The “Trophy Trainer”

By Tom Warden

“kits by Walter Umland”

Trophy Trainer Building Notes

By Walter Umland

Thank you for purchasing this kit, the best balsa wood available was used to make Tom Warden's Trophy Trainer. Tom Lay & Bob Kruger worked together to verify accuracy of these plans. The laser cut parts are the state of the art. I hope that you enjoy building this kit as much as I have doing the prototype kit. This kit was designed for the more experienced builder, flyer and competitor however; if you have some basic model building experience then you should do just fine.

Preconstruction notes.

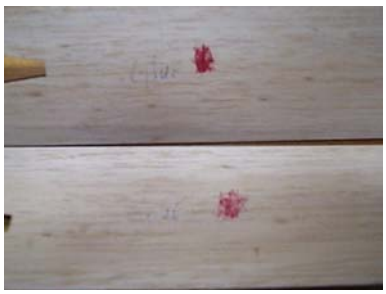
I have made every effort to make this one of the most efficient kits available for the serious modeler just shy of any hardware. Use the following building notes to act as guidelines for construction of the kit. Read them at least once before starting the airplane and they should familiarize you with terminology in building Control Line Stunt Models, especially if you are new to this type of construction.

Before starting construction, lay out all the parts in the kit and check them against the checklist. If you have found any problems at all and have access to the Internet contact us at: builtrightflyright@builtrightflyright.com Attn: Walter

Fuselage:

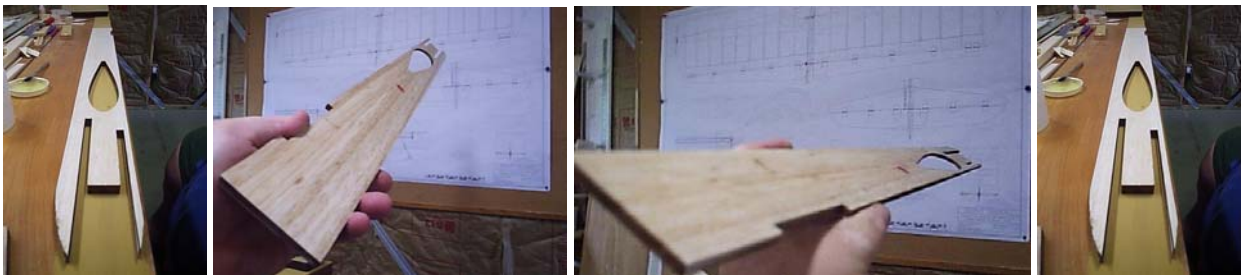
Start with the fuselage. First remove the balsa from the wing cut out section, remove the tail filler piece and glue together, this will aid in alignment of the fuselage halves.

Mark on the fuselage which sides are to receive the glue, this will prevent you from gluing the wrong side.



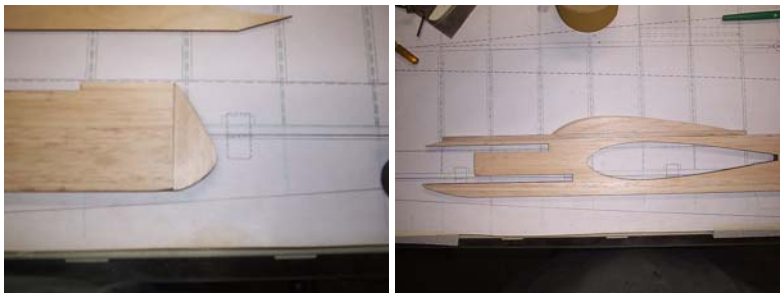
Clean off any charring and then start assembly by carefully gluing the two body halves together with 24 hr epoxy. This will give you time to check the alignment of the fuselage halves as the epoxy cures. I suggest that you put a very thin layer on both sides and allow about five minutes or so for the glue to soak in and then with a scrap piece of wood scrape off any excess glue, **You can also apply a little heat with a heat gun to thin out the epoxy as you are removing the excess glue*.* A**lign** the fuselage halves together then separate once, then lay flat on the table and

Fuselage continued:



Temporarily re-install the center wing cut out piece. Carefully place the other half back together and apply pressure, clean off any excess glue that may squeeze out, and tape together, Once you have finished taping all around the fuselage, you can remove the center wing cut out piece, as this is no longer needed. Put a clean piece of wax paper under the body and lay on a flat surface with lots of weight on top. Bricks or large heavy books will suffice.

Before actually gluing the plywood doublers to the front of the fuselage, clean off the outer edges of the fuselage with sandpaper, then glue on the tail filler piece and the ½ x ¼ balsa piece, this piece goes just below the canopy, *I suggest that you only tack glue the canopy at this time,* then sand flush with the rest of the fuselage.



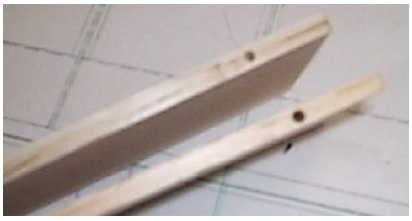
Make sure you test fit the mounts as sometimes hardwood and balsa thicknesses tend to be a bit off, sand to proper fit.

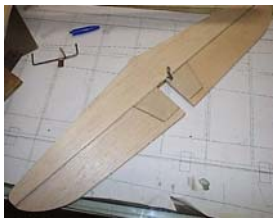
Mark on the doublers which side will receive the glue to eliminate any chance of gluing the wrong side.

Fuselage continued:

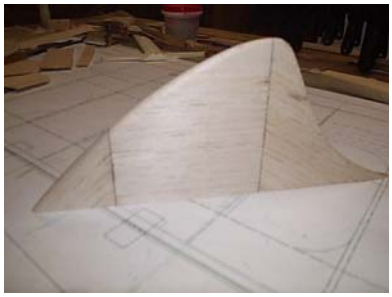
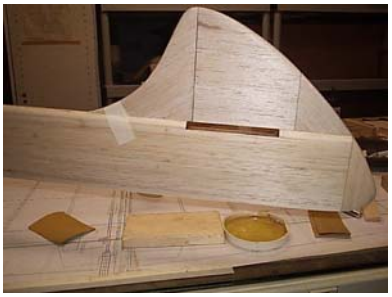
Once marked, glue the doublers and mounts to the fuse. *Note, I recommend you use some ¼" scrap balsa wedged in the wing cut out as shown in the photo below to help prevent the double from moving.* Taping the doublers in place first is a good idea, then with as many clamps as you have, clamp together, set aside and start building the tail.


Assembling the Stabilizer & Elevators. Tape the elevators to the stabilizer and mark the horn locations on the elevator's and carefully drill holes for the horn wire in the elev. halves. Apply the plywood horn support's (elev. doublers) and trim as needed, add hinges. Then sand to shape.



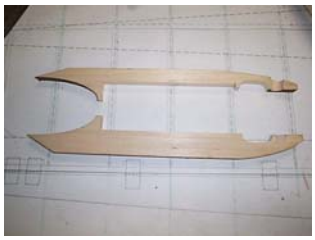
Assemble the vertical fin/ rudder, sand to shape and mark on the fuselage the location where the rudder will mount. Start sanding the fuselage aft of the plywood doublers. Note, the doublers DO NOT get sanded because the balsa triplers are glued to them but NOT until after the holes for the engine and tank are drilled.

Assemble the ¼ inch balsa triplers in the same fashion as was done with the fuselage sides, set aside and let dry. While the triplers are drying, mark and drill the locations of the engine and tank, then temporarily mount engine and mark and cut balsa triplers.


Remove tank, mark and cut the engine side balsa tripler to allow mounting of the engine and tank. Comment: It may not be required for your tank choice but a five ounce tank was mounted on the proto-type for future testing reasons so when it came time to make the cut out for the tank I found it easier to break the tripler in two as shown in the picture on the next page.

Fuselage continued:

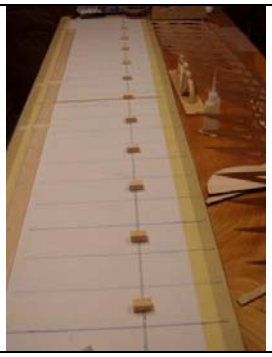



Once done, you can accurately find the location of the blind nuts by simply lining the fuselage over the inboard side tripler and pressing the fuselage down leaving marks as shown here.


Check the fit and amount of clearance around the engine as well as the movement of the tank adjustment up and down. When you're satisfied with this remove the engine and tank, glue triplers, tape in place, add weight and let dry.

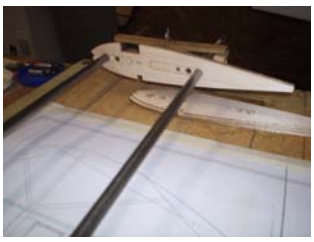
Once dry, drill the 3/8th x ½ basswood tail wheel block for a piece of 1/16th music wire to go through it, insert the wire, carefully cut and install the tail wheel assembly as shown.

*** Wing Notes*** I will show the wing constructed on a jig but should you elect to not use a jig and build on your table I recommend securing a small ½"sq. pieces of balsa to your building surface, this will act as a shim under the main spar for gluing the ribs and trailing edge in place, either way you decide to build the wing you first should tape the plans to your building surface.

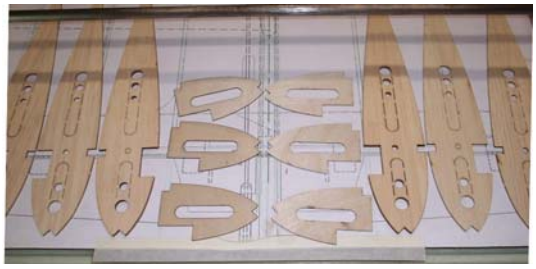
	This picture is from a different models wing when not using a wing jig, this photo is just a sample. Using either tape or a drop of glue place the blocks on the plan between the ribs. Taping the spar to the blocks is recommended. Next add your ribs to the spar and the bottom T.E. sheeting and go from there.	

Let's move on to building with a wing jig. Make sure the jig is lined up straight and you compensate the height of your rod shims for any possible dips in the bench. A misconception when using a rod jig is that one might think that simply using a rod type jig insures a straight wing. If you evenly shim the rods on an uneven bench then the rods will be off as well and that is a no, no, so make sure to setup your jig and spend at least 30 minutes checking the levels from different angles.

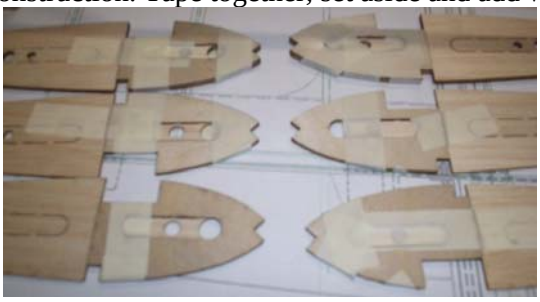
Building your wing using a rod type wing jig. First we set the rods for the width of the holes in the ribs, At this point it does not matter which way the ribs are facing as you are only setting up the jig.

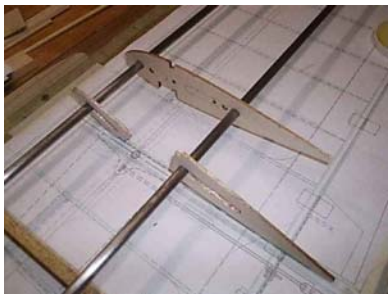

Next lay out ribs; #R3, R3A and R5 as they will become left and rights.



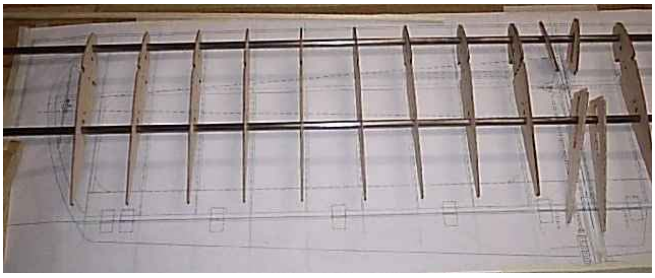
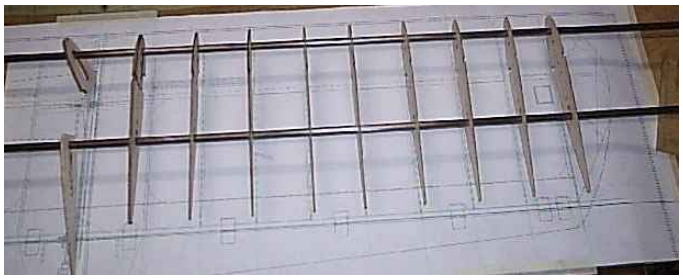
Using a slow curing epoxy, add a thin layer to the side of the plywood rib doubler (R5) and join with each of ribs R3 & R3A. Temporarily add a piece of scrap balsa to ensure that they are properly aligned, * you don't want to have to trim later on in the middle of construction. Tape together, set aside and add weight and let cure.

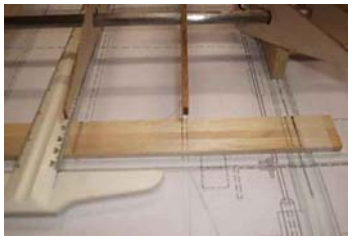

Now add all the ribs onto the rods making sure you have the left side gear ribs on the left and the same for the right side, also make sure your ribs that will receive the gear blocks are all pointing downward.

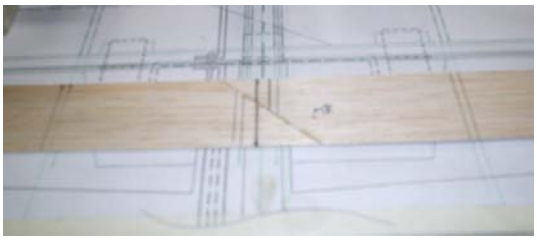




** A personal note here, * When building the prototype, I found it would have been a good idea to leave out rib R2 so for now either leave them out or just leave them unglued because if you don't do either as I did, you will only have to cut it out later.*

Leaving a little extra material on the inside, start marking the T.E. sheeting where the ribs will be glued to the T.E. sheeting so you can have enough T.E. sheeting to make your angle cut for joining the two sides.



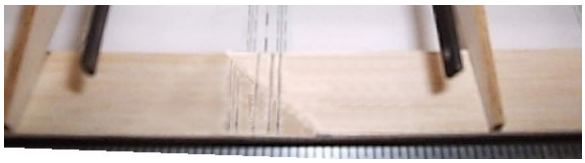


Check the main spar to see how it fits into the ribs before gluing it into the wing, as the laser burn cuts the wood so this may need a very slight sanding for perfect fit. Use very fine sand-paper as all you want to do is remove the charring. Then with wax paper under the spar, tack glue the two spars together, checking the straightness as you glue the main spars. Once the ribs are in place, glue the Leading Edges on then add the top spars, then assemble the B.C. mount and be sure to use a spare piece of 1/8th music wire as a temporary spacer as shown.

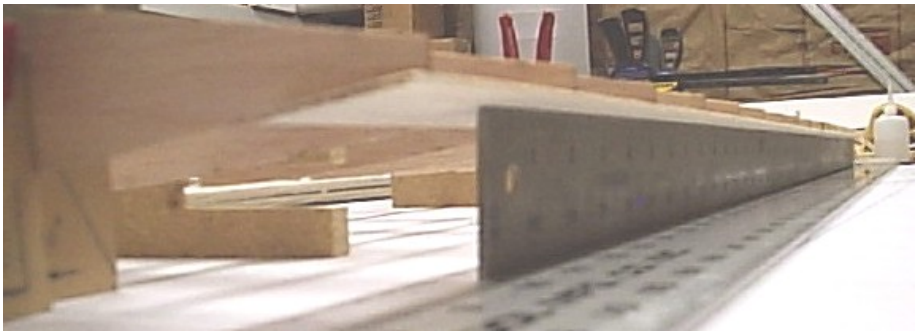


Repeat the process for adding in the bottom spars.


Join the trailing edge, *Remember to leave the R2 ribs unglued.* Now that the Ribs, L.E. and Spar is in place, Place the trailing edges under the back portion of the ribs and align over the plans using a square and then start to tack glue.

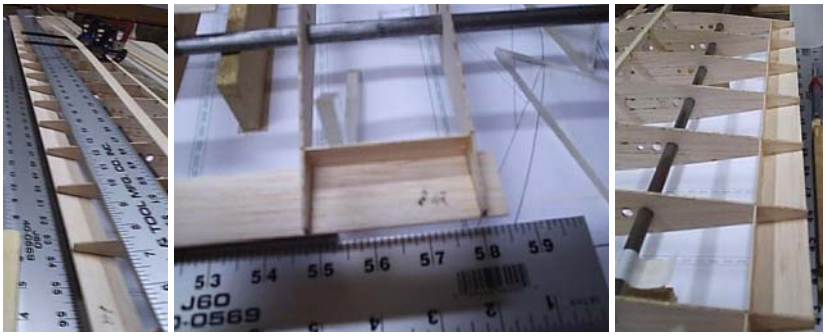


For the next step I'd like to make a suggestion. Using two large straight edges taped together as an L will help to help keep your trailing edge straight. See photos.



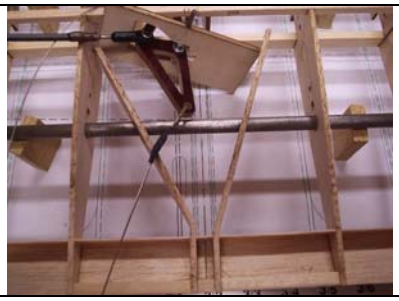
Using several small squares can be very helpful with the construction of the Trophy Trainer.

After the bottom trailing edge is mounted, take another straight edge and mark the location on the top of the rib where the trailing edge webbing will be installed. A sheet of 1/32 x 3 x 36 Balsa has been provided. Measure the height where the webbing will be mounted and cut strips as needed. Once done, proceed with adding the webbing to the T.E.



A Control Line Central ball link system was used for the prototype, some minor trimming of the B.C. mount was necessary. Follow CLC control system instructions when setting up the controls and don't forget the locktite.

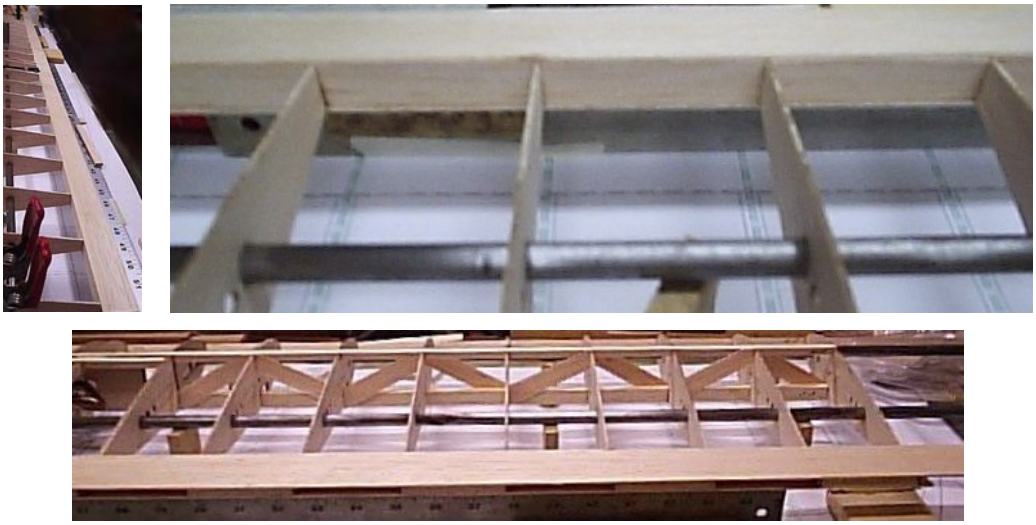
If you recall I mentioned in the beginning that it would be best to leave the # 2 ribs out until later, well here we are. The photo to the right is of that Boo Boo.



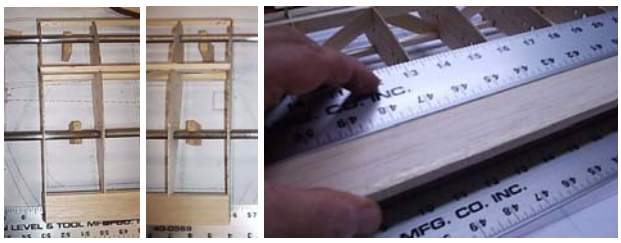
With the # 2 ribs removed, test fit the B.C. mount assembly, then trim the #1 and # 2 ribs as needed.

Once you have the B.C. mount assembly fitted, permanently install the flap pushrod to your bellcrank and glue the entire assembly to the Spars and clamp in place. Immediately after clamping, add the # 2 ribs in place and add the precut ¼ sq. x 6" bellcrank supports in now.

Now that you have the T.E. webbing and B.C. mount with controls installed, install the top T.E. sheeting and then the spar webbing.



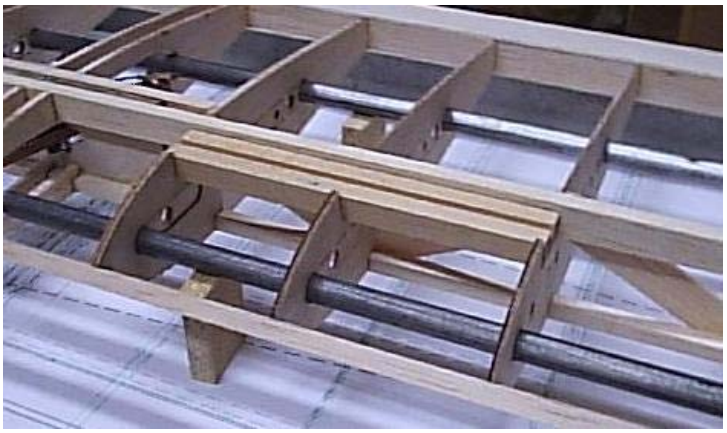
Trim off any excess T.E. sheeting & add the ¼ x 3/8 T.E. Using a straight edge as shown can prevent any damage to the T.E. and gives you something solid to grab onto while you add tape to secure the ¼ x 3/8 T.E. from moving.



Use another straight to edge check that the T.E. is straight before glue sets, re-align if needed, let dry. Don't sand yet.

Now is a good time to flip the wing over so you can work on the bottom of the wing. Add the precut ¼ sq. x 6 bellcrank supports in now.

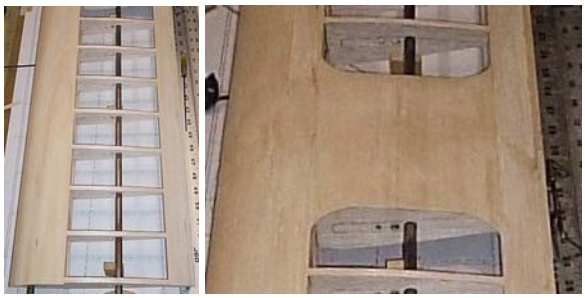
Add Gear blocks at this time. It is not shown or mentioned on the plans but because the gear blocks are below the sheeting you need to add some scrap balsa to the front portion of the gear blocks between the two ribs (R3 & R3A) to give the L.E. sheeting a place to be glued.



Sheeting the bottom wing & leading edge.

Starting by using a slow cure C/A or any other slow drying wood glue, apply glue to the leading edge and add sheeting. Secure sheeting with either pins or tape and let dry. Once dry, remove pins or tape and dampen the sheet, then apply glue to the ribs and spar and immediately and evenly push down the leading edge sheeting. This may be achieved using a long block or straight edge. Clamp the straight edge or pin the leading edge sheeting to the spar. Once done, repeat the process for the other panel. (see photos on top of page 10)

Add cap strips and center section sheeting as shown on plans.



After you have completed sheeting the bottom leading edge, locate and carefully cut out the opening for the gear block covers. **covers are faint, but they are in the picture.** Drill the holes for the L.G. wire and gear covers and add bolts and blind nuts. *Don't worry about drilling the hole in the torque block that can be done easily later on.*

Once you have the bottom wing completely sheeted, cap stripped and the gear block covers done, remove the wing from the jig and carefully flip the wing over **again**, realign and re-shim the wing into the jig where necessary. Add epoxy around the blind nuts for added security as they can turn if over tightened.

Now is the time to install the flap horn and make any final adjustments to the bellcrank. This is your last chance to add the locktite if you haven't already done so.

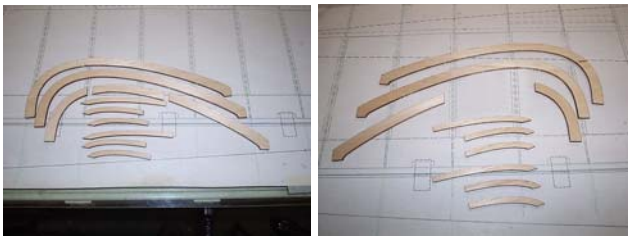
Now repeat the process for the top sheeting.

Join the sheeting, make a reference mark for the center and with the horn connected make your cut out for the pushrod and give up & down a few times testing for adequate clearance.

Trim center sheeting and permanently glue in place. Add cap strips. Using scrap sheeting add the corner trim pieces,

Remove the wing from the jig and start sanding the entire wing now. This can prevent damaging the wingtips later.

Next, lay out the wing tip parts and assemble as shown.



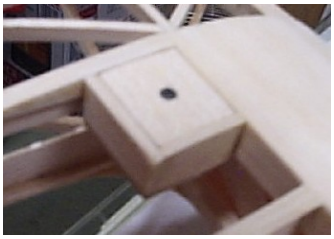
Sand the last rib flush and install wingtip and wingtip ribs as shown.



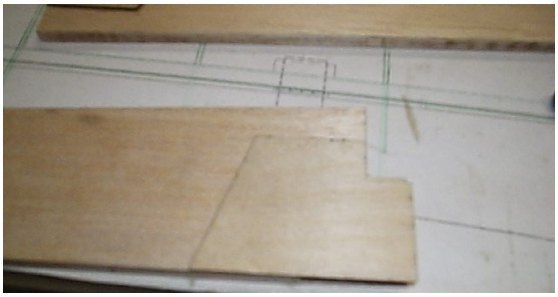
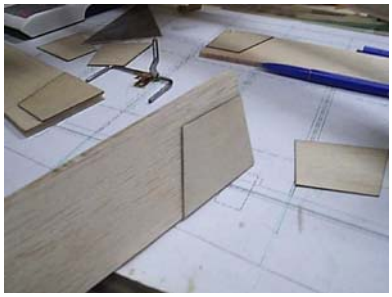

Flip wing over and repeat process.

Repeat the process again on the inboard wing only this time include an adjustable Lead-out guide as shown on plans.

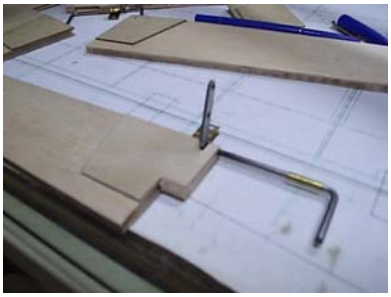

Once done, install weight box with a frame around it for the covering to hold onto.
Now sand the weight box cover and wingtips as desired.


Install the flap horn doublers top and bottom on both flaps.

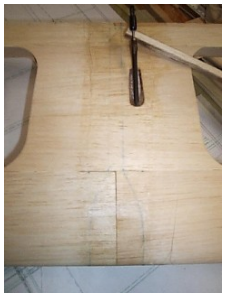



Install the flap horn now. If you are using nylon hinges now is the time to cut the slots in the flaps and wing for the hinges and horn wire clip (bushing). Regardless of what type of hinges you use, be it nylon or cloth, you want to have the hinge line as close as possible.

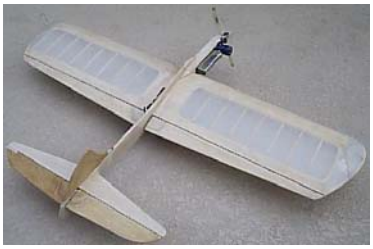


Temporarily install the wing into the fuselage and mark the center section where the fuselage will mount, then glass the center section using a lightweight fiberglass cloth and slow curing epoxy. Set aside and let cure.





Let’s jump ahead and show you a sneak preview...



Completely assemble, final sand entire model and Cover to your desired finish, and the rest is up to you.

The photos and notes above should be use as a reference based on building of the prototype.
Please feel free to use your own building techniques as you see fit.