ENERGY

Gearing up for the Future

EFFICIENT TESTING FOR EFFICIENT ENERGY

ABOUT THE CUSTOMER:

Established in 1923, ZF Wind Power has steadily become one of the world's leading manufacturers of wind turbine gearboxes. With the increasing demand for cleaner energy, their priorities remain to provide the highest quality product at a competitive cost of energy and to provide such resources around the globe.

CHALLENGE

ZF Wind Power specializes in the production of gearboxes, designed to support excessive loads. Before a unit leaves one of their facilities in Belgium, China or India, reliable operation in the field is ensured through rigorous testing. Product quality is the most important factor for our client to consider, as once a gearbox is installed on a wind turbine 125 meters in the air, regular maintenance or repair is not a simple task. With the growing demand for more flexible and increasingly stringent testing, ZF Wind Power was on the lookout for an upgrade of their existing set-up to increase the reliability and flexibility of their end-of-line test setup.

RESULTS

WITH ITS SEAMLESS INTEGRATION, THE UPDATED OPERATION SIMPLIFIES EFFICIENT AUTOMATED TESTING. THE FIRST STATIONS WERE ROLLED OUT IN LOMMEL BELGIUM, FOLLOWED BY CHINA AND INDIA. THE AVERNA (FORMERLY, T&M SOLUTIONS) MEASUREMENT SYSTEM HAS A **FUTURE-PROOF MODULAR DESIGN** THAT CAN BE EXPANDED AND UPGRADED AT A VERY LOW COST. WITH ITS **USER-FRIENDLY DESIGN**, ZF CAN DEVELOP THEIR OWN FEATURES AND QUICKLY IMPLEMENT NEW MEASUREMENT TYPES WITH ON-DEMAND SOFTWARE UPDATES. ULTIMATELY, THE STATION REDUCES THE TIME GEARBOXES SPEND ON A TEST BENCH AND SAVE OPERATORS A SIGNIFICANT AMOUNT OF TIME BY **RE-USING VIRTUALLY STORED PARAMETERS OF PREVIOUS SET-UPS** TO CREATE IDENTICAL TESTING CONDITIONS.

Averna

Wind turbine gearboxes are subject to extreme loads and harsh environmental conditions. Two or three propeller-like blades are turned around a rotor by the wind. On one side, the rotor is connected to a gearbox (provided by ZF Wind Power), which subsequently spins a generator on the high-speed shaft to generate electricity. In extreme wind conditions, heavy vibrations can cause damage or malfunction, resulting in hazardous situations and massive costs.

Tailor-made measurement system

THE AVERNA SOLUTION

ZF Wind Power was attracted to both the reliability of National Instruments' product portfolio and the experience and expertise of Averna. Having already successfully collaborated with Averna on an integrated experiment control system of their test set-up, the company decided to appeal to their services once more. The result is a flexible, state-of-the-art test solution that is easy to operate and leaves nothing to chance.

"We improved our automated tests through a highly reliable, cost-efficient and future-proof system of T&M Solutions which will support us to ensure high quality gearboxes to our customers."

Rudy Slegers,
IT Project Manager,
ZF Wind Power

Data Acquisition for a High-End Testing Environment

The set-up itself consists of two giant electrical motors: one to simulate the wind-force, while the other is used as a brake to simulate a generator. Sensors measuring vibration, torque, speed, temperature and sound are attached to each gearbox. They transmit valuable data to the condition monitoring system, which tracks the development of possible damage in the gearbox. A history of loading conditions is kept on the servers and can be retrieved and analyzed in the case of incidents in the field. Furthermore, this data can be used for long-term statistical analyses and preventative maintenance.

Based on ZF's specifications, the majority of the hardware consisted of a National Instruments' CompactDAQ system. Each setup consists of the aforementioned sensors, two main cabinets with a CompactDAQ Ethernet chassis, a synchronization module and several input channels. Averna also provided a special casing that provides adequate protection as well as easy access to replace worn parts.

Flexible Monitoring at ZF Wind Power

Behind this hardware, the LabVIEW software running on the network server conducts all the necessary analyses and archives the data for future consultation. The software was co-developed by ZF and Averna and has been seamlessly integrated into ZF's standard IT configuration virtual server. This unique set-up gives ZF full control and allows IT to incorporate the measurement servers into their standard management system and processes.