Resource conservation and efficiency: multifunctional lightweight vehicle centre console

About this project

NaMiKoSmart

Resource conservation and efficiency: multifunctional lightweight vehicle centre console

Markets:

Material: Basalt fibres, Thermoset plastics, Yarns, rovings, Basalt fibre-reinforced plastic

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

Technology Transfer Program Leichtbau

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Context

In many applications in the mobility sector, the aim is to combine lower weight with the same or increased functionality. In addition, sustainability issues are becoming increasingly important against the backdrop of increasing environmental and climate pollution. Sustainable lightweight construction technologies can make a decisive contribution to the resource, energy and transport transition with innovative solutions.

Purpose

In the NaMiKoSmart project, researchers are developing a weight-reduced and multifunctional vehicle centre console that combines economic potential, climate protection and resource efficiency. To this end, they are combining various innovative lightweight construction technologies. The aim is to use the component as an example to demonstrate the possibilities for cross-industry utilisation of sustainable materials and production-ready process technologies. The research results should contribute to effectively reducing the weight of components in various industrial sectors without restricting functionalities.

The project team aims to demonstrate how sustainable natural fibres and the innovative space-winding process, "xFK in 3D", can be used to produce lightweight yet high-strength and rigid truss structures with minimal waste. In addition to high resource efficiency due to the reduced waste of the composite material - of a maximum of one per cent - large amounts of CO2 are to be saved throughout the entire life cycle of the bio-based, completely recyclable material. The project partners also want to integrate various additional functions with "Smart Textiles".

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Procedure

With "xFK in 3D", the researchers are using a cost-effective and flexible fibre composite technology for the three-dimensional winding of various fibre materials such as nylon, carbon, glass or basalt fibres. The hybrid or multi-material approach is characterised by a digital process chain that is being continuously developed. The fibre-reinforced plastics are wound based on calculations and simulations and can be specifically placed in the direction of the force and load paths. This allows the researchers to significantly reduce material and energy consumption and cut CO2 emissions.

The scientists are also focussing on the use of smart textiles. Linking these functional fabrics with "xFK in 3D" not only enables significant weight savings, but also the integration of new design elements, haptics, heating functions, sensors and lighting options.

When selecting materials and production processes, the project team relies on comprehensive analyses, such as the "Sustainability Value Analysis". This management tool is used to identify and evaluate ecological and economic sustainability criteria at an early stage. In this way, weak points in the process chain are recognised at an early stage with regard to their ecological and economic sustainability aspects and can be taken into account during development.

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Funding duration:

Project partner:

Funding sign:	03LB2030	**Funding amount:**	EUR 976 thousand

Further websites foerderportal.bund.de/foekat/jsp/SucheAction.do?actionMode=view&fkz=03LB2030A - NaMiKoSmart in the federal funding catalogue

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Project coordination

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Lightweighting classification

	Realisation
Offer	
Products Parts and components, Semi-finished parts, Materials, Tools and moulds	✓
Services & consulting Training, Consulting, Engineering, Prototyping, Technology transfer	✓

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Lightweighting classification

	Realisation
Field of technology	
Design & layout Lightweight manufacturing, Hybrid structures, Lightweight construction concepts	✓
Functional integration Actuator technology, Sensor technology, Thermal activation	✓
Measuring and testing technology Component and part analysis, Environmental simulation, Materials analysis	✓
Modelling and simulation Loads & stress, Life-cycle analysis, Structural mechanics, Materials	✓
Plant construction & automation Automation technology, Handling technology	✓
Recycling technologies Material separation, Recycling	✓
Manufacturing process	
Additive manufacturing	
Coating (surface engineering)	
Fibre composite technology Filament winding, Resin infusion process	✓
Forming	
Joining	
Material property alteration	
Primary forming Others (3D space wrapping technology)	✓
Processing and separating	
Textile technology Preforming, Knitting, laid web production	✓

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Lightweighting classification

	Realisation
Material	
Biogenic materials	
Cellular materials (foam materials)	
Composites Basalt fibre-reinforced plastic	✓
Fibres Basalt fibres	✓
Functional materials	
Metals	
Plastics Thermoset plastics	✓
Structural ceramics	
(Technical) textiles Yarns, rovings	✓