

# Fatigue properties of self-reinforced polymers

Assignment: Master Thesis/Laboratory project



## Motivation

The mechanical properties of plastics are limited compared to other classes of materials. Nevertheless, this class of materials has decisive advantages, including a very high degree of design freedom and low density, so that polymers are used in a wide range of technical applications. In order to increase the mechanical properties of polymers, research has been carried out for some time on self-reinforced polymer composites (srPC). SRPCs are composites based on the use of identical materials for the matrix and reinforcement phases, while conventional composites are made from the combination of two or more different materials. This approach not only significantly increases the mechanical performance, but also allows the srPCs to be disposed of by type at the end of the product's life. The fatigue behavior of srPCs has not yet been comprehensively researched, but a comprehensive understanding of materials is essential for sustainable material use.



## Ziele

This thesis focuses on the investigation of the fatigue behavior of srPC. In this context, the degradation behavior of the mechanical properties at different loads and frequencies will be investigated.



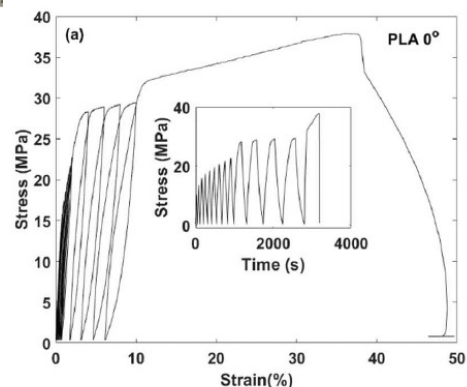
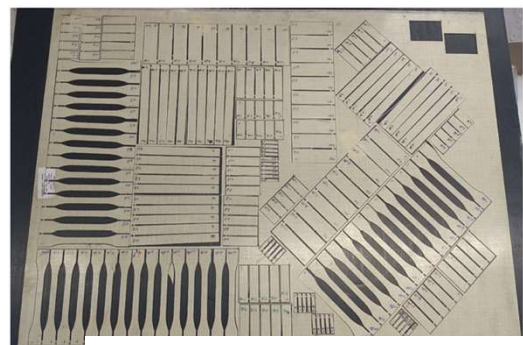
## Voraussetzungen

- Degree in materials science, industrial engineering or similar, whereby the approval to start the final thesis/laboratory project has already been obtained on the basis of the applicable study regulations
- Previous knowledge in the field of materials science and composites desirable
- Interest in experimental research and data analysis
- Sound knowledge of English



## Aufgaben

- Literature research and presentation of the state of the art on the subject of srPC and especially on fatigue behavior.
- Literature review on fatigue testing of (fiber-reinforced) plastics
- Sampling taken from the composite material provided. For this purpose, suitable sample geometries and a cutting plan must be designed and a suitable cutting technique (e.g. waterjet cutting) must be selected
- Preparation of a test plan and execution of the fatigue test
- Evaluation of the test data to derive the fatigue behavior of srPC
- Presentation of results and theory in scientific form  
Preparation of the main results and presentation in the seminar



### Scientific Guidance:

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Chair of Hybrid Composite Materials  
Research Group: Materials&Mechanics

**Start:**

**type of work:**

anytime

experimental