

Project name: Development of an innovative manufacturing process for the thermoplastic consolidation of sustainably designed sandwich structures with the realization of three-dimensional polygon cover layers - BlueBoard

Partners: Gun Sails von Oberhausen GmbH (Ausgründung KANOA Surfboards)

Institut für Textiltechnik (ITA) of RWTH Aachen University

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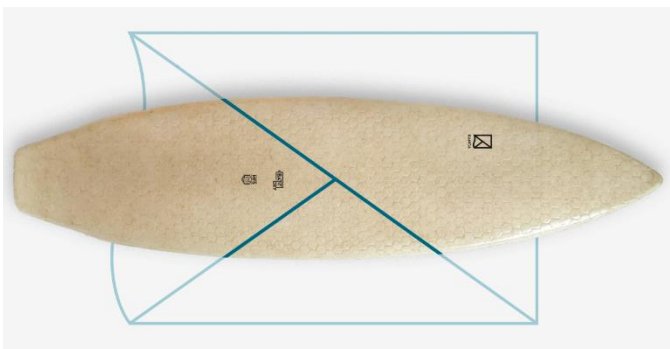
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Mission Statement

Many fibre reinforced plastics (FRP) are manufactured in a sandwich construction. Such structures are especially suitable for use as components exposed to bending loads and are used for a wide range of applications. The material properties of sandwich structures are based not only on the selection of the materials used but also on the compatibility of the composite materials with each other. For an optimal utilization of the material properties, precise manufacturing processes are required. In these layered composites, the advantages of different materials and structures (foam, textile reinforcing structure, etc.) are specifically exploited through the foam core and the cover layers. This is the reason for the wide field of application of sandwich structures. An example of such structures is the surfboard.

At present, surfboards are manufactured exclusively with thermoset matrix. In concrete terms, a basic distinction is made between polyester construction and epoxy construction in the production of surfboards. In both processes a vast amount of manual work is involved and the cycle times of thermoset composite systems must be taken into account. In addition, the lamination process must be followed by an extensive finishing process. The toxic resin systems, the extensive process chain and the materials based on fossil raw materials stand in contrast to the desired aspect of sustainability, both in terms of materials and process technology.

Biobased sandwich structures with natural fibre reinforcement and biobased thermoplastic (TP) matrix can be a sustainable alternative for surfboards. Currently, there are still deficits in the limited experience with natural fibre reinforced TP-FRP, especially in the process control with high melting temperatures during fibre impregnation.



Surfboard of project partner *KANOA Surfboards* (subsidiary of *Gun Sails von Osterhausen GmbH*)

Aim and approach

The aim of the project is the process development for the economic production of surfboards made of FRP with the highest possible content of biobased raw materials and thermoplastic matrix. Overall, the new development has a high market potential due to the following characteristics:

- Short cycle times
- Reduction of process costs
- Adaptivity of materials and processes
- Sustainability

The development of sandwich components for surfboard production is carried out in a two-stage manufacturing process. In the first step, *KANOA Surfboards* is developing an impregnation process suitable for series production for TP-foam cores and a natural fiber/TP top layer. The resulting TP-semi-finished parts form the basis for the later final design of components.

In a second step, *ITA* develops an innovative manufacturing process for customizable components (complex shapes, individual load paths, individual cover layers) from the semi-finished parts produced before. The relevant mechanical parameters of the resulting bio-based sandwich structures are then investigated and validated. At the end of the project, a surfboard made of 100 % biobased raw materials will be used as a demonstrator.

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