

Reusing rotor blades: solutions for infrastructure construction

About this project



BladeReUse

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Markets:



Material:

Glass fibres, Thermoset plastics, Glass-fiber reinforced plastics (GFRP),
Closed-pore

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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 decommissioning of older wind turbines will result in significant quantities of discarded rotor blades in the coming years. These consist predominantly of glass- or carbon-fibre-reinforced plastics and plastic foams. These materials are lightweight, strong and durable, but so far their high-quality recycling has been limited. In practice, rotor blades in Germany are currently often shredded and then used for thermal recovery, for example in the cement industry. This results in the loss of load-bearing structures and generates additional CO₂ emissions.

At the same time, there is currently a lack of scalable processes for reusing large quantities of dismantled rotor blades in a way that is both economically and technically viable. Existing approaches are mostly limited to individual applications or small markets. For use in the construction and infrastructure sectors, there is a particular lack of methods for assessing residual load-bearing capacity, suitable processing methods and structural engineering verification to ensure safe use.

Purpose

As part of the BladeReUse project, the team is developing a method for reusing dismantled rotor blades in infrastructure applications in a way that conserves resources and reduces CO₂ emissions. The focus is on building components made from rotor blade segments, particularly for noise barriers.

The project team is investigating how the segments can be used safely and in a manner appropriate to their intended application. To this end, it is developing procedures for targeted dismantling, as well as methods for assessing residual load-bearing capacity and long-term behaviour. In addition, the researchers are examining how residual pieces that cannot be used directly can be utilised in shredded form as a secondary raw material.

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Procedure

First, the project partners analyse the rotor blades in terms of their geometry, structure and condition. From this, they derive cutting patterns that can be used to produce suitable segments for new components.

The researchers then investigate options for non-destructive testing of the recovered segments and subsequently carry out mechanical tests to assess their load-bearing capacity. This enables them to evaluate the remaining load-bearing capacity and the suitability of the parts for various applications. The further processing of curved blade segments into flat components is also being investigated.

On this basis, the team is developing prototype components, in particular a noise barrier using dismantled rotor blade segments. The researchers are investigating mechanical and acoustic properties, preparing for structural qualification and evaluating the entire ReUse process from an economic and environmental perspective. The focus here is on the potential CO₂ savings compared with conventional construction methods.

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Funding duration:

Funding sign:

03LB3095

Funding amount:

EUR 1.2 million

Final report

Further websites

foerderportal.bund.de/foekat/jsp/SucheAction.do?actionMode=view&fkz=03LB3095A - BladeReUse in the federal government's funding catalogue

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Project coordination

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English (EN){ { Projektpartner } }



Amiblu Germany GmbH, Geosystem GBK GmbH

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Lightweighting classification	
	Realisation
Offer	
Products Parts and components, Materials	✓
Services & consulting Testing and trials, Engineering, Validation, Technology transfer	✓
Field of technology	
Design & layout Lightweight manufacturing, Lightweight design, Hybrid structures	✓
Functional integration Material functionalisation	✓
Measuring and testing technology Materials analysis, Destructive analysis, Non-destructive analysis	✓
<i>Modelling and simulation</i>	
Plant construction & automation Handling technology	✓
Recycling technologies Material separation, Recycling	✓

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Lightweighting classification	
	Realisation
Manufacturing process	
Additive manufacturing	
Coating (surface engineering)	
Fibre composite technology	
Forming Bending, Thermal converting	✓
Joining Adhesive bonding, Screwing	✓
Material property alteration Thermochemical treatment	✓
Primary forming	
Processing and separating Sawing, Grinding, Cutting	✓
Textile technology	
Material	
Biogenic materials	
Cellular materials (foam materials) Closed-pore	✓
Composites Glass-fiber reinforced plastics (GFRP)	✓
Fibres Glass fibres	✓
Functional materials	
Metals	
Plastics Thermoset plastics	✓
Structural ceramics	
(Technical) textiles	