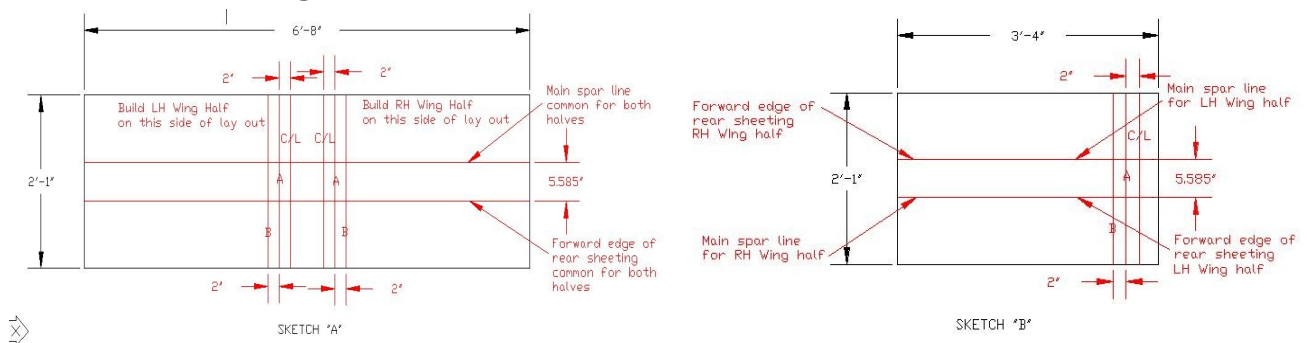


MAIN WING CONSTRUCTION

Note: The main wing is a turbular wing design. The forward portion of the wing is not sheeted and left open. The forward part of the ribs, the leading edge, the forward stringer and the main spars are covered only with the finished covering. This leaves the surface of the wing with a rippled surface that disturbs or turbulates the air passing over it. For a detailed explanation of this design go to www.mh-aerotools.de/airfoils/turbulat.htm

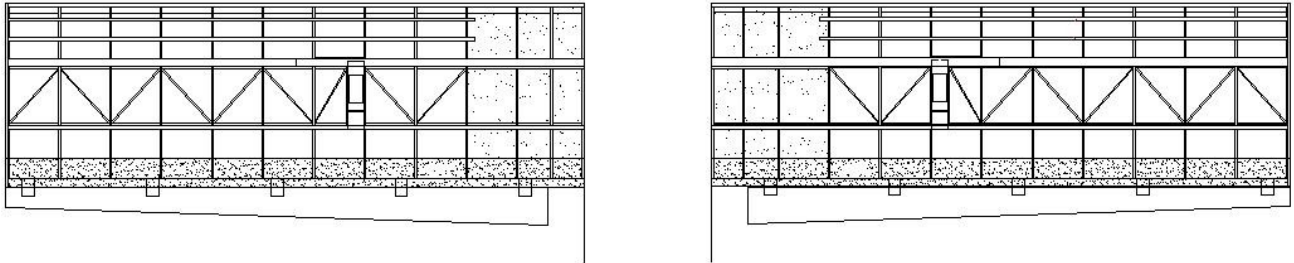
The ribs, dihedral brace, wing hold down reinforcement, and servo trays are laser cut. The balance of the parts are hand built and assembled per the following instructions and photos.

- Before the actual construction of the main wing is started, your work surface must be prepared. Just about everybody has a different size work table or work surface. The following lines (*shown in red*) must be drawn on the face of the work surface.*
- If your surface is large enough so both wing halves can be built at the same time use sketch A. If your work surface is smaller and only one half of the wing can be built at a time, use sketch B and mirror build the second wing half after the first half is built.*



- Accuracy counts in the flatness of your work surface and the laying out of the work lines. You will be building your main wing to this work surface and these lines.*

NOTE: This is the plan view of the main wing halves. It is to be used as a reference only. The wing construction is to be built to the lay out lines on your work surface using the construction manual and photos.



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- It is advisable to segregate and position the supplied wing components on the wing lay out on your build surface. Dry fit the parts while reading the instructions and reviewing the photos. You can verify the parts received and familiarize yourself with the build process.*

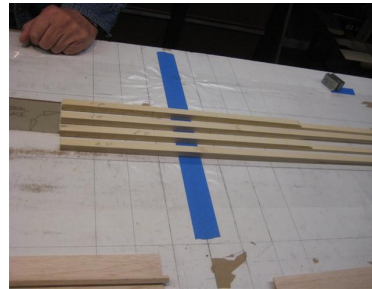
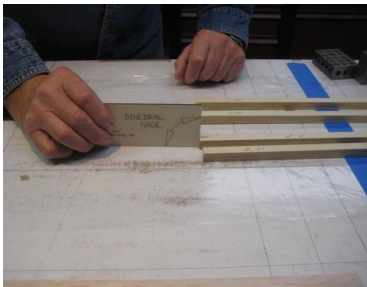


There are parts that need to be cut and assembled into sub-assemblies prior to the actual assembling of the wing.

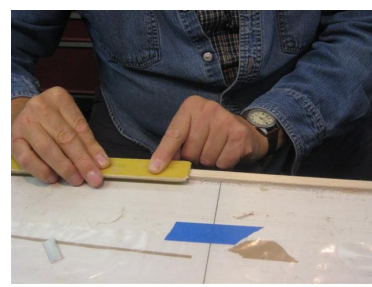
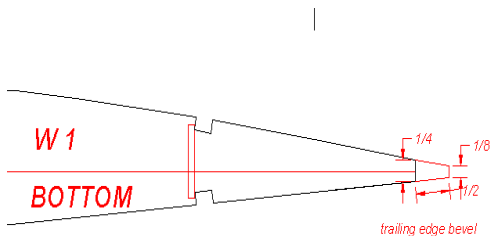
- The spruce 1/4"x1/2" main spars (4 pieces required: top, right & left and bottom, right & left) are sistered from the center line out board approx. 17 1/2". The main spars should now be glued together forming the main spar sub-assemblies. They are made using 6 pieces of the 1/4"x1/2" x 36" spruce stock.*



- *Once the glue is dry, the sistered ends of the main spar sub-assemblies should be cut and sanded on a 1 degree angle as shown in the photo. Care must be used to form the proper angle direction on each of the sub-assembled spars. Use the dihedral gage to mark and check the angle. Set these parts aside for the wing assembly.*



- *Mark and shape the rear trailing edge by beveling the top surface of a balsa 1/4" x 1/2" x 36" stick. See sketch & photos.*



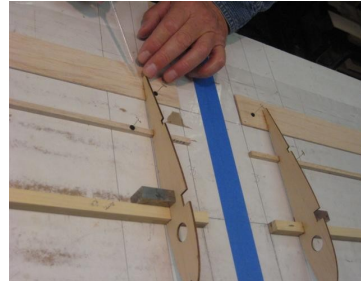
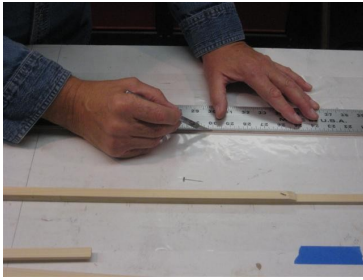
Note: The main wing assembly is made in two halves (right & left hand) later joined at the center. Both halves can be built in unison or separately on the same work surface or board, depending on the size of your work surface.

- The half wing assembly starts with the bottom main spar positioned with the sistered side facing up and the rear side of the spar accurately lined up forward of the main work line drawn on the work table or board. The 1 degree dihedral cut end should be lined up to the first perpendicular work line (labeled C/L) drawn on the work table or board. This main spar should be firmly fastened to the work table or board with pins.*



-
- Accurately trim the forward edge of the rear bottom sheeting (3/32"x2"x36") straight and placed on and pinned to the work table, lined up to the rear lay out line, 5.585" parallel to the main spar that is drawn on your work table. Refer to sketch A or B.*
 - Place the rear (1/4"x1/4"approx. 36" long) spar flat on the work table. Make sure it is extended beyond the perpendicular work line (labeled C/L). The rear notches in the ribs will control the location of the spar.*
 - Place the main spar notch of a W1 rib "bottom" down on the main spar and on top of the rear sheeting. Line the rib up inboard of the second perpendicular work line (labeled A). There should be a 3/32" gap*

between the bottom of the rib and the table. Glue W1 rib in place to anchor the construction.



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- *Place the main spar notch of the second W1 rib "bottom" down on the main spar and on top of the rear sheeting, spacing it 2" from the previous rib. This should line the rib up outboard of the second perpendicular work line (labeled B). There should be a 3/32" gap between the bottom of the rib and the table. Place the rear notch on the rear 1/4"x1/4" spar laying flat on the work table. Glue the second W1 rib in place.*
 - *Note: The rest of the main wing full rib spacings will be 3" apart. You can make a 3" spacer block from wood, to be used as an aid to position the ribs apart. This will speed up the wing build time. Make sure the ribs are positioned 90 degrees to the main spar.*
 - *Place the main spar notch of the W2 rib "bottom" down on the main spar and on top of the rear sheeting, spacing it 3" from the previous rib. There should be a 3/32" gap between the bottom of the rib and the table. Place the rear notch on the rear 1/4"x1/4" spar laying flat on the work table. Glue the W2 rib in place.*
 - *Place the main spar notches of the three W3 ribs on the main spar "bottom" down flat on the work table and the rear offset on the*

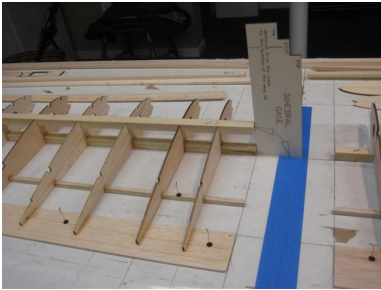
forward edge of the rear sheeting, spacing each 3" from the previous rib. Place the rear notch on the rear 1/4"x1/4" spar laying flat on the work table. Glue in place.



-
- *Place the main spar notches of the six W5 ribs on the main spar "bottom" down flat on the work table and the rear offset on the forward edge of the rear sheeting, spacing each 3" from the previous rib. Place the rear notch on the rear 1/4"x1/4" spar laying flat on the work table. Glue in place.*
 - *Note: These twelve ribs identify the wing span. The total finished wing span (both wing halves married together) should be approx. 70-1/2".*



- *Place the main top spar in the top notches of all the ribs, lining up the beveled end of the top spar with the beveled end of the bottom main spar using the dihedral gauge. Glue in place.*



- *Place the laser cut aileron servo tray between the second and third W3 rib approx. 13" from the center line of the wing. Place the tray on the top surface of the bottom main spar and the bottom rear 1/4"x1/4" spar and against the second W3 rib. Glue in place.*



- *Place the W4 (partial) rib "bottom" down flat on the work table between the main spar and the forward edge of the rear 1/4x1/4 spar, against the aileron servo tray (trapping the servo tray). There should be a 3/32" gap between the front edge of the rib and the main spar. Glue in place.*

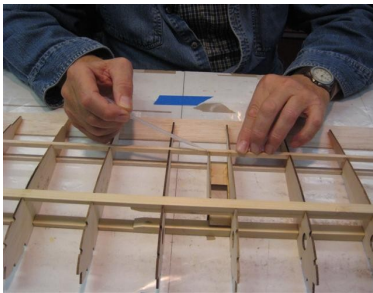


- *Cut, fit and glue in place 1/4" x 1/2" spruce reinforcements for the servo mounting screws on the top of the servo trays at the forward and rear of the servos opening.*

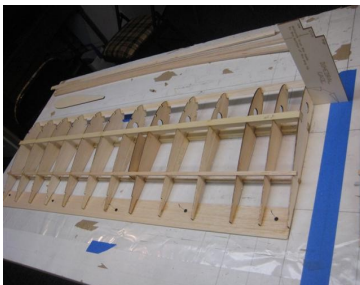


Verify the flatness of the wing and that all ribs and spars are squared to each other.

- *Place and glue the balsa top rear spar (1/4"x1/4"approx. 36" long) into the notches in all the ribs . Make sure it is extended beyond the center line.*



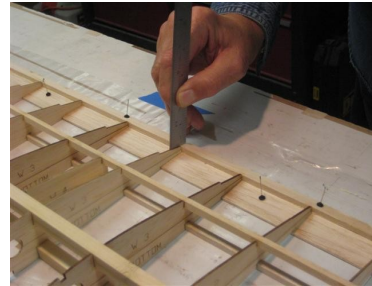
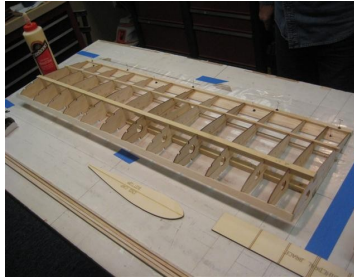
-
- *Place the center W1 root rib on the bottom main spar, the top main spar, the rear upper and lower spars, and the trailing edge, and use the 1 degree dihedral gage to set the angle and glue in place.*



- *Place and glue the balsa leading edge (1/2"x1/2"approx. 36" long) into the notches in the ribs . Make sure it is extended proud of the W1 root rib.*



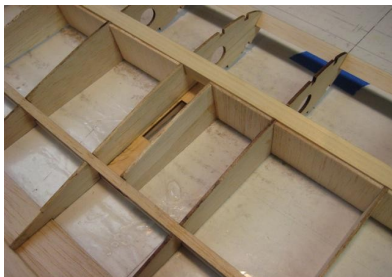
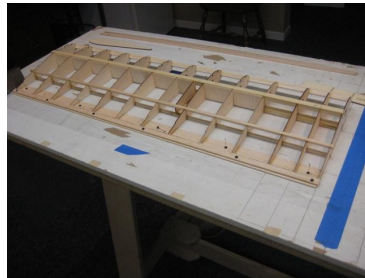
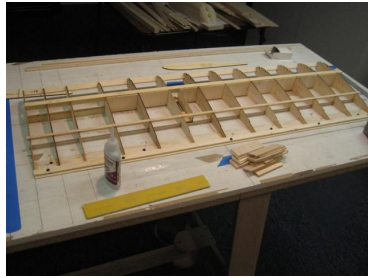
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- *Place and glue the preshaped balsa trailing edge (1/4"x1/2"approx. 36" long) on top of the trailing edge sheeting and at the rear end of the ribs . Make sure it is proud of the center line.*



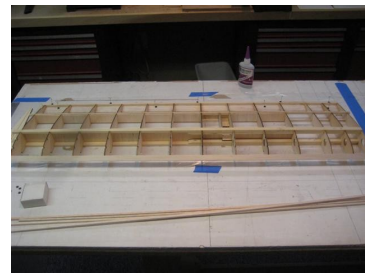
-
- *Cross cut all webbing from 3/32"x3"x36" balsa wood sheet stock. The front webbing length is 1-3/4" long, and the rear webbing is 1" long. Nine piece each is required on each wing half to fill nine outer bays.*



- *Glue the front webbing to the rear of the main spars, centered to leave clearance at top and bottom of the main spars.*



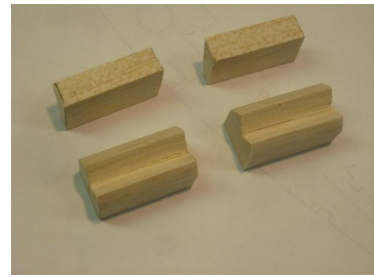
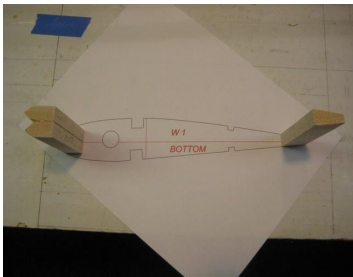
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- *Glue the rear webbing to the front of the rear 1/4"x1/4" spars, centered to leave clearance at top and bottom of the rear spars.*



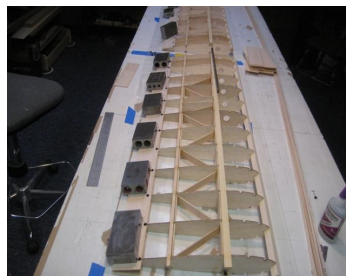
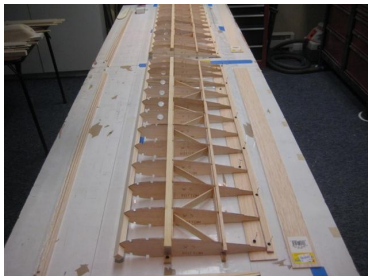
- *Cut, fit and glue in place the diagonal wing braces, made from stock balsa 3/32x3/4x 36", between the webbing of the front and rear spars, centered to leave clearance at top and bottom.*



- *Cut and fit the 1" x 1" x 6" balsa reinforcement blocks to the dihedral angle of the center rib and in length to the second rib. Shape the surface of the blocks to the rib profile. Glue in place behind the leading edge and in front of the trailing edge.*



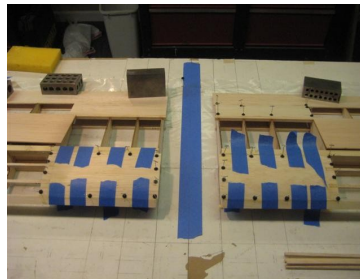
- *Accurately trim the forward edge of the upper rear sheet straight. Place and glue the rear sheet on the top of the ribs extending beyond the W1 root rib. Trim the top rear trailing edge sheeting to be flush to the rear edge of the attached preshaped trailing edge.*



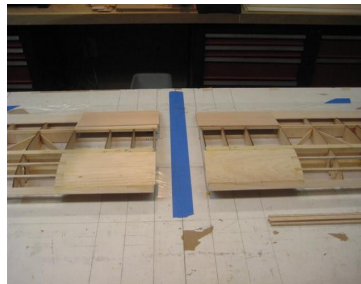
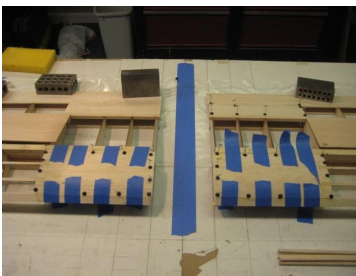
- *Cut, fit and glue the rear top sheeting between the center line and the outboard side of the W2 rib.*



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- *Cut, fit and glue the forward top sheeting between the center line and the outboard side of the W2 rib. After the glue on the center section sheeting has cured, cut two 3/16" x 1/2" slots in the top leading edge sheeting at W2 rib. Precut center sheeting and set aside.*



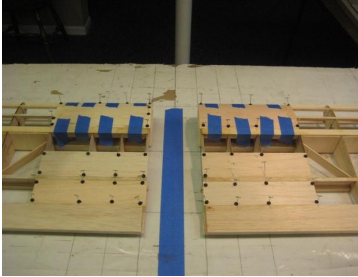
-
- *Glue two 3/16" x 3/16" top forward spars into these slots and in the notches of all the ribs.*



-
- *Cut, fit and glue the forward bottom sheeting between the center line and the outboard side of the W2 rib. After the glue on the center section sheeting has cured, cut two 3/16" x 1/2" slots in the top leading edge sheeting at W2 rib.*
 - *Glue two 3/16" x 3/16" bottom forward spars into these slots and in*

the notches of all the ribs.

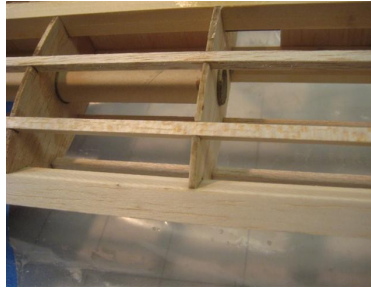
- *Cut, fit and glue the bottom rear sheeting between the center line and the outboard side of the W2 rib.*
- *Cut, fit and glue the bottom center sheeting between the center line and the outboard side of the W2 rib.*
- *Trim the top and bottom rear trailing edge sheeting to be flush to the rear edge of the attached pre-shaped trailing edge.*



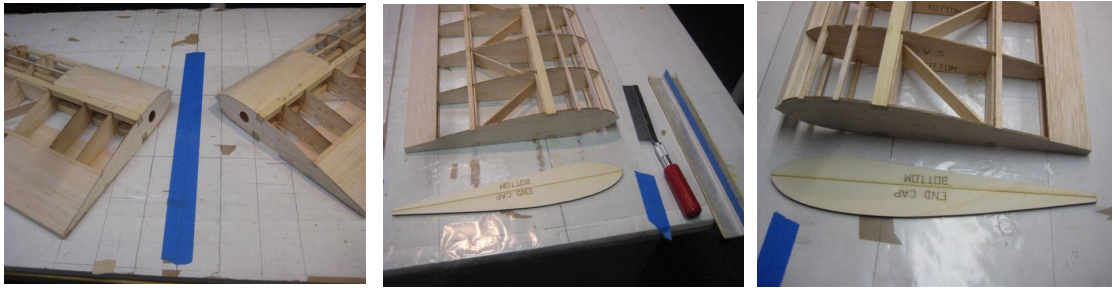
-
- *Cut the three W1 ribs along the laser scribed line and behind the main spars, creating a 1/8" clearance for the dihedral brace.*



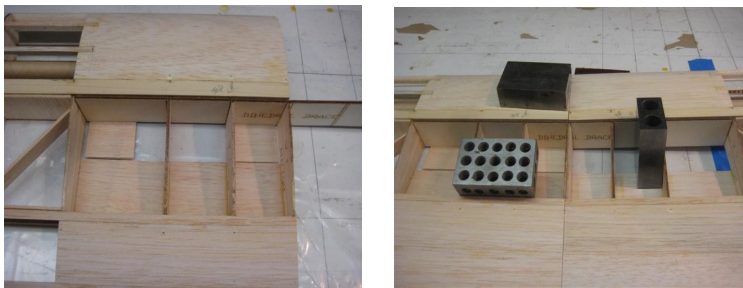
-
- *Cut the supplied pre-made cardboard tube to 11 3/4" in length. Slide the tube through the holes in the center wing ribs up to and just through the 2nd W3 rib, and glue in place.*



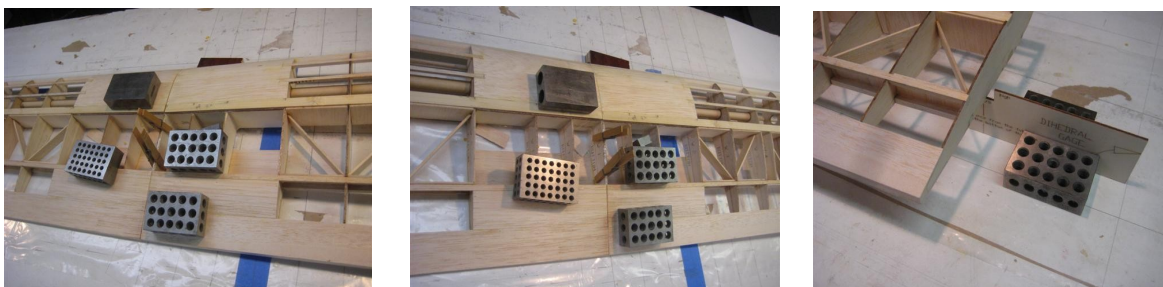
- *Trim all components flush to the surface of the W1 rib at the center, and to the outboard surface of the last W5 rib.*



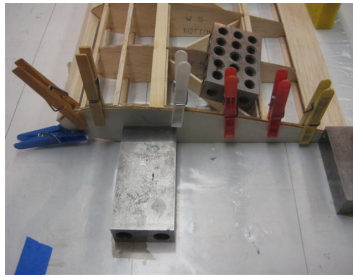
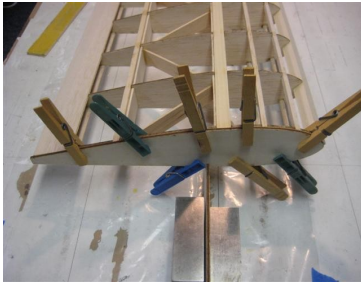
- *Join the two (right and Left) wing panels together using the plywood laser cut dihedral brace installed between the main spars. Care must be used to ensure there is no interference between the wing panels and the dihedral brace providing a snug fit. When satisfied with the fit between the two wing panels the following steps should be taken.*



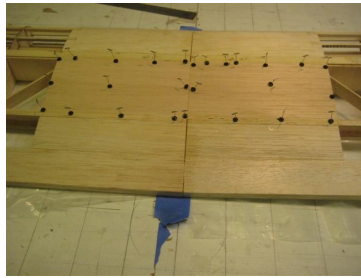
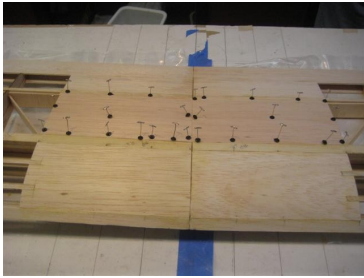
- *Place one wing panel flat on the build surface, and slide the second panel in place, guided by the dihedral brace and using the dihedral gauge at the bottom of the last rib of the elevated panel. Check the line up of the leading and trailing edges. When satisfied with the alignment, glue the dihedral brace and the two wing halves together using epoxy. Clean up any excess epoxy with alcohol.*



- *Glue the laser cut plywood wing tips to both panels.*



-
- *When the epoxy sets after joining the wing halves together, finish the remaining center wing sheeting on both the top and bottom of the wing.*



-
- *Cut 3/4" access hole in the top sheeting above the aileron servo wire tube.*



- *Lightly sand the wing surface to eliminate surface high spots. Sand a radius along the front of the leading edge to match the plywood wing tips. Then reinforce the center joint on the top and bottom of the wing panels with 2" wide fiberglass tape.*

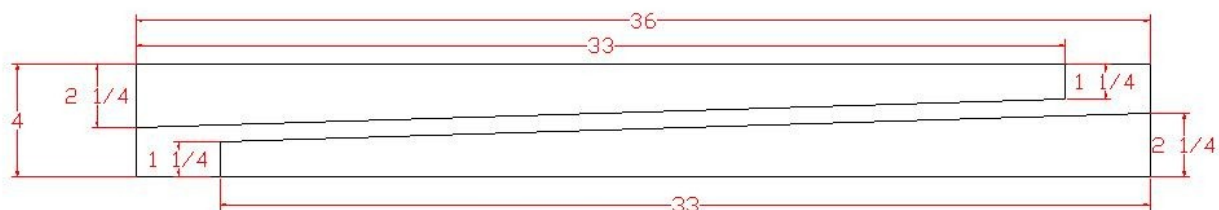


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- *Apply glue to all the joints within the wing, don't be stingy with the glue. The integrity of the wing depends on strong glue joints. Be sure the shear webs are bonded to the top and bottom spars.*

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- *Install the laser cut plywood wing hold down plates to the bottom center of the wing and flush with the trailing edge.*

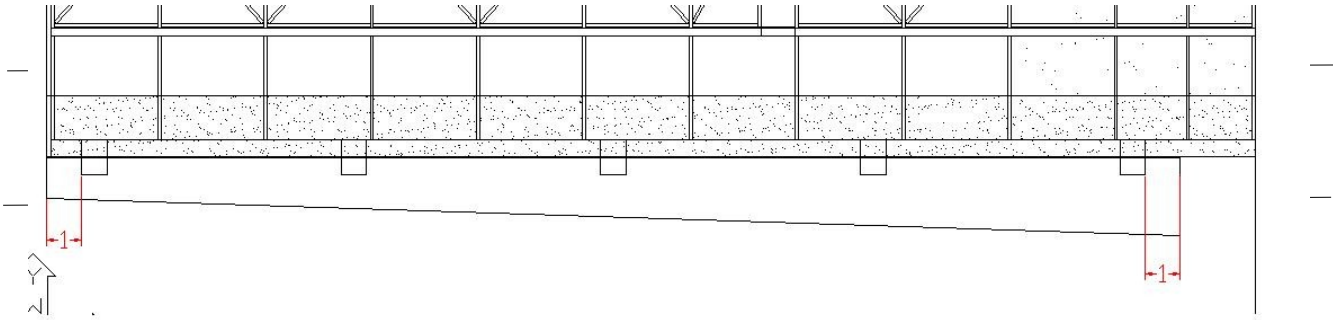


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- *The two ailerons are now supplied in the short kit-- pre-cut from a 3/8"x4"x36" balsa sheet and shaped to size. The sketch is for reference only.*

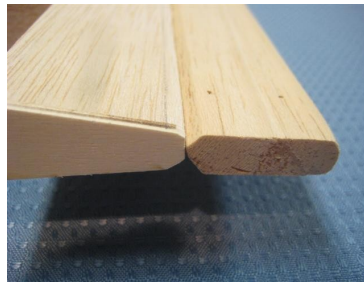
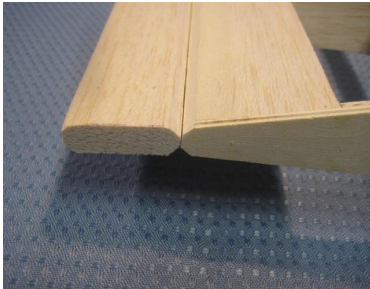


cut two ailerons from
this balsa 3/8"x4"x36" sheet

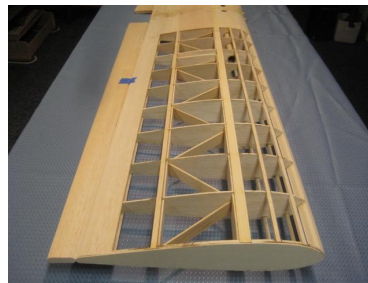
- *Mark, cut and temporarily install five equally spaced CA hinges in each aileron and in the corresponding locations in the trailing edge of the wing. Reference the plan view of the main wing half below.*



- *Bevel the hinged edges of the wing and ailerons to create clearances for the flying surface movements.*



- *Temporarily assemble the hinged joints of the wing and ailerons (do not glue in the hinges) and round over the remaining edges of the ailerons and wing.*



Note: Repeat the build sequence to construct the opposite wing panel if you are building the wing halves on a smaller work surface. Be careful not to build two like panels.

The main wing is now ready to be attached to the fuselage.
