

NEWSLETTER

LFS25 ISSUE TWO • MARCH 2025



OVER HALFWAY NOW

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LFS25 TEAM LEADER

As we begin to near our Easter break here at Loughborough, the manufacture of LFS25 is picking up speed with designs nearing completion. The feeling of accomplishment at seeing the LFS25 monocoque sheet metal mould, next to LFS24 ready to roll out of the lab for testing creates a new wave of momentum.

With two of the largest design changes since moving electric, it has been both a design and operational challenge. The team's progression since our last newsletter has been significant from not only a design standpoint but also the breadth of team knowledge. We've taken a step towards increasing training, particularly within electronics, our greatest skills gap area with formal training and workshops offered by sponsors.

The hours of testing we've completed have developed a team comfortable with operating a running vehicle ready for FSUK this year. I hope this newsletter provides insight into not only some of the work completed so far and what is yet to come but also an experience of the enjoyment that we've had from taking LFS24 out and pushing its limits.



TEAM PHOTO

With Vice-Chancellor Professor Nick Jennings Our senior team photo for this year was taken in February outside the iconic Loughborough fountain and Hazlerigg Hall with the Vice-Chancellor, Professor Nick Jennings. A goal of this year was to expand the university awareness of the team. Through this, we have begun meeting with key figures across the university to discuss team progression for the future. We're incredibly grateful to all at the university for taking the time to speak to us and help wherever possible.

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LFS24 TESTING

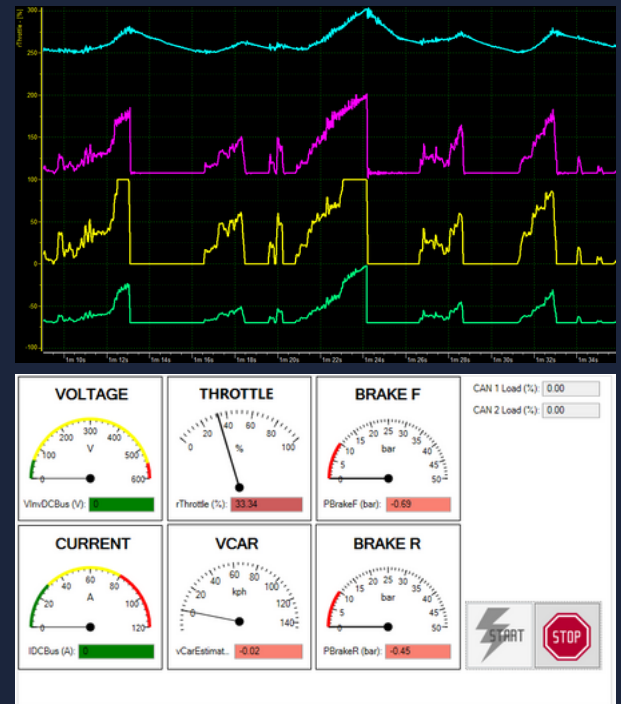
One of our key aims for the 2024/25 team was to conduct the first previous year car testing since transitioning to an electric powertrain in 2020. We are proud to have achieved this milestone with three days of shakedown testing, followed by an intensive three-day session at MIRA. This testing not only allowed us to assess the reliability of critical transferable systems for the new LFS25 vehicle but also provided an invaluable learning experience for our team members, strengthening our expertise as we push towards the upcoming events.

WINTER TEST

As the rest of the university wound down for the Christmas break at the end of 2024, our team was hard at work preparing LFS24 for a critical winter shakedown. Over the three days of testing, we put key systems through their paces, in particular, the high voltage electrical system and gathered valuable data on both reliability and performance. This hands-on experience not only strengthened our technical understanding but also laid the groundwork for further refinements as we develop LFS25.

Key Aims:

- Reliability Testing
- Data Gathering
- Team Training / Knowledge
- Driver Knowledge



MIRA TEST

In January, our team was incredibly fortunate to conduct three days of testing at the MIRA Proving Ground Steering Pad, thanks to the generous support of Bosch Engineering. At MIRA, we carried out mock endurance and acceleration runs, allowing us to push further than would be possible within testing areas at the University. This generated a wider understanding of cooling requirements, parameter tuning across vehicle systems and driver handling.

Looking ahead, we are continuing the test LFS24 focusing on control systems, helping the team better setup the LFS25 contender.



TEAM DRIVE DAY

On Saturday, February 22nd, we had the privilege of welcoming back some of the alumni who played a pivotal role in the development of our teams first electric vehicle over the past few years. This event was a fantastic opportunity to reconnect with past members, celebrate their contributions, and showcase the progress we've made since starting development of an electric vehicle.

Throughout the day, both alumni and current team members had the opportunity to get behind the wheel of LFS24. This hands-on experience allowed all present to witness the changes and advancements, as well as share knowledge and insights between past and present generations of the team.

A huge thank you to all the alumni who joined us - it was a pleasure to have you back, and we hope to see you at future events.



SES TESTING

WHAT IS SES?

The Structural Equivalency Spreadsheet (SES) is a document required into compete in Formula Student events in which teams must prove the structural performance of key car structures, such as the Chassis and Accumulator. For a Carbon Fibre Monocoque chassis, the structural equivalency of chassis laminates to a steel space frame must be proven.

WHAT WAS INVOLVED?

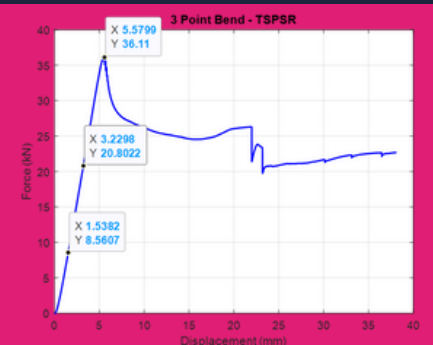
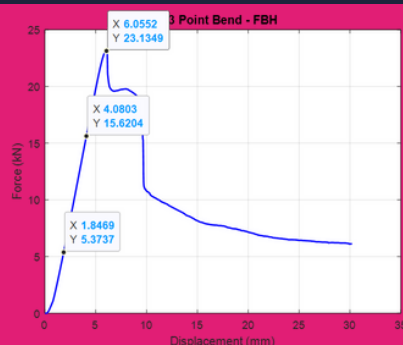
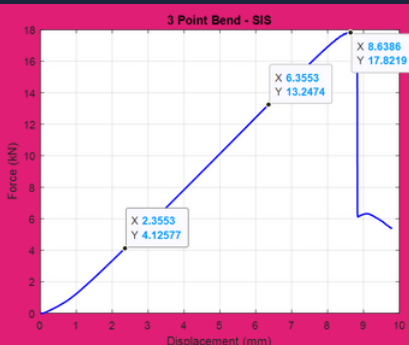
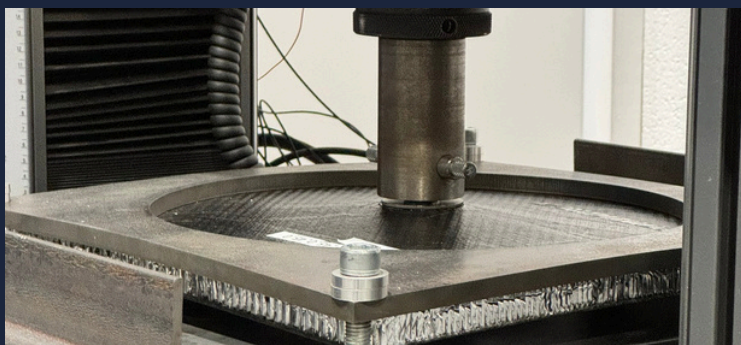
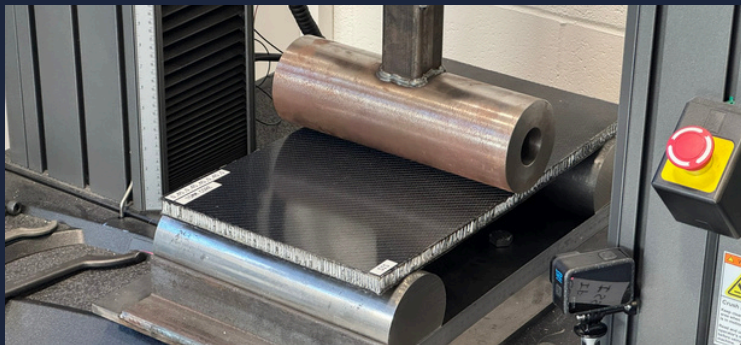
In order to prove the Structural Equivalency, test panels using laminates representative of key chassis laminates were manufactured. These test panels were then tested using custom test fixtures in accordance to the FSUK technical regulations to ascertain load over displacement data, and thus calculate laminate properties such as flexural rigidity, Ultimate Tensile Stress, Ultimate Shear Stress and energy absorption up to UTS. The values for these must exceed calculated baseline values. The completion of this document is a key milestone in the development of LFS25 and sets the laminates that will be used in its chassis.

REQUIRED TESTS:

3 Point Bend - Large rectangular flat composite panel positioned on top of two large cylindrical rollers. A third roller is lowered at a slow, controlled rate into the test panel, inducing a flexural load.

Perimeter Shear - A square test panel is positioned on a flat base with a hole in it. A cylindrical punch is lowered through the test panel to measure the shear strength.

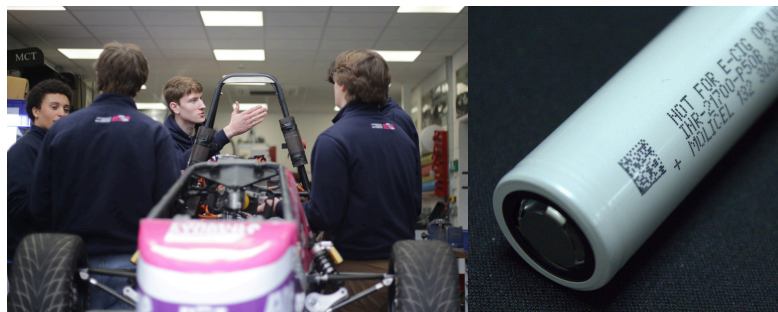
Insert Pull Out - A test panel including a representative design for harness attachment inserts is manufactured and tested by pulling the insert through the laminate.



LFS25 PROGRESS

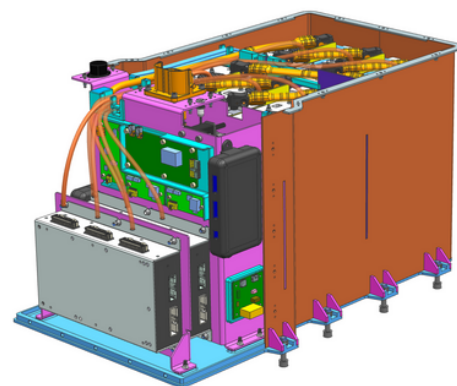
POWERTRAINS

Accumulator progress is making rapid strides, with the build phase now underway and preparations in full swing for a module test in the coming weeks.



Key Updates:

- Cooling Test
- Test Module Manufacture
- Cell Testing



Additionally, the team is focused on finalising the reduced complexity cooling design for LFS25, drawing insights from LFS24 testing. Test prints of various 3D-printed components for the accumulator are being conducted to refine our designs before final production.

With momentum building, the team is eager to complete a fully assembled accumulator by the end of the Easter break - bringing us one step closer to hitting the track with a powerful and reliable system.



ELECTRONICS

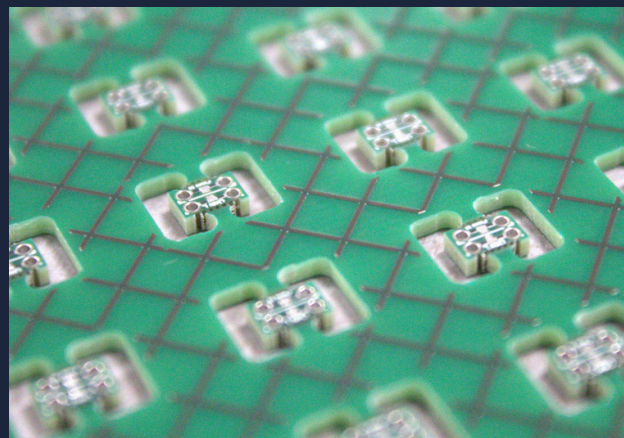
The Electronics team has been working to finalise the design stages of LFS25, tackling everything from wiring harnesses to development of custom PCBs. A major milestone has been reached with the production of LFS25's PCBs, where a large proportion are now delivered or en route thanks to the support of Eurocircuits.

On the wiring front, we've embraced this development cycle as an opportunity for a ground up redesign of the harnesses. Our aim has been to simplify the looms, reducing complexity through considering what sensors are necessary for running.

On the controls front, we are working towards the development of in house data analytics tools with the help of the Vector vSignalizer software. A couple of our members have attended a 2 day Vector training workshop to better understand how we can take advantage of the Vector Platform particularly now we are hands on with LFS24 data.

Key Updates:

- First PCBs Manufacture
- Druck PCB Soldering Training
- Control Debugging
- Full Car Digital Twin

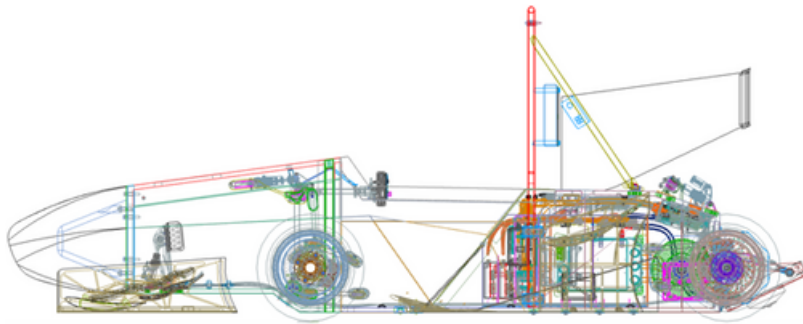


LFS25 PROGRESS

CAR DESIGN

The team has reached several key milestones within the car design group, marking significant progress as we push forward in the build phase for both Chassis and Suspension.

Following the successful completion of SES testing, we have now taken delivery of the aluminum mold for our first-ever carbon fiber monocoque chassis. The team is currently preparing the mold and inserts, ensuring everything is set for the lamination process in the coming weeks.



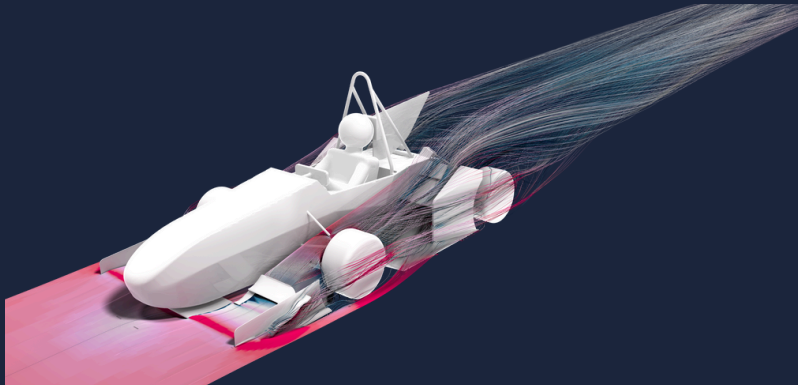
Key Updates:

- SES Submitted
- Monocoque Mould Arrived
- Suspension Build Progressing



On the suspension side, our focus remains on finalising and delivering all components in time for chassis lamination completions, keeping us on track for integration into the chassis build.

PERFORMANCE

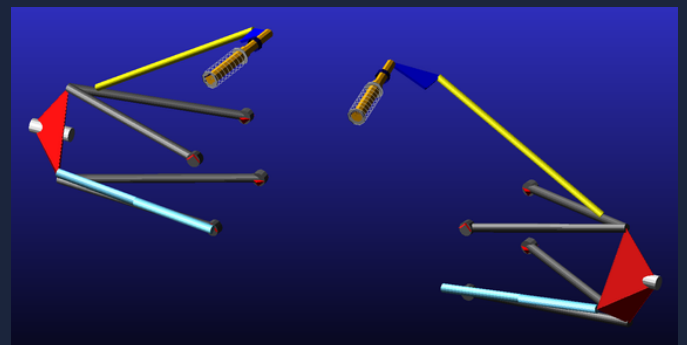


The Aerodynamics team has been hard at work advancing the mechanical stages of the design following our aero freeze at the end of 2024. Progress has been fast, and with test builds set to begin in the coming weeks, we are on track for a full aero build during the Easter break.

Meanwhile, on the Simulation front, the team have been developing a comprehensive multibody simulation. Having focused on steering and front suspension, their attention now shifts to completing the rear quarters simulation.

Key Updates:

- Aero Freeze Complete
- Aero Mechanical Design progresses
- Development of Multibody Simulation of front suspension and steering completed
- Test builds in coming weeks



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