Universität Rostock Traditio et Innovatio

CHAIR OF LIGHTWEIGHT DESIGN
Lehrstuhl für Leichtbau

Universität Rostock | Fakultät für Maschinenbau und Schiffstechnik | Lehrstuhl für Leichtbau | Prof. Dr.-Ing. Philipp Weißgraeber
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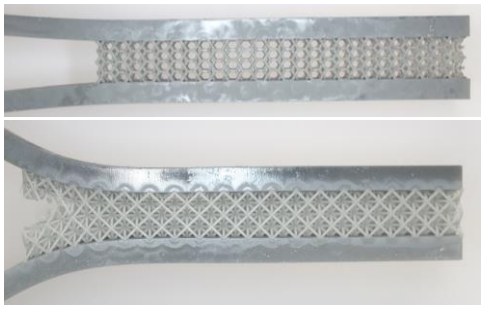
Experimental evaluation of architected interfaces in DCBs under mode I loading.

(Bachelor-/ Studien-/ Masterarbeit)



Mechanical metamaterials, also known as architected materials, use specially designed microstructures to achieve tailored mechanical behavior and failure response. We are investigating concepts of architected interfaces for use in novel lightweight desoign concepts.

It is important to understand the failure process of architected interfaces to avoid sudden collapse of the bonded structures. Numerical modelling of architected interfaces has indicated that by introducing architected materials to the interface, bridging zones might be created in the damage process. Other studies have shown that architected materials by themselves can be used to modify the fracture toughness of the material compared to homogenous interfaces.

The objective of this thesis is to perform an experimental study to understand the effect of geometrical changes on the failure process for selected architected interfaces. A literature review will be conducted to understand the behavior of various architected materials and their effective fracture toughness. An experimental study is to be designed that allows to compare the fracture toughness of the architected interface with the fracture toughness of the material used for the interface. In addition, the damage process of the interface must be studied, where the appearance of bridging zones and toughening effects are of particular interest. To perform the experimental study, a procedure for the design and preparation of test specimens using 3D printing must be developed. This includes the selection of a suitable material and the determination of the required material properties for the selected material.

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