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Visualization of vibration and temperature

RollerSense and PulleySense are designed to increase uptime and safety. Metso expertise combined with data-driven decisions enable optimized maintenance and reduce unplanned downtime.

What are RollerSense and PulleySense?

Before a roller or pulley gets hot, they send signals in the form of vibrations — often weeks or even months before equipment failure. Along with temperature readings, RollerSense and PulleySense monitor triaxial vibration which means that data points are simultaneously collected over the X,Y and Z axis points. These data points are visually represented as different colored wavelengths. With the help of Metso expertise, users establish their desired norms. Any wavelengths recorded out of those tolerances will trigger a message to maintenance staff, to their smart devices and/or web platform gateway, for immediate review.

Roller and pulley design and engineering

Metso experts use this data along with years of experience to analyze and optimize conveyor operations. All components are assessed, including roller and pulley design, to verify that the engineering matches the specific application, material and environment — maximizing performance.

Bluetooth Low Energy v.5.3

Data travels wirelessly via BLE long-lasting, low-power consumption technology. This fast, secure and simple technology is supported by a variety of leading operating systems. The RollerSense and PulleySense data loggers are automatically updated with the latest software; keeping them current with the latest features and innovations.

Raw waveform

RollerSense and PulleySense collect raw waveform data. This means as the software continuously improves, a customer can go back in time and reprocess raw historical data. This allows users to further customize their parameters, reflect upon post-processing, and continually improve the accuracy of their decisions moving forward. Raw waveform data provides the flexibility of importing and interpreting data into a wider variety of software and hardware ecosystems.

The digital mine

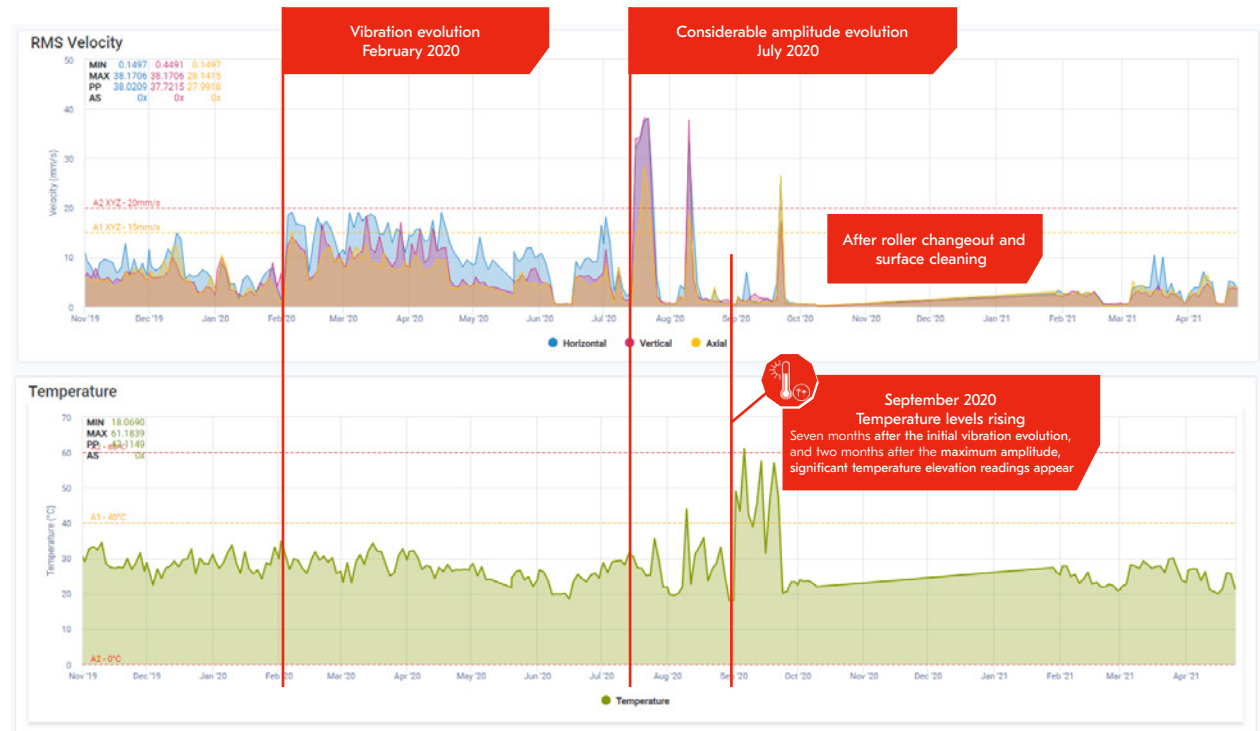
RollerSense and PulleySense data can be integrated with third-party enterprise resource planning (ERP) software such as SAP® and AVEVA™ PI Vision™ (aka OSIsoft®). The ability to directly interact with a multitude of systems such as ERP and CEMS (Continuous Emission Monitoring Systems) will further enable the unification of data, putting more intelligence into the system, and efficiently managing the entire asset lifecycle.

Intelligent monitoring is all about optimizing performance and preventing issues that cause downtime. RollerSense and PulleySense enable operators, controllers and service professionals to see real-time performance analysis.

Accurately forecast and avoid failures by anticipating and minimizing unexpected equipment failures.

Data driven decisions

This graph shows how roller vibrations dramatically increased in February, peaked in July, and it wasn't until September — seven months later — that temperature levels showed a remarkable increase.



Digital vibration and temperature monitoring with RollerSense and PulleySense provides:

- Increased safety – Remove the need for human intervention to capture data using a hand-held device within difficult-to-access and hazardous environments. Proactively suspend malfunctioning equipment from the circuit before amassing costs and incurring risks.
- Predictive maintenance – Empower maintenance staff to order replacement parts and schedule repairs with confidence.
- Increased data reliability – A cost-effective solution to: increase the number of data collection points, the consistency of the information, and the reliability of the data.
- Increase availability – Avoid unexpected and serious failures, helping to prevent production stoppages that cut into the bottom line.

- Expand maintenance intervals – Schedule maintenance by need, not by unnecessarily changing parts, or reactively, after the damage is done.
- Assurance – Stay ahead of schedule and build confidence in budgeting, and productivity estimates.

Harsh environments

Both RollerSense and PulleySense have been engineered to tolerate harsh, dusty environments and extreme temperatures. They are rated IP69 by the National Institute of Metrology, Standardization, and Industrial Quality - INMETRO, meaning that these devices are dust and watertight. INMETRO closely follows the International Electrotechnical Commission (IEC) requirements. IECEx has provided a gas zone "0" definition for atmospheres with explosive gases and vapors as well dust zone "20" where combustible dust clouds and/or thick layers of dust, fibers or flyings can form that would normally negatively impact unrated devices.

Communications certifications

These devices¹ have gone through detailed certification processes across the globe and have received certificates from:

- Federal Communications Commission (FCC)
- Industry Canada (IC)
- Conformité Européenne (CE)
- Australian Communications and Media Authority (ACMA)
- Agência Nacional de Telecomunicações (ANATEL)
- National Institute of Metrology, Standardization, and Industrial Quality - INMETRO

¹ Hardware supplied by Dynamox s.a.



RollerSense Sensor

Features

- Engineered to tolerate harsh, dusty environments and extreme temperatures
- Rated IP69 – dust and watertight
- Gas zone "0" – explosive gases and vapors
- Dust zone "20" – combustible dust clouds and/or thick layers of dust, fibers or flyings that would normally negatively impact unrated devices



Metal backing plate
Allows for more accurate
conduction of heat and
vibration. Also enables
greater adhesive bond.



PulleySense Sensor

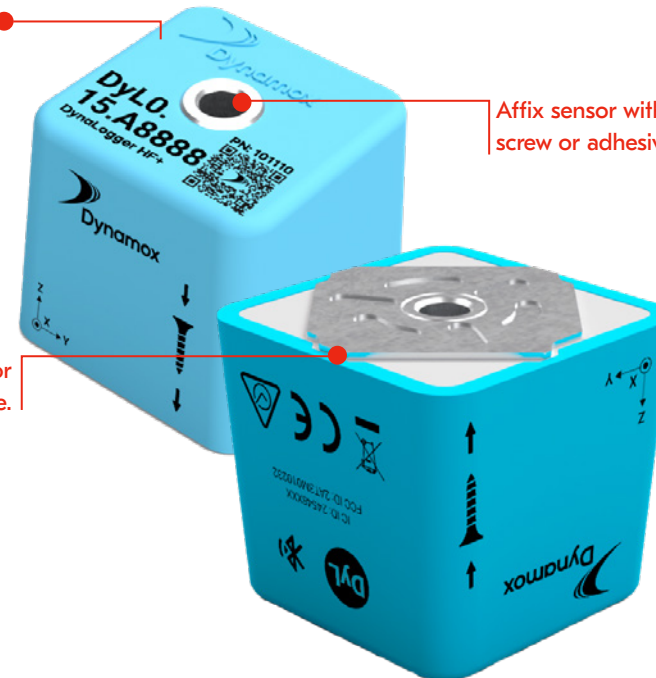
Features

- Same features as RollerSense sensor plus:
 - Ultra-low rotation spectral analysis capability
 - Higher amplitude resolution (16 bit)
 - Spectral analysis and telemetry up to 2.5 kHz
 - Up to 98,000 spectral lines
 - Ability to affix sensor with screw or adhesive
 - Choice of aluminum or stainless-steel base

Low-speed applications
(less than 10 RPM).

Affix sensor with
screw or adhesive

Options of stainless steel or
aluminum backing plate.



Case: European bulk materials

RollerSense Case Bearing failure

Challenge

- A2 alarm (1.5 g) triggered on April 12 due to increased acceleration up to 1.89 g on horizontal axis. Roller bearing failure observed

Solution

- Roller changed April 12

Results

- Conveyor up and running in less than one hour. Disasterous failure and associated stress, mess and possible safety issues avoided.



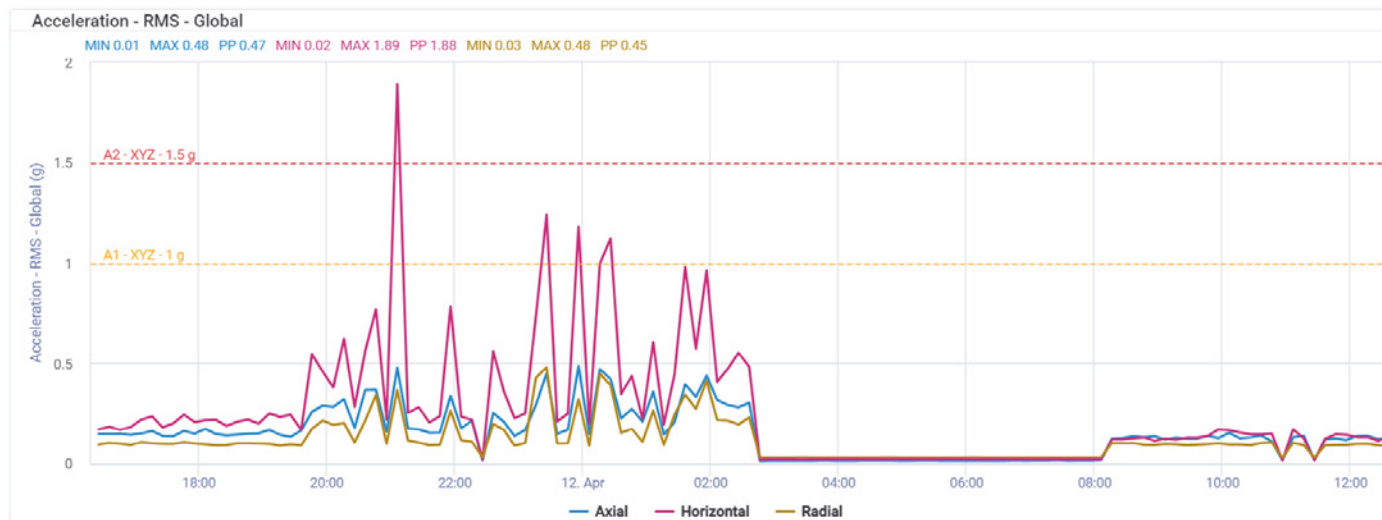
March 6: RollerSense installation



April 12: RollerSense senses a fault — bearing failure



Temperature
Notice that the temperature remained constant during the bearing failure.



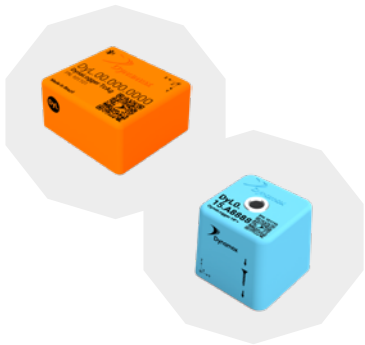
Acceleration

As this acceleration telemetry graph from April 11/12 shows, a serious spike occurred around 8:30 pm. This sent out a fault message and a bearing failure was discovered.



Your data at your fingertips

Remote predictive maintenance



Data Loggers

Data loggers (aka sensors) for monitoring temperature, triaxial vibration, and acceleration.



Mobile APP

Mobile app (Android and iOS) for configuration and data collection from installed data sensors. Allows users to obtain instantaneous data at any time.

and
or



Gateway

Device for automating data collection. Performs data collection automatically; sending data directly to the web platform.



Web Platform

Online web platform that allows for complete data analysis. Includes a variety of tools to support decision-making and maintenance actions. Can be customized.

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