Organizational Issues for Improved Asset Performance Management

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Keywords
Enterprise Asset Management, Asset Performance Management, Plant Asset Management

Summary
Integrating the enterprise asset management (EAM) system with condition monitoring-related process information helps automate business processes for maintenance management and improve overall asset performance management (APM). This requires cross-functional support by process engineering and maintenance, which is difficult to achieve in some organizations. Moving from a focus on organizational silos to asset performance management provides the bridge to bring the two groups together for common objectives.

Improving Maintenance Effectiveness
ARC’s annual surveys of users consistently have four top drivers for maintenance management and EAM systems. In priority order, they are:

- Improve uptime
- Control maintenance costs
- Extend asset longevity
- Safety and risk management

To achieve these goals, maintenance managers reduce reactive maintenance by deploying strategies such as “run-to-failure” for non-critical assets, and increase proactive maintenance for critical assets to complement preventive maintenance and inspection programs. More effective maintenance strategies require broader adoption of asset condition monitoring and automated
business process management using plant and EAM systems. Monitoring and analyzing operating parameters and using this data to drive the timing and specific work processes of maintenance work orders improves maintenance effectiveness. This approach facilitates three strategies for the maintenance scheduling:

- **Preventive maintenance based on actual usage or asset condition** rather than just calendar time (for example, the running hours of a heat exchanger to schedule cleaning of the tubes since hours of operation directly related to scaling and plugging of internals). Scheduling preventive maintenance based on actual asset usage avoids work orders for unnecessary preventive maintenance.

- **Predictive maintenance** uses condition monitoring to alert when equipment deteriorates (for example, pressure change through a heat exchanger, amperage draw of the blower motor, or increasing vibrations from rotating equipment). Proactive, predictive maintenance reduces costly manual inspection, catches failures before it cascades into other failures, and schedules appropriate work orders.

- **Run-to Failure** allows assets to fail, after which they are repaired or replaced. Often, the failure of the asset goes unnoticed until product quality issues arise or production declines significantly. Condition monitoring provides faster identification of failures, and integration with EAM supports timely resolution.

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**Positioning APM within ARC’s Asset Lifecycle Model**
Asset Performance Management

APM encapsulates a key process in ARC’s Asset Lifecycle Management (ALM) model. In this model, APM integrates with the other major ALM processes. APM leverages information to optimize asset availability and utilization while balancing operational constraints to improve return on asset (ROA) and financial results. APM applies to the long-term, “operate and maintain” phase of an asset’s lifecycle and particularly important to asset-intensive industries.

With APM solutions, operations and maintenance become more collaborative, exchanging information to manage critical issues and operational constraints while improving overall operating performance. Determining the business’ unique critical issues provides a foundation for an APM initiative. Leveraging the rich information in the plant and maintenance management solutions improves the effectiveness of both areas. Combining the information from the traditionally separate solutions offers new opportunities for managing risk and optimizing performance in for both areas.

Automated Business Process Management

Nearly all EAM systems have tools for automating workflows. Typically, this involves generating a work order based on information from plant systems (historians, control systems, building management systems, and intelligent equipment). This capability is well understood, with many users having one or more application instances.

This workflow automation is consistent with strategies for APM. Increasing the breath and scale of this business process automation can dramatically improve performance. Since many organizations have some
limited instances of this integration, the constraint is not technical. Organizational issues arise that also need to be overcome.

**Organizational Cross-Functional Support**

Using plant information to drive maintenance activities requires involvement by both the process/control engineering and the maintenance groups. Process engineering resources are required, but the major benefits occur in maintenance. Since the cost occurs in one budget and the benefit comes to another, cross-functional facilitation is often needed.

The process engineering group designs and supports the production processes. It has responsibility for process information from plant systems. Specific skills, application knowledge, and governance controls are required to use these systems and access the associated information. Editing by a casual user has risks and support implications. Engineering tends to be protective of the control system, since mistakes often have negative ramifications, hence the understandable resistance to giving access to others.

Maintenance management tends to focus on equipment uptime and the allocation of resources to execute the work orders for the needed repairs. The EAM system provides the means to manage the associated information and business processes. Similarly, using this system requires specific skills, application knowledge, and governance controls. Again, resistance to giving others access for making changes is understandable.

Crossing these natural organizational barriers requires management intervention, resource allocation, and a change in metrics. Change management centers on a more effective maintenance strategy for higher equipment uptime with lower costs and improved process control.

**Implementation Methodology**

Connecting EAM systems to the control systems through an intermediate system relieves the concerns of both organizations. This could be a plant asset management (PAM) system, historian, or other host for process information. Since each organization has its unique set of systems, technologies, processes, and business practices, the specific system will vary by application. Focusing on one or a limited set of technologies allows an organization to move along a learning curve to scale up and apply APM broadly.
Asset Performance Management Automated Workflow

Recommendations

Overcome cross-organizational issues and scale-up asset performance management by integrating appropriate plant information and EAM systems. Consistency and economies of scale enable rapid expansion of business process automation for managing maintenance work orders. Consider the following guidelines:

- Focus on a limited number of platforms and technologies to move along the learning curve and reduce support issues
- Establish a data management plan among control systems, historian, PAM, and EAM with consistent tag names and other schema
- Deploy wireless sensors having low installation costs for condition monitoring and a more comprehensive asset performance management program
- Provide a role-based information portal to improve collaboration among maintenance and production

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