SABIA®

PROJECT PROFILE

Lafarge North America - Whitehall Plant

Lafarge Whitehall Achieves Record Low Kiln Feed Variability with Online Raw Mix Control

Situation Outline

Lafarge North America's Whitehall Plant, located in the Lehigh Valley in Pennsylvania, has one of the company's most heterogeneous quarries, but due to high silica and alumina content, the raw mix also includes purchased limestone. Reducing quarry variability and improving raw-mix control tend to reduce the use of purchased material, an important cost factor for the plant.

To improve the raw mix control Lafarge Whitehall decided to implement an online raw-mix control strategy using a SABIA on-belt elemental analyzer in conjunction with the company's proprietary raw-mix-control software.

Lafarge Whitehall analyzer location before and after installation

Benefits

- **Record low kiln feed variability**
- **Fuel savings**
- **Improved product consistency**
- **Lower kiln maintenance cost**
- **Purchased material savings**
- **Reduction of physical samples by 50%**

Project Challenges

- The belt had very little room for installation of an analyzer
- The belt is narrow (24 in.) with low material loading (maximum possible about 60 kg/m)
- There was no room for the installation of a belt weigh scale
- The materials have variable moisture contents with significant layering

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Little Room to Install Analyzer

The SABIA Analyzer was delivered and installed in 2007. Mechanical installation went smoothly despite the confined space, due to the analyzer's flexible design and detailed planning. Actual installation and commissioning took less than three days.

No Room for a Belt Weigh Scale

In most raw-mix applications of a PGNA analyzer, a belt weigh scale would provide a signal for closed-loop belt load control of a variable-frequency drive (VFD) to ensure uniform belt loading. In this case, there was no room available for the installation of a belt weigh scale.

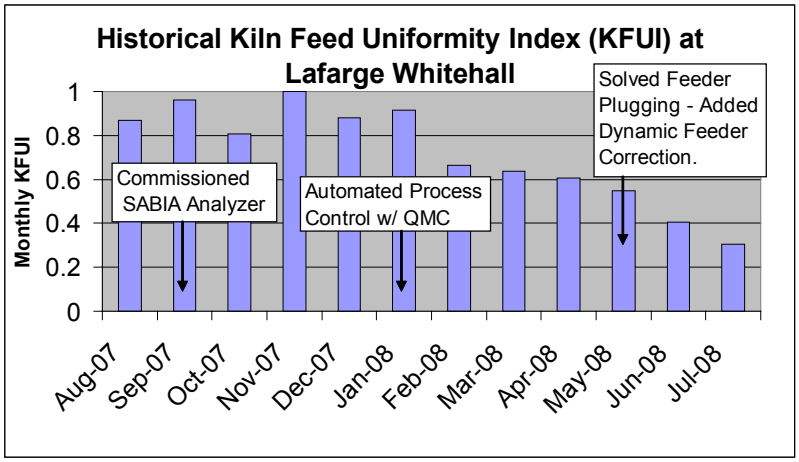
Initially, the tph (tons per hour) signal consisted of the sum of feeder flow demand signals as the assumed equivalent analyzer belt-weight scale signal.

During the first few months of implementation, the team learned that problems with a weigh-belt feeder not centering material on the belt properly and fugitive material resulting from belt overload conditions affected the analysis. Relatively simple measures largely corrected these conditions.

Using the sum of feeder demand signals and a VFD, belt loading was at first unstable. A thorough examination of data revealed that analyzer results included a signal that correlated well with the actual dynamic belt loading. The data showed that available analyzer data could potentially achieve a much better belt loading control than the sum of feeder demand signals. At that point, VFD control was switched to the signal from the analyzer, with excellent results. This was the first time in the cement industry that a belt-loading control loop used a signal from a PGNA analyzer.

Significant Layering

There was an intermittent small shift between the analyzer and lab results. Several problems were identified and corrected, including a fairly significant feeder plugging problem. The shift largely correlated to the significantly layered addition of the calcium and silica material from their respective feeders. A methodology developed to dynamically compensate for the layering effect in real-time proved successful. A webcam also proved helpful, as SABIA could remotely monitor belt conditions associated with calibration shifts and compare the visual information to events in the data set.



Summary

Any cement plant application of an on-belt analyzer will best succeed if installed on a belt with a weigh scale and well mixed materials on it. Through teamwork, determination, and innovation, the SABIA/ Lafarge team succeeded in achieving record low kiln feed variability with online raw mix control, despite layering problems and without a weigh scale.

Reference: Foster, S. and Graham, J. 'Lafarge, Whitehall Opts for PGNA Analyzer,' *World Cement*, February 2009, pp. 67-70.

SABIA, Inc.
15070 Avenue of Science
San Diego, CA 92128, USA

+1-888-SABIAINC (722-4246)
sales@sabiainc.com