

Project title: NFK-Federbein: Lightweight suspension strut made of natural fibre-reinforced plastic (NFRC) for an aircraft up to 600 kg MTOW

Partners: Fa. Viethen, Zülpich
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Mission Statement

Flax fibre-reinforced plastics (FRP) have very good sound absorption and excellent damping properties in addition to low density. This predestines them for use in structures where vibrations, periodic loads and external shocks occur. In addition, they have an excellent eco-balance. However, a lack of understanding of structural mechanics in the design and a lack of knowledge in the specific processing of materials (suitable textile structures) into composite components limits their use.

The aim of the " NFK-Federbein" project is to validate structural components made of flax (NFRC) with increased damping properties on the example of a suspension strut for a lightweight aircraft from the Viethen company. This is intended to explore a more ecological alternative to conventional lightweight materials.

Solution path

To achieve this goal, the project is divided into the following steps: computer-aided design using FEA methods [CompDesE GmbH]; load-case-optimized production of the component using a braiding process with optimized fibre placement in the fibre direction and integration of force introduction elements as well as application of locally adapted textile layers (tailored fibre placement) [ITA]; validation in a field test [Viethen]. The economic-ecological aspects are summarized and evaluated in a Life Cycle Analysis (LCA) [ITA].

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