Bachelor/Master Thesis

Experimental Determination of the Mechanical Properties of Composite Facesheets in a Hybrid Sandwich Structure

Für Herrn / Frau XXX (Matrikel-Nr. XXXXX)

Problem

Sandwich composite structures are commonly used in different areas such as aerospace, marine, space, architectural structures where high strength and stiffness are required as well as the weight is a critical problem. Mechanical properties of the sandwich panels were affected by facesheets type, facesheet density and dimensions of the core materials. In this study, mechanical properties of the composite facesheet in a hybrid sandwich structure will be determined experimentally.

While the facesheets increase the impact resistance, they resist against the in-plane tensile and compression forces during bending. The core material, which is adhered to the facesheets, is resistant to shear forces. Core shear stress, surface stress and flexural strength of the panel can be compared with bending tests in appropriate standards. In order to evaluate mechanical properties of the hybrid sandwich structures, composite facesheet's engineering constants should be find out by compression and tension tests of composite material specimens.

Figure 1: Example of Composite Specimen Tensile Test

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Aufgaben

The aim of this work is determination of composite facesheets mechanical properties by appropriate experiments.

Following tasks are planned in the framework of this investigation:

- Literature survey on composite sandwich structures, standards and application of compression, tension and bending tests.
- Mathematical analysis based on composite material testing and composite mechanics.
- Tensile and compression tests of ready-made composite material.
- Bending test of a composite facesheet sandwich structure.
- Documentation and critical discussion of the results

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Deutscher Titel

Experimentelle Bestimmung der mechanischen Eigenschaften einer zusammengesetzten Deckschicht in einer hybriden Sandwichstruktur