

Formula Manipal's Newsletter

Vol. 1 Issue 3 December 2019

# FORMULA MONTHLY

## COMPETITION EDITION



### In This Issue:

---

Keeping up with FM

02

About Formula Bharat

03

Our Sponsors

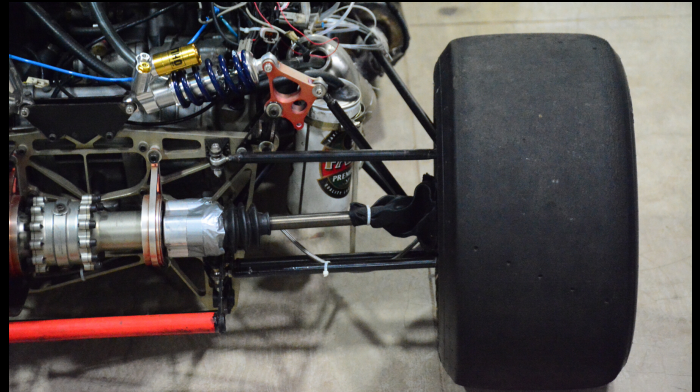
04

# Keeping up with FM

As the 2020 season approached, Formula Manipal left no room for excuses. Dr. Ferdinand Porsche once said, "Change is easy, but improvement is far more difficult." Testing is that crucial phase of a Formula Student timeline which involves making improvements to the car designed and manufactured by the team in order to maximize vehicle performance while ensuring reliability. To build a car that can finish first, you must first build a car that can finish. After the tiring manufacturing phase and the assembly of the car, our team kept these principles in mind as we looked forward to extensive testing in order to make the car race ready.

## MECHANICAL:

- Dyno tuning is a testing process where a car engine's torque and net horsepower are tested via a mechanical resistance method. This allows us to give our vehicle a tune-up of unparalleled quality, providing us with the smoothest and most economical performance possible from our vehicle. Our team carried out some testing of FM20 on a chassis roller dyno in Coimbatore.
- The Engine subsystem worked on optimizing the fuel and ignition map of the car in order to maximize power.
- Various components of the car such as the high performance titanium driveshafts and aluminum sprockets, the custom made fuel rail and the muffler were tested for reliability.



**The transmission assembly, consisting of the titanium halfshafts and aluminium sprockets.**



**An accumulator segment is shown with the cell tabs and the thermistor connections attached.**

## DRIVERLESS:

The Driverless subsystem was successful in smoothing the motion of their bot and implementing cone detection on a video feed from a moving bot on the road. However, they faced problems in executing this with a live video due to computational limitations. Also, over depth estimation was a bit off due to incorrect camera parameters. They'll be working on correcting these issues promptly before moving on to localization.

## ELECTRONICS:

- The Controls subsystem spaced the CAN network, which collects data from 30+ sensors, across the car. This data will be relayed across the CAN bus to the main data logger, which would also broadcast the data wirelessly in an order specifically designed by the team.
- The E-powertrain subsystem assembled the accumulator for our electric vehicle. Our team also interfaced the BMS (Battery Management System) with the entire battery pack and designed the electronics box.
- The Electronics subsystem successfully tested the DAQ (data acquisition) system.

# About Formula Bharat

Over the past few months, Formula Manipal has been gearing up for the Indian Formula Student-style competition, Formula Bharat 2020, which will be held between the 22nd and 26th of January. The purpose of this competition is to inculcate practical engineering experience and student innovation by creating a competitive Indian platform for Indian teams.

During this competition, teams take on the assumption that they are a manufacturer developing a prototype to be evaluated for production and a group of developers are interested in investing in their project. The intended sales market is the non-professional weekend auto-cropper. Therefore, the car must have very high performance in terms of its acceleration, braking and handling qualities while ensuring low cost, easy maintenance and reliability.

The challenge for the design team is to design and fabricate a prototype that best meets these goals and intents. Over the course of a five-day competition, a jury of experts from the motorsport, automotive and supplier industries judge the design, cost and business planning of all the teams to determine the best team and vehicle. Simultaneously, the team's on-track performance scores will demonstrate how well they hold up under real life conditions. Formula Bharat is divided into 2 categories – static and dynamic events – which account for a total of 1000 points.



The FMX8 competing in the Endurance event at FB19.

## STATIC EVENTS:

- **Engineering Design Event** - This event evaluates the student's engineering process and effort that went into the design of the vehicle to meet the intent of the competition.
- **Cost and Manufacturing Event** - This event evaluates the team's understanding of the manufacturing processes and the costs associated with the construction of a prototype race car.
- **Business Event** - This event tests the team's ability to develop and deliver a comprehensive business model which demonstrates that their prototype race car could become a rewarding business opportunity.



The FMX8 competing in the Endurance event at FB19.

## DYNAMIC EVENTS:

- **Skidpad Event** - The skidpad course (2 concentric circles in a figure-8 pattern) tests the car's cornering ability.
- **Acceleration Event** - This is a timed event along a 75m straight stretch that tests the car's acceleration.
- **Autocross event** - The autocross track layout is a sub-1.5 km handling course built to contain straights, constant turns, hairpins, slaloms, chicanes etc.
- **Endurance Event** - The endurance track is a closed lap circuit. The length of one lap of the endurance track is approximately 1 km and each team is required to complete 22 laps.
- **Efficiency Event** - Only those vehicles which score points in the endurance event will receive points for efficiency. Post the completion of the endurance event, the amount of fuel consumed for the same is calculated and points are allotted for the same based relative ranking.



# Our Sponsors



**MANIPAL**  
ACADEMY of HIGHER EDUCATION  
(Deemed to be University under Section 3 of the UGC Act, 1956)

## Platinum Sponsors



**MOUSER**  
ELECTRONICS



**ANALOG**  
DEVICES



**SIMSCALE**



## Gold Sponsors



**IPG**  
AUTOMOTIVE



**Altair**



**MikroElektronika**  
DEVELOPMENT TOOLS | COMPILERS | BOOKS

For any queries, contact:

Alish Dobariya  
Team Manager  
Formula Manipal  
+91 7818999982



**FORMULA**  
**MANIPAL**

Engineered with Passion

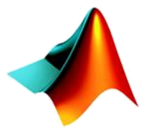
Email: [management.formulamanipal@gmail.com](mailto:management.formulamanipal@gmail.com)

Website: [formulamanipal.in](http://formulamanipal.in)

: Formula Manipal  
 : formulamanipal  
 : Formula Manipal

# Our Sponsors

## Other Sponsors



MATLAB



## Monetary Sponsors



For any queries, contact:

Alish Dobariya

Team Manager

Formula Manipal

+91 7818999982



**FORMULA  
MANIPAL**

Engineered with Passion

Email: [management.formulamanipal@gmail.com](mailto:management.formulamanipal@gmail.com)

Website: [formulamanipal.in](http://formulamanipal.in)

: Formula Manipal

: formulamanipal

: Formula Manipal

Page 5