



ProcessLogix Process Control System Minimizes Temperature Overshoot, Reduces Temperature Variances in Batch Reaction Process

Coherent Technologies, Incorporated, an Authorized Rockwell Automation Application Solution Provider, improves product quality, and increases primary product production.

Application Profile

Industry Overview

Many Specialty Chemicals and Polymers producers are batch operations with one or more batch reactors at the heart of the process. Traditionally, such operations are either manual or partially automated with manual intervention and supervision still required. Product quality and price pressures of the global marketplace, however, demand more reliable, more repeatable and tighter control of these processes. This calls for complete automation.

Specific Application Problem

Numerous sequences of operations must be seamlessly orchestrated in order to produce a high quality product with a minimum batch cycle time. Raw material charges must be accurately metered into the reactor in a repeatable fashion. The resulting mix must be heated to reaction temperature quickly to minimize batch cycle time, without overshoot to minimize quality problems and prevent runaway reaction. The reaction then proceeds to one or more cook cycles within tight temperature specs, followed by a rapid cooling and product transfer. Recipes must be easily accessible by operators to accommodate product changes. Interlocks must be in place to ensure safety and quality.

The Previous Control System

The process in one such facility was previously a manual operation with the exception of a panel-mounted batch temperature controller. This left the plant susceptible to inaccurate material charges and less than ideal

temperature control, resulting in wide quality control limits, and costly downtime and materials loss when batches went bad. The stakes were even higher when the plant decided to increase capacity of the facility with the addition of a substantially larger reactor.

Potential Solutions

Most of the operations in such a plant utilize discrete I/O, traditionally the realm of PLC controllers. However, control of the reaction itself, a highly non-linear process, involves some advanced regulatory control, achievable with PLC controllers, but typically simpler to integrate using algorithms provided in a DCS development environment. The challenge for specialty chemicals and plastics firms is to achieve this type of control at a cost closer to that of the PLC.

Rockwell Automation's ProcessLogix Process Control System provides the control algorithms of a DCS needed for batch reaction control. In addition, it provides an easy to use tool for building the logic required for control of the sequences of operations (Sequence Control Modules), functions that traditional DCS system don't always provide. This comes at a cost that is much less than traditional DCS solutions,



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making ProcessLogix the ideal solution for the combination of discrete control and advanced regulatory control found in batch reaction processes.

Specific Architecture

The system consists of a ProcessLogix Server which serves as the operator interface, and maintains the global database, and all reports and system messages. Adding workstations is as simple as dropping another PC on an Ethernet cable and loading the client software. Redundant servers are available for critical process units.

A single 1757 controller communicates to the server via ControlNet. Redundant cabling and redundant CPUs can be incorporated for critical processes. In this application, the I/O modules are located on the same rack as the controller. The controller itself occupies two slots in a standard Allen-Bradley ControlLogix equipment chassis.

Existing PLC controllers running discrete burner management systems can be brought into the ProcessLogix Process Control System through the standard Allen-Bradley DH+ communications protocol directly into the server.

Integrator-Specific Expertise

Coherent Technologies Inc. is a Rockwell Applications Solution Provider with extensive experience in the area of batch automation including batch reaction, mixing and blending, and startup and shutdown of critical processes.

Results of the New System

Coherent Technologies Inc. has integrated such a system for a batch reactor with excellent results. Overshoot was minimized on break-over

from heat-up to cook cycles and temperature variance was reduced during cook cycles resulting in improved product quality and increased prime product production.

The ProcessLogix system provides the ease and convenience afforded by its Windows NT based operating system while providing the ruggedness and reliability of a PLC controller. Operators have access to recipes through graphics provided on the Windows NT operator station. Engineers can easily modify or add to the controls configuration through the Control Builder software running on an NT server and download it to the C100 controller.

The ProcessLogix System has a footprint the size of a traditional MMI/PLC system, considerably smaller than that of a DCS system. The controller itself is no larger than a dual wide IO module and sits in the front of the I/O rack.

Coherent Technologies Inc. - Rockwell Applications Solution Provider

CTI specializes in control systems integration for the process industries, including specialty chemicals and polymers. Incorporated in 1985, Coherent Technologies, Inc. is an engineering consulting firm specializing in the design and configuration of control and enterprise-wide information systems for industrial facilities. Coherent's engineers have worked for operating companies and have extensive experience in automation projects, process operations and system configuration. Coherent offers a complete range of services including project scope development and justification, engineering, project and installation

management, commissioning (start-up and hot cut-overs) and system documentation. CTI services our worldwide customers from our headquarters in Houston, Texas.

The mission of the Control Systems Engineering (CSE) group at Coherent is to provide a comprehensive controls solution including control design, automation design and configuration services. We focus on the end user approach, highly flexible and proficient in all aspects of an automation project.

Rockwell Automation

Rockwell Automation/Allen-Bradley has developed and marketed a variety of process control products and services. Beginning with the introduction of analog I/O in the mid-1970's, Rockwell's controllers have been enhanced over time with the introduction of industrial networking, expanded instruction sets for PLC controllers, improved MMI packages, and process-oriented software packages for the family of PLC 5 products.

Today, Rockwell Automation/Allen-Bradley plays an even more important role in the process control industry. The seamless integration of PLC functions with ProcessLogix's DCS functionality provides a hybrid control system solution that offers the best of sequential control, the most advanced continuous process control, information management, and connectivity to the enterprise management systems. The solutions are now not only available and cost effective, but also easy to implement and use.

Reach us now at www.rockwellautomation.com

Wherever you need us, Rockwell Automation brings together leading brands in industrial automation including Allen-Bradley controls, Reliance Electric power transmission products, Dodge mechanical power transmission components, and Rockwell Software. Rockwell Automation's unique, flexible approach to helping customers achieve a competitive advantage is supported by thousands of authorized partners, distributors and system integrators around the world.

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