

Wind Turbine Gearboxes

Extending Component Life through Remanufacturing

Using material innovation, testing and simulation to support more reliable, circular and cost-effective wind turbine gearbox components

THE CHALLENGE

Fluctuating loads, mechanical stress, lubrication issues and harsh operating environments can lead to premature failures in gears, bearings and flange connections.

Wind turbine gearboxes are essential components in renewable energy production, but they operate under demanding conditions.

Repair or replacement is costly, complex and time-consuming and, has a direct impact on wind turbine availability and on the overall cost of energy production.

Today, the remanufacturing of wind turbine gearbox components remains limited, and even functional components may be replaced as a precaution.

The challenge is to understand why components fail, develop stronger repair and upgrade methods and keep high-value parts in use for longer without compromising safety or performance.

THE R3-MYDAS SOLUTION



R3-Mydas develops new repair, reuse and remanufacturing approaches for wind turbine gearbox components, combining material innovation, testing and simulation to improve reliability and circularity.



Understanding failure mechanisms



Advanced testing under realistic conditions



Material innovation and repair methods



Simulation for better decision-making



Validation of remanufactured components



Improved flange connection reliability

By combining practical testing with advanced modelling and repair technologies, R3-Mydas supports a more reliable route for keeping high-value wind turbine gearbox components in use for longer.

KPIS ACHIEVED

R3-Mydas demonstrates how advanced testing, material innovation and remanufacturing methods can improve the reliability and circularity of wind turbine gearbox components.

97%

Estimated reusage rate

90%

Prevention rate for premature failures

15%

Torque density increase confirmed by testing

75%

Reduction in lead time

>85%

Raw material savings potential

SUSTAINABILITY

R3-Mydas supports a more circular approach to wind turbine gearbox maintenance by helping selected components be repaired, upgraded and reused instead of replaced.



Reducing the impact of steel-intensive components



50% carbon footprint reduction



More favourable lifecycle cost scenario



Less waste from preventive replacement



Circularity for renewable energy assets

USE CASE LEAD

Aligned with Current ISO/CEN Standards

This use case is led by **Flender Finland**, connected to Flender's expertise in mechanical drive technology, wind turbine gearboxes, wind generators and drivetrain services.

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MORE ABOUT THE CASE STUDY

r3-mydas.eu/rmydas-demo-cases-windturbinegears

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