Press Release

Schaeffler at the Hannover Messe 2019 (Hall 22, Booth D43)

Schaeffler combines condition and torque monitoring in one single system

SCHWEINFURT, 2019-03-22.
• Industry 4.0 pilot project for the wind power industry presented in Hannover
• Innovative TorqueTracking system for industrial drives
• Vibration analysis and torque monitoring combined in a single system
• Customers benefit from increased drive availability and longer maintenance intervals

The long-term development partnership of Schaeffler and Bonfiglioli, market leader in yaw and pitch drives for wind turbines, lead to the creation of a compact Industry 4.0 solution package. Schaeffler has combined two of its proven measuring systems, the SmartCheck and the TorqueSense to create a new condition and torque monitoring system. While the vibration diagnosis system of the Schaeffler SmartCheck detects incipient damage at a very early stage, peak loads as well as their frequency can also be detected and limited using the precise torque signal. Using algorithms that are based on their application expertise, Bonfiglioli converts such data into information throughout the entire lifetime of a wind turbine. Thus, online reporting on relevant performance indicators is provided, e.g. the general “health” status of the geared drives, possible critical conditions, and abnormal behavior of the yaw systems. In total, customers benefit from reduced unplanned downtimes as a result of overloading or unexpected operational conditions of the system and load-based (i.e. generally longer) maintenance intervals due to predictive monitoring.

A clever combination

The Schaeffler SmartCheck device performs frequency-selective condition monitoring of bearings, gearboxes, electric motors, pumps, fans, and machines based on solid-borne vibrations. Conspicuous frequencies can be automatically attributed to the damaged component using only one Schaeffler SmartCheck. A temperature sensor is also integrated into the device. The torque signal and speed signal of the Schaeffler TorqueSense are sent, preprocessed and supplied to the machine control system and/or maintenance department with the vibration signals that are also analyzed via the SmartCheck. The addition of operating data on torque and speed to the SmartCheck condition monitoring system opens up several new scenarios. In the simplest case, the system allows the monitoring of torque peaks and their frequency and thus
an evaluation of the utilization level and the derivation of load-based maintenance measures. The signals can also be integrated into the operating strategy for drives and initiate torque limitation or shutdown functions. The new system is particularly suitable for adjustment and rotary drives in the wind power and shipbuilding industry, in large cranes, construction and mining machinery with turrets, and for winches. The torque signal can be used for both monitoring and smooth and precise torque control and regulation of the pull cable.

**Pilot project for the wind power industry**

Schaeffler is currently developing an initial pilot project for Bonfiglioli’s geared motors of yaw drives for wind turbines. In this application, the load data that are condensed using the Schaeffler SmartCheck are compared with predefined limit values and the results are transmitted wirelessly to Bonfiglioli via a gateway. The monitoring system for Bonfiglioli geared motors operates independently and is not connected with the turbine’s control system, making it very easy to retrofit when the geared motors are replaced. With the new system, Bonfiglioli aims to monitor overloading of the yaw drives, increase the lead times for maintenance, and make it possible to define load-based instead of time-dependent maintenance procedures. The TorqueSense module is positioned between the motor and gearbox to integrate it into the flow of force of the geared motor. The measurement system is also fully functional in lubricating oil and offers significant advantages for integration into the drive train such as:

- high measurement accuracy (approximately 1% of the measuring range) at an attractive price,
- non-contact measurement principle,
- no change in the load carrying capacity and torsional rigidity due to the sensor shaft,
- temperature has a minimal influence on the operating life and measurement accuracy, and
- integrated speed measurement.

**Torque sensor technology can be easily integrated**

Schaeffler TorqueSense comprises a magnetically conditioned section of shaft and a sensor housing. The housing does not have to completely surround the shaft. Designs that are mounted on one side only or U-shaped designs are possible depending on the required accuracy and interference immunity. Because a non-contact measurement principle is used, the torque can also be measured from outside by means of a non-magnetic housing. The sensor module can then be mounted from the outside. With Schaeffler TorqueSense, customer and application-specific shaft diameters of up to
approximately 100 mm are possible; sensor units in different standard diameters already exist. The measuring range is from 100 Nm to 20 kNm. The sensors have high linearity and extremely small hysteresis due to the measurement principle used.

Further press releases regarding the innovations that Schaeffler will be presenting at the Hannover Messe can be found in our press kit: www.schaeffler.com/press-kit/hannover-messe

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The Schaeffler Group is a leading global supplier to the automotive and industrial sectors. The portfolio includes high-precision components and systems for engine, transmission, and chassis applications as well as rolling and plain bearing solutions for a large number of industrial applications. The Schaeffler Group is already shaping “Mobility for tomorrow” to a significant degree with innovative and sustainable technologies for electric mobility, digitalization, and Industry 4.0. The technology company generated sales of approximately 14.4 billion euros in 2019. With around 86,500 employees, Schaeffler is one of the world’s largest family companies and, with approximately 170 locations in over 50 countries, has a global network of manufacturing locations, research and development facilities, and sales companies. With almost 2,400 patent applications in 2019, Schaeffler is Germany’s second most innovative company according to the DPMA (German Patent and Trademark Office).

Press picture
TorqueTracking: The new system comprising the Schaeffler TorqueSense and the Schaeffler SmartCheck offers automated, frequency-selective vibration analysis and temperature, speed, and torque values for condition and system monitoring.

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Press picture
Schaeffler is currently developing an initial pilot project for the geared motors of yaw drives for wind turbines from the Italian market leader Bonfiglioli. In this application, the load data that are condensed using the Schaeffler SmartCheck are compared with predefined limit values and the results are transmitted wirelessly to Bonfiglioli via a gateway.

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