Team 15 is comprised of four Mechanical Engineering students (left to right): Lake Chen, Jacob VandeHaar, Nate Konyndyk, and Scott Kamp.

Introduction

We are building a vehicle with a dual tilting suspension. The vehicle will lean during cornering, to resist lateral forces and increase traction. Our vehicle is unique because it uses a passive mechanism, meaning no user or computer input is necessary.

Design and Analysis

After early prototyping validated our concept, we began to design the CAD model in Creo Elements/Pro. The dimensions were optimized according to sensitivity study results. Next, the predicted response was dynamically simulated using another software program (Mechanism).

Prototype

Our prototype demonstrates that the concept is achievable in a full-size vehicle. This prototype closely matches our CAD model. Due to the large amount of components, quality was a primary focus in the manufacturing process.

We completed the manufacturing and fabrication of the vehicle with a rolling chassis that includes steering and braking.

Future Development

Because of the difficulty of constructing a vehicle with an innovative suspension, the powertrain was removed from our project. However, certain features were included in the prototype to allow for the addition of the powertrain. This is a possible project for a Senior Design team next year.

Figure 1: Dual Suspension System

Figure 2: CAD Model

Figure 3: Slider Assembly

Figure 4: Prototype