

Chettinad Cement in India

Building blocks of efficiency with state-of-the-art automation



The year 2012 marks the 50th anniversary of one of India's leading cement producers, Chettinad Cement. Over the last two generations, Chettinad has built the reputation of a technology leader – for example, it is the first cement producer in India to take advantage of fieldbus communication protocols. It kept an eye on the future: to ensure continued productivity, maximum energy efficiency and optimum environmental compliance, it looked to advances in measurement and optimization tools, automation and process control.

Chettinad Cement has emerged as one of the fastest growing cement producers in India over the past 10 years. A part of the Chettinad Group of Companies, Chettinad Cement continues to expand its production facilities with additional plants throughout India.

Starting in 1968 with a wet process cement plant, Chettinad Cement has since expanded its operations and diversified its cement products portfolio. It has established top position

in the Southern Indian market by aligning its products and services to the needs of cement users. Under its Builders Choice brand name, Chettinad Cement offers an extensive range of bagged products that includes Ordinary Portland cements and blended cements for building and construction applications.

It does not rest on its laurels. Chettinad Cement recognizes that further efficiencies and optimal operations can be achieved and ensured in its cement manufacturing process. It looked to investing in comprehensive operational and control technologies to manage and continually derive productivity gains from its assets.

Greenfield cement plant

In a growing economy such as India, construction and infrastructure are on an upward trend. Chettinad harnessed the potentials of the industry by building more plants to address the demands of the domestic market.



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Mr. C. Sudhakar, Technical Director
Chettinad Cement Groups

The cement plant in Karikkali was built by Chettinad Cement in 2001 as its second location. The plant, handling limestone mined from three kilometers away and transported by long conveyor belts, consists of two lines that produce a combined total of 7,400 tons per day (TPD).

Line 1, commissioned in 2001, features control system, instrumentation, drives and motors from ABB. Incorporating 150 transmitters (Profibus PA) to measure pressure and temperature at critical points down the line, the complete cement plant solution is comprised of an electrical power distribution and automation package. In 2010, the plant was enhanced with the Expert Optimizer (EO), a thin client-based graphical engineering and programming tool that controls and optimizes the kiln and mills.

For Line 2, commissioned in 2011, Chettinad again contracted ABB to supply a complete, IEC 61850 -compliant electrical power distribution and automation package. The contract comprises upgrading Line 1’s control system to ABB’s System 800xA including the latest human machine interface (HMI). Drives, motors and 150 transmitters were also supplied by ABB. In addition, the new ABB Advance Optima 2020 continuous gas analyzers were used to help with product quality and nitrogen oxides (NOx), sulfur oxides (SOx) compliance.

This plant features Knowledge Manager (KM), an ABB solution for production and quality management specifically for the cement and mineral processing industry. ABB leveraged its know-how and long experience in other deliveries to Chettinad. For example, for Chettinad’s 5,000TPD Ariyalur cement plant, ABB supplied the electrical power distribution and automation package (Line 1), and a distributed control system (DCS) (Line 2).

Measurement products

ABB automation and measurement products were also used on the 15MW power plant on the site that provides reliable power for the plant.

ABB Measurement Products’ Advance Optima gas sampling system is used on the kiln inlets. The model AO2020 analyzer receives a sample from an extraction probe that is inserted into the kiln to analyze combustion gases, specifically O₂, CO and NO, to maximize clinker quality, optimize fuel consumption, reduce emissions and ensure safe operation. Gas sampling is very challenging because of high temperatures and high dust loads. The Advance Optima AO2020 analyzer includes a water-cooled probe and a highly efficient self-cleaning function that ensures reliable measurements at the kiln inlet.

ABB’s 2600T series of pressure transmitters and sensors were used throughout the plant to ensure safe operation and optimal performance. These transmitters feature an easy-to-use local HMI for quick commissioning and maintenance, as well as a broad range of sensor technologies all of which are manufactured by ABB. Its plug-in communication board and terminal block can be replaced in minutes without the need to reconfigure the transmitter. Plugged impulse line diagnostics (PILD) are standard to ensure no false readings if the impulse lines become clogged or frozen. All ABB pressure transmitters are available with HART / 4-20 mA, PROFIBUS PA or FOUNDATION Fieldbus communications.

ABB provided a variety of temperature sensors connected to remote and direct mount transmitter housings in the Chettinad plant. The full line of transmitters and sensors, including high-temperature sensors for temperatures up to 1,800°C are available with HART / 4-20 mA, PROFIBUS PA or FOUNDATION Fieldbus communications.

Reduced energy consumption

Cement manufacturing is an energy-intensive process. Chettinad was keen to identify areas in its production line that need improvement in terms of energy usage.

Through these process optimization solutions, the amount of energy used by Chettinad's production processes can be lowered and therefore made more efficient.

For instance, by making full use of ABB's System 800xA capabilities, Chettinad's control room staff can adjust the process to run at its optimal level and reduce energy and raw material consumption, as well as keep vital processes running without interruption.

When an operator can use the integration of their process knowledge and System 800xA's full capability, energy consumption can be reduced by 10%.

Mr. C. Sudhakar, Technical Director, Chettinad Cement Groups, explains why Chettinad Cement chose ABB for their measurement and control on both production lines: "ABB is an excellent company. We are very happy with the reliability of the measurement devices we have in Line 1 at the plant and value the long-lasting, trouble-free solutions that ABB has delivered over the years. Line 2 is almost entirely ABB automation solutions and reflects our belief in ABB's proven technology, application expertise and responsive local support."

The solution for the Karikkali plant (Line 2) was delivered within eight months, with erection and commissioning completed within four months – all lending to a strong argument for instant gratification in a manufacturing process that never stops.

Chettinad Cement is certified for ISO 9001/2008, ISO 14001/2004 and IS 18001/2007.

The solution

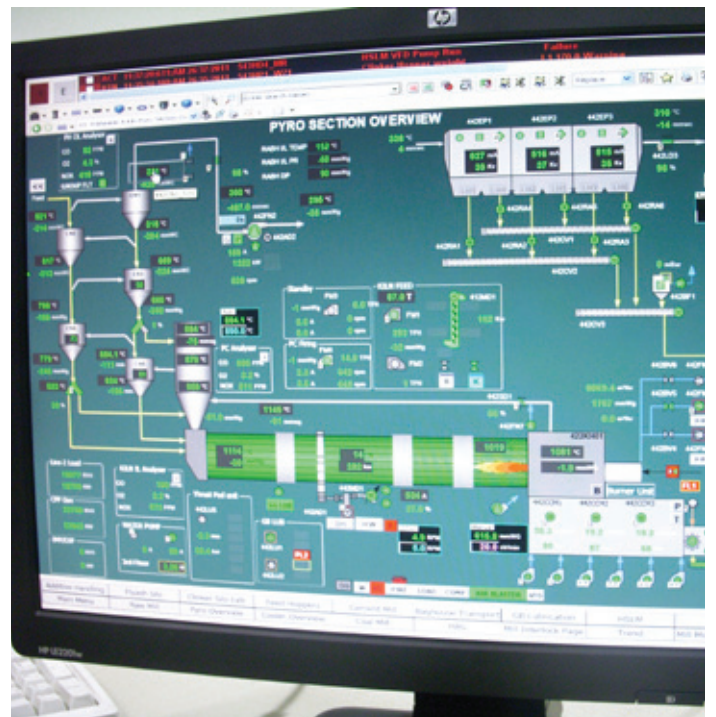
- System 800xA for the complete cement plant
- Total of 14,200 I/Os
- All Transmitters on Profibus PA
- Knowledge Manager.
- Expert Optimization
- Complete Electrical Power Distribution System
- Energy Monitoring System (EMS) Package
- Upgrade of Line 1 Plant Automation Package (AC400 connect to 800xA platform)
- ABB Site services (Commissioning services)

Other ABB products

- 110kV/6.6kV Substation
- 6.6kV Medium Voltage Switchgear
- 415V Low Voltage Power Control Centre
- 415V Motor Control Centre
- Field mounted Push Button Station
- MV & LT Capacitor
- Battery and Battery charger
- Liquid Resistance Starter
- Grid Rotor Resistance Starter
- Field Instruments
- UPS system
- CCTV
- Third party Site Services (Installation Services)

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Chettinad



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