ACRO SPORT Newsletter

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Spring Gear for the Acro Sport

by David Hintenlang

Throughout the process of building my Acrosport I've been looking at the various options for the landing gear since the bungees seem to be somewhat problematic in determining the correct size and ultimately wearing out. I had seen several reports of Acrosports flying with aluminum spring gear which seem to improve performance while eliminating some of the problems with the bungees. Finding sources for aluminum spring gear was not too hard (Grove Aircraft and Aircraft Spruce are two sources) but I couldn't find much information as to what changes might be necessary to reinforce the fuselage structure for this alternate gear style.

When I started putting my fuselage together I figured it was time to find out so that I could decide if I would accommodate the possibility of spring gear, and decide on the specifics later in the construction process. With that in mind I contacted Grove Aircraft to see if they had suggestions as to what would be involved to accommodate their gear. The folks there were most cooperative. I sent a schematic of the Acrosport II fuselage structure and they marked it up and faxed it back to me. What I've done here is to try to reproduce the modifications suggested by Grove as I understand them, mainly to give any-

Standard Fuselage Layout

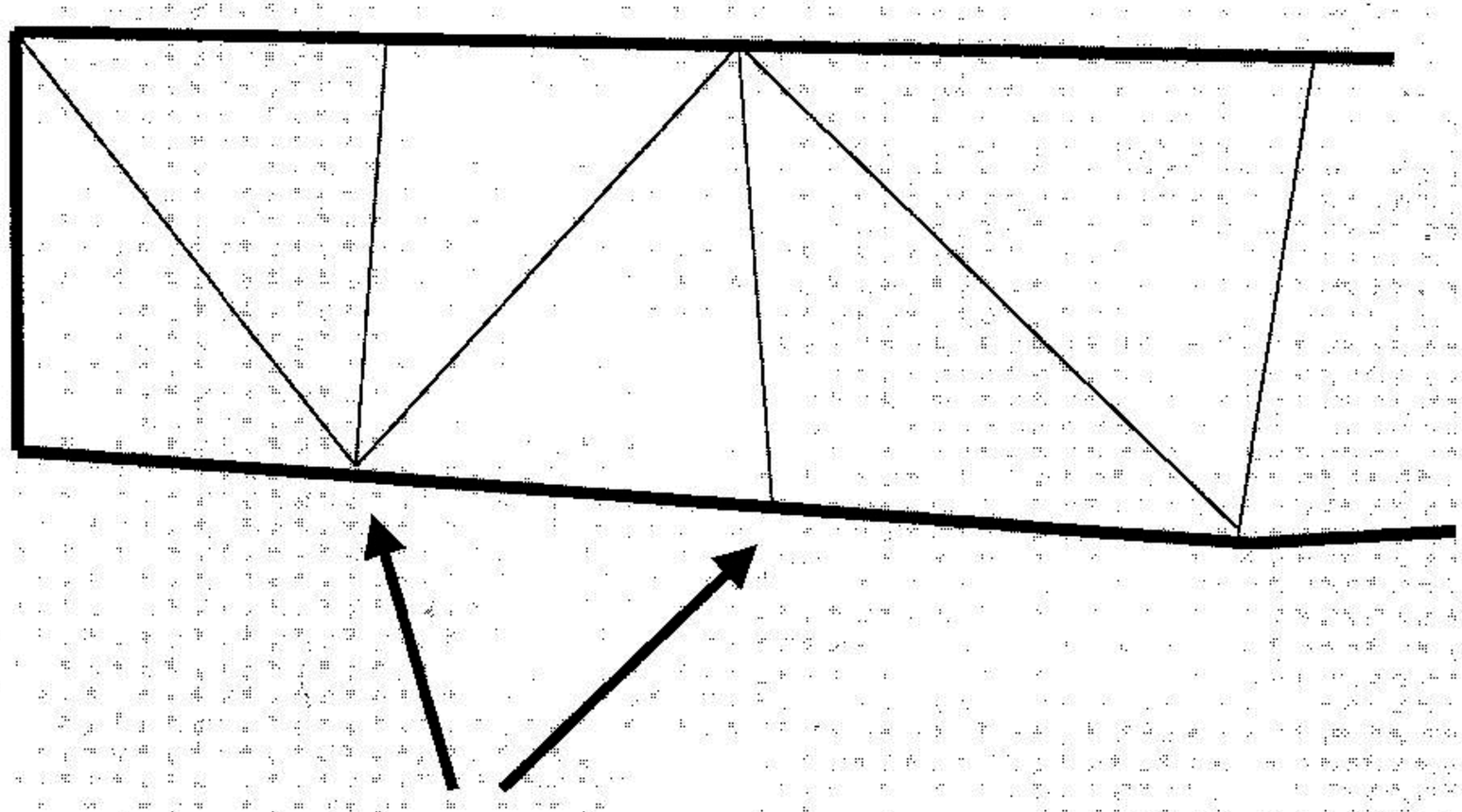
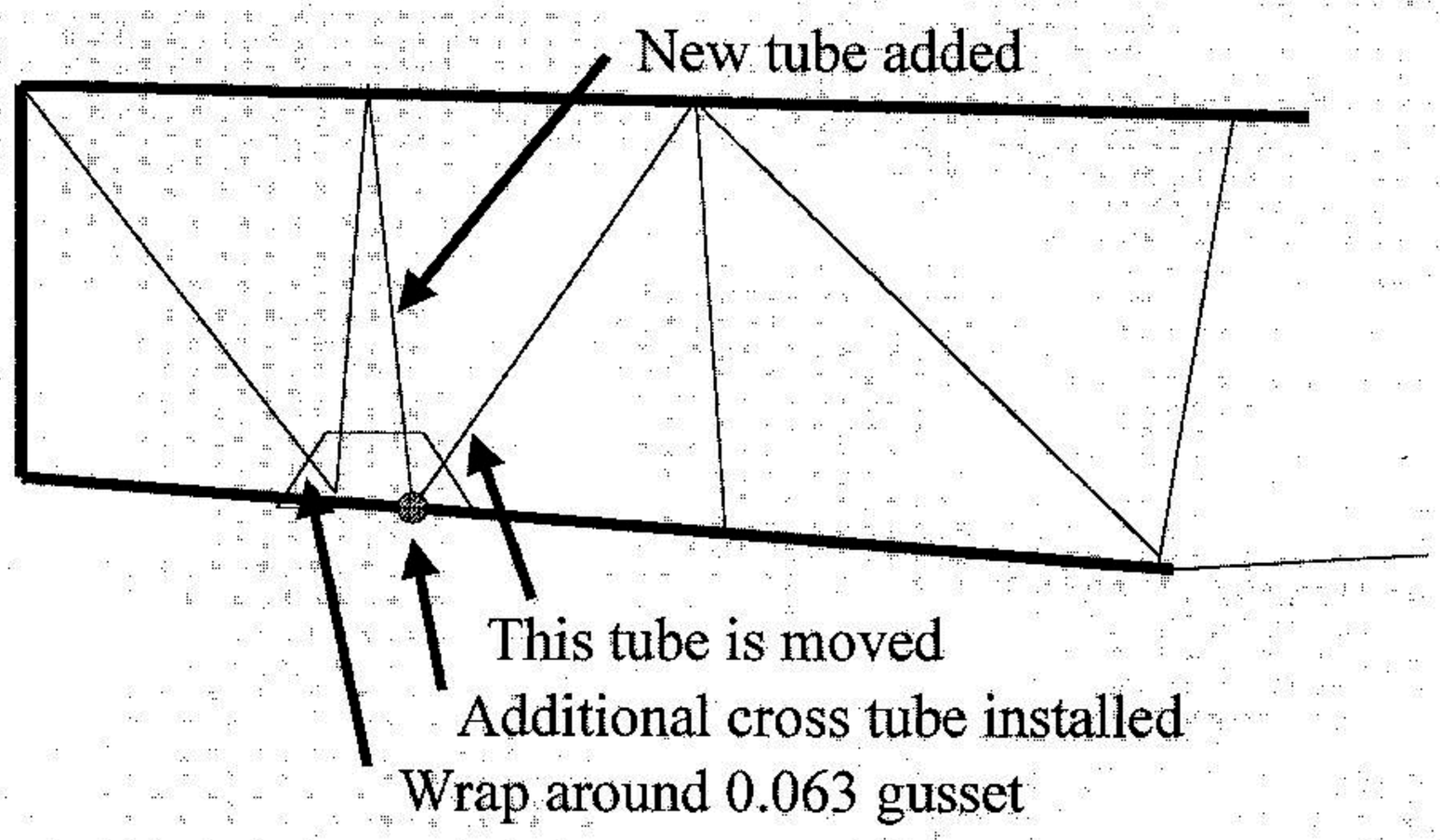


Figure 1

Figure 2

Modified Fuselage Layout



one considering going to the aluminum gear an idea of the types of changes that should be incorporated.

Figure 1 shows a schematic of the Acrosport II fuselage structure (side view) from station 1 back to station 4. The plans gear fits with two gear attachment points located below station 2 and station 3. The spring gear is a single assembly bent out of 1" thick aluminum and is attached across the bottom of the fuselage station 2. Figure 2 illustrates some of the rework of the fuselage suggested to support the spring gear assembly.

1. An additional vertical member is installed from the top longeron at station 2 to a point about 5.5 inches behind station 2 on the lower longeron.

2. The diagonal member extending from the bottom of station 2 to the top of station 3 is moved so that it now extends from the bottom of the new vertical member to the top of station 3.

3. An additional cross tube is inserted between the lower longerons where the new vertical member meets the diagonal. This cross tube will be in three pieces to accommodate the existing diagonals across the bottom of the fuselage.

4. A 0.063" 4130 gusset is added that wraps around to the bottom of the fuselage to strengthen the entire area.

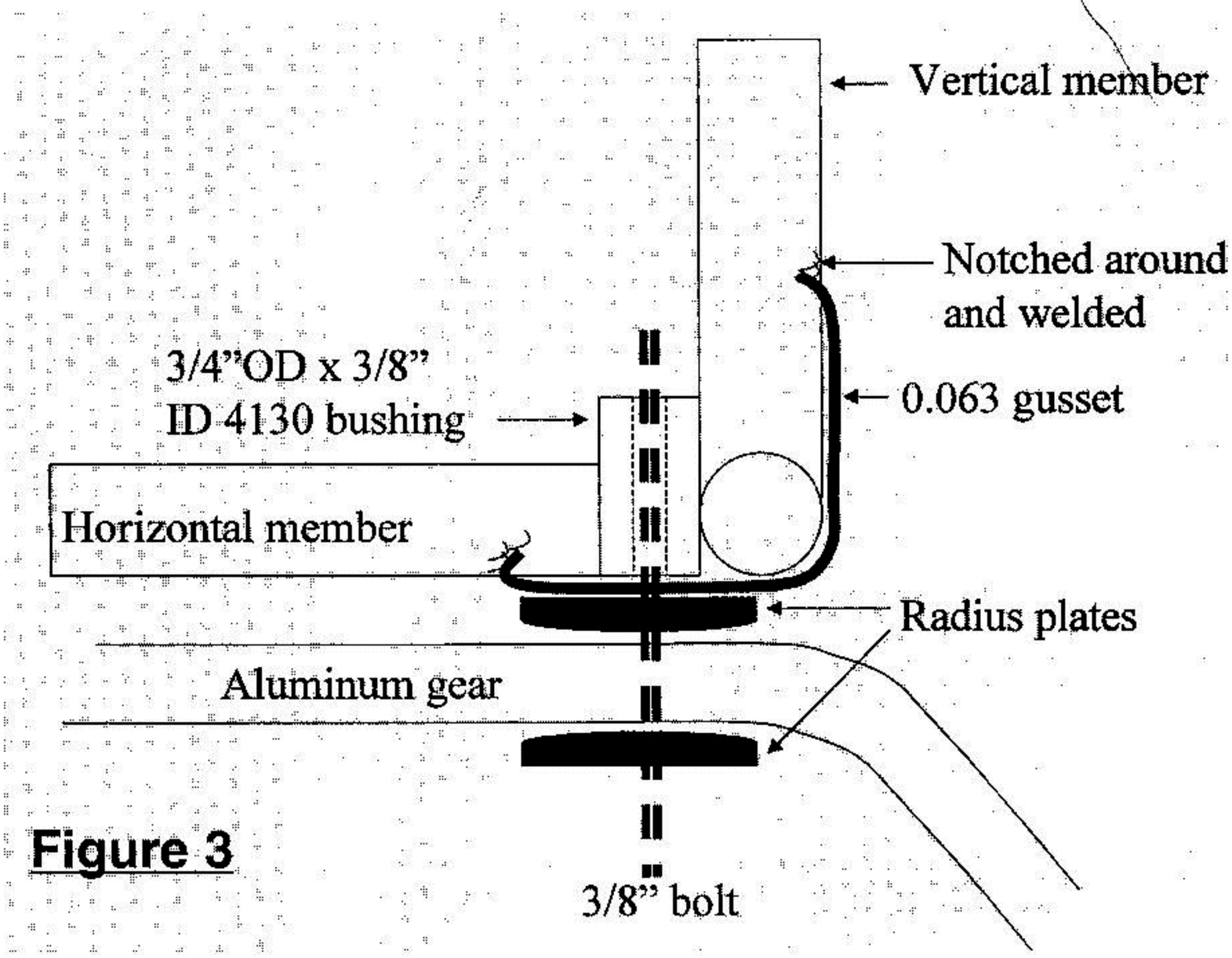


Figure 3

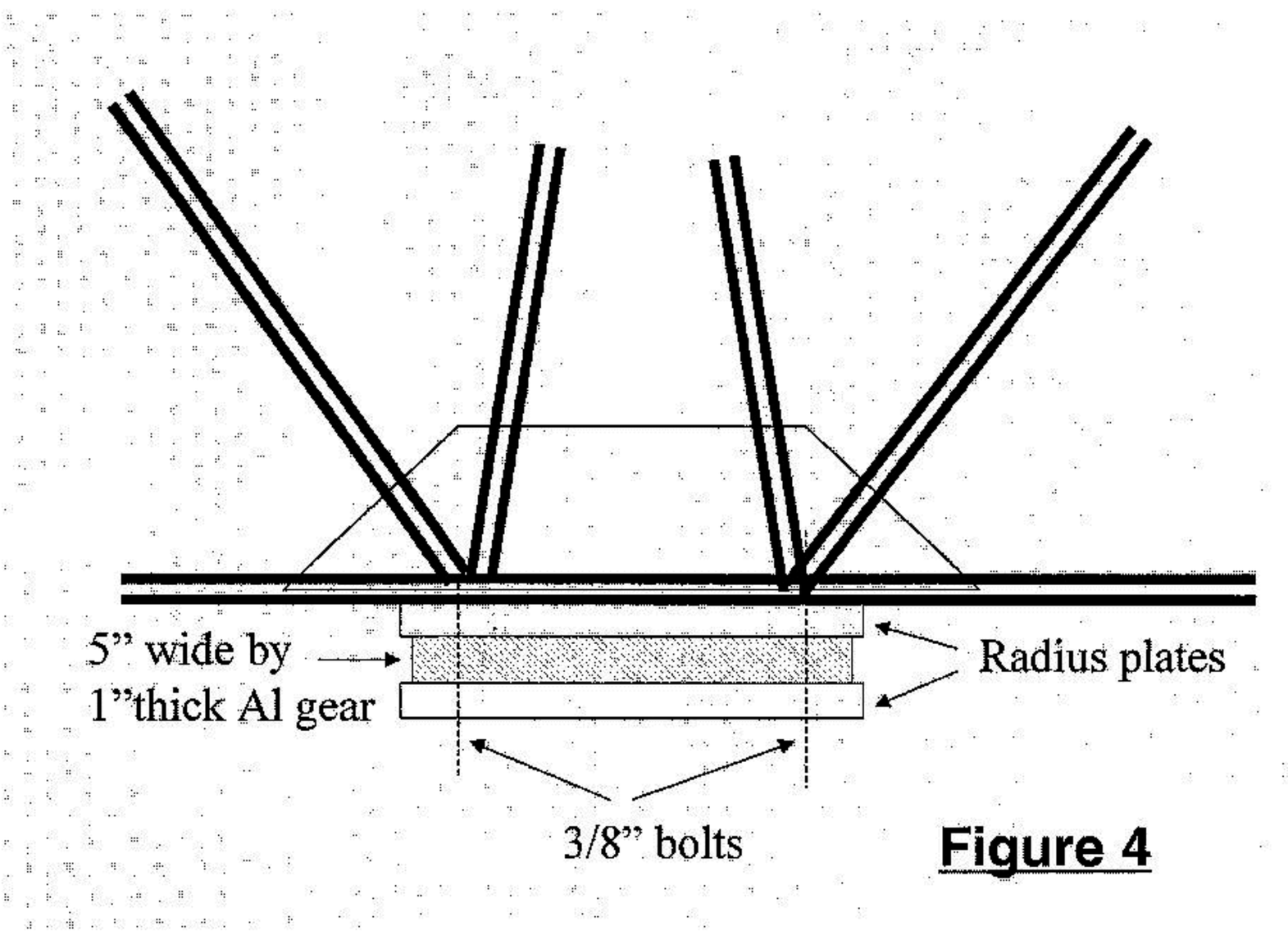


Figure 4

Figure 3 shows this assembly from the front view. The gusset is not only wrapped around, but is notched and welded around the tubing. Four 3/4" OD x 3/8" ID 4130 steel bushings are also added at the four corners of the landing gear attachment bolts. I'm not certain, but believe that these are welded adjacent to the cross tubes and probably do not intersect them. Once this is accomplished the assembly bolts together as illustrated in Figures 3 and 4 (side view). The aluminum gear is sandwiched between and rides on the steel radius plates which can be purchased from Grove. This arrangement would seem to help distribute the stresses associated with the spring gear over a reasonable portion of the airframe.

For anyone looking for more information or engineering details on this installation I would suggest that they contact the folks at Grove Aircraft. They seem to be very helpful in both answering questions and providing feedback on design alternatives, and will quickly fax the relevant landing gear specifications. They list the aluminum spring gear for the Acrosport II as a "stocked" item, as does Aircraft Spruce, so there must be a regular demand for them. I presume that this design is flying on some aircraft and it would be interesting to hear from those who are flying the spring gear to see if this is the design that they are using, or what other options are being used, if any problems have been encountered, and, ultimately how they hold up over time. In the meantime I have decided to go with the plans gear style (using the coil springs instead of bungees) for two reasons: 1) I've decided I like the more traditional look, and 2) It will have a much smaller impact on my wallet!

David Hintenlang, 6 Marlboro Country Estates, 12691 NE 131 Place, Archer, FL 32618.

Acro Sport List

David Hintenlang advises that the Acro Sport on-line list can now be reached at:

Acrosport-L@lists.ufl.edu

If you need additional guidance, he can be reached at:

dhinten@UFL.EDU

If you are on-line, be sure to check out the list. Answers to many construction questions can be found there, and you will probably be able to help someone out.