› Solution Brief

Business Impact

"The cost of unplanned downtime can be significant, and traditional approaches to ensuring high levels of equipment utilization have reached their limit."

Using Advanced Analytics to Predict Equipment Failure, Leif Eriksen and Kristian Steenstrup, Gartner, Inc. 29 May 2015

Challenges

- **Lack of data-driven early-warning systems.** Without automatic notifications, pending failures are more easily overlooked.

- **Inconsistent views across multiple monitoring systems and assets.** Key parameters are monitored in isolation for each type of equipment, overwhelming users.

- **High volumes and velocities of sensor data.** Integrating and managing sensor data and adding operational context has become increasingly hard.

- **Planning complexity.** Due to increased scale, it's difficult to schedule resources, supplies and workflows across thousands of assets simultaneously.

Increase Uptime and Optimize Performance of Upstream Facilities With Predictive Analytics

The Issue

With decreasing margins from every barrel of oil and gas produced, the industry is firmly focused on managing operational costs to maintain incremental profit margins and cash flow. Maximizing incremental revenues and managing nonproductive time has become crucial. For a production asset operating 24/7, partial or total shutdowns mean additional costs and lost revenue. Reliability engineers must plan maintenance schedules that minimize downtime.

Maintenance optimization is a complex process that involves many resources – often external – and substantial operational expenses. But unplanned maintenance results in even longer outages that cause substantial cash flow concerns.

Oil and gas companies need a better way to extend asset uptime, improve process control, and optimize the process of extracting, processing and delivering hydrocarbons downstream. Yet the data that can make this possible is scattered across different formats and sources. Even sensor data measurements, often considered relatively simple, need to be contextually enriched with activity, operational intent and process state to deliver meaningful insights. Analytically enriched facilities data delivers a clearer picture and supports advanced analytical models that provide meaningful decision support, either directly or indirectly, to both the human and the process.

Our Approach

SAS has an analytical framework that reduces unscheduled downtime and optimizes maintenance cycles as well as maintenance and operating costs for upstream assets. Our software and services help you:

- **Identify the precursors of unplanned adverse events** and prescribe operational parameters to maximize asset efficiency, with predictive and probabilistic modeling.

- **Obtain data that's cleansed, governed, timely and available** for analysis by using comprehensive data management software.

- **Alert stakeholders** when maintenance is required. Our sophisticated rules engine is based on predictive models and data mining capabilities to minimize or prevent operational disruptions.

- **Determine the most profitable way** to handle aging, degrading assets, using scenario analysis.

- **Ensure optimal use of maintenance teams, supplies and fleets** with resource optimization tools.

By analyzing billions of data points to uncover patterns, SAS can predict asset anomalies or failures – improving the quality of complex processes and optimizing upstream assets.

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THE POWER TO KNOW®

The SAS® Difference:
Detect emerging patterns of pending asset failure or process instability with advanced analytics

SAS helps oil and gas companies avoid unplanned downtime and keep production goals on target. With SAS, you get:

- **Advanced analytics and machine learning** to improve productivity and performance. SAS continuously monitors asset health and sends alerts if equipment or assets are likely to fail. It tests new sensor data and conditions against defined rules, thresholds and predictive scoring models in near-real time and determines root-cause analyses. Machine learning and natural language processing techniques automate manual activities.

- **Contextual enrichment of asset data.** Sophisticated linguistic rules uncover insights hidden in big text data. SAS transforms unstructured data into organized information for upstream assets to provide more information about the intent, procedure and activity related to facility data.

- **An asset management dashboard** that empowers problem solvers by giving them the type of information they need. Easy-to-understand reports, KPIs and alerts show current performance in different dimensions, locations, functions, asset types and more.

- **An enterprise maintenance data model** that integrates all relevant data. Achieve a comprehensive, reliable view of asset performance – historical, right-time and real-time data – all sources and formats.

Other solutions rely on condition-based alerts to identify potential asset failures. SAS identifies and tests new sensor and conditions data, and even standardizes problem resolution through corrective and preventive action (CAPA) workflows and case management.

Case Study:
A large oil and gas company

Situation

One of the world's largest integrated, export-oriented oil and gas companies needed to make sure the active magnetic bearings that drive compressors during production functioned properly. The bearings rely on sensors that detect signals – up to 15,000 times per second – to measure distances and keep the shaft and motor in position. When sensors fail – and then bearings – it leads to production losses or sometimes extreme equipment damage.

Solution

Using SAS® Asset Performance Analytics, the company developed data-driven models that can predict sensor and magnetic bearing degradation. The models point maintenance teams to equipment that may fail – before any significant problems or loss in efficiency occurs.

Results

With the SAS solution, the company was able to:

- Optimize maintenance costs.
- Increase productivity.
- Improve processes and performance.
- Enhance business strategy.

What if you could …

Spot patterns that may signal unplanned shutdowns

What if you could quickly analyze streams of data against multiple historical references?

Predict disruptions early enough to avoid problems

What if you could take preventive actions to stop problems before they start?

Automatically send early warnings to the right person

What if you could have confidence that the right person would always receive the information needed to intervene?

Embed data quality into your processes

What if you could be absolutely sure of the accuracy and integrity of analyses?

You can. SAS gives you THE POWER TO KNOW®.

SAS Facts

- SAS helps customers at more than 75,000 sites improve performance and deliver value by making better decisions faster.

- SAS has more than 200 unique oil and gas customers across 35 countries, including all six majors.

- SAS is a Leader in "The Forrester Wave™: Big Data Predictive Analytics Solutions, Q2 2015."

Learn more about SAS software and services for oil and gas at sas.com/oilgas

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