Water Treatment Plant Increases Throughput and Safety with Reliable Level Measurement of Quicklime (Calcium Oxide) Storage Silos

RESULTS
• Decreased downtime with reliable level measurement
• Improved process availability resulting in increased throughput
• Reduced safety risk of plant personnel

APPLICATION
Quicklime silos

APPLICATION CHARACTERISTICS
Very fine powder

CUSTOMER
Water Treatment Plant in Iowa, USA

CHALLENGE
At this municipally owned water treatment plant in Iowa, they use calcium oxide, more commonly known as quicklime, to treat groundwater for public potable water. Quicklime is a very fine solid, which makes it difficult to measure its level inside a silo accurately. The treatment plant needed a reliable level measurement to better manage the volume of available raw material lime purchased for its water treatment operation. If the volume is not measured correctly, they run the risk of a shortage of material, which would prevent them from treating water. They were using an electromechanical float and tape system which was not dependable.

They needed a solution that does not require staff climbing to the top of the silos to “stick measure” the lime height. Since it is an outdoor set of silos with very slippery steps, a slippery roof and large hatches that someone could fall into, risk of accident is high. In addition, availability of the water treatment plant was affected due to the unreliable level measurement.

After one year of service, Rosemount’s 5303 Guided Wave Radar performed with outstanding reliability despite the extremely dusty conditions.

Figure 1. One common building with four quicklime silos.
SOLUTION

Four Rosemount 5303 Guided Wave Radar units were installed, one on each of the 25 ft. (7.6 m) tall silos. The four silos are each roughly 10 ft. (3 m) by 20 ft. (6 m) in plan view and were built as one common structure divided into four quadrants. As the existing flanges/nozzles were 13 in. (33 cm) high and new ones could not be cut into the concrete roofs, a unique mounting was required to meet the operating criteria for the Rosemount 5303. Each of the devices was mounted in a manway/hatch with parts fabricated by a contractor.

The Rosemount 5303 Guided Wave Radar has proven to be a reliable instrument to measure the lime level and automatically convert the product level to volume. This has allowed the water treatment plant to eliminate downtime due to quicklime shortage and maintain consistent throughput. Furthermore, it enables gauging of plant availability without having to risk the safety of their personnel by requiring manual measurements from the top of the silos. According to the plant operator, after one year of service the units performed with outstanding reliability despite the extremely dusty conditions.

RESOURCES

Emerson Process Management Water & Wastewater Industry
http://www2.emersonprocess.com/en-US/divisions/power-water/Pages/powerwater.aspx

Rosemount 5300 Series

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