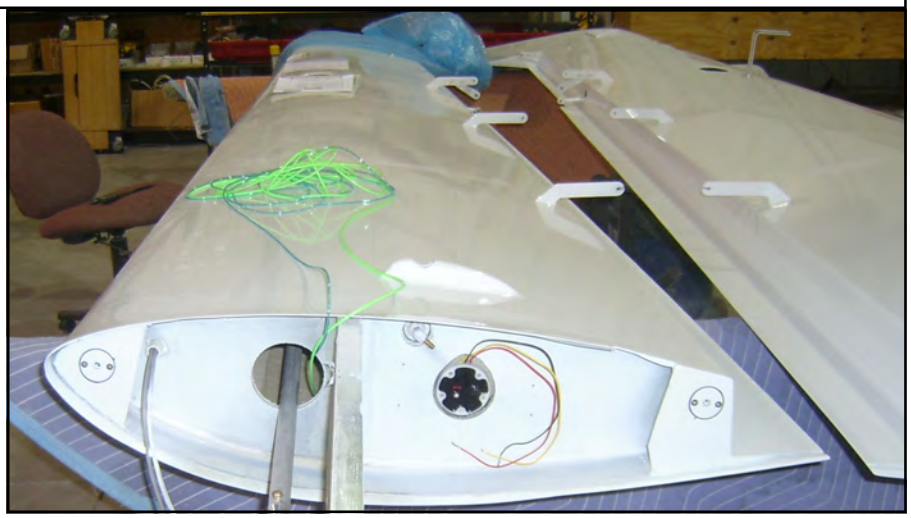
16. Wing Final Assembly and Installation

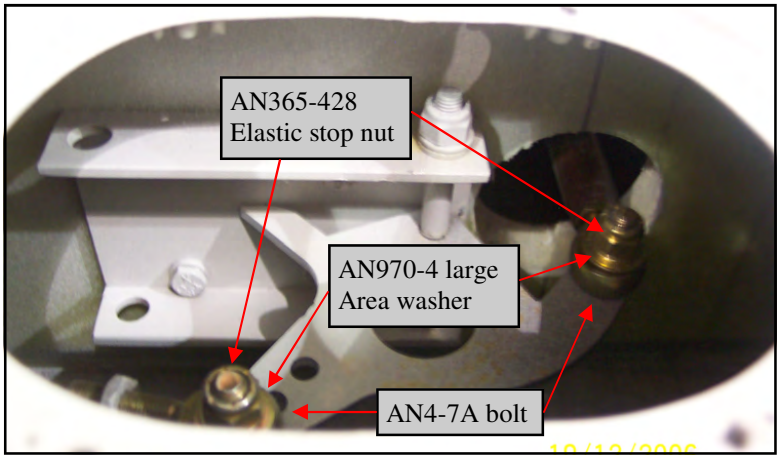
Section Objective: Installation and rigging of ailerons. Pitot tube install, and any other wing related items.
Required Parts: Left aileron push rod ALA-0072, Right aileron push rod ALA-0073, Push tube end cones small ALA-0075, 2 Long Aluminum tube stock 0.875D 0.035wall 10' long,
Required Hardware: 8 of AN4-7A, 4 of AN4-10A, 10 of AN356-428 elastic stop nut, 2 of AN364-428 elastic stop nut. 10 of AN970-4 large area washers.
Required Tools: Assorted Socket and wrench set. Assorted Drill bit set.
Required conditions: None
Skills or Training: Simple use of hands tools, read and understand instructions.

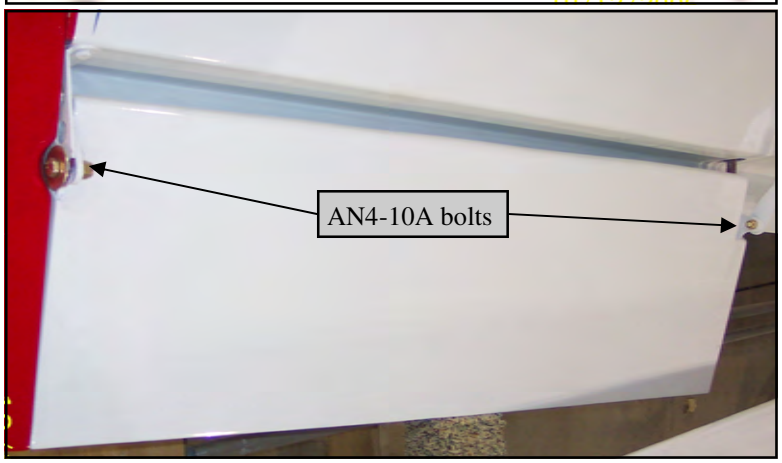
Date Completed

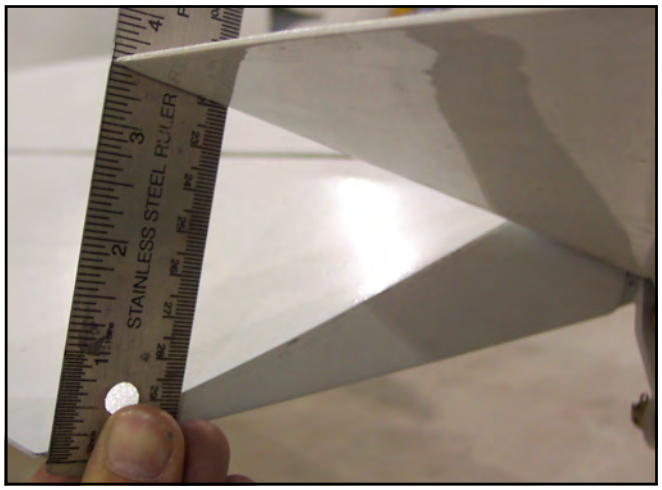


1. Both wings should be placed inverted on saw horses to ease assembly.

2. **Left Wing** Locate the small push rod, put a jam nut and rod end on each end, do not adjust the rod ends yet.
3. Attach the pushrod to the bellcrank with a AN4-7A bolt, you must install an AN970-4 large area washer on the rod end to cover the rod end in the event of a bearing failure (see photo).
4. Install the aileron next.
5. AN4-10A bolts are used at both hinges.
6. Use an AN970-4 large area washer under the bolt head, slide the bolt thru the bearing
7. Secure the bolt with an AN365-428 elastic stop nut.

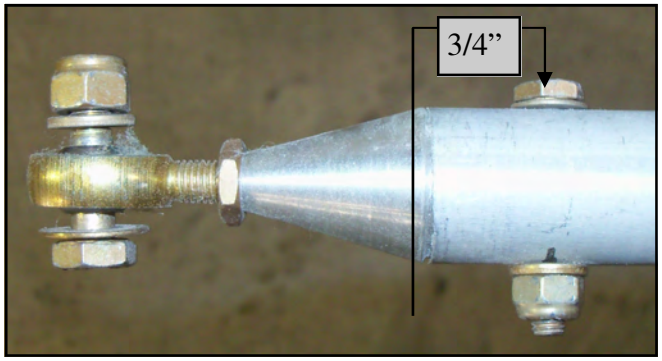






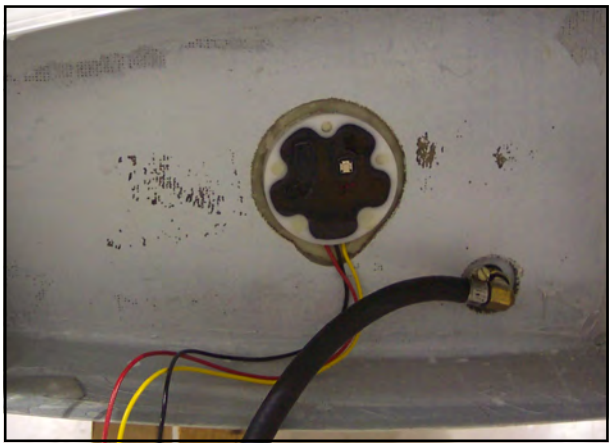
8. With the aileron attached, place the aileron at full up deflection, this is measured at the tip and must be 3.5 inches.

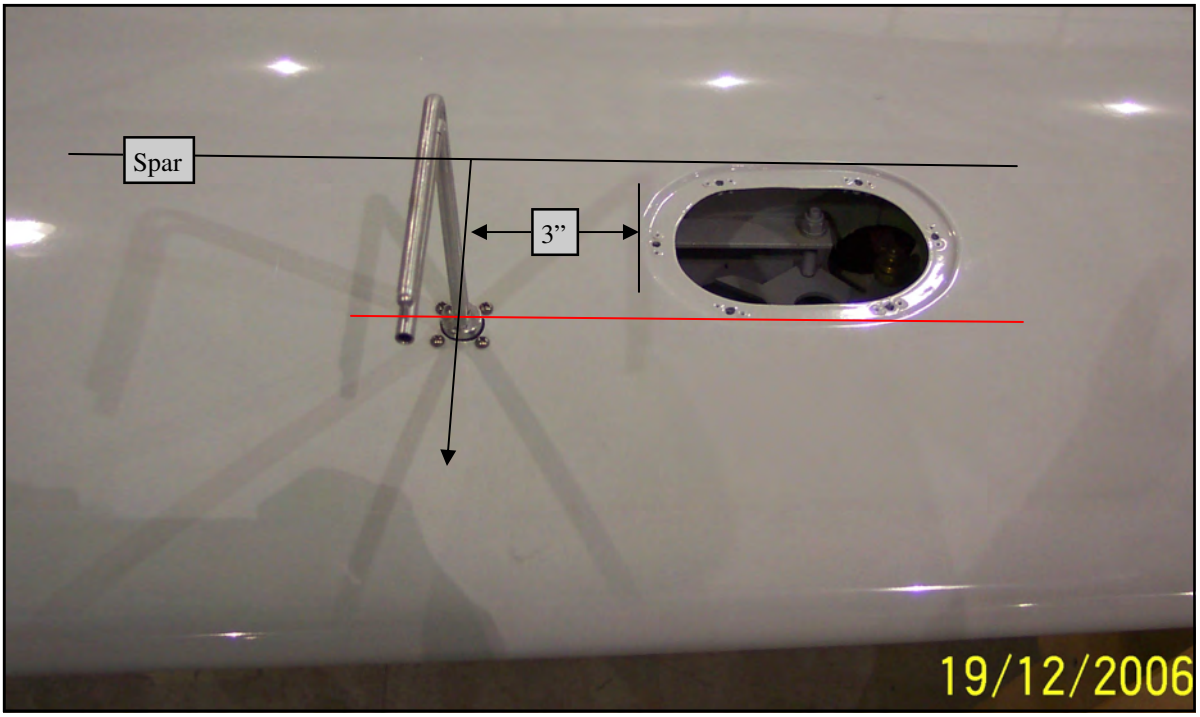
9. The bell crank in the wing must now be placed at the stop, adjust the push rod to fit the length between the bell-crank and attach point on the aileron.
10. Bolt the push rod to the aileron.
11. Locate the long aluminum push pull measuring 10’ 7/8” with a 0.035” wall.
12. Cut this tube to 104.5”
13. Insert a aileron end cone (smaller cone) into each end.
14. Measure in 3/4” from the end of the tube.
15. Drill a 3/16” hole thru the tube using a v block and the drill press.
16. Bolt the end cone to the tube with an AN3 -7A, bolt and AN365-1032 elastic stop nut. Use standard AN960-10 washer if needed.
17. Slide the tube thru the wing and bolt to the outer hole in the bell-crank in the same manner as the small push rod installed earlier.
18. At the other end of the wing , install the fin-



ger filter into the lower boss with some permatex #2 sealant , next install a 1/4npt 90degree fitting in the end of the filter with the barb facing rearward.

19. Attach 1.5 feet of 1/4" fuel line to the finger filter pickup.
20. Install the Drain valve in the boss on the bottom of the wing.
21. The fuel probe installation must be completed prior to wing installation.
22. **Repeat prior procedures for the right wing**, with exception to the pitot static tube installation.
23. Pitot tube in the right wing is installed near the inspection hole.





24. Measure 3 inches inboard of the inspection hole. The position should be in line with front of the inspection hole
25. Drill the hole to 9/16", this is for the smaller section of the pitot base so that it can fit thru the wing from the inside.
26. Once fitted thru the hole, match drill the four 5/32" mounting holes in the pitiot tube to the wing, insure that the pitot tube is perpendicular to the spar.
27. Install with #8 counter sunk screws and timmerman washers.

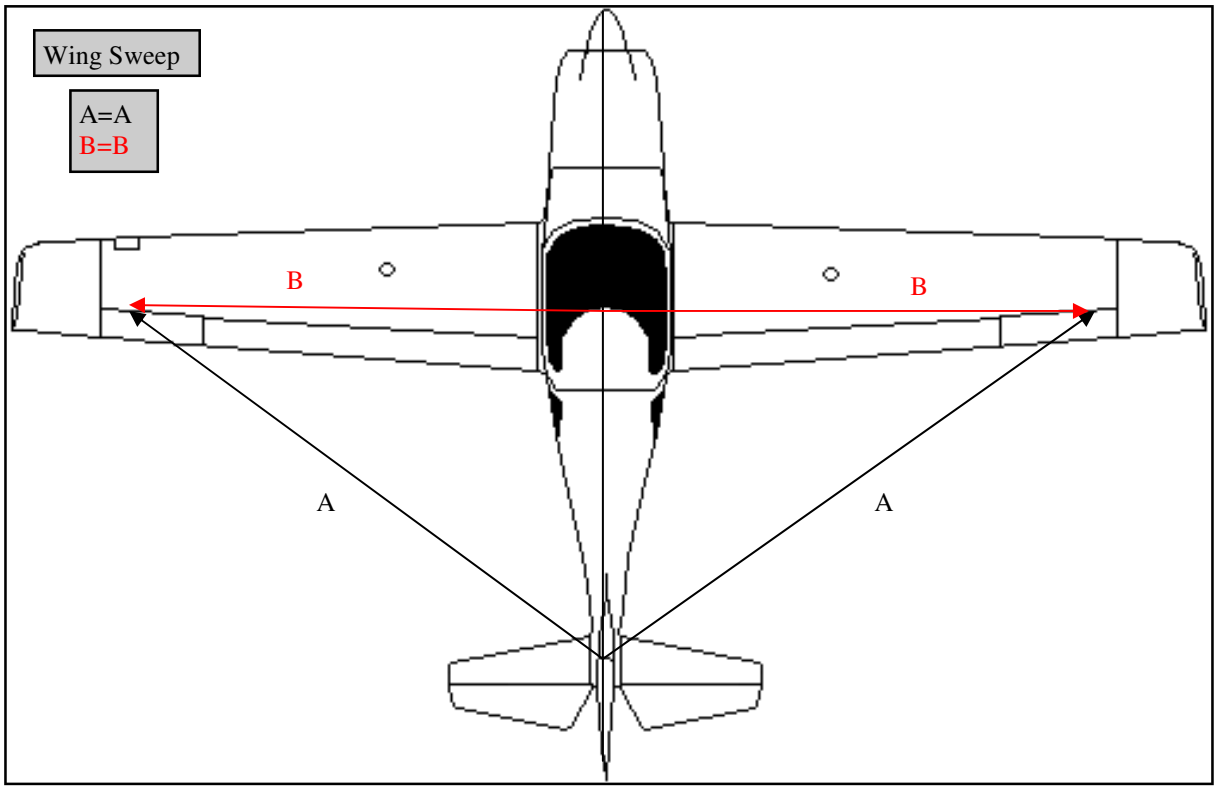
Section Objective: Final installation of the wing and subassemblies.
Required Parts: Finished wing sub assemblies,
Required Hardware: Main Spar bolts 5/8-18 by 6", 2 AN5-7A, 2 AN5-10A, up to 8 AN970-5 washers
Required Tools: Assorted SAE tools. Loctite 242 blue, 15/16 socket, 15/16" wrench.
Required conditions: None
Skills or Training: Simple use of hands tools, read and understand instructions.

Date Completed

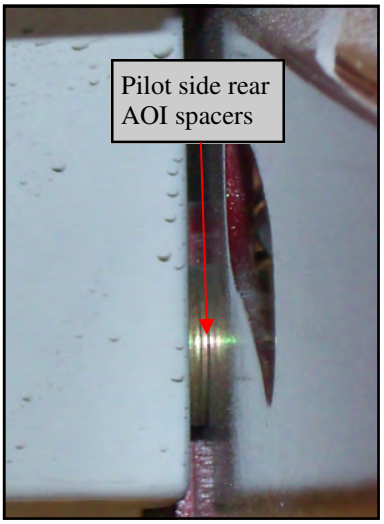
Wing final Installation

1. The spar bolts should have the end tapered to aid in aligning the holes in the spars.
2. Run the spar nut down on the bolt. Grind a 45 in the ends of the bolt as shown in the picture.
3. After the rough shaping is done use a scotch bright pad to polish the end of the bolt. This will keep it from creating a burr in the wing spar bushing.
4. Run the nut off of the bolt when thru this will clean the threads of the bolt.

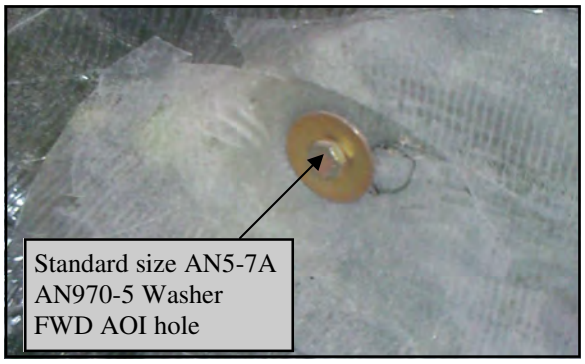
5. The left wing spar is forward of the right wing spar.
6. Caution should be taken when sliding the wings into position, do not pinch the static lines, fuel lines, any wiring, long push pull tubes, and do not run the spars across the rudder cables.
7. Slide the wings in all the way, use a drift to line up the left spar bolt hole.
8. Have a helper move the left wing up or down to line up the right hole in the box and the spar, run the main spar bolt thru the first spar.
9. Now have the helper move the right wing up and down to line up the right hole in the aft spar and the box. Run the bolt thru the rear spar and box.
10. Repeat these steps for the spar bolt in the left side.
11. Do not put the large nuts on the spar bolts at this time.
12. Check the wing sweep at this time. During initial build you may have done this, but double check again to make sure the correct amount of washers are between in the wing and fuselage where the need to be.



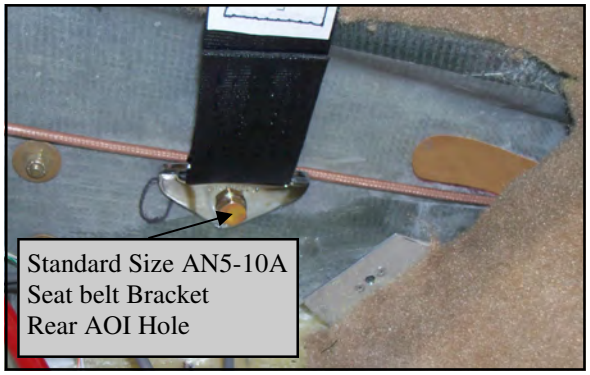
13. To check a given sweep measure out a given distance on each wing from the fuselage centerline, should be the same. Any distance will do as long as it is far enough out span wise.
14. Measure to that point from the top of the vertical stab. Those distance should be the same, the tolerance is 1/4" difference.
15. The Wings can shimmed with large area washers to change the sweep.
16. Use AN970-5 large area washers to shim the wing.
17. Those can be placed between the wing a fuselage at the AOI points.



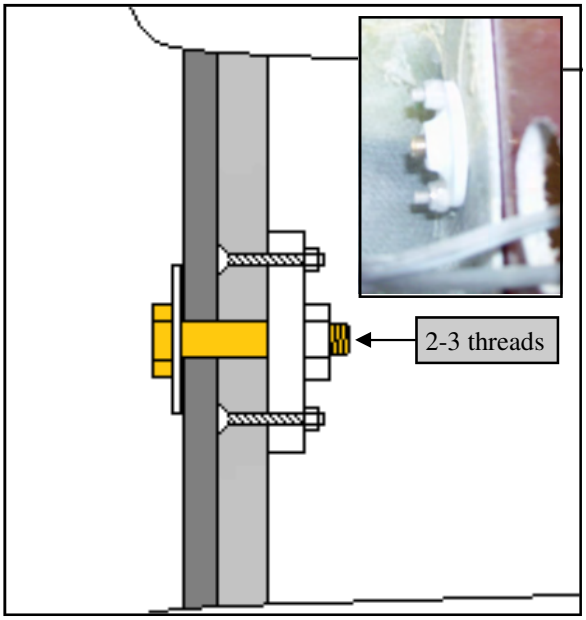
AOI Bolts



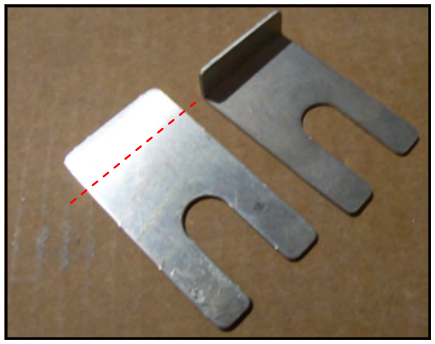
18. Install the AN5 front angle of incidence bolts with loctite 242, do not tighten them only run these bolts in half way for now.



19. Locate the outside seat belt sets. These will have a bent flange on one end that allows the belt buckle to be up right with out twist in the belt.
20. Install the AN5 rear angle of incidence bolts with the following sequence.
21. AN5-10A bolt, seat belt bracket, with bent part pointing in.
22. Once all of the AOI bolts are started, go ahead and tighten them all down.

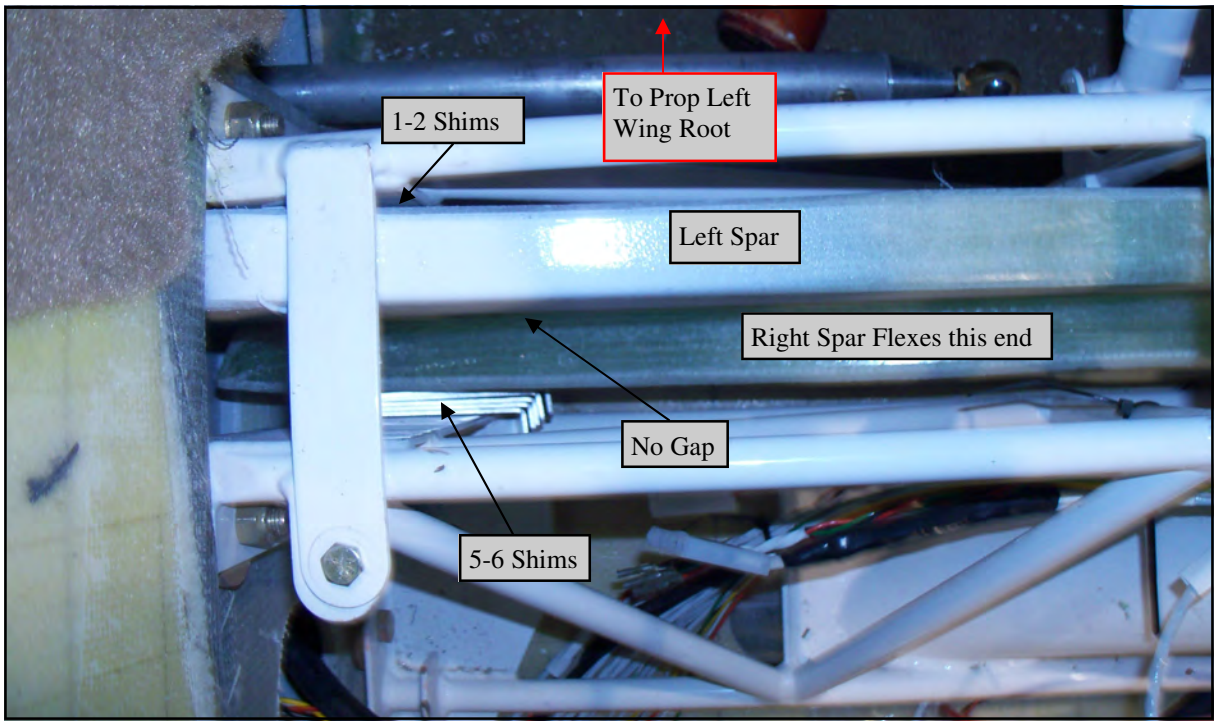


23. Check the AOI bolt length at the forward position by placing a small flashlight in the wing root thru the push pull tube D hole.
24. Use a mirror to make sure that there 2 or 3 threads showing past the nut on the plate.
25. If there are 5 or more threads showing, the bolt most likely tightened on the shoulder and the wing is loose, remove the bolt and add an AN960-5 standard washer under the head.
26. Check the rear AOI bolts in the same fashion thru the fuel probe access hole.

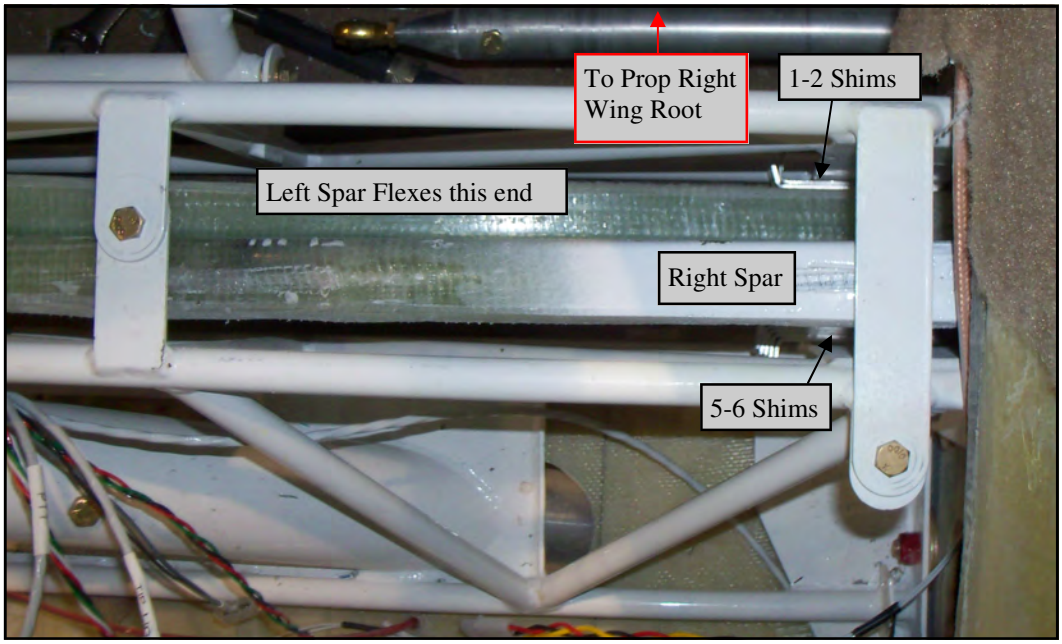


27. Locate the spar shims ALW-0071.
28. Measure 1/2” in from the solid end and bend over 90 degrees. Use a small piece of wood in the vise, making a sharp bend can crack the aluminum.

29. Working with the left wing first.
30. If needed slide a spar shim between the spar box and the spar at the root.
31. The long end of the spar can be flexed some. Insert enough shims to push this end of the spar against the root end of the right wing spar.



32. Now with the right wing. Slide a shim between the spar and box.
33. Again the opposite end of the spar should be shimmed up against the forward spar.
34. Use the picture to help, this is a photo of the left wing root. Note that there are several shims at the back pushing the flexible end of the right wing spar against the leftwing spar.
35. Tighten the main spar nuts, snug is all that is needed.

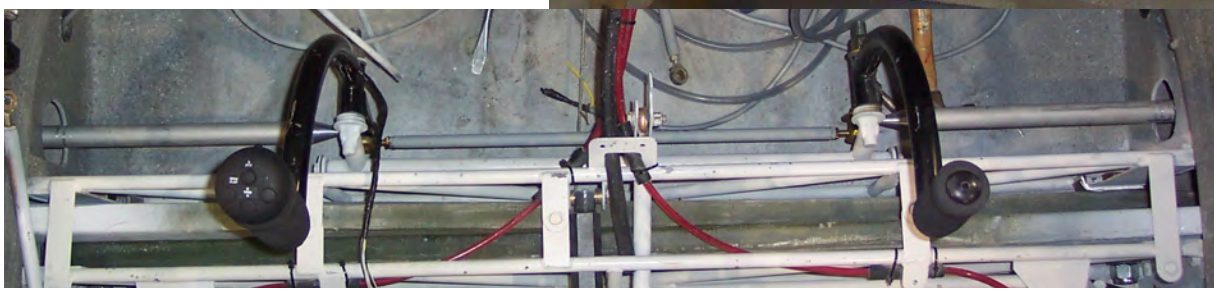


Aileron final rigging

Required items: 2 small push pull end cones, Four 1/4-28 rod ends , AN4 hardware, stick mixer push rod, Sticks, stick nuts.

Date Completed

1. With the wings in place for the final time , final fit and rig of the ailerons can be completed.
2. Use some card board and a spring clamp to hold the ailerons even with the wing tips.
3. Ensure that the jamnuts are set on the long tubes so they can not move for the procedure.
4. Locate the Stick mixer assembly.
5. The assembly must have a new hole drilled in the bellcrank.
6. Measure down 3/4" on center from the original hole and drill a 5/16" hole here.



7. Small bronze bushings must be used in the tabs on the front of the spar box where the mixer is to be installed , they install from the inside out, file off the extra bushing protruding thru the tab.
8. Install the mixer between the tabs, there must be no side slop if the tabs are slightly wide than take up the space with washers. Use AN4-6A bolts and large washers with some loctite 242 in each end. The bolts must not be to tight the assembly should move freely.
9. Temporarily install the sticks, they must be vertical and in the neutral position.
10. Install a rod end half way into one of the small end cones.
11. Slide a bolt into the rod end and the stick.
12. Hold the end cone up to the tube to determine where to cut the long tube.
13. Once marked cut with a tubing cutter, and deburr the inside.
14. Measure 1/2" in from the end of the tube. Slide the cone in the end and drill thru the tube and the cone, drill on as v-block for best results. Install AN3-7A bolt and nyloc nut.
15. Repeat the procedure for the other tube.
16. Install 1/4-28 rod ends on each end of the stick mixer tube.
17. Install the stick mixer tube and long push pull on the left stick.
18. When installing them, the bolt should run from the back to front with the stick mixer on the back of the stick and the long tube on the front.
19. There must be large area washers covering the rod ends, on both sides.
20. Repeat the process for the other side.

Required items: Flaps, AN4-7 bolt, AN4-7A bolts, castle nuts, cotter keys, AN4 nyloc nuts flap push rods, 1/4-28 rod ends, loctite 242, spring clamps.

Flap Final Install

1. With the ailerons installed and rigged, use a clamp as before to hold the surface even with the wing tip.
2. Install the Flap, use AN4-7 bolt, castle nut and cotter pin to secure.
3. Raise flap to the up position and also clamp the surface even with the wing root.
4. Locate the flap pushrods, install a 1/4-28 rod end and jam-nut on each end.
5. Insure that the flap motor is in the full retracted position.
6. Bolt one end of the pushrod to the flap torque tube. Do not forget that the rod end must have a washer large enough to cover the bearing race in the event of a bearing failure.
7. Adjust the push rods length so that the other end lines up with the stud in the flap.
8. Install a AN4-7A bolt with large washer under the head and between the rodend use loctite 242 blue on the bolts threads.
9. Tighten the jam nuts on both ends.
10. Repeat for the other flap.