



Brake system

OUR PROJECT

Formula Electric Belgium is a student-run electric race team which competes in Formula Student, the world's largest competition for engineering students. We aim to push the limits of performance, innovation and sustainability within electric racing every year, which is only possible with the help of our Thesis students. These pioneers are responsible for performance-defining innovations within the team, and we would love for you to join our team of highly ambitious and motivated engineers. As a Thesis student, you will research, design, prototype and test your innovations alongside the full-time members which make sure the team pushes itself and the car to new heights.

AIM AND OBJECTIVE

This master's thesis aims to design and optimize an in-house brake caliper and brake disc for the Formula Electric Belgium race car, with a strong focus on Finite Element Analysis (FEA). The goal is to develop a lightweight, stiff, thermally robust, and leak-tight braking system that meets Formula Student safety requirements and performs reliably under dynamic conditions.

The work emphasizes the structural and thermal design of both components, considering interactions between mechanical loads, thermal loads, and sealing interfaces. FEA is used to assess stresses, deformations, thermal behaviour, and contact pressures to ensure sufficient stiffness, structural integrity, and sealing performance.

A key challenge is balancing weight reduction with stiffness, thermal resistance, and reliability. Caliper deformation can reduce braking precision and sealing performance, while thermal loads in the disc may cause temperature gradients, cracking, or wear. These issues are addressed through geometry optimization, material selection, and robust sealing design, supported by structural and thermal FEA. Special attention is given to tolerance sensitivity, thermal expansion, and contact behaviour due to their impact on brake feel and durability.

Where feasible, simulations are validated through stiffness measurements, pressure and leak testing, and thermal evaluation of the brake disc.

PROFILE

- Interest in **mechanical design and structural analysis**
- Experience with **Finite Element Analysis**
- Has a background in **mechanical, electromechanical, or automotive engineering**
- Analytical mindset and pays attention to **model assumptions, boundary conditions, and validation**

RETURNS

- Unique experience within a racing team
- Genuine work experience to carry with you into your career
- Exposure to cutting edge technology and software

INTERESTED?



Send us your contact details and field of interest to

recruitment@formulaelectric.be