

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.

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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.



Figure 2. Rosemount 5303 mounted in custom bridge across existing hatch.

RESOURCES

Emerson Process Management Water & Wastewater Industry

<http://www2.emersonprocess.com/en-US/divisions/power-water/Pages/powerwater.aspx>

Rosemount 5300 Series

<http://www2.emersonprocess.com/en-US/brands/rosemount/Level/Guided-Wave-Radar/5300-Series/Pages/index.aspx>

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**Emerson Process Management
Rosemount Measurement**
8200 Market Boulevard
Chanhassen MN 55317 USA
Tel (USA) 1 800 999 9307
Tel (International) +1 952 906 8888
Fax +1 952 906 8889

Emerson Process Management
Blegistrasse 23
P.O. Box 1046
CH 6341 Baar
Switzerland
Tel +41 (0) 41 768 6111
Fax +41 (0) 41 768 6300

Emerson FZE
P.O. Box 17033
Jebel Ali Free Zone
Dubai UAE
Tel +971 4 811 8100
Fax +971 4 886 5465

Emerson Process Management Asia Pacific Pte Ltd
1 Pandan Crescent
Singapore 128461
Tel +65 6777 8211
Fax +65 6777 0947
Service Support Hotline : +65 6770 8711
Email : Enquiries@AP.EmersonProcess.com

ROSEMOUNT

For more information:
www.rosemount.com


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