Emerson's Smart Wireless Devices Protect "Hot Tanks" at Hunt Refining by Avoiding Cold Spots and Costly Damage

BENEFITS

- Easy and cost-effective installation of Smart Wireless solution helps to prevent costly damage
- Temperature data is carried to the refinery's control system
- Wired or wireless, the data appears the same

CHALLENGE

At Hunt Refining, operators need to keep asphalt at process temperatures above 212° F in about 10 tanks, to avoid formation of cold spots. When very hot asphalt (at 300° to 400° F) is added to a tank, the hot fluid may "melt through" the currently stored asphalt and reach cold pockets where any moisture present can flash off violently. Such "cold spots" can lead to tank failure, with repairs costing up to $200,000 per tank.

SOLUTION

A decision was made at Hunt to install wireless temperature sensors in these tanks and connect the measurement data into the refinery's distributed control system so cold spots could be avoided, and easily identified if they do occur. Three Rosemount® wireless temperature transmitters were positioned 120 degrees apart around the outer circumference of the tank and one to two feet above the bottom. The Smart Wireless Gateway for these transmitters was located about 400 feet away near the I/O building with a repeater between the tank and gateway to assure reception of all signals transmitted on the self-organizing wireless network. Two-wire Modbus communication carries the temperature data from the Smart Wireless Gateway to the refinery's distributed control system. Emerson's AMS® Suite predictive maintenance software is connected along with the Plant Information (PI) network, so the wireless field devices are added to all wired devices managed by this software. Several hot tanks at the refinery are fitted with wireless temperature transmitters as a cost-effective means of keeping control room operators informed of conditions inside the tanks.

"This wireless technology proved to be so reliable and robust it has already been expanded with temperature monitors on more tanks networked to a second Smart Wireless Gateway. That gateway also receives transmissions from a single wireless temperature transmitter monitoring the water being returned to the Black Warrior River to be certain of compliance with environmental regulations."

Dennis Stone
Hunt Refining Process Control Engineer

For more information:
www.EmersonProcess.com/SmartWireless

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RESULTS

Wired or wireless, the data appears the same. The installation was simple, and the transmitters came up immediately and talked with the gateway as soon as power was applied. The gateway was easily connected to the distributed control system via a 2-wire Modbus communication. Now, any computer with access to Hunt's Plant Information network can obtain the information.

Each wireless device on a self-organizing network can act as a router for other nearby devices, passing messages along until they reach their destination. If there is an obstruction, transmissions are simply re-routed along the mesh network until a clear path to the Smart Wireless Gateway is found. Although the transmitters at Hunt Refining are spaced evenly around the tank and not within sight of each other, their transmissions easily "bend" around the tank and then on to the repeater and gateway.

As conditions change or new obstacles are encountered in a plant, such as temporary scaffolding, new equipment, or a parked construction trailer, these wireless networks simply reorganize and find a way. All of this happens automatically, without any involvement by the user, providing redundant communication paths and better reliability than direct, line-of-sight communications between individual devices and their gateway. This self-organizing technology optimizes data reliability while minimizing power consumption. It also reduces the effort and infrastructure necessary to set up a successful wireless network.

Smart Wireless transmitter on tank.

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