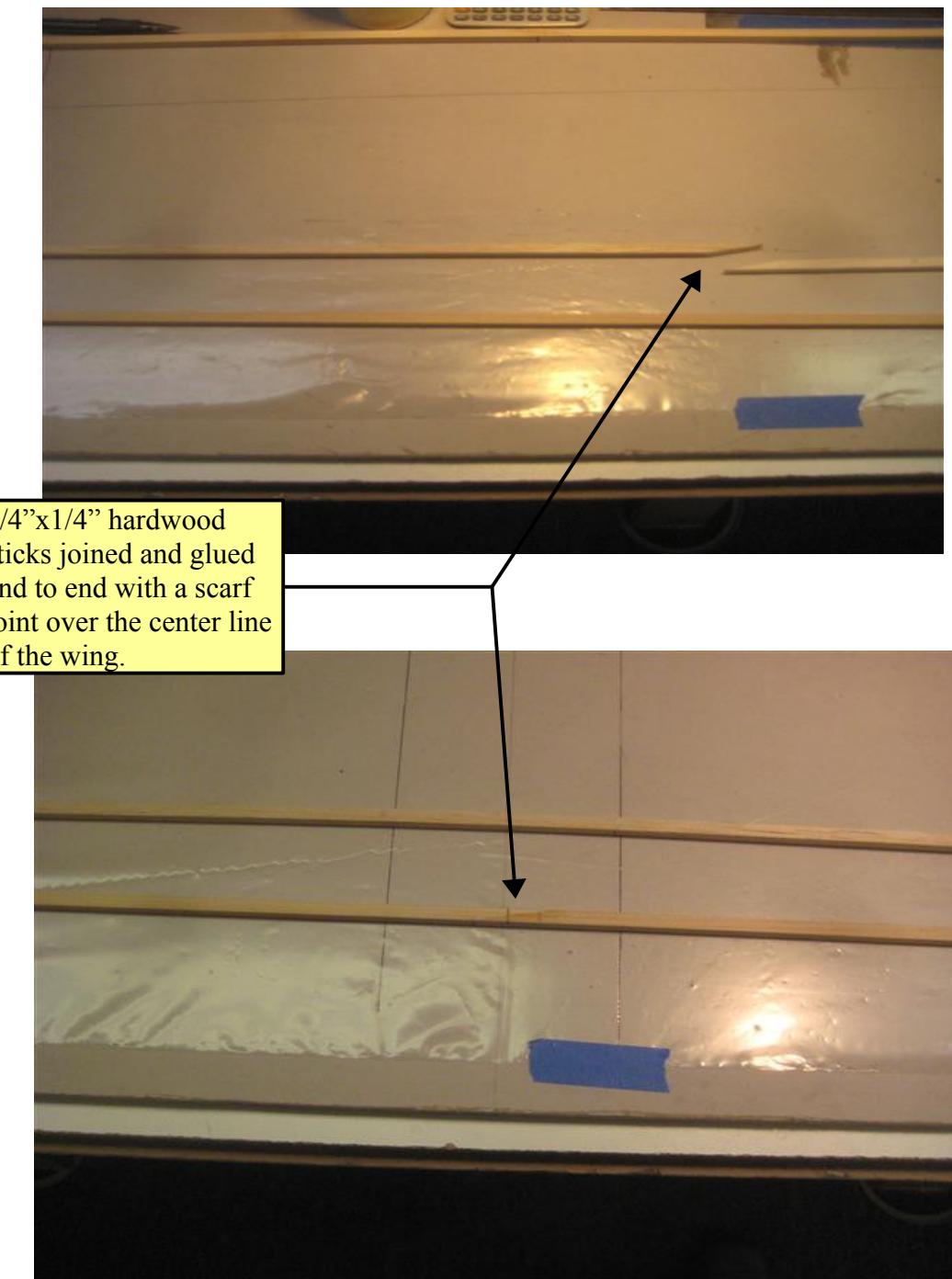
All the main wing laser cut parts should be segregated and organized, along with the supplied sticks and sheets.



Start with building the following Sub Assemblies:

The main wing has two main spars (one upper and one lower).

**The upper main spar is made by joining two 1/4"x1/4" hard wood sticks end to end with a scarf joint at the center line of the wing.*



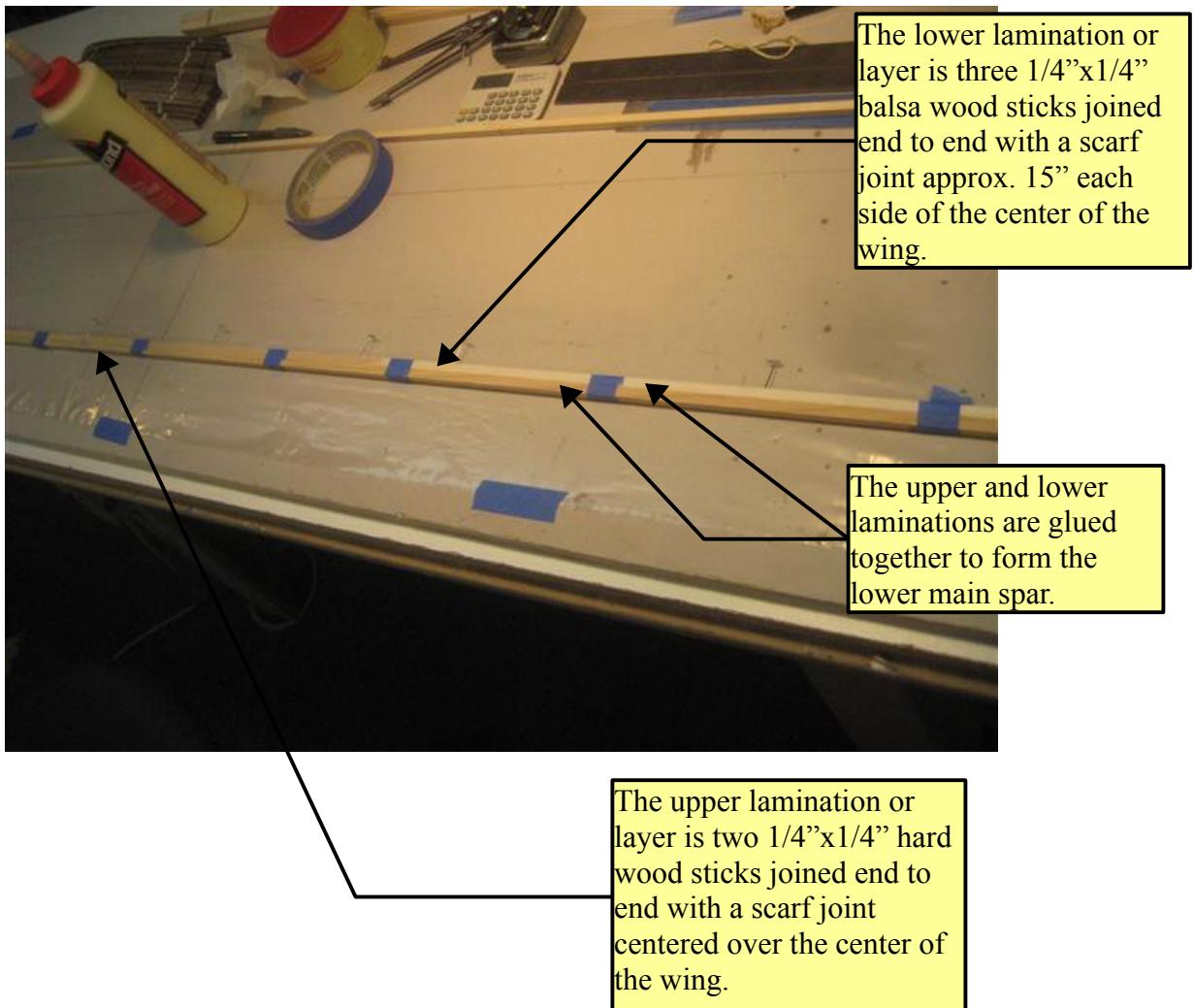
*****The lower main spar is a laminated sub assembled main spar.***

*****The upper lamination or layer is two 1/4"x1/4" hardwood sticks joined end to end with a scarf joint at the center of the wing.***

*****The lower lamination or layer is three 1/4"x1/4" balsa wood sticks joined end to end with a scarf joint approximately 15" each side of the center of the wing.***

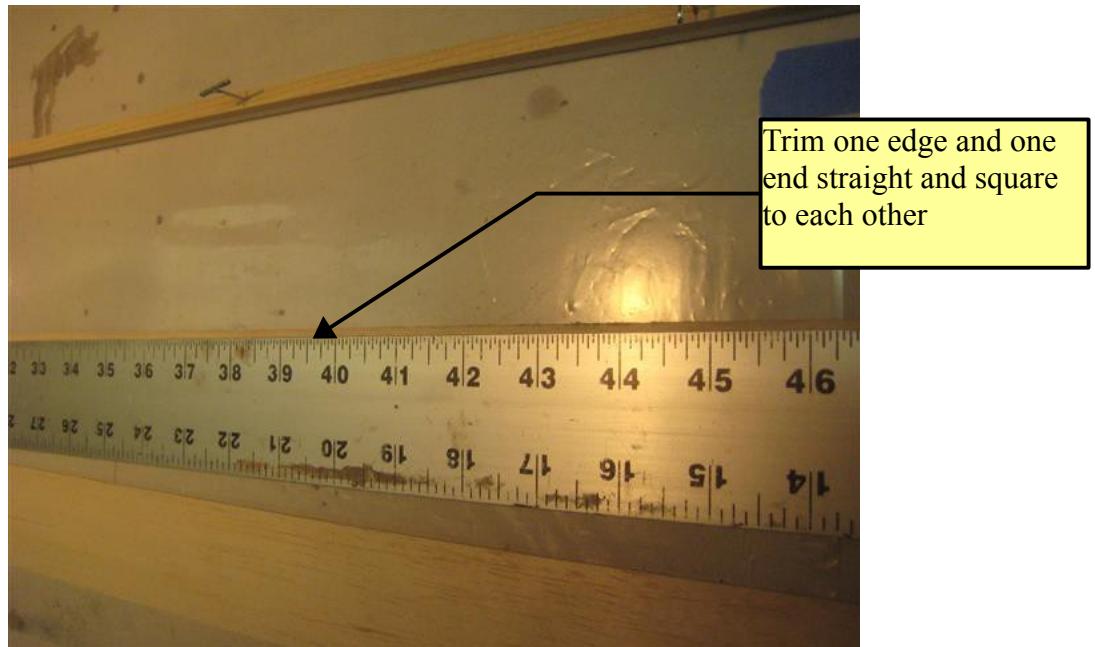
These two layers are then glued or laminated together to form the complete lower main spar.

*** Sand all the main spar glue joints so the don't exceed 1/4" in width.**

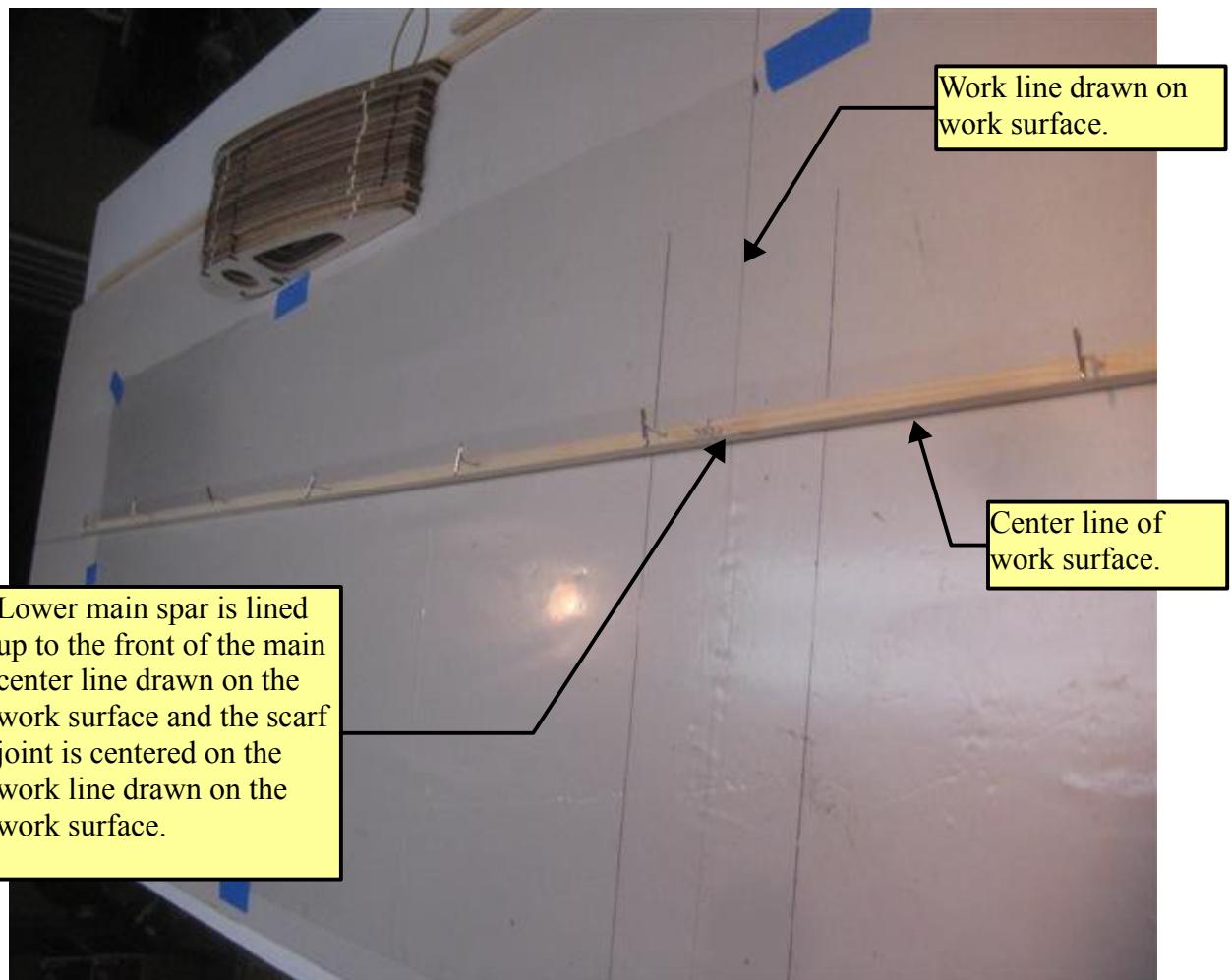


Sub Assemblies continued:

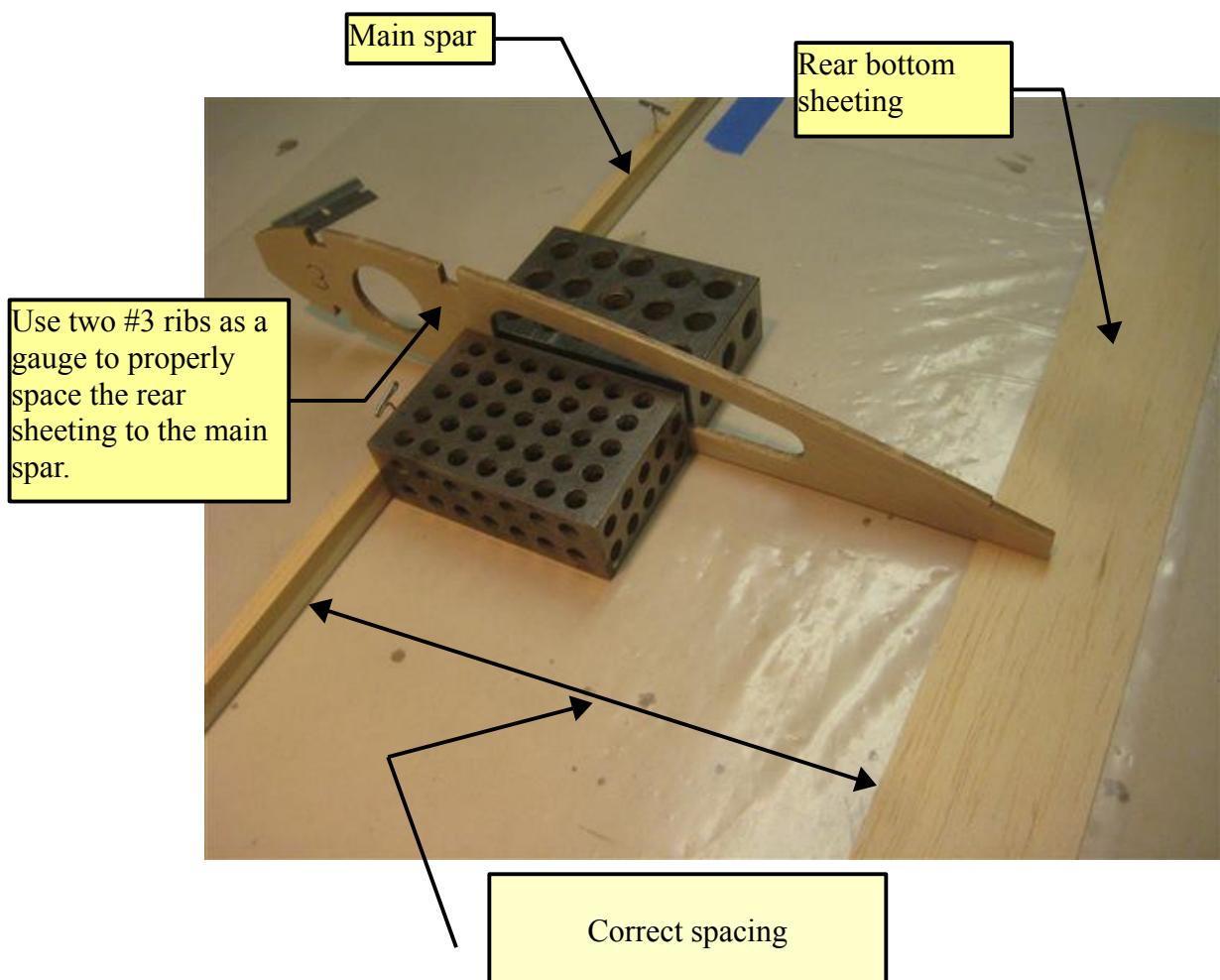
**Prepare two 1/16"x2"x36" balsa bottom rear sheeting by cutting a straight edge and one end 90 degrees to the straight edge.*



*The main wing construction is started by placing the lower main spar on the work surface with the balsa wood lamination or layer facing the work surface. The lower main spar is lined up to the front of the main center line drawn on the work surface with the center line of the main spar lined up to the work line drawn on the work surface. Pin this spar to the work surface. It is key that this spar is straight and flat on the table. This main spar controls the positioning of all the ribs.

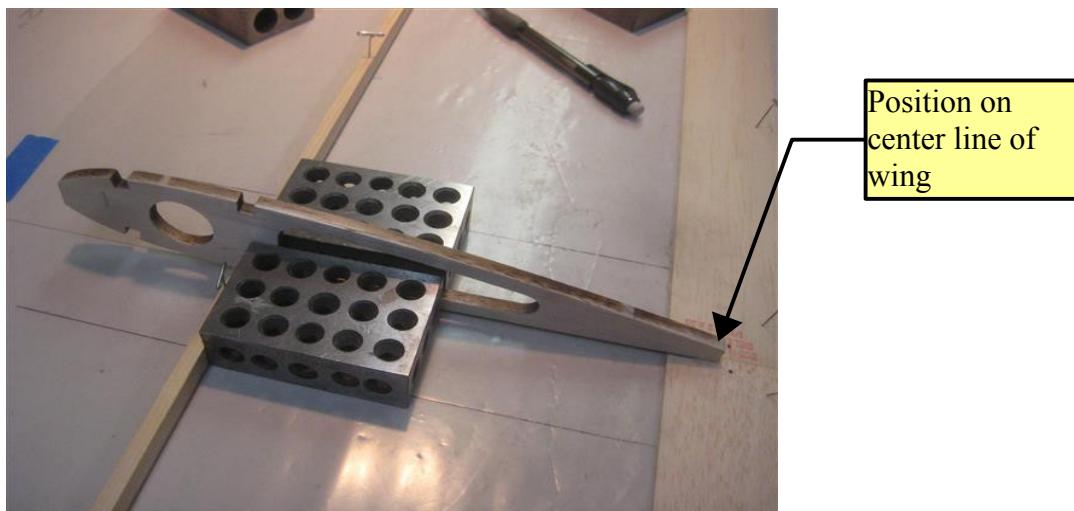


*Place the previously prepared bottom rear 1/16" sheeting flat on the work surface with the straight edge facing the main spar. Temporarily place two #3 wing ribs with their bottom notch over the main spar and the ribs 90 degrees to the main spar. Move the bottom sheeting in position so the straight edge bumps against the rear notch of the ribs and the 90 degree edge of the sheeting lines up to the work line drawn on the table. This will line up the sheeting parallel to the main spar and correctly spaced. Do this on both sides of the center of the wing. Pin sheeting in place.

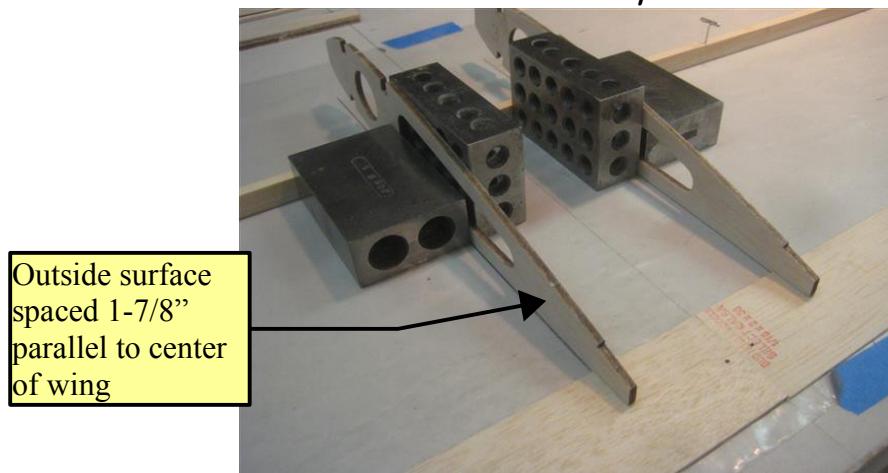


***Note: All ribs will have their bottom edge identified with a laser scribed letter "B".**

***Place one #1 rib centered on the work line drawn on the work surface with its bottom notch over the bottom main spar and the rear end of the rib on the rear sheeting. Make sure the rib is 90 degrees to the work surface and the main spar. There should be a 1/16" gap between the bottom of the rib and the work surface. Glue in place.**



***Place two # 1 ribs (one on each side of the wing center line) with its outside surface spaced 1-7/8" parallel to the center line of the wing and with its bottom notch over the bottom main spar and the rear end of the rib on the rear sheeting. Make sure the rib is 90 degrees to the work surface and the main spar. There should be a 1/16" gap between the bottom of the rib and the work surface. Glue in place.**



Note: The all the remaining ribs are spaced 3" APART.....Not 3" on center.

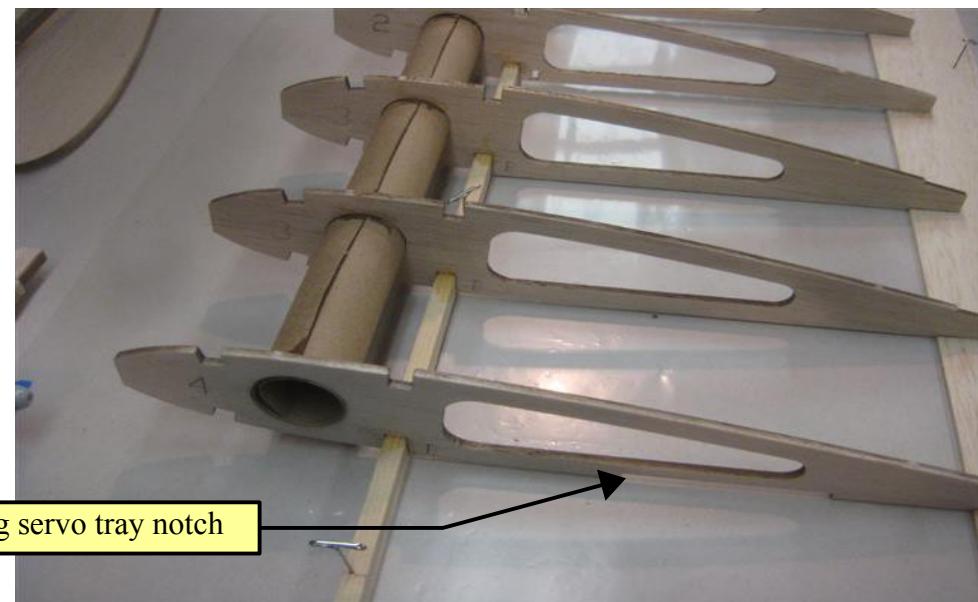
**Place two # 2 ribs each side of the wing center line spaced 3" from the previous installed #1 rib and from each other, with their bottom notch over the bottom main spar and the rear end of the rib on the rear sheeting. Make sure the ribs are 90 degrees to the work surface and the main spar. There should be a 1/16" gap between the bottom of the ribs and the work surface. Glue in place.*



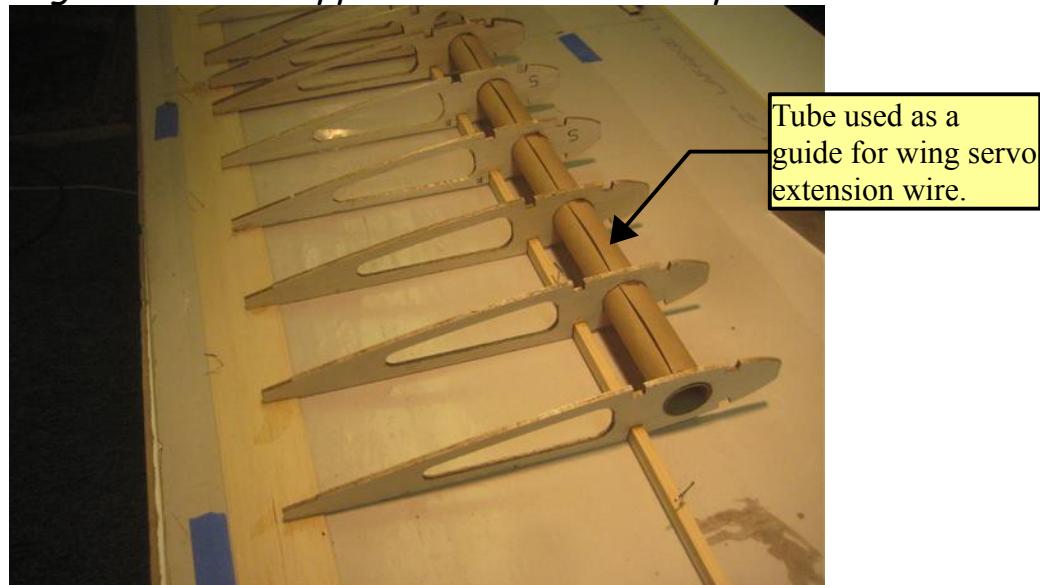
**Place two # 3 ribs each side of the wing center line spaced 3" from the previous installed # 2 rib and from each other, with their bottom notch over the bottom main spar and the rear end of the rib on the rear sheeting. Make sure the ribs are 90 degrees to the work surface and the main spar. There should be a no gap between the bottom of the ribs and the work surface. Glue in place.*



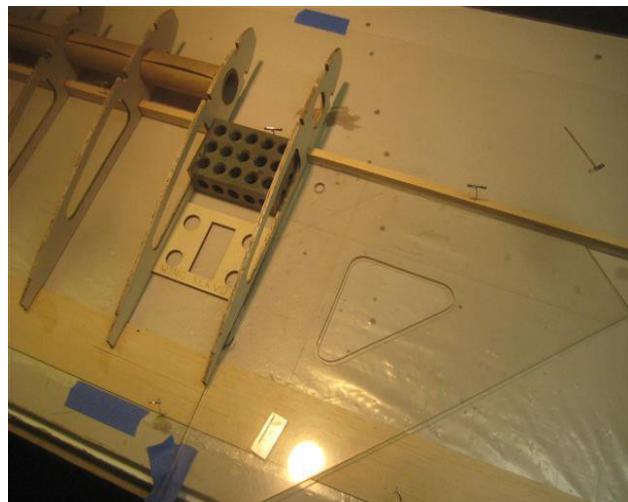
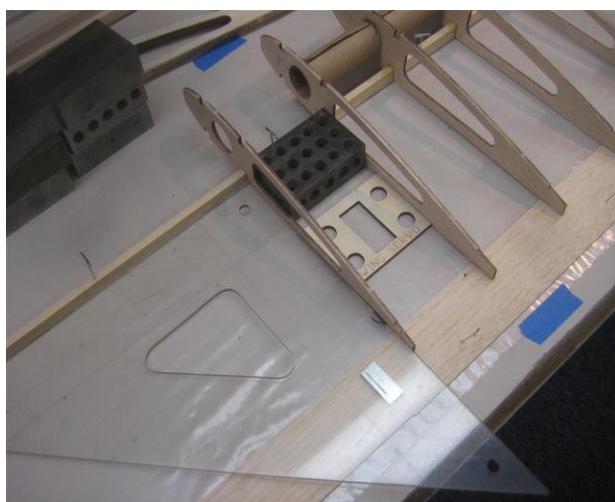
*Place one # 4 rib each side of the wing center line spaced 3" from the previous installed # 3 rib, with its bottom notch over the bottom main spar and the rear end of the rib on the rear sheeting. Make sure the rib is 90 degrees to the work surface and the main spar. There should be a no gap (except for the wing servo tray notch) between the bottom of the rib and the work surface. Glue in place.



**Construct a paper tube to slide through the forward round holes starting with the second #1 rib through the # 4 rib, both sides of the wing center line. The tube length should be approx. 16-1/4". Glue in place.*

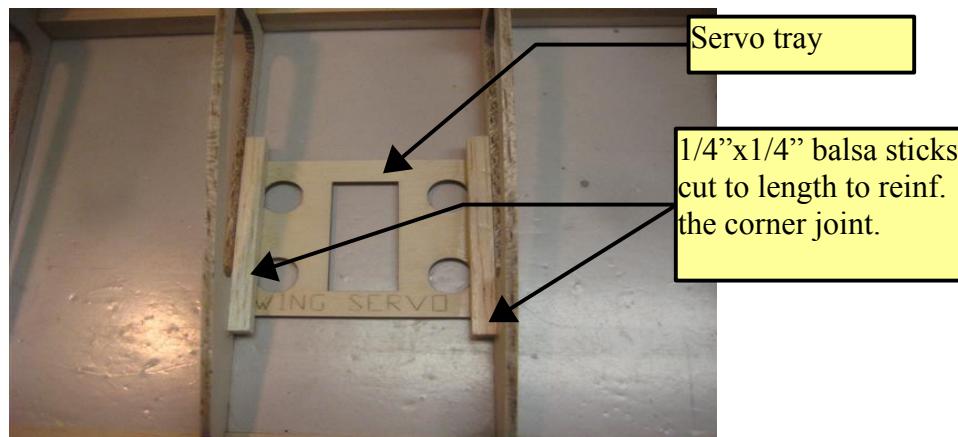


**Place one # 4 rib each side of the wing center line spaced 3" from the previous installed # 4 rib, with its bottom notch over the bottom main spar and the rear end of the rib on the rear sheeting. Make sure the rib is 90 degrees to the work surface and the main spar. There should be a no gap (except for the wing servo tray notch) between the bottom of the rib and the work surface. Glue in place.*



*Position the laser cut 1/8" plywood wing servo trays one on each side of the wing center line flat on the work surface and in the notches in the # 4 ribs. Glue in place. See photo above.

*cut to fit and glue in place 1/4"x1/4" balsa sticks to reinforce the servos trays to the # 4 ribs.

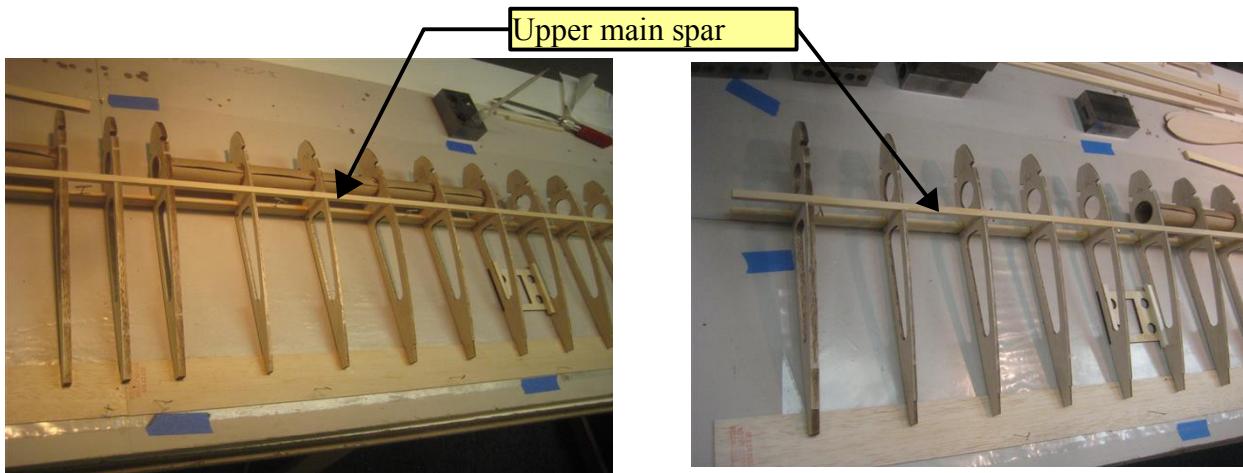


*Place three of the remaining six # 3 ribs each side of the wing center line spaced 3" from the previous installed # 4 rib and to each other, with their bottom notch over the bottom main spar and the rear end of the ribs on the rear sheeting. Make sure the ribs are 90 degrees to the work surface and the main spar. There should be a no gap between the bottom of the ribs and the work surface. Glue in place.

*Place one # 5 rib each side of the wing center line spaced 3" from the previous installed # 3 rib, with its bottom notch over the bottom main spar and the rear end of the rib on the rear sheeting. Make sure the rib is 90 degrees to the work surface and the main spar. There should be a no gap between the bottom of the rib and the work surface. Glue in place.

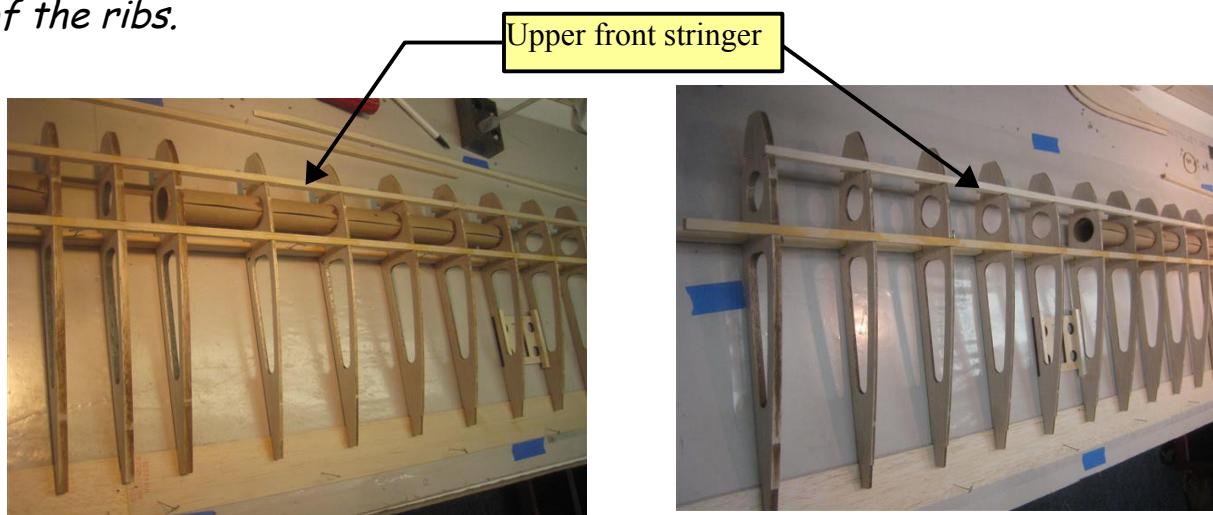
*All the ribs are now installed. The overall distance from the outside surface of # 5 rib on the right to the outside surface of rib # 5 on the left theoretically is 66-1/4". If there is an accumulation of length it shouldn't pose any problem in flight. Any adjustment needed can be done when positioning the wing on the fuselage.

**Install the upper main spar in all the top notches of all the ribs while lining up the scarf joint of the spar is centered on the middle # 1 rib. Make sure the spar is fully in the top notch and flush with the edge surface of the ribs. Adjust the rib notch/es if necessary. Glue spar in place.*

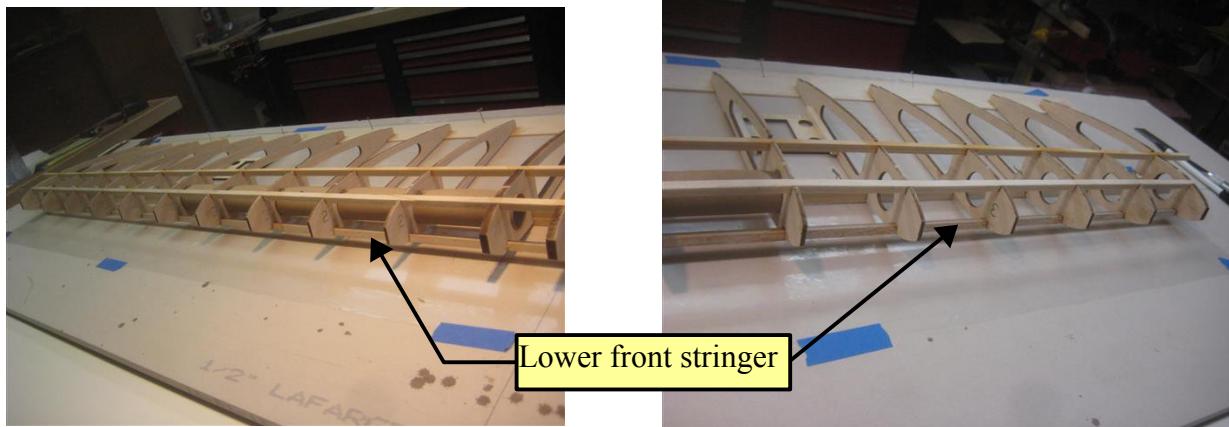


Note: All the 1/4"x1/4" balsa stringers should be scarf joined and the joint should be positioned over the center rib.

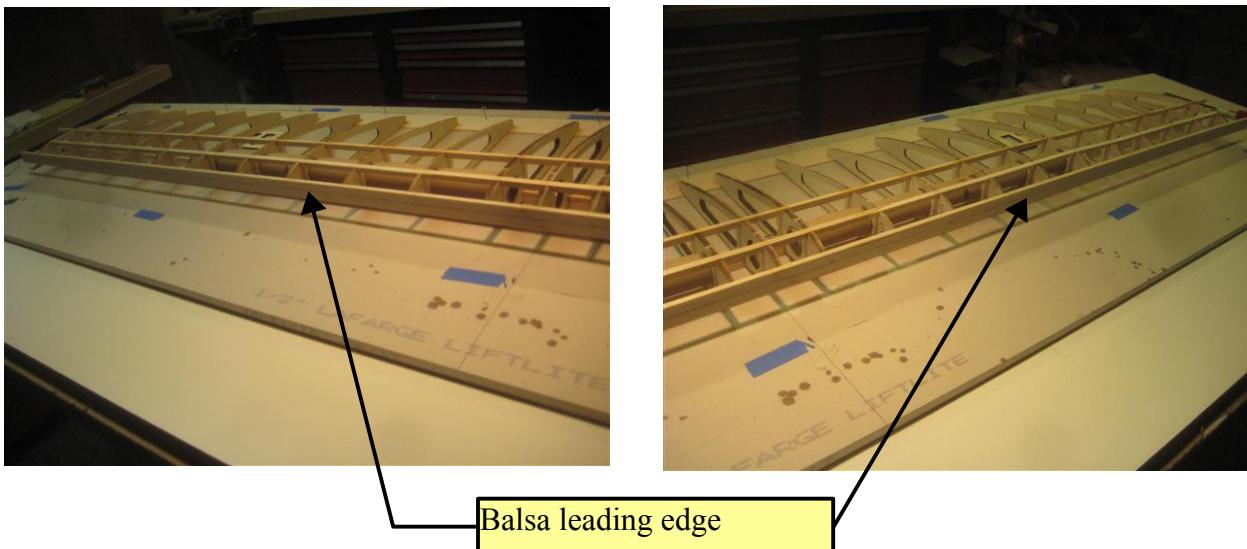
**Install the upper front stringer in all the top stringer notches. Adjust the notch/es if necessary. The stringer should be flush with the edge surface of the ribs.*



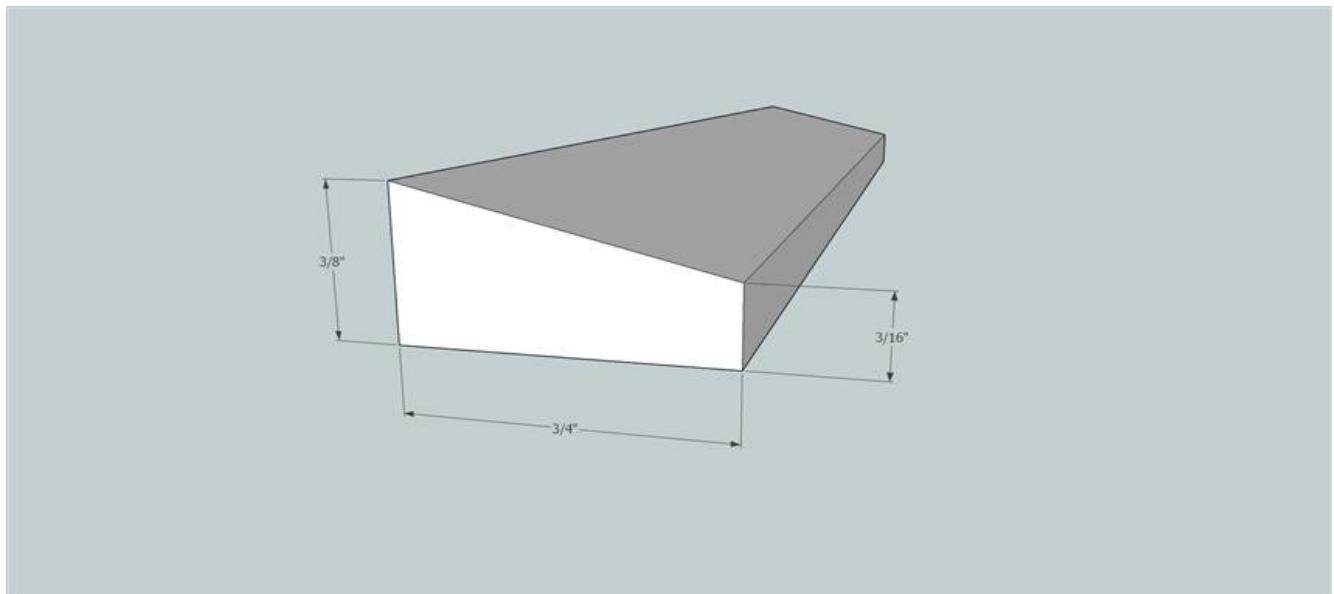
**Install the lower front stringer in all the lower stringer notches. Adjust the notch/es if necessary. The stringer should be flush with the edge surface of the ribs.*



**Two 1/4"x3/4"x36" balsa stick leading edge stock should be scarf joined. A long center reference line should be marked on the face of the leading edge 3/8" from its edge as an aid when applying the finish radii along its length. The leading edge stock should be centered on the front edge of all the ribs and the scarf joint positioned centered on the center of the #1 rib. Glue in place.*



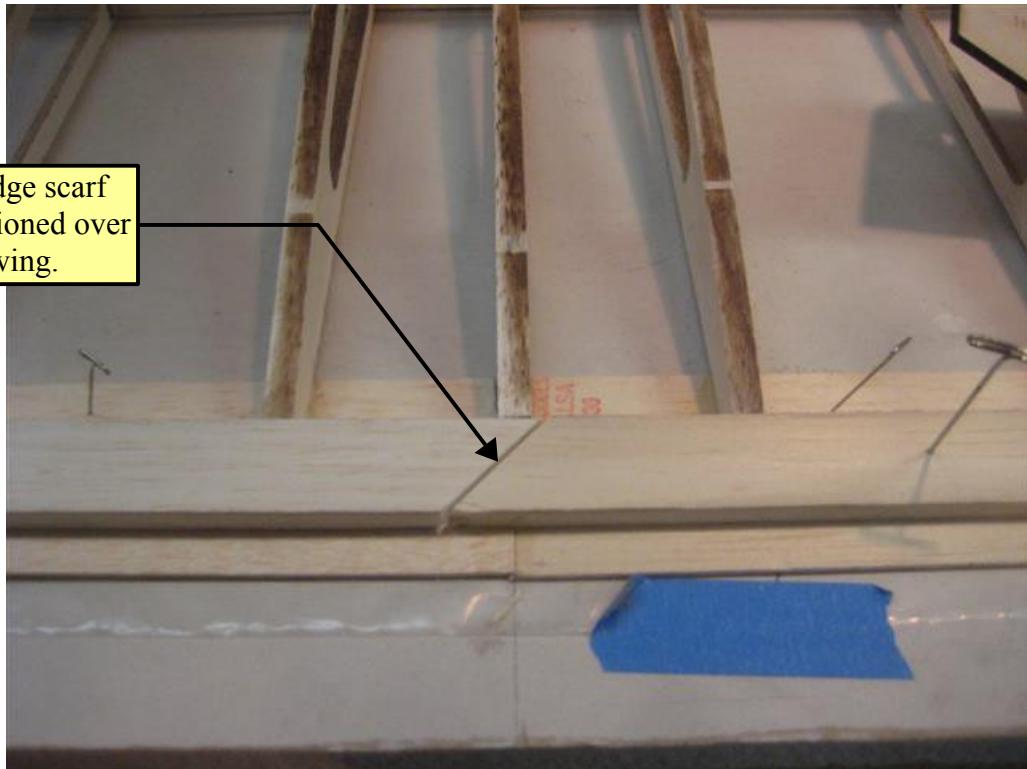
**create the main wing trailing edge from two supplied 3/8" x 3/4" x 36" balsa sticks scarf joined together. Hand bevel the top surface of the trailing edge the full length. The top surface is beveled from the 3/8" front edge to a line marked 3/16" up from the bottom surface on the rear surface. See sketch below.*



Plane down or sand
top surface trailing
edge per above
sketch.

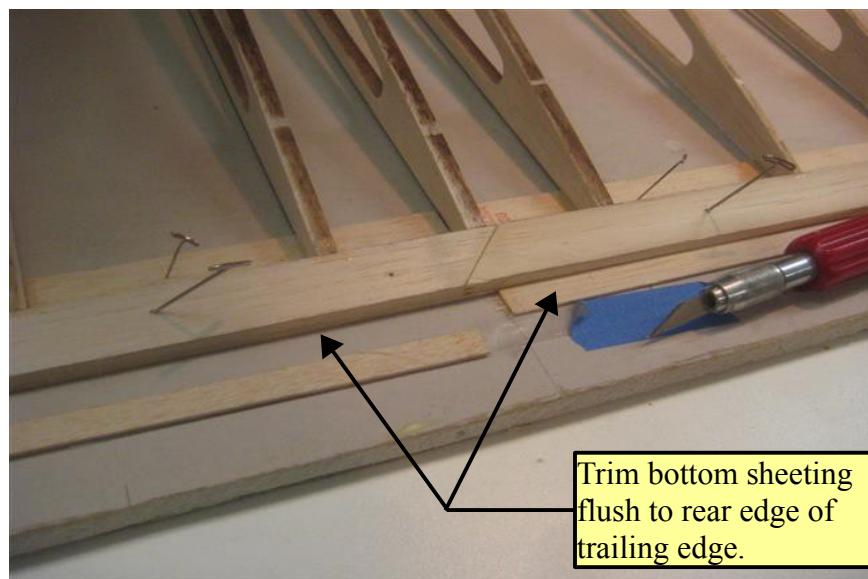
**Position the balsa trailing edge on the lower rear sheeting against the rear edges of all the ribs with the scarf joint centered on the center line of the wing and glue in place. The beveled top edge of the trailing edge should be a continuous surface with the rear top edge of all the ribs.*

Trailing edge scarf joint positioned over center of wing.

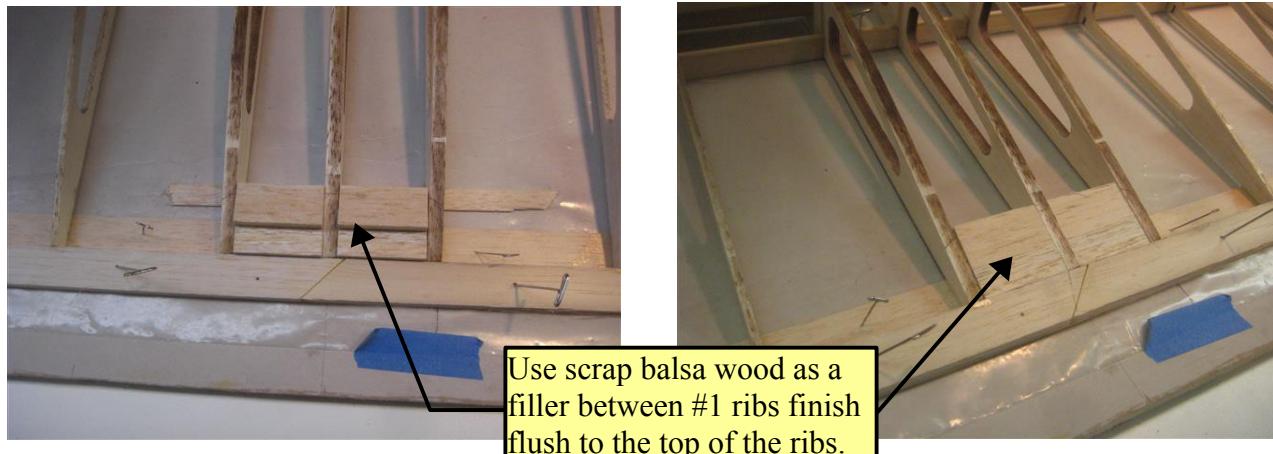


**Trim the bottom rear sheeting off flush to the rear edge of the trailing edge.*

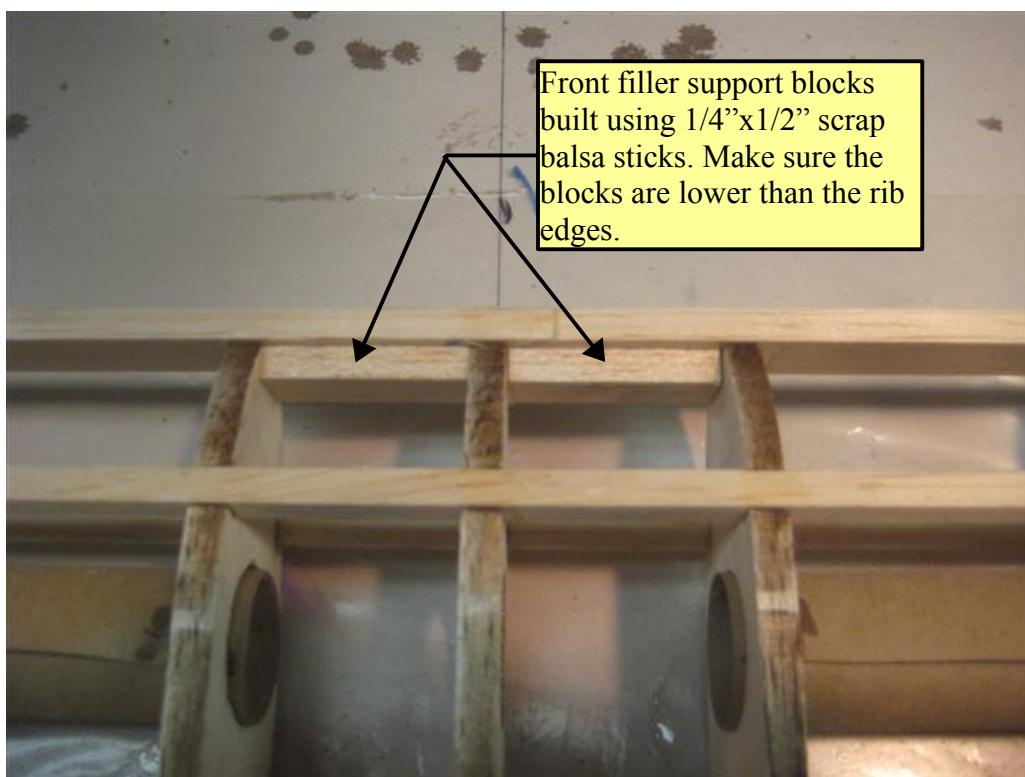
Trim bottom sheeting flush to rear edge of trailing edge.



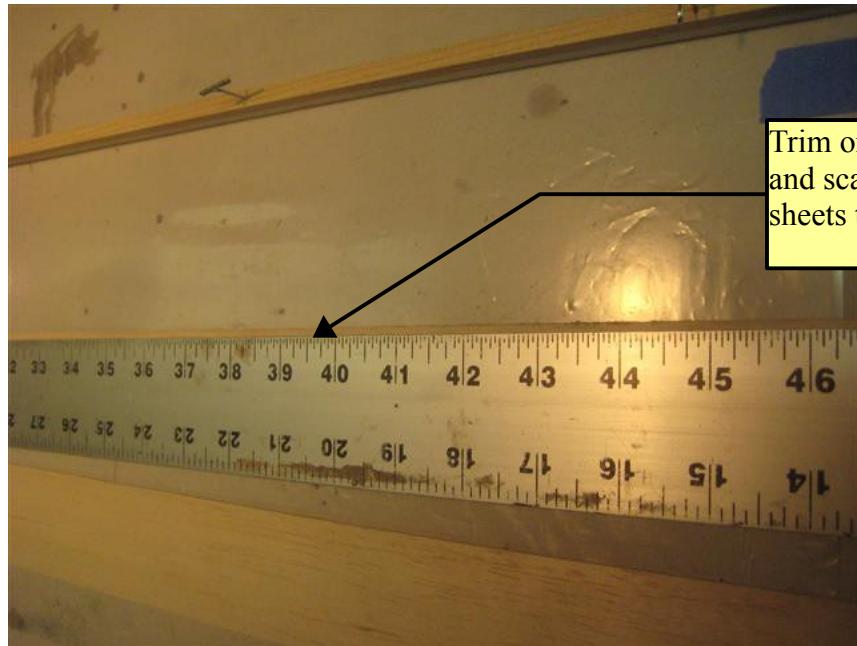
**Using 1/4" scrap balsa cut and fit rear filler blocks between the #1 ribs just in front of the trailing edge then shape the top surface of the filler blocks flush to the top surface of the ribs.*



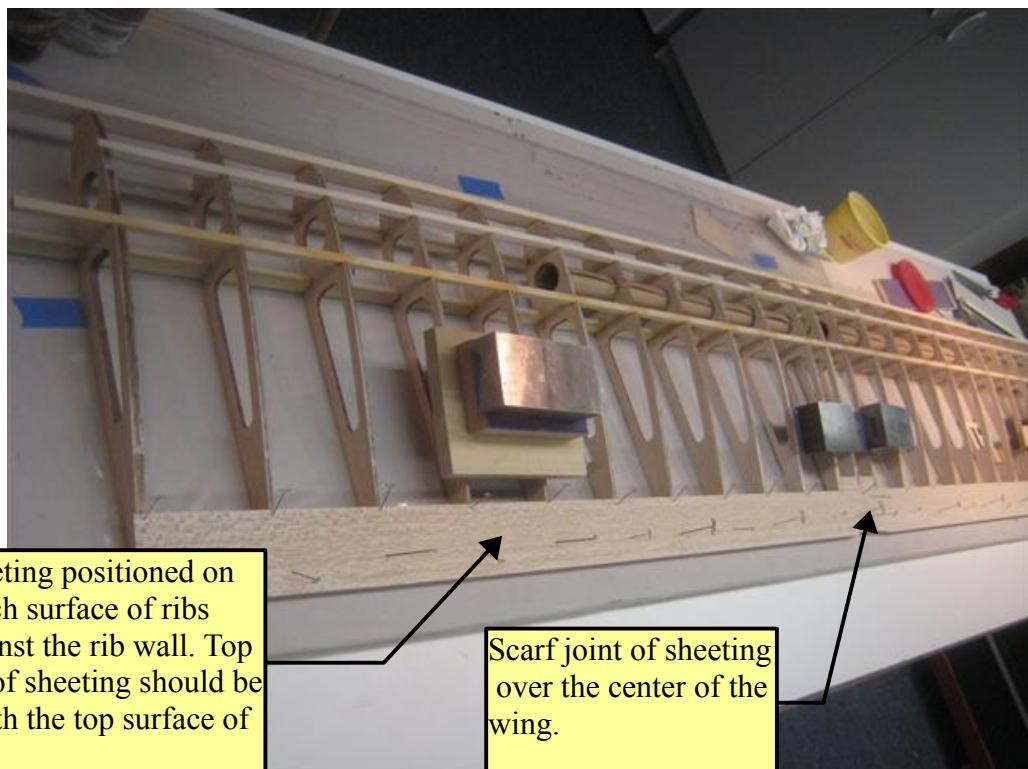
**Make front filler support blocks using 1/4"x1/2" scrap balsa sticks cut and fit between the #1 ribs and glue behind the leading edge.*



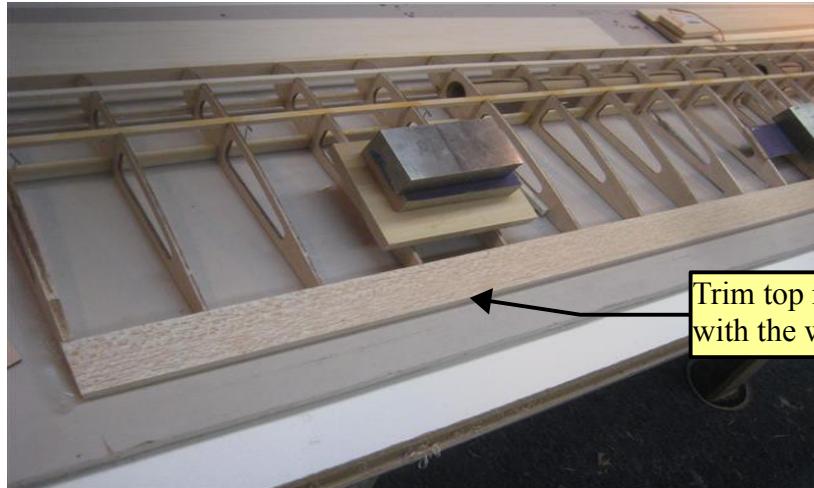
**Prepare two 1/16" x 2" x 36" balsa top rear sheeting by cutting a straight edge and make a scarf joint between the two sheets.*



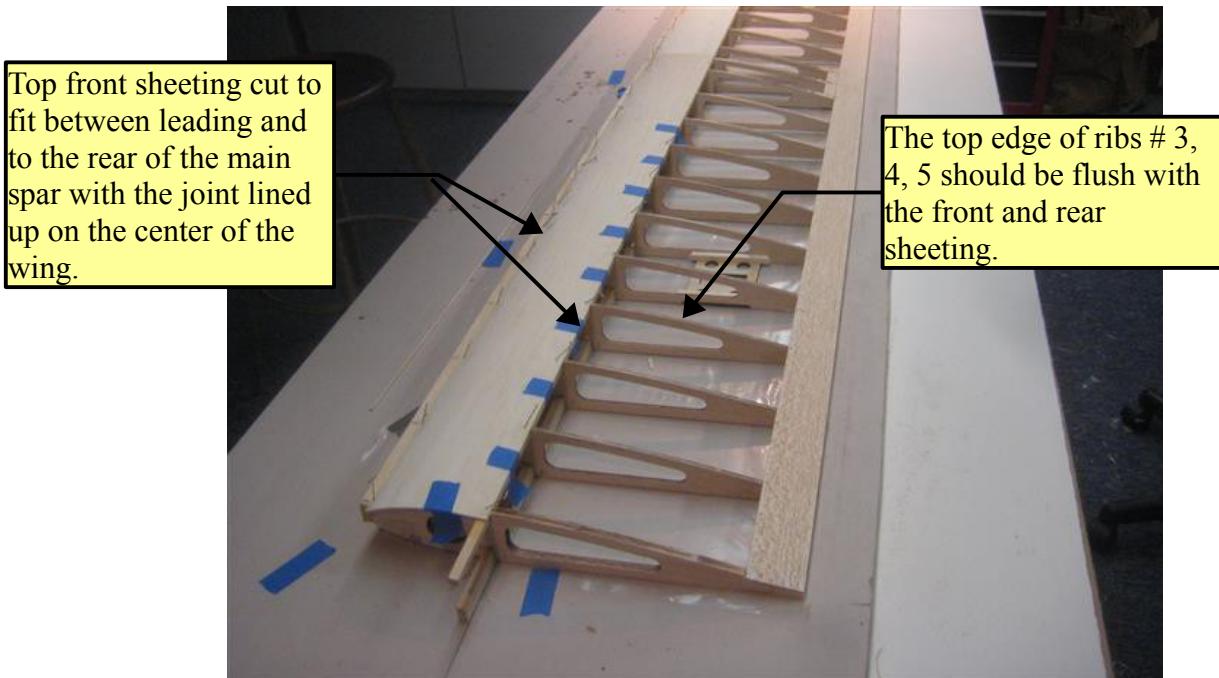
**place the 1/16" balsa top rear sheeting on the notched rear surfaces of all the ribs with the straight edge of the sheeting against the notch and the scarf joint over the center of the wing. Glue in place.*



**Trim the top rear sheeting flush with the rear edge of the wing trailing edge.*



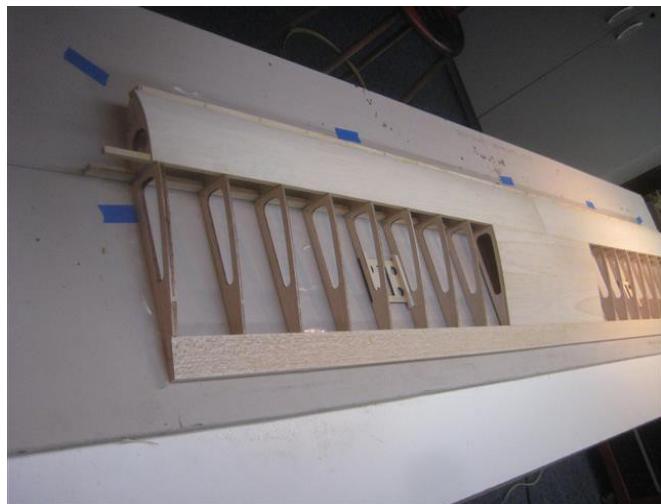
**Prepare two 1/16"x4"x36" balsa top front sheeting by cutting a straight edge and one end 90 degrees to the straight edge. Place the front straight edge against the back of the leading edge and line up the 90 degree end on the center line of the wing then bend the sheeting over the top edge of the ribs and mark the rear edge of the main spar. Remove the sheeting and mark a line parallel to the straight edge of the sheeting using the mark from the rear edge of the spar as a guide. Cut the sheeting to that line. Replace the sheeting and glue in place. Note, the top surface of the sheeting should be flush with the exposed top edge of ribs #3, 4, 5.*



**Cut, fit and glue in place the 1/16" balsa center area sheeting between the front and rear sheeting. This sheeting should span over and include all the ribs from the # 2 ribs on the right to the #2 ribs on the left of the center of the wing. Note, make sure any pins holding the lower main spar are removed before applying the center sheeting.*



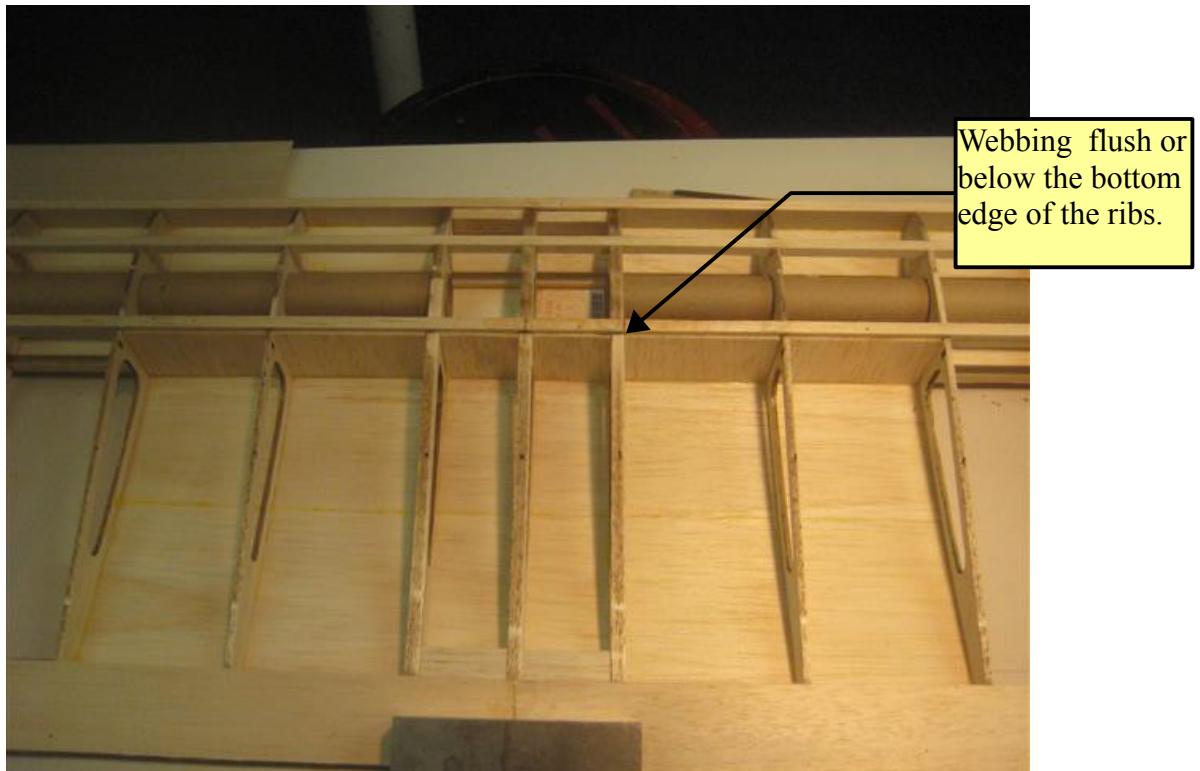
**The wing is ready to remove from the work surface and be turned over to work on the bottom surface of the wing.*



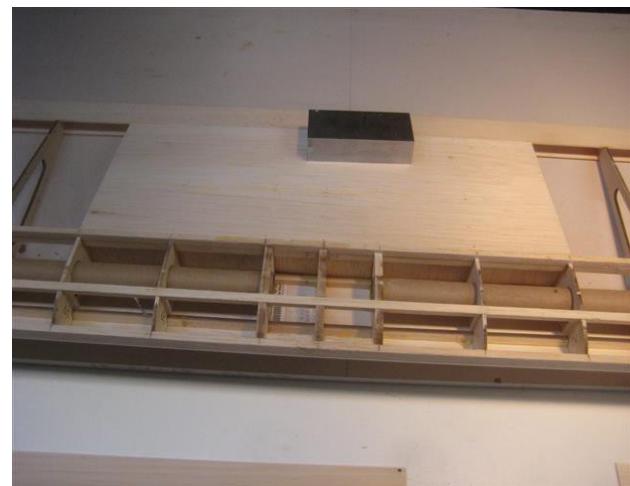
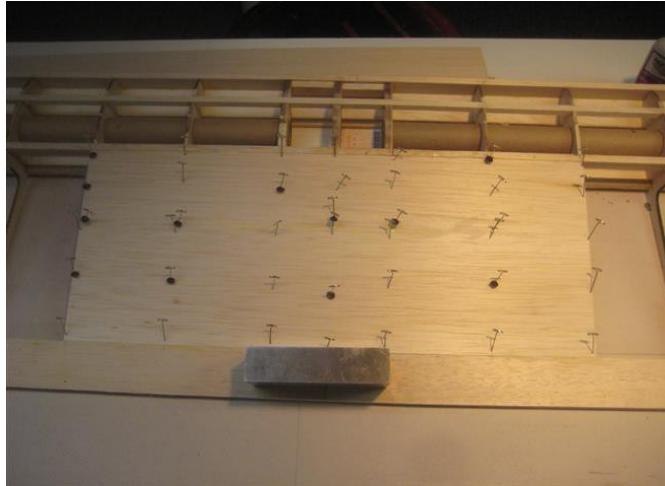
**Trim off all the existing spars, stringers, and sheeting that may be beyond the outside surface of the last rib. Clean up any glue joints that may have excess glue that will interfere with the construction of the bottom side of the wing.*



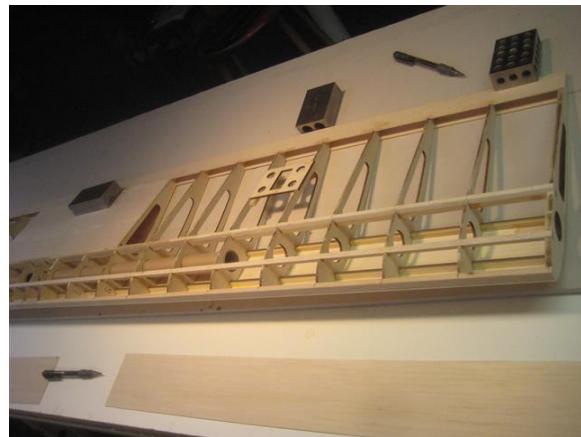
**Cut, fit and glue in place 1/16" balsa webbing against the back of the spars from the #2 ribs left side to the #2 ribs right side. Make sure the webs are flush to or below the bottom edge surface of the ribs.*

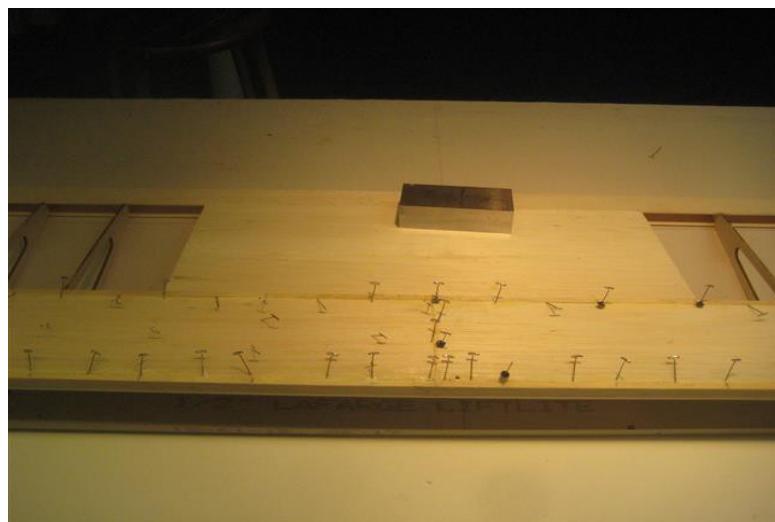
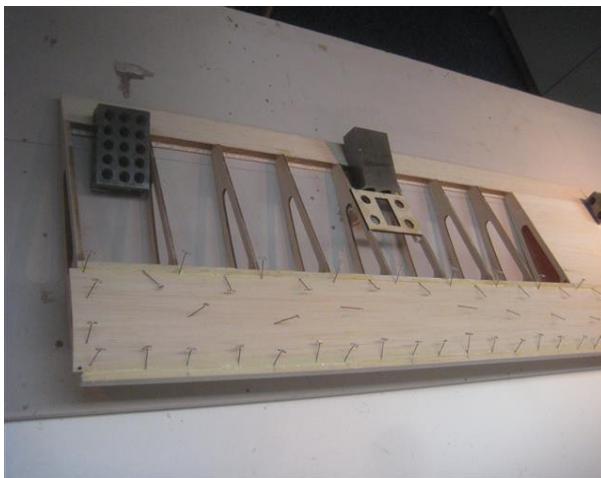


**Cut, fit and glue in place the 1/16" balsa bottom center area sheeting between the rear of the bottom main spar and rear sheeting. This sheeting should span over and include all the ribs from the # 2 ribs on the right to the #2 ribs on the left of the center of the wing.*



**Prepare two 1/16"x4"x36" balsa bottom front sheeting by cutting a straight edge and one end 90 degrees to the straight edge. Place the front strait edge against the back of the leading edge and line up the 90 degree end on the center line of the wing then bend the sheeting over the bottom edge of the ribs and mark the front edge of the main spar. Remove the sheeting and mark a line parallel to the straight edge of the sheeting using the mark from the front edge of the spar as a guide. Cut the sheeting to that line. Replace the sheeting and glue in place. Note the balsa layer of the bottom main spar will be slightly proud of the sheeting. This will be worked off when surfacing the bottom of the wing.*

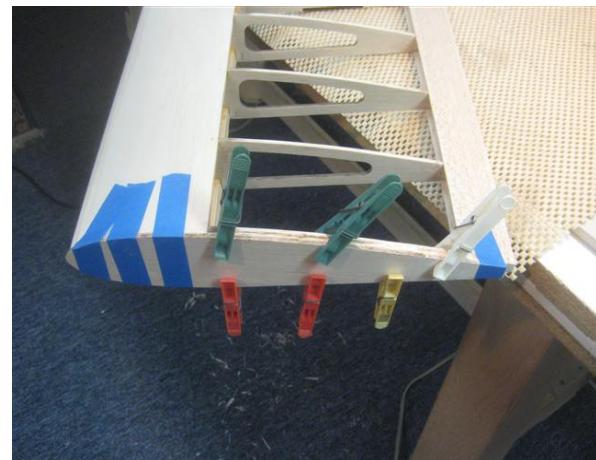




**A radius should be hand worked along the total span of the leading edge of the wing. This radius should match the radius in the wing saddle of the fuselage and also match the radius of the wing end caps.*



**The end caps should be positioned on the out board surface of the last rib and glued in place. The periphery of the end cap should be sanded to match the wing surface and a small radius applied to the end cap.*



**The wing should be placed bottom down back on the work surface (weighted flat if necessary) and the spar webbing should be cut and fit between each rib and held shy of both the top surface and bottom surface of the wing. This webbing should be held tight against the back of the top and bottom spars. Note, no webbing is applied to the bay between ribs #4 both right and left side (this is the area where the servo wire comes through).*

**The total surface of the wing should be lightly sanded at this point blending the all the joints of the sheeting and applying any small radii needed to smooth off the wing.*

**The top wing reinforcement should be positioned centered on the center line of the wing and the straight edge of the reinforcement flush with the rear edge of the trailing edge. Glue in place.*



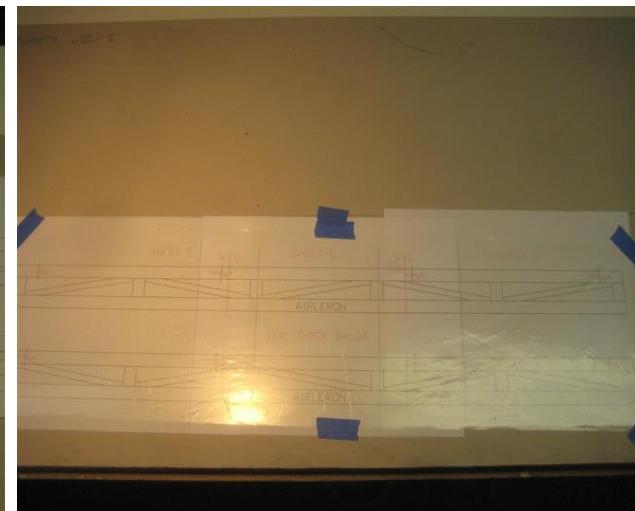
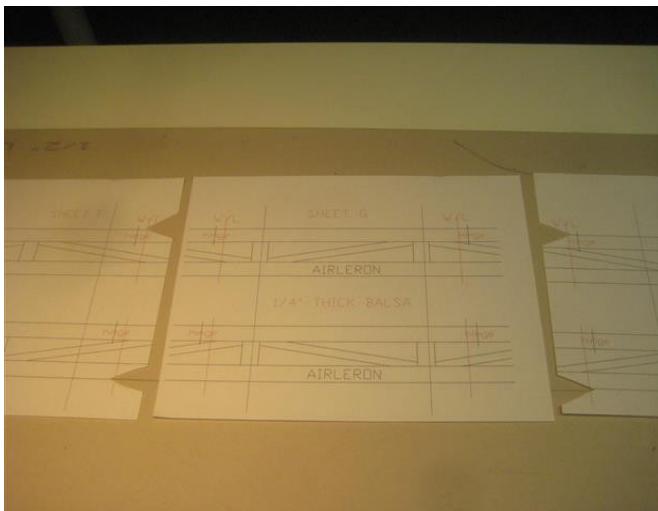
The straight edge of the reinforcement flush to the trailing edge of the wing.

The center of the reinforcement should be centered on the wing

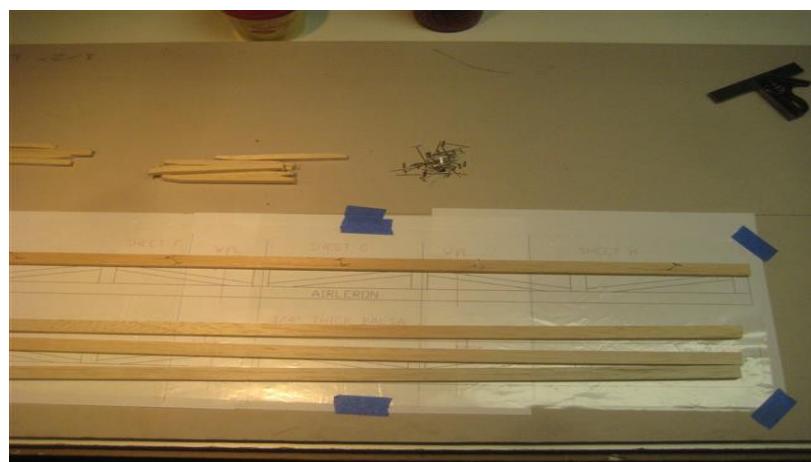
**Set this portion of the wing aside at this point and start the construction of the ailerons.*

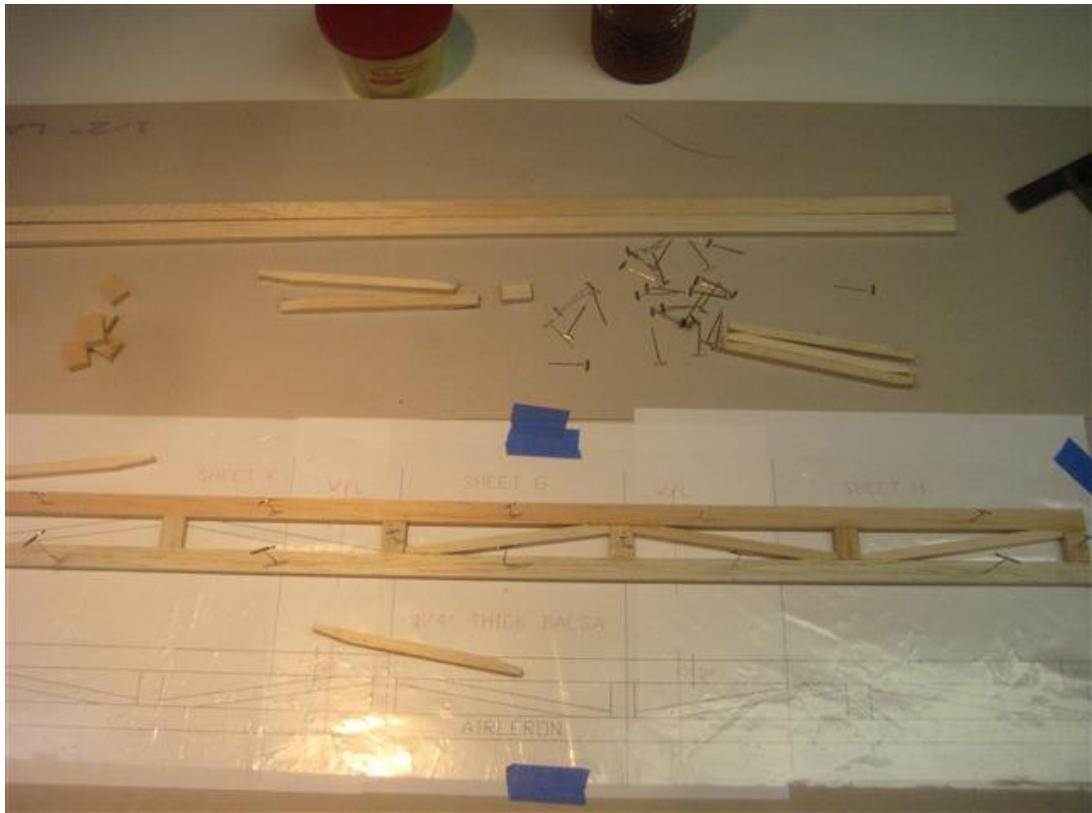
**The next step in the construction of the wing is to hand build the ailerons to the supplied partial plans, using the supplied balsa sticks.*

*Prepare the partial supplied drawings, arrange them, and then join them together to form complete drawings to build the parts on. The partial drawings should be laid flat on your work surface. They should be lined up so the printed lines on the partial drawings line up from one drawing to the adjacent drawing. Once lined up, they should be taped together and at the same time taped to the work surface to form a complete drawing of the parts. The complete drawing should be covered with a clear protective covering (wax paper or equivalent) before starting the build.



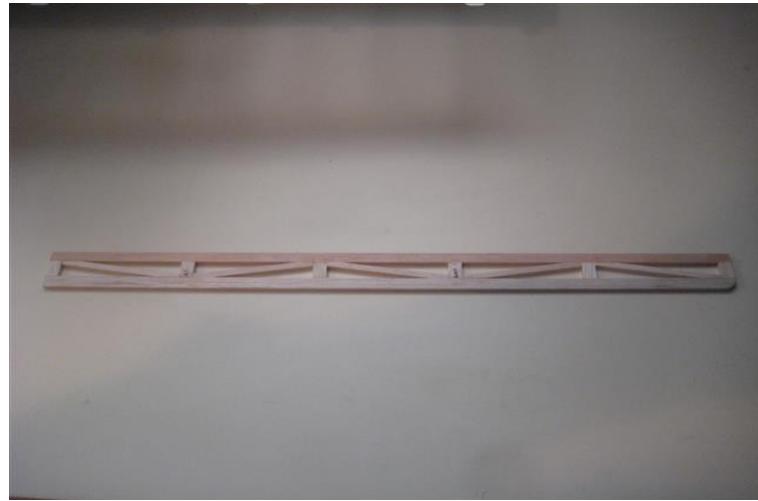
*The ailerons are constructed on the plans using just the supplied 1/4" thick balsa sticks cut to size, pinned and glued. There are no laser cut parts used on the ailerons. Use the plans as shown for the width and length of the 1/4" thick balsa sticks.



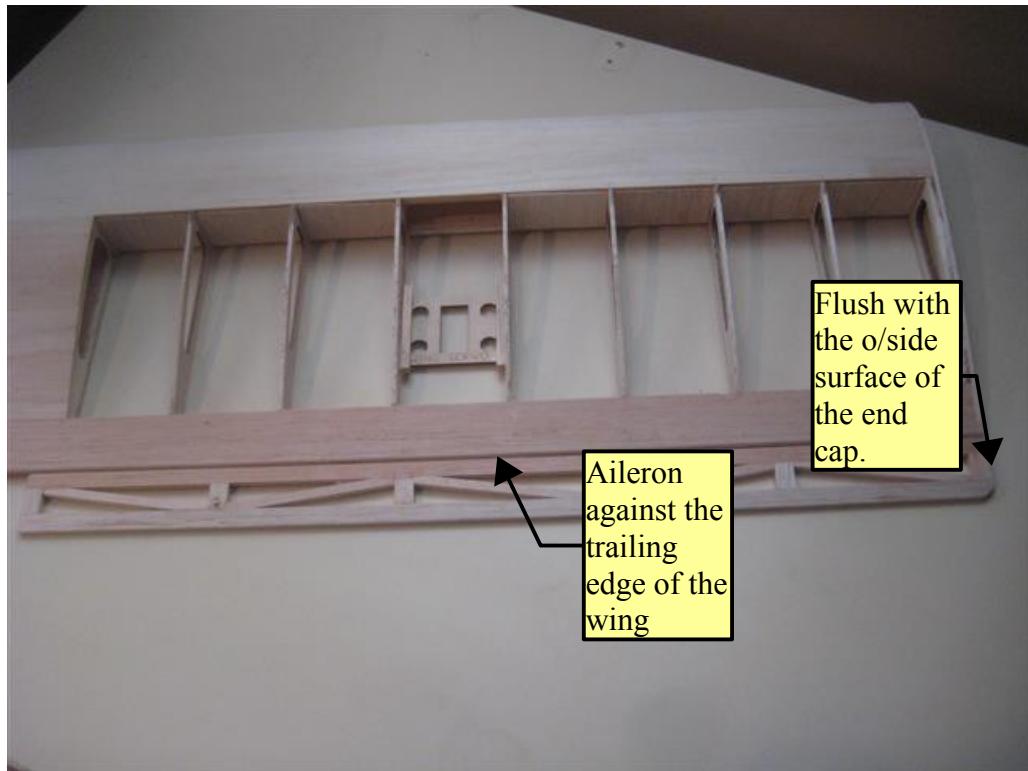


*Mark the CA hinge locations from the drawing.





**Line up the ailerons against the trailing edge of the main wing and position the outside end of the aileron (end with the large corner radius) flush to the out side surface of the end cap of the main wing. Transfer the CA hinge locations from the ailerons to the wing and cut in all the hinge slots in the main wing trailing edge and in the ailerons.*



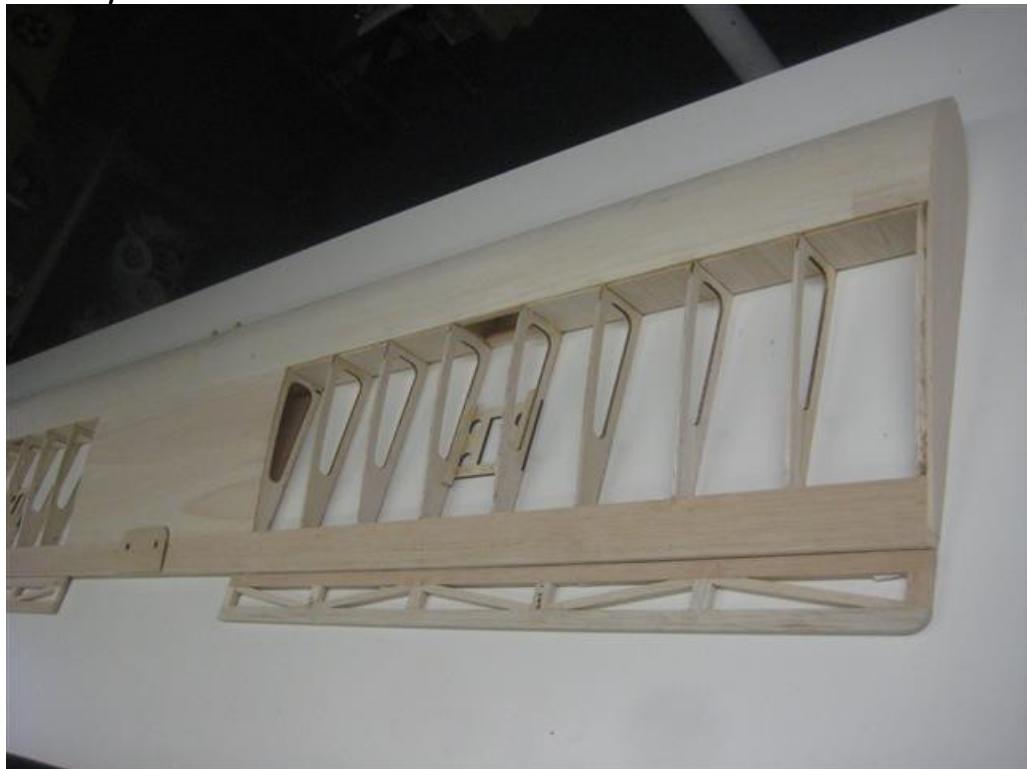
**Bevel the leading edge of the aileron to form a clearance for the up and down movement of the aileron.*



**Apply a small radius along the trailing edge of the main wing the full span of the wing, stopping at the rear wing attachment reinforcement located on the top surface of the wing.*



**Re-install the ailerons (dry) to the main wing making sure all the hinge locations line up.*





*The wing is now ready to mount to the fuselage.

*Set the main wing aside at this point.

Then go to "assembling the wing to the fuselage" for the finalizing of the wing and the plane build.