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Japanese, Chinese Plants Bag Hart Awards

January 18th, 2010

Mitsubishi Chemicals and Evonik Degussa Specialty Chemicals are recognized for outstanding use of Hart Communication technology.



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By one recent measure, at least, the most notable work in process instrumentation communication these days is taking place in Asia. Plants in Japan and China recently grabbed two top awards from the **Hart Communication Foundation (HCF, www.hartcomm.org)**, the Austin, Texas-based organization that oversees the Hart Communication protocol used in intelligent process measurement and control field devices.

The HCF announced on Dec. 18 that it had selected the **Mitsubishi Chemical Corp.** ethylene plant in Kashima, Japan, as recipient of the 2009 Hart Plant of the Year Award. Then on Jan. 13, HCF said that the **Evonik Degussa Specialty Chemicals Co.**, in Shanghai, P.R. China, is being recognized with the Hart Innovative Achievement Award.

The **Plant of the Year award** won by Mitsubishi is given annually to recognize the people, companies and plant sites around the globe that are using the advanced capabilities of Hart communication in real-time applications to improve operations, lower costs and increase availability. The Innovative Achievement Award given to Evonik Degussa is presented to recognize exceptional achievement, ingenuity and innovation in using the power of Hart communication in real-time applications, HCF said.

Plant-wide deployment

What prompted the Innovative Achievement Award to the Chinese specialty chemical maker? Following research on the use of Hart in all phases of the plant life cycle, engineers at Evonik decided to use Hart communication throughout their new methacrylates production complex, including design, construction, device configuration, loop check, operations, maintenance and troubleshooting. The complex has more than 2000 Hart-enabled instruments and valves installed from multiple global manufacturers.

“We were impressed with how extensively this greenfield project used the appropriate design and equipment necessary to take full advantage of Hart technology and the intelligence of smart field devices,” explains Ron Helson, HCF executive director. “Integrating Hart data into their DCS (distributed control system) and **asset management** systems provides full-time access to valuable device and process information that is often overlooked. Providing this real-time information to operations and maintenance personnel lowers operating costs and improves plant availability.”

For its part—as the 2009 Hart Plant of the Year winner—the Mitsubishi Chemical plant is using the Hart communication capability of more than 800 interoperable field devices integrated with its DCS and asset



management systems through multiplexers and Hart-enabled input/outputs (I/Os) to access real-time continuous process variables and diagnostics. By accessing this real-time intelligent data, the company is able to diagnose abnormal process conditions and track equipment health 24 hours a day. As a result, peak production performance has improved with an estimated operational savings for the plant of \$20,000 to \$30,000 per day.

Diagnostics also are used at the Japanese plant to uncover device failures before they affect the process. It is estimated that two or three device failures have been detected that would have caused unplanned shutdowns. An unscheduled plant shutdown costs an estimated \$600,000 in lost production per day with a minimum production restart time of five days (\$3 million USD total savings).

Reduced costs

“Diagnostic parameters that help detect signs of an abnormal situation or degrading performance are difficult to obtain with simple handheld devices because they require a time-consuming, manual, step-by-step approach,” says Takayuki Aoyama, team leader, instrumentation group, Mitsubishi Chemical. “Hart technology made it possible to access this data without manual operation. This made it much easier for us to gather data and detect abnormal situations from field devices and has reduced maintenance costs by 10 percent.”

In addition, trending and analysis of secondary process variables throughout the plant provide process insight that has allowed plant engineers to analyze, troubleshoot and resolve a number of operational problems including plugged impulse lines, an unstable flow profile, and an inefficient compressor pump.

“We have designated Hart as our standard communication protocol and will replace (older) devices with Hart-type whenever we get a chance,” says Takayuki. “We use Hart communication to collect online data from our field devices without disturbing the 4-20 milliamp (mA) analog signal to the control system. Our goal is to detect abnormal situations in the process and protect field devices from malfunctions.”

“Mitsubishi Chemical is a perfect example of how the power of Hart can be used to lower costs, improve plant availability and help keep a plant competitive,” says HCF’s Helson. “We congratulate Mitsubishi Chemical on their innovative use of Hart Communication in applications that not only benefit their company, but also serve as a powerful model for industry users worldwide—a working illustration of how to realize far greater benefits from HART Communication than ever before.”

Quantifiable benefits are also reported by Innovation Achievement Award winner Evonik Degussa Specialty Chemicals. “Brainstorming sessions based on technical reports regarding the use of Hart in asset management systems led to establishing a more efficient loop check methodology in compliance with international standards,” says Luc Sterck, project manager, instrumentation, Evonik Engineering-Automation and Process Management. “As a direct result of this implementation, we cut loop check time and costs by 25 percent. As well, daily troubleshooting of instruments are now mainly performed from the safety and convenience of the control room.”

Benefits listed

According to Sterck, benefits realized through the real-time use of Hart communication include: easy configuration of field instruments from the control room; easy calibration management of instruments; online diagnostics and status monitoring of devices; automated documentation of calibration and configuration data into the asset management database; fewer people needed for maintenance; and easy checking/adjusting of device parameters for better control loop tuning.

“We are now initiating a **predictive maintenance** program in which priority equipments such as control valves and safety instruments in key implementations receive immediate attention,” Sterck says. “We strongly believe that our plant’s commitment to implement predictive device diagnostics on all Hart instruments will bring comprehensive and pertinent operating information to key personnel and therefore assure better plant availability by predicting unexpected failures and avoiding associated downtimes.”

Evonik is a global leader in specialty chemicals and has been producing specialty chemical products in China since the early 1990s with wide-ranging trading relations already in place prior to this. The Group now has a total of 20 companies and 16 production sites in the region. In fiscal year 2008, 4,000 employees generated sales of over €820 million.

Mitsubishi Chemical Corp. is Japan’s largest chemical manufacturer, and has 39,000 employees, including subsidiaries. The ethylene plant capacity is 380,000 tons per year. Approximately 800 Hart devices are currently installed in the plant with an additional 2200 4-20 mA only devices that will be upgraded over time.

Hart Communication Foundation

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