Case study

Expert Optimizer facilitates advanced process control
ABB successfully increased process stability and reduced energy cost at Votorantim Cimentos

Expert Optimizer, ABB's advanced control system, increases stability and reduces cost at Votorantim Cimentos

Imagine you worring less about ore grade variation impacting your process stability and resulting in increased energy. The team at Votorantim Cimentos in Brazil is already living this reality thanks to Expert Optimizer.

A control system is crucial for any modern plant. It is directly responsible for regulating the stability and consequently the quality of the product delivered by the plant. Currently, in the industry, the most widespread and widely used control strategy is the PID (proportional integral derivative) control. This strategy seems to be efficient at first, but it hides a potential increase in production and a significant reduction in electrical energy costs which may become apparent when using an advanced control system.

Implementing an advanced control system is not an easy task. However, ABB's Expert Optimizer facilitates this process, enabling commissioning without the need to stop the plant and still keeping the freedom of human interaction in the system.

The installation topology allows it to be deployed both in ABB control systems and in third-party control systems, making it applicable to any type of industry.

One of the Votorantim Cimentos plants located in Rio Branco do Sul, Paraná, Brazil, launched a new line for cement production in 2013. After about one year of operation the company contacted ABB to optimize this new line using advanced process control techniques.

ABB's scope of supply
Gain more through better control

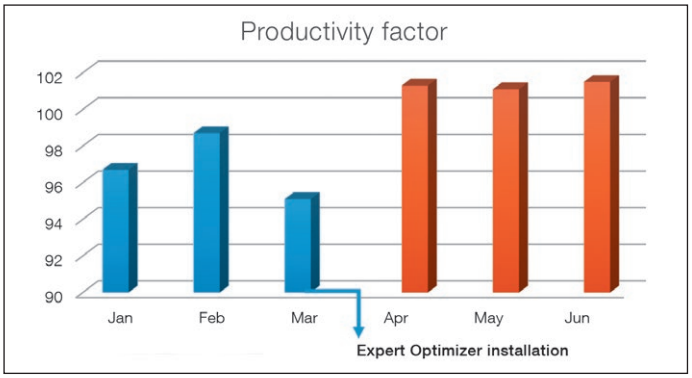
Expert Optimizer is able to control the process using two distinguished advanced process control techniques: Fuzzy Control and Model Predictive Control (MPC). After its implementation in each individual area, a connection is made between them so that the optimization happens in the whole system and not just sectorally.

Scope of supply
- Expert Optimizer 8.0
- APC (Advanced Process Control), used for the modeling of the equipment where the MPC has been implemented
- Implementation of Expert Optimizer for the following unit process:
  - 1 raw mill (vertical)
  - 1 coal mill (balls)
  - 1 kiln
  - 1 calciner
  - 1 cooler
  - 2 cement mills (vertical)

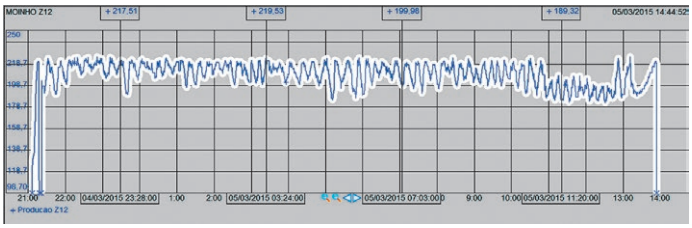
Features
- Expert Optimizer integrated with third-party control system already present in the plant
- All mills modeled and commissioned with MPC
- Calciner, kiln and cooler commissioned with Fuzzy Control

Benefits
- 62% reduction of the standard deviation of raw mill power
- 60% reduction of the standard deviation of raw mill bed depth
- 24% reduction of the standard deviation of kiln motor load
- 27% reduction of free lime standard deviation
- 16% reduction in liter weight standard deviation
- 5% reduction in burning zone temperature standard deviation
- Reduction in consumption of grinding media in ball mill

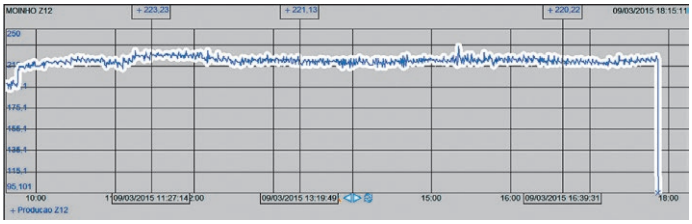
"The cement mill's productivity gain had a positive impact that reflected on a reduction of 1.15 kWh/t of energy consumption", says Bruno Marin, production manager at Votorantim Cimentos



Cement mill Z12 productivity factor



Cement mill Z12 stability before EO commissioning



Cement mill Z12 stability after EO commissioning

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