-Intro:Max -Design:All Shifter:Max\$ Transmission:Sean\$ Fuel Catchment:Fahad\$ Suspension:Auston\$ Muffler:Peng -Frame Design:Peng and Jing \*Precheck:Peng \*F.E.A., Cost, Website: Jing -Goals For March 31st -Overall Conclusion:

\$=Goals at beginning, progress report, Goals for rest of semester

# SAE Baja Pre-Proposal

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> Srinivas Kosaraju Mar. 10, 2016





#### Introduction

The expectations for individual design components at start of semester

Progress report of individual components to date

- Goals for individual components: completion, testing, and assessment
- Analysis of frame, results of the pre-check reports, and the possibility for competition
- Overall goal: have a driveable Baja by April 1, leaving time to test and reevaluate

## **Design: Shifter**



- End of last semester 3D print of the shifting mechanism was complete
- Major components of the shifter have been machined and fit to the shifting shaft
- Goal is to have shifter and mechanism installed and assembled by April 1st

## Design: Shifter





- Expectation: Fully operational by Hardware Review 3 (March 2)
- Progress of transmission:







• Progress of Transmission (cont.):





- Goal for completion: •
  - Modify shift fork for reverse gear
  - Break in gears
    Order a clutch





### **Design: Fuel Catchment**

- Expectation: Revise fuel catchment design, and make it agreed with the project requirement.
- Progression: Making side shield of sheet metal, to protect the catchment of the heat from the muffler.
- Final step(fabrication): Fabricate the fuel catchment to be as the new design.

## **Design: Fuel Catchment**



#### **Suspension: Initial Goals**

Old Single Trailing Arm Design

<image>

This design acts as a cantilever when coming into a turn which causes a large moment at bushing. Additional linkages allow for support during horizontal loading.

Desired Three Link Design (Representation)

#### Suspension: First Iteration Of Design



The original design change included two additional links but due to an issue with the upper link mounting location the design was simplified to a single link.

#### Suspension: Second and Current Design & Analysis



The decision was made to only as one additional link onto the baja and access the situation as the build became drivable.

#### Suspension: Second and Current Design & Analysis



- The next step is to analyze the rear suspension travel under load.
- How will the bushing hold up with an arc due to the additional member?
- Will the cv shafts still attempt to pull from the transmission?

### Old Muffler







### Muffler: Design Requirements (SAE)

- Muffler Relocation: ID of 32mm (1.25 in)
- Must use the original muffler
- Muffler Supports
- Exhaust Pipe Length
- Exhaust Pipe Holes & Tubes
- Exhaust System Durability Required
- The exhaust exit must not exit towards the driver.

#### New Muffler



#### Frame Pre-check (Approved by SAE)

- Roll Cage Specification Sheet & frame material documentation (invoices, certifications, calculations, etc.)
- Engineering Drawings of the frame from several specific views

## Updated FEA



### Updated FEA

	Maximum Stress *10^8 Pa	Yield Stress *10^8 Pa	Factor of Safety	Factor of Safety Requirement
Front impact	1.551	4.6	2.96	1
Side impact	3.972	4.6	1.158	1
Rear impact	4.092	4.6	1.124	1
Roll over	1.859	4.6	2.470	1

#### **Gantt Chart: Milestones**

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#### Gantt Chart: Progress Plan

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#### Conclusion

The expectations for individual design components at start of semester

Progress report of individual components to date

- Goals for individual components: completion, testing, and assessment
- Analysis of frame, results of the pre-check reports, and the possibility for competition
- Overall goal: have a driveable Baja by April 1, leaving time to test and reevaluate

#### **References:**

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