

PRESS RELEASE

Laser scanner increases flexibility of production process for FRP prototypes Combined joining and forming process of additively manufactured thermoplastic parts

Aachen, April 2018 – Complex functionalised parts based on fibre-reinforced thermoplastics can nowadays be produced with integrated manufacturing processes in short cycle times. However, the economical production of prototypes or small series has so far not been successful because of the high mould costs involved. For this reason, the Institute of Plastics Processing at RWTH Aachen University has, as part of a joint BMBF project called "LightFlex", linked up with other project partners to develop an innovative, photonic-based production process for increased flexibility and geometrical complexity in prototype and small-series manufacture.

The core development of the innovative production process is the combined joining and forming process of a previously additively manufactured polyamide functional structure with a thermoplastic composite. While the thermoplastic component – a composite sheet, for example – is heated under an infrared lamp, the surface of the additively manufactured structures is heated with a 1 kW laser from Laserline GmbH, Mühlheim-Kärlich. Thanks to the combination of the laser with a 3D laser scan head provided by Arges GmbH of Wackersdorf, the focus of the laser can be shifted in all directions inline. Only in this way is it possible to ensure that defined melting of the surface takes place, even with uneven and complex geometries.

After the successful integration of the laser and laser scan head into the thermoforming line at IKV, the research team is now occupied with the interplay of the different process parameters and their effects on the quality of the end-product. Of interest here, for example, is the influence of lamp temperature, heating-up time and start of heating, as well as the laser output, processing speed and number of passes.

This process makes it possible for the first time to economically produce individual fibre-reinforced parts even in small series.

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About IKV

IKV, the Institute of Plastics Processing at RWTH Aachen University, is Europe-wide the leading research and education institute engaged in the field of plastics processing enjoying outstanding reputation. More than 300 staff are employed in finding solutions to problems connected with processing, materials technology and part design in the plastics and rubber industries. IKV's close contacts with industry and science, together with its outstanding facilities, enable cutting-edge research in plastics technology and ensure that students benefit from a comprehensive, practically oriented course of study. Plastics engineering graduates from IKV are thus sought-after experts in industry. In organisational terms, IKV is divided up into the four specialist departments of Injection Moulding, Extrusion and Rubber Technology, Part Design and Materials Technology, and Composites and Polyurethane Technology. The institute also takes in the Centre for Analysis and Testing of Plastics, and the Training and Further Education department. IKV is run by an Association of Sponsors, which currently has a membership of about 290 plastics companies from all over the world. Univ.-Prof. Dr.-Ing. Christian Hopmann is Head of the Institute and Managing Director of the Association of Sponsors. He also holds the Chair of Plastics Processing at the Faculty of Mechanical Engineering at RWTH Aachen University.



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Integration of the laser into existing plant engineering at IKV (photo: IKV)