



Society of Motor Management

Application Notes

Motor Management Helps Cement Plant Maximize Kiln Operations

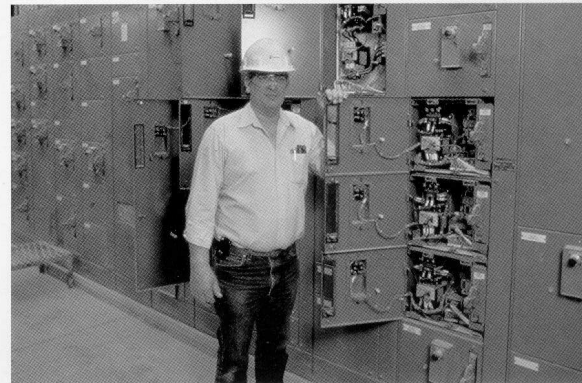
Incorporating motor management as part of a total control system upgrade helped Lafarge Corporation's cement plant in Alpena, Mich., reduce installation time, improve kiln operations and obtain greater diagnostic and preventive maintenance capabilities.

Lafarge is a worldwide supplier of building materials such as cement, concrete and aggregate used in virtually all forms of construction—from sidewalks and schools to highways and high-rise buildings. The Alpena plant is the company's largest cement-producing facility, generating approximately 2.5 million tons per year.

The Problem

Five large rotary kilns operate 24 hours a day, every day of the year—except for an annual maintenance shutdown. Approximately 500 motors, varying in size from one half to 450 horsepower, run various kiln functions. The loss of a critical motor could shut down a kiln and dramatically impact the plant's productivity and its profitability—especially since the five kilns average more than 9,500 tons of clinker a week.

According to Jim Grochowski, Lafarge systems engineer, the previous motor control centers were vintage 1960s models and were prone to mechanical failures. The first phase of the control system upgrade involved three of the five kilns and consisted of approximately 250 motors. One of the primary concerns was the need to install the new control system within the annual, 21-day scheduled kiln maintenance shutdown. That meant that re-wiring existing motor control centers was not a feasible option.



Lafarge Corporation saved considerable wiring and installation costs and achieved greater plant-wide reliability by installing pre-wired Allen-Bradley Bulletin 2100 Motor Control Centers integrated with the DeviceNet™ sub-network.

The Solution

Considering the short time available for installation and the need for diagnostic communications, Lafarge decided on a packaged control solution consisting of pre-wired motor control centers that included the DeviceNet™ sub-network. To maintain the operational integrity of these motors, Lafarge installed Allen-Bradley SMP-3™ Smart Motor Protectors as a cost-effective solution that would deliver the required information—beyond run, start and stop commands—to actually manage each motor.

Allen-Bradley PLCs

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The SMP-3 solid state overload relay allows the desired trip class to be programmed, guards against loss and ground fault, and protects motors from jam conditions. Jam protection, which takes the motor off-line within two seconds when a jam occurs, protects against overheating of the motor windings and damage to drive gears, belts, chains and other components.

These fully digital devices also simplify data acquisition by monitoring motor current and computing remaining thermal capacity, which identifies how close motor conditions are to tripping the overload. With this information, Lafarge might find that a filter needs cleaning, a conveyor is nearing capacity or motor bearings need attention—actions that are more predictive.

The Results

In addition to advanced motor protection, by linking the solid-state overload relays to the programmable controllers via DeviceNet, Lafarge was able to obtain more detailed motor management data at rates higher than those transmitted by traditional control wiring. They were also able to reduce both the wiring and component content of their system, such as current transducers and analog input modules.

The new motor management solution provides Lafarge with more operating data than in the past, giving operators a better understanding of motor loads and enabling them to respond

to mechanical and electrical problems with greater precision. With the amount and type of real-time and historical process information Lafarge can gather from the solid-state overload relays, they are able to monitor day-to-day trends and develop more sophisticated, predictive maintenance procedures. In addition, by eliminating all hardwiring to their central control, Lafarge has saved on wiring and installation cost and has achieved greater plant-wide integration and reliability.