Wireless With A HART Is Catching On

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It’s been two years since the WirelessHART™ standard was approved by some 200 member companies of the HART Communications Foundation. Successful Smart Wireless applications are now operating in more than 1,000 customer sites around the world, and as the range of available wireless products grows, end-users are finding more and more ways to apply them.

One U.S. company has already established a plant-wide wireless infrastructure capable of supporting field device transmissions and Wi-Fi communications. The first field networks are in operation with Rosemount® wireless pressure and temperature transmitters monitoring storage tanks and certain utilities. In the months ahead, up to 1,000 additional transmitters and other wireless devices will be installed for applications such as vibration monitoring of pumps, temperature in columns, and overfill and corrosion protection.

With wireless technology proven for industrial control, users are adapting it broadly to accomplish things that are valuable but just not possible with traditional wired systems. Their goals are to increase safety, enhance environmental accountability, and improve process performance by obtaining better information from more places.

New Must-Have Measurements

As new environmental and safety laws are passed, companies are finding wireless to be the least expensive and most practical way to implement must-have measurements.

In one instance, wireless technology enabled a California cement company to comply with air quality emissions requirements, despite its rotating equipment and

harsh conditions. A self-organizing wireless network of field instrumentation monitors the process used to reduce NOx emissions inside a rotating cement kiln at the facility. The rotation, extreme temperature and location of the kiln made using a wired solution impractical. The gradually sloped 540-foot (L), 13-foot (dia.) kiln rotates almost twice a minute and operates at temperatures as high as 2,800° F. The continued addition of process variable instrumentation to optimize the control strategy can become overwhelming, but wireless allows for easy movement of the process indicators to various positions on the kiln.

Wireless solved another kind of problem at a chemical plant in Australia, where production was halted two or three times per week due to the failure of wired instruments mounted on a rotating reactor. Contamination entering at slip-ring connection points resulted in unreliable transmission of data and caused the frequent shutdowns. Wireless transmitters mounted on one end of the reactor now measure pressure and temperature within the moving vessel. The motion of the reactor does not affect the quality of data transmitted to a nearby logic controller, enabling the company to optimize each chemical reaction for greater productivity and higher product quality.

Safety often provides a reason for adding wireless devices. For example, a wireless network has replaced local hard-wired high-temperature trip protection on 20 hazardous-duty chemical pumps at an ammonium nitrate production facility. The new WirelessHART™ network, comprising 20 wireless temperature transmitters, 20 wireless discrete switches, dual-element temperature sensors and high-temperature switches, extends about 1,500 feet from end-to-end. The transmitters are connected by a self-organizing wireless mesh network to one Smart Wireless gateway, which relays the data to a digital automation system for monitoring, alarming and trending purposes. The wireless discrete switches transmit system fault and high-temperature trip signals from the temperature switches to the digital system console, where operator graphics display temperature and switch data for each pump, along with a wireless network overview and status screen for operations and maintenance personnel.

Want-To-Have Measurements

When a plant is built, many proposed measurement points are never wired. Later, operating personnel may identify additional points where measurements could improve plant performance, but adding wired field devices could not be cost-justified. Now, costs can be reduced dramatically with wireless.

The many manually operated (or even automatic) valves that today provide zero feedback on their actual positions are prime targets for wireless because incorrectly positioned valves represent a significant cause of safety-related incidents. Infrequently used valves are not normally monitored today because of the high cost of wiring them, but accidents can happen when operators incorrectly assume that a valve is closed. Cost-effective wireless monitors on manually operated valves could become the single largest application area for wireless devices in chemical plants. A Kansas-based chemical manufacturer is using Fisher® wireless position monitors to help avoid inadvertent emissions and bad batches, as well as avoid the high costs

of rework, cleanup and lost material.

There are many other examples of wireless devices providing measurements that were not possible a few years ago, including:

- Continuous vibration monitoring of rotating equipment.
- Heat exchangers that use wireless monitors to give personnel advance warning when maintenance may be needed.
- Monitoring of filter performance.

The rapid acceptance of wireless technology can be attributed to its reliability, ease of installation and use, and cost-effectiveness, driving the use and expansion of self-organizing wireless mesh networks in chemical complexes around the world.