

## Perfectly aligned wings with recessed wing bolts (or replacing sub standard bolts)

Stan Douglas

I have used this method of installing ¼" nylon wing bolts on all my modeling projects. It assures that the wing alignment is perfect (or what ever you originally set it at) every time you assemble the wing to the aircraft.

Here is a picture of the tools I have assembled to accomplish the installation.



From the left.

1. Drill bit to drill out the old original nut hole.
2. Hard wood Dowel, the same size as the bit to plug the hole.
3. ¼" tap
4. #13 ( .1850" or 3/16") drill bit for drilling the tap hole.
5. ¼" brass tubing; .250" outside diameter .220" inside diameter
6. Brass tubing .220" outside diameter .185 inside diameter the size that just slides into the ¼" tubing.
7. Bit for recessing flat head machine screws
8. Not pictured the ¼-20 nylon screws available from Micro Fastners, NBF-1440. Life time supply for \$3.50.  
<http://www.microfasteners.com/catalog/products/NYLNBF.cfm>
9. Your favorite drill.

If you are replacing an existing bolt system. You first need to remove the existing nut and plug the hole. On my Raider there was a metric metal bolt used with blind nuts in the wing holding blocks in the fuselage. I was able to install the metric bolt and then tap the bolt head lightly with a small hammer to remove the blind nuts.

Next I drilled out the remaining holes with my dowel bit. The size doesn't matter as long as it gives the dowel a good fit and the new hole is clean. Then I cut the dowel to the depth of the hole and CA'd the dowel in the holes. Just for good measure I also installed a 1/8" plywood plate on the underside of the wing mounting block up against the dowels.

That being done I now proceed to the wing. And here it is the same as if you are installing a wing for the first time. Drill your wing holes now with the 1/4" drill bit. You want a nice hole in the angle you want the final 1/4-20 nylon bolt to take. Do not recess the hole at this time.

Install the wing on the airframe and align it using your favorite method; measuring from tail center to wing tip, what ever. Once you have it where you want to be, tape it securely to the fuse so it won't shift.



Now take the two brass pieces of tubing on inside the other and the #13 bit and carefully drill a hole through the wing block at all wing bolt locations. Below is just an example, I used a lot more tape to secure the wing on the original hole drilling.



Remove the wing and tap the new holes with your  $\frac{1}{4}$ " tap. After tapping, soak the new threads with thin CA and re-tap (after the CA has set of course).



You now have a set of  $\frac{1}{4}$ " holes in the wing and a  $\frac{1}{4}$ -20 thread in the wing blocks that perfectly aligns with the wing holes.

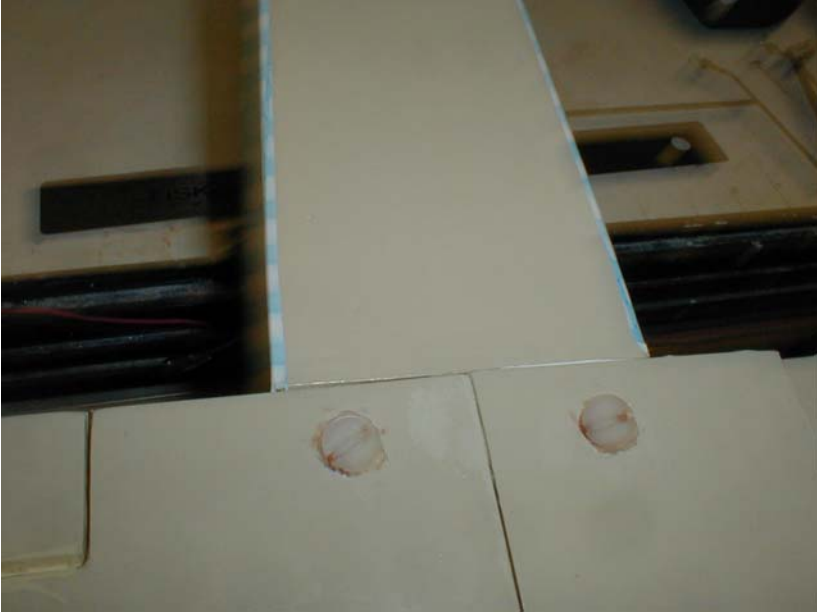
Test fit:



Now you can recess the holes in the wing so that the top of the nylon flat head screws are exactly even with the wing surface.



Cut the nylon wing bolts to the length you need, throw a few extra in your flight bag and go fly!



That red stuff around the holes is some discolored epoxy I applied to the recess of the holes.

Enjoy,  
Stan Douglas