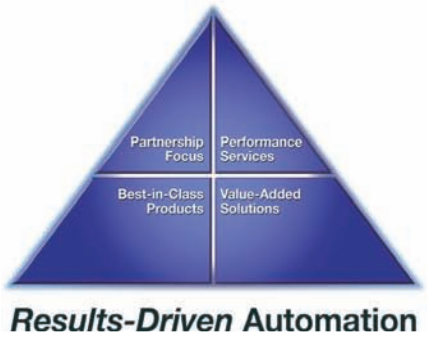


Results-Driven Automation

Value-Added Solutions

ABB Expert Optimizer Boosts Kiln Output 8% for Holcim Group

"Advanced process control and optimization systems from ABB are helping the modern cement and mining industry in its quest for higher profitability."

Doug Clark
Project Engineer
ABB Switzerland, Ltd.

An ABB Optimize^{IT} Expert Optimizer was implemented on the kiln and cooler at the Ternate cement plant of Holcim Italy located in northern Italy. Online times of more than 95% have been achieved. Moreover, production increases of 8% plus reduction of quality variability by as much as 40% have been measured by these satisfied customers.

Operators at Holcim's Ternate plant in northern Italy were involved in the project from an early stage. Project goals were communicated to them and they were given training both before and during commissioning. As a result they soon felt able to take ownership of the system and treated it as a labor saving tool. Their confidence is shown by online times of more than 95% in the first months of operation.

The kiln feed chemistry at Ternate varies due to the following effects:

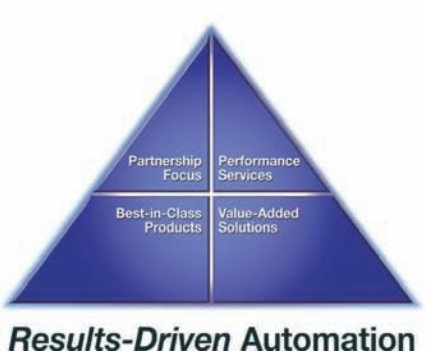
- Complex preblending and raw mill bins feeding systems
- Continuous attempts to correct a low lime saturation factor in the raw mill circuit
- Unsatisfactory performance of the homogenization silo
- Kiln dust return during direct operation

The kiln system is fired with multiple fuels. Petcoke is the main fuel; heavy fuel oil is used for warming up. There are also four alternative fuels (AFRs). The use of AFRs varies because of:

- The plant's low storage capacity
- The occasional lack of alternative fuels in the market
- Handling problems (for example, when the conveying system blocked up)
- Temporary inability to meet the conditions required by the environmental permit

Any stoppage in the AFR changed both the quality of the flame in the kiln and the LSF. Although the burning of alternative fuels is an economic necessity, it created both operational and quality problems.

ABB's Optimize IT Expert Optimizer system permitted a higher usage of alternative fuels, and improved the cement plant's process stability. The Expert Optimizer is installed on a Dell server and interfaces to Siemens S7 PLCs by use of Microsoft OPC technology. Initially the quality data from the plant quality system was not available automatically but now this data is read via the PLC. The Expert Optimizer user interface is a web browser and so no special operator station is re-



Results-Driven Automation

Success Stories

quired although it was decided to install a dedicated PC so that the operator can see the interface at all times without having to swap between applications.

In order to correctly operate the process it is necessary to (a) correctly understand what the instrumentation is saying about the process and (b) have the correct targets to operate the process in the optimum manner.

Utilizing the skills and knowledge of the engineers and the operators, the key parameters on the kiln were determined to be the burning zone temperature (BZT); precalciner temperature (PCT); kiln inlet oxygen and CO; and preheater oxygen and CO. In Expert Optimizer, fuels are divided into two classes:

- A master fuel – this is a fuel that Expert Optimizer adjusts in response to the energy requirements of the strategy.
- A secondary fuel - this is an AFR fuel where the Expert Optimizer does not send a set point but responds to changes made elsewhere.

The master fuel is adjusted by Expert Optimizer to ensure that sufficient energy is supplied to the process at all times. The changes made respond both to the temperature of the process and any changes to the supply of secondary fuels.

Where multiple fuels are in use, the problem of managing the fuels to meet constraints (such as operating cost, emissions, and chemistry) is not a trivial problem and operators can not cope with this task in a satisfactory manner. With the Expert Optimizer, mathematical solutions are now available that offer the prospect of taking the management of alternative fuels to a new level.

Bottom stage cyclones blockages have been one of the main operational problems over the last few years. Since the installation of Expert Optimizer these have been avoided due to better control of the calcination and of the kiln oxygen. Improvement in refractory lifetime cannot yet be estimated; however, the kiln shell temperature profile shows more stable coating and a more constant temperature. This should lead to better refractory life.

The Expert Optimizer always attempts to reach the maximum production. Even when the kiln has to operate at reduced output because of mechanical or other problems, the Expert Optimizer helps to keep the production rate high. The Expert Optimizer can increase the feed because of its good control of the oxygen; the average output is higher (92%) than the kiln operators could achieve alone (85%). Quality variability was decreased by as much as 40%!

For more information on solving your cement manufacturing issues, visit us at: www.abb.com/cement.

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