



Simulation of Crack Growth in CFRP Sheets for Laminarisation of Transonic Transport Aircraft

Project Description

The Institute of Mechanics and Adaptronics, as part of the Cluster of Excellence for Sustainable and Energy-Efficient Aviation Structures, is focused on developing innovative solutions for laminarising transonic transport aircraft. Our research has shown promising results with micro-perforated carbon fibre reinforced plastic (CFRP) sheets, which exhibit high-quality perforations and exceptional mechanical strength while maintaining an extremely lightweight design. However, uncertainty quantification studies on Hybrid Laminar Flow Control (HLFC) technologies have highlighted the critical role of accurate porosity in micro-perforated sheets for successful laminarisation.

Unlike metal sheets, it remains uncertain whether unintended porosity exists in thin, micro-perforated CFRP sheets due to micro-cracks induced by low temperatures at flight altitudes and residual stresses from the manufacturing process. To address this, the Institute of Mechanics and Adaptronics aims to simulate crack growth in CFRP sheets under thermal loading to quantify their impact on sheet porosity.

We are seeking a talented and motivated young scientist, preferably female, who has a keen interest in mechanics and finite element simulation of CFRP materials.

Requirements

- A master degree in engineering, materials science, or a related field.
- Strong background in mechanics, composite materials, and finite element analysis.
- Proficiency in simulation software for crack growth analysis (e.g., Abaqus, ANSYS).
- Experience in conducting research experiments and analysing data.
- Excellent written and verbal communication skills in English.
- Ability to work independently and collaboratively in a research team.
- Previous knowledge of CFRP and experience with thermomechanical simulations is desirable.
- Attention to detail, problem-solving skills, and a passion for scientific research.

Contact information

For any inquiries or further information, please contact Prof. Dr.-Ing. Christian Hühne at christian.huehne@tu-braunschweig.de or 0531 391 8054.

The entry date is as soon as possible, and the duration of employment is limited to 6 months. The position is part-time with 50% of the regular weekly working time (currently 19,9h). Ongoing applications are possible until all positions are filled.

The payment is made according to task assignment and fulfillment of personal requirements to salary group EG 13 TV-L. International applicants may have to successfully complete a visa process before hiring can take place. Candidates with handicaps will be preferred if equally qualified. Please enclose a proof. The position is part of the SE²A International Female Programme, so only applications by female graduates of non-German universities are possible.

All documents should be in PDF format, preferably in a single file. Personal data and documents relating to the application process will be stored electronically. Please note that application costs cannot be refunded.