Smart wireless solutions solve compliance and complexity issues

Two European chemical companies have turned to smart wireless solutions: the first to help meet local environmental regulations and the second to improve condition monitoring of filters. Sean Ottewell reports.

Deux sociétés européennes chimiques se sont tournées vers des solutions intelligentes sans fil : la première en vue de répondre aux réglementations environnementales locales et la seconde afin d'améliorer le suivi d'état des filtres. Article de Sean Ottewell.

Zwei europäische Chemieunternehmen haben sich für intelligente Funklösungen entschieden: Das erste Unternehmen, um die lokalen Umweltschutz-bedingungen zu erfüllen, und das zweite, um die Zustandsüberwachung bei Filtern zu verbessern. Sean Ottewell berichtet.

Fig. 1. The temperature of the water extracted from the river is transmitted wirelessly to a Smart Wireless gateway.

Image courtesy of Emerson Process Management.

Wireless technology has long overcome its traditional drawbacks. However, as two new projects demonstrate, smart wireless solutions are proving to be the ideal answer in the difficult process situations that regularly occur in the chemical industry.

The first project is at the Lenzing Fibres mill in Heiligenkreuz, Austria. Here Emerson Process Management has successfully applied its Smart Wireless solution to monitor river water temperature.

Lenzing Fibres is the world's largest producer of Tencel fibres. Made from wood pulp cellulose, Tencel offers a combination of the most desirable properties of man-made and natural fibres. According to the company, this makes it as soft as silk, strong as polyester, cool as linen, warm as wool and absorbent as cotton.

The Heiligenkreuz plant uses water drawn from a local river for cooling purposes. Local environmental regulations require that the water returned to the river must not be more than 3°C higher than the water extracted. The regulations also stipulate that the company must maintain a constant check and record of the water temperature at both inlet and outlet points.

Prior to the regulation being introduced, Lenzing was already monitoring the water temperatures manually involving daily visits to the river. However, to meet the environmental regulation there was a need to improve the reliability of the results and for these measurements to be easily stored and be made readily available for inspection. By implementing a solution that enabled online measurements, Lenzing Fibres was presented with an opportunity to reduce operations costs by eliminating the number of trips to the river and to streamline the reporting.

The water temperature is transmitted wirelessly via Emerson's Rosemount wireless temperature transmitter, to a Smart Wireless gateway. The gateway is on an external wall of the pump station control room, 200 metres away (Fig. 1). A second wireless transmitter is installed where water is returned to the river, and a third transmitter is 200 metres downstream where it measures the temperature of the remixed water after the return point. A fourth transmitter is currently used as a weather station and is situated by a nearby lake that is used as a cooling water reserve. This device acts as a repeater and provides additional paths for the self-organising network, ensuring the highest possible communication reliability.

Emerson's AMS Suite: Intelligent Device Manager is used to manage the new Smart Wireless devices, enabling the technicians to configure the devices, run diagnostic checks and monitor alarms and alerts. AMS Suite is also used to manage and store calibration information. The Smart Wireless network is integrated into Lenzing Fibres' existing control system and the temperature information is stored in a data historian to meet environmental regulations.

Emerson's self-organising technology delivers high communications reliability and makes addition of more measurement devices easy. Each wireless device 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 network until a clear path to the Smart Wireless gateway is found. As conditions change the wireless network simply reorganises and finds a way to get its signals through.

Installation of the wireless temperature transmitters in Emerson's self-organising wireless network enables the company to meet local government regulations related to the temperature of water discharged into rivers and watercourses.

A similar solution also enables INEOS to monitor filters within polyethylene pellet transportation tubes, blockages of whose filters can lead to production downtime at its plant in Cologne, Germany. The pellets are 'blown' through the transportation tubes using compressed air. The incoming air is filtered to prevent any pollution of final product. The filters become blocked over time and lose their efficiency, which in turn affects the quality of the end product.

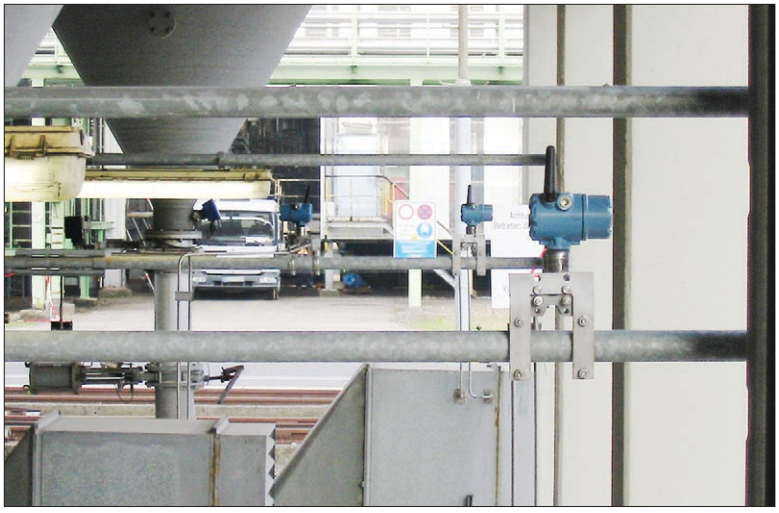

Fig. 2. The eight wireless transmitters send pressure data back to the INEOS control system where the condition of the filters can be constantly monitored.

Image courtesy of Emerson Process Management.

A liquid column (u-tube) was installed across the filter, indicating the differential pressure. An increase in the pressure suggests that the filters are blocking. Identifying a blocked filter did, however depend on the operator making his rounds at the moment the blockage was becoming noticeable.

An automated alternative to the operator's visual inspection was to measure the differential pressure across the filter. An increase in differential pressure above a pre-determined point would indicate that the filter is becoming blocked. However, because of the location of the filters, connecting the required measurement points back to the control system using a wired solution was not feasible.

INEOS looked at a number of wireless technologies for this task, but found that line-of-sight solutions could not provide the reliability of connection or the robustness they required. The transmitters are positioned in a dense working environment with many metal obstructions that can cause interference. There is also moving equipment that could cause temporary loss of signal for line-of-sight wireless solutions.

INEOS installed Emerson's Smart Wireless solution. Eight Rosemount 3051S DP wireless transmitters were installed as well as a single Emerson Smart Wireless gateway. The eight wireless transmitters send the pressure data back to the INEOS control system where the condition of the filters can be monitored. The transmitters are positioned up to 150 metres from the gateway (Fig. 2).

With the self-organising technology, each wireless device can act as a router for nearby devices, passing messages until they reach their destination. This happens automatically, providing redundant communication paths and better reliability than direct, line-of-sight communications between individual devices and a receiver. ❖

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