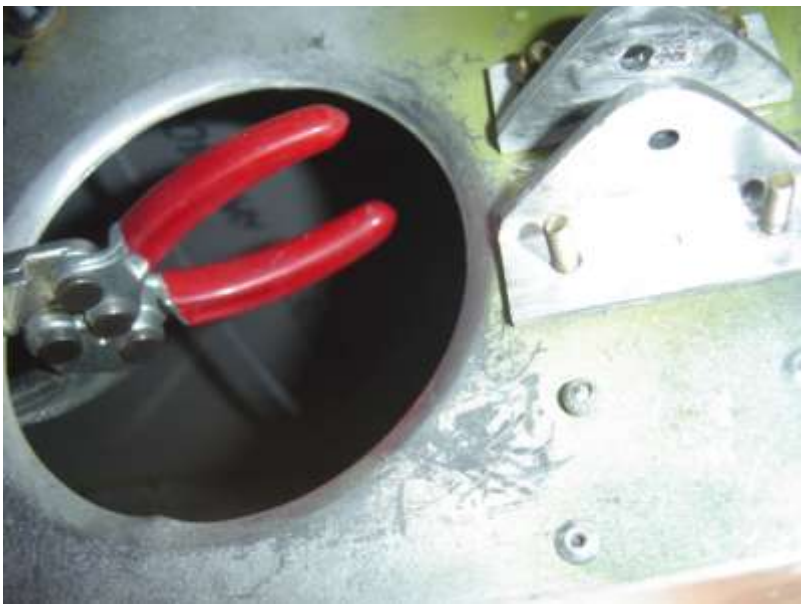
BEEFING UP THE BELLCRANK BRACE

Hello again from Bill's Airplane Building Shop. Remember, we are the folks that recently brought you the aileron push rods saga in 601XL. If you recall I had a wonderful disclaimer and a warning not to do what I did.

Make these changes, etc. Well, again I am telling you all not to do what I have done and that I make this additional modification here just for education and enternaiment and I'm not responsbile for anyone's attempt to emulate my efforts to reduce the chance of aileron flutter.

After about 5 hours of flying my XL with the push rods a builder friend named Ed mentioned that the bellcrank hinges were merely rivetted onto the ribspan and that new and different forces were acting on those rivets now and I should consider drilling out two rivets per hinge half and replace then with AN3 bolts and nuts.

I respect Ed's opinion a lot (except his taste in football teams) so I did what he suggested.



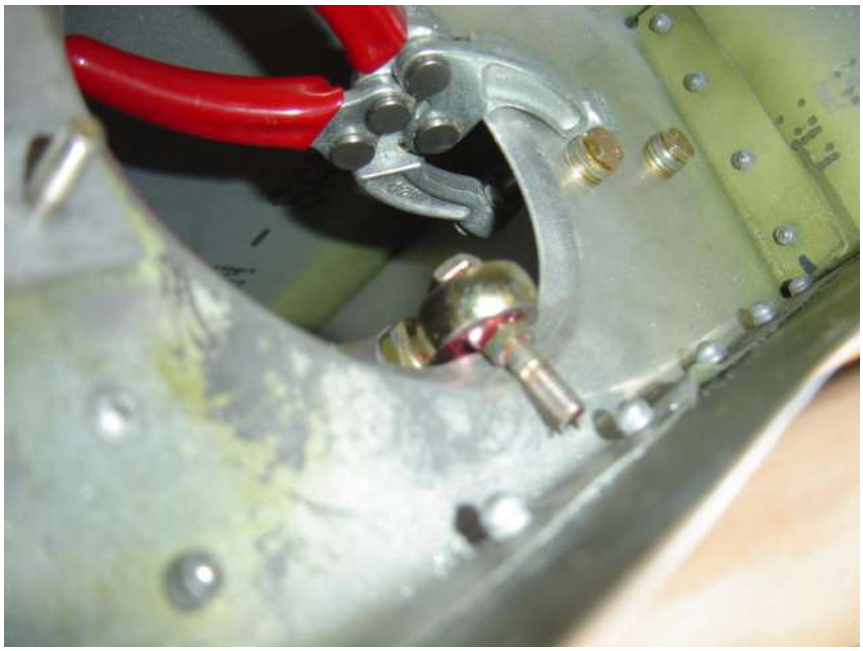
I put at all back together and I checked and still got some movement on the hinges. Still got some wig wag of the rib so I decided to expand the bottom hinge with a “L” angle brace across to the rib sections in front and behind the rib span with the bellcrank.

I made some spacers under the brace the same thickness and the hinge botton so it would lay flat to the rib. Seen here at the ends.

Further, I added a .025 “L” angle behind the center span to spread the load to even more rivets. This one is for the right hand wing. Custom made with flush rivets and countersinking

The whole effort was handicapped by the small area to work in, small access hole to get both hands in and the difficulty of even seeing up into the wing from a setting and laying position. Painfull work. Sure would have been easier during building.

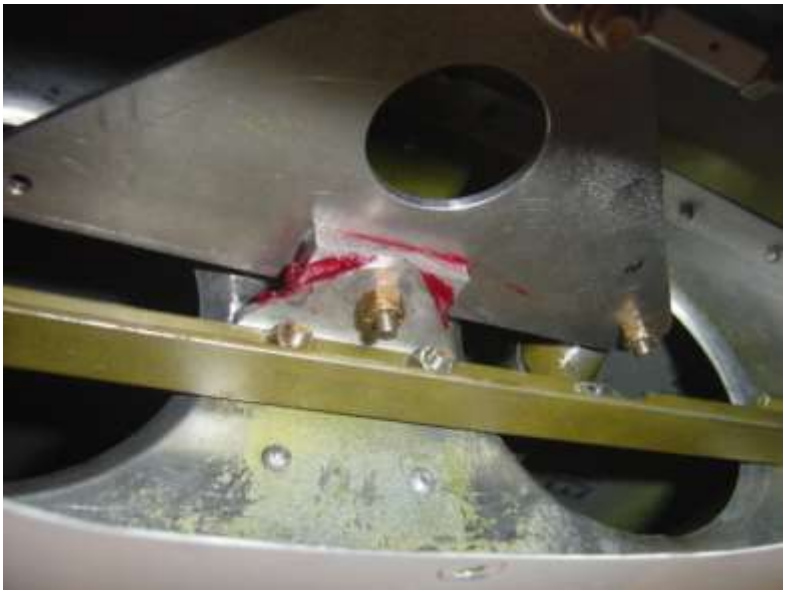
I had to make spacers under the brace to level the cross brace with the heigth of the hinge.

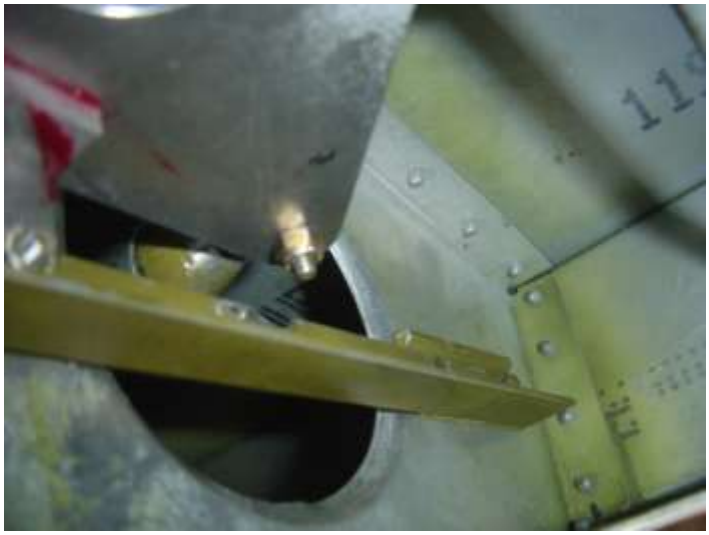


Also, because there was just no way to get and hold nuts on the back side of the rib I made a plate with nut plates that I glued in place with yellow adhesive. Here you see where I clamped and glued the nutplate plate to the inboard side of the rib spans.

I used pull rivets on the orward span “L” ange I added. I intergarted it with the nutp late plate.

These three photos are my attempt to show the brace in place. This is on the left wing from front to rear in 3 exposures.





Some folks were concerned that the push rods were not as strong as cables. My concern is whether the rod and bellcrank and rib are strong enough. And whether I can be reassured that I can reduce the risk of aileron flutter. I think if I was building my XL again I would have the push rods right behind the main spar and attach the bellcrank hinge to the side of the spar. Sure would reduce any chance for play.

Side note. I readjusted the ailerons a couple mm above the flap lay line. I had heard from the thread sometime in the past that doing so will reduce drag and increase speed, but will also increase stall speed. I think it did make for more nimble controls and at 2800 rpm it was showing 140 and still climbing a bit. Also I readjusted my rudder cables. Had not done so in some time because of the jack the front up requirement is a pain in the butt. Of course they were lose. Next flight I stomped on them as I have been doing for some time and I almost swapped ends!

If I can help anybody just give me a call and best of luck, Bill Phillips. See you at SnF.