

Weedhopper construction manual.

Steps are in the order that makes it easy to establish the correct angles and distances between certain parts.

Defining what model you are building is a necessity also – C, 40, or 2 place.

All the parts except the rear tubes are the same – those tubes will be longer on a 40 model vs a C model as the axle is moved forward on the boom tube. Heavier engines are best with the 40 model configuration for W&B issues.

Note: If you need to add anything remember you can add all the lightness you have available. To test this hold the part out and let go if it – if it falls to the ground make sure you need this added weight on your plane.

1. **Root Tube:** Make the Root Tube – Cut to length and Drill all holes in Root tube. WH C Model CD \ C Boom Tube.jpg
2. **Axle:** Make the Axle – Cut to length and Drill holes. WH C model CD\Factory WH C dimensional drawings \ Axle.JPG .
3. **Axle\Fuse attach points:** Make the axle / fuse tube attachment parts. This can be done using the plate or the U channel method your choice.
4. **Center Fuse Tubes:** Make the center fuse braces tubes – make sure they are identical as this will be a critical part in getting all of the other parts lined up and the plane to be correctly aligned. WH C model CD\Factory WH C dimensional drawings \ Center fuse strut.JPG
5. **Initial setup and alignment:** Attach the center fuse tubes to the axle and the root tube. You will find that using an adjustable stand supporting the front and rear of the root tube will be of great help. I used a couple of adjustable screw type jacks for leveling trailers with a simple 2 X 4 framework for holding mine level and solid during this process.  
**Note:** you are going to maintain a 2 degree down slope on the boom tube.
6. Set the correct angle of the center fuse tubes and establish the correct distance from the boom tube to the axle. Use a plum bob attached to the root tube and hanging down centered over the axle. Measure from the hole for the center fuse tube back 9-1/4 inch. This should be the distance that the axle is behind the hole in the boom tube. This should also establish the 41-1/2 inches from the center of the boom tube to the axle. With this established the measurements for all the other fuselage tubes should be really close. WH C model CD\Factory WH C dimensional drawings \ (added drawings) \ center-fuse-angle.jpg
7. **Rear Brace Tubes:** Building and attaching the rear brace tubes to the axle and to the root tube will now stabilize the dimensions set in step 6 above. Verify that the axle is still square with the boom tube during this process. **Note:** you are going to maintain a 2 degree down slope on the boom tube.
8. **Nose Strut & Nose Fork:** Build and attach the Nose strut bracket to the boom tube.
9. Build the nose fork assembly / assemble all the parts including the tire. Nose fork Dims - Nose fork slot.jpg
10. Build the nose strut. And attach the nose fork assembly to the bottom of the nose strut.
11. Build the seat tubes and associated parts and attach them to the axle. Center the seat assembly the on the axle so there is even spacing from each side. The distance between them is correct when the tubes are equal distance apart from the axle to where the bend starts going toward the nose strut attach point..
12. Attach the nose strut to the nose strut bracket attached to the boom tube.
13. **Seat Tubes:** Attach the seat tubes to the nose strut. Verify that the nose strut is lined up correctly with the boom tube and is square to the axle ends. Checking to verify each attached point will guarantee the airframe stays in alignment.

14. **Axle Bushings & Wheels:** At this point build the Axle bushings and mount the main wheels. The assembly can now be rolled easily to move from one area to another and the main squareness and configuration of the fuselage has been established.



15. **Motor Mount:** If you have the motor for your plane I suggest that you build the motor mount, get it mounted. This is required on some setups to mount the front fuse tubes to a mount point that is part of the engine mounting system.
16. **Front Fuse Tubes:** build the front fuse tubes and get them mounted to where ever you have selected to make these attach points. Original C model had them attached to the boom tube. If that is where they are going then attach them there. If you are attaching to a point other than original C position your tubes may not be built to the specs of the drawing but customized in length and or angle of bend on one or both ends depending of how your attach points are fabricated near the engine.
17. **Sub Fin Rudder Brace:** Build the sub fin rudder brace and the associated parts: stabilizer brace strut tangs,  $\frac{1}{4}$  inch stainless threaded rod (5/16 vs 1/4) is my choice, the plastic tube to go over the threaded rod, (I used a piece of aluminum tubing for mine vs the plastic), and assemble these components. Yes you will have to take this back apart again to put the sails on. I prefer to assemble the whole airframe without the sail material in the way so I can verify all alignment is correct and it is easy to see and measure.
18. **Subfin Brace Tubes:** You can now build the subfin brace tubes and connect them to the rear subfin rudder brace. There are a few ways that this can be done. Your choice of how they get mounted the main important part is that the bottom of the rear subfin brace is in alignment with the boom tube. When the rudder is mounted any little bit of misalignment will be noticed as the rudder will not be aligned vertically. Take your time here. Also note that the measurement from the drawings for the subfin rudder brace tubes may change length and where the hole is drilled depending on how you mount the end to the subfin brace tube. (Weedhopper\_Model\_40\_Re-Illustrated\_Assembly\_Manual – page 9 - I did mine a bit differently. By using a U channel that was attached using the

threaded rod and attached the tubes to the sides of that .



19. **Rudder:** Build the rudder parts: including the rudder horn, tangs, and rudder hinge bracket – assemble the tubing and mount it to the airframe. Should look similar to the photo above. You can support the rear of the airframe with a simple setup now as it is probably tail heavy and needs something to support it.
20. **Stabilizer & Elevator:** Build the elevator parts: elevator spar tube, strut, torque tube, horn, and trailing edge. Also build horizontal stabilizer LE and the associated parts that will let you put all this together. Although these parts are not listed here is a picture of how they connect and attach. Also build the hinge strap at this time





21. Once this stabilizer and elevator assembly is built you can mount it on the airframe. Verify that all the components are level and square with the boom tube / rudder, etc... after mounting on the airframe.
22. **Control Stick Cables and Elevator Rod:** Build the control stick and associated parts for the rollers and mount to the axle. Attach the cables and crimp with the NICO press copper connectors. I found it easiest to do the pieces attached to the control stick with the control stick assembly on a bench then reattach the control stick to the axle mount point. Feed the cables to where they go on the rudder horn verify everything is in the correct position (straight inline rudder and level on the stick controls) and then attach the cable, thimbles and NICO press ferrules and crimp (two on rear connection). For a clean look before you do the rear cables slide a piece of heat shrink tubing onto the cable and when you are done you can slide it up over the bit of cable that is left sticking out and the first ferrule and heat it to shrink tightly over the assembly. Build the Elevator rod and mount to control stick and also to elevator horn and verify correct 8 inch up and 4 down movement on the TE off the elevator.
23. **Seat:** Build the seat parts, rear tubes, cross tube, and fabric of your choice and mount this assembly. If running a seat back tank you may want to look at how you are going to mount this and do this all at the same time as some bolts may attach both the seat and the gas tank bracket.
24. **Wings:** Attach the rest of the wing brackets onto the root tube.
25. Build the wing parts: Leading edge, LE attach bracket (machine or sheet metal shop to bend), trailing edge, compression strut, thrust drag spar, end rib and associated pieces on end of LE for attachment of the rib. NOTE: Scott sells a replacement for the Weedhopper wing tip block <http://ulav8r.com/products.htm>.
26. **Wing Struts:** Build the wing tangs and bend as required. The wing dihedral needs to be set and this is done by the length of the struts. At this time since the wings attach to the

airframe also set the washout. Both of these items are set with the wing struts. Once this is done verify all points are still square. IE: tip of the wing TE is the same distance to the rear of the root tube on each side - is the same distance to the axle on each side etc....

27. **Engine:** The engine should be mounted, fuel line run, fuel cut off valve in place, squeeze bulb and a bypass around the squeeze bulb for safety. Throttle lever needs to be built and mounted along with the cabling from the engine to throttle control. Last after all components are attached mount the propeller.
28. **Fabric:** Attach all the sail, rudder, subfin, stabilizer, and elevator fabric to their specific areas.
29. **Ribs:** Although you can build the ribs at any point you want do not cut them – leave them just a bit long.... Building the ribs after the plane is assembled allows you to custom fit the rib to the rib slot on the wing. This will guarantee that you have the rib the correct length and the clip riveted in correctly. I also find that the system I have been using is a great help in assembly if you have to tear down and trailer as I do. All right side parts – Wing struts, and ribs are painted with a red band around one end - on the struts it is on the end that goes to the wheel and on the ribs it is the end with the clip. I also numbered the ribs 1 – 9 so I can easily read the number and spread the ribs out over the wing before inserting them. I also insert 3 on one side then 3 on the other side when putting the ribs in.
30. **Pre Flight:** Make a list of major things to check every time. With the simplicity of the Weedhopper you can visually and manually put your fingers on every part on the airplane every time you fly. Get in the habit of doing this Start at the engine and visually inspect it (plugs – wires – carb – fuel lines- brackets etc.) Starting at the LE attach point look at the bolt / nut and touch them to verify the nuts or pins and clips are on and secure. Walk the LE of the Right wing – TD spar and Compression attach bolts – Strut attach bolt / pin – End rib bolt on TE. All of the ribs are clipped and the flaps folded up – Rear Strut attach bolt / pin. Bolts / pins for wing attach points on root tube – Strut attach points on right axle. Front bolt on stabilizer, stabilizer struts attached, elevator control rod, control cables for rudder. Verify rudder turns freely and elevator also moves freely both ways. Repeat for left side of plane. Visually look at the plane and see if there is anything that just seems to be not straight or out of place. This is not a toy but a very simple but elegant flying machine but it can kill you with something as simple as not checking to verify if a single bolt or pin is connected and tight..