THERMOPLASTIC FUSELAGE CUTOUT

RESEARCH LOCATION

DLR Institute of Structures and Design, Stuttgart

PROJECT

TB-Rumpf – Technology Bricks for future thermoplastic fuselage configuration

PROJECT TERM

2018–2021

MATERIAL

Thermoplastic composite (CF/LM-PAEK)

OBJECTIVES

- Technology development for fuselage production
- Advancement of thermoplatic resistance welding
- Out-of-autoclave integration of stringers

As part of the TB-Rumpf project, the autoclave-free consolidation of thermoplastic laminates and resistance welding are being developed and validated as technology bricks for future thermoplastic aircraft fuselages. The work is being carried out in collaboration with partners from the aerospace industry and research institutes.

State of the art for the consolidation of large-area components made of continuous fibre-reinforced high-temperature thermoplastics, such as CF-PAEK, is the autoclave consolidation process. Through an optimised process setup and tailored process control, it is possible to achieve complete consolidation using only temperature and vacuum pressure. The use of self-heated

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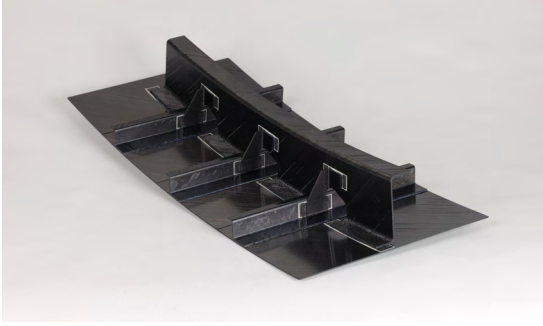

molds or ovens can eliminate the need for an autoclave and thus generate cost advantages. TB-Rumpf aims to mature the process called VCT (Vacuum Consolidation Technique) and to determine the process limits in terms of maximum possible laminate thickness.

The weldability of thermoplastic structures represents an essential aspect for the future use of this material group. Resistance welding in particular is characterised by high achievable strengths and is therefore of great importance for thermoplastic fuselage structures. Within the framework of TB-Rumpf, the welding process itself as well as the necessary welding elements are specifically optimised and the achievable mechanical values are validated.

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More information
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YouTube video
Technology Bricks for future thermoplastic aircraft

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