Functionally integrated components for furniture: conserving resources, enabling recycling

About this project

InPeiro

Functionally integrated components for furniture: conserving resources, enabling recycling

Markets:

Material: Wood, Steel

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This project is funded by the Technology Transfer Programme Leichtbau (TTP LB) of the Federal Ministry of Economics and Energy.

Technology Transfer Program Leichtbau

Context

The demand for resource-conserving, energy-efficient and recyclable products is growing across all industries. Furniture and interior design companies are also facing the challenge of combining modern, sustainable materials with innovative production techniques. The industry is currently dominated by conventional wood-based materials such as chipboard and fibreboard. Hinged and sliding doors or flaps are realised using space-consuming, material-intensive metal fittings that are screwed to the panel materials on the inside of the furniture.

A promising solution is to integrate the hardware technology directly into the furniture component. This creates a panel-shaped lightweight component with increased strength, which significantly reduces the amount of material used and improves the recyclability of the products. By dispensing with external metal fittings, the recyclability of the components is made considerably easier. At the same time, both the mechanical requirements and the aesthetics of the furniture must be taken into account. This is where the researchers in the InPeiro project come in.

Purpose

The project participants are developing lightweight sandwich components (PANELS) that not only fulfil the structural functions in furniture construction, but also integrate mechanical functions such as fittings for door and flap openings. By fully integrating the hardware technology as a functional, statically effective core structure of a sandwich component, a technology platform is created that has the potential to accommodate additional technical elements and smart home devices. This significantly reduces the amount of material used and improves recyclability.

The researchers are initially testing the technology for furniture construction; in the future, however, it should also be transferable to other sectors such as vehicle, boat and aircraft construction. In the long term, the developed technology should reach market maturity and thus contribute to the efficient, environmentally friendly and cost-effective production of furniture and similar products.

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Procedure

The project team is initially developing a concept that enables fully integrated hardware technology. The researchers are working on the development of connection and joining processes that ensure the mechanical function of the fittings in the sandwich core.

In the next step, the participants will produce prototypes and test their suitability for practical use. They also analyse the material properties and develop techniques for secure and sustainable joining of the cover layers.

In order to be able to use the technology on an industrial scale, the team is developing a special production machine that enables semi-automated production. At the same time, they are carrying out ecological assessments of the new components in order to determine the CO# savings potential and resource efficiency of the new technology.

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Project coordination

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English (EN){{ Projektpartner }}

Gerhard Koch Maschinenfabrik GmbH & Co. KG

Lightweighting classification

	Realisation
Offer	
Products	
Services & consulting	

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Lightweighting classification

	Realisation
Field of technology	
Design & layout Lightweight manufacturing	✓
Functional integration Others (Mechanics and suspensions)	✓
Measuring and testing technology	
Modelling and simulation	
Plant construction & automation	
Recycling technologies	
Manufacturing process	
Additive manufacturing	
Coating (surface engineering)	
Fibre composite technology	
Forming	
Joining Adhesive bonding, Screwing	✓
Material property alteration	
Primary forming	
Processing and separating	
Textile technology	

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Lightweighting classification

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