Ansys

CASE STUDY /

# Ansys + Team Predators Racing

"Team Predators Racing uses Ansys software to optimize structural components for mass and strength and for simulation of fluid flow over individual components and full car models. With the help of Ansys' simulation software, we were able to analyze and simulate every dynamic condition, which led us to manufacture a high-performing, sound vehicle. Specifically, our team was able to decrease the overall weight by 3% and drag by 5% with the use of Ansys tools."

**Ali Abu Farjad**
Business Head / Team Predators Racing

CASE STUDY

# Optimizing a BAJA SAE Buggy with Ansys Mechanical and Ansys Fluent

We are designing an off-road Baja vehicle for the BAJA SAE competition, where the design of a buggy is evaluated for rough terrain performance. These highly competitive vehicles require an optimized project using advanced technologies to be successful. With the help of Ansys solutions, we were able to optimize components, keeping product quality and durability in mind.

## Challenges

Designing and manufacturing a brand-new off-roading BAJA vehicle from scratch each year means the team must work vigorously on simulating the design parameters within the rules set by SAE. Dynamically, to achieve optimal performance under such constraints, the simulation software must be able to produce accurate results for us to build a winning vehicle.

## Ansys Products Used

- Ansys Mechanical
- Ansys Fluent

## Engineering Solution

- Static structural analysis was performed on the buggy arms and gears to verify that the components met an optimum factor of safety.
- Torsional analysis of the driveshaft was carried out to achieve minimum deformation and optimum factor of safety.
- Thermal analysis was performed to determine the temperature rise in the rotor. From this, the cross-section and profile of the rotor was changed to achieve minimum temperature rise.
- CFD analysis was run to determine the drag coefficient of the vehicle and reduce the drag force.

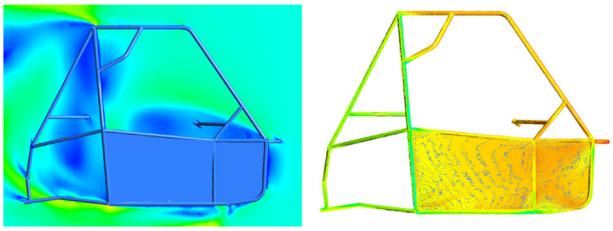
## Benefits

Simulation allows the team to deliver a well-engineered, reliable, optimized car every season. It allows us to predict dynamic behaviors without any cost. This year, the new chassis design iterated from CFD simulations reduced drag by 5%. By perfroming topological optimization on the designed components we decreased the overall car weight by around 6.5 kg. As budding engineers, this whole process helped us understand the fundamentals of a race winning vehicle and gave us an edge over the competition.

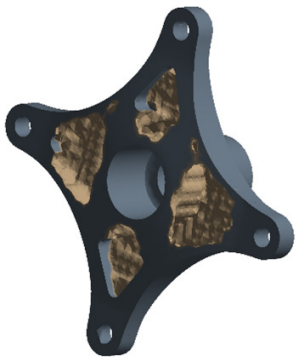
## Company Description

Team Predators Racing is a group of highly passionate and growing engineers at D.Y. Patil College of Engineering, Akurdi, Pune. Every year, the team participates in the BAJA SAE event at the National (Pithampur, Indore) & at International (California, Maryland, Tennessee, USA) level. BAJA SAE is an off-road Motorsport platform for undergraduate engineers, enabling us to simulate real-world engineering problems by designing and manufacturing an All-Terrain Vehicle (ATV) from scratch.

Team Photo Season 2020-2021



CFD of Rollcage



Topology Optimisation of Wheel Hub

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