

# Condition Monitoring as a Risk Management Tool

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BP's struggle with the consequences of the catastrophic Deepwater Horizon oil spill underlines the magnitude of the risks that lie buried in industrial companies' operating assets. These risks can pose significant threats to the companies' financial health – either by causing catastrophic failures or more commonly simply by jeopardizing the ability of the company's plant and equipment to meet its marketing targets.

Unlike pure financial risks – such as foreign exchange exposure or product liability – reliability risks are usually invisible to the corporation's CFO; and reliability risks are therefore poorly quantified and managed primarily in a reactive manner. According to a recent survey by Duke University and CFO Magazine published in CFO Magazine (July 15, 2010) CFO's top five concerns about their own companies were, in descending order:

1. Ability to maintain margins
2. Ability to forecast results
3. Maintaining morale/productivity
4. Cost of healthcare
5. Working-capital management

Four of five of these top five concerns (cost of healthcare is the exception) are directly related to reliability. Reliability risks can be every bit as devastating to the corporation's financial health as an unexpected rise in borrowing costs or the failure of a new product launch. Yet, CFOs and other executives often don't grasp how reliability risk management can be used to address these concerns. Condition monitoring is a powerful tool to establish reliability risk management.

The vulnerability of physical plant assets to unexpected breakdown is complex to evaluate. It requires timely data on the condition of the assets; ideally with a non-intrusive monitoring technology. The monitoring frequency is dictated in large part by the criticality of the asset; we want to ensure safe, uninterrupted production. It also requires expertise to filter and analyze condition monitoring data to make it actionable.

One of the difficulties is that many plants suffer from an awareness gap. In the industrial world, this awareness gap is frequently caused by a lack of clarity between asset reliability performance and business results.

Often time's organizations lack the capability to link asset reliability performance with business results because of weak execution of an effective work management system; effective work management systems provide equipment history that can be analyzed. The result is unusable historic data. Demographics and employee turnover play a role; retiring baby boomers, and other people leave with their knowledge and experience. In the developing world there is often the issue of the rapid growth in industrial capacity outpacing the supply of seasoned engineers.

In any case, companies need to put in place strategies to bridge the awareness gap in order to mitigate reliability risk. If you don't have a well designed and executed work management process, you should establish one as soon as possible. If you do have a well designed and functioning work management process, you should design and implement a condition monitoring program in conjunction with the organization's preventive and predictive maintenance program.

Fortunately the modern risk manager can leverage the power of the internet and of powerful screening software and advanced diagnostic tools to establish condition monitoring in a scalable, cost-effective manner. The internet allows data that was traditionally inaccessible in stand-alone databases at plant level to be moved, aggregated and analyzed at a central, secure host. Suddenly it is possible to shine a bright light onto aspects of plant maintenance and equipment condition that were previously hidden from view. With this comes the potential to prioritize and manage risk across production units, regardless of location, through enterprise-wide key performance indicators.

Making the potential of condition monitoring a reality requires that large amounts of data be collected, monitored, filtered and turned into actionable information. The cheaper and more ubiquitous the computerized monitoring hardware becomes, the greater the volume of data and the more challenging it becomes to manage and interpret.

The best solution for multi-business unit, or multi-site organizations is web-based technology that can automatically perform first level filtering to eliminate 'noise' and detect exceptions with remarkable accuracy. Such software must be user-friendly, with intuitive, browser based dashboards and alerts for production staff, maintenance, engineering and central risk managers.

With a well functioning work management system and a web-based condition monitoring system, the third element is accessible human expertise to confirm and augment the system diagnosis. Expert human engineering support must be available to augment recommendations from the expert software for risk management decision support. This augmentation will reduce false alarms, and assist the risk manager by providing confirmation, or amplifying information on indicated equipment defects.

Ideally, we would want to ensure high cost, or high production loss activities are minimized.

One benefit of the centralized database and expert software is that this it provides the accumulation of highly valuable equipment history and decision tools; a valuable knowledge resource, collected in a highly efficient manner.

Problems can be brought to the appropriate expert who is closest to the problem, rather than the other way around. Whether the troublesome pump or high speed turbo-compressor is located in India or Indianapolis, the local, qualified expert can view statistical data, pictures, even 'listen' electronically to the machine despite being located thousands of miles away. A disciplined peer review process can be implemented to ensure automatic cross-checking of fault diagnosis, just as there might be when two cardio surgeons consult on the appropriate intervention for a heart patient from different geographic locations.

The advantage of this approach is that it provides a quantifiable risk-based analysis of equipment health. The solution is scalable across multiple facilities and solves the problem of knowledge retention because it is not dependent on a handful of individuals.

The web-based condition monitoring solution is also ideally suited to an outsourced service provider in partnership with client staff and corporate risk managers. The service partner provides always-available data hosting and advanced expert software tools, without the company needing specialized IT support or organic software modeling. The outsourced service provider also supplies diagnostic experts whose skills are honed by continually working on the toughest problems in their client's industries, and in many other industries. This outsourced support condition monitoring expert can either augment or replace in-house engineering skills. The plants co-own the program so that program recommendations are implemented and feedback is incorporated into the expert software system a process of continuous improvement is established and sustained.

When data is available to link equipment/asset performance with business results, risk managers can better appreciate the company's points of vulnerability, develop action plans to deal with them effectively. All this leads to shareholders, executives, managers and employees who will be able to sleep more easily knowing the web-based condition monitoring system is on the job.