



Motivation

Gearbox-related failures account for a significant share of wind turbine downtime and O&M costs, while current condition monitoring systems typically detect faults at late stages with limited root-cause insight. The WHATSOM project addresses this gap by creating a controlled and representative environment to investigate early-stage failure mechanisms in wind turbine gearboxes, integrating mechanical and electrical phenomena to improve diagnostic capability and reduce lifecycle costs.

Objective

To develop and validate a predictive maintenance methodology for wind turbine gearboxes by correlating mechanical degradation and electrical disturbances, enabling earlier gear failure detection, improved root-cause analysis, and higher operational availability.

Approach

WHATSON implements a reduced-scale test rig to generate representative mechanical and electrical failure data under controlled conditions. Experimental tests, non-destructive evaluation, and data acquisition are combined with machine learning techniques to correlate multi-physics signals and validate the developed algorithms using real wind turbine data, increasing the technological maturity of smart O&M solutions.