

## PROJECT OVERVIEW

### DEVELOPMENT, VERIFICATION & VALIDATION OF AN ALL-TERRAIN VEHICLE (ATV)

#### PROJECT OBJECTIVE:

The BAJA SAE tasks the students to design, fabricate, and validate a single-seater 4-wheeled offroad vehicle to take part in a 3-day event testing the vehicle for sound engineering practices.



**VEHICLE DESIGN**



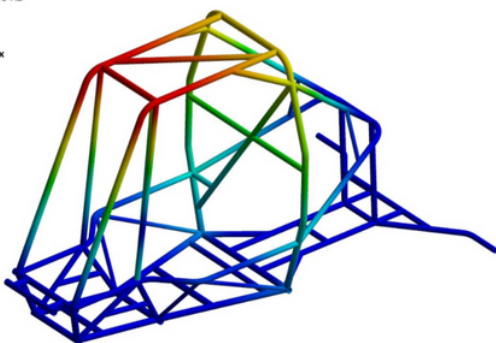
**VEHICLE PROTOTYPE**

#### RESPONSIBILITIES:

- Performed in-depth FEA on the ATV chassis using Ansys, optimizing structural integrity and reducing weight by 25% without performance compromise
- Executed dynamic impact simulations to test ATV chassis response to collisions and rollovers, ensuring compliance with safety standards
- Designed, Validated, and implemented a cost-efficient coil-over suspension setup for an off-road all-terrain vehicle, reducing the cost by 30% while not compromising efficiency

A: Modal  
Total Deformation 5  
Type: Total Deformation  
Frequency: 34.115 Hz

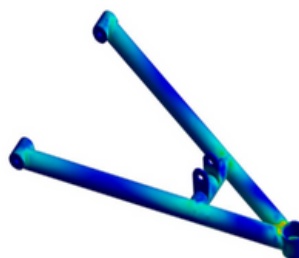
12.985 Max  
11.542  
10.099  
8.6564  
7.2136  
5.7709  
4.3282  
2.8855  
1.4427  
0 Min



**MODAL ANALYSIS: CHASSIS**

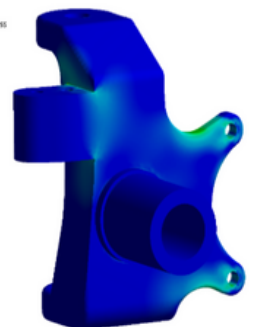
A: Lower arm  
Equivalent Stress  
Type: Equivalent (von-Mises) Stress - Top/Bottom  
Unit: MPa

188.27 Max  
167.35  
146.43  
125.51  
104.59  
83.675  
62.756  
41.838  
25.919  
0 Min



A: upright  
Equivalent Stress  
Type: Equivalent (von-Mises) Stress  
Unit: MPa

164.01 Max  
145.79  
127.57  
106.35  
91.179  
72.909  
54.689  
36.47  
18.25  
0.629812 Min



**STATIC ANALYSIS: VEHICLE COMPONENTS**