REINFORCED ELASTOMER COMPOSITES FOR AIRCRAFT STRUCTURES

The Polymer Competence Center Leoben GmbH (PCCL) is the leading Austrian center for cooperative research in the field of polymer technology and polymer science. In collaboration with companies in the polymer industry and numerous academic institutions, our around 100 highly-qualified employees jointly work in R&D projects on innovative polymer solutions for a wide range of applications. We are looking for industrial and scientific partners interested to developing the idea of “reinforced elastomer composites for structural aerospace applications” within the framework of a publicly funded research project.

The proposed project focuses on the implementation of elastomer films in aerospace qualified epoxy carbon fiber reinforced laminates for structural aerospace applications. A combination of soft elastomers with stiff fibres enables the built up of a composite with very strong direction dependent properties. This could lead to a tailored chord wise flexibility, remaining the span wise stiffness properties of the wing structures during various flight conditions. Different concepts for such morphing structure are described in the literature, however, the usage of carbon fiber reinforced elastomers are applicable. Due to the versatile material morphology and the resulting unique material properties elastomeric materials are predestined as an interesting alternative.

In order to achieve this goal the following key activities will be performed:

- Improvement of the compatibility and functionality of the elastomer film by adapting its chemical composition to enhance a sufficient interfacial bonding between the elastomer film and the laminate
- Optimization of the process parameter for the curing of the flexible matrix composite to achieve the required component performance using state-of-the-art resin infusion technologies
- Characterization of the resulting (thermo)-mechanical performance of the investigated flexible matrix composite with standardized test methods under application relevant temperature and defined environmental conditions (e.g. hot/wet, hydraulic and de-icing fluids).
- Fabrication of a reduced scale demonstrator in order to ensure the capability of producing demonstrator parts

Project financing

Research will be done within the framework of a COMET (Competence Centers for Excellent Technologies) K1 center (PCCL-K1). PCCL-K1 cooperates with national and international industrial partners on the basis of medium- and long-term R&D-projects. PCCL-K1 receives public funding (50 % of total costs), and both national and international partner companies can participate in the research program of PCCL-K1. Detailed information about the center and the funding program are given in the enclosed presentation.

- Project duration: 4 years
- Time period: 2021-2024
- Financing: up to € 50.000,- (cash) and € 50.000,- (in-kind) per year

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