

Lime Kilns Switch to DeltaV™ System with No Shutdowns

RESULTS

- Increased production
- Reduced variability
- No shutdown, re-start production loss



APPLICATION

Lime kiln, limestone production

CUSTOMER

National Lime & Stone Company's Carey, Ohio mill kilns operate 24 hours a day, seven days a week, processing 20 million tons of limestone annually for use in products like asphalt, carpet backing, ready-mix concrete and other non-organic substances.

CHALLENGE

Each kiln moves limestone through combustion gasses at over 2,000°F in an effort to reduce residue carbon dioxide from 1% to 2% in the shortest possible time. If the kiln is too hot, limestone sinters into lumps and fuel is wasted. A too-cool kiln increases cycle time, reducing profits. It takes at least 12 hours for a cold kiln to regain operating temperature, so shutting down is avoided. The company wanted to increase production and reduce variability, but faced up to four days' shutdown time to replace its process control system.

SOLUTION

The company found it could install the Emerson's DeltaV™ automation system for tighter control of its lime kiln production with no downtime.

Beginning on a Monday, the old system was removed. With none of the original signal wires tagged, each pair of wires was tested and leveled and a lot of unused wires were removed.

By Wednesday afternoon all wires had been identified, application software configured, remote devices working; the system was powered up, with the controller and operator station on line. With the kiln kept hot, troubleshooting was easy and system tuning was possible. Customer acceptance testing was completed on Thursday and, by mid-

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Lloyd Kelly

Project Manager, National Lime & Stone Co.



For more information:
www.EmersonProcess.com/DeltaV



day Saturday, most of the kiln operators had been trained to navigate the DeltaV system's graphical displays and to make operational changes.

In the changeover, 15 temperature transmitters to profile kiln performance and lime quality were added to the original temperature flow, pressure, amperage, and oxygen transmitters. Control logic includes a master kiln temperature loop with adjustable air/fuel ratios to trim combustion air and natural gas demands. Cross-limiting these ratios ensures safe combustion control during load changes.

The project came in on time and on budget, providing additional performance enhancements including:

- System logic that monitors and remembers modes and setpoints and can restart control logic following power outages.
- Remote diagnostics and engineering via modem from anywhere, 24 hours a day.
- Online data collection and graphing of temperature and speed variables, which aids in laboratory analysis to better meet customer specifications.

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Future enhancement plans at the Carey mill kilns include developing fully automatic kiln control to reduce process variability from manual interventions, as well as installing a fuzzy logic controller to stabilize kiln temperatures caused by raw material variations.

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