

DeviceNet helps new cement plant cut commissioning costs by US\$10,000 per day and total engineering costs by 50%, or approximately US\$500,000

CEMEX Bangladesh cement plant was commissioned in less than 45 days. By going to market early, the plant realized an additional US\$5.47 million in revenue, while maximizing efficiency and capacity utilization.

Background

Since making its first batch of cement in 1906, CEMEX has emerged to become one of the world's leading producers and marketers of cement and ready mix products. With an annual revenue of US\$25 billion, the company is the third largest cement manufacturer in the world.

CEMEX decided to construct and commission a fully automated cement plant — including a cement mill, packer, and loading station — in Bangladesh, a growing country with a booming construction market. CEMEX Bangladesh would be a wholly owned subsidiary of CEMEX Monterrey, Mexico.

To reduce costs and speed time to market, CEMEX required that the plant be constructed with minimum start-up time and immediately deliver trouble-free performance. However, building a plant half way around the world in a hot, difficult climate would be challenging. Never before had CEMEX constructed a plant this size so far from the main office.

To ensure the new plant was "plug-n-play," not "plug-n-pray" CEMEX decided to try something new. The plant would be constructed entirely in Mexico by the CEMEX Technology Division, and then erected in Bangladesh by the Bangladesh Foundry & Engineering Works.



Challenge

To maximize efficiency and obtain a competitive edge, CEMEX has always been a strong believer in the "Complete Automation" approach to manufacturing. To provide automated control of the plant, CEMEX needed a solution provider who could deliver industry leading products, combined with strong local support.

In addition, CEMEX uses a variety of vendors that provide intelligent instrumentation for its plants. For CEMEX Bangladesh, it needed a reliable network that would provide quick and simple connectivity to these devices.

Solution

CEMEX approached Rockwell Automation to provide a complete automated control system for the

Bangladesh plant. A longtime user of Rockwell Automation products, CEMEX did not hesitate to select Rockwell Automation to develop the solution for their Bangladesh operation. In addition, because the plant was in close proximity to Rockwell Automation's India operations, CEMEX felt confident that Rockwell Automation could furnish the required level of local support.

CEMEX had considered using DeviceNet in their operations for a number of years because of its capability to connect with many different field devices, but thought it might be too difficult and too costly to use for the Bangladesh operation. Rockwell Automation coordinated



Commissioning the system early saved CEMEX approximately US\$10,000 per day, the cost that would have been required to deploy ten foreign technicians. Total engineering costs were reduced by 50%, or approximately US\$500,000. By being able to get to market 45 days earlier, the plant realized an additional US\$5.47 million in revenue.

By fully automating the plant using a trouble-free system, CEMEX was able to maximize capacity and reach peak

several plant visits including a cement plant, so CEMEX personnel could observe first-hand how DeviceNet could be implemented.

CEMEX concluded that DeviceNet would provide a solution that would be much more cost-effective and simpler to use than traditional solutions, such as wired I/O and other devices. DeviceNet gives CEMEX Bangladesh the ability to quickly and easily add equipment, anywhere at anytime. Plus, DeviceNet Starter Auxiliaries Plant Diagnostic provides the complete status of the plant, making it easier to track and identify faults.

Rockwell Automation proposed a comprehensive control system that employs two Allen-Bradley PLC 5/80 systems, two DeviceNet networks with a maximum of 64 nodes, and two eight section smart Motor Control Centers (MCCs). The system is controlled from two PC operator stations running FLS Automation ECS NT process control software over an Ethernet network. The system also includes the Rockwell Automation software products, RSLinx, RSLogix, and RSNetworkx.

The cement packing machine, screw conveyor, and bucket elevator are controlled by an Allen-Bradley SLC connected to the main PLC over a



network in the main control room. An Allen-Bradley 1336 Plus AC drive controls the conveyor speed to the weigh feeders.

Results

The entire control system was built and tested in a staging room in Monterrey, Mexico over a two-month period before being shipped to Bangladesh. Due to the simulated trial in Mexico, the plant was commissioned in record time — within 45 days compared to the three months usually required for most cement plants.

The trip around the world seemed to have little impact on the system. Only minor modifications were required during commissioning in Bangladesh. Loose cables were discovered on the DeviceNet module inside one of the MCCs. To address the problem, CEMEX only needed to tighten a few screws inside the module.

production much more quickly. Plus, through automation, the plant runs much more efficiently. Only three shifts of sixteen workers produce cement for the Bangladesh market in this highly automated environment. The new plant produces 1,750 tons of Portland cement per day, or over half a million tons per year.

Because of DeviceNet connectivity through MCCs, CEMEX cut its field wiring costs by 40% and civil works by 20%. Although an increased initial cost of MCCs wired with DeviceNet, DeviceNet employs fewer I/O cards, racks, and cabinets. With the lower wiring and commissioning costs, CEMEX actually saved 7-10% in total costs.

DeviceNet also saved installation time. Because the MCCs only need to be

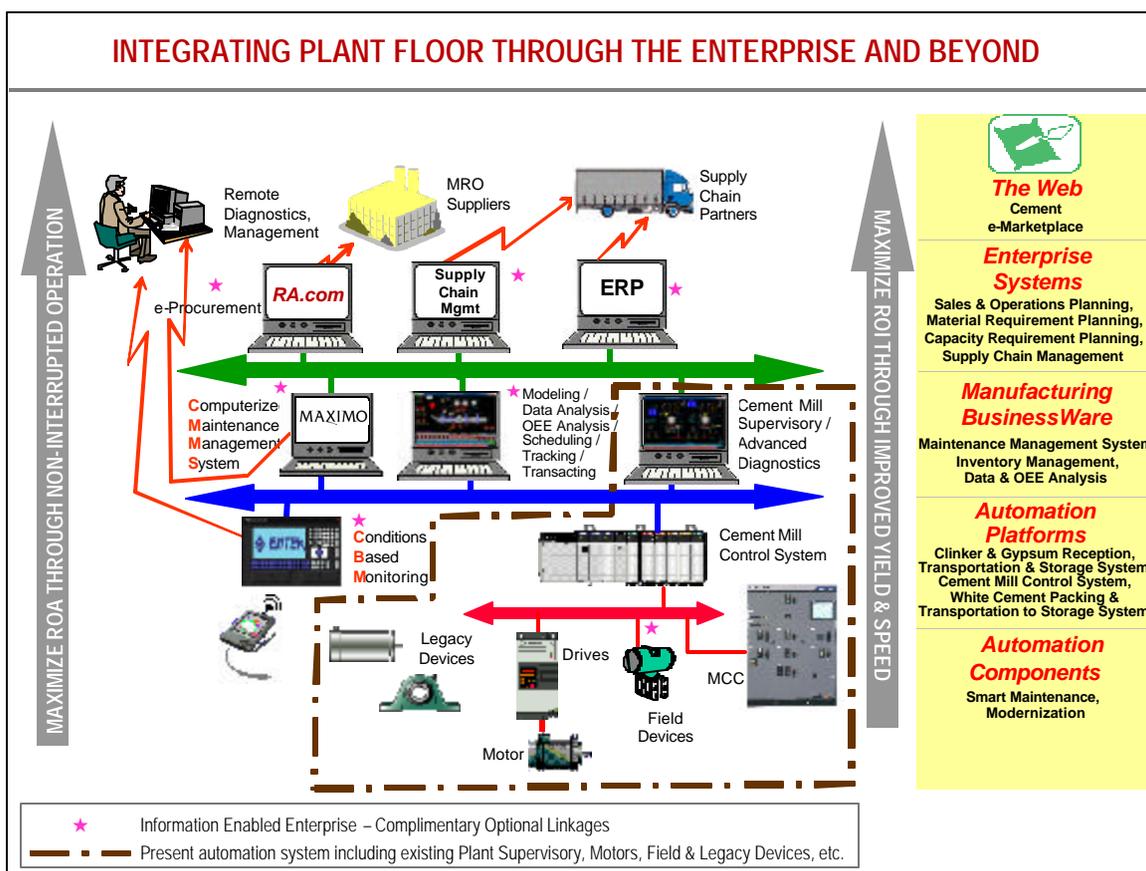
wired to the motor, DeviceNet only took 5 minutes per signal times 700 signals, cutting start-up time by almost two weeks alone.

CEMEX has been very pleased with Rockwell Automation products and support. It is planning construction of a new mill on the same site, and will approach Rockwell Automation to develop an automated system for the plant.

"The transfer of automation technology from Rockwell Automation India was transparent and the training they provided was excellent," says Nuruddin Khondakar, Automation, Electrical & Instrumentation Manager, CEMEX. "We are very happy with Allen-Bradley components, software accessibility, and troubleshooting compared to Siemens, which we had used previously. I have had no downtime in the plant since it was commissioned. We will definitely involve

Rockwell Automation in future expansions.

The architecture below depicts Rockwell Automation's concept of an Information Enabled Enterprise. The area outlined with a brown dash line represents the present automation level under discussion in this document. The remaining portion illustrates a host of solutions that Rockwell Automation can provide today to integrate the plant floor to the enterprise and beyond.



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