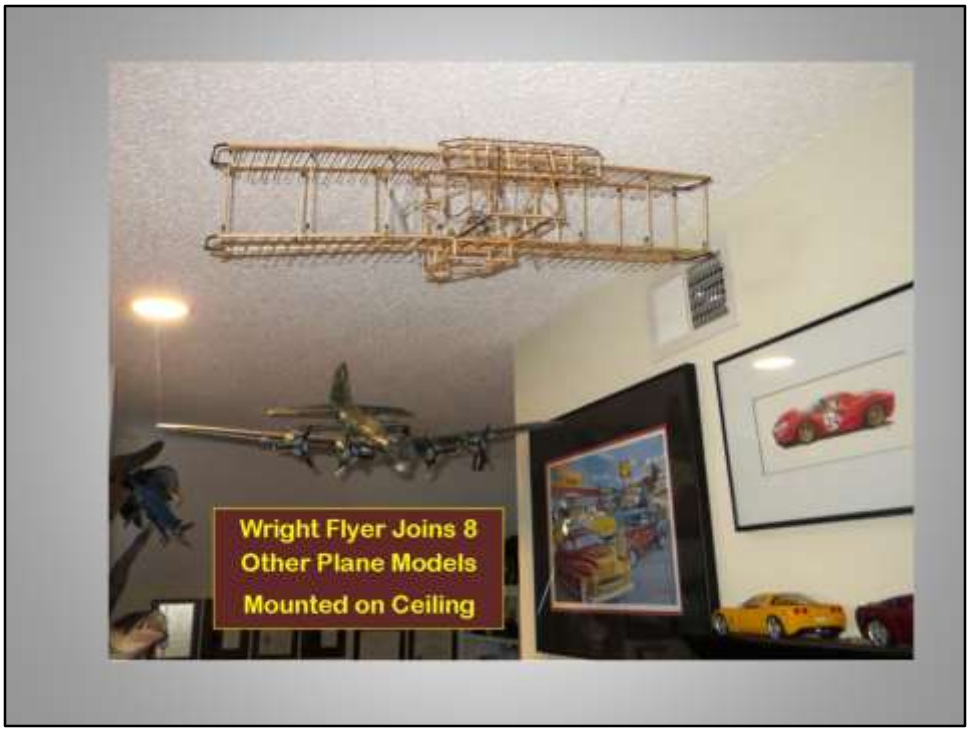
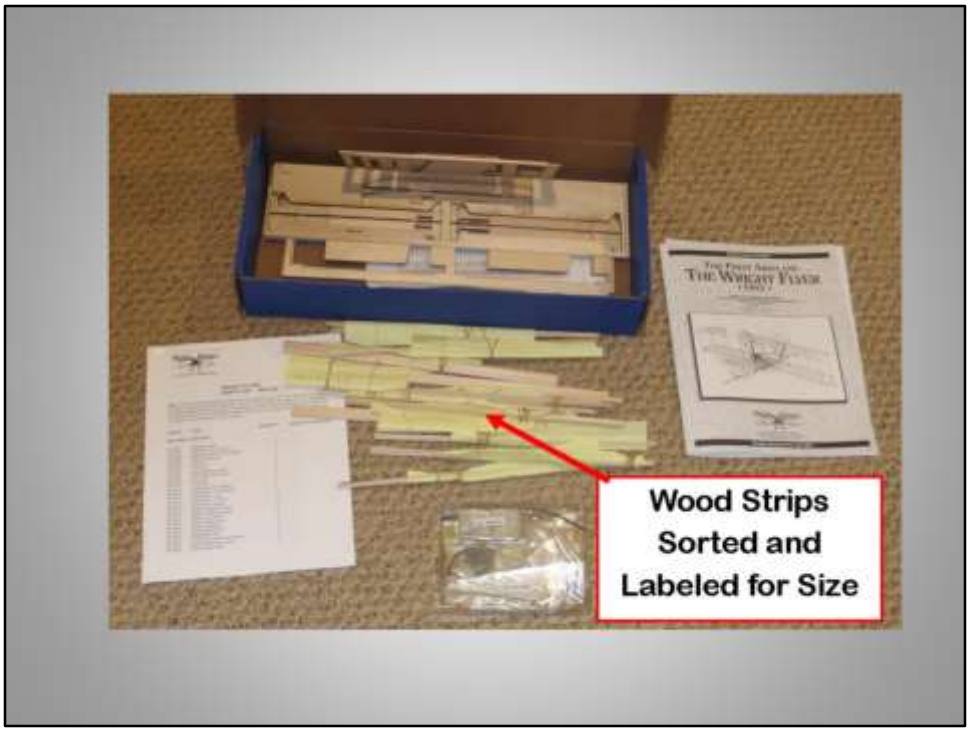
Construction of Model Airways Wright Brothers First Powered Flight Airplane

The objective of this PDF is to share some the models construction techniques found useful that are not suggested in the instructions.



On December 17, 1903 the Wright Flyer made their historic first powered flight. This accurate model is mounted on the ceiling in my "Man Cave" / Office along with 8 other Model Planes- most from WWII.

The 1/16 scale kit by Model Airways is an accurate, detailed replica of the Wright Brothers first airplane. The manufacturer indicates it is for a 15 year old and up. It is a challenging model to assemble.
Hopefully this video will avoid some construction frustration! If you're going to spend the time required for the build, watching this reviewing this PDF is well worth the effort.



The Laser cut wood parts are excellent. The metal parts are also well detailed but need some modest finishing.

The 28 page instructions are good but not simple to follow. It is worth downloading a PDF from the Internet so part numbers can be searched. Full model scale plans are provided and are used during construction.

One suggestion provided by another builder is to measure, group and label the wood strips- - this was helpful.

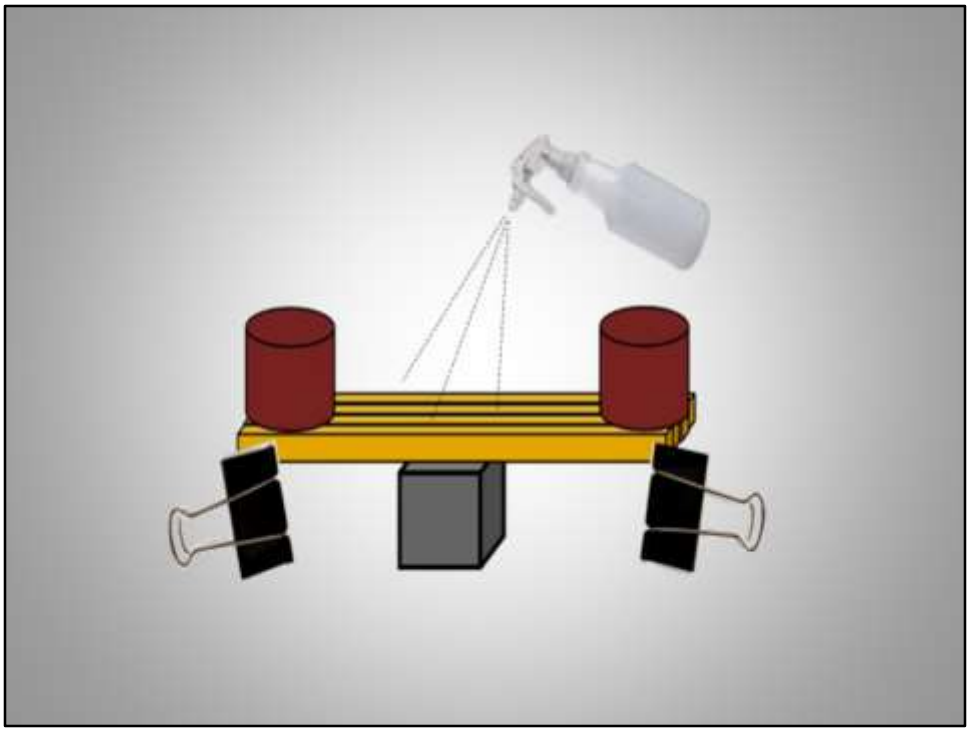
Another recommendation by someone who built the model is to Google pictures of the model and paintings or sketches of the Wright brother's plane. They can be referenced during construction.

After putting the top wing paper plan on a board that accepts straight pins you're ready to construction the wing building fixture.
Half inch foam insulation was used to hold this ~35 inch wide plan.

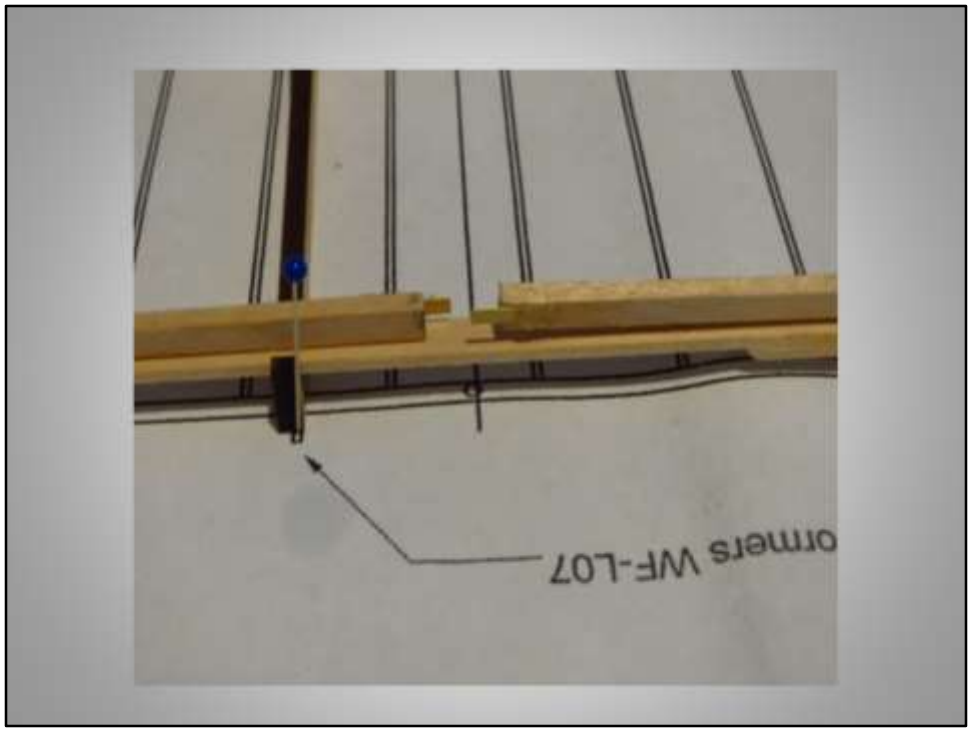
The wing fixture is assembled with glue or epoxy. "5 minute" or "quick set" epoxy was used for much on the model joining. UV activated plastic was also found to be a very useful joining technique. While holding a part in one hand just shine the UV light for 10 to 15 seconds to set the adhesive.

A reinforcement wood strip was epoxied under each wing fixture splice for added strength.

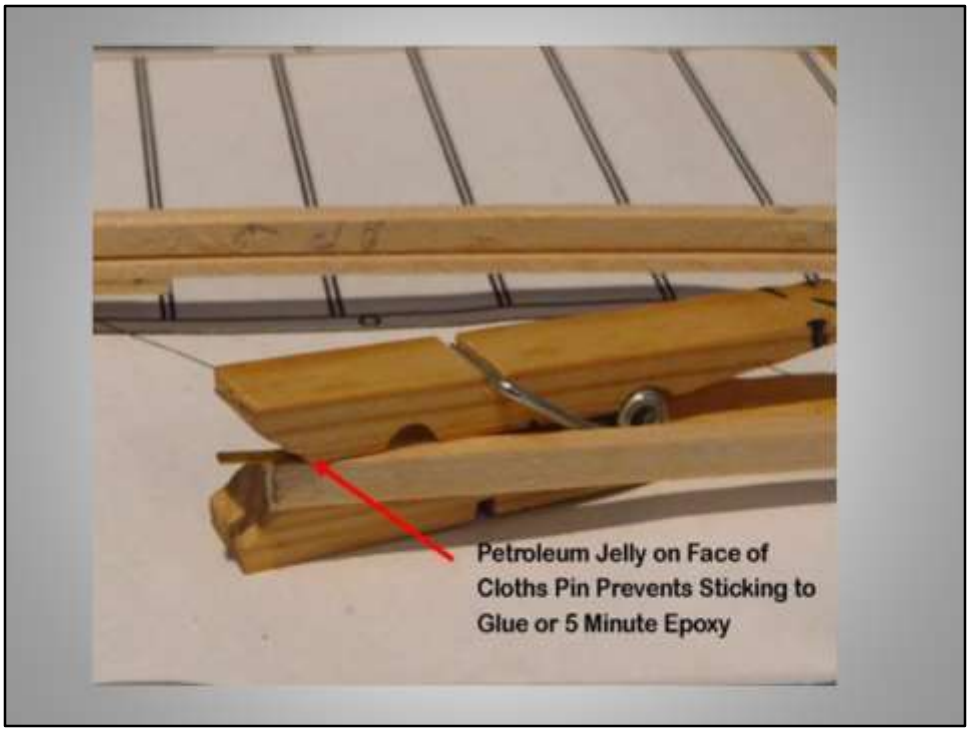
The finished wing fixture is ready to accept the two main wing spars.



The instructions say to select the spar pieces so they bend slightly downward. Found the most pieces were very straight! Those they were slightly bent were marked on the convex side with a small pencil dot. To slightly bend the others, I clamped the pieces together, weighted the ends over a center support and sprayed lightly with water. The next day they were bent sufficiently!

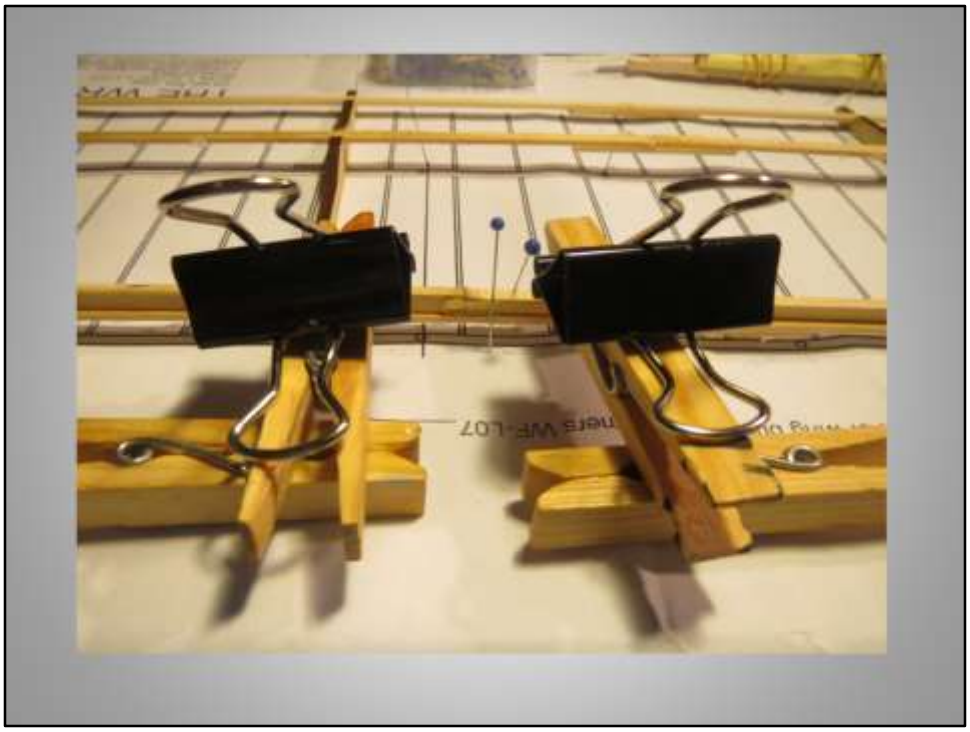


The brass hinge plates were epoxied to the spar sections to be joined before putting a small amount of epoxy in the joint.

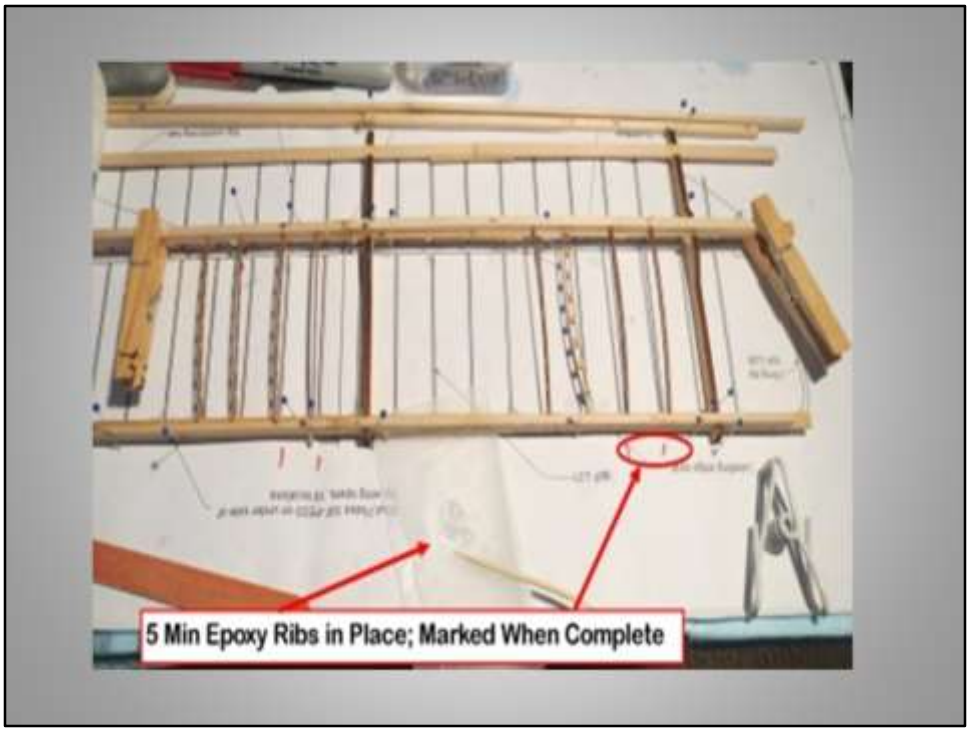


So the clothespin clamp used to hold the brass hinge plate to the spar did not stick, the clamping face was coated with petroleum jelly.

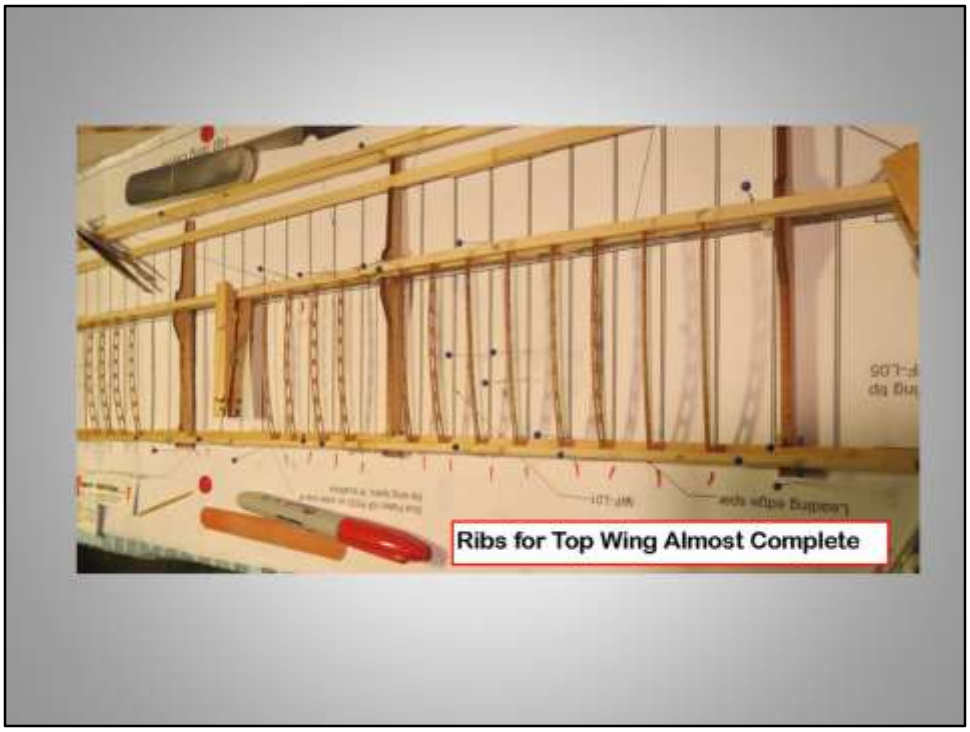
The petroleum jelly technique worked well for much of the construction. To avoid some of the epoxy used for the spar splice and the rib to spar joints from sticking inadvertently to the wing fixture, it was brushed with a heavy layer od Vaseline!



So the spar joints remained aligned whiled the epoxy cured, clothespins large metal clips weighted it down to the fixture.



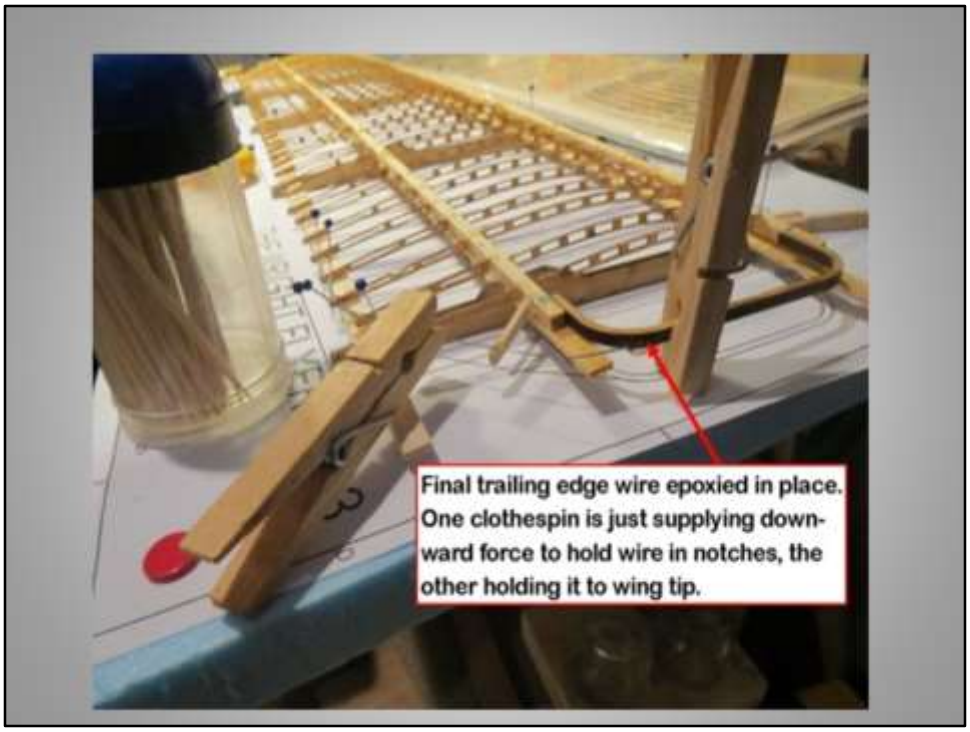
Two sets of 38 ribs need to be joined to the spars. I found a drop of epoxy placed on both rib ends with a toothpick worked well for the first group. The epoxy started to thicken in ~4 minutes so if a rib started to tilt from position it could be righted at that point. Only about 6 ribs were done at a time.



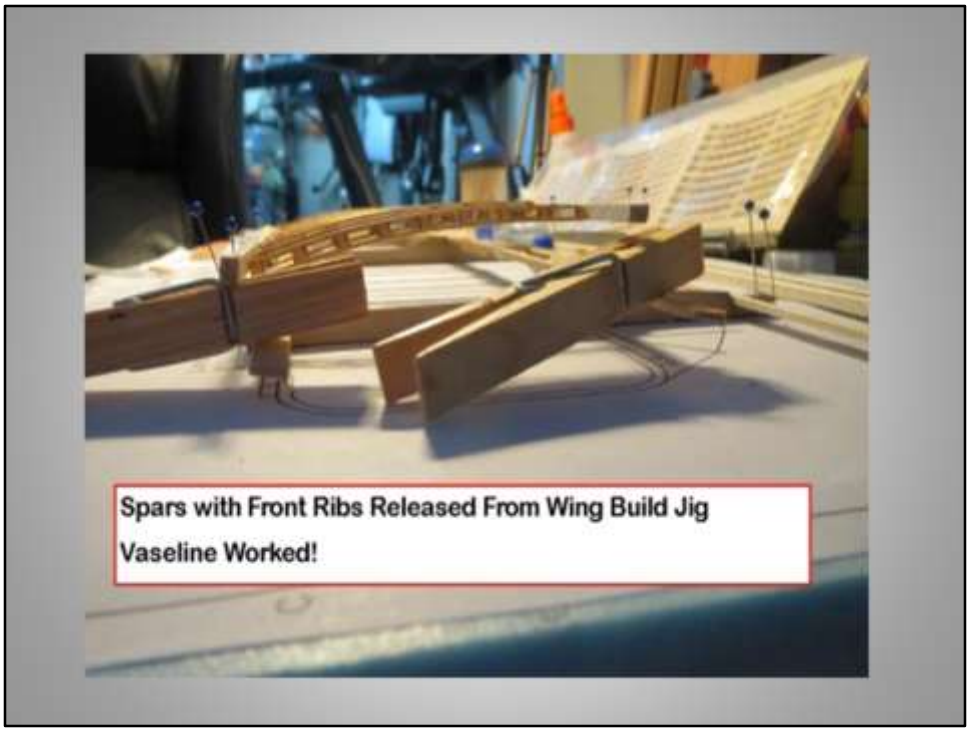
The epoxy is viscous so it helps hold the ribs in place without support while it cures. After ~10 minutes the next batch of 6 ribs was started to be put in place.

Made a small fixture from scrap wood to support the two short ribs at the wing ends while the epoxy cured.

Attached the trailing edge wire starting in the center and using just the weight of a clothespins to apply downward pressure and a drop of epoxy in the groove in the rib end. Progress from the center to each end after the epoxy cures.

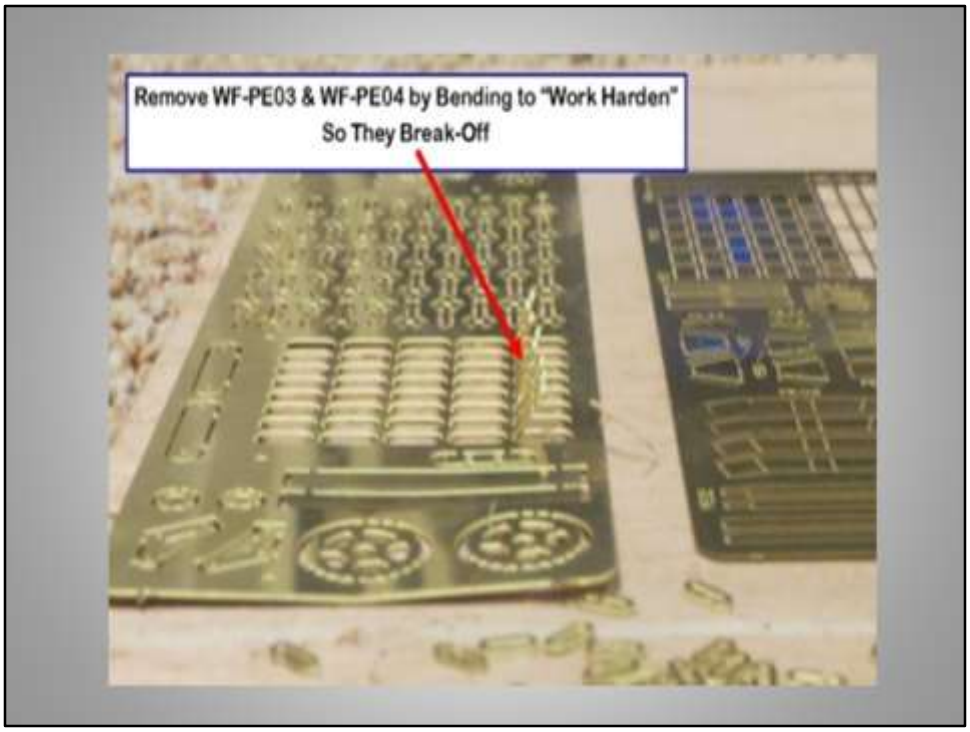


Bend the end of the trailing edge wire with pliers and use a petroleum coated face clothespin to secure to the wing tip. Use epoxy and let it dry overnight to provide a strong bond, then cut off excess wire.



When finished joining all ribs, remove the assembly from the fixture.

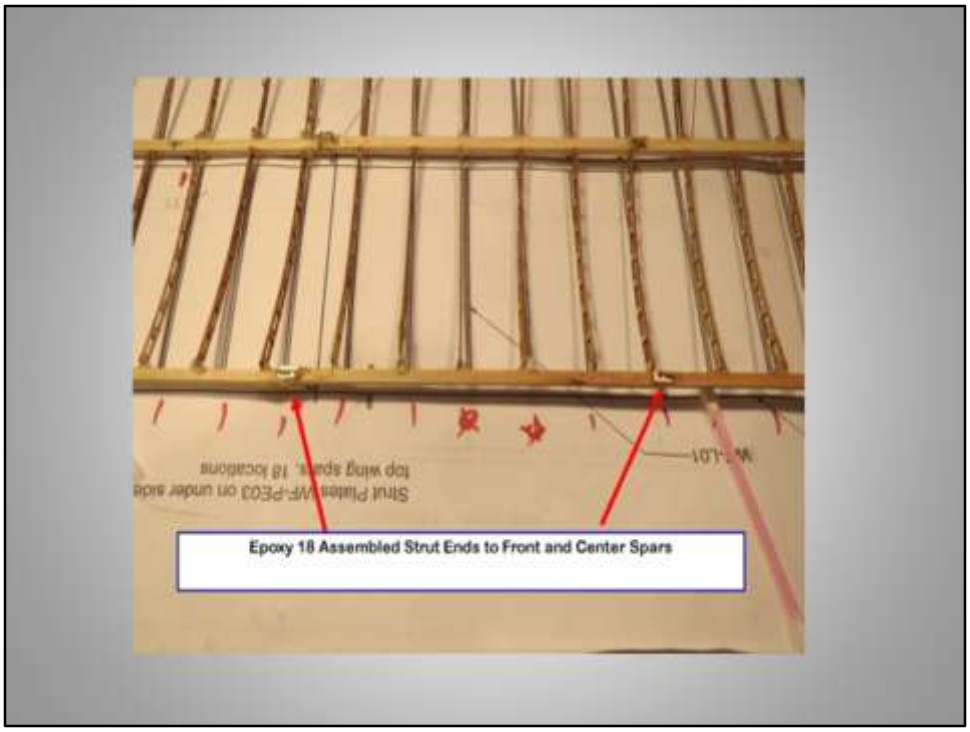
Turned the wing over and after wetting the end of a toothpick with epoxy, spread it to the sides of each rib joint, making a small fillet. A bit tedious but this step provided a secure joint.



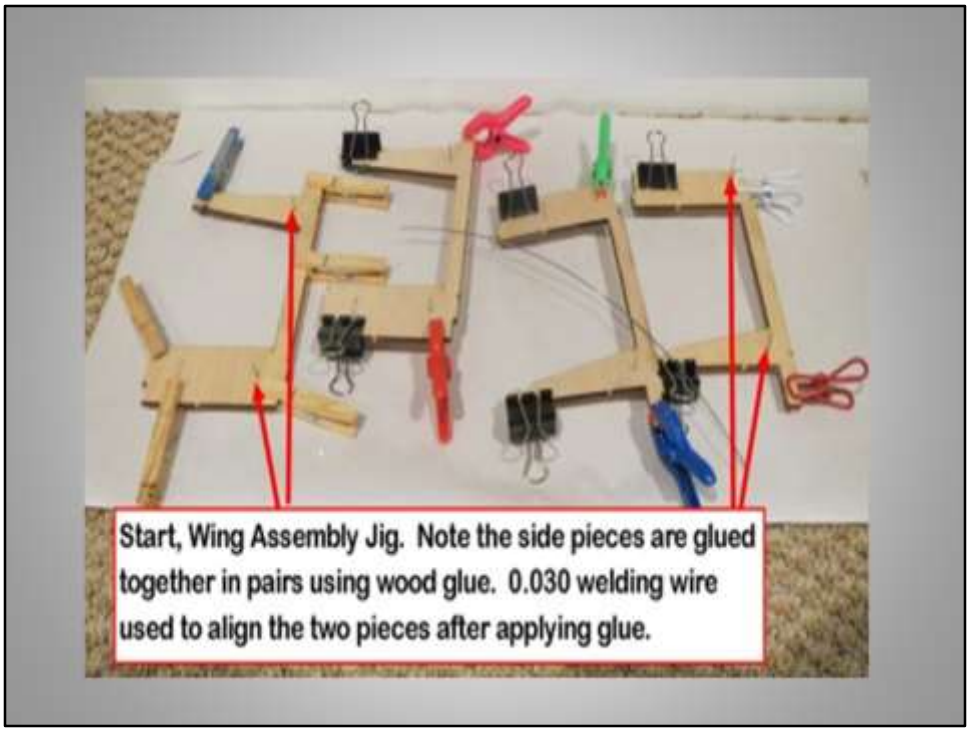
Remove the brass strut fittings and strut plates by bending back and forth. This will cause the connection to work harden and break.

To join the strut fitting to the strut plate "super glue, "was tried but found a better approach was to dip a toothpick in petroleum jelly and insert it tightly into the fitting. Then dipped the fitting bottom edge into epoxy and laid it with it's toothpick support on a plate. Did 6 at a time. A total of 18 are needed.

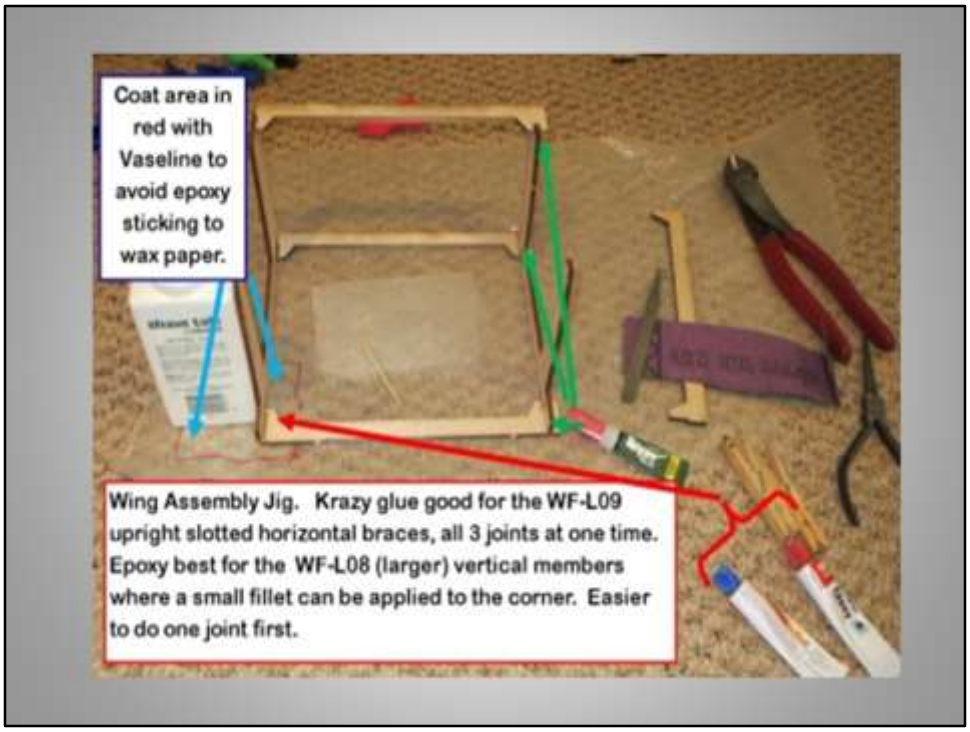
Note, used both small pieces of wax paper and aluminum foil to mix small amounts of epoxy. Found the foil worked best.



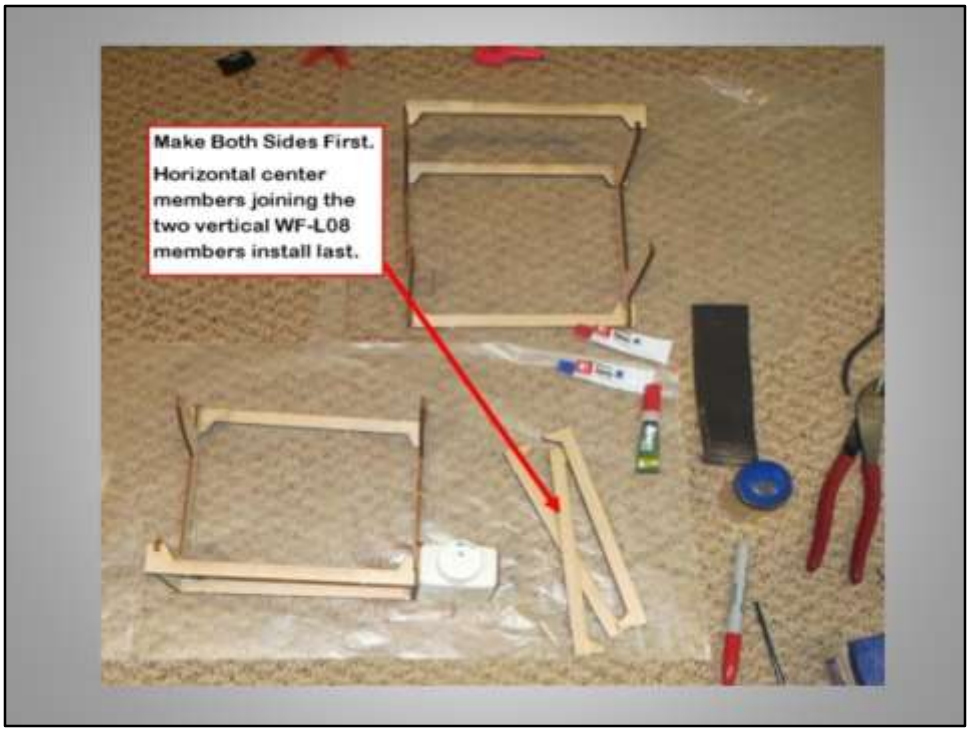
The strut plates are epoxied to the bottom of the Top Wing spars and the top of Bottom Wing spars. The locations are identified as dots on Plan 1 & 2.



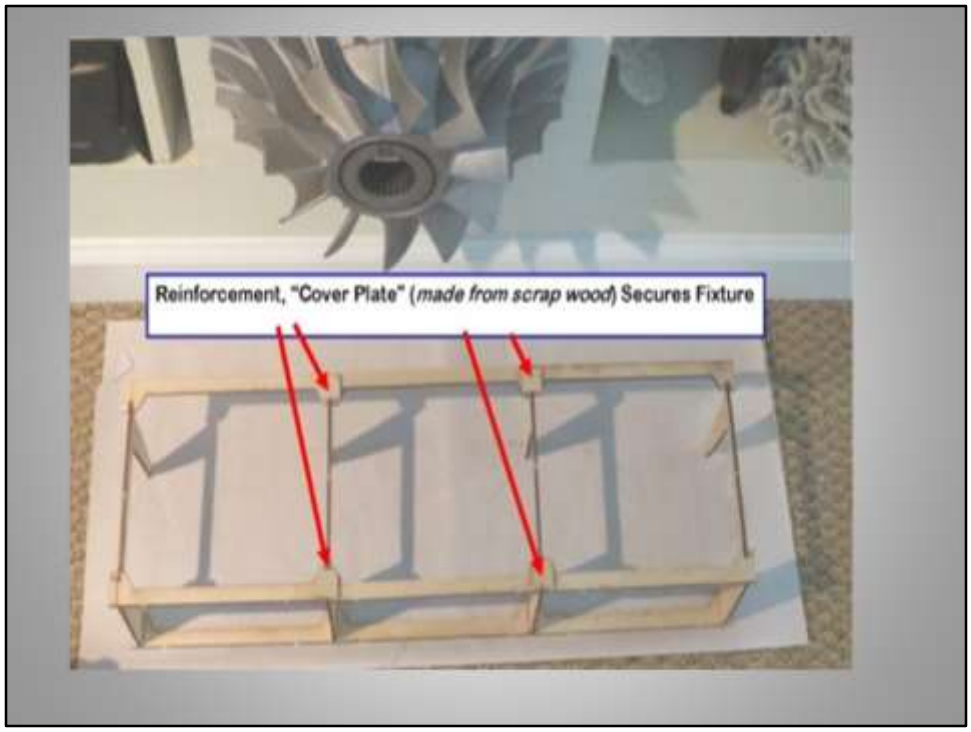
Wood glue was used to join the parts of the wing assembly jig together. A piece of 0.030 welding wire was placed in the predrilled holes to keep parts aligned.



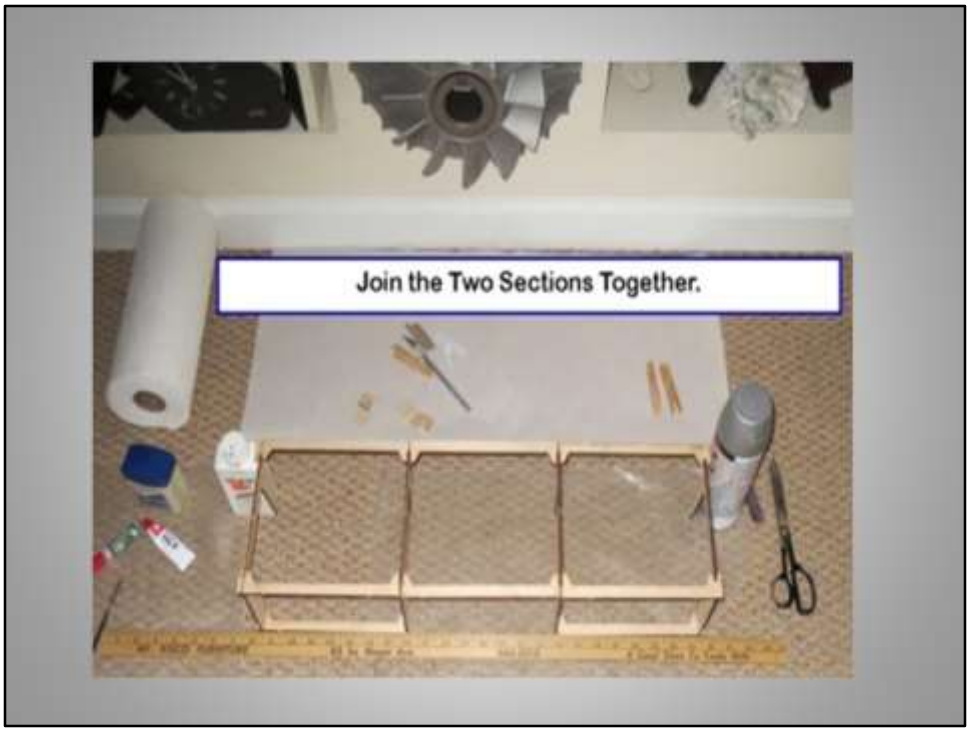
The assembled end Wing jig parts are epoxied together. Note petroleum jelly was coated on wax paper where the joined sections were placed so they did not stick to the paper. If the joined section was to attach with another in a subsequent step, the petroleum jelly was cleaned with rubbing alcohol.



After making the side fixture pieces, join them together so the slightly lower height sections of each are toward the outside. This causes a downward bend of the wing. Although two small epoxy tubes are visible large tubes from Harbor Freight are worth the extra cost.

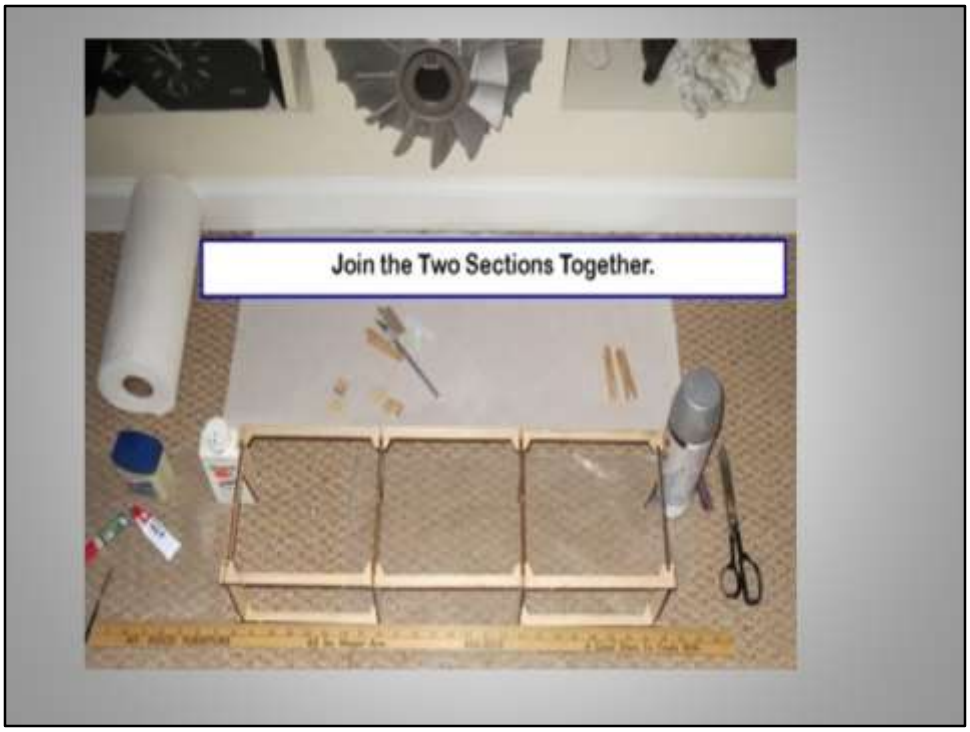


This is only a fixture so to assure the center butt joints are strong enough a cover piece was made from scrap wood and epoxied in place,

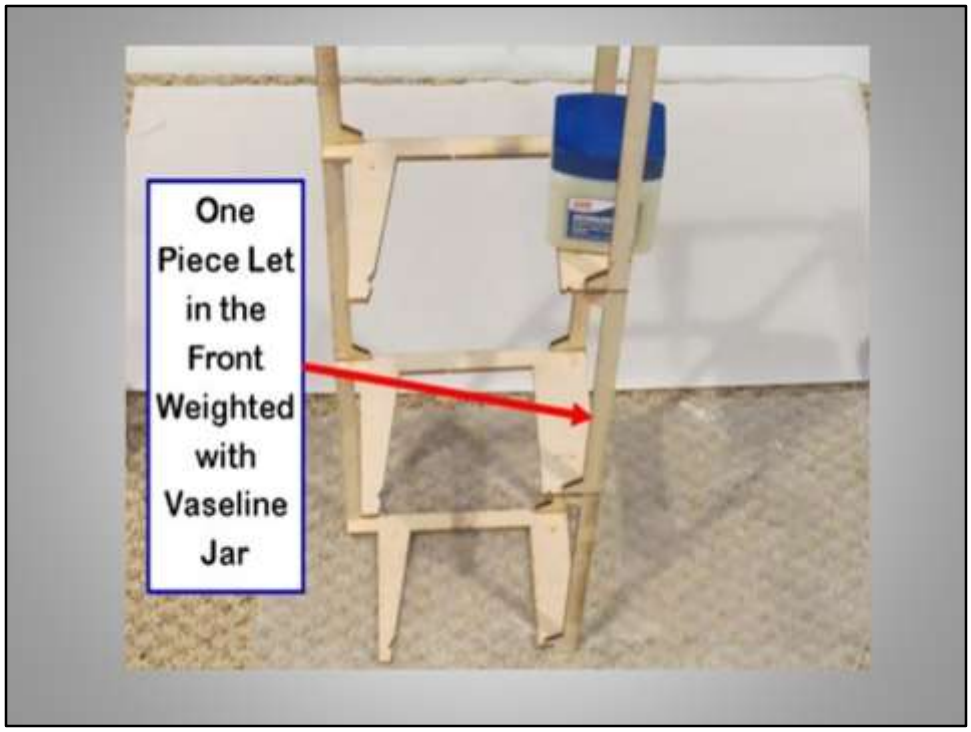


To hold the sections in alignment as the epoxy cured, supports were placed on either end.

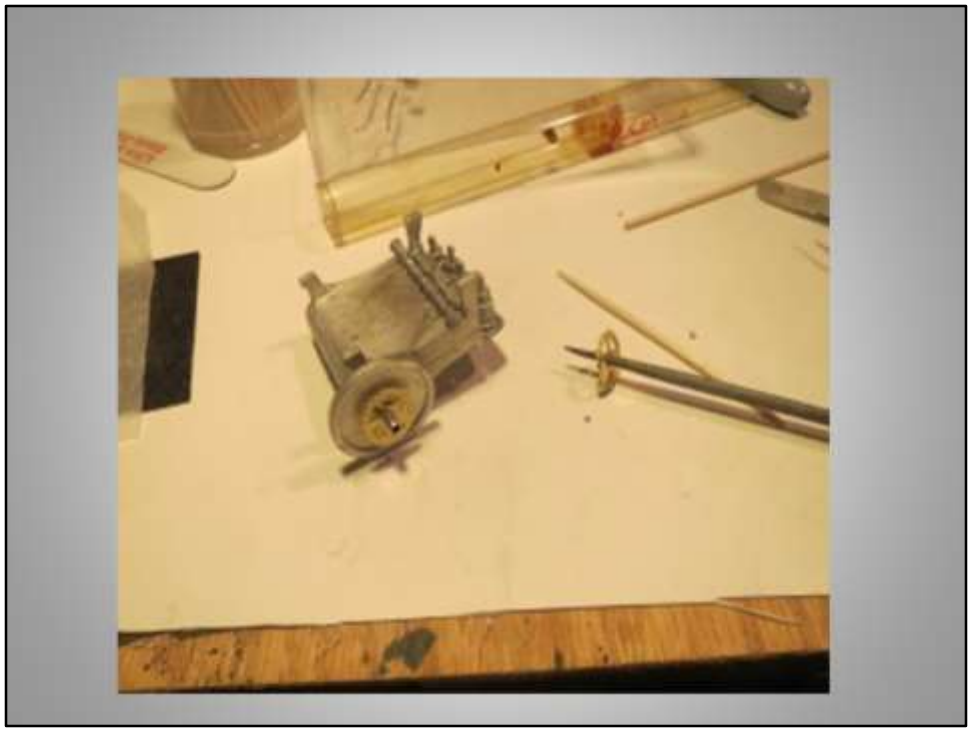
This is only a fixture so to assure the center butt joints are strong enough a cover piece was made from scrap wood and epoxied in place.



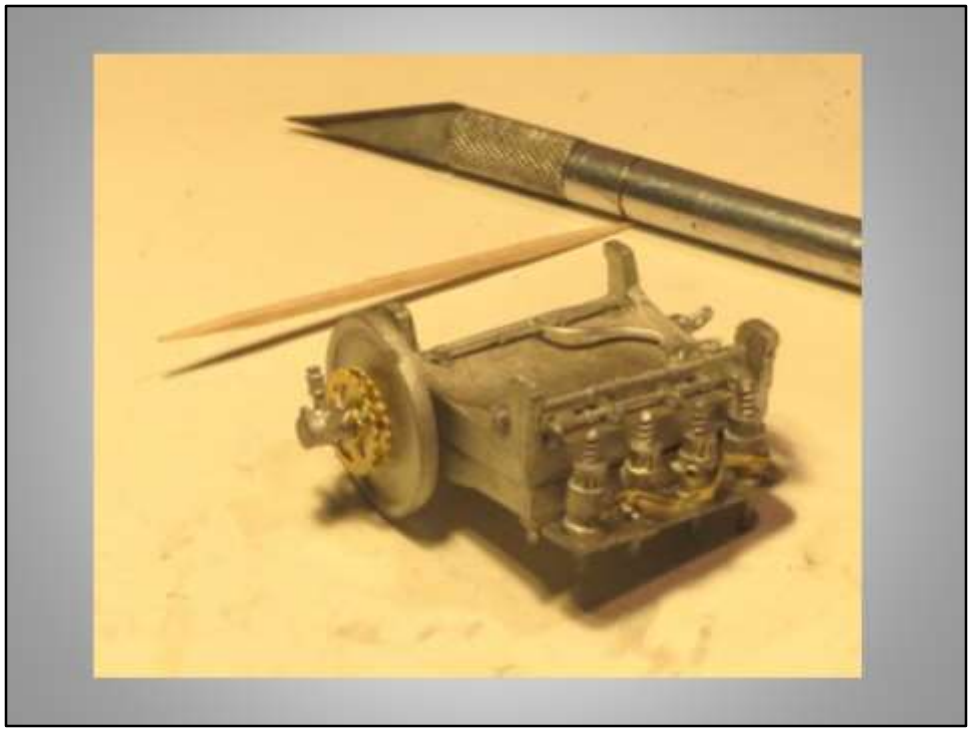
To hold the sections in alignment as the epoxy hardened, supports were placed on either end.



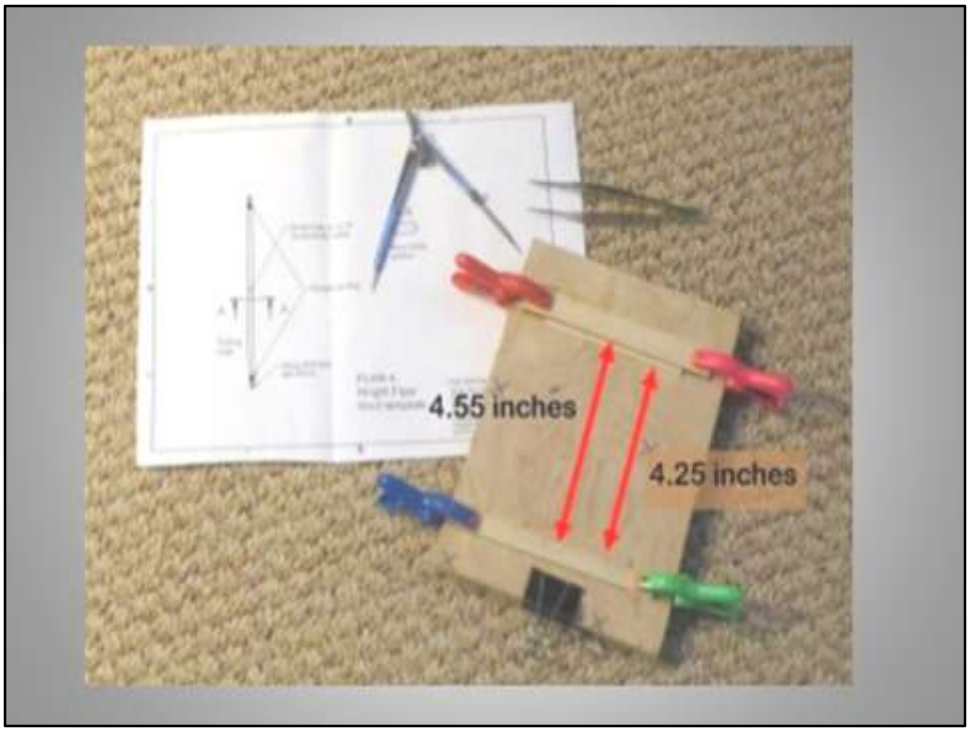
The final joints were placed in compression by putting the assembly vertically and weighting with a petroleum jelly container.



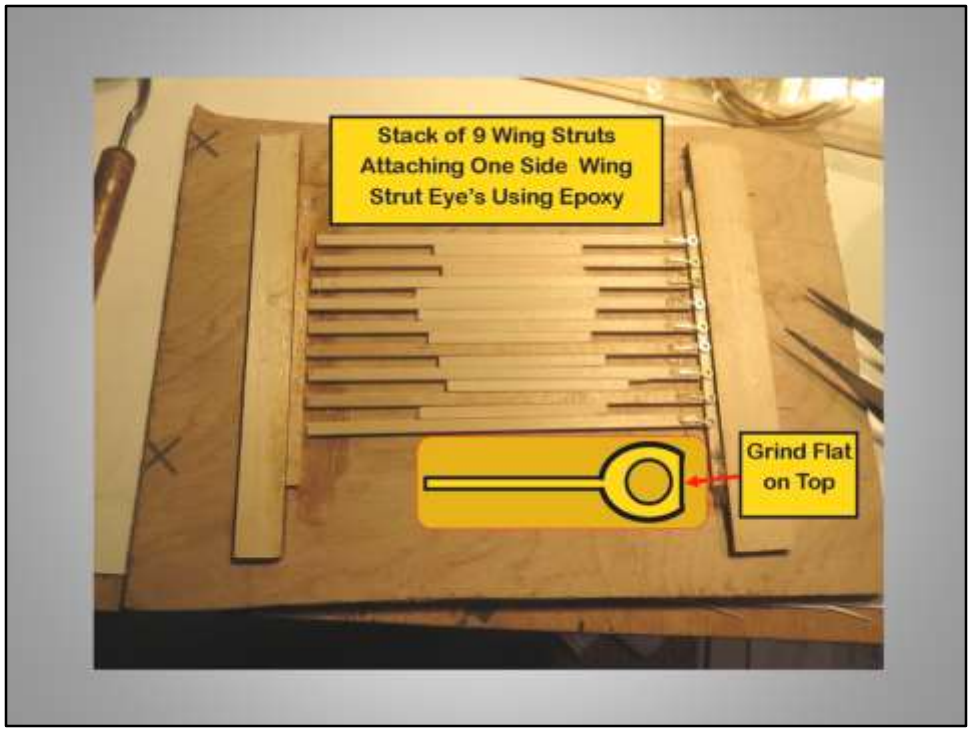
Assembly of the motor is straight forward. Some filing is required. A small rat tailed file is used to enlarge the gear hole.



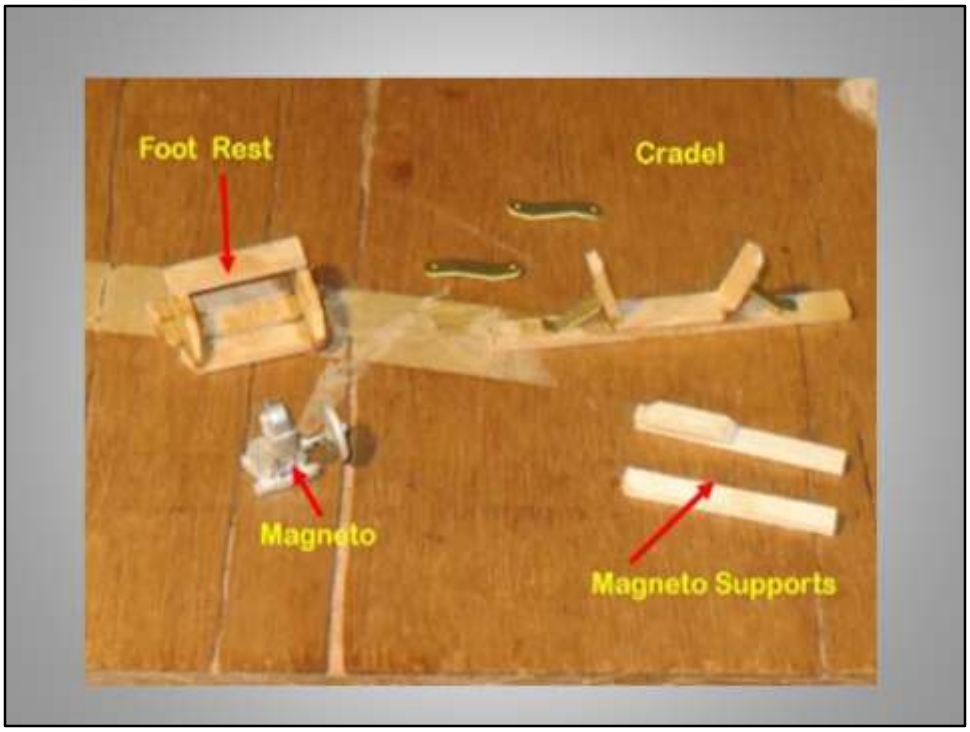
Should be two small gears on motor and large gears on propeller. Caught the error too late to fix!



To make the required 18 wing struts that hold the top and bottom wing together a simple fixture was fabricated. That helped produce 9 in each of two batches.

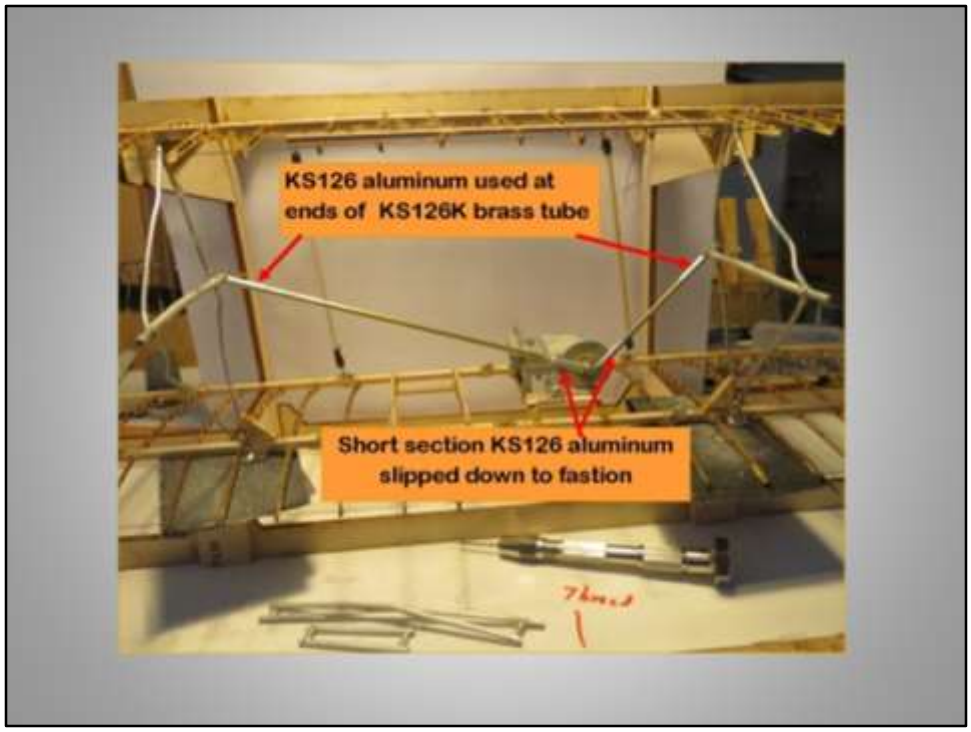


Epoxied the brass wing strut eyes to the wood strut. As seen on the schematic at the bottom of the picture, suggest filing or grinding a flat on the wing strut eye end before or after assembly. It is needed to have them slip more easily into the wing strut fitting



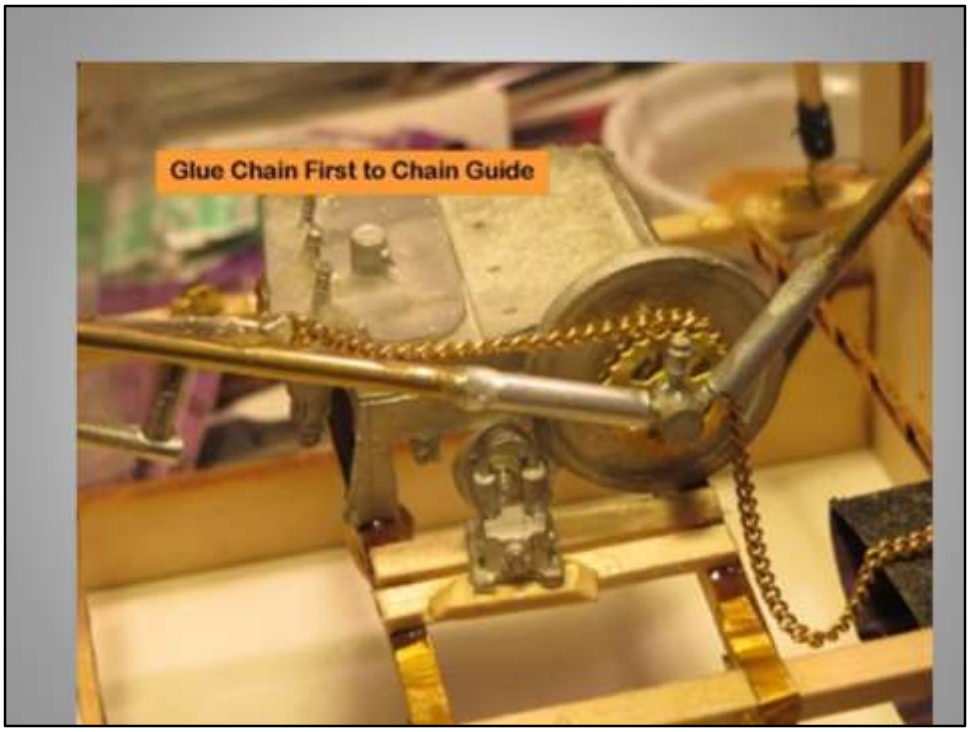
Complete the small parts. Colored the cradle surface with a brown Sharpe.

Epoxied the propeller supports to the wings. It is made from a flexible material and was bent with slight pressure for proper alignment. Then wing struts are inserted in top and bottom brass strut fittings and epoxied in place.



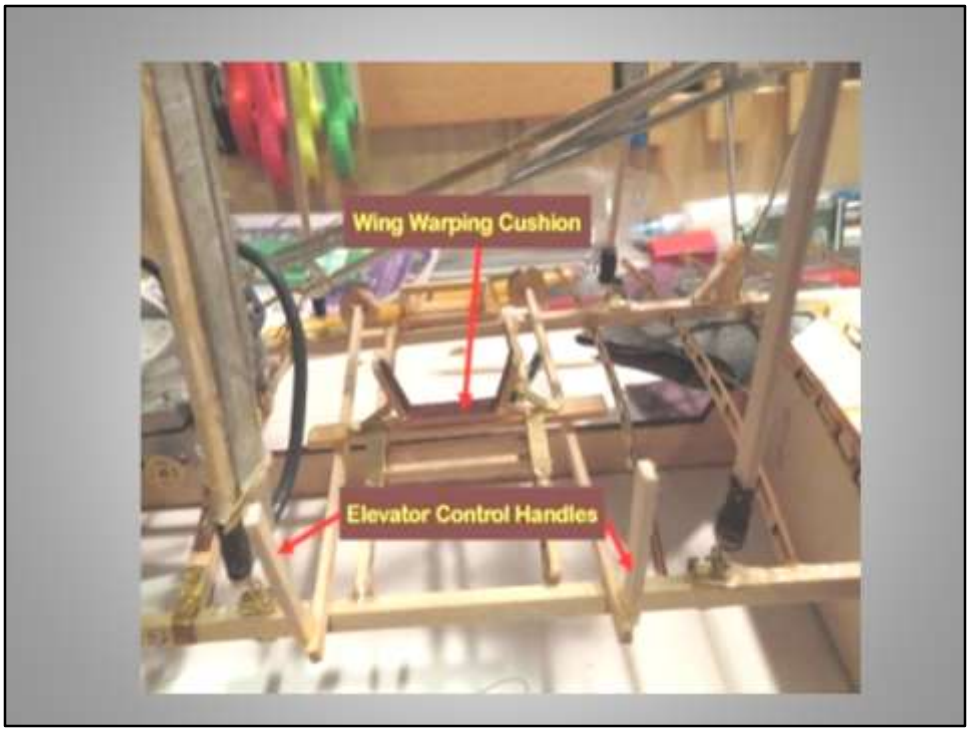
The aluminum tube supplied was not sufficiently long to use as the chain guide supports. So cut small pieces of the tubing to fit properly over the ends and epoxied those to the brass tube that was supplied. Worked well.

Epoxied chain guide support to tube.

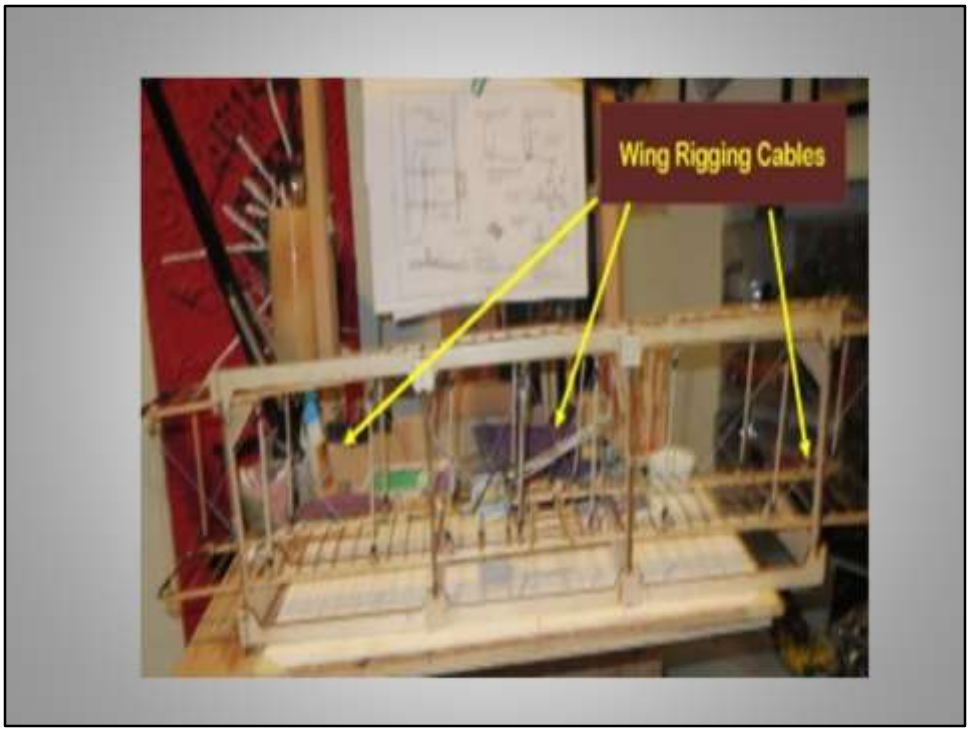


The instruction say installing the chain is the most difficult construction step. There are actually many of those! Used their suggestion of putting super glue on a small section of the chain end. After it hardened use UV activated plastic to attach that end to the recess in the chain guard. The UV activated plastic was very useful for a number of joints. (This relatively new product is seen on TV but a larger size was purchased from Amazon.) After it was secured used a small amount of epoxy over the joint for more support.

Made pulleys and used clay to hold while epoxy cured.



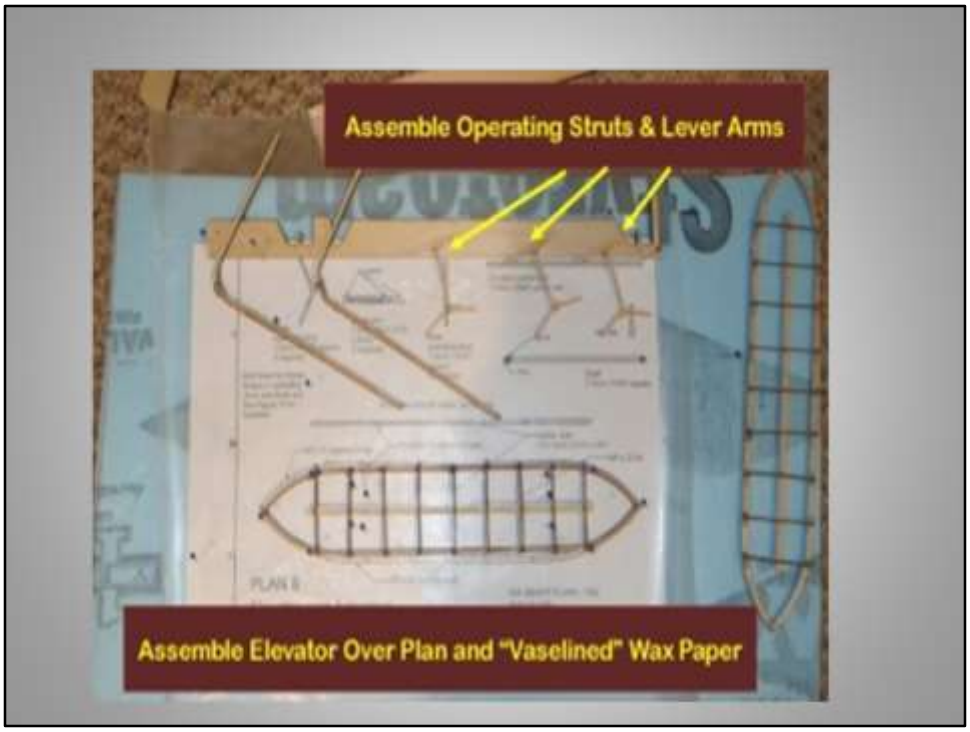
Used 12 pound braded fishing line for wing warping cables to differentiate it from the wing rigging cables. Tensioned the cables with clamps over the pulleys then used a drop of super glue to join the two. Thicker, no drip super glue works best.



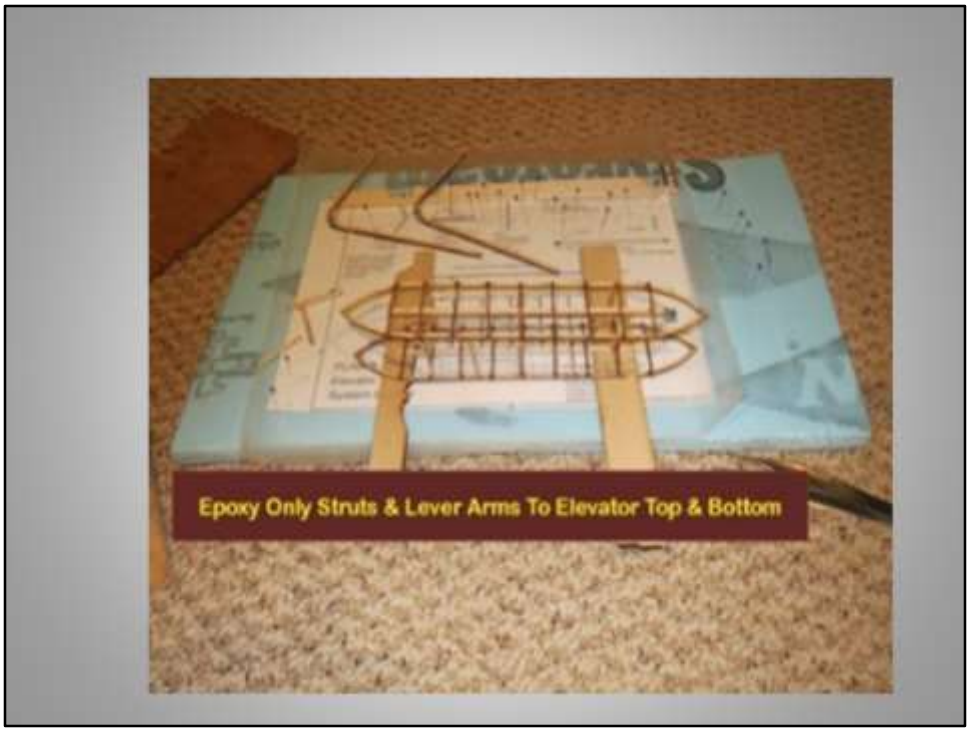
Follow the instructions and install wing rigging "only where indicated." Pull taught and apply super glue on the joins.

Note the center sections are the only ones where wing rigging cables cross from front to back. The ends sections must flex for wing warping control.

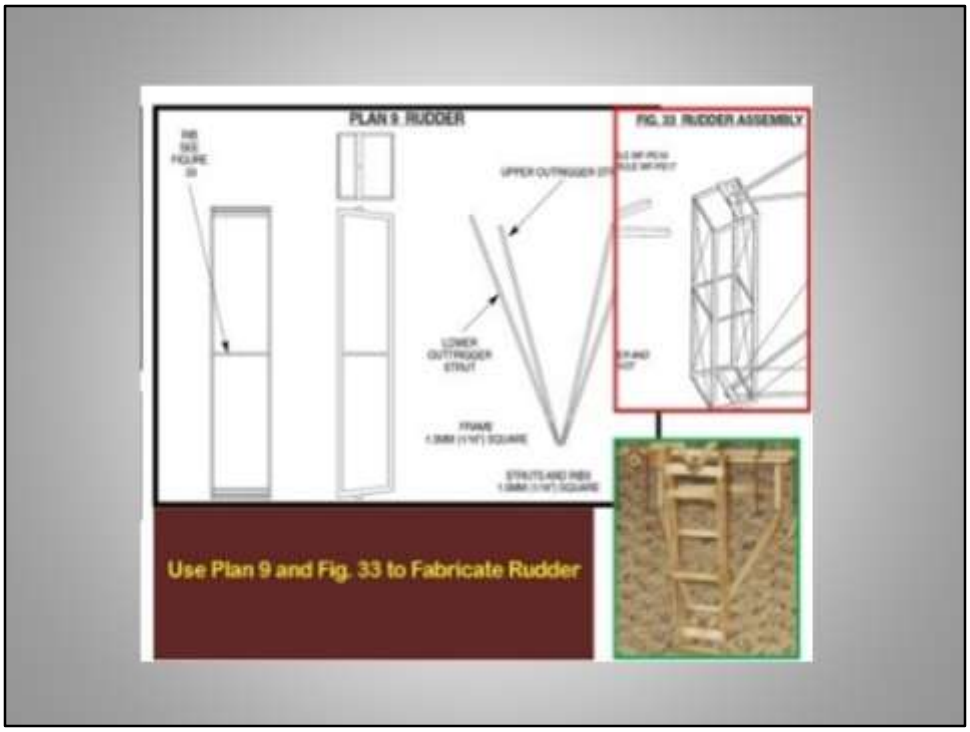
Finally the wings can be released from the fixture! The struts and wing rigging cables hold it together securely.



Use the elevator plan and cover with Vaselined wax paper so epoxy doesn't stick to areas where ribs are glued to perimeter. Assemble 3 operating struts to lever arm.

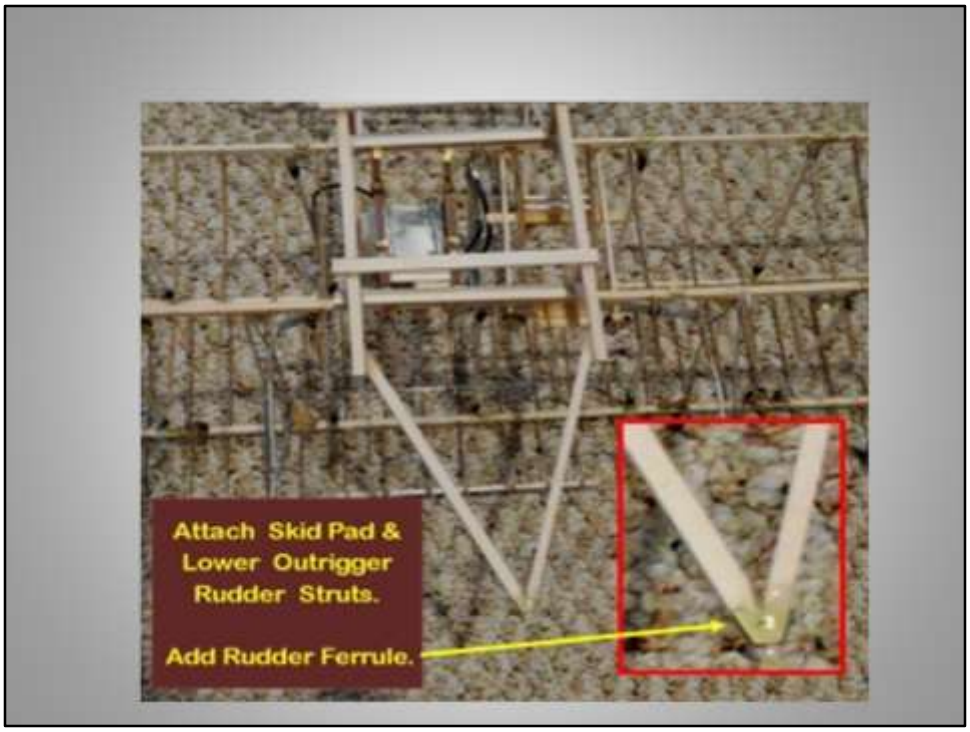


Epoxy only the 3 operating struts and lever arm assemblies to support bottom and top elevator parts. Then after the 3 cure, add the 6 other vertical struts.

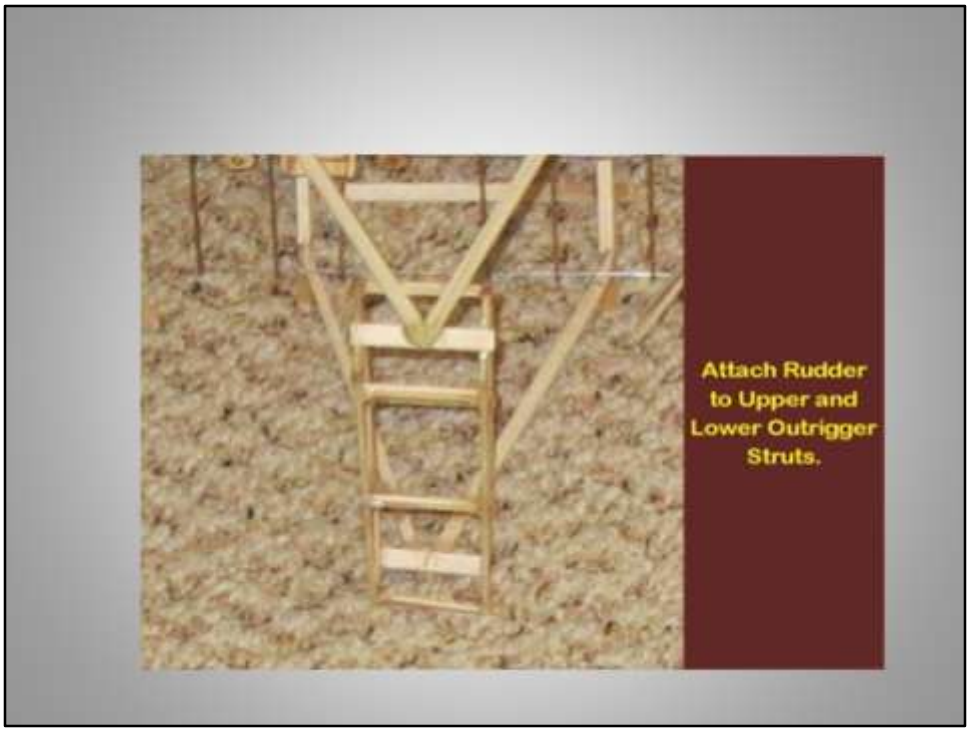


Assemble the rudder per the plan. This like other areas is made from wood that is specified only on the plan, not in the text. Lengths were cut to the plan.

Fabricate the landing skid per the plan.



Attach landing skid to the bottom wing spars and lower outriggers for the rudder.



Attached upper outrigger struts to rudder.

The finished model looks fine. May not be as detailed or as neat as some will make it, but for my purposes it does what was desired. Hopefully some of the tips, such as the use of UV activated plastic joining and petroleum jelly are useful. Read the manual several times from cover to cover before starting and get a PDF version so you can do a part number search when needed.

My display of plane models and WWII engine parts started with the eBay purchase of a single exhaust valve from a WWII Pratt Whitney R2800, 18 cylinder radial engine! Subsequently found a cylinder, pistons and other parts on eBay and a source for NOS intake and exhaust valves! Make great Man Cave displays! Had a professor who worked for Curtiss Wright on radial engine development! Amazing how they were able to increase power by 50% from the start to end of the war!

My Man Cave has 1:32 scale airplane models that used these powerful radial engines during the war as well as other hobby trophies like these two 11 and 12 pound bass!

It is also where my office is located and my 30 year old exercise equipment (that is the 3rd Treadmill!) No excuse when it is where I spend my time. My 7 day a week exersize routine includes doing 3 sets of 10 pull-ups on back day. Not bad for 73!

My main hobby is cars. After an old friend with ~40 vintage cars died very unexpectedly 6 years ago I started a model car collection. He raced a number of his cars including a multimillion dollar 1960 Maserati Birdcage in vintage races. Now have over 40 models and three CMC metal models similar to what he owned and raced. One of a bare chassis, one stripped of the body and a fully assembled Maserati Birdcage. They are in the lower picture. They have such incredible detail I used close up pictures of them in a book I recently wrote for CarTech, "Advanced Automotive Welding." One picture required a ~30 second exposure to get the required depth of field and I found decals not easily visible to the naked eye were on the battery!

My main car hobby includes a '34 ProStreet Rod with

an 8.2 Liter engine and my daily driver a 2014 Corvette. They are in the garage!

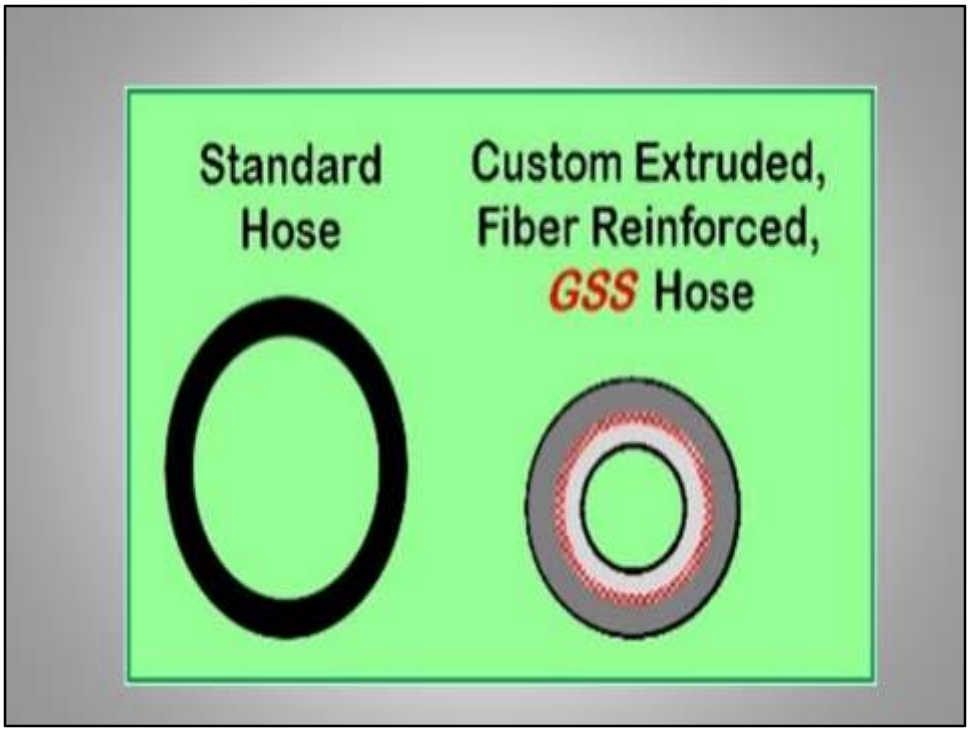
See PDF , “Engineering a Street Rod”

http://netwelding.com/Engineering%20Street%20Rod%203-08.pdf

Have a MIG or Wire Welder?

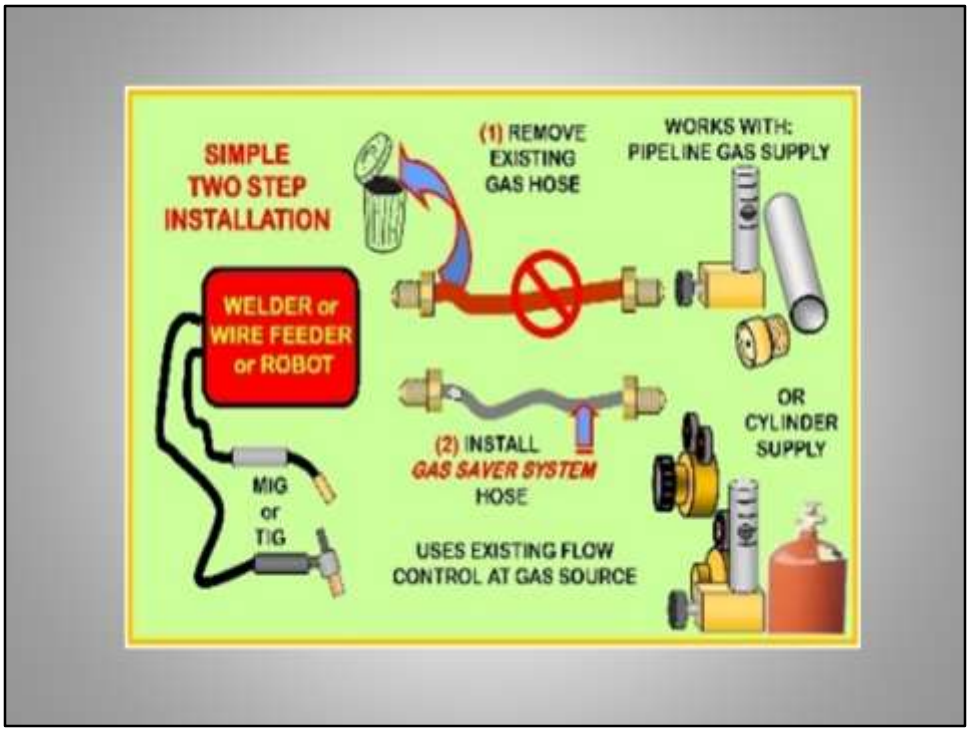
We have a patented product that can help make better quality welds while cutting shielding gas cost in half! There is one attached to my welder and shielding gas cylinder in my work/shop garage in the above picture.

The "Gas Blast" you hear at every weld start pulls air into the shielding gas stream creating excess spatter and irregular shaped welds. It also wastes over half the gas used!



Our patented product reduces the volume of excess gas by 80 to 85%.

In addition we install a peak flow limiting orifice in the hose fitting to reduce the gas surge velocity, avoiding excess turbulence and providing better shielding.



The product is inexpensive and easy to install. Just replace the existing gas delivery hose. Over 10,000 are in use saving fabricators millions of dollars annually.

This simple custom extruded hose just replaces the exiting gas delivery hose. Pressure is maintained to deliver a small amount of gas to purge the weld start area of air. There are no moving parts to wear or extra knobs to set.
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Thanks for Reviewing the PDF.