

### Table of Contents teaser:

Combining smart instruments, analyzers and valves with a modern asset management system can provide faster response to incidents, enable proactive maintenance and reduce downtime.

### Fast Forward Bullet Points:

- The asset management system should be used as the central repository for all information related to devices and equipment.
- A comprehensive asset management system will enable operations and maintenance personnel to quickly access and analyze information in response to alarms and incidents.
- Skilled personnel can use asset management systems to analyze data and perform proactive maintenance, predicting failures before they occur.

### Resource Box:

1. Asset Management Systems Increase Reliability and Efficiency;  
<http://www.isa.org/InTechTemplate.cfm?template=/ContentManagement/ContentDisplay.cfm&ContentID=93358>
2. Utilizing Asset Data for Predictive Asset Management;  
<http://www.isa.org/InTechTemplate.cfm?Section=Archives4&template=/ContentManagement/ContentDisplay.cfm&ContentID=87833>
3. Integrated Asset Management;  
[http://www.isa.org/InTechTemplate.cfm?Section=Executive\\_Corner2&template=/ContentManagement/ContentDisplay.cfm&ContentID=84336](http://www.isa.org/InTechTemplate.cfm?Section=Executive_Corner2&template=/ContentManagement/ContentDisplay.cfm&ContentID=84336)

## **Better Maintenance Strategies Improve Operations and Maintenance**

*Developing new asset management strategies can extend equipment life and improve overall efficiency in process plants.*

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In today's power and process plants, improving overall efficiency and lowering costs are vital for profitable operations. To accomplish these goals, operations and maintenance personnel need to respond quickly to potential problems in order to keep the plant running as smoothly and efficiently as possible.

Operations and maintenance teams are now asked to go further than simply identifying problems and fixing equipment breakdowns—they are now expected to work together to increase efficiency, minimize downtime, and extend the life of the plant's equipment. The integration of maintenance data and associated methodologies into an asset management system can create a successful foundation for operations and maintenance teams to meet these challenges (Image 1).

The latest instruments, analyzers and valves provide not only important device-related data, but also additional information that can be used to ascertain the overall status of equipment and the entire facility. Current digital bus technologies, such as HART or the different varieties of fieldbus, make the procedures for detecting, documenting and recording device alerts and other problems less costly and time consuming.

Organizing this data, and documenting the actions taken to resolve problems, is an important part of a plant's overall maintenance strategy. By implementing a proper methodology, maintenance tasks become easier to assign and schedule. Equally important is the audit trail proving that maintenance tasks were executed in a proper manner. Documenting and tracking instrumentation maintenance data also provides valuable long-term records that enable operations and maintenance personnel to better respond to specific issues.

While this article will focus on instruments, analyzers and valves—it's important to note that many of the same maintenance procedures can easily apply to electrical equipment. This makes sense from an organizational point of view as most process plants' maintenance functions are organized around the instrument and electrical disciplines or a closely aligned group.

### **Asset Management Improvements**

Most process plants use an asset management system that encompasses all large mechanical equipment such as furnaces, tanks, turbines and vessels. Twenty years ago, the asset management information pertaining to such equipment would probably be limited to the original documentation, with maybe a few modifications found in maintenance documents. The vast majority of this maintenance information wasn't located in a central repository, as maintenance-related documents were instead

stored in different locations in various formats. When questions arose about the status of a particular asset, it would be very difficult to find relevant documents and historical maintenance records.

It became clear to many plants that a better system for managing assets was needed. The asset management system had to encompass the entire life cycle of the mechanical equipment, along with incorporating real-time diagnostics. The system also had to be easy to use, and it needed to provide information to relevant parties in a variety of formats.

With the right asset management system, operations and maintenance personnel can work together to proactively extend equipment life and prevent breakdowns by closely monitoring device diagnostics (Image 2). Proactive maintenance translates into faster correction of abnormalities, and can extend equipment life while increasing the plant's overall efficiency and uptime. See Table 1 for a summary of advantages provided by a correctly specified, installed and maintained asset management system.

### **Proper Planning Essential**

Selection, installation and implementation of an asset management system must begin with a clear plan. The plan should clearly underscore the mission and goals of asset management, and detail required on-going activities. Showing workers how an asset management system can make their jobs easier and make their plant run more efficiently is the first planning step, as this will create buy-in and make subsequent steps easier to implement.

Explaining the connection between better maintenance records stored in an asset management system and lower overall maintenance costs will help operations teams understand the importance of good record keeping, and will facilitate their participation. Operations staff should be trained to be the first responders, because a good asset management system will supply operators with critical information about potential problems on an ongoing basis.

Maintenance staff should be shown how the right asset management system can help them go beyond the old methods of fix and repair. They should be encouraged to adopt a maintenance philosophy that captures the most relevant operations data, and compares this data with past maintenance records.

The right asset management system can help maintenance personnel use information to create lists of potential devices that are prone or susceptible to failures. To implement this type of maintenance methodology, maintenance records can't be separate from the operations' records, as all relevant information must be stored in a central repository, namely the asset management system.

Record keeping must be a comprehensive process that makes it easy to cross reference records. Employees must be confident that historical records as well as the last maintenance action on specific devices are organized in a way that makes retrieving this data easy. In this early stage, a great deal of emphasis should be placed on embracing this methodology as a means to interpret the diagnostics provided by each and every instrument, analyzer or valve.

### **Collecting Information for Easy Access**

Asset management system training begins by demonstrating how readily available documentation simplifies the information retrieval for a specific device. By creating a single location for all pertinent data, many labor hours can be saved, and problems can be addressed more rapidly.

The creation of a single data location starts by collecting all applicable data, and entering this data into the asset management system. Most vendors provide electronic documents for each device such

as operating manuals and specification sheets, and those documents should be electronically attached to the asset management system to enable easy access.

Additional information, such as equipment location and photos, as well as any specific information concerning the environment in which the piece of equipment is located, should also be entered. Another useful device document is the Piping and Instrumentation Diagrams (P&IDs) associated with a specific device, along with date of purchase and the commissioning date of the device.

A specific naming convention for devices provides valuable information in the event of a problem. For example, if a device is designated as environmental, this enables the maintenance manager to easily query all devices associated with environmental monitoring. This is extremely helpful in determining a root cause analysis. A similar convention can be established for other like groups of devices.

### **Documenting Maintenance**

After the initial stage of gathering and inputting the documents associated with a device, the focus turns to maintaining a central point for maintenance records within the asset management system. The actions performed on each device and the name of the maintenance employee who performed those actions should be noted in the asset management records section.

This maintenance documentation will serve as an integral part of the inspection schedule of individual devices. Good record keeping can alert maintenance team members to specific devices that require more attention based on process conditions such as vibration or corrosion. This will provide good insight in determining if one type or brand of device is requiring excessive maintenance.

Regardless if the process plant is a new unit ready to be commissioned, or one with fifteen years of continuous service, the maintenance plan should make every effort to follow the required procedures as new devices are placed into service. The maintenance staff should follow stringent or regimented policies as to how those new devices will be installed and documented, as this consistency will streamline information retrieval.

### **Using Asset Management Tools**

One of the key advantages of an asset management implementation is the ability of the operations team to identify a potential device problem early on, and to alert the proper maintenance team of the situation. These types of coordinated efforts prevent small problems such as a minor air leak on a valve or intermittent improper readings from a pH analyzer from becoming more serious situations.

Asset management diagnostic tools can provide clearly recognizable alerts for both operations and maintenance personnel that can help them determine the severity of a device problem (Image 3). When a call or alert occurs from a device, the first response should be to determine the severity of the problem. The next step is to determine who has recently maintained the device, and what other devices or processes may be affected by this specific issue.

A correctly installed and maintained asset management system can facilitate these activities, speeding problem resolution and quickly returning the device back to its normal working state. Documenting actions taken to resolve problems will help technicians know the best procedure for correcting that type of problem in the future, and the asset management system is the recommended place to store this type of data.

### **Beyond Troubleshooting**

A good asset management system does more than help operations and maintenance staff troubleshoot problems, as it can also help improve the overall operation of the plant.

One of the tools provided by asset management systems is a pictorial view of all of the devices installed corresponding to a particular process areas. This diagnostic view will be the first place the skilled maintenance technician will look for a thorough overview of the overall plant asset status and operating efficiency.

A skilled maintenance person can view and analyze the operation of many instruments and valves from an asset management workstation. This view will provide a wide and varied list of devices, and an easy-to-read indication of device problems. This overview information can then be used to make improvements.

For example, the asset management system can be used to retrieve valve diagnostic information, such as the detection of high or low friction conditions. Friction data can be then displayed along with other corresponding information such as valve supply pressure and temperature. With this new set of valuable related information, the maintenance technician can get a much better picture of the health of the valve, allowing proactive diagnosis of issues.

Similar diagnostics from transmitters, such as sensor temperature on pressure devices that indicate abnormal temperature of the device, also offer important data that can be similarly analyzed to predict problems before they occur.

These alerts and alarms can provide an early warning mechanism, enabling maintenance technicians to be proactive when solving problems, and preventing more serious conditions from arising. Furthermore, equipment can receive timely maintenance that can extend its overall life.

In today's modern plant, whether it's a recently commissioned or an updated ten-year old facility, asset management plays a critical role in helping operations and maintenance personnel identify problems quickly. Asset management systems provide easy navigation and document retrieval to help skilled technicians locate potential problem quicker and more accurately, thus preventing small problems from becoming serious incidents.

#### Table 1, Advantages of Asset Management

1. Faster response to incidents
2. Better root cause troubleshooting
3. Extension of equipment life
4. Enables proactive maintenance
5. Reduces downtime
6. Increases equipment and facility efficiency
7. Lowers record-keeping and overall maintenance costs
8. Provides history of maintenance activities

Image 1: Today's process plants can improve operations, reduce maintenance and cut costs by using a modern asset management system.

Image 2: Smart instruments, analyzers and valves can transmit a wealth of data to an asset management system.

Image 3: An asset management system can provide the data needed by operations and maintenance personnel in customizable formats to increase clarity.