Refinery Improves Availability of Coking Unit with Wireless Monitoring

RESULTS

- Improved availability of coking operation by reducing unplanned failure of expensive equipment
- Operator time freed up for higher value activities
- Up to 90 percent reduction in installed cost over traditional wireless network

Unplanned shutdowns are minimized because of more frequent and accurate bearing temperature monitoring.

APPLICATION

Calcining Unit for a Coking Operation

CUSTOMER

Refinery in North America

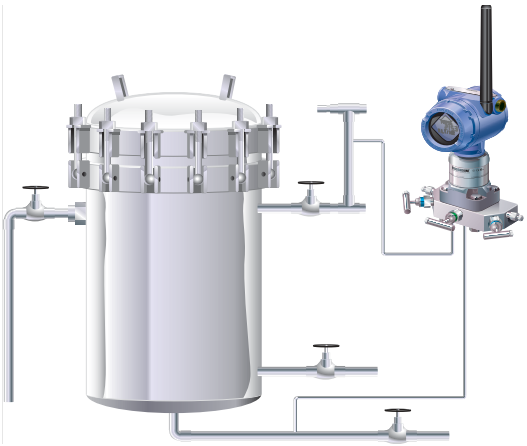
CHALLENGE

A refinery in North America wanted to automate non-production areas of their plant to free up labor resources for higher-value activities that improve plant productivity. Unfortunately, the high installed cost of traditional wired instrument networks was prohibitive, and they were forced to manually log most of their monitored points. Operators were visiting the calcining unit for the coker once a month and manually logging motor bearing temperatures, pump casing temperatures, differential pressure across water filters, and in-line pressures on chemical injection lines to detect plugging.

For the motor bearing and pump casing temperatures they had to manually take the readings for each of the three hearths with an infrared gun, then write them in a log and key the data into a data historian. This was in addition to any action that would be taken in case maintenance was needed. Because of limited resources, the refinery was seeking a cost-effective way to automate this area of the coker and free the operators from this time-consuming process. They also wanted to eliminate human error in logging each measurement and keying it into the historian. Finally, they wanted to improve resolution to the process and receive readings every hour instead of the current rate of once per month. They hoped to move from preventative maintenance techniques, which could result in unnecessary maintenance or unplanned failure of expensive equipment, to a proactive environment with predictable turnarounds. They needed an affordable, reliable measurement system that could handle the high humidity, high vibration, high EMF/RF environment as well as the extreme temperatures of -40°C to 85°C.

SOLUTION

The refinery installed a Smart Wireless self-organizing network from Emerson to monitor 14 points across a 1200 foot area of the coker and support units. Customers have estimated the cost of installing a traditional wired point is $8,000 to $15,000, including engineering and design for power and



Typical filter application

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communications, installation, and materials (excluding the cost of the instruments). In comparison, a wireless point on the self-organizing network only costs an average of $1,000 per point, representing a 90 percent reduction over the wired solution, which made the project feasible for the customer. They installed the Rosemount 648 wireless temperature transmitter for motor bearing and pump casing temperatures and the Rosemount 3051S wireless pressure transmitter to monitor plugging of water filters and chemical injection lines. Emerson's 1420 Wireless Gateway was installed to connect the wireless instruments to the existing OSIsoft® PI System.™ Live process data as well as trend histories from the calciner are now available to operators, instrument technicians, engineers and management through their existing PI System.

Very little training was required, since Rosemount wireless devices can be installed exactly the same way as wired devices. The customer had their own people install and start up the equipment; they did not need Emerson engineers. In fact, one instrument engineer acknowledged that the instruments look exactly like their wired counterparts.

Now the plant monitors bearing temperatures more frequently and accurately, and is able to detect problems in motor and pump casings before they lead to unplanned failure. On the first day of installation, the plant engineers noticed the bearings on one hearth were running 30°C hotter than optimal. They installed a cooling system to prolong the life of that equipment and prevent an unplanned shutdown. The bearing temperatures for all three hearths are used to modify the capacity at which the calciner is operating. If the motor or pump casing temperatures go above a critical point, plant engineers reduce the capacity of the calciner so the motors can safely run until the next scheduled turnaround without damaging their equipment. Other equipment like filters has been optimized by higher accuracy and higher resolution to the process. Back flushing is no longer based on a set schedule, but is performed as needed based on the differential pressure trend history in the historian. This has prevented filter plugging and subsequent downtime as well as reducing unnecessary maintenance activities.

The operators still make rounds, but without an infrared gun and a manual log. They use a wireless PDA to interrogate their wireless instruments and connect to the data historian to check trend histories. Their focus is now on solving problems instead of manually reading, logging and entering data. With higher resolution to the process and more accurate measurements, the plant has improved the availability of the coking operation, streamlined maintenance activities, moved the plant to predictable turnarounds, and minimized unplanned failures of expensive pumps and motors.

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RESOURCES

http://www.emersonprocess.com/rosemount/smartwireless/

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00830-0200-4420, Rev AA