HERITAGE P-51 BUILD MANUAL
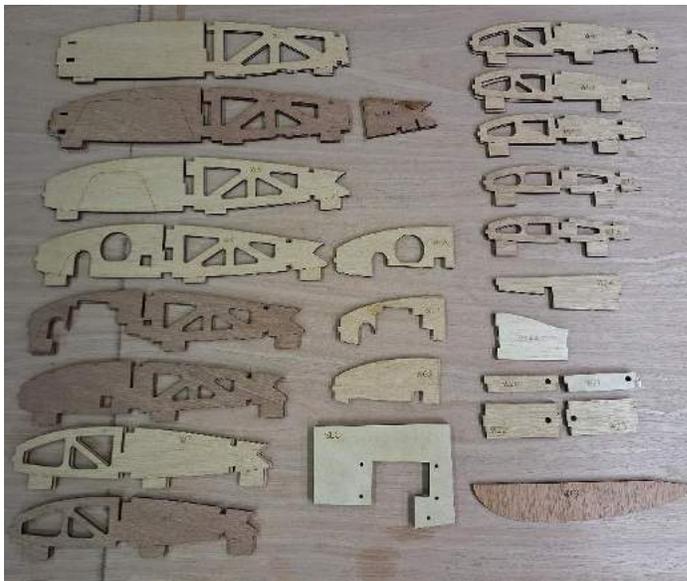
Meister Scale Models

Introduction

This is a basic build manual. Many of the small details are left to the modeler. Due to the fact that wood changes over time, temperature, and pressure, the plans should be used as a guide. This airplane is built with the new interlocking design, the plane can be built without the plans. Please note that this manual is designed to help you step by step build the components. Many modelers build in many different styles. Use the style best for you.

Revision 72424-1

Gather Parts

You will first need to gather all of your wing parts.

- You should have 2 of each part pictured above.
- You will only have 1 wood wing spar.
- Pick a side and lay the plans out and each rib.

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Thanks to Meister Scale's interlocking design, you can easily test fit the entire wing pre-cut pieces without gluing. Make sure all the pieces fit.

Use the plans to check all ribs are in the correct order but do not fix to plans

Rib W4 – W6 have leading edge doublers. Make sure they are glued to the correct side of the rib.

Once you are happy with the fit, glue W1-12 to the W15 Main Spar. Do not fix to the plans
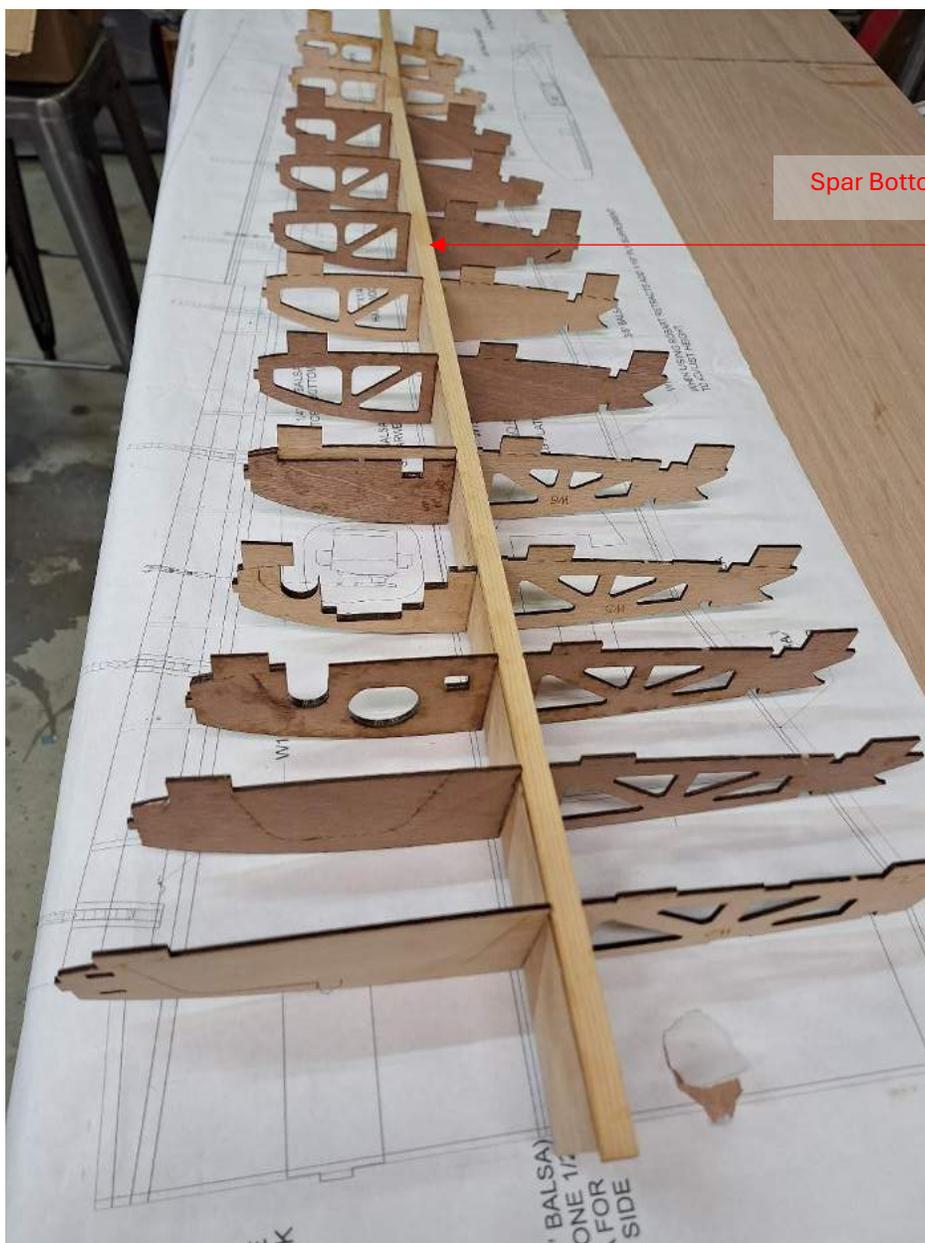

W15 Main Spar

W1 -W12

Check Plans for W4-W6 (these are doublers for strength around the landing gear)

W1 is not pictured as this was the protype build. Go ahead and glue W1 in place.

Turn the wing upside down and glue the hardwood spar bottom cap strip to the W15 main spar and the notches on each rib.

Spar Bottom Cap Strip

Glue W 16 into place. Use the plans for the correct location. This is a tight fit and will need to be "wiggled" into place. Once you are happy with the fit, glue into place.
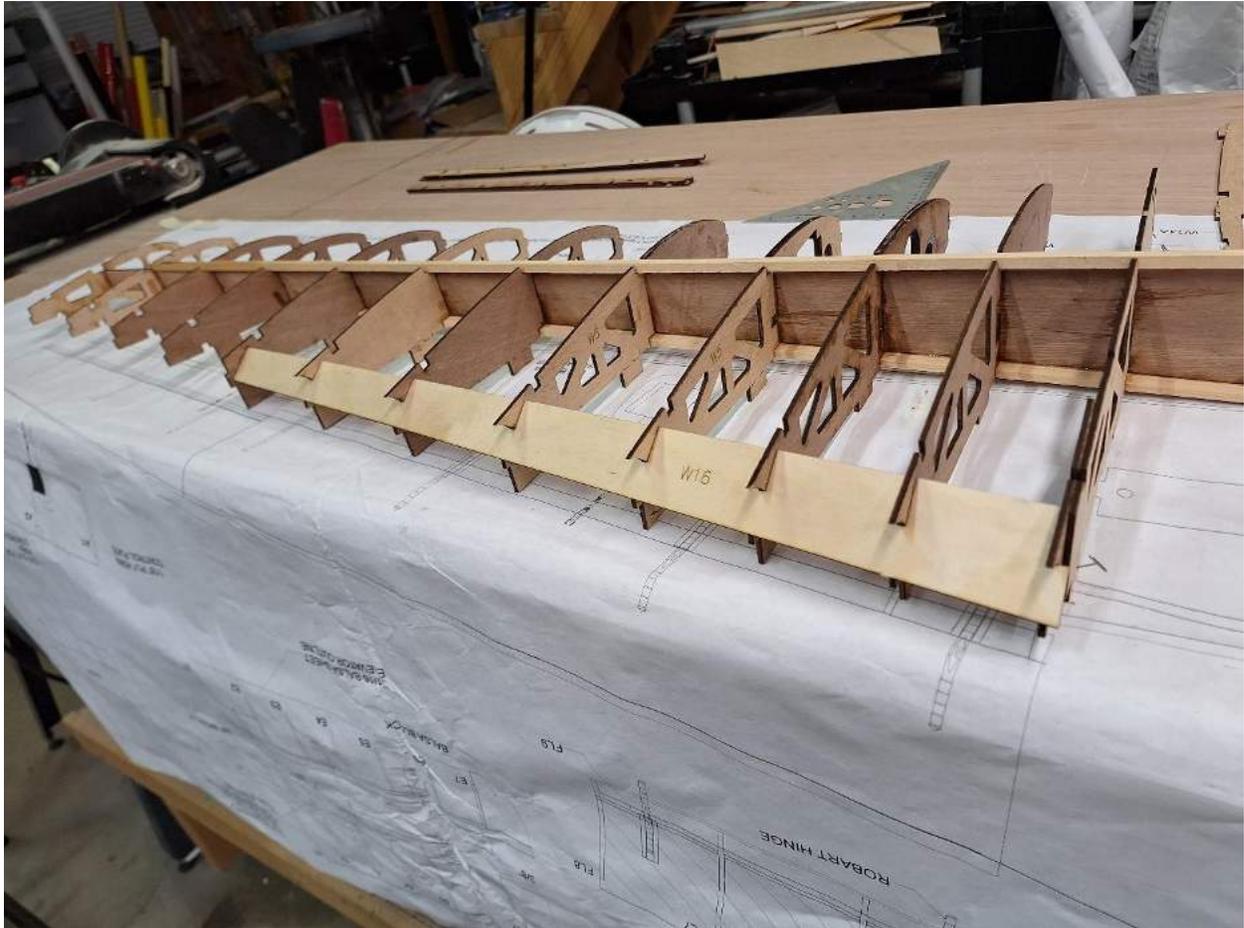
- Locate W17 and W 18. Glue them together where the holes align. This will be glued on the wing and are where the ailerons attach to the wing
  - Check with the plans first! You want the holes to be facing inside the wing.
  - The notches on W17 are for the wing ribs to glue to the trailing edge.
- Glue the wood blocks in front of each hole (any scrap balsa will do).
- Once you are happy, glue this piece to the trailing edge of the wing ribs.

***I suggest you only build 1 at a time. Only build the second while you are building the second wing. It is too easy to make two identical. The 2nd will be a mirror of the first to fit on the opposite side.*

- Glue W23 trailing edge wing bolt guide between W1 and W2. Do the same with W22 leading edge wing bolt guide. There are notches in W1 and W2 where they fit. Check with the plans to make sure of a good fit.
- The bot holes should be closer to W2.
- Glue W23 and W21. Test that a bolt (1/4 x 20) fits through both holes.

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- Locate W14A, W14B, and W14C. Test fit to the leading edge of W1 – W12. Once you are happy with the fit, glue into place.
- At this point, fix the wing to the plans. Start by pinning W1 and W2. You will then want to make sure the spar follows the line on the plans to the wing tip.
- Due to the interlocking design, the wing may need some tweaking, but basically once one rib is perfect, the others will fall in line. You may need to adjust a few ribs but fix the leading edge and the trailing edge of each rib to the plans.
- Each rib has a guide on the bottom (on the L.E. and one on the T.E.). This is where you attach to the plans. If there are no gaps, the wing will be straight.
- Glue the trailing edge spar strip from hard wood.

Trailing Edge Spar

W14A

W14B

W14C
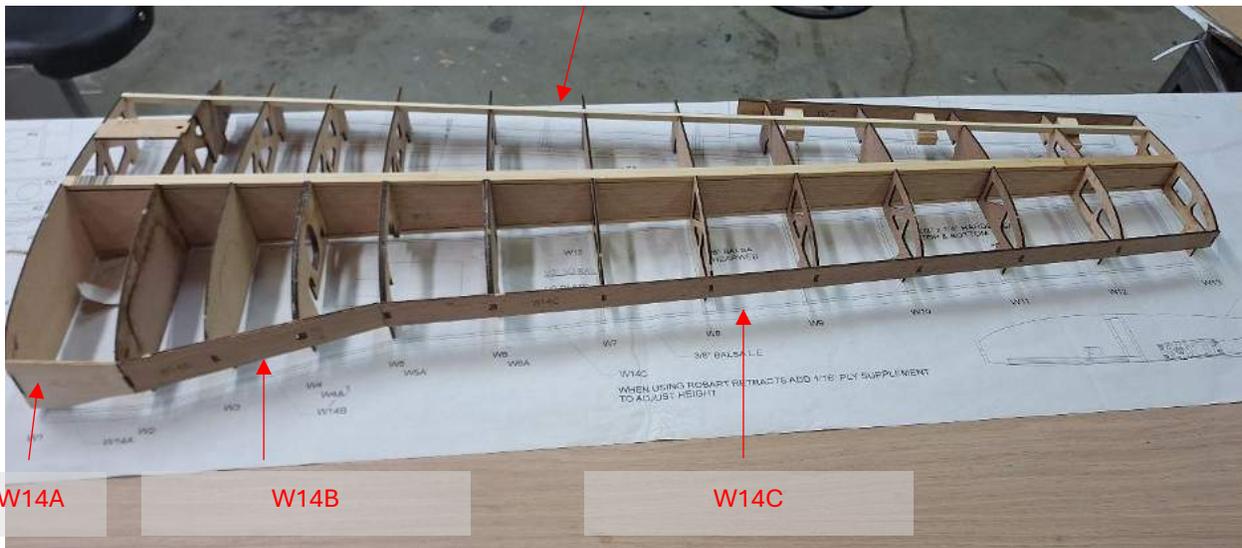
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- Sheet the top of the wing.
  - There are many ways to sheet a wing. This is how the plane built for this manual was sheeted.
    - I draw a line splitting the main spar length wise.
    - I sheet from that line towards the trailing edge and finish the wing to the trailing edge.
    - Then I will sheet the wing leading edge. A lot of times I find it that the wing is stronger and can take the bending of the sheeting.
- Use a razor plane or sand W14A, W14B, and W14C to match the contour of each rib.

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- Once the top of the wing is fully sheeted, pop the wing off the plans and turn upside down.
- Glue the landing gear support block into place
- Test fit the landing gear plate. Once you are happy, glue with hysol or 30-minute epoxy.

- Test fit the landing gear. Once you are happy with the alignment, mark holes where you will drill for the attachment screws.
- Use blind nuts for the other side.

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*** *At this point, you will need to pause on the wing and build the corresponding flap. Once you have built the flap, resume to the next step.*

- Using the hinges from the flap, mark where you will glue the balsa block to glue the flap to.

- Glue balsa block as shown.
- Glue the spar top and bottom strips with balsa wood. Make sure the balsa grains are as shown.
- Glue the bottom trailing edge spar into place
- Fit and glue W24 into place

Balsa strengthening between each rib.

Trailing edge spar

W24

Balsa block for flaps
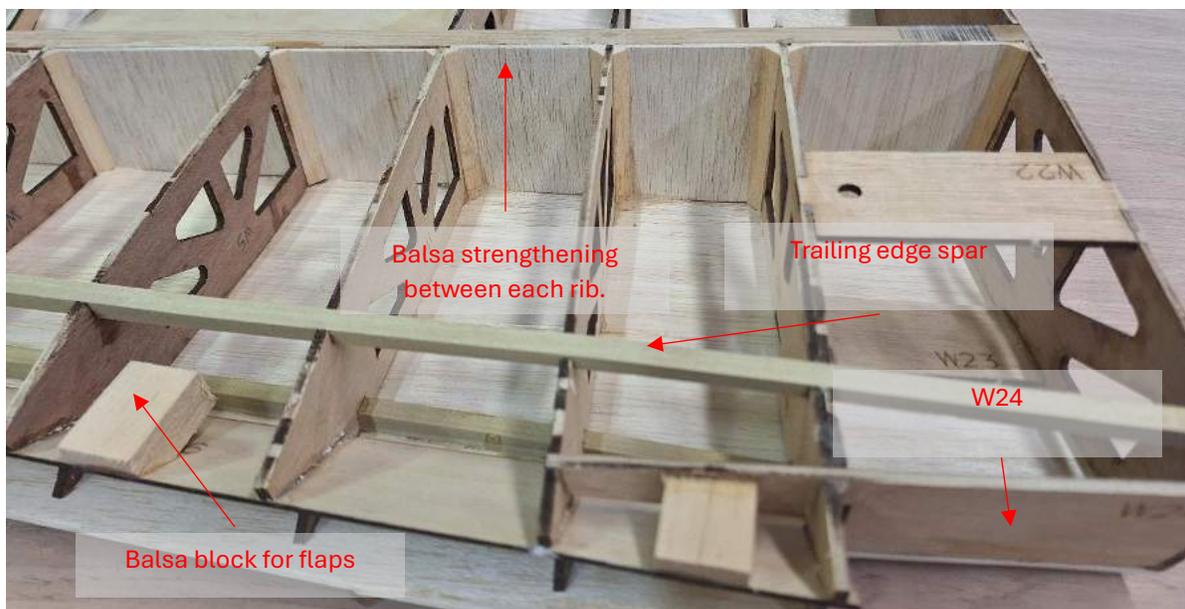
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- Find your flap and aileron servo mounting plates.
  - Part A is the faceplate
  - Part B is the bottom (with large hole big enough to fit servo through)
- Glue Part B in conjunction with the location on the plans
  - Lay part A over and trace where this will lay on part B. This will make sheeting around the hatch much easier.

Part B

Part A
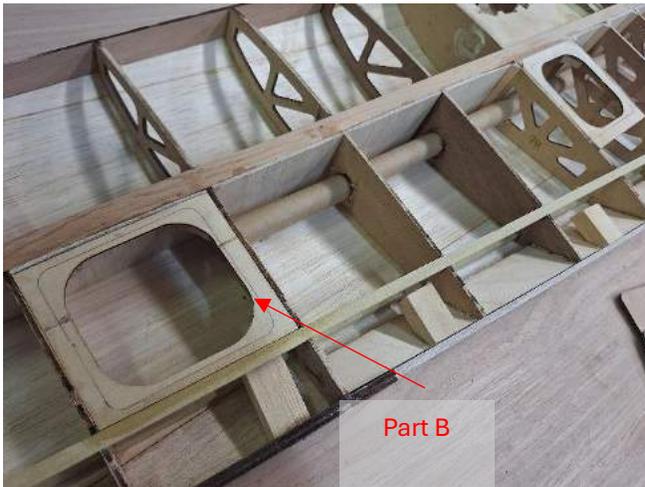
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- You will need to strengthen the bolt points. I used hardwood in place then hysoled everything into place. There are many different ways to accomplish this.
- Also, to help from the bolt head squeezing the wood, I glued a washer into place.

***At this point, the wing construction is complete. Make sure you have either ran tubes for the servo line or run string so you can pull the servo wire through later. Sheet the bottom of the wing.**

- Use a balsa block to glue to the leading edge of the wing and sand the leading edge to shape
    - Start by shaping the area over W14C (longest part)
    - Then Glue the balsa over W14B, then A
    - It is easier to sand to shape if they are separate rather than risking accidental over sanding at the joints.

***At this point, you will need to pause on the wing and build the corresponding aileron. Once you have built the aileron, resume to the next step.**

- Locate W19 Wing Tip Template
  - Glue into position from the leading edge of the wing. You want this to cut the rib in half lengthwise.
- Glue extra balsa block to the tip
  - Note – Make sure the wingtip balsa grains match the grains of the sheeting. Again, this will make sanding to shape much easier.
  - Once you are "close" locate and install the aileron. Sand the wingtip to match the aileron.

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- Install the aileron and flap on the wing
  - Make sure you are happy with the fit and that you are happy with the gaps between the flap and aileron and the aileron and wing tip.
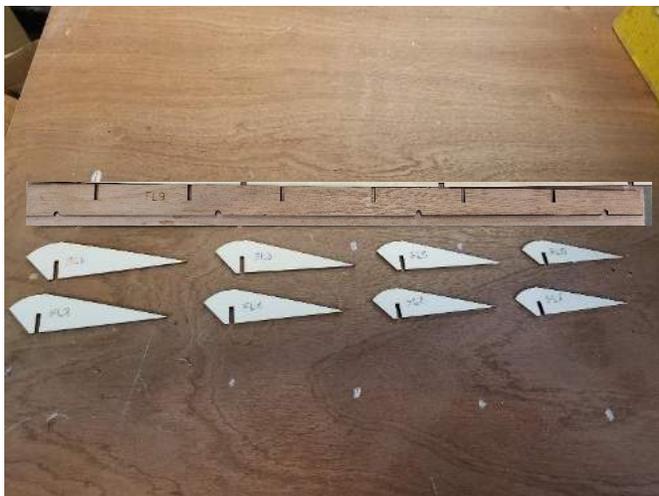
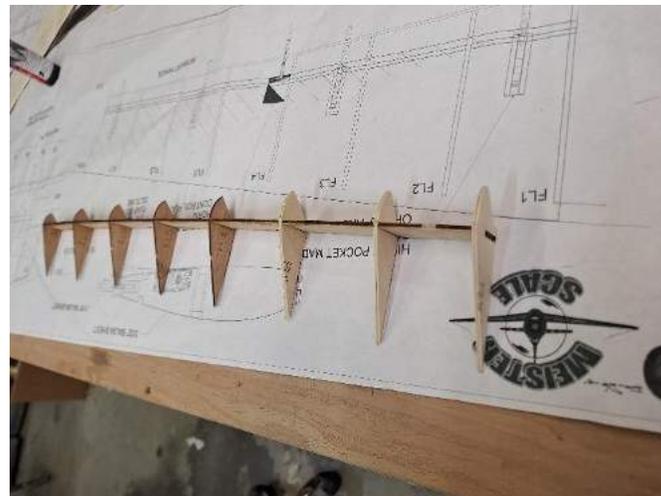Congratulations, now go build the other half!

FLAP

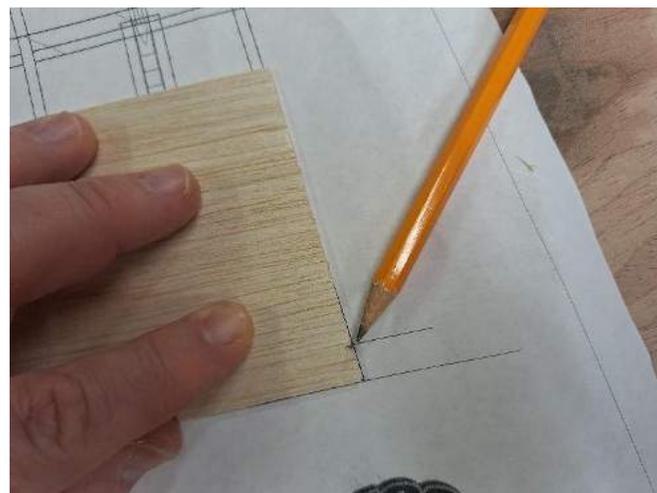Gather Parts

You will first need to gather all of your Flap parts.

- You should have 2 of each part pictured above. FL9 and FL1 – FL 7

- Test fit FL1 – FL 7 on to FL 9 as to match the plans.
- When you are happy, tac glue all parts in place.


- Make 2 flap top and bottom sheets using the plans.

- Using a pencil, make a mark where FL1 and FL 9 trailing edge will stop.
- Draw a line connecting the two
- When you line up the Flap Ribs, all of the trailing edges will stop on this line.

- Use a razor plane or a sanding block to sand the trailing edge of the sheeting to a point.
  - You will want to sand up to the line but don't sand the line.
  - Do this to both sheets
- You are doing this so the sheeting comes to a point at the trailing edge of the flap.
 - Refer to the 2nd picture.
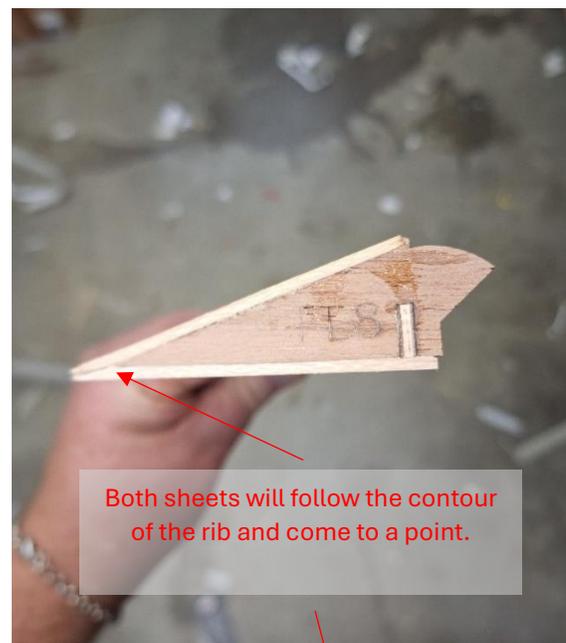
Both sheets will follow the contour of the rib and come to a point.
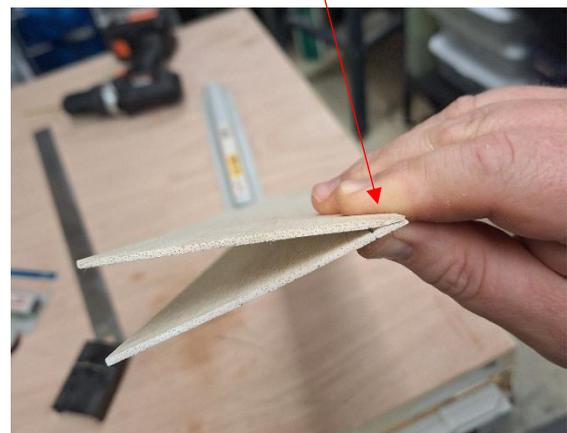
- Glue the ribs to the sheeting.
  - The leading bottom edge should fit flush with the leading edge of the sheeting and the trailing edge of each rib should be at or very close to the line you drew.
- Install balsa block for the hinges to glue in
- At this point you will want to locate where you are going to install your control horn.
  - Use a piece of hardwood for this
  - Line the flap up to the wing and use a control rod from the servo opening of the servo hatch to the flap. This is the location you will want to install hard wood.
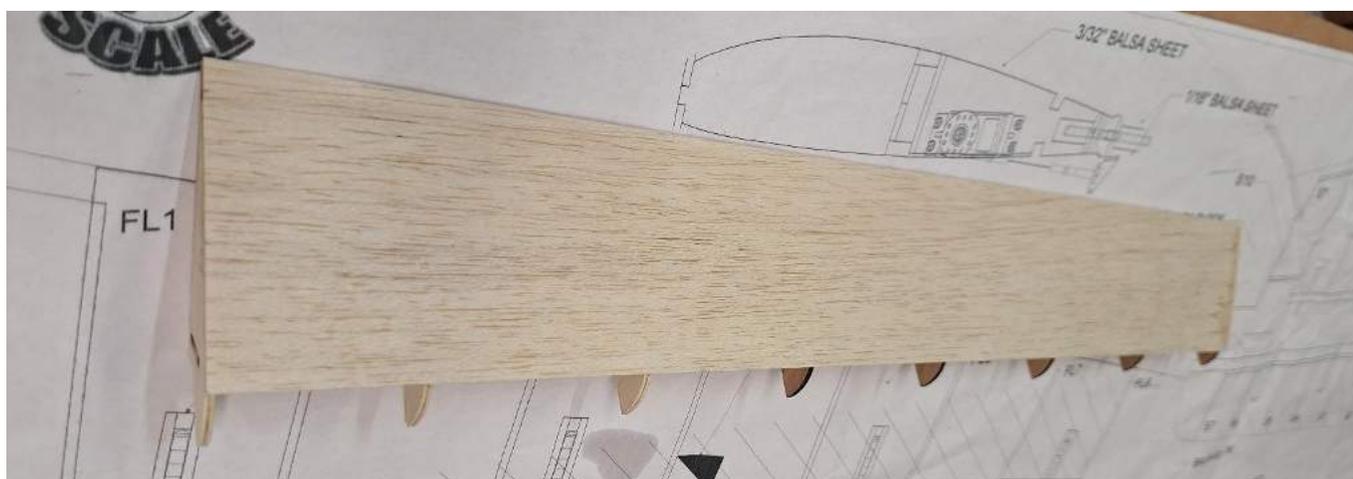
- Glue the top sheeting to the ribs
  - The leading edge of the sheeting should align flush with FL-7 and match the bottom sheeting trailing edge (or close to it)

Once the sheeting is cut to length and width, it will be glued to the ribs here.
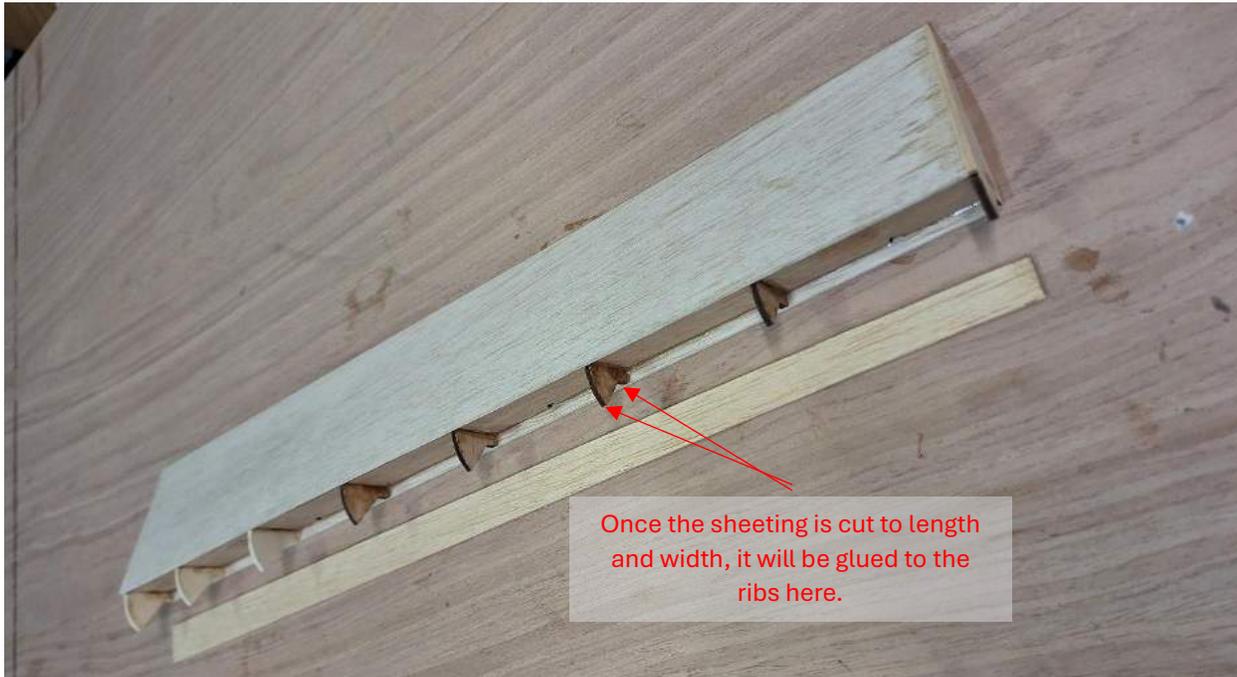
- Measure a scrap piece of sheeting that will lay down from the leading edge of each rib as well as the full length of the flap.
- Glue this piece to the bottom leading edge of the ribs.
- Do the same for the top
  - There should be no gap at the leading edge of the flap or at the point of each rib.
- There is a gap at the bottom leading edge of the flap.

There is a gap at the bottom. This will be covered with the wing.

- o Mark the sheeting and cut a small slot where each hinge will be installed.
    - There are 4 small notches on the bottom of FL-7 that are guides
    - On the back side of these is where you glued your balsa block

At this stage of the build, you can go back to the wing to mount the flap to the wing.

These two pictures are just for reference. The flap should fit snug within the wing once retracted and as the flap extends the curve at the leading edge should just barely brush against the wing.
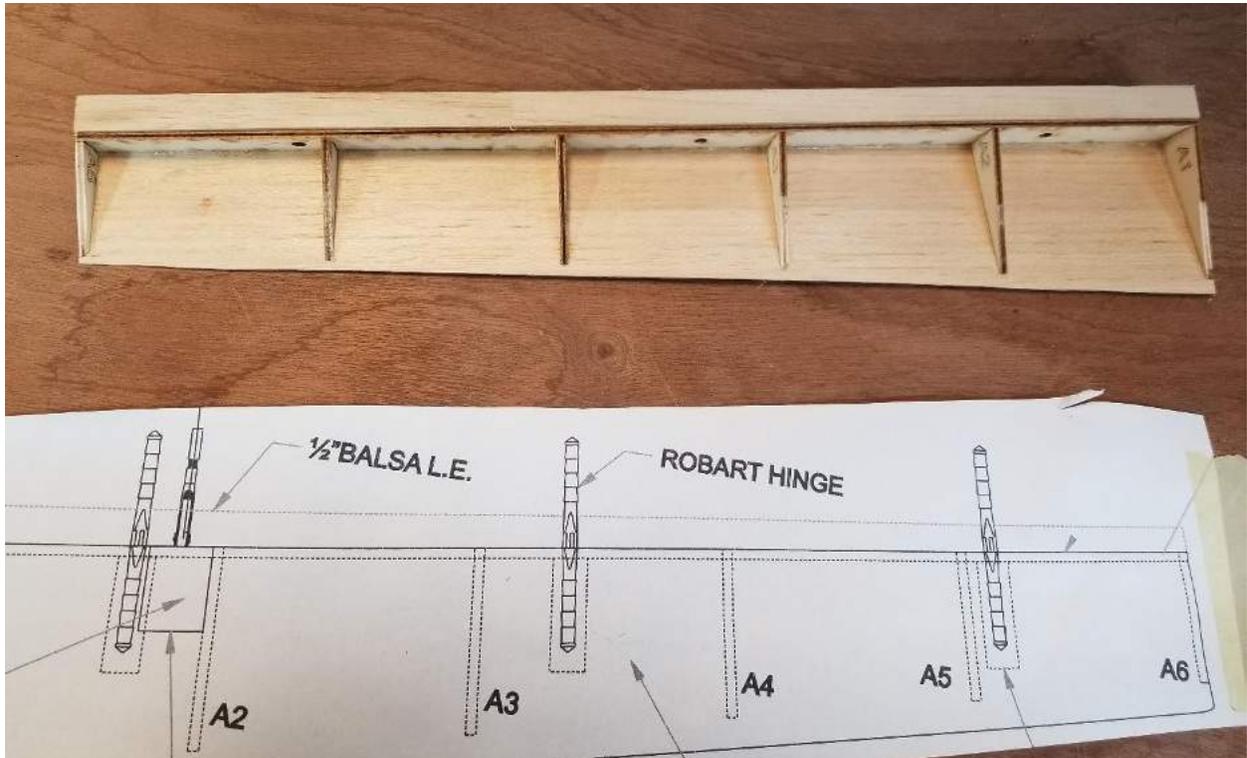
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Gather Parts:

- You should have 2 of A1 – A6
- You should have 2 of A7 Leading Edge

- Glue A1 – A6 to A7 leading edge
  - Make sure that the aileron ribs and set 90 degrees and the tips are pointing the exact same direction.

½"BALSA L.E.   ROBART HINGE

A2   A3   A4   A5   A6

- Using the plans, cut sheeting for the top and bottom
- Glue the balsa leading edge to A7 allowing room for the sheeting to butt up against the block when it is applied.
- Lay the aileron down on the sheeting you cut for the aileron bottom and glue into place.

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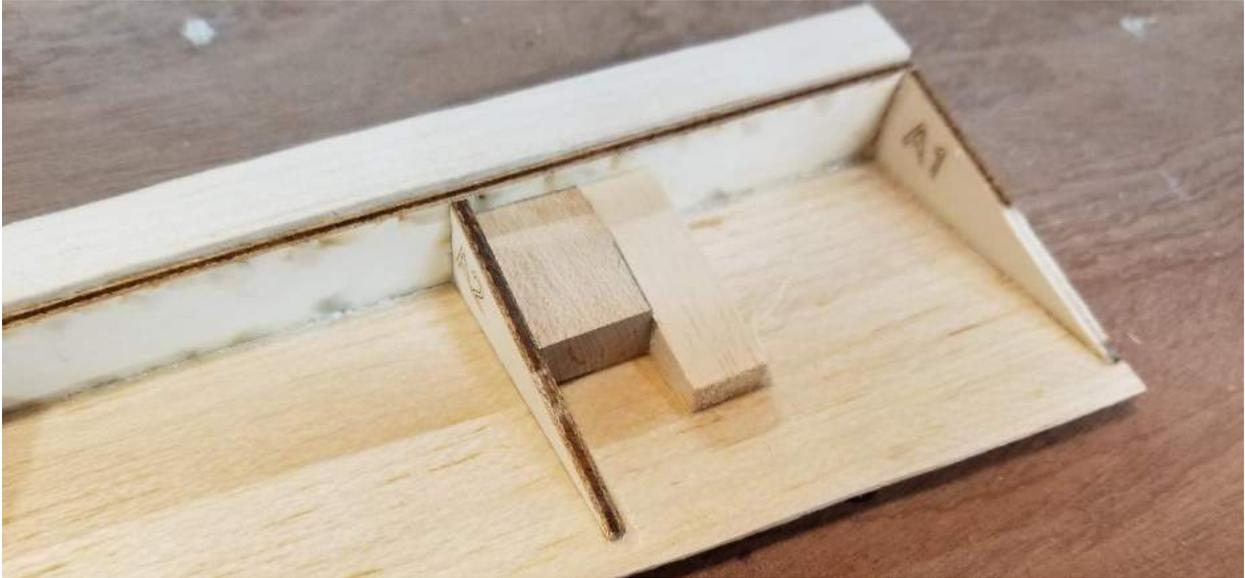
- Locate the aileron hinge holes and insert scrap balsa over the area where the hinges will be located.
  - ○ Before you glue into place, you may want to drill from the hole on A7 through the leading edge balsa!
- Depending on where you install your aileron control arm, glue a piece of hardwood block.
  - ○ For a more expansive description see the flap section under this area.
- Trim the trailing edge of the bottom and top sheeting to match the contour of each rib.
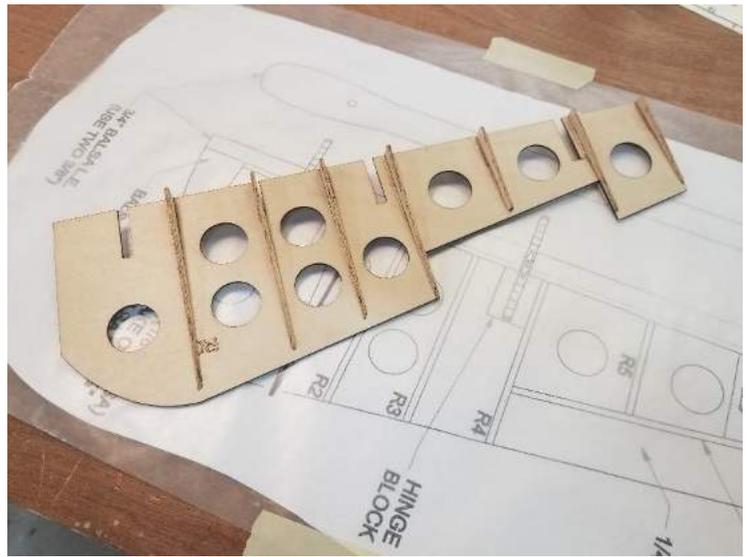 - ○ For a more expansive description see the flap section under this area.

- Glue the top sheeting on
- Sand the leading edge to shape

Note the 3 holes for the aileron hinges. It is much easier to drill those before you glue the scrap balsa over those holes!
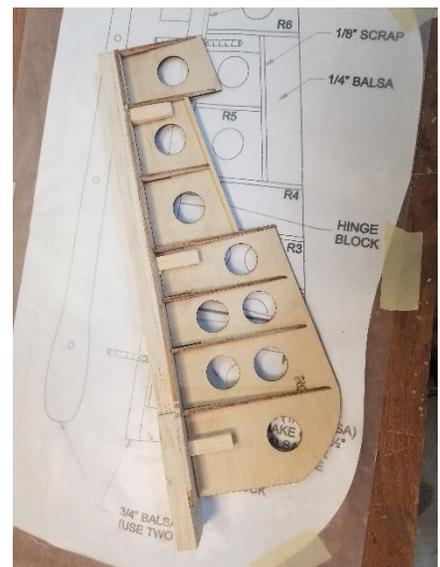
Gather Parts:

- R0 – Rudder Outline
- R1-R7 Rudder Ribs
- R8 – Rudder Spine

Using the plans as a guide, mark where R1 – R7 will be attached to R0. Glue one side, then use the locations of those ribs to mark the other side. Glue R1-R7 to both sides.
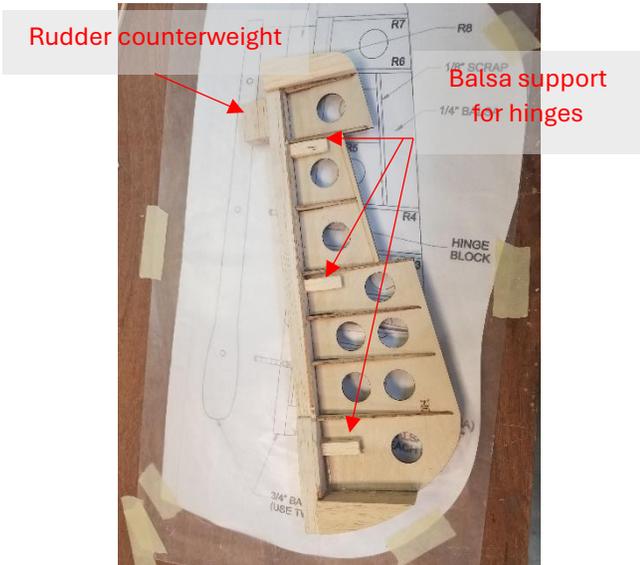

Glue R8 to the leading edge of R0 and the Rudder Ribs as shown

Using balsa, glue the leading-edge balsa to R8.

Notice that the leading edge extends below R8 as per the plans.

Rudder counterweight

Balsa support for hinges

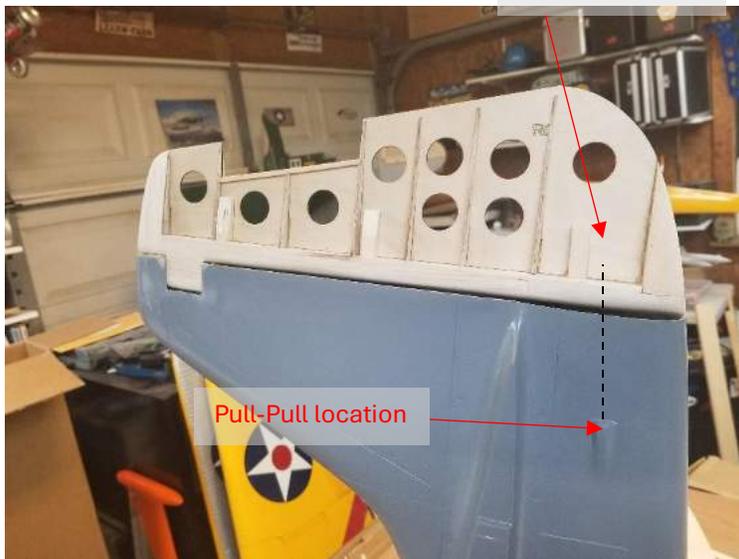Glue balsa block to the top and bottom of the rudder.

Use the plans as a template.

Glue balsa for the hinges.

Glue the counterweight with balsa block.

Sand to the desired shape.

Balsa support for hinges

Pull-Pull location

As you are sanding, use the fuselage so that the rudder will match the contour of the fuselage when finally attached.

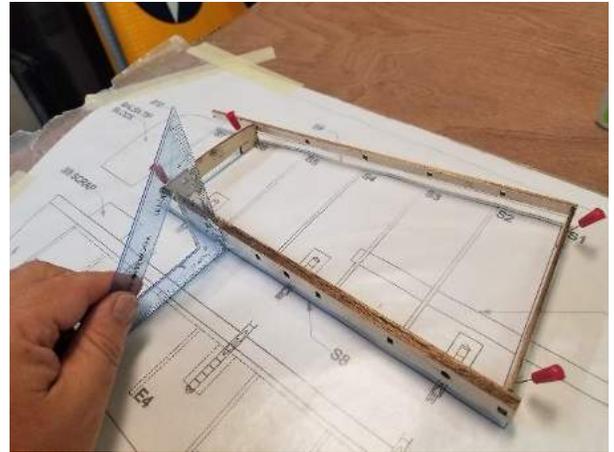Following where the "pull-pull" cable will go, glue hard block for the control horn.

Gather Parts

You will first need to gather all of your Stab parts.

- You should have 2 of each part pictured above.

Place S8 (trailing edge), S9 (leading edge), S1 rib and S6 rib.

Use a straight edge to assure each piece is 90 degrees. Glue together.
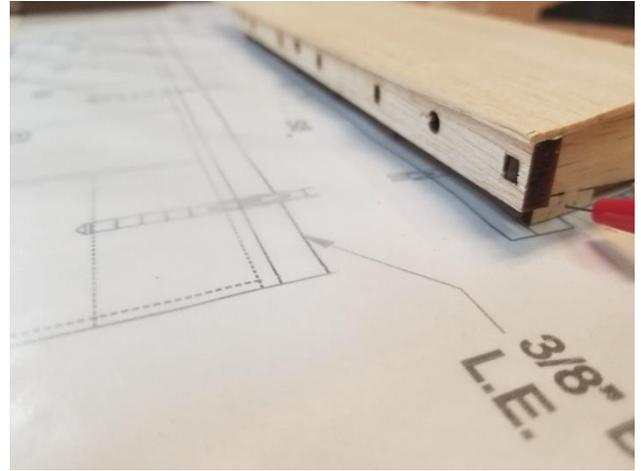

S8 Trailing Edge

Glue S7 rib in place.

Glue S10 trailing edge in place.

Glue some balsa block on the inside for your hinges.
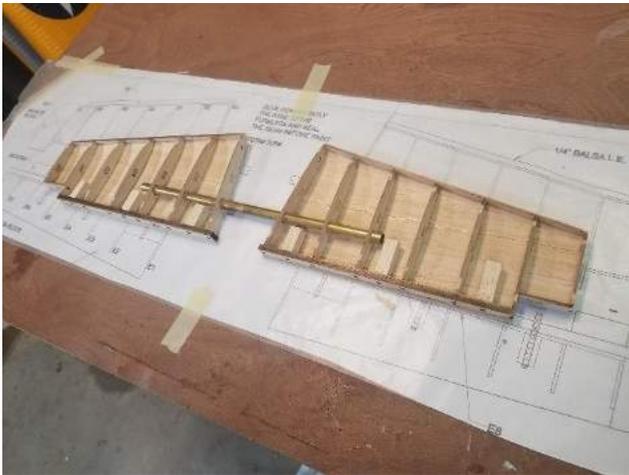

Form S9 to shape with the leading edge of each rib.

Sheet the top of the wing so that the trailing edge overlaps about 1/8th of an inch past the trailing edge.

Glue balsa sheet to the leading edge and form to shape.

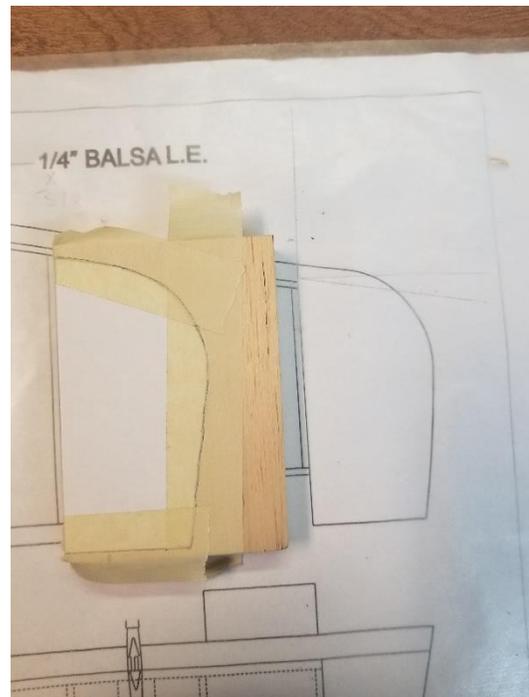
Repeat these steps for the opposite side.

Test fit both halves to the fuselage.

You can choose to make this area removable. On the model, a brass tube with a wood dowel inside is sufficient.

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Once happy with the fit, sheet the underside of the stab and sand to a smooth form.

Make a template from plans and fix to a piece of balsa block as shown.

Cut to shape and glue it to the stab tip.
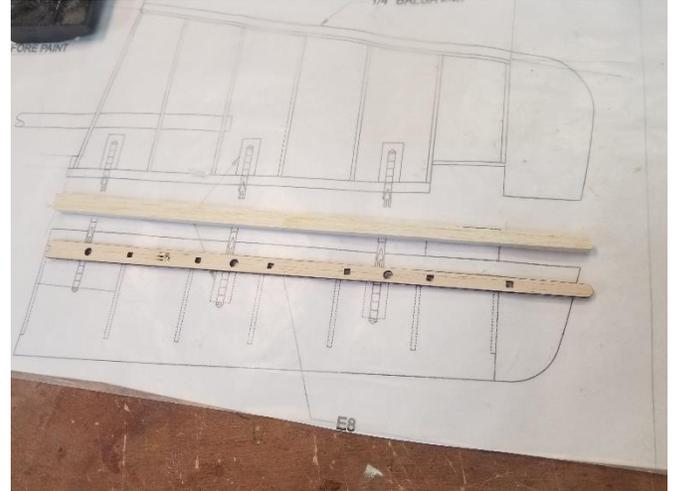

Shape to the form of the stab

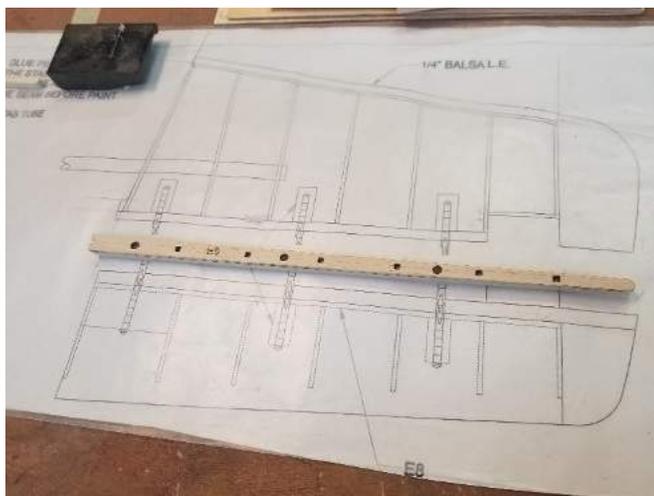Once complete, repeat steps for the opposite side.

ELEVATOR

Gather Parts:

- You should have 2 of E1-E7
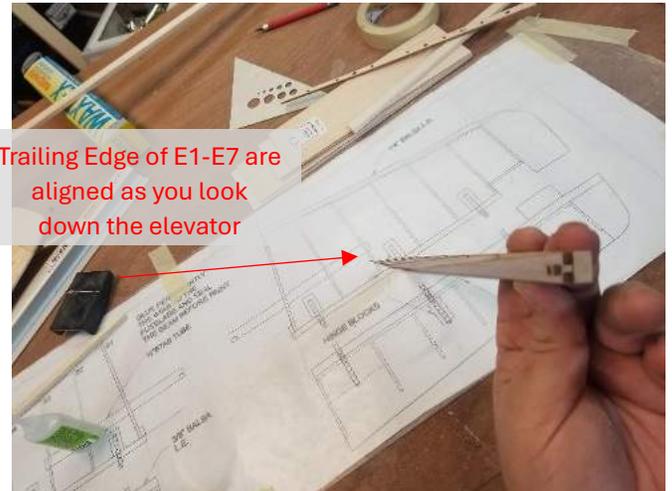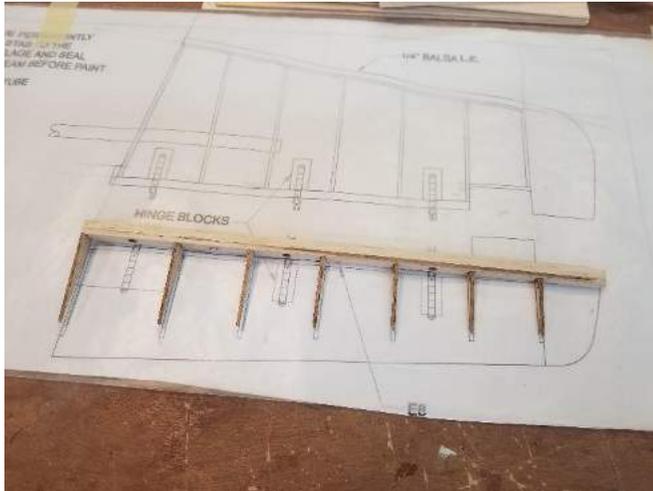- You should have 2 of E8 Leading Edge

Cut a piece of strip balsa that matches the plans. You will need to cut 2 pieces roughly the length of E8.

Glue the balsa strip to E8 making sure that the entire leading edge is straight. Do not allow warping!
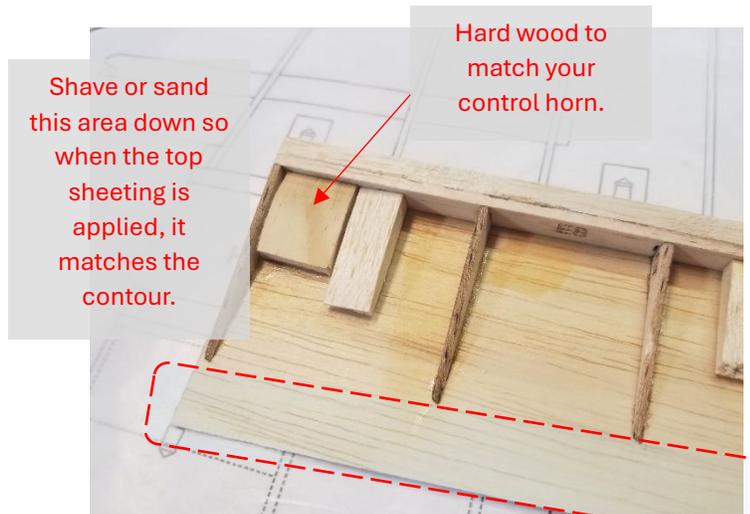
THIS SPACE IS INTENTIONALLY LEFT BLANK.

Glue E1 through E7 on the side that has E8. Do **NOT** glue to the balsa block side! ***Before you glue, please look at the next step***!

Trailing Edge of E1-E7 are aligned as you look down the elevator

While glueing you **NEED** to make sure the trailing edges are straight so if you look down the elevator, there is no warping! Start with E1, and match E2,3,4,5,6,7 exactly!
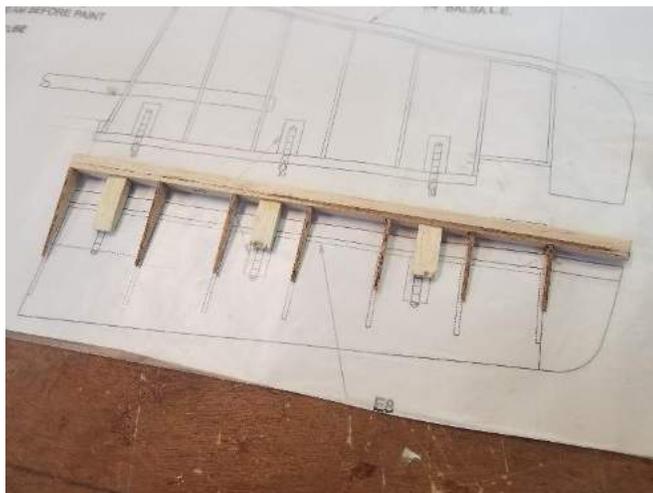
Glue some scrap balsa for your hinges. Shape these to fit the contour of the elevator.

Shave or sand this area down so when the top sheeting is applied, it matches the contour.

Hard wood to match your control horn.

Glue a piece of hardwood block to the inside of E1. This will be used for the control horn.

Once you are happy, sheet the bottom of the elevator (you will need to trim the balsa at the area shown on both the top and bottom sheeting so when they join, this sill match the contour of the elevator.

Elevator counterweight

Glue the top sheeting into place.

Make a template of the tip from the plans.

- Once cut to shape, glue to the tip of the elevator.

Sand the leading edge and tip smooth.

Attach a piece of balsa to make the "elevator counterweight."

Attache the elevator to the stab multiple times as you sand the elevator to shape. This way the elevator will match the stab perfectly once complete.

Unlike other fiberglass fuselages on the market, the Heritage P-51 fuselage finds its strength within the actual fiberglass work itself. There is little need for multiple formers as this will only add weight. In order to keep the strength at a maximum and weight at a minimum, great thought was placed in the layer build up of the fuselage. There are only 2 formers, a wing saddle, and a firewall added for additional strength. This allows the weight to remain at a minimum and to allow flexing during flight.

- Gather your parts for the Wing Saddle (WS)
    - WS1 x 2
    - WS2 x 1
    - WS 3 x 1
    - WS 3 x 2
- Glue WS1 to WS 1 to make the thick trailing edge wing bolt plate (this will go in the trailing edge notch of WS 4).
- Glue WS3 in the middle of WS2 so you have a notch on either side (the lip of WS2 will go in the leading edge notch of WS4 to make the leading edge wing bolt plate).

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- Using the wing saddle in the fuselage as a guide, test fit WS4 in place making sure that the trailing edge notch faces the rear and the leading edge notch faces the nose of the fuselage.
- Insert the leading edge and trailing edge wing bolt plates in place. You may want to tac glue then place the wing over and look through the bolt holes through the wing you (made earlier) to make sure the bolts will go into the wing bolt plates.
- Once you are happy, I suggest you hysol or 30min epoxy in place.

Leading edge (W2=W3) wing bolt plate

Trailing edge (W1 + W1) wing bolt plate
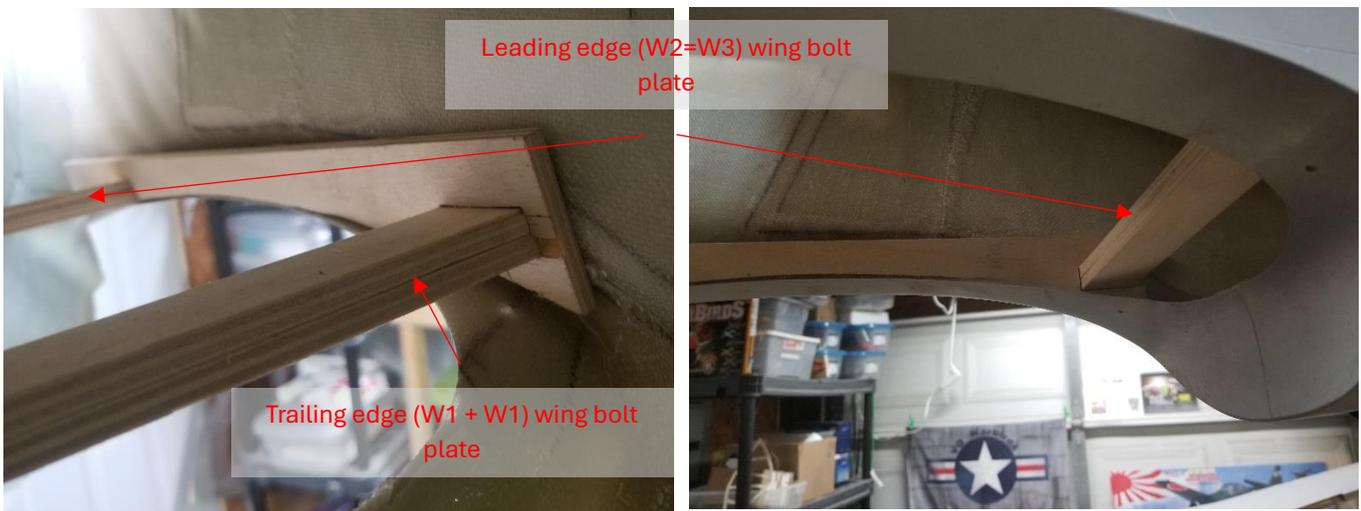
- Locate F2 and glue into place.
  - This serves no structural purpose. Its idea is a base for the fuel tank. You could glue additional floor to this if you chose.
  - You do not need to use this if you have a different idea for the fuel tank.

- Locate the Front Fuselage Former and from the front, install and push back into place until it stops. Once you are happy with the fit, glue into place.
    - Notice the gaps around the former. This is okay. This is a perfect example of why I use hysol. It doesn't run after it is applied.
        - Fist tac glue with some CA in several areas to prevent the former from moving then apply the hysol.
        - Notice in the 2nd picture, after rubbing it smooth with your finger (use gloves! – this stuff is hard to wipe off your finger), the hysol will fill all the gaps and not move.

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- Locate the Rear Fuselage Former.
  - Repeat the same steps as you did in page 4 with the Front Fuselage Former

- o Locate the firewall
  - Fit this into place and try to make it is square as you can. Depending on what engine you use, you may want to wait until you are ready for the engine install before you secure the firewall.