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Composite Devision

22.11.2018

Project titel:	**Development of a process for the automated production of complex, bionic short fiber composite structures using 3D-printed carrier forms wetted in fiber sludge.** **(Short title: AutoComp3D)**
Partner:	consider it GmbH (Bremen)
Term:	09/2017 – 08/2019
Funding agencies:	Central Innovation Programme for SMEs

Mission Statement

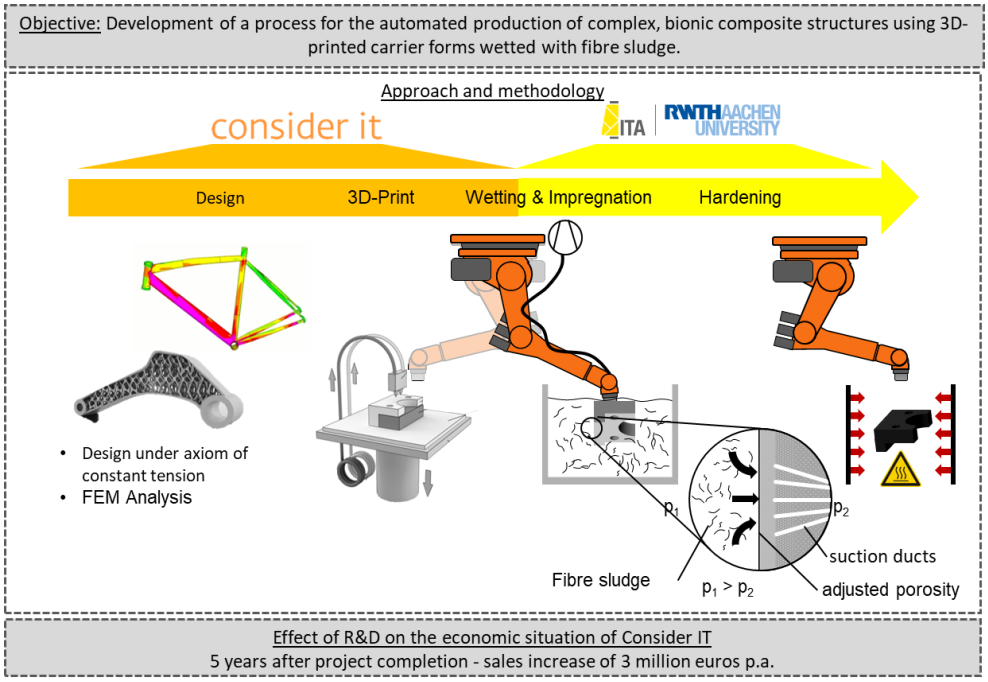
Bionics deals with the transfer of phenomena from nature to technology. The production of these very complex but load-optimized structures was only possible through additive manufacturing. In the field of bicycles, fibre composite plastics (FRP) are already being used for the frames of high-performance bicycles. The state of the art is manual production from up to 200 individual layers of expensive pre-impregnated textiles, which are cut and joined separately. The production process is therefore characterised by a high proportion of manual work and high semi-finished product costs. Due to the lack of production technologies and process chains, bionically optimized frame structures cannot be produced economically.

In addition to an increasing demand for bicycles (market volume in Germany 2.5 billion EUR p.a.), the currently fast-growing market for e-bikes can in future serve as a catalyst for the use of FRP structures in bicycle construction. Due to the heavy batteries required for e-bikes, there is a high demand for lightweight structures. At a cost share of the bicycle frame of approx. 20 %, this results in a sum of EUR 500 million p.a.

Solution approach

The aim of this project is to develop a process for the automated production of complex, bionic short-/long-fiber composite structures while simultaneously reducing costs by 30 %.

The innovative approach is the fibre deposition by suction of short / long fibres (e.g. cut waste) in a fibre slurry on specially 3D-printed carrier forms. The bionic 3D carrier forms are manufactured using Fused Deposition Modeling (FDM). The differentiation to the state of the art consists among other things in the saving of the processes for the textile surface production (e.g. weaving), the packaging of the semi-finished products as well as the impregnation with resins. All three steps are combined directly in one step. The entire process is integrated into the existing, fully automated preform center of the ITA.



Acknowledgment

We would like to thank the Federal Ministry of Economics and Energy for funding the research project as part of the Central Innovation Programme for SMEs.

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