

SAE Mini Baja: Suspension and Steering

Progress Report

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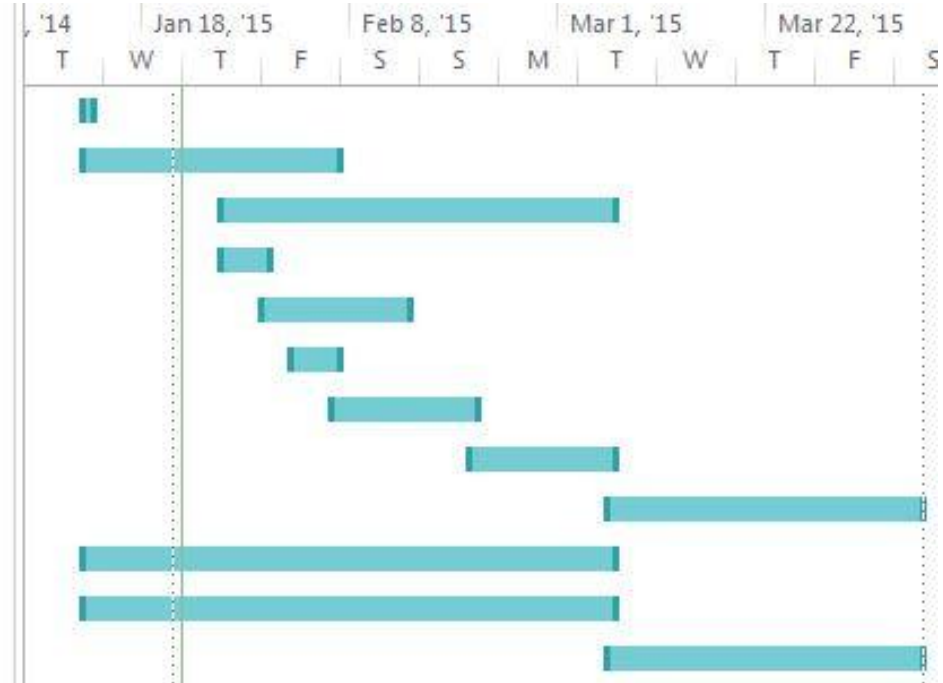


Overview

- Gantt Chart
- Recap
- Changes
- Possibilities
- Future Tasks
- Conclusion

Gantt Chart

Task Name	Start	Finish
Start of 2nd Semester	Mon 1/12/15	Mon 1/12/15
Getting Materials	Mon 1/12/15	Fri 2/6/15
Building	Mon 1/26/15	Fri 3/6/15
Jigs for Front Suspension	Mon 1/26/15	Fri 1/30/15
Build Front Suspension	Fri 1/30/15	Fri 2/13/15
Jigs for Rear Suspension	Mon 2/2/15	Fri 2/6/15
Build Rear Suspension	Fri 2/6/15	Fri 2/20/15
Steering	Fri 2/20/15	Fri 3/6/15
Testing	Fri 3/6/15	Mon 4/6/15
Sponsors	Mon 1/12/15	Fri 3/6/15
Help other teams	Mon 1/12/15	Fri 3/6/15
Car finishings	Fri 3/6/15	Mon 4/6/15



Front Suspension - Double A-arms

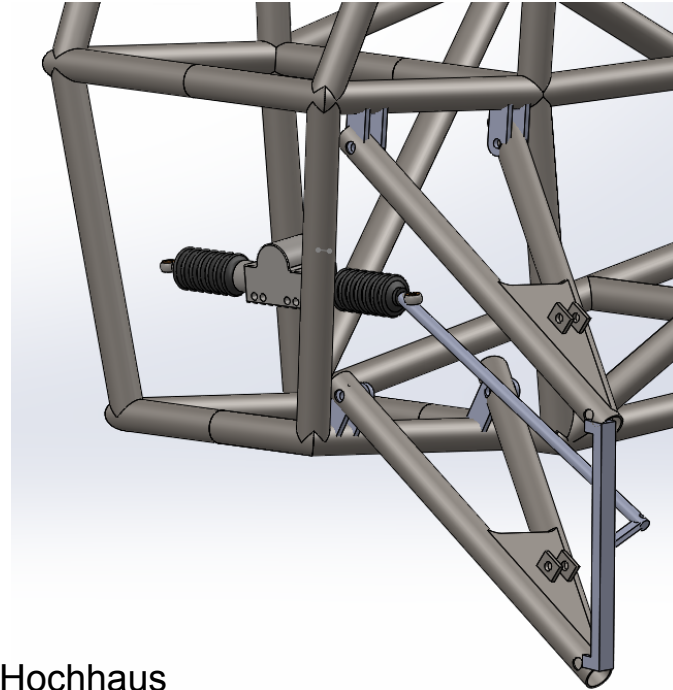
A-Shaped Members:

- Designed for weight reduction
- Simplistic
- Strong against front impact
- Easy to manufacture

Specifications:

- 17in length
- 1.25 Diameter
- 0.065 wall thickness
- 4130 steel

Front Isometric View



Steering Recap

Steering Angles

- Inside Tire = 35.54
- Outside Tire = 24.90

Tie Rod Mount From Kingpin

- 1.43 in

Steering Ratio

- Remove steering quickener (6:1 ratio)
- Re-gain 12:1 ratio

Tie Rod Specifications

- 4130 steel
- Solid Tube
- .50" Diameter
- 15.5" Length

Rear Suspension- Double A-arms

A-Shaped Members

- Same design as front suspension

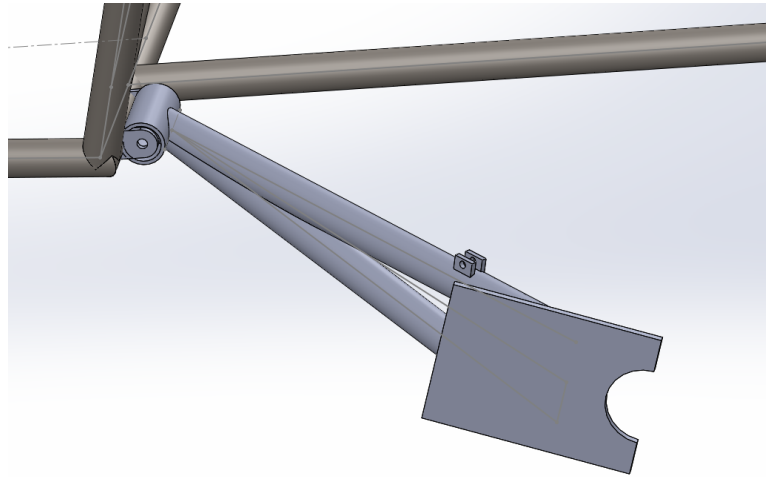
Specifications:

- Length dependent on gearbox size
- 1.25 Diameter
- 0.065 wall thickness
- 4130 steel

Changes to Rear suspension

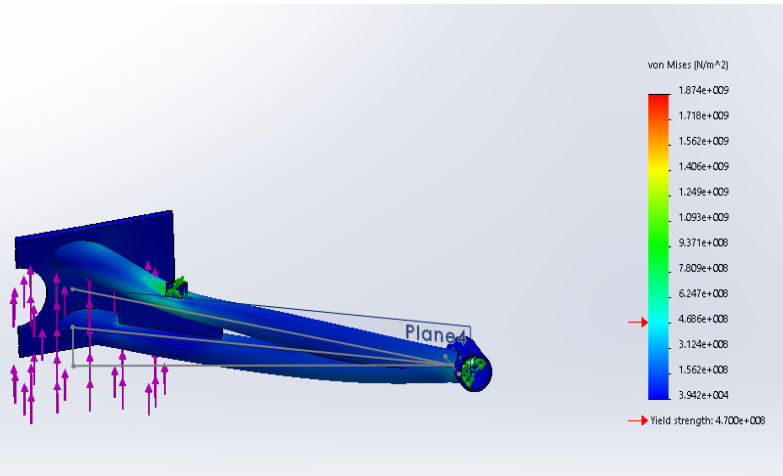
Changing to 1 link

- Size restrictions from rest of vehicle

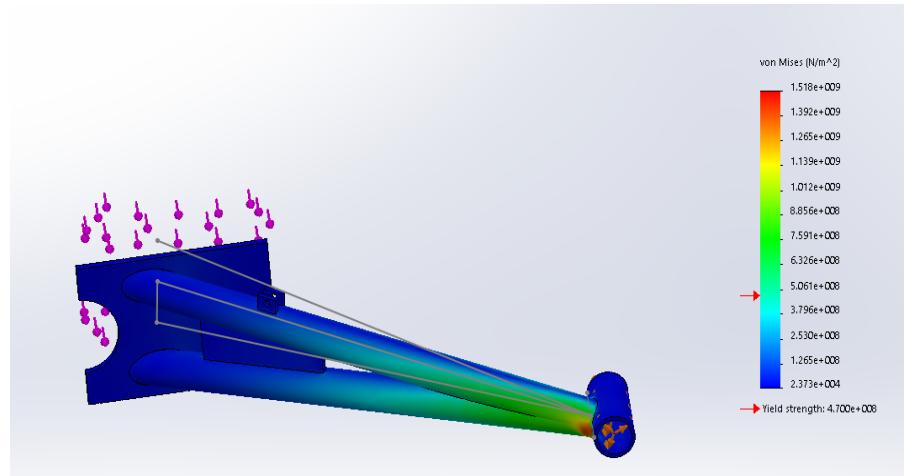


FEA

Vertical Loading (landing) Side Impact (5mph)



FOS: 3.2



FOS: 2.1

Possibilities

Aluminum Hub (6061)

Pros:

- Reduce hub weight by **50 percent**
- Reduces unsprung weight
- Reduce rotational mass
- Have tools to manufacture hub from scratch

Cons:

- Material is expensive (Can we stay within budget)
- Reduced hub life (1-2 years)



Possibilities Continued

Minimize track width

Pros:

- Reduce steering angles
- Homogeneous track width front & rear
- Improved maneuverability (in-between trees, boulders, etc.)

Cons:

- Less stability
- Increases probability of rolling

Future Tasks

Order parts

- Uniball joints
- Bolts/Fasteners
- Tie rod material

Build jigs

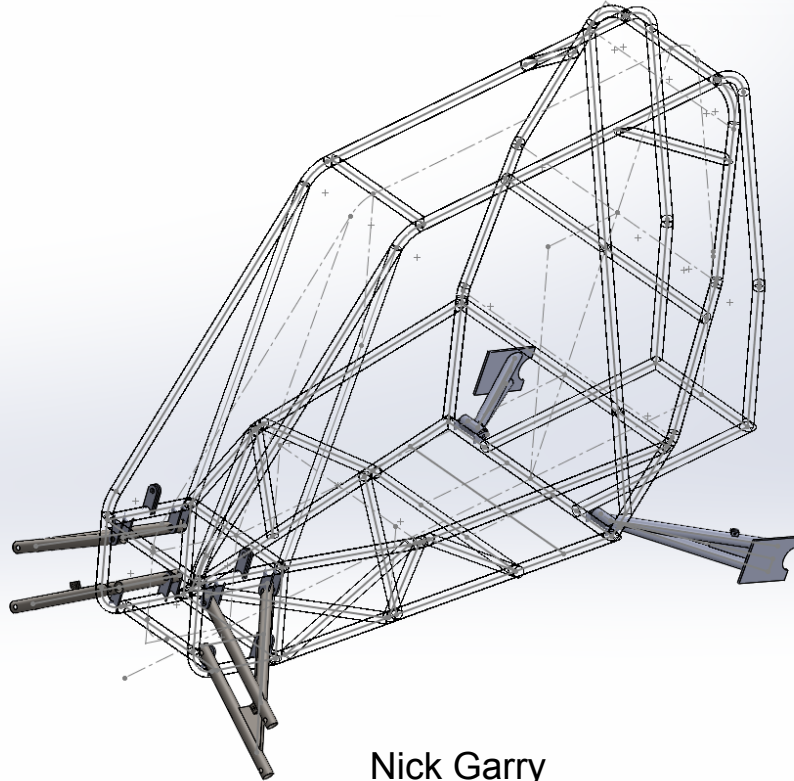
- Front A-arms
- Rear 1 link

Manufacture new tie rod mount

- Kingpin adjustment for proper steering angles
- Attachment design
- Fabrication of attachment

Sponsorships

Final Assembly



Conclusion

- Front suspension uses double A-arms
- Steering design kept the same
- Rear suspension changed to 1 link
- Track Width minimized
- Looking into designing aluminum hubs for rear
- Begin building next week