Article

CHANGING PLANT OPERATIONS AND MAINTENANCE CULTURES IMPROVES PLANT RELIABILITY

Significant benefits come when operations and maintenance efforts focus on preventing shutdowns and improving plant reliability

(article 2 of a 3 part series)

OVERVIEW

As a plant life cycle moves from the planning, engineering and start-up phases (Part 1) to the operation and maintenance phases, the focus turns to keeping the plant operational at optimal performance and lowest possible costs. Automation decisions have defined the available resources, assets and capabilities. Now it's up to operations and maintenance to produce product and achieve plant objectives.

Operations and maintenance now have the opportunity to formulate a strategy moving into the next phases of the life cycle - continue to work as they have in the past – hoping for better results, or, change the culture and work processes based on information enabling a more forward-looking strategy. Let's explore the operations and maintenance life-cycle phases to see what changes can improve plant reliability and achieve plant objectives.

BUSINESS DRIVERS

Today's business drivers include the need to reduce downtime, improve plant reliability, lower operating costs and to comply with regulations in areas such as safety and environmental monitoring. In order to address these business drivers, plant managers need to consider a culture change to maximize the benefits of information available in intelligent measurement and control devices. In today's information-oriented business culture, operations and maintenance organizations are being driven to make product faster, smarter and cheaper with little additional resources.

If we expect different results from our operations, we need to change the way we think about our work and how it is performed. With a few work process changes and a focus on information from intelligent measurement devices, companies can transition from doing daily preventive scheduled maintenance to conducting a daily predictive routine dramatically improving plant operations and reducing maintenance costs. The benefits of using FDT Technology-enabled systems

and devices permit the use of intelligent device diagnostics, allowing improved plant reliability and maintenance cost reductions, delivering a positive impact to the bottom line.

OPERATIONS

The goal of plant operations is to keep the plant running so that product can be delivered on time and on budget. Traditionally, companies want to operate and turn to maintenance to fix things that prevent the plant from operating. Even though devices are expected to operate without failure for 20+ years – and many of them do - breakdowns and failures occur because equipment is exposed to mechanical, thermal, chemical and industrial hazards. Once a device reaches a wear limit, it will fail! In this case, you either shut down to do the repair or continue to operate without the measurement information - which is like running blind!

There are many case studies that document dramatic results when operations and maintenance are armed with the right information at the right time, to do the right things, to prevent an unscheduled shutdown or unnecessary maintenance. Using FDT Technology-enabled solutions provides device diagnostic information that enables early detection and warning of pending problems, putting operations in control of the situation. Millions of dollars are saved every year when plants avoid unscheduled shutdowns or when plants reduce the duration of a shutdown. These savings are achieved with minimal investments of money and time.

Management must strongly support a change from a reactive to predictive plant operation by enacting a maintenance culture that includes work processes that facilitate the change. This change is more than just a maintenance matter, really it is not a matter of if you change, but when! Let's face it, if we keep doing the same things the same way, we will never change the results. In this way, FDT Technology benefits operations and maintenance by enabling changes that change the game.

MAINTENANCE

Most maintenance programs begin as reactive: run equipment until it fails and then hope to quickly fix it. This simple approach isn't optimal, but countless companies use it as many assets can run till failure without serious consequences. However, when applied across an entire facility, this approach causes unscheduled shutdowns and production interruptions.

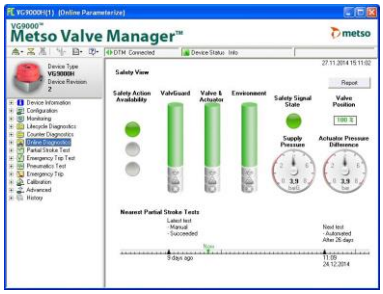
Scheduled maintenance is a slightly higher level of sophistication. This is generally an improvement over a purely reactive strategy, but it is still expensive because work is scheduled where it might not be needed. Some studies suggest that 12% of maintenance costs are wasted because maintenance may not be required but is performed simply by following a decade-old schedule.

If reactive and scheduled approaches are the basis for your maintenance program, you will have a difficult time reaching any form of operational excellence and achieving assigned objectives. There is another way: predictive maintenance based on actual condition monitoring. When you know something is going to happen in advance, you can take action before failure based on your schedule – saving time and money.

An effective maintenance program based on condition or predictive monitoring requires three elements:

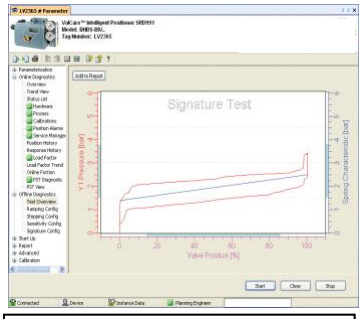
1. Field devices must be smart, meaning they have diagnostic functions and can communicate the information, typically via 4-20mA +HART or any of the other process or factory communication networks (See graphic on right). Make sure a device DTM is available for your device. There are 8,000+ devices supported by certified DTMs provided by major device suppliers. Check out the DTM Product Catalog here.
2. The main process control system must be able to convey the information from the devices to a central point via the appropriate field wiring or wireless access – field communication enabled.
3. Integrated device and asset management software must be installed and used to gather and interpret diagnostic information either manually or automatically. This requires a FDT-enabled device management application known as a Frame Application.

In all likelihood, you already have the first two elements in place, at least in terms of most of the field devices and the control platform. The majority of your measurement and control devices are smart (or intelligent) as this has been a standard capability in many devices for 10+ years. Similarly, process automation control systems typically provide the field communication interface to these devices.



Example of graphics-based information from intelligent valve positioner via a DTM

The third element required to implement a predictive maintenance program is an integrated device and asset management software application. It will provide access to valuable device diagnostic information sitting in your intelligent devices such as the valve diagnostics information shown on the DTM on the left. Many plants have such systems in place but aren't utilizing them to their fullest extent. If you do not have such an application, there are more than 40 cost-effective options that provide device information access and system integration of this information that are easy to deploy and use. Check with your automation system supplier to see whether your system is FDT capable.



Automated functions such as Partial Stroke Tests can reduce safety valve shut down frequency

When all three elements of a condition monitoring program are in place, frequent routine device checks in the field are no longer necessary. User's report 63% of maintenance checks result in "no action taken". Most of the things a technician can do with a hand-held device while standing at the device can now be handled from the control room or maintenance shop (see image of a valve positioner device DTM above). Some asset management systems can perform checks automatically by simply selecting the desired check interval. Checking a device that appears to be malfunctioning can also be done without a visit to the field. If there is a malfunction, the application has probably reported the failure, and may even have done so in

advance. The result is that a high percentage of field trips your technicians make may be eliminated, and you can predict failures before they occur - reducing cost and improving employee safety.

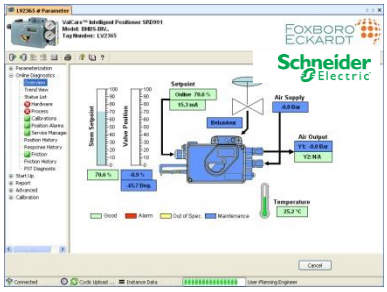


Image of a device DTM shows device diagnostics and condition monitoring

These elements combine to optimize your predictive maintenance strategy with a process that provides maximum availability and reliability. Interruptions are minimized, as are overall maintenance costs. A NAMUR study stated that using (device) diagnostics can enhance quality and reduce cost significantly. An optimized predictive maintenance strategy begins with the device diagnostic information available in intelligent measurement devices that communicate and use FDT Technology.

CULTURE CHANGE IMPROVES OPERATIONS AND MAINTENANCE

Moving into the operations and maintenance phases of the plant life cycle, the strategy choices are either business as usual or transition to a strategy based on valuable information sitting in your installed assets. With a few work process and culture changes, including a management commitment to use the information from your intelligent measurement devices, the operations and maintenance phases of the plant life cycle can be dramatically and quickly improved. By specifying and using FDT Technology, expected improvements include a predictive maintenance strategy, improved plant reliability and lower maintenance costs.

How do you get started? Initiate the discussion between operations and maintenance and you may be surprised to find how a few small changes can produce such big results. And, ask your automation providers for their FDT solutions. For more information, visit www.fdtgroup.org.

References:

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