

Refinery Increases Plant Availability and Reduces Pipe Inspection Costs with Corrosion and Erosion Monitoring

Results

- Reduced pipe failure risk and unscheduled shutdowns with more consistent production performance.
- Eliminated costly and dangerous manual inspections as well as cut back on maintenance costs
- Automated system now monitors wall thickness continuously, in real time



Application

Rosemount™ Wireless Permasense Corrosion and Erosion Monitoring Sensors and Analytics Software used to monitor refinery equipment.

Customer

Asia-based energy company with refining in Thailand

Challenge

In the refinery's crude unit, one critical section of overhead piping caused ongoing headaches due to the high temperature involved and its position in the process with unusually elevated concentrations of acids and other corrosive elements. Localized corrosion tended to be worst in critical areas around fittings and welds which caused occasional breakthroughs and leaks.

The pipe's elevated location made it difficult and dangerous to repair or even inspect, calling for extensive scaffolding. These logistical complications meant the maintenance group could only take manual wall-thickness measurements during biennial turnarounds. The measurements provided neither the required frequency nor sufficient accuracy to plot metal loss in a way that could predict when a given area might be nearing a break-through.

Actual leaks called for an immediate response with a unit shutdown as the first step. This halted production as scaffolding had to be set up, insulation stripped away, and welders called in to perform and certify the repairs. If production could not be restarted soon enough, downstream units had to be slowed or even shut down, creating costly ripple effects through the larger facility.

Plant engineers concluded that the only practical solution to ensure uninterrupted production would involve permanent mounted sensors capable of measuring the wall thickness in real time.

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Wanravee T.
Inspection Engineer

Solution

The facility selected Rosemount Wireless Permasense Corrosion Sensors based on their accuracy and ease of installation. These sensors send data via the facility's *WirelessHART*® networks, so they require no cabling and their internal power modules last for six to eight years. The sensors require no pipe penetrations and are able to withstand the normal pipe temperature of 570 °F (300 °C) in continuous operation.

After consultations with Emerson engineers, 18 critical locations were selected where corrosion had been or was likely to be severe. During a scheduled shutdown, technicians installed 48 sensors in those locations, using models WT210 and ET210, and connecting them to the *WirelessHART* network. The Plantweb™ Insight Inline Corrosion application gathers and analyzes the data. The installation proved simple and with little training the sensors can be handled by plant operators. All corrosion monitoring can be done from the control room. Engineers neither need to climb scaffolding nor enter hazardous places.

With the installation of Emerson's Rosemount Wireless Permasense monitoring system, the plant now has real-time monitoring of the critical areas. As the historical data grows, it is possible to determine the rate of metal loss in addition to the current pipe thickness. Operations and maintenance can evaluate the condition and judge if the pipe will remain safe until the next shutdown or if more immediate action needs to be taken. Historical data is benchmarked to high and low metal loss which can be used to compare with operating conditions to suggest appropriate changes.

If any thickness crosses a minimum threshold, it can trigger an alarm or even shut down the unit. However, continuous monitoring is designed specifically to avoid those drastic responses. With the capabilities of continuous metal thickness monitoring, the facility is able to operate more profitably thanks to a very accurate picture of the equipment condition. The ability to control all aspects of production in real-time is the ultimate tool for improving financial performance.

Resources

Emerson Automation Solutions Industries

[Emerson.com/Refining](https://www.emerson.com/Refining)

Rosemount Wireless Permasense Corrosion and Erosion Monitoring

[Emerson.com/RosemountCorrosion](https://www.emerson.com/RosemountCorrosion)

Emerson Automation Solutions
Asia Pacific
1 Pandan Crescent
Singapore 128461

+65 6777 8211
+65 6777 0947
Enquiries@AP.Emerson.com

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As the extent of historized data grows, it is possible to determine the rate of metal loss in addition to the thickness at the moment. Operations and maintenance can evaluate the condition and gauge if the pipe will remain safe until the next shutdown or if more immediate action needs to be taken.

Consider It Solved.

Emerson Automation Solutions supports you with innovative technologies and expertise to address your toughest challenges.

For more information, visit [Emerson.com/Corrosion-Erosion](https://www.emerson.com/Corrosion-Erosion)