SIDDERS MODIFICATION FOR ACRO II AILERON BELLCRANKS

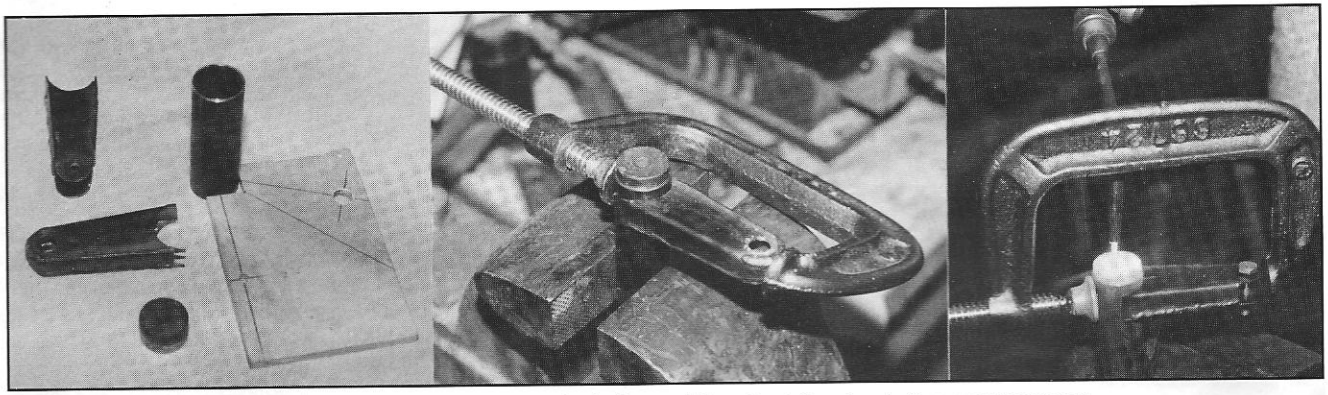
Neil Sidders
235 Rowland Road
Monroe, LA 71203

We modified the aileron bellcrank a little to simplify building. The bearing sleeve in ours is 2⅞" long, allowing both levers to be welded to the sleeve at 90 degree angles. (The Acro I wing is not thick enough to use this taller bellcrank). A plywood gauge was made to locate the angle of the levers to each other. A steel slug .900" in diameter is used to insert into the bearing sleeve when welding the levers to the sleeve. The slug keeps the atmosphere from the inside wall of the tube during welding and also keeps the ID of the tubing to the proper size for a KP-4 bearing.

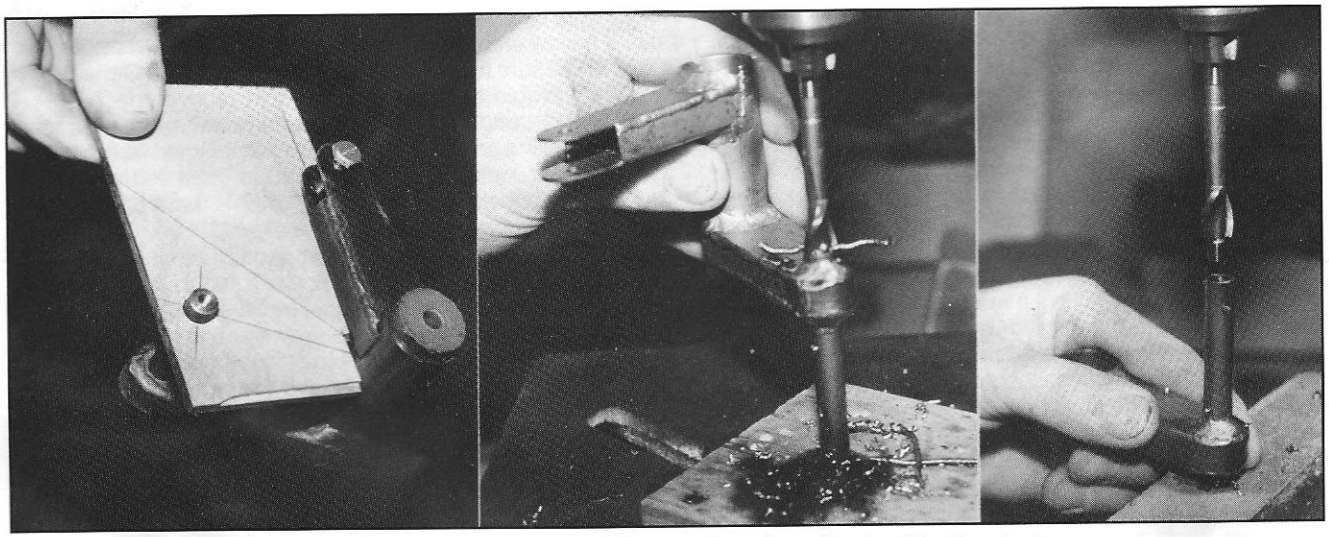
SPACER

Locate the bearing in the bearing sleeve as per the plans. Then tap the slug in until it contacts the spacer, clamp the lower arm to the bearing cage and prepare to weld. Start the weld by heating the slug to a bright red. This will allow you to weld the lever to the sleeve without losing your heat to the slug. After the part cools, you can knock the slug out and it will leave a good clean hole for the bearing.

Now you get to use the little plywood gage you made. Slide a rod through the hole in the lower lever, (you haven't welded in the bushing stock yet have



The steel slug is for insertion only during welding. Heat the slug before welding lever.



Plywood gauge to locate bellcrank levers. Squaring off ends of busing stock.

you?), and locate the upper lever as in the photo. Clamp the lever to the bearing cage with the slug in place and repeat the welding steps.

The aileron bracket flat pattern dimensions on sheet 14.0 change like this:

3¼" becomes 3¾"
2½" becomes 3"
6⅛" becomes 6⅝"

The gusset 1¼" becomes 1¾" and the bearing cage 2⅜" becomes 2⅞". Weld the levers 3/16" from the ends of the bearing cage.

If there is a weak link in the aileron control system, it is the rod end at the bottom of the bellcrank bushing stock. It is extremely important that the end of the bushing stock be very square to the bore to reduce the bending loads on the AN-3 bolt. All the other rod ends are driven on both sides of the Uniball which is great because it eliminates the bending loads altogether. We used a Tu-Lip counter bore to spot off the end of the bushing stock after it is reamed to size.

In the May 1989 SPORT AVIATION, pg. 56, there is an article on control bearings that I wrote. This article is descriptive of how we did it. Just keep in mind that when two bearings such as the KP-4 are used with a bolt or axle passing through them drawing them together, some means must be used to control the dimension between both inner and outer races of paired bearings. If anyone has any questions, please feel free to give me a call at (318) 343-3885.

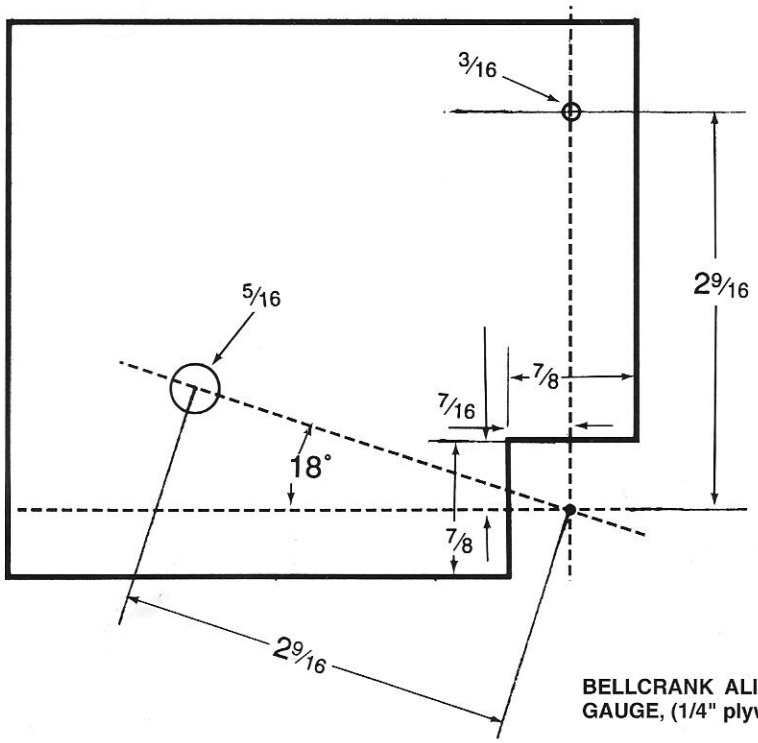
AILERON HORN BEARING. On Acro Sport II plan, sheet 16.0, zone A5, Neil recommends using a Fafnir KP3A instead of the KP3 for its smaller outside diameter, (0.625" vs. 0.770").

Aileron Stop Adjustment

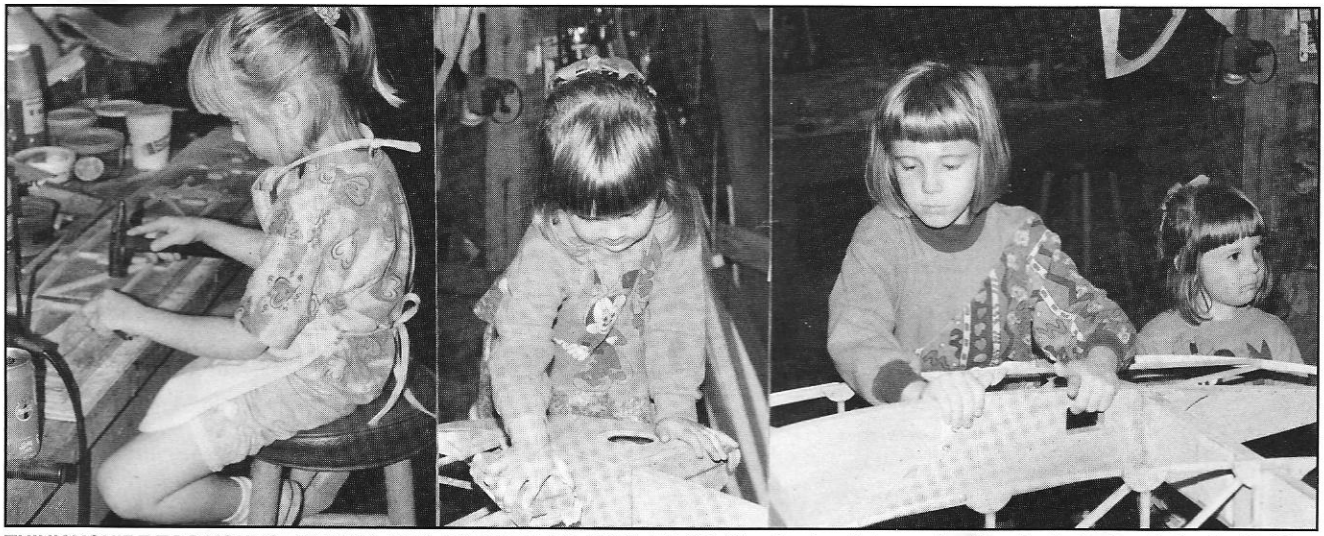
Submitted by Joe P. Spencer

The Acro II plans call for the aileron stops to be set at 25 degrees aileron travel. There is another consideration when setting these stops that may or may not apply to your plane. Check the first male rod end in the elevator push-pull system, (the one that bolts into the rear control stick), for twisting at full aileron travel. If torque is applied to this rod end, then the stop should be re-adjusted 'till the torque is eliminated. On my particular plane, I had to set the stops at slightly less than 25 degrees — I still have more than enough aileron.

On the way to Sun-n-Fun 92 I stopped at a small airport in south Georgia for fuel. The local FBO, (a homebuilder), told me of a Skybolt that crashed from loss of elevator control. He showed me the part that failed—the male rod end immediately aft of the rear stick broke in the threads—possibly the result of the aileron stops being set too wide. I believe it's worth a check.



BELLCRANK ALIGNMENT GAUGE, (1/4" plywood).



THINK YOU'RE TOO YOUNG, (OR TOO OLD), TO BUILD AN AIRPLANE? Left — Becky gluing and nailing the last wing rib for the Sidders Acro II. She does pretty well at driving those little aircraft nails, mixing glue, and putting the parts in the jig. Quality time? You bet!! Center — Sanding technician Laura — if you are as lucky as Neil to have kids who are curious and want to try what you are doing, make sure you have some extra stock to remove! Right — Becky, (6), and Laura, (3), daughters of Neil and Debbie Sidders going over the wing one last time before varnishing. Don't ask why there is a push-rod tube hole in the tip rib, and don't blame the girls!