

## High Performance Carbon Composite Molding for Load Introductions

The manufacturing of high performance carbon composite parts is up to now still labor intensive and highly automated manufacturing scenarios are needed. The development of such solutions for of complex load introductions was subject of a federal funded research project.

The industrialization of the processing of high performance fiber composite materials is a exploratory focus at the Institute of Polymer Engineering.

### Motivation

In aircraft construction load introductions into laminar CFRP structures are usually realized in metal. The reason is that the well established prepreg autoclav method is not suited for producing complex geometries in a rational way. In addition to the higher weight, metallic connections have also the disadvantages of being susceptible to corrosion in combination with CFRP and the different thermal dilatation.

### Result

In close cooperation with the industry partner **RUAG Technology, Aerostructures Emmen**, a demonstrator has been developed and manufactured, which features large local variations in geometry in wall thickness which was so far uncommon for composite parts,. Through this additional design freedom, the material and geometry can be better adapted to localized loading situations.



### Manufacturing

The material is inserted only as a simplified preform into the mold. It then gets pressed to net shape with a cavity pressure of about 80 bars in a process comparable to drop forging. The compression mold has been specifically designed and constructed to meet the requirements of this process. The production time for the displayed component is less than 30 minutes, which is significantly shorter than for a similar CFRP component in prepreg autoclav method or even a metal component.