RESEARCH THESIS

Monocoque FEM and experimental Validation

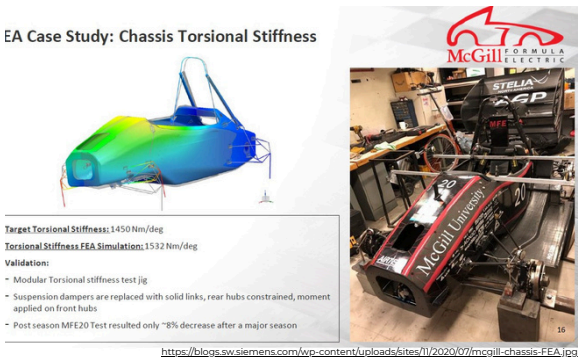
The monocoque is the structural backbone of a Formula Student race car, combining high stiffness, low weight, and driver safety. This makes accurate simulation essential due to their anisotropic behavior. To ensure reliability, simulation results must be validated through experimental testing of existing structures.

The goal of this thesis is to develop and refine FEM models of the monocoque and validate them through physical testing, improving the correlation between simulation and real-world behavior.

Your Tasks involve:

- Development and refinement of FEM models for CFRP monocoque structures
- Simulation of structural properties such as torsional stiffness, strength, and failure behavior
- Planning and execution of experimental tests on existing monocoques (e.g., torsional stiffness or load tests)
- Correlation and validation of FEM results with the test data
- Identification of discrepancies and improvement of simulation accuracy

https://infinityracing.de/wp-content/uploads/2021/05/mono2-2.png



https://blogs.sw.siemens.com/wp-content/uploads/sites/11/2020/07/mcgill-chassis-FEA.jpg

Tasks:

- Build FEM for Monocoque in hypermesh
- Simulation of structural properties
- Planning and execution of experimental tests
- Correlation and validation of FEM results with the test data
- Identification of discrepancies and improvement of simulation

Requirements:

- FEM experience best with CFRP
- Become team member