

Chemical Manufacturer Avoids Shutdowns by Using Fieldbus Technology

RESULTS

- Avoided chemical reactor shutdown
- Estimated cost savings of \$1.5 million in lost production
- Avoided labor and material costs associated with unplugging the reactor



APPLICATION

Monitoring reactor temperature during polymerization process

CUSTOMER

A North American chemical manufacturing company

CHALLENGE

It is typical to carefully monitor the transition of a chemical reactor during start-up with a process designed to run at constant steady state conditions. In this case, a chemical manufacturing company was preparing to start up one of its production trains for a particular product type. Precise control of the operating conditions was necessary to regulate the polymerization process to produce on-spec product.

To observe the progress of the reaction during start-up, the customer wanted to monitor the temperature profile of the reactor's dome. Any indication of the temperature moving outside the normal limits could indicate that polymerization was occurring in the wrong stage of the reaction. This could create a solid polymer plug in the reactor, which could cause a unit shutdown. If the reactor were to plug, it could cost the customer anywhere from two to three weeks in downtime, depending on the severity of the plugging or polymerization. Lost production for this unit is estimated at approximately \$3000 per hour of downtime. This number does not include the labor and material costs that would be required to unplug the reactor.

SOLUTION

The project team first evaluated a traditional approach using individual transmitters on 16 temperature sensors. Because of the long wire run and high installation costs, the project was not funded. However, when the team learned of the Rosemount 848T Eight Input temperature transmitter and its potential wiring cost savings due to the FOUNDATION™ fieldbus

The Rosemount 848T and 3420 provided an efficient, cost-effective solution.

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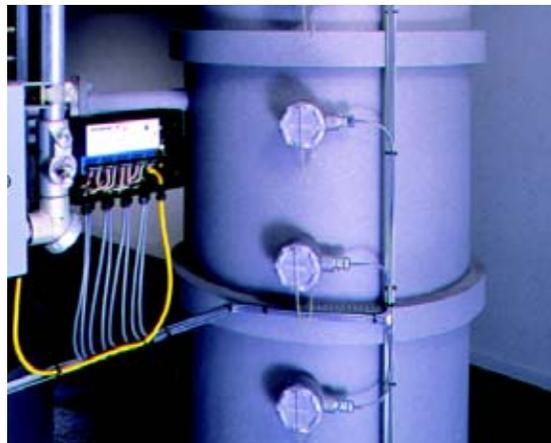
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technology, they quickly realized they had a cost-effective alternative. They also used the Rosemount 3420 Fieldbus Interface Module because their 5-year-old TDC DCS did not have fieldbus capability, but a Modbus Serial interface was available. The cost of the 848T/3420 solution was about 50% of the traditional analog installation.

The instrumentation used in this application consisted of two 848Ts and one 3420. Sixteen Type J thermocouple assemblies with magnetic pull downs were installed at each required temperature monitoring point. The sensor lead wires were run to a nearby 848T with each transmitter accepting eight sensor inputs. The 848Ts are mounted in a junction box and wired to a fieldbus terminal block. A single pair of wires is run from the 848Ts to the 3420, which is located about 650 feet away in the control room where they are then interfaced to the DCS.

This cost effective temperature monitoring solution proved beneficial to the customer during start-up. The 848T and 3420 enabled the customer to notice an increase in temperature on the dome of the reactor during start-up. Upon entering the reactor, plastic buildup on the inside of the dome was identified. Without these extra monitoring points, the problem would not have been identified early enough to avoid a shutdown. The customer estimated a savings of approximately \$1.5 million in lost production.



The Rosemount 848T installed.

RESOURCES

Rosemount 848T

<http://www.emersonprocess.com/rosemount/products/temperature/m848t.html>

Rosemount 3420

<http://www.emersonprocess.com/rosemount/products/accessories/m3420.html>

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