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Non-Intrusive Continuous Asset Monitoring

Is Here and It's Easier Than You Think

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ASSET FAILURE IS NOT AN OPTION

In oil and gas operations, nothing is more important than ensuring assets operate at their peak performance all day, all night, every day of the year.

These systems are often geographically located in some of the world's furthest corners and toughest environmental conditions. Downtime is measured in minutes and the cost of system failure for even a single day is calculated in the millions of dollars. Under these challenging, and often dangerous conditions, failure is simply not an option.

It is now possible to use electric waveform analysis to root out the cause of electrical and mechanical failures well before they happen. Unlike previous generations of vibration analysis, today's software is completely non-intrusive and monitors the condition of an electrically-driven motor or motor-driven asset 24/7. It checks performance in real-time against established baselines.

NON-INTRUSIVE CONDITION-BASED MONITORING (CBM)

With the software, nothing is installed on the machines being monitored. Instead, predictive intelligence monitors (PIMs) continuously acquire electrical waveforms at the motor switches at high sampling rates. Data is transferred wirelessly to the software, which analyzes these waveforms, identifying impending faults and assessing energy efficiency. The software then produces predictive and actionable intelligence from each asset that operators want to monitor, detecting both electric and mechanical faults.

The software identifies and distinguishes the sources of waveform distortion, whether it is caused by changes in incoming grid power, driven process, or asset conditions. Empirically developing and tracking system impedance models are used to detect electric problems. Further, classification and isolation of faults is accomplished by a combination of machine learning methods based on classifiers and specific spectral fingerprints of faults.

IT IS NOW POSSIBLE TO USE ELECTRIC WAVEFORM ANALYSIS TO ROOT OUT THE CAUSE OF ELECTRICAL AND MECHANICAL FAILURES WELL BEFORE THEY HAPPEN.

In addition, the electrical waveform analysis software learns the specific fingerprint signatures of monitored power trains, sets condition alarm thresholds and then automatically enters the assessment mode to continually check for issues. Because it detects abrupt changes to the preexisting conditions of the monitored assets, the electrical waveform analysis evaluates assets by comparing their actual, observed behavior to previous levels. This helps engineers identify failures before they happen, rather than depending upon manual inspections to uncover potential (or already existing) problems.

SAP EAM MEETS ELECTRICALLY-DRIVEN ASSETS

The SAP enterprise asset management (EAM) interface is a key component for establishing a comprehensive and holistic maintenance and reliability solution where the breadth of SAP tools extends beyond the core modules.

With real-time continuous monitoring, SAP EAM users are able to complete their EAM strategies and specific workflows all the way to the motors themselves. SAP already delivers a comprehensive end-to-end solution for enterprise asset management. However, operators can now take it one step further and enable complete workflow automation and pass specific information for failing parts to initiate workflows right from the source and months ahead of traditional solutions.

OPERATORS CAN NOW TAKE IT ONE STEP FURTHER AND ENABLE COMPLETE WORKFLOW AUTOMATION AND PASS SPECIFIC INFORMATION FOR FAILING PARTS TO INITIATE WORKFLOWS

POINTS OF POSITIVE IMPACT

Asset Operations & Maintenance

Detects developing problems and provides engineers detailed electrical and mechanical fault data directly from the motor. Integration with SAP MII passes asset watch lists, which trigger work orders and enables condition-based monitoring strategies to include asset prioritization and risk modeling.

Asset Planning & Scheduling

Delivers fault warnings and energy efficiency information from several months to up to a year ahead of potential failure. Integration with visual enterprise provides historical details and KPIs available on-demand for detailed 3D visualization.

Service Procurement

Starts the procurement workflow as soon as an upcoming fault is detected and provides operational fault details to the service team months in advance of the expected failure.

Spare Parts Management

Identifies specific issues with related parts, such as bearings and rotors, for mechanical faults and stator for electrical faults. Includes mobility with SAP Syclo to supply to-do lists to field teams on their mobile devices.

SAP HANA & Business Intelligence

Builds "large data" repositories for asset condition and energy effectiveness, and empowers intelligent asset analytics on maintenance and energy efficiency.

AVAILABILITY OF EXPERT CBM TO SAP INTEGRATION SERVICES

As the new asset monitoring tools are coming to market, quality integration services will be needed to support operations and bring asset data captured in the process control network through to SAP in the business network.

CONCLUSION

Any number of factors can cause asset failure, but bringing EAM all the way down to the asset level and implementing a complete CBM solution can produce a major impact by reducing risk of downtime and improving energy efficiency as a result of pro-active maintenance and high reliability.

Continuous monitoring using non-intrusive electric waveform analysis does a great deal in assisting oil and gas operators with reducing downtime in electrical and mechanical systems by eliminating many of the manual processes associated with asset monitoring. This, in turn, closes the gaps in an organization's EAM strategy.

Starting on the path towards true real-time continuous monitoring begins with a pilot program to measure the financial benefits of reducing unexpected failures in power trains, avoiding unrecoverable lost production, emergency maintenance costs and excess energy consumption from inefficiently operating machines.

Innovative oil and gas operators are leading the entire industry in implementing affordable asset performance monitoring tools capable of providing actionable information not only on critical assets, but also across their entire asset. Instead of only monitoring the effect of damaged assets on production, electric waveform analysis detects the root cause, enabling true predictive maintenance and improved asset reliability.