How to Optimize Equipment-Condition Information

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In any manufacturing environment, the optimization of equipment assets is essential to increasing profits. To perform this optimization, plants require timely access to integrated data. The costs associated with data integration have traditionally prevented many plants from moving to this optimization level. But, the availability of open systems, as espoused by MIMOSA, OPC Foundation, ISO STEP and OAG, are lowering this barrier so plants can make the strategic use of vital information.

The need for improved production reliability and reduced expenses is also key to improving the bottom line. As a result, industrial manufacturers are applying various optimization strategies to improve their process efficiency and reduce maintenance, thus enhancing their return on assets. According to one 1999 study, some companies report as much as a 30% reduction in maintenance costs and up to a 20% drop in production downtime after implementing a plant-asset management (PAM) strategy. Because maintenance costs can represent as much as 40% of revenue, these savings contribute significantly to the bottom line. Industries such as petrochemicals, power generation, pulp and paper, and other production companies are aggressively moving ahead in adopting asset optimization principles.

Today's maintenance strategies have shifted away from "run-to-failure" to "condition-based." Preventive, predictive, and proactive maintenance are the approaches that forward-thinking corporations are using. The ability to constantly monitor and assess the health or condition of plant assets is critical in both maintenance and operations scheduling. Enterprise asset management (EAM) systems and PAM systems provide timely information to operations and maintenance personnel in order to safely increase the total production output of a plant at a reduced cost per unit of output.

Easy, common access to real-time data is critical to making timely maintenance decisions. The magnitude and analytical load of evaluating data on a constant basis presents a unique challenge to many information systems. Understanding available technology and implementing an effective PAM strategy will contribute to the effective evaluation of vast amounts of data.

Information handling

It's important that the data produced by various manufacturing technology systems be integrated. However, the link between systems – which include engineering, resource planning, process control, maintenance management, and asset health systems – has not materialized for many companies and is upsetting the

expectations of optimum asset utilization. For instance, the results of vibration analysis, oil analysis, and other crucial tests are not easily available to a complete machinery diagnostic/prognostic expert system, or to a maintenance system for operations to be adjusted.

This "disconnect" is a significant feat to overcome. Communicating in the same "language" and synchronizing data among various systems is a formidable task. Most plant systems are accustomed to a single information and functional structure. Many lack the abilities to interface or integrate the information from other sources.

Industrial users who seek to integrate their systems have three choices: buy all software from one vendor; launch in-house integration efforts; or utilize industry-standard, open-system interfaces from equipment software providers. Users who want common access among their information systems seem to be left with little choice other than to hire a company to piece the systems together. Some system integration companies offer an array of software with a single database platform. The cost of developing custom links between systems can be high. Maintaining these links and revising the databases every time a vendor's format changes can also be costly. A better long-term strategy is to purchase systems that utilize industry-standard, open system interfaces. This facilitates data handling and information for common presentation and processing.

Condition monitoring and information handling today

As plants restructure and merge to maintain their competitive edge, maintenance practices become a target for major process revisions. Instead of operating under a corrective maintenance (run until failure then fix it) program, many organizations are adopting a mix of corrective, preventive, predictive, and proactive maintenance procedures.

Predictive maintenance (PdM) technologies were once considered high-science by some and "machinery voodoo" by others. Condition monitoring is necessary for any true asset management effort. You can't improve what you can't measure.

Effective operations and maintenance programs require processes that include data collection, data analysis, condition reporting, corrective action, and program evaluation. Types of information that can be accessed include:

- Process and Historical Operating Data
- Condition Monitoring and PdM Technology Data
- Component, System, and Unit Performance and Operating Condition Data
- Maintenance and Specific Problem Processed Information

But, CM/PdM systems do a poor job of providing free access of machinery condition information throughout a plant. Information about plant condition is extremely valuable, but has less value when it is not easily accessed.

A single source application like the Industrial Peer-to-Peer's eDNA Web Equipment Status Module (eDNA-ESM) makes the job easier. It collects and analyzes multiple types of equipment/component/system condition monitoring information. It also creates a common repository for the reviewed information; creates case studies (compilation of data reviews and diagnoses); and performs cost benefit analyses on equipment or system basis. Condition monitoring suppliers such as CSI, Entek, Predict-DLI and others offer integrated condition monitoring software, which effectively integrates condition monitoring technology data into reports. Also, an increasing number of computerized maintenance management system (CMMS) vendors include a condition monitoring module or a link to specified CM packages within their software.

Condition monitoring for the future

While there are many factors that will affect the future of condition monitoring, some of the key issues are: • More widespread acceptance and continued usage of condition monitoring

• The use of condition monitoring technologies to improve equipment reliability and performance, rather than predicting component failure

• The continued development of smart sensors, and other low-cost on-line monitoring systems

• Increasingly sophisticated condition monitoring software, with realized expert diagnostic capabilities

• Improving integration, and acceptance of common standards for interfacing condition monitoring applications with maintenance management systems and process control applications

• Improved historical storage of and access to all types of data and information

• A reduction in the cost-per-point and sustained positive ROI of applying condition monitoring technologies

Taking condition monitoring a step further, the future condition of a piece of equipment or system based upon it's current condition can be predicted. Predictive condition monitoring (PCM) techniques use a proactive approach of an asset to determine true health/condition and identify trends that will ultimately lead to a component failure or production upset. One such application is SmartSignal Corp.'s Equipment Condition Monitoring (ECM) software which provides real-time, advanced fault detection through a multivariate analysis of correlated sensors and data. These types of analytical tools extend condition monitoring and predictive technologies to not just provide data, not just provide processed information, but provide results that lead directly to impacting decisions.

Business related pressures are driving enterprise operations in many industries to

reduce personnel and minimize costs. Remaining personnel have less time to focus on minor variations in system performance and equipment condition. To combat this situation, many corporations are turning to advanced information technologies to aid the information handling needs.

It is necessary to have information available and to have immediate access to it. Information handling and dissemination can make or break critical decisions. Critical decisions can make or break a corporate enterprise.

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