

FORMULA MONTHLY



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Keeping up with FM

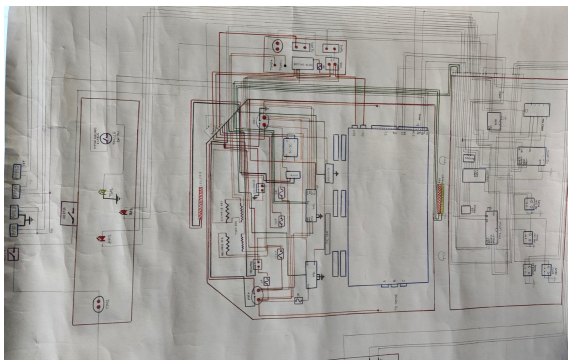
Enzo Ferrari was right when he once said, *"If you can dream it, you can do it."* Over the course of this month, all sub-systems of Formula Manipal worked with each other cohesively to ensure that every assembly on FM20 is correct and reliable. The assembly of this car is where we saw various intricately designed parts come together in harmony to produce a machine that can go from 0-100 in just 4.2 seconds. Members from each sub-system spent painstakingly long yet rewarding nights within the same 4 walls of FM's workshop as they each did their bit in realising the dream of FM20.

MECHANICAL:

- Vehicle Dynamics (VD) is the study of how a vehicle will react to the driver inputs on a given solid surface.
- The VD sub-system finished the assembly for both the suspension as well as the wheels, while work on the ARB assembly was underway.
- ARB, or the anti-roll bar, is a part of automobile suspensions that helps reduce the body roll of vehicle during fast cornering or over road irregularities.
- The VD team was also working on manufacturing a carbon-fibre two force member that will help in weight reduction.
- The aerodynamic components of a formula-style car have two vital jobs on the track – producing down force and controlling drag. This is mainly done by the wing, undertray and nose cone of the car.
- The nose cone is designed in such a way as to maximize aerodynamic efficiency.
- This year, on introducing the aero package, the Aerodynamics team has progressed and successfully made a nose cone and undertray mould.
- Additionally, the team also manufactured carbon fibre tubes for the suspension of the car.



ARB blades, a part of the anti-roll bar assembly



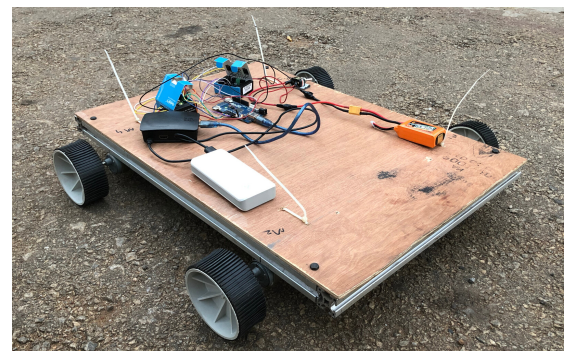
A schematic of the wiring harness

ELECTRONICS:

- The E-Powertrain and Controls sub-systems worked on the charging cart and wiring harness for the car. These components play a major role in improving fuel efficiency of a vehicle while minimizing the risk of shorts in electrical circuits.
- These sub-systems also finished the welding of the accumulator: a device that accepts, stores and releases energy as required.
- Finally, the team also completed the soldering of safety circuits and PCBs for the car.

DRIVERLESS:

- Meanwhile, the Driverless (DV) subsystem is currently working on prototyping different algorithms for an autonomous car. For that purpose, a four-wheeled bot has been manufactured for testing.
- The first step will be to smoothen the motion of the bot and control it wirelessly using a PC.
- Looking ahead, their plan for coming month is to implement cone detection and SLAM (Simultaneous localization and mapping) on the bot before moving on to implementing other autonomous features.



The bot that will be used by the DV team for testing

A Deep Dive in F1

SAFETY VS THRILL

The proceedings of the second lap of the Formula 2 feature race cast a pall, and understandably so, on the Saturday of the 2019 Belgian Grand Prix weekend. The paddock at Spa descended into silence as the day that would otherwise have been filled with talks about Ferrari's front row lock-out was now veiled with stoicism and silent contemplation. The accident that killed Formula 2 driver Anthoine Hubert that day serves as a reminder of the unpalatable truth that motorsport can never be safe.



Raidillon, the tricky uphill corner at Spa where Hubert's crash took place

Since its advent in the year 1950, Formula 1 has always been a perilous sport. Its inaugural era was perhaps the most tragic of all: a time where fatalities were so common that these conditions were accepted – and dare I say, embraced – by drivers of that era as dangers that were part and parcel of the sport. Over the years, the staggering safety improvements made by F1 are nothing shy of a great achievement. Since 2011, the FIA has been considering ways to protect the driver's head in the event of crashes, with flying debris proving itself to be a lethal safety risk yet to be engineered away. Consequently, the halo was deemed to be the best of the few options being considered with the FIA touting it as the best compromise between aesthetics and safety.



The halo atop the cockpit of Daniel Ricciardo's Red Bull

The halo is a titanium structure, covered with carbon fibre, that sits above the cockpit of an F1 car and is capable of withstanding huge impacts. This potentially life-saving innovation was made mandatory on every F1 car from 2018 but its introduction in the F1 world hasn't been as smooth as the FIA would have liked. Majority of the drivers and teams eventually proved to be supportive of the halo and gave good feedback of its merits, but it was harder to get the fans to come around. This begs the question: Why are so many F1 fans against the halo and similar safety devices?

Additions such as the Nomex fire-restraint suits and HANS (Head and Neck Support) devices have proved to be some of the most significant safety advancements in generations and F1 fans have always welcomed these changes. Moreover, traditionalist and purist F1 fans would never subscribe to the once widespread suggestion that 'people go to races to see drivers get killed' so naturally, safety improving devices have always received the backing of the viewers.

A Deep Dive in F1



The HANS device integrated with helmets of all F1 drivers

Hence, we get the sense that the hate associated with the halo is less about some fleeting concern such as its aesthetics and more about what it represents. The fans would eventually get used to the way it looks but the underlying concern with the halo was: where does it stop? Undoubtedly the pinnacle of motorsport, F1 boasts a rich history of open cockpit racing, but what if they become safety conscious to the point where they consider completely closing in the cockpits?

F1 Grand Prix racing became popular in the middle of the 20th century because it combined the glamour of fast cars driven by young men in exotic locales. As safety standards have improved, the frequency of F1 fatalities has decreased steadily but moments such as Hubert's accident confront racing drivers in a very immediate sense with the dangers of the profession they choose because they love it. The risk they take is an inherent part of that love, however hard that might be for some to comprehend. Of course, they don't want to be injured, or worse, but the very fact that they can be adds an extra frisson to an activity that already rewards its participants with feelings that they simply can't experience anywhere else.

The combination of balance, bravery, skill, judgement and excitement that comes from controlling a racing car on the very edge at high speeds, and trying to beat everyone else while doing it, is what makes racing drivers stand out from other people, and makes it different from most other sports. It is also a part of the appeal to the people who watch it. They don't want to see people hurt either, but they appreciate what the drivers are doing, what it requires of them and what is at stake.



The halo protecting Charles Leclerc in his collision with Fernando Alonso at Spa

Not for nothing did Hemingway say: *"There are only three sports: bullfighting, motor racing, and mountaineering; all the rest are merely games."* The sport that the fans love brings them incredible highs as well as awful lows. The combination of all that is what makes it so special. Perhaps that's why F1 fans found it so hard to accept the halo for the positive development that it is, since all they wanted was to protect F1's integrity for the beautiful sport that it is before they end up with something no one wants to watch.

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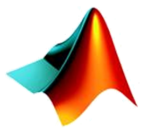
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