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Asset management leverages smart wireless devices

Smart wireless devices generate diagnostics that extend the value of asset management systems

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Emerson Process Management

With the proliferation of wireless devices for obtaining control-related information on equipment in remote locations, many operators are wondering if they can be sure the wireless devices are functioning as intended, providing accurate readings, and if they can extract standard diagnostics from remote devices.

Many of the wireless field devices in the process industries are used to monitor conditions in a remote part of a plant or even off-site. They have no control functionality, so two-way communications are generally not provided. The only way to verify the condition of a wireless device or the accuracy of its measurements is to send a technician to the remote area to find the device and test it with a handheld communicator. This approach fails to take advantage of a key characteristic of all smart devices: the diagnostics they generate.

Wireless field instruments produce device and advanced diagnostics, both of which offer operational and financial benefits to the end user. They can make your plant more efficient, more profitable and safer. However, a means is needed to manage the intelligence they impart about their own health, and that of the equipment they are monitoring.

Photo courtesy of Emerson Process Management

The BP refinery in Cherry Point, WA – the largest supplier of calcined coke to the aluminum industry – has expanded wireless use to 35 transmitters including tank farm and utility applications, and installation of a Smart Wireless gateway in the diesel unit to make it ready for wireless motes. This Smart Wireless transmitter monitors a calciner fan bearing temperature.

Intelligent Device Manager, which is part of Emerson's AMS Suite, manages equipment health intelligence through a wireless gateway that facilitates two-way communications. Field device transmissions received by the wireless gateway are passed on to the asset management software, generally via an Ethernet connection. For example, alerts transmitted by wireless field devices and received by the device manager make the operators aware of potentially unsafe situations and enable them to take action to avoid an unscheduled shutdown. At the same time, orders and inquiries are conveyed to the remote devices via the wireless gateway.

The AMS Device Manager can be used in conjunction with both wired and wireless devices regardless of the automation system employed for process control. In fact, it is capable of communicating with a wide range of smart field instruments, including HART and FOUNDATION fieldbus devices to gather diagnostics information giving plant personnel an otherwise unattainable view of real-time conditions throughout a plant or mill. It is also compatible with the WirelessHART standard.

Asset management

Data retrieved from smart field devices are stored, processed and organized by asset management software and made available to plant personnel in functional graphics that simplify maintenance tasks. Personnel can use this tool to determine the status of a field device and even the operating condition of

equipment to which it is attached. They can view, configure and troubleshoot any device transmitting through the wireless gateway. Since the diagnostic data are available in both the control room and the maintenance shop, all personnel see the same information.

Device diagnostics are useful in troubleshooting an instrument that operators may suspect is malfunctioning or not sending accurate information. The conventional method of checking out such a device located in a remote safety zone would be to obtain a work permit; dispatch an operator with a sniffer to ensure the area is clear of explosive gases; and send an instrument technician to evaluate the condition of the device with a handheld. After the device is either declared operational or replaced, the work order can be closed. This generally takes at least two hours to complete, and in most cases, no problem is found.

With asset management, troubleshooting suspected process problems can normally be done from the maintenance shop and is therefore faster than sending technicians out to remote areas. For example, interrogating a smart device remotely can normally be accomplished in no more than two minutes. Only if a device needs to be repaired or replaced should a work order even be necessary. This is a great time-saver, allowing maintenance personnel to concentrate on keeping the process running.

Advanced diagnostics can be accessed from wireless devices in the same way, enabling maintenance personnel to identify conditions that can cause potential problems such as a plugged impulse line or sticking valve that might cause a failure or severe process upset. Such information can be used by maintenance personnel to predict when a device – or the equipment to which it is mounted – may need maintenance to continue operating without interruption. In some cases, they may need to act quickly to defuse a potential issue to avoid unscheduled downtime.

Photo courtesy of Emerson Process Management

BP installed Smart Wireless throughout its R&D facility in Naperville, IL. The facility includes a modernized tank farm that feeds an expanding number of pilot plants that develop processing technology options for BP. The wireless network uses Rosemount wireless transmitters to monitor suction and discharge pressures, levels, flow and temperatures.

The practice of predictive maintenance relies on the availability of accurate information about the condition of field devices, including wireless. Knowledgeable personnel can use this information to estimate how long this equipment is expected to operate satisfactorily.

Predictive maintenance of high priority equipment is much more economical than traditional preventive maintenance. Managers soon become believers when they realize how much money can be saved when they make repair/replace decisions based on good intelligence.

Asset management systems can manage periodic device calibration, alerting operators when signs of change appear and accurately documenting maintenance events for every device in the system.

It's no longer necessary to waste the valuable diagnostics generated by smart wireless devices. That information can be captured and used by asset management to improve efficiency, reduce maintenance costs and generally make life easier for your maintenance department.

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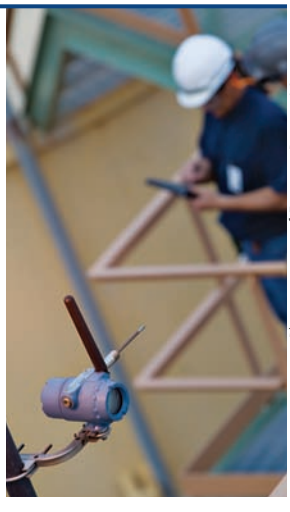
Take 5

At PPG's Chemical Division facility in Lake Charles, LA, wireless transmitters make it possible to place instruments in remote locations where they would normally be cost-prohibitive. PPG estimates installation costs for wired instruments at about $20 per foot for wiring and conduit. Wireless devices are not only less expensive to install in remote areas, the diagnostic information they transmit has the potential to increase process reliability and reduce maintenance costs.

According to Tim Gerami, senior design engineer at PPG, "When Emerson first approached me with their industrial wireless solution and told me the system was 'plug and play,' I had to laugh. Nothing I'd seen so far was that easy, but I'm a believer now. Five minutes after installing it, the wireless network came to life. It's been there ever since."

Emerson's Smart Wireless system uses a Time Synchronized Mesh Protocol technology. The system combines smart field instruments with wireless transmitters in a self-organizing mesh network that automatically adapts as device points are added or removed or when obstructions are encountered. Emerson is now working with Cisco to offer open-standard solutions for wireless process and asset management applications.



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