

Schaeffler Global Technology Solutions

Wind Power

Fred. Olsen Renewables, United Kingdom

Reliable Online Condition Monitoring of Wind Turbines

Crystal Rig I wind farm is located on the Lammermuir Hills, approximately 40 kilometer east of Edinburgh in the Scottish Borders. With total 25 wind turbines it belongs to the greatest onshore wind farms in Scotland. The wind farm developer and operator is Fred. Olsen Renewables (FOR).

Challenge for Schaeffler

Back in September 2011, FOR was looking for a suitable UK based supplier that could provide a professional and comprehensive condition monitoring solution. Schaeffler was awarded the contract as they demonstrated confidence to provide the most suitable condition monitoring system combined with flexible training, remote monitoring and reporting services. In the first step the monitoring concept should be realized for five wind turbines.

Schaeffler Solution

In order to fulfill the high demanding tasks Schaeffler used the monitoring system FAG WiPro s. On each of the five wind turbines six vibration acceleration sensors were installed. One of these sensors is a special, low frequency vibration sensor that monitors the main rotor bearing and there is also a low frequency vibration sensor on the input shaft to the gearbox. Two additional standard vibration acceleration sensors are installed on the power train gearbox, with a further two vibration sensors on the generators. Due to the installation of the FAG WiPro s, vibration data on the main bearing, generator and gearbox can be monitored around the clock. The data is transmitted to the Schaeffler Online Monitoring Center where it is analyzed. If any conspicuous events are detected, the wind farm operator is informed immediately. Moreover, the customer's staff received a training on Basic Vibration Analysis at the Schaeffler Technology Center in Sutton Coldfield (UK).



 **Fred.Olsen Renewables**

Technical Information about the Plant

Crystal Rig I Wind Farm

Number of wind turbines:

25

Capacity:

62.5 MW

Location:

Near Dunbar, East Lothian, Edinburgh, Scotland

Map coordinates:

55° 56'N, 2° 30'E

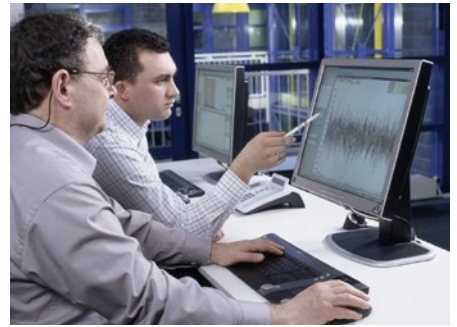




FAG WiPro s – monitoring system especially suited for wind applications



Reliable monitoring of all parts of the drive train of a wind turbine



Data analysis in the Schaeffler Online Monitoring Center

Customer Benefit

Since the five systems were put into operation at the Crystal Rig I Wind farm, several instances of damage to the generator bearings as well as problems with the gearbox have been detected in good time and confirmed by FOR by means of endoscopic measurements. This way FOR was able to carry out repair works at an early stage and lower cost. Looking only at the cost of a possible single gearbox damage in this park the cost can easily exceed 200 000 Euro. Due to good results achieved with the FAG WiPro s the customer has meanwhile decided to equip the complete wind farm with the monitoring solution. Schaeffler has delivered 20 further condition monitoring systems for the purpose of monitoring the condition of the main rotor bearings, gearboxes and generators.

What's special

From the beginning the project was characterized by short communication paths and an intensive exchange of information among the specialists that have contributed to the success. The Schaeffler sales engineers have been liaising directly with the customer and the engineers both in the Schaeffler Technology Center in UK and in the headquarter in Germany.

Technical Information about the Solution

Monitoring system:

FAG WiPro s

Number of monitoring systems:

- Started with 5 FAG WiPro s
- Meanwhile in total 25 FAG WiPro s

Monitored units:

- Main rotor bearing
- Power train gearbox
- Generators

Sensors:

6 sensors per wind turbine

Communication:

VPN

Additional signals:

Speed and power

Alarm:

Remote communication via VPN