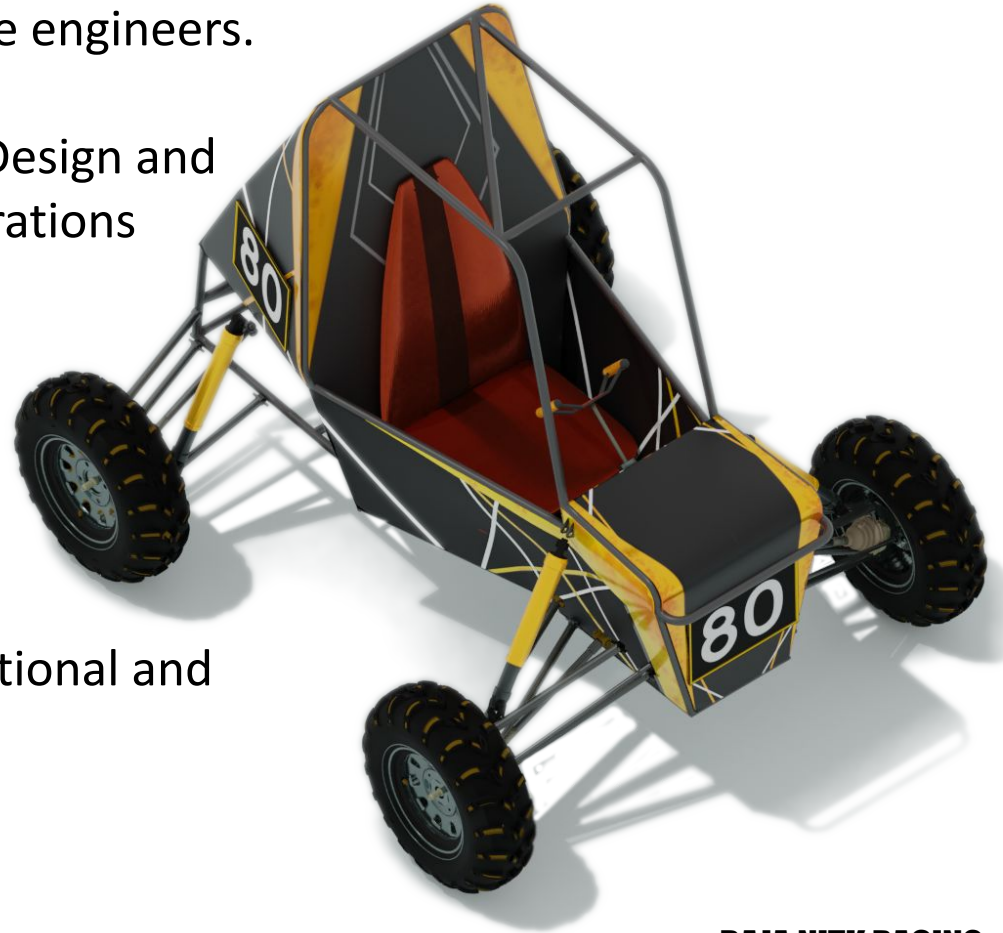
BAJA NITK RACING

Endurance Engineered

BAJA Induction talk

Who we are

- Team BAJA NITK Racing was formed in 2007 with the aim of developing ATV for the BAJA Racing events. The team has grown over the years, with the current team being 51 members strong, comprising of aspiring passionate engineers.
- The team functions as different Special Interest Groups namely Design and Analysis, Vehicle Dynamics, Power Train and Marketing and Operations which work throughout the year
- The primary objective is to build a race car, the process of which serves to boost the entire team's understanding on automotive engineering.
- We strive to promote our university, partners and sponsors at National and International levels.



What is BAJA?

BAJA SAE International

BAJA SAE is a Collegiate Design Series competition run by Society of Automotive Engineers(SAE) International for engineering students.

It tasks students particularly with grueling engineering challenges: to conceive, design & fabricate, race and even market an All-Terrain Vehicle, to a panel of judges belonging to SAE India.

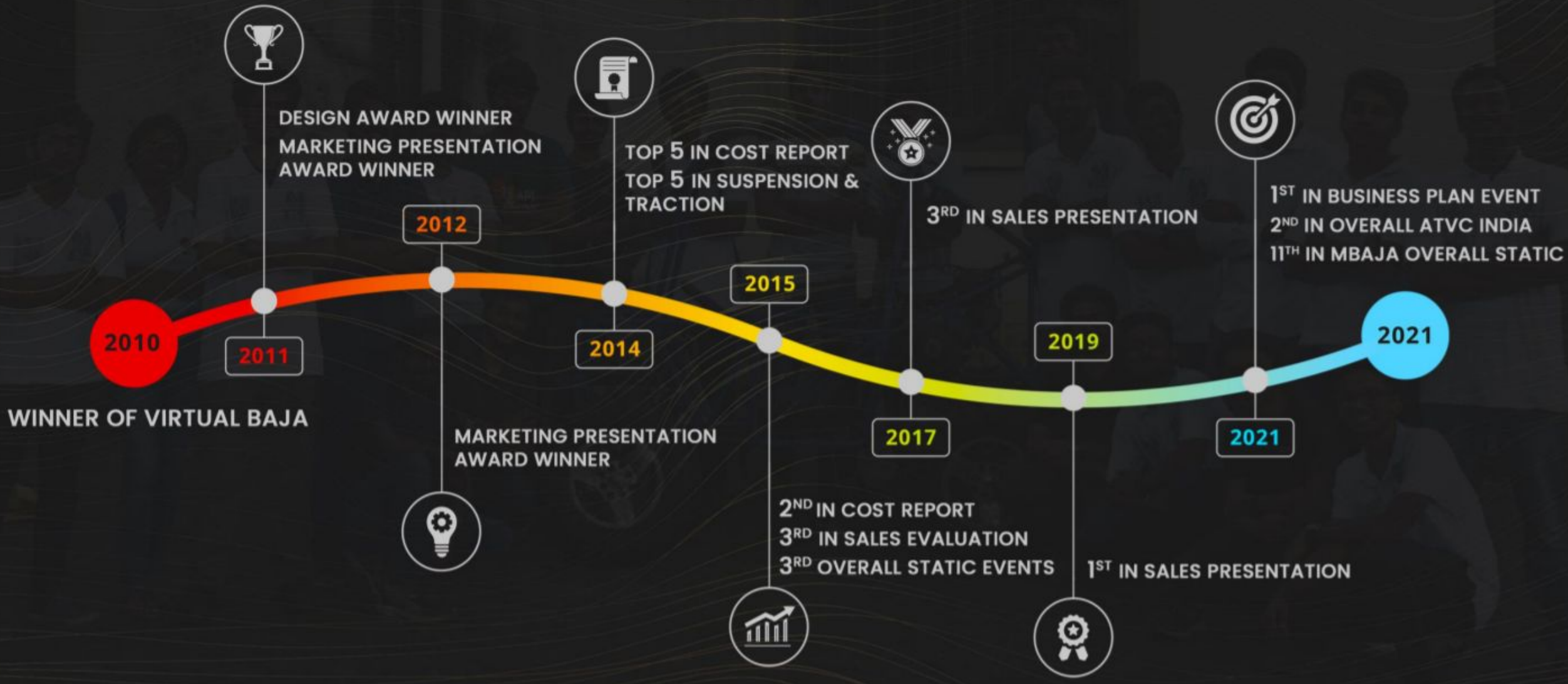
The competition has two main stages, Virtual BAJA & the main event.

BAJA SAE INDIA

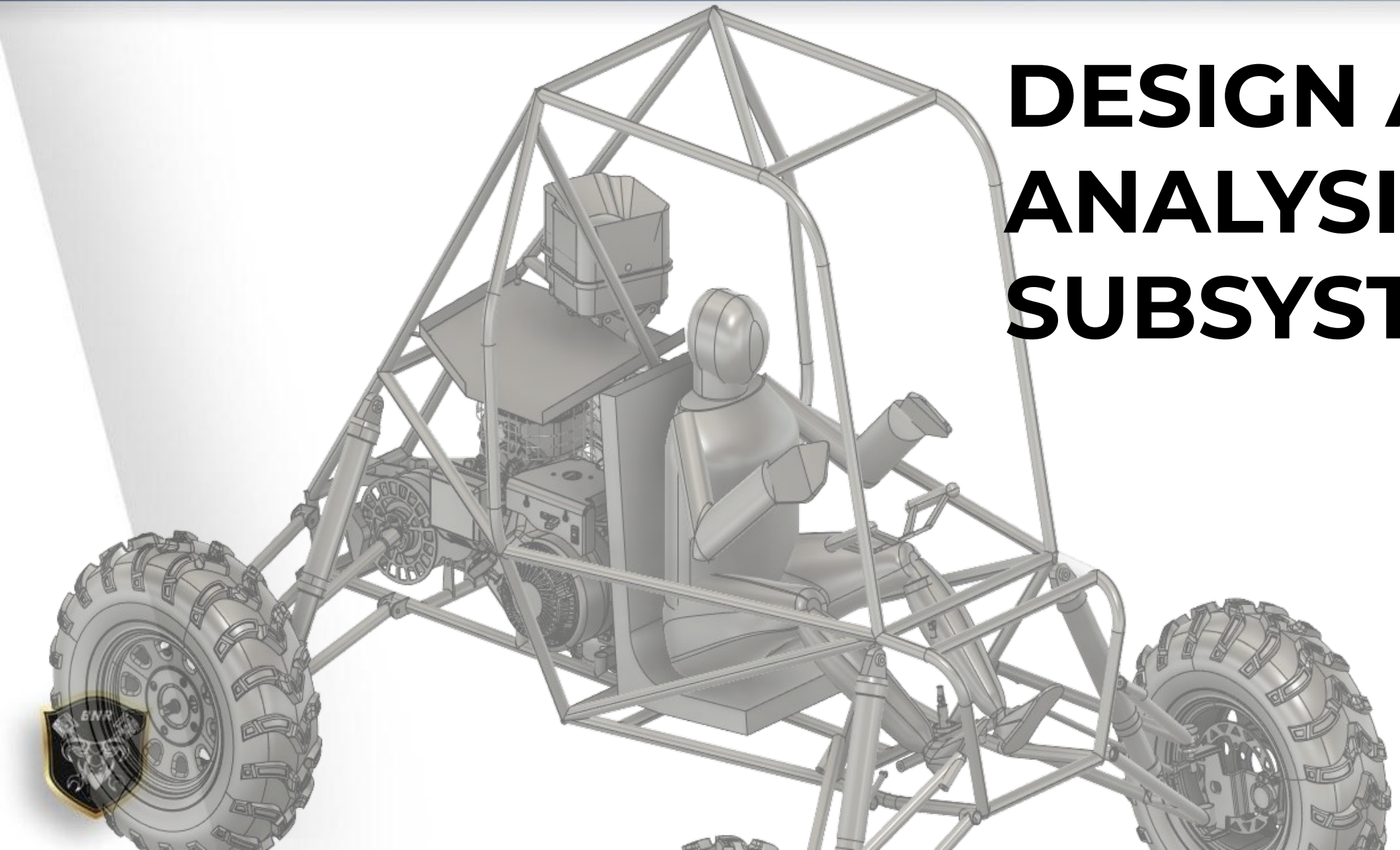
BAJA SAE India is a student competition which follows the standards of the international BAJA SAE competition held all over the World.

BAJA is one of the is one of the largest and most prestigious engineering event in India in which over 350 teams compete against each other

ACHIEVEMENTS



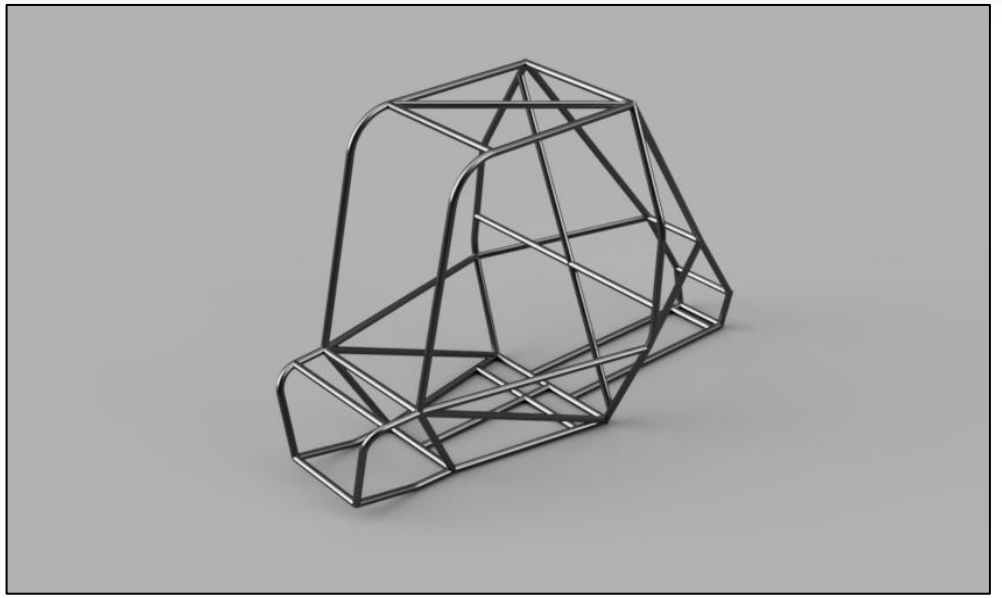
DESIGN AND ANALYSIS SUBSYSTEM



Design and Analysis

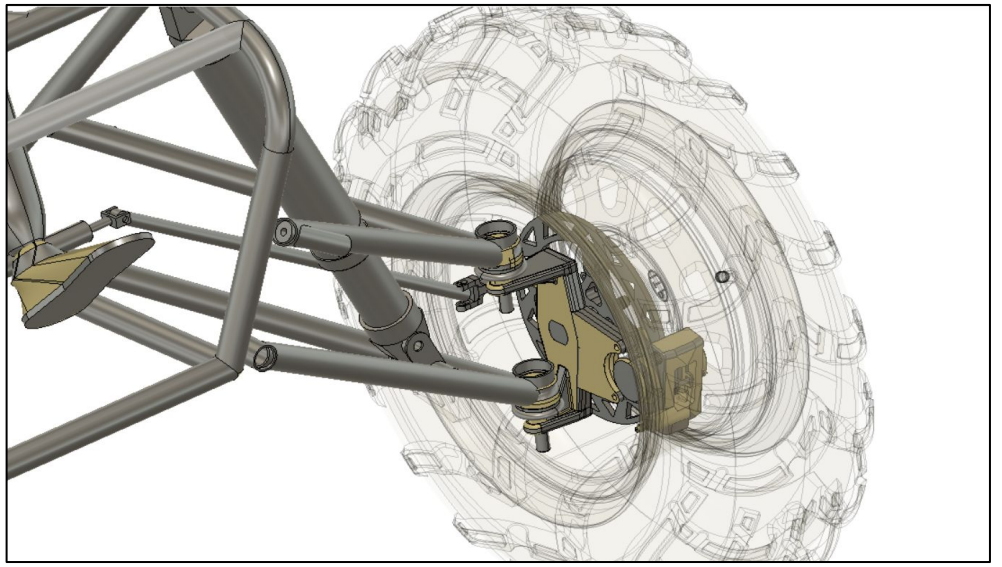
Design and Analysis subsystem primarily deals with:

- **Design, structural analysis and optimisation** of Chassis, Knuckles and Wheel hub
- And finally assembly of all these components



What we do

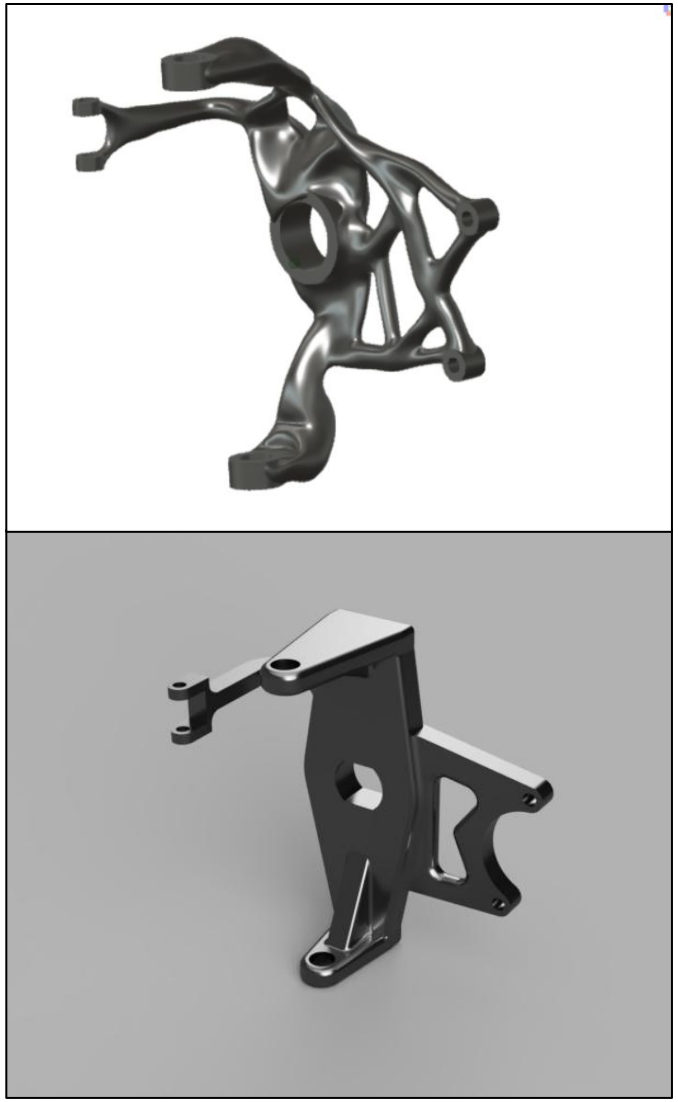
- After receiving data from other subsystems, we build a basic model of our component around it (**Fusion 360**)
- We check our model with the rulebook so that it satisfies all the requirements.
- We run FEM simulations (**Ansys**) with predetermined loads and optimize our design.

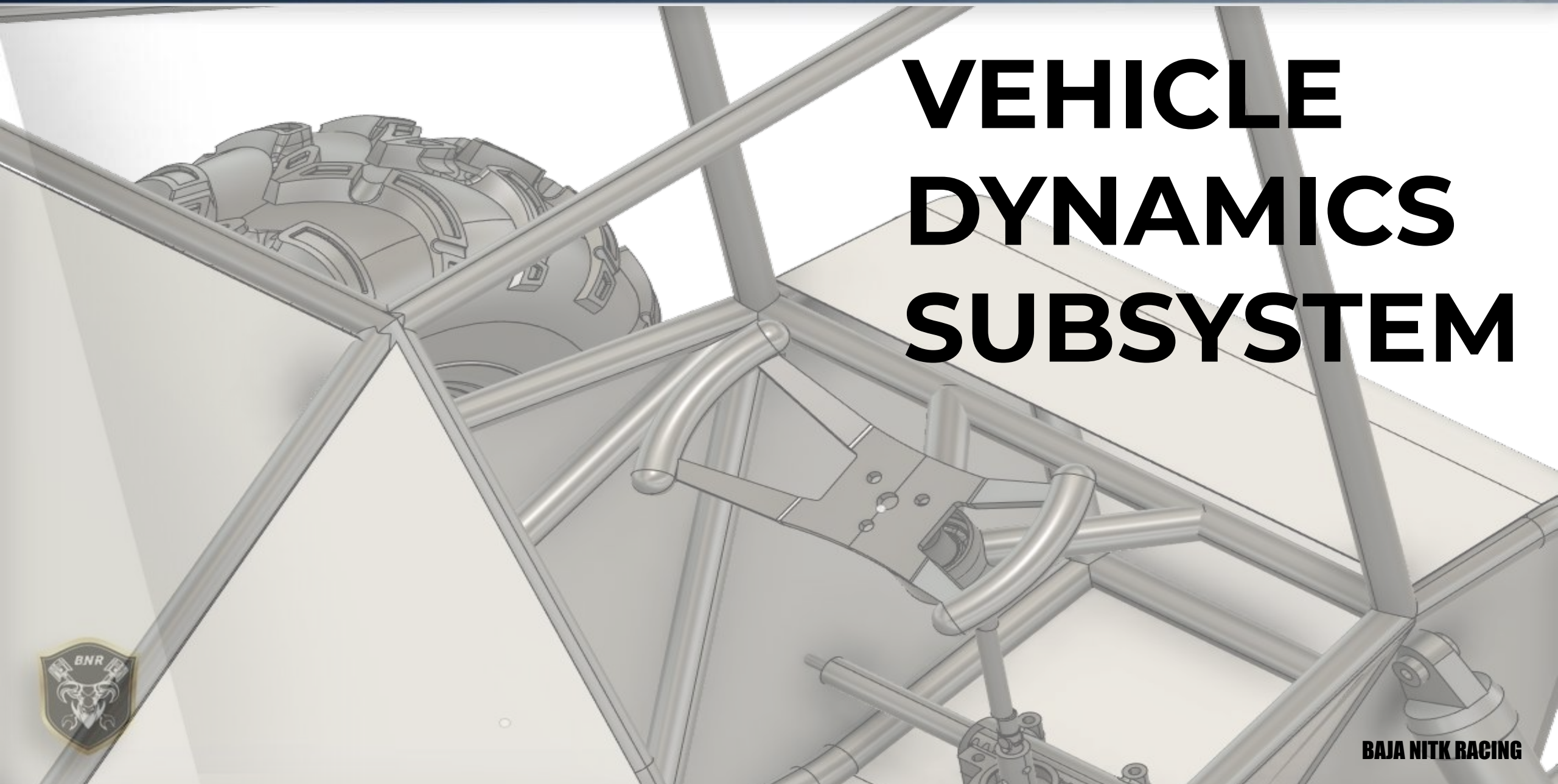


Design and Analysis

Objectives

- To design components light as possible **without compromising strength and safety**
- Aim to **improve accuracy** on simulation/analysis results which inevitably leads to better designs
- To incorporate extensive use of **Generative Design** to get optimal designs efficiently





VEHICLE DYNAMICS SUBSYSTEM

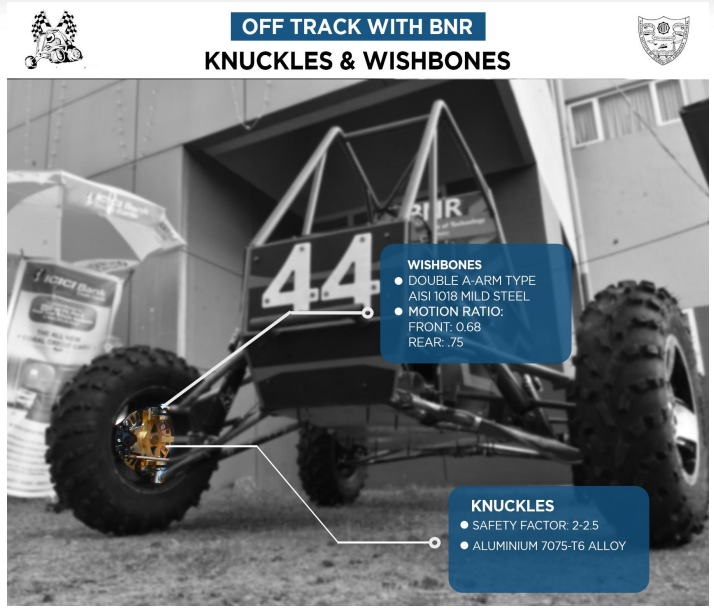
Vehicle Dynamics

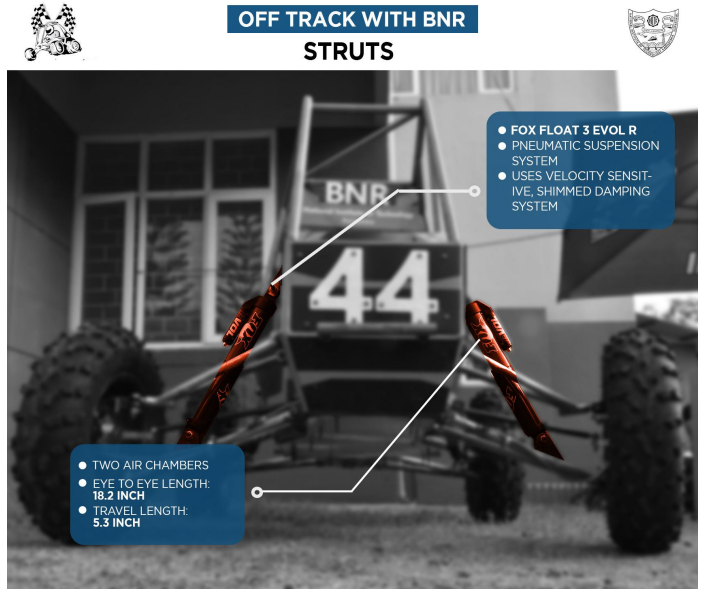
Objectives -

- Achieve good ride dynamics
- Achieve effective braking characteristics
- Control the suspension system to enable maximum traction.
- Optimize steering geometry for good maneuverability.

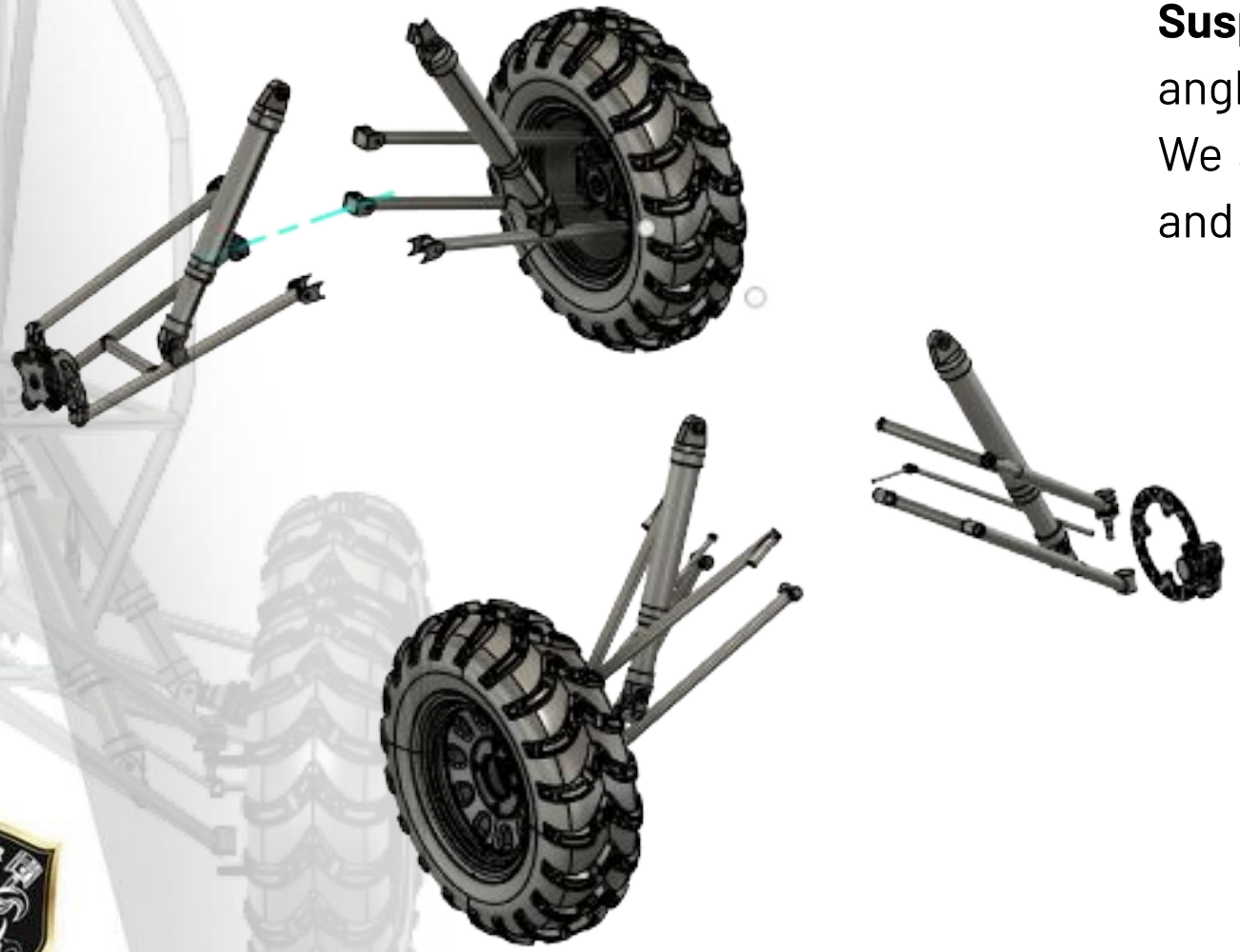
What we do

- Decide what characteristics are required for the dynamics of the car.
- Select appropriate system types for suspension, steering and brakes.
- Prepare rough models and run simulations.
- Once desirable results are obtained, CAD models are developed, fabricated and assembled

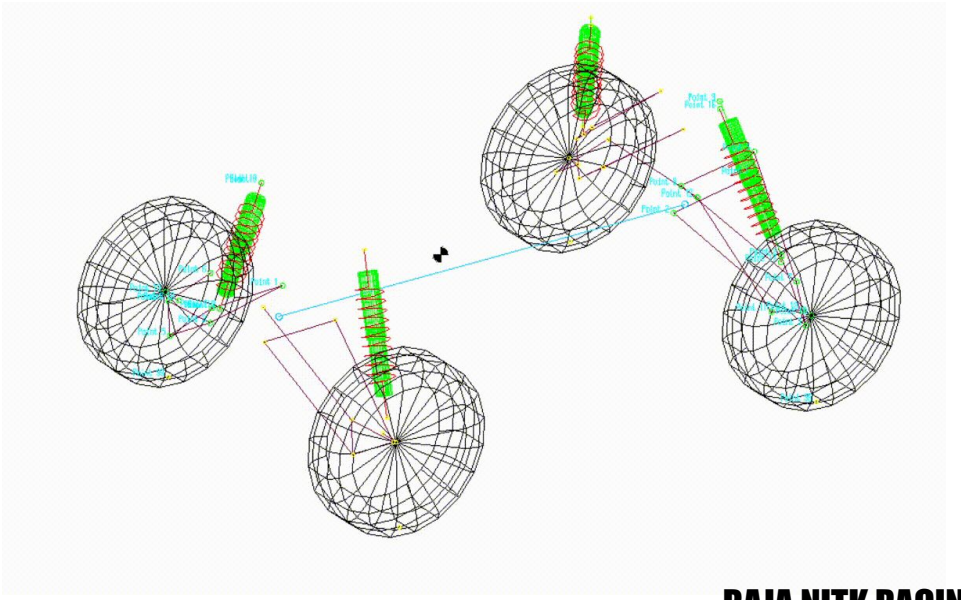




Vehicle Dynamics

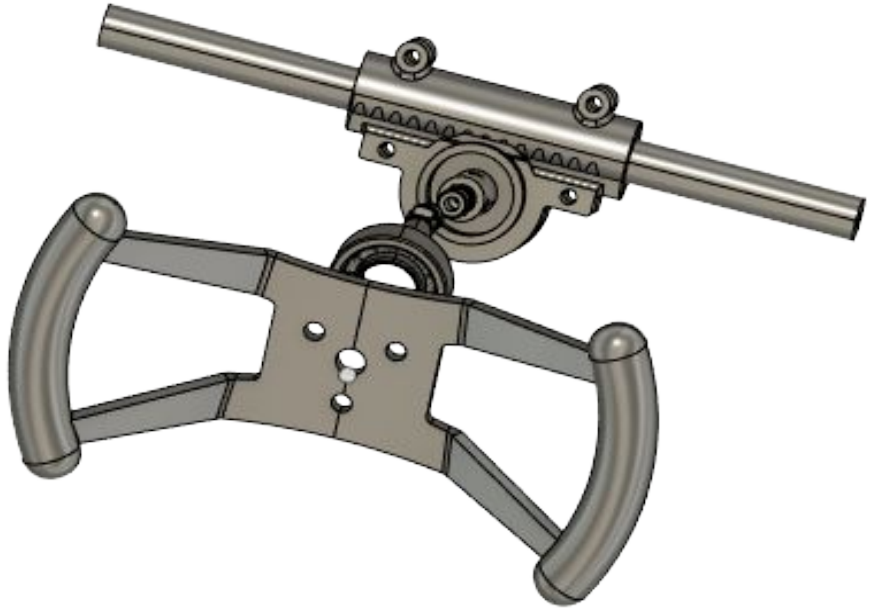


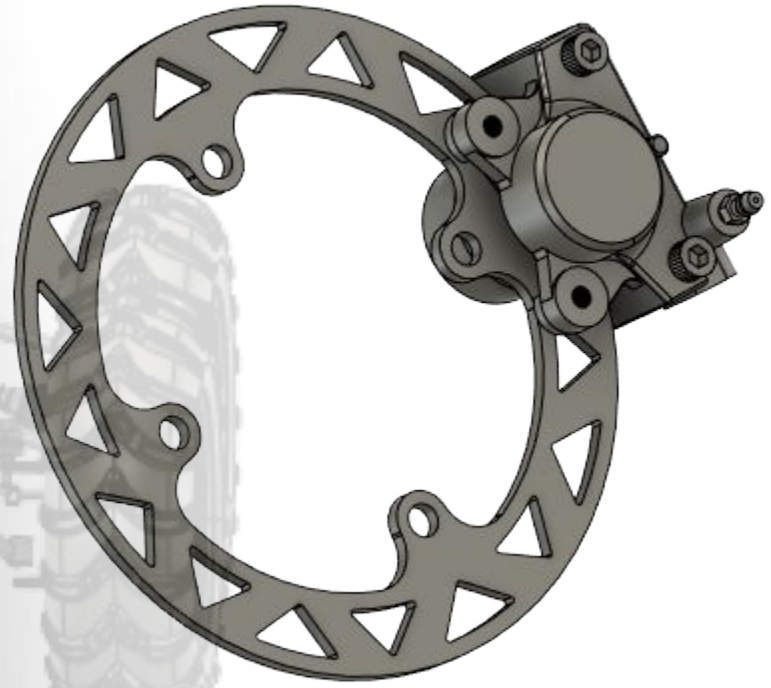
Suspension Analysis primarily deals with tyre angles on events of bumps, droops or breaking. We also optimize the car behaviour in corners and hill climbs which we see across the track



Vehicle Dynamics

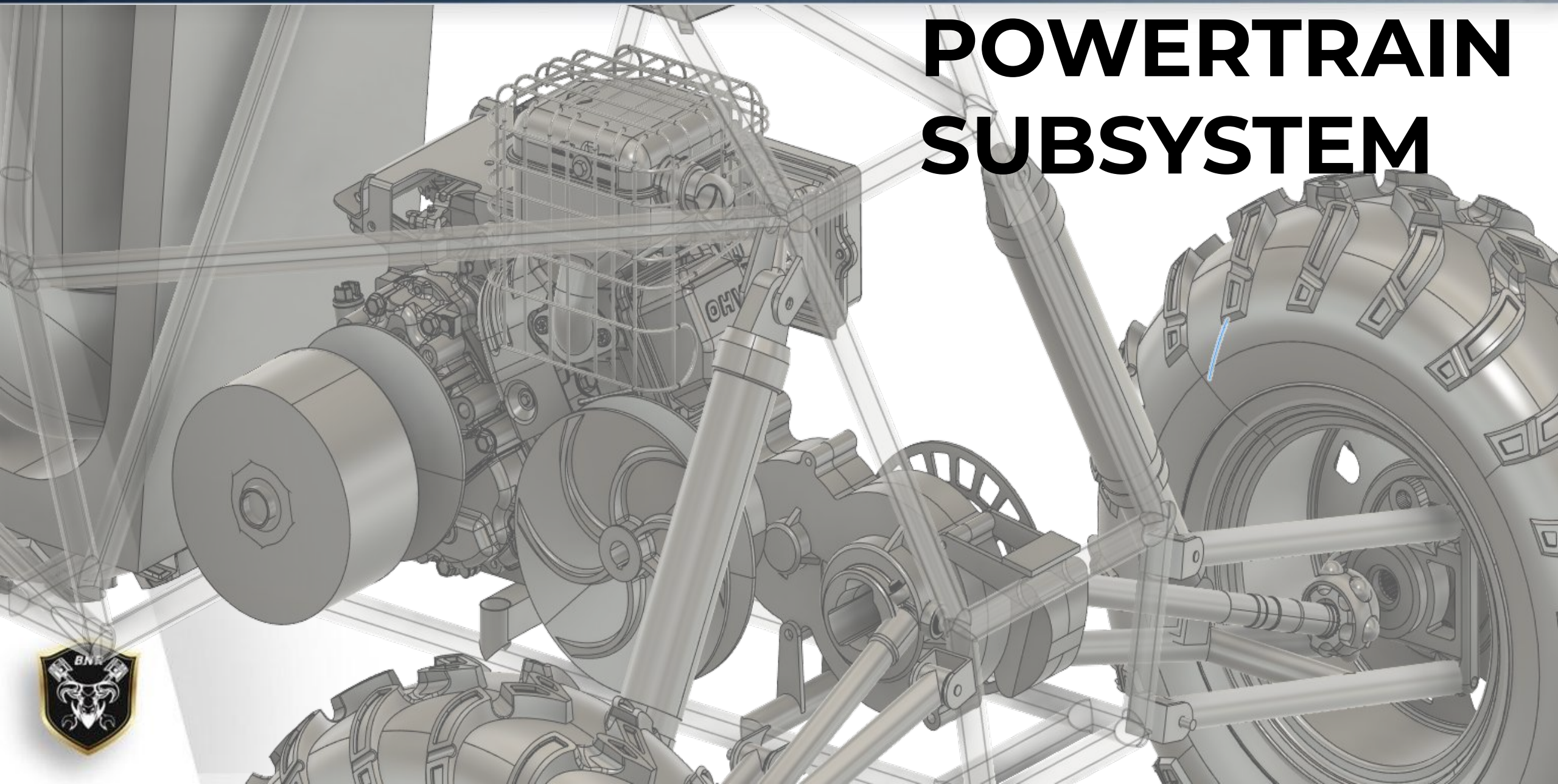
Modelling and optimizing the **Steering components** play an important role in the maneuverability tests in Baja. We focus on designing adequate components in the steering geometry for the best ride handling.





From coming down slopes to stopping in almost no time, the **brakes** should always be ready for the driver in Baja. We test and optimize the right pressure ratios and calliper forces to get the best stopping behavior.

POWERTRAIN SUBSYSTEM



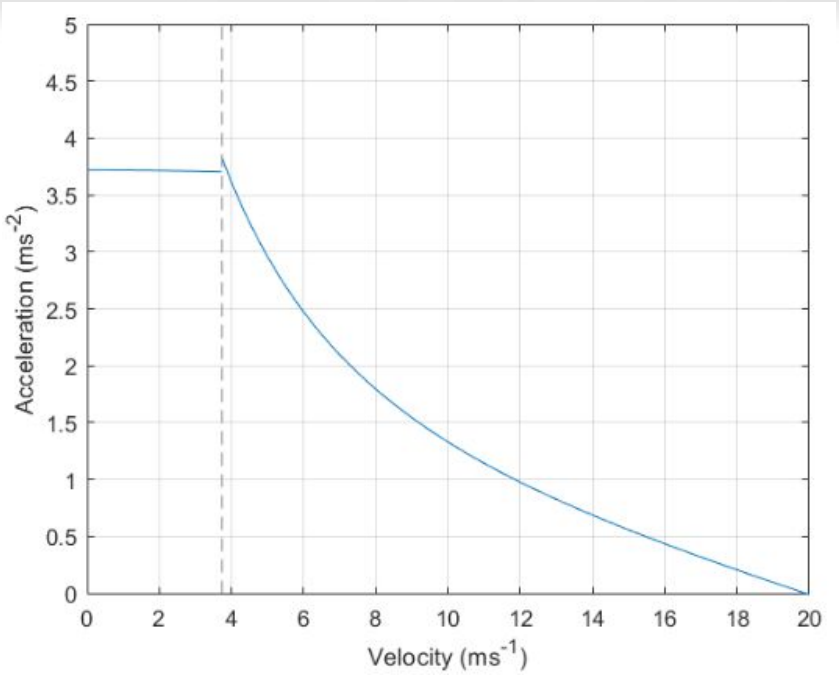
Powertrain

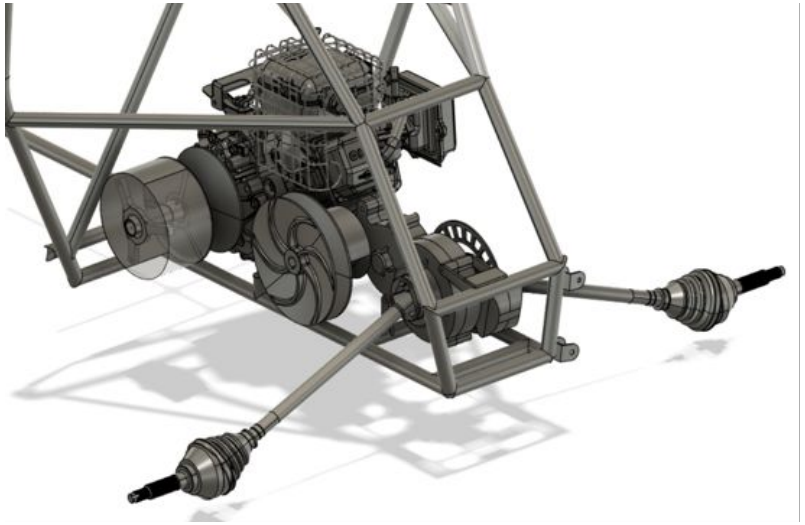
Objectives

- Optimum power delivery
- High Torque delivery for high acceleration and ability to climb steep obstacles
- Durable and light-weight components

What we do

- Mathematical Modelling using Matlab
- Finding the optimum parameters for best performance
- Design all the components on CAD (Fusion 360)
- FEM Analysis (Ansys)
- Fabricate the designed parts and assemble them

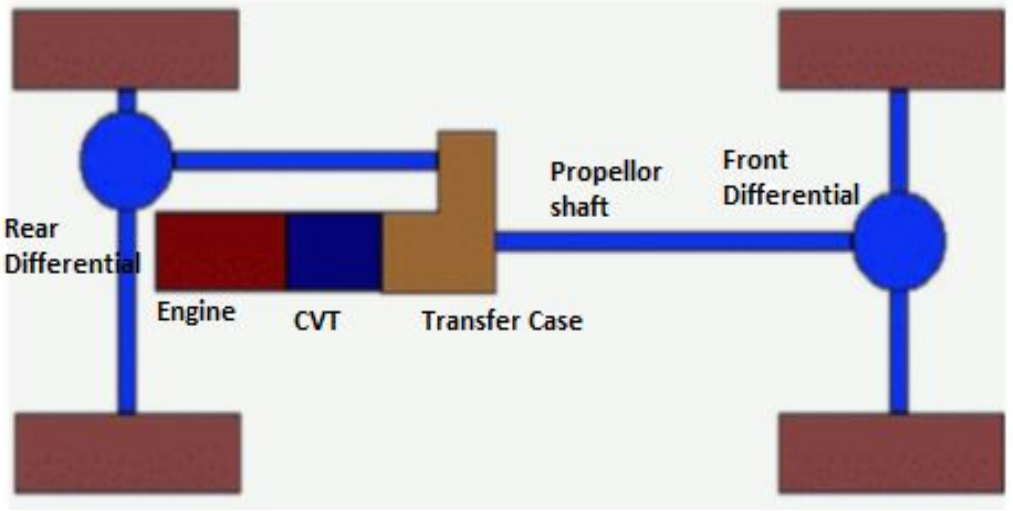


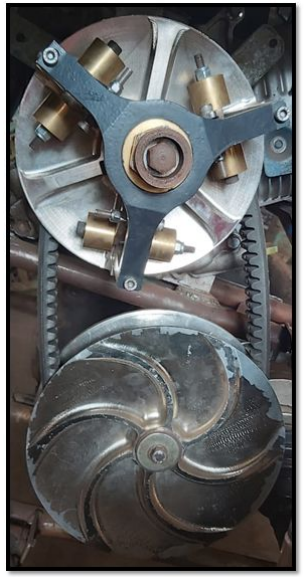


Powertrain

The Main components of our current powertrain assembly:

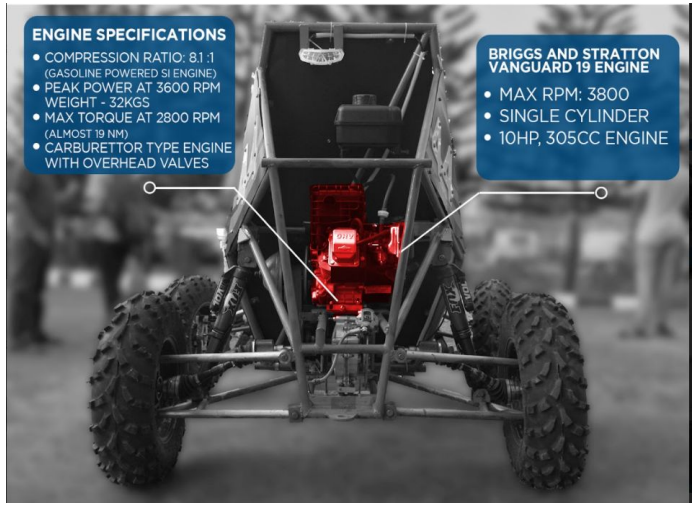
- Engine
- CVT
- Gearbox
- Driveshafts

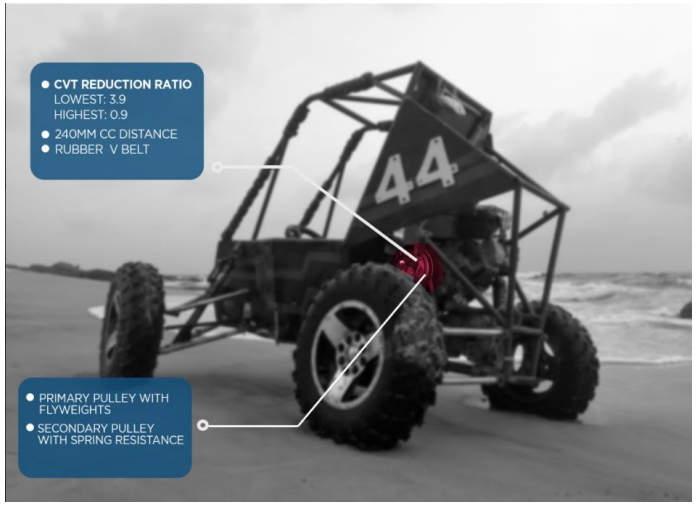




Components of the new 4WD system:

- Engine
- CVT
- Transfer case
- Propellor shaft
- Front and Rear Differential
- Driveshafts





Go Green Initiative

Baja Catalytic Converter

The purpose of the project is to implement an affordable technology to reduce the emissions like **CO, HC, NOx** and particulate matter from the IC engine for all range of cars

MARKETING

Marketing

- **BNR Marketing** is responsible for **heavy lifting of funds** and **sourcing of parts** to build a robust ATV, making us the backbone of the team.
- Through the year, we approach companies and **strike sponsorship deals** with them, teaching us what to focus on while **pitching to a company**.
- Participate in the **business event** hosted by **Society of Automotive Engineers** which witnesses fierce competition across India.
- We work through the year to prepare a comprehensive **B-Plan, Sales Presentation** and **Cost Report**.
- Wonderful learning experience in the fields of **business, marketing** and **finance**.
- BNR has **dominated business events** and won many **laurels** over the years and is looking for dedicated people to continue the legacy.

Marketing


OUR PAST SPONSORS
BOSCH
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BED MART, SURATHKAL
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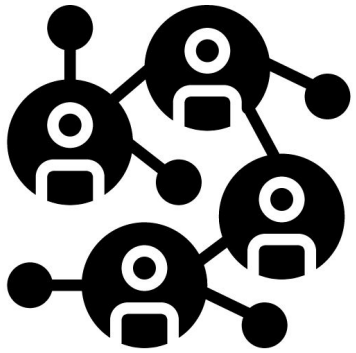

MEDIA

Media


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VEGA
AUTOBYTE
MAX ACCELERATION
6.64 M/S²


2020
BAJA NITK RACING'S
CAR 128
BNR
128
UNDER THE HOOD
8.98 M/S² Acceleration
53 KMPH Top Speed
242 MM CC Distance
576 NM Torque at Wheels
5.25 / 2.73 Net Gear Ratio
7.5 / 1 Gear Box Ratio
Engine specifications are same across all years
Mounting and NHV considerations -in the picture

BNR at mBAJA 2021

Our Work

Gallery


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Gallery

THANK YOU

Check out Insta and FB handles for a glimpse of our journey!

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