SERVICES POWERED BY ANALYTICS

Taking service to the next level

Case Study

FAST RETURN to OPERATIONS

Problem statement

The gearbox is a critical wind turbine component.
Existing value chain is fragmented and reactive.
Failures of components lead to:

- Lost revenue
- High emergency repair costs
- An increase in the Levelized Cost of Energy (LCoE)

Example of the problem statement

Fault notification processing:
2 days

Fault inspection time:
1 week

Order the right components:
3 weeks

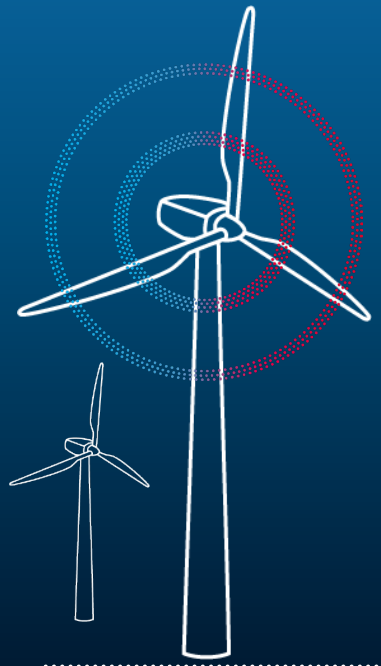
Plan & execute repairs:
2 weeks

Typical service intervention: 6 weeks

75.000€

Lost revenue for 3.5 MW turbine

Case study



Running for more than 1 year

European market

Approximately 100 wind turbines

Joint project SKF and ZF Wind Power

Example of automated CMS alert handling by ZF Wind Power

CMS ALERT

The Condition Monitoring System (CMS) detects an indication of a potential failure in the High Speed Shaft (HSS).

From gearbox anomaly detection to service solutions using Artificial Intelligence #1/3

ALERT PROCESSING

- ZF automatically receives the alert and the associated anomaly findings via a cloud integration.
- The ZF system improves the severity classification of the alert by using gearbox domain knowledge and data analytics.
- The result is an automatic match of the alert with the associated failure which in this case is a subsurface crack in the bearing inner ring.

50%
Alert processing effort

From gearbox anomaly detection to service solutions using Artificial Intelligence #2/3

ALERT BASED RECOMMEN-DATIONS

- The system generates a detailed report indicating the continuous rollers' load will cause further detorioration. Metal particles would spread into the gearbox and could cause consequential damage. Ultimately the gearbox functionality could get jeopardized.
- ZF recommends a HSS bearing upgrade with pre-assembled shaft.
- The data analytics enable the system to provide a reaction horizon over 180 days to resolve the anomaly.

60%

Unplanned field inspections

From gearbox anomaly detection to service solutions using Artificial Intelligence #3/3

SERVICE EXECUTION

- The system transforms the recommendation into a case for the ZF service team.
- Supply chain for the bearing kit and pre-assembly of the shaft is activated.
- The delivery lead time can be defined based on proactively planned stock levels and the associated service event, including field service technician and tools, can be allocated.
- At the planned date, the service is executed and the unplanned turbine downtime is avoided.

85%
Lead time to repair

Tangible benefits from the case study