

What You Don't Know About Your Pipeline Will Hurt You

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Oil and gas companies are tasked with maintaining, securing and ensuring that hundreds of miles of pipeline deliver energy to residents and businesses throughout the country every day. This is a job made even more daunting considering the shortage of resources within the industry and budgets requiring managers to stretch every dollar.

Organizations cannot rely on depleted staffs to operate at the same efficiency and effectiveness of days past, so it is important for oil and gas companies to employ predictive maintenance (PdM) and condition-based monitoring technologies to ensure machinery uptime, employee safety and – most of all – happy customers and shareholders

Pipelines and their associated machinery can suffer from a host of problems if not properly monitored and cared for. Beyond initial repair costs and customer service headaches, a significant pipeline failure could result in death, loss of property damage and unplanned downtime which could cost the company and shareholders millions.

With advanced technologies available to the pipeline and gas industry today, it is critical to identify and implement programs that will allow the early detection of failure including mechanical damage due to cracking, corrosion and material defects. Predictive maintenance allows an organization to predict future pipeline conditions so that proper repairs can be made before causing costly environmental, reputation and production failures.

The first decision a company needs to make when implementing a PdM and condition-based monitoring program is whether it will be managed in-house or outsourced to a trusted service company. Managers have many different things to consider that need to be evaluated when making this choice.

Both options involve a great deal of investment into a company's maintenance budget, therefore, deciding which route will make the most sense for a specific facility is essential. Cost of capital, training, resources, abilities and capabilities of a potential supplier to fit the operational culture of their organization are all important considerations.

When the decision is made to keep a PdM program in-house, an intricate training process needs to be implemented. While many companies have the ability to train employees on the latest PdM and condition monitoring technologies and strategies,

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trends within the manufacturing industry have begun to show a greater ROI when outsourcing the program and turning that responsibility over to the outsourced supplier.

The decision to take the outsourcing option also involves the critical choice of which service provider to use. It is important to find a partner that can provide expertise in multiple condition-based monitoring technologies, has the size and depth to efficiently manage a sustainable program and deliver quality machine condition assessments. Many service providers have an in-depth knowledge of the context in which their technologies are being deployed across facilities, allowing a greater success rate of these programs.

With all of these factors to consider, there will always be companies that have a greater sense of security by keeping their programs in-house but, in the end, outsourcing is proven to increase ROI while removing initial upfront costs associated with training, capital, equipment, software and program management. Outsourcing also ensures sustainability.

When PdM and condition-based monitoring programs are put into place, a reliable infrastructure that provides employees with security, reliability and flexibility is all imperative. A prototypical program utilizes a wide variety of technologies including infrared thermography, vibration analysis, remote monitoring and emerging cloud-based technologies to evaluate equipment and detect machine health information.

Prevent Equipment Failure Using Infrared Thermography

Many PdM programs have an infrared thermography model; these capabilities have been shown to serve as an essential component in a comprehensive condition monitoring program. Infrared testing processes use cameras as a way to “see” and “measure” thermal energy that is produced within gas pipelines.

With advanced capabilities to detect leaks as temperatures increase and monitoring over extended ranges, infrared thermography increases uptime and efficiency, while decreasing risks of fire and equipment failure.

Without inspection, undetected failures are going to result in inefficiencies and catastrophic failure, if left undetected. Infrared Thermography is also used to detect electrical abnormalities that could pose threats to employee safety or cause fires by identifying loose or overheated connections.

Using Vibration Analysis To Assess Your Pipeline

As mentioned previously, vibration analysis is another component of predictive maintenance programs and a principal tool when assessing pipeline conditioning. Vibration spectrums, waveforms and demodulated data are all crucial when the health of pipeline equipment is being reviewed. Having the ability to evaluate these different components allows analysts to give a proper diagnosis and repair recommendations. It has become clear that customers need a proven methodology recognized by international standards that provide the following capabilities in the most efficient manner:

- Data acquisition (sensor selection and mounting);
- Data manipulation (signal processing);
- State detection (baseline profiles);

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- Health assessment (automated fault diagnostics);
- Prognostic assessment (prioritized repair) and
- Advisory generation (portal/reports/documentation).

Remote Online Monitoring for Safety, Convenience & Reliability

Remote Monitoring also plays a key factor into the safety, convenience and reliability in a PdM program. Having the capability to mount monitoring equipment on or near your machinery empowers a maintenance staff's ability to discover and identify machine fault quickly through automated alerts that can be transmitted via an Internet-connected device.

A central benefit to remote online monitoring is that it allows for engineers to stay out of harm's way as compared to the manual collection of data. Not only does this technology introduce a simplistic approach to the realm of machine monitoring, it allows for facilities to eliminate high sensor and cabling costs.

The New-Comer: Cloud Computing

When discussing wireless technology, it is important to acknowledge a newcomer to the world of predictive maintenance and condition monitoring, cloud computing. Cloud computing is one of the few innovative technologies to move from consumer programs to enterprise level software.

Cloud computing has swept through the industry, gaining a great deal of attention and credibility along the way. By moving to the cloud, customers are able to take advantage of centralized data management. Eliminating capital costs and delivering reliable information, a successful PdM program depends not only on its analysis capabilities and data gathering, but on the ability to distribute these results to plant and corporate decision makers. Cloud-based models allow company leaders to share data and support a sustainable program, instead of information sharing among separate departments; information can be accessed at any time. These capabilities can ensure that facilities run smoothly and managers are up-to-date on the most current machine conditions.

With the different factors contributing to pipeline failures, investing in predictive maintenance and condition-based monitoring programs is clearly one of the decisions facility managers should be making today. The initial costs and task of training employees do not compare with the catastrophic affects a failure could cause.

PdM technologies can indisputably prevent unplanned downtime and pipeline failure resulting in measurable ROI, enhanced employee productivity and greater communications throughout the company. Having these software platforms in place, in which an intelligent rule-base diagnostic system is used to detect faults and notify engineers, can improve the quality of pipeline facilities immensely. PdM and condition-based monitoring technologies is a safeguard that can help pipeline and oil companies rest easy, knowing their machinery is running smoothly and will continue to do so for the foreseeable future.