Project title: FiberKleb
Partner: Institut für Schweißtechnik und Fügetechnik (ISF)
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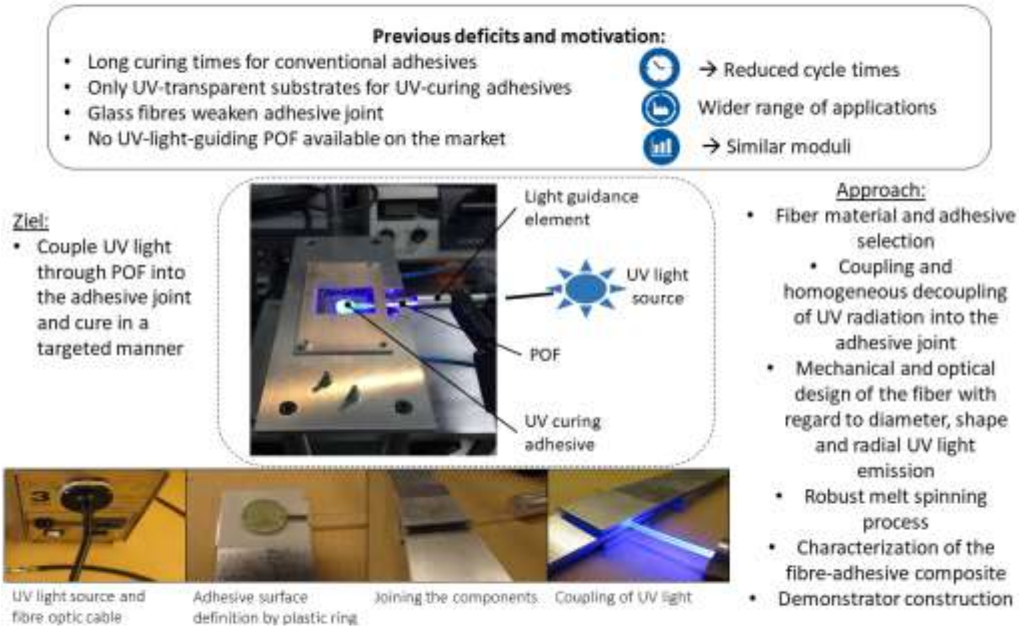
Mission Statement



Goals

An essential deficit of the adhesive technology, which until now could not be sufficiently addressed, are the long curing times of the adhesives. Only UV-curing adhesives enable complete curing within seconds. Complex fixing and holding devices until the handling strength is reached are not necessary. So far however, the use of UV adhesives has only been possible with at least one UV-transparent joining part. The use of UV adhesives on non-transparent parts is not possible according to the current state of the art. The specific advantages of UV adhesives, such as the curing "at the touch of a button", the simple dosing by only one adhesive component to be processed and the adhesive's infinite opened period cannot be used with UV light non-transparent parts. In the FiberKleb process, UV adhesives are cured between UV-light non-transparent parts by using optical polymer fibres (POF). A POF is inserted into the adhesive joint. The UV light is coupled out radially (or axially) via the POF to cure the adhesive in

the adhesive joint. As a polymer fibre, the mechanical properties of POF can be specifically adapted to the adhesive joint, in contrast to glass fibres. The influence of POF on the adhesive bond can thus be minimized or even eliminated.
The aim of the research project is to further develop the FiberKleb technology and to develop a basic understanding of the effects of POF in an adhesive joint. The results of the research should eliminate acceptance restrictions compared to bonding technology due to the long curing times and thus open up new fields of application.

Approach

Within several iteration steps, POFs are produced. They are optimized with regard to their material, diameter and cross-sectional shape. In order to minimize the necessary iterations, FEM simulations for the mechanical design of the fibre in the adhesive joint and raytracing simulations for the optical design of the UV decoupling along the fibre axis are performed.
The optimized fibres are continuously tested and finally used in several demonstrators for bonding. The regular exchange with the project committee ensures that the FiberKleb technology meets the industrial standards.

Acknowledgement

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