

Building fertiliser spreaders more sustainably: lightweight and modular support structure

About this project



LE²GRO

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Markets:



Material:

Others (Multi-material composite)

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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 growing global demand for food and renewable raw materials requires increasingly intensive farming. This is accompanied by problems such as increasing soil compaction, which is also caused by increasingly heavy machinery. Conventional fertiliser spreader booms made of stainless steel structures are already so optimised in their lightweight steel construction that no major weight savings are possible. With innovative technologies and new material approaches, lightweight construction can help to make machines lighter and more efficient and thus make agriculture more sustainable.

Purpose

The LE²GRO project aims to develop a near-series, weight-reduced and modular support structure for fertiliser spreader booms. By using innovative lightweight construction technologies in the form of braided fibre-thermoplastic composite profiles, heavy and cost-intensive stainless steel tubes are to be replaced. This enables comprehensive manufacturing, structural and functional integration while avoiding cost-intensive post-processing steps. The scientists are not only striving for technological innovation, but also for an economically viable solution for the agricultural machinery industry.

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Procedure

The researchers use the continuous blow moulding process for the production of fibre-reinforced thermoplastic hollow profiles and develop a digital tool for the automated design and dimensioning of the supporting structure. They are developing load-appropriate profile connections and innovative braided node structures and implementing them as prototypes. The modularisation of the supporting structure enables rapid adaptation to different application scenarios and helps to increase efficiency when spreading the fertiliser. Integrated sensor technology also enables continuous monitoring and optimisation of the agricultural machine.

In addition, the researchers are further developing process chains to ensure the economical production of functional load-bearing profile structures and to guarantee consistent quality monitoring. The innovative approach of the multi-material support structure design not only promises a significant reduction in component complexity, but also improved competitiveness for the German agricultural industry as well as more sustainable agriculture by reducing soil compaction and optimising fertiliser application.

The project participants have been awarded 1st place in the "Innovative Products and Applications" category of the AVK Innovation Award 2024.

Funding duration:

Funding sign:	03LB2002	Funding amount:	EUR 923 thousand
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Final report

Further websites	foerderportal.bund.de/foekat/jsp/SucheAction.do?actionMode=view&fkz=03LB2002A - LE2GRO in the federal funding catalogue
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Project coordination

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English (EN){ Projektpartner }



Lightweighting classification

Realisation

Offer

Products

Semi-finished parts



Services & consulting

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Lightweighting classification	
	Realisation
Field of technology	
Design & layout Lightweight material construction	✓
Functional integration Sensor technology	✓
<i>Measuring and testing technology</i>	
Modelling and simulation Loads & stress, Reliability validation	✓
Plant construction & automation Handling technology	✓
<i>Recycling technologies</i>	
Manufacturing process	
<i>Additive manufacturing</i>	
<i>Coating (surface engineering)</i>	
<i>Fibre composite technology</i>	
<i>Forming</i>	
<i>Joining</i>	
<i>Material property alteration</i>	
<i>Primary forming</i>	
<i>Processing and separating</i>	
Textile technology Braiding, Preforming	✓

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Lightweighting classification	
	Realisation
Material	
<i>Biogenic materials</i>	
<i>Cellular materials (foam materials)</i>	
Composites Others (Multi-material composite)	✓
<i>Fibres</i>	
<i>Functional materials</i>	
<i>Metals</i>	
<i>Plastics</i>	
<i>Structural ceramics</i>	
<i>(Technical) textiles</i>	