Master Thesis, spring 2023 - "Development of structural finite element models for aerospace CFRP components" (30 ECTS credits/20 weeks – 1 student)

Job Background

By the end of 2022, a hybrid Carbon Fibre Reinforced Polymer (CFRP)/metal full scale demonstrator will be tested at GKN Aerospace in Trollhättan, which is the culmination of a 5 year project. One area of technology development within this project is related to ultimate strength modelling of the composite laminates. Work is ongoing to develop and calibrate models with respect to physical tests on the coupon, feature and component level. This master thesis offers the possibility to contribute in this project for development advanced numerical models for carbon fibre composites.
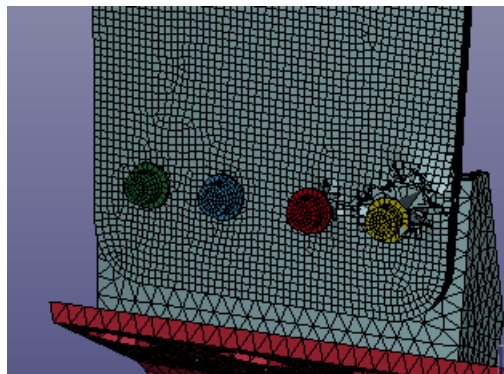

Figure 1: FE simulation trial of a bolted joint, performed in LS-Dyna.

Assignment Description:

- Familiarize with the topic and perform a literature study.
- Model physical tests with the finite element (FE) pre-processor Ansys Workbench and use FE solver LS-DYNA.
- Model interlaminar fracture with a cohesive zone modelling (CZM) technique and intralaminar fracture with Continuum Damage models (CDM).
- Evaluate and enhance models based on the physical tests.
- Summarize and suggest improvements for the modelling strategy.
- Participate in mixed mode (MMB test, ASTM D6671) interlaminar fracture toughness testing.

Qualifications

Students in their M.Sc. studies in the field of Mechanical Engineering, Applied Mechanics and Materials Science. Previous experience with simulation tools such as Ansys and LS-DYNA is desirable. A basic course in composite mechanics is a prerequisite. We are looking for a student with a strong interest in numerical modelling and composite mechanics

Apply by

Send your resume and cover letter to Dennis Wilhelmsson dennis.wilhelmsson@gknaerospace.com, +46 700873174.