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Reliable data in extreme conditions

More efficient cement production with customized level monitoring

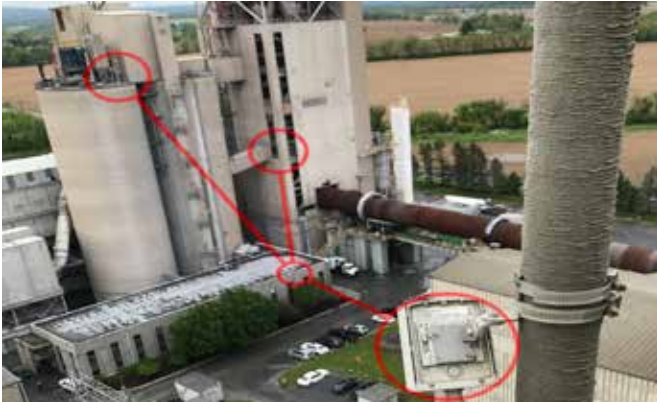
Buildings, bridges and tunnels. Sidewalks, roads and runways. What do they all share in common? They form the backbone of cities and suburbs across the world – and none of them could exist without cement. This low-cost, high-strength powder is the glue that holds together modern-day infrastructure. The Lehigh Cement Company is among the leading North American producers of this valuable commodity, with 19 cement plants and more than 70 distribution terminals throughout the United States and Canada.

At their facility in Nazareth, Pennsylvania, Lehigh Cement blends and melts limestone, iron, silica and shale to form a lava-like substance called clinker. The clinker is then ground into the fine, usually gray-colored powder known as ce-

ment. The raw materials, clinker and finished cement are stored in separate silos, where frequent level measurements must be taken to keep a close eye on inventory and prevent overflow conditions.

Challenge: Eliminate the need for inefficient and potentially dangerous manual level measurements of the material in the silos.

Lehigh Cement already had an ultrasonic level measurement system installed in their silos, but it was outdated, no longer functioned properly and therefore wasn't considered trustworthy. Operators had instead resorted to the time-consuming process of taking manual measurements every day. This



Three wireless client units transmit level data to a central access point in the Lehigh Cement control room.

made it impossible to obtain real-time inventory data, which is critical for efficient operations and reactive decision-making. It also posed a constant risk to the health and safety of anyone required to climb up the silos.

Solution: Equip the silos with robust, reliable continuous radar level instrumentation capable of transmitting data directly to the control system in real time.

Lehigh Cement had specific criteria in mind when they began the search for a replacement level measurement technology. They needed a transmitter that could stand up without fail to the often-brutal operating conditions inside the plant, including extreme levels of dust and very high temperatures. They also wanted a supplier with the experience and flexibility to design an all-in-one solution – something capable of measuring accurately and transmitting all data back to their control system digitally in real time.

The plant weighed several options, but ultimately felt most confident with Siemens due to their long-ranging experience and well-integrated portfolio of instrumentation, communication and automation solutions. Siemens' field-proven SITRANS LR560 radar level transmitter was chosen as the basis for their new silo measurement system. With its unique 78 GHz frequency and narrow, 4-degree beam, the LR560 operates reliably even in harsh environments and over the long ranges customary in the cement industry.

The Siemens Engineered Instrument Solutions team then got to work developing a custom level measurement package that combined the SITRANS LR560 with hardwired and wireless communication components. In the finished cement silos, Siemens replaced the existing hardwired level system with specially engineered LR560 transmitters for monitoring radar levels and sending the data via Modbus communication back to Lehigh Cement's control system. Additional level monitoring points with wireless transmission capabilities were installed in the raw material and clinker silos. The wireless solution included industrial-grade products like the reliable and secure SCALANCE Industrial Wireless LAN.



The SITRANS LR560 radar level transmitter features a unique 78 GHz frequency and narrow, 4-degree beam.

Results: Reduced safety risks, better transparency into silo inventory and lower operating costs.

The company is now reaping the benefits of retrofitting their cement silos with SITRANS LR560 level transmitters. "We are very pleased with the performance and wireless connectivity of the LR560, and what's most important is that the operators now trust our level measurement system," says Ryan Frantz, an electrical inspector for Lehigh Cement.

The transmitters are providing consistently accurate measurements of the various materials stored in the silos at the Nazareth facility, and require very minimal maintenance thanks to their rugged design. Operators no longer need to make potentially hazardous trips to the tops of the silos to take manual measurements or check on faulty equipment.

Process transparency has also improved by leaps and bounds. Since the new measurement system is integrated directly into Lehigh Cement's control system and all data is transmitted digitally, operators now receive real-time updates on the inventory levels of their raw materials, clinker and finished cement. This means the plant can more effectively plan cement production, maintain proper material levels and avoid overfilling the silos – all of which adds up to significant cost savings.

According to Frantz, "Siemens did it all for us: from designing a customized LR560-based system that integrated with our control system, to working with the local installation contractor and commissioning the delivered product. They've saved us a lot of money and man-hours."

Siemens Industry, Inc.
Process Industries and Drives
100 Technology Drive
Alpharetta, GA 30005
1-800-365-8766

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