White Paper

COULD THE BIGGEST OBSTACLE TO ASSET MANAGEMENT BE MANAGEMENT?

PURPOSE

The goals of maximizing assets and improving plant reliability are common today. And, as the expression goes, “if it was easy everyone would be doing it.” An effective asset management program might be easy to financially justify because the investment can sometimes pay for itself by preventing just a single unplanned shutdown. That said, why is it that more companies are not actively using asset management programs to improve performance and increase plant reliability? Several large companies have asked and answered this question and initiated a program only to find that the people asking for reliability improvements might be the same people that are preventing it! This white paper explores the experiences of users who have successfully implemented an effective asset management and reliability program and discusses the culture and work process changes required in order to achieve significant change. The paper also looks at the work being done by ISA108 Intelligent Device Management to define best practices and work processes surrounding the use of information provided by intelligent field device.

INTRODUCTION

Assets. Assets come in many forms including physical assets, people assets, legal assets, knowledge assets, property assets and others. Wikipedia defines asset as an economic resource – anything tangible or intangible that is capable of being owned or controlled to produce value. Simply stated, assets represent value of ownership that can be converted into cash. Using this definition, the significant number of installed measurement and control devices currently used to monitor and control our manufacturing facilities are assets because they are owned and controlled to produce value. For years, these intelligent assets were configured, installed and basically forgotten. That is, until it failed or caused a failure which might have caused a significant loss of value.

Using field proven intelligent measurement devices and their embedded field communication protocol are examples of assets that should be included in asset management systems and programs along with valves, pumps, motors, mixers and a host of other critical assets. These process and factory automation protocols include EtherNet/IP, FOUNDATION Fieldbus, HART, IOLink, ISA100, Profibus, ProfiNet, and many others. Intelligent measurement devices communicate their measurement values and device diagnostics using these field communication protocols to connect to control or asset management systems to produce a product or to provide information that contributes to the success and reliability of the operation.

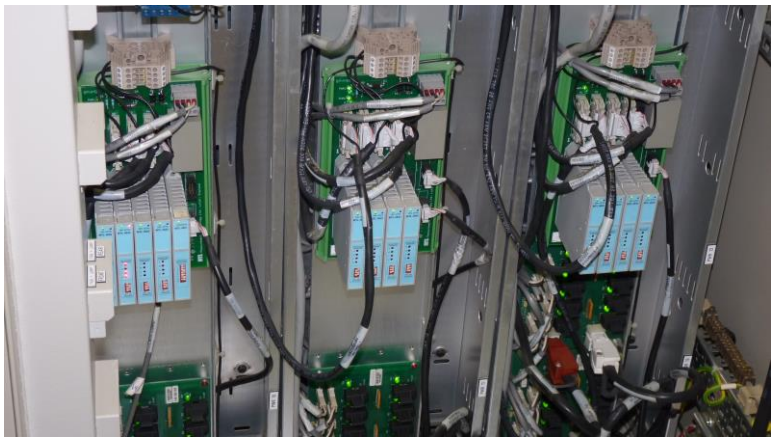
Over the past 10+ years, tens of millions of intelligent measurement devices and control valve positioners (assets) have been installed but their real asset value remains untapped. In a recent article, Herman Storey, chief technology officer of Herman Storey Consulting, LLC and an a strong advocate of asset management programs, stated that automated diagnostic capabilities for valves and other field devices available through field communication protocols can

provide huge benefits at many levels. Effective diagnostic tools can make these activities quick and easy to perform from a central control facility or even a remote location. The concept of taking the data to an expert instead of taking the expert to the problem is a powerful and underutilized concept, but depends on proper implementation of a good set of diagnostic tools and effective work processes.

ASSET MANAGEMENT

According to many users familiar with this topic, the low capital investment costs to add an asset management system vs. the ROI (return on investment) may be a single avoided event such as an unplanned shutdown of the operation. If this is the case, then why are not more operations today aggressively using an asset management system to maximize their assets and improve plant reliability?

Let's review the lack of asset management systems situation in more detail. The asset management system includes several product categories or components. First, you need intelligent measurement and control devices. Second, there needs to be a communication protocol that provides and delivers the information to the control or asset management system. Third, is the physical connection and integration of the information that allows access to the information and lastly, you will need an asset management system - typically a PC based application which is available from many automation suppliers. Reviewing our list, it seems that the biggest cost is already covered – the thousands of intelligent measurement devices and the connection to a system.



If the system is not enabled to access the information, there are many suppliers who provide low cost solutions that give access to the intelligent device information needed for asset management systems. Although it might take some work to get these solutions installed and connected, the investment is relatively small compared to the potential increase in plant reliability they will enable.

As Herman states, "the second part of the lack of asset management problem is management. Technical problems have solutions given management support, but managers have to be rewarded for doing so. That kind of program requires good metrics, good reporting, and effective audits to produce a scorecard. In the absence of a good management system, poor performance is often treated as a technology problem, or just the normal state of things." Management has to be part of the asset management team in order for the operation to get the real value from their installed assets. This requires an honest and "lead by example" commitment to get educated on the available information from the system and to learn what it takes to interpret and act on the information. Like many things, this is a process and does not happen overnight.

For success of asset management in general and IDM in particular, a number of technical disciplines and business groups must have a cooperative relationship and work together to achieve common goals. These groups include procurement, project, operations, and maintenance organizations and many of the technical focus areas supporting these business units. If performance measurements and rewards for these businesses are completely independent, asset management will suffer. If KPI's and incentives are done well and technical focus is supported, work processes and tools for asset management can flourish and provide significant risk management and profit for the business units. Management has to provide the environment and reward system where asset management can be successful.

Canada's province of Alberta is home to the world's largest oil sands reserves. Many energy companies operating in Alberta have been building new facilities or adding new capacity to existing ones to meet burgeoning oil demand. In 2011, Shell commissioned a 100,000 barrel per day (bpd) expansion to its existing 155,000 bpd capacity Scotford Upgrader near Fort Saskatchewan. The upgrader processes "extra heavy" crude oil (or bitumen) from the Albian Sands Mine into a range of synthetic crude oils. Most of the output is refined at the adjacent Shell Scotford refinery; the facility also houses a chemical plant.

Supporting a safe and timely expansion start-up meant Scotford's instrumentation team had to work quickly and efficiently with minimal mistakes. The Shell team charged with this challenge found that HART technology provided a way to streamline testing and pre-configuration of devices so when they were installed, everything was ready for a smooth start-up run.

Shell realized during the project's early phase that they had the equipment (in this case provided by Honeywell) to provide a platform to take advantage of smart instrumentation. This data can be used not only during commissioning, but also during normal operation and maintenance. It provided a plug-and-play platform for all intelligent devices. It also allowed for the addition of EDD (Electronic Device Descriptions) and FDT/DTM (Device Tool Manager) Technology without additional testing. Shell uses the system to bring data to the control and asset management system. Additionally, it provided templates for standardizing process variables coming from field instruments. The HART or digital signals bring additional digital variables including, PV (Primary Variable), SV (Secondary Variable), TV (Tertiary Variable) and QV (Quaternary Variable) . This data can be employed in the plant control system for measurement, control or graphics display.

The instrument asset management solution provided Shell with the following benefits:

• Fast and safe device configuration and programming, as well as the commissioning of 1,200 intelligent devices from 26 vendors.

• Loop function testing and process variable simulation performed in 30% of the time normally required, with no potential for human error.

• Simulation of critical and complex safety narratives involving more than 15 inputs and multiple outputs for more than 50% of overall time saving.

• Elimination of the need to add external hardware to more than 700 smart valve positioners, saving about $2,000 per valve.

• Ability to monitor secondary transmitter temperature variables remotely for improved efficiency in preventive maintenance on heated instrument boxes, saving more than $200,000 per year.

• Re-calibration, parameter checks and device diagnostics performed from a central control room rather than at each individual transmitter location, providing savings of $100,000 per year.

CULTURE CHANGE

Based on traditional organizations, there is no clear owner of the information in the asset management system or clear responsible department that will take action based on the information – said differently, who will turn the information into asset value. The typical plant departments or organization functions may not lend themselves to being able to view, analyze, interpret and take decisive action unless there is clear ownership by all parties involved. This requires a major culture and work process change. A management level commitment and cross-functional teams need to be established to create, manage and implement an effective asset management program that can truly maximize all plant assets. In this case the expression lead, manage or get out of the way applies.

The MOL Group's Danube Refinery in Százhalombatta, Hungary, set-out to profit with HART technology in 2002, and only three years later, decided to overhaul its maintenance systems with a new, unified asset management system strategy. The combination of the two has changed the way MOL runs maintenance, and the way it looks at diagnostic data.

Gabor Bereznai, MOL instrument and electrical department head, believes valve diagnostics are the most important thing. "There is a huge benefit. Predictive notification can save $7,000 to $100,000 or more by avoiding unplanned outages. At our facility, our most important product is diesel. One day's diesel production is worth $300,000. In 2011, we avoided a one-day outage. You can see why this is important."

To make it work, Bereznai adds, his team involved everyone. "Everybody needs asset management," he says, "and it's very important to involve everybody. There were many skeptics at first, but now they're believers." How did Bereznai and his team get started? "First, we got high level buy in," he says. "Then we standardized on HART and later Foundation fieldbus devices. Then we put together a maintenance strategy plan and an action plan." Because their asset management systems were DTM enabled, they were able to work with different field communication protocols and have access to the predictive notifications they needed to avoid unplanned outages. FDT Frame Applications and DTMs support the preventive maintenance strategy with device diagnostics and condition monitoring.

We have an ongoing contract with our three DCS vendors to maintain the systems and keep them current. And finally, we provided everyone on the team with training. Maintenance involves all of the staff, and everybody participates."

GETTING STARTED

According to Joel Holmes, Site Electrical Reliability Engineer at Monsanto Muscatine, Iowa facility, asset prioritization is the foundation of all their reliability programs. It consists of continuous evaluation and ranking of equipment based on; cost, safety, throughput, environmental compliance, quality and operational impact. Using and A, B, and C letter ranking, they determined the device criticality.

Each of their reliability programs (calibration, vibration analysis, motor analysis and others) stem from applying and utilizing Predictive Maintenance (PdM) Technologies. By implementing conditioned based monitoring techniques, they can effectively identify, diagnose, troubleshoot, and ultimately repair issues prior to their effects negatively impacting production.

Joel also suggests sharing the success! Keep production, management, and maintenance personnel informed of your efforts and provide continued exposure of findings to plant personnel to help leverage and drive reliability initiatives and management buy in. As a result, with a cost avoidance of over $1600/work order, it correlates to over $200 thousand dollars annually. Since 2008, they have achieved between $800 thousand and $1.6 million dollars in cost avoidance per year through our reliability program efforts.

Another good place to start is with your automation and device suppliers. Ask them about the products you purchase and have installed to see what intelligent information and diagnostic information may be sitting in your assets. They may suggest the use of their product specialist who can deliver training on the available capabilities in their devices or suggest tools that are available to access such information.

Several users report that going after the “low hanging fruit” provides some quick successes and contributes to building a cross-functional or cross-discipline team – including management. Quick successes typically focus on the devices that may cause unscheduled shutdowns – devices such as control valves and transmitters that measure critical parameters. A walk around the plant with team members looking at critical assets has produced some revealing results. Reliability improvements can start with small successes but it is important to note that implementing a successful asset management program is a project in itself. It takes active management support and a strong commitment to turn data into actionable information.

BEST PRACTICES FROM ISA108

Herman also indicated that reports from companies that have created effective asset management programs suggest that changing individuals’ thinking is more difficult than the technology of collecting diagnostic data. “There is no question that intelligent devices and their related field communication protocols work as advertised, but users find it difficult to bridge the gap between diagnostic information and effective asset management.” Putting intelligent devices to work effectively is what ISA108 is about. As stated, “The purpose of ISA108 is to define standard templates of best practices and work processes for implementation and use of diagnostic and other information provided by intelligent field devices in the process industries.”

According to an ISA108 Press Release,

> Intelligent field devices, pervasive in modern process manufacturing, bring the promise of transforming the way information is utilized related to these devices and to the processes they control. Devices with impending maintenance problems, for example, can be identified earlier, and information can be provided directly to process automation systems, plant asset management systems, or any other systems or software in a plant as required.
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> In many cases, however, the promise remains unrealized, often because users are employing old maintenance work processes with new technology. The new devices and applications are installed, but operators and technicians stick to their traditional approaches to preventive or routine maintenance and do not take advantage of the huge amount of information available to them.

The scope of the committee work products will include recommended work processes and implementation practices for systems that utilize information from intelligent field devices and the people who use them. Work process templates by worker roles (such as maintenance or operations) will be one area of research. Best practices for implementation will be developed. Models will be developed for the flow of information from devices through the various systems that use the information.

SUMMARY

Of course using the right standardized tools that are protocol, device and supplier independent can be one of the many keys to creating an effective and successful asset management program. FDT Technology provides the core component of effective asset management system. Management's buy-in and persistent support is also very important. In several case studies reviewed for this paper, a "champion" of the asset management cause steps up and initiates the training, investigation or program creation either as a result of their job position or just based on their desire and vision to improve plant reliability.

But, sooner or later management must decide to either remain part of the problem (status quo) or become part of the solution. There is little chance for success of a well designed and implemented asset management initiative without the full support and active participation of management from all levels of the plant organization. As seen by the Shell, MOL and Monsanto examples, significant gains are available by creating and using effective asset management but only if management is not an obstacle.

Sources / References:

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Monsanto - A Straightforward maintenance strategy yields improved plant performance

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ISA108, Intelligent Device Management