

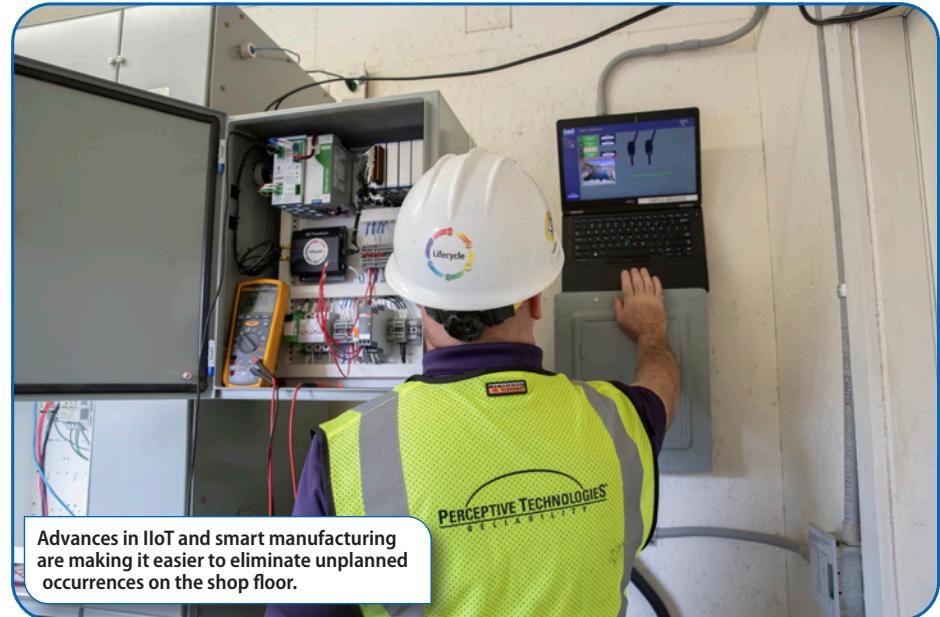
A Little Peace of Mind

Condition Monitoring Technology Evolves for Gear Drives, Gearmotors and Gearboxes

Matthew Jaster, Senior Editor

Life is full of planned and unplanned activities. Sometimes we embrace those unplanned moments (character-builders some might say), but we also feel a sense of real satisfaction when everything goes according to plan. In the manufacturing world where gear drives and gearmotors are supposed to do exactly as they're told, the unplanned activities could increase costs, cause equipment failures, and stop production altogether. Thankfully, advances in IIoT and smart manufacturing are making it easier every year to eliminate unplanned occurrences on the shop floor.

"Every asset may have a different critical component. In some applications, the gearbox might be the most critical. In other applications, it may be the motor, a bearing, or multiple gearboxes or motors," said Dan Phillips, director, Perceptiv Technologies at Regal Beloit. "Having a scalable system allows for the flexibility to monitor all the components within an asset. In some instances, if a gearbox experiences a failure, the motor or bearings may need to be replaced if the failure is severe and causes damage to these components. Monitoring multiple components provides insight to make the necessary



improvements based on data. Additionally, a scalable system allows a user to expand the system to adjacent power transmission applications instead of having to invest in different technology."

The following article examines a few of the condition monitoring systems available in the PT market that help shop personnel stay ahead of unplanned activities regarding gear drives, gearboxes and gearmotors. With an emphasis on smart manufacturing, these tools stay ahead of operation failures, provide real-time data to make better informed maintenance decisions, reduce service and material costs and provide longer service life not just for individual components but entire mechanical systems.

Regal Offers Wireless Condition Monitoring Solution

The Perceptiv wireless monitoring system is an evolution for Regal's diagnostics and services team. It was launched based on feedback from customers who needed an easy-to-use, expandable wireless vibration and temperature monitoring system for their gearboxes, bearings and motors.

Unlike other wireless systems that provide only "basic" diagnostic data, the Perceptiv monitoring system delivers full waveform and spectral data to provide better predictive capabilities.

This data is multi-functional — vibration and temperature analysis, for example. It is adaptable to any industry or equipment and scalable (25 nodes per gateway). Operator safety is vital as it eliminates the need to be near the equipment. It's





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also cost-effective, providing a simple installation that allows the operator to monitor many different assets. In addition, the data visualization is web-based, the platform can be located on-site or in the cloud, and the battery offers a two-year lifespan.

"Regal's technology continues to evolve with our customers. We offer a variety of technologies to align with the needs of our customers' changing businesses and infrastructures," Phillips said. "Not too long ago, wired systems were the norm. With the advent of 5G and improvements to communication equipment, we see more and more wireless capabilities driving data to a secure cloud, which allows monitoring from the comfort of your home while being able to keep an eye on your equipment or a plant's operations."

Phillips said that Regal can monitor vibration, strain, temperature, power and current voltage. "This toolset allows us to obtain torque, speed, efficiency and reliability data, which ties back to tons, bottles and cartons per hour for our customers. To help make this easier for customers, we use augmented reality. It allows users to look at equipment on a tablet or smartphone to monitor equipment conditions. With just the scroll of a finger, they can peel back equipment layers to look at critical components, read bills of materials, and gain a better understanding," he added.



Regal MP-56 with vibration sensor.

While product reliability and uptime are the leading justification, Regal sees its customers expanding the scope of this equipment to optimize the performance of their assets or better understand operation and maintenance.

"These additional uses are a result of the lower costs of monitoring systems. In the past, the cost of installation was a significant hurdle, which prevented users from investing," Phillips said. "Improvements to technologies and communications make it affordable to collect data and deliver it to a cloud-based system, respectively."

Rexnord Expands Series 1000 Smart Condition Monitoring System

Proven maintenance savings alone enable manufacturers to recoup their investment in the Rexnord Series 1000 Smart Condition Monitoring System, powered by DiRXN, in less



Easy-to-deploy solutions like the Rexnord Series 1000 Smart Condition Monitoring System make maintenance accessible on a sliding scale to match manufacturers' priorities and budgets.

than a year. Additional productivity gains are driven by increased uptime and enhanced safety.

Customers can now choose from four levels of monitoring, from continuous monitoring of overall gear drive vibration and temperature, all the way up to comprehensive cloud-based notification of abnormalities. And in an industry first, the base model now comes standard on select new Falk V-Class and A-Plus Gear Drives.

These easy-to-deploy solutions make condition-based maintenance accessible on a sliding scale to match manufacturers' priorities and budgets. Customers get the right information at the right time to further extend their Rexnord products' already-premium operating life.

"This more cohesive, cost-effective approach eliminates unnecessary maintenance activities and significantly lowers total cost of ownership for mission-critical and standard gearbox assets," said Rick Morse, Rexnord vice president of innovation and digital solutions. "The new models accelerate the customer's journey from run-to-failure or schedule-based maintenance to condition-based maintenance."

The Smart Condition Monitoring System uses proprietary algorithms to continuously compare sensor data against models of healthy gear drive operating conditions. Abnormal conditions trigger alerts to onsite visual indicators, the control system, and at the highest level, the Rexnord Connect Portal.

The system puts data in context, enabling customers to focus on outcomes; teams know what action to take when and why. Manufacturers gain the ability to replace time-consuming, hands-on equipment inspections with digital technology that enhances team safety, extends asset life, and lowers inventory and operating costs.

Morse says the scalable solution addresses current and future customer needs, with hardware and instrumentation incorporating common user interfaces and industry-standard communications protocols.

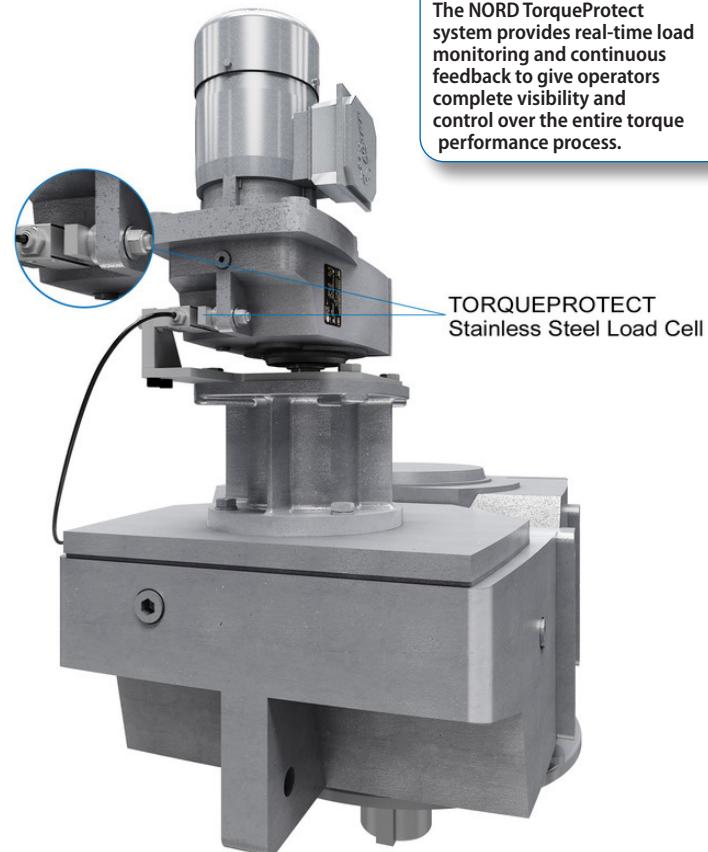
"We heard from manufacturers in mining, steel, cement, and pulp & paper that they're keen to deploy condition-based maintenance solutions that can scale for different monitoring applications," Morse said. "The new series lets you zero in on the most immediate need, with field upgrades whenever you're ready to move from our base model to one of our more advanced solutions."

NORD Offers Intelligent Monitoring and Predictive Maintenance for Gear Units

For condition monitoring, drive and status data are recorded periodically or continuously in order to optimize the operational safety and efficiency of machines and plants. NORD believes this technology continues to provide vital information for predictive maintenance. The objective is to maintain machines and plants proactively, reduce downtimes, and increase the efficiency of the entire plant. IIoT focuses on Internet usage in industrial processes and procedures while the sensors play a role in providing the basis for condition monitoring and predictive maintenance.

This drive-based approach includes the sensorless determination of the optimal oil change time based on virtual oil temperature, pre-processing of drive data in the integrated PLC, and the ability to offer the data to the customer via common interfaces. Gear unit parameters and specific operational parameters make it possible to calculate the oil change time. The NORD solution looks at the oil temperature as a key factor for oil aging in gear units. A hardware temperature sensor is not needed because virtual sensors calculate the current oil temperature continuously by way of drive-specific parameters. The existing VFD from NORD is used as an evaluation unit and the algorithm runs in the internal PLC.

In addition to condition monitoring for gear units, NORD offers TorqueProtect, a gearbox torque monitoring system designed for wastewater treatment facilities, power



The NORD TorqueProtect system provides real-time load monitoring and continuous feedback to give operators complete visibility and control over the entire torque performance process.

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The NORD TorqueProtect system provides real-time load monitoring and continuous feedback to give operators complete visibility and control over the entire torque performance process. Unlike traditional spring load monitoring systems that can only provide readings at specified maximum load ratings, TorqueProtect delivers continuous feedback, which allows users to know when loads are trending higher or lower than expected and take corrective action as needed.

Torque monitoring is especially critical for wastewater clarifier applications where even small strains in the load cell can create big problems. A clarifier is designed for continuous operation and if the system becomes overloaded for any reason, a million-dollar clarifier may be shut down for several days or weeks. There's also the risk of incurring significant costs associated with repairing or replacing expensive industrial gearboxes that may become damaged without accurate torque monitoring.

DB Santasalo Looks at Digitalization Opportunities for Condition Monitoring

In 2018, David Brown Santasalo introduced a monitoring system that examines industrial gears. This remote monitoring service is called GearWatch and is available in three packages including:

DBS GearWatch Standard which examines gear unit wear



David Brown Santasalo welcomed 50+ customers and DBS team members to a GearWatch User Day in Jyväskylä, Finland in November 2019.

process through oil particle counting and provides a compact and cost-efficient condition monitoring solution where measurement results are simple to analyze

DBS GearWatch Oil Monitoring is an oil analyzing unit that detects early stages of the wear process and provides a proactive approach to operation with oil quality measurements.

DBS GearWatch Pro is a tailored, monitoring systems for gear units and drivelines with selected parameters including oil particle counter, vibration, rotational speed, temperature, oil quality, oil pressure and load.

GearWatch can be tailored to specific operating parameters. All the data is monitored by gearbox experts at DB Santasalo's central control center. Not only does it measure

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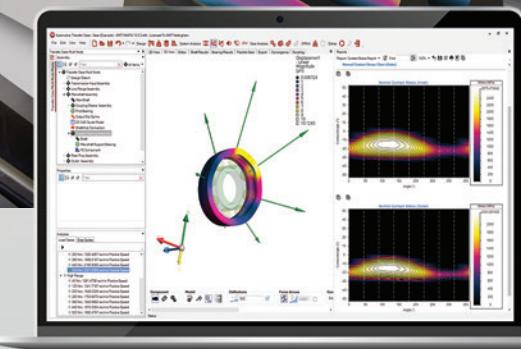
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changes within the gearbox, it can also monitor a full range of equipment including motors, hydraulic systems, and bearings, as required. Furthermore, GearWatch can support any industrial application in process critical industries globally.

David Brown Santasalo welcomed 50+ customers and DBS team members to a GearWatch User Day in Jyväskylä, Finland in November 2019. This provided a forum to share views and experiences of preventive condition monitoring systems, and the opportunities digitalization will bring to condition monitoring now and in the future.

DB Santasalo also showcased the latest GearWatch features and functions, including its ability to detect defects at an early stage through oil particle counting. Customers provided feedback on how the condition monitoring system has improved maintenance actions and minimized product downtime and costly shutdowns.

The New Enemy—The Empty Shop Floor

For years, this magazine has examined how sensors and mechanical systems have provided real-time data solutions via condition monitoring. This was originally a technology that provided extra safety measures when it came to hazardous applications or training solutions for staffs that lacked the skilled workforce necessary to prevent plant shutdowns.

In 2020, we add pandemic to the growing list of manufacturing challenges. The ability to monitor a gearbox, gearmotor or complete mechanical system from a smartphone in your living room is a nice capability to have when no one

answers the phone and the manufacturing floor is relatively empty.

Thankfully, engineers, technophiles and futurists continue to gaze into the crystal ball and provide new solutions to age-old problems—and for that we're all eternally grateful. **PTE**

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