

# Ticket #961

**Ticket Status:** Resolved**Name:** Philip Piper**Department:** Mechanical**Email:** philip.piper@yale.edu**Create Date:** 09/08/2015 8:48 am**Phone:** (713) 501-2744**Field of Study:** Mechanical Engineering

Subject: Yale

**09/08/2015 8:48 am Philip Piper**

This question is in regards to T3.2(l) - node to node triangulation.

We are having our chassis manufactured externally to the club because we do not have the proper welding experience, equipment, nor time to jig an entire chassis. Our manufacturer recently pointed out that certain diagonals on our chassis will be physically impossible to locate at the two end points due to the nature of trying to fit diagonal round tubes (see the diagonal in the front view of sheet 9 in "Chassis.PDF").

Is it against the rules to offset one end of these diagonal tubes about half an inch from the node to make welding possible? In Figure 3 of the rules, how far is "Not OK" from "Properly Triangulated"? To be clear, we reran torsional rigidity and impact FEAs and found that small offsets from the diagonal nodes of interest did not lead to large enough stress concentrations nor bending loads to be of any concern.

Best,

Phil

Chassis.PDF(1.5 mb)

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**09/11/2015 6:35 am**

Philip,

Thank you for the detailed document. It is always nice to see this degree of planning in advance of construction. We have a couple of comments:

1. Overall, your chassis looks compliant. We would note that tube #41 needs to be 0.065" instead of 0.049" because we consider that to be part of the lower Side impact. You have this correctly specified for tube 9, so it appears that you need to update your BOM.
2. While your finite element analysis shows a rigid frame with 1/2" offsets on your diagonals, we request that they either (a) extend to the corner where there is a weld, or (b) have a gusset plate applied that covers ALL three tubes involved in the joint.
3. Your front bulkhead (referenced on page 9) doesn't absolutely need a diagonal, so this is actually an ok place to have an offset of a half inch. Other crucial items that support driver protection will need to be compliant.

As an overall comment, the diagonals, as shown in your drawing #9 are hard (not impossible) to fabricate. Your fabricator, however, should be able to fish-mouth the tubes for other crucial structures (e.g. bars 20, 21, 22 on page 21) such that they all touch in a way that is compliant. Note that they don't have to completely overlap. See the enclosed picture for clarification.

Doug Van Citters  
Michael Royce

photo.JPG(1.6 mb)

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**09/12/2015 12:55 pm Philip Piper**

Doug and Michael,

Nice catch on point 1! That document is the work order we sent to the manufacturer, so I'll be sure to point out the discrepancy to him. Thanks for the clarification on T3.2(1) as well. We will make sure that our chassis remains compliant during the fabrication process.

Best,

Phil

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**Please Wait!**

Please wait... it will take a second!