

**UNIVERSITY OF MINNESOTA
SOLAR VEHICLE PROJECT**



**MECHANICAL SYSTEMS STRUCTURAL
REPORT**

ADDENDUM - February 23, 2010

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1. I read your statement about the panels having interlocking tabs in your first Structural Report. I'm just trying to get some clarity here. Are you making a "box joint" or "finger joint" (with wide fingers), like what you have done with previous vehicles? Parts of your vehicle structure look familiar.

Hopefully the picture below helps clear things up. The large green and grey panels are joined with tabs as shown; all tabs and joints are glued using the DP-460 two-part epoxy.

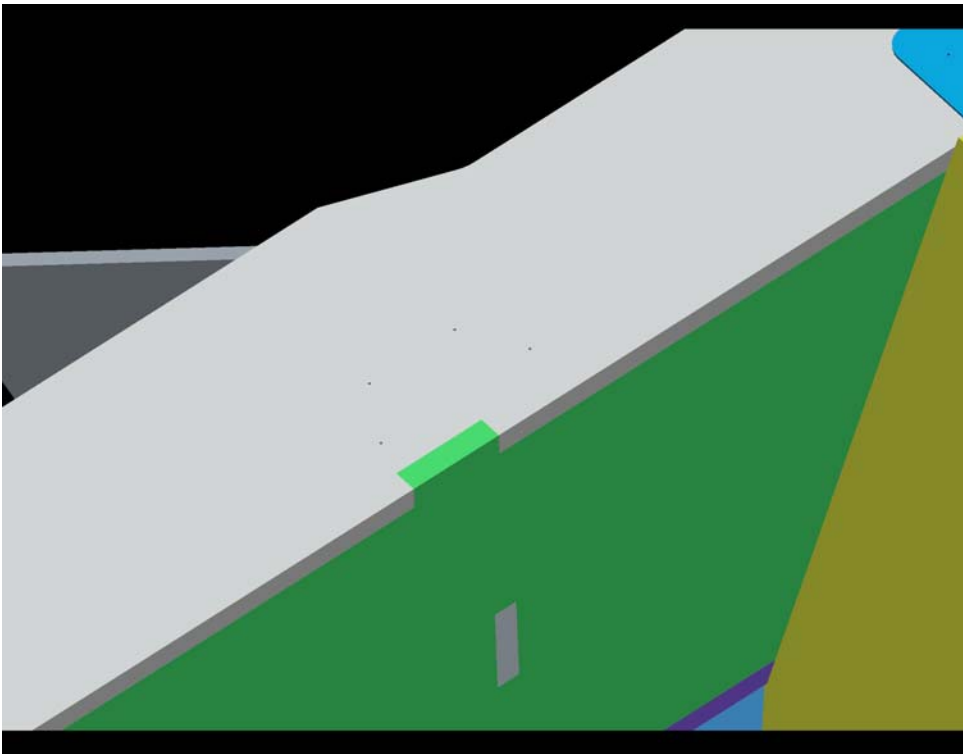


Figure A2.2: Chassis Tabs

7. I see in Figure 5.5 that the spherical bearing has a bore in the horizontal direction taking a thrust load from braking. I am curious as to how the bearing is mounted in the a-arm. Is it held in place by a press fit, is it swaged, or is the thrust taken by a shoulder?

The picture below is a top view cut plane of the lower a-arm. The bearing holder has a steel shoulder behind the bearing. The bearing is retained in the other direction by a steel snap ring. All dimensions shown are in inches. The picture is of the left front suspension; bottom of picture is car rear.

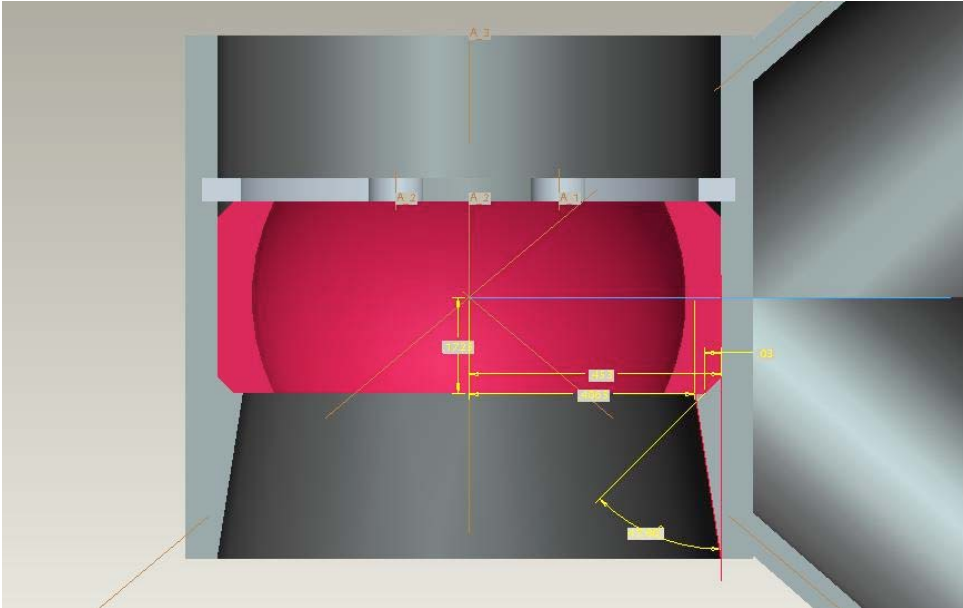


Figure A5.1: Front Suspension Bearing Section

8. New item.....Checking the numbers on page 27, I think the values of D1 and D2 are reversed. Your value of $A_z=816.9$ for the thrust load on the ball joint suggests that this is the case. Reversing these numbers, I get the same value to have for A_z using a 300-lb braking load per wheel. Check the values of A_x and A_y . I think they may be reversed also.

The switch of D1 and D2, you are absolutely correct; this was a typo in the report. D1 should be 8 [in], and D2 should be 13.78 [in]. A_x and A_y are correct as is, the equations being:

$$A_y = -\text{Car Weight} * 4G \text{ Bump} / 3 \text{ Wheels} = -600 * 4/3 \\ = -800 \text{ [lbs]} \text{ (pressing down on the upright)}$$

$$A_x = \text{Force Cornering} * (D1+D2) / D1 - \text{Weight} * 4G \text{ bump} (D3/D1) \\ = 400 * (8+13.78) / 8 + 800 * (1.75/8) = 1264 \text{ [lbs]}$$