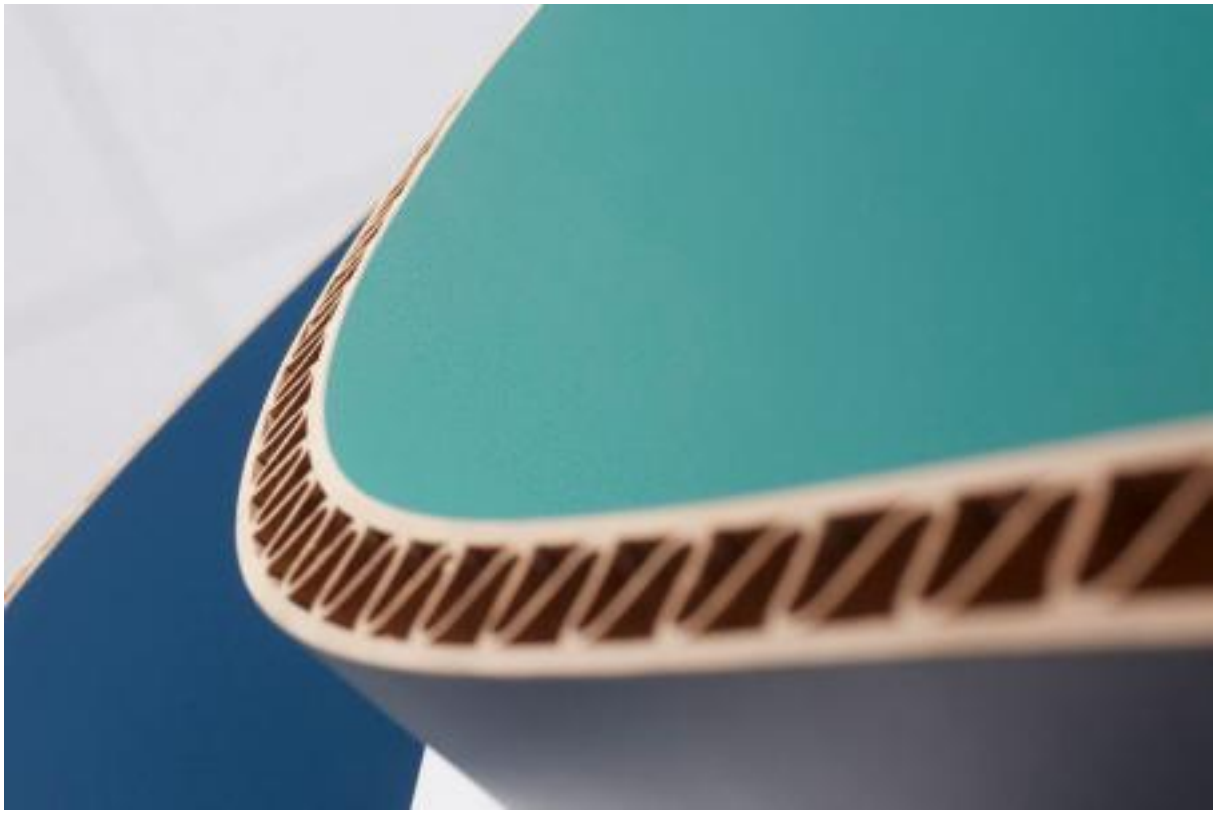
Sustainable wood fibre sandwich: industrial production and cross-sector use

About this project



BENHoLei

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Markets:

Material: Wood, Natural fibres, Aluminium

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Technology Transfer Program Leichtbau

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Context

The team in the BENHoLei research project has set itself the goal of developing sustainable lightweight construction elements made from wood fibre materials across all sectors. The basis was the wood fibre material Homawave, which is characterised by its wave-like structure that is reminiscent of corrugated cardboard. This structure is produced by a continuous forming process in which wood fibre boards are corrugated and then combined with cover layers such as aluminium or high-density fibreboard. The result is stable sandwich materials that are more resource-efficient and considerably lighter than conventional wood-based materials. BENHoLei has shown that these materials can be used in a variety of ways, for example in furniture, vehicle parts or the packaging industry, and can make an important contribution to reducing CO# emissions by reducing material consumption and weight.

Purpose

The aim of the researchers is to optimise wood fibre materials for large-scale production and thus enable more sustainable and environmentally friendly industrial processes. To this end, they are developing automated production processes that integrate mechanical testing and non-destructive testing methods. The focus is on improving material properties, such as flexural strength and dimensional stability, through hybrid combinations of cover and core materials. In addition to technical development, the project team is pursuing the goal of transferring the research results directly into practical applications. The use of Homawave in the furniture and automotive industries as well as in ship interiors should create both ecological and economic benefits such as lower material consumption, lower transport costs and a sustainable value chain.

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Procedure

The researchers successfully complete the material and process development. They further develop the Homawave core in combination with various cover layers and subject it to extensive mechanical tests. In particular, the successful tests with acrylate and phenolic resin systems lead to a higher forming quality and improved surface quality. At the same time, the team develops new roller geometries and optimises the production processes, for example through more precise temperature and humidity settings, thereby increasing the production speed to up to 5 metres per minute. They integrate non-destructive testing methods into the process chain to ensure quality and detect defects at an early stage.

The sandwich materials developed in the project are tested for their practical suitability using a lectern as a demonstrator. The positive response, for example at the INTERZUM 2023 trade fair for suppliers to the furniture and interior design industry, confirms the market relevance of the materials. Finally, the scientists are developing a concept for a production plant suitable for large-scale production that fulfils both economic and ecological requirements.




Funding duration:

Funding sign:	03LB2006	**Funding amount:**	EUR 757 thousand

Further websites foerderportal.bund.de/foekat/jsp/SucheAction.do?actionMode=view&fkz=03LB2006A - BENHoLei in the federal funding catalogue

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Project coordination

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English (EN){{ Projektpartner }}

Lightweighting classification

	Realisation
Offer	
Products Parts and components, Semi-finished parts, Machines and plants, Systems and end products, Materials	✓
Services & consulting Validation, Simulation	✓

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Lightweighting classification

	Realisation
Field of technology	
Design & layout Lightweight design, Hybrid structures	✓
Functional integration	
Measuring and testing technology Materials analysis, Destructive analysis, Non-destructive analysis	✓
Modelling and simulation Optimisation, Structural mechanics	✓
Plant construction & automation Plant construction	✓
Recycling technologies Recycling	✓
Manufacturing process	
Additive manufacturing Others (Fibreboard production from wood)	✓
Coating (surface engineering)	
Fibre composite technology	
Forming Compression moulding, Thermal converting, Rolling	✓
Joining Adhesive bonding	✓
Material property alteration	
Primary forming	
Processing and separating Sawing, Cutting	✓
Textile technology	

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Lightweighting classification

	Realisation
Material	
Biogenic materials Wood	✓
Cellular materials (foam materials)	
Composites	
Fibres Natural fibres	✓
Functional materials	
Metals Aluminium	✓
Plastics	
Structural ceramics	
(Technical) textiles	