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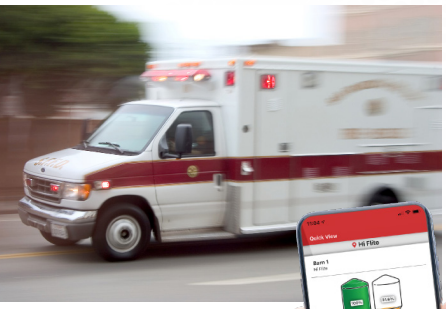
Article



Concrete Company leaves LADDER LIABILITY

According to the U.S. Center for Disease Control, every year, more than 500,000 people are treated for ladder-related injuries. 300 die. The cost is high both personally and financially as ladders account for work loss, medical, legal fees and pain and suffering. It's a $24 billion problem. Industries are quickly realizing the best solution is automation when it comes to silo, tank or bin measurements. BinMaster provides sensors that continuously measure bulk inventory then send data to a cloud-based application for use by operations, maintenance, transportation and supply departments. Let's look at ways a major U.S. concrete company proactively boosted safety for their people...

SAFETY SOLUTION FOR CEMENT PRODUCER
SENSORS/SOFTWARE SYSTEM

Danger lurks on top, in and around storage silos. In a proactive approach to employee safety, a leading North American cement producer undertook a company-wide initiative to reduce risk by automating silo level measurement using a variety of level sensors to keep people firmly grounded in a culture of safety. The goal of the silo safety initiative by a key North American cement company was to eliminate the inherent risks to personnel associated with climbing ladders or walking on top of silos to check inventories of cement, sand, limestone and aggregates.

Additional hazards associated with inventory monitoring include:

- opening and closing lids on silos, which can lead to injuries to hands and fingers
- entering silos, posing a threat of entrapment in shifting material.

To address dangerous manual practices in inventory monitoring, the cement producer decided to install sensors to measure silo levels.

NUMEROUS CEMENT SITES GET SENSORS - CONNECT THROUGH CLOUD

Evaluating the company's numerous sites called for replacing worn-out equipment such as high-level sensors and dust collection systems. In many cases, simply upgrading to new equipment and the latest technology was the easiest solution. This was also an affordable option, as existing mounting flanges and power connections could be used.

BinMaster first connected with corporate safety personnel. BinMaster's Nathan Grube, spearheaded the effort and assembled standardized quotes available company-wide so each location could place orders.

Local plants worked with BinMaster directly, to discuss specific concerns for their location. Many had diverse equipment of varying ages and conditions. Locations had anywhere from 2 to 20 silos, with the average plant housing 3 to 4. Silos stored more than one material type. Dust was a big issue in sensor selection as many silos contained powdered cement or fly ash. Plant preferences and regional weather variations were also addressed by offering a variety of sensors, including rotaries, non-contact and guided-wave radar and SmartBobs.

SO MANY SILOS, SO MANY SENSOR STYLES, ONE COMPANY

Custom rotaries with a fail-safe bonus

One of the most popular selections across many batch plant locations was an extended rotary used for high-level detection in silos. This option prevents the overfilling of silos, and, as a result, reduces wasted product and the need for manual clean-up. Therefore, in many locations, outdated high-level controls were replaced with roof-mounted rotaries.

The custom configuration was inserted through an existing opening employing a collapsible paddle, which also was easy to install using existing couplings, saving time and money. Custom extensions were outfitted with a seal shaft guard to prevent material from packing up in the extensions and interfering with the performance of the rotary. The company overwhelmingly selected a fail-safe rotary as continuous operation of the rotary is critical to continuous production at the plant.

The MAXIMA+ model alerts to the status of the rotary, indicating power loss, motor or electronics failure, allowing it to be used confidently for process control. Alerts can be detected via a light on the lid of the unit or sent via relay to an audible horn or light mounted at a convenient location. The cement producer installed about 400 of these fail-safe rotaries as high-level indicators across numerous locations in the USA.

Radar level inventory measurement

The company was presented options for continuous level measurement. Non-contact radar with 80 GHz frequency emerged as the most popular choice with close to 100 units being installed across the organisation. The powerful signal, focussed in a narrow 4° beam, excels in the high-dust environments typical in the cement industry. Non-contact technology also protects structure at the bottom of the silo, as there is nothing to break off. The rugged NCR-80 model was ideal for the environmental conditions at batch plants. With a wide variety of models and options available, each plant cou ld configure the radar for their particular control

system and wiring needs. Most plants selected a two-wire version and some were using Modbus communications. When it came to mounting options, most used the metal-jacketed flanged model.

This model has a 10° swivelling aiming option to target the measurement point to the output of the silo. However, some plants opted for the 1 1/2" NPT option as it was easier to install through an existing opening. The NCR-80 non-contact radar is easy to set up using a BinDisc module installed under the cap of the device. Following a series of simple steps using the push buttons, each device can be configured in a matter of minutes. A further advantage is that only one BinDisc is needed per location, since it can easily be transferred quickly from one sensor to another.

Guided-wave radar

The guided-wave radar level detector is preferred by some plants for measuring the level of solids. An 8mm cable suspended from the sensor head detects the level of material along the cable in silos up to 30m (100 foot) high. Cement plants like guided-wave radar because it excels in environments with high dust levels, considerable air movement or excessive noise. It is also resistant to buildup and performs well in conditions where there might be high condensation. The GWR- 2000 guided wave radar is compatible with the NCR-80 radar, so it is suitable when a location would prefer to have both types of sensors in the same system.

Staying with proven SmartBobs

Not all plants chose to switch out their continuous level sensor. Legacy systems were using SmartBob weight and cable-based sensors that work like an automated tape measure. With a long service life, there was no reason to switch to another type of sensor. SmartBobs are still a popular and affordable sensor for new systems. Some locations opted to add more bobs to their existing system. The sensors are highly reliable with consistent performance and wireless options to save on installation costs. When teamed up with Binventory® software or the BinView® web app, inventory data can be accessed from a centralised office location or from a phone or tablet.

Individualised output options

With plants constructed over several decades and in various sizes, there is a diverse range of existing equipment throughout the country. In many cases, existing control systems and PLCs were perfectly suited for use with new level sensors. Some plants chose to upgrade to new inventory management software, while others wanted simpler solutions such as bar graph displays. The key was to customize the solution to every plant, which saved money while still meeting the end goal of safety.

Benefits of using sensors

By choosing to use sensors to measure silo levels and report inventory, the cement producer not only addressed dangerous manual practices in inventory monitoring, it was also able to achieve greater efficiency and time savings in overall inventory control. Moreover, complying with safety regulations became easier once level sensors were installed. With automation, there is a reduced need for documentation and safety equipment, and this supports the company in its intent to avoid even a single safety incident.

The long-term benefits include labor cost savings, and the potential to reduce insurance claims and premiums. Furthermore, the project improves the quality of the product. Adequate inventory makes it easier to supply proper proportions of materials, ultimately ensuring a higher-quality product. The result is fewer errors, less rework and less downtime due to waiting for materials to be available.

A proactive approach to health and safety practice

As one of the largest building materials producers in North America, the company takes safety very seriously, making it an inherent part of its culture. Its proactive approach to improve health and safety practices at all locations ensures all workers arrive home to their friends and family each day. Its aim to integrate automation and initiate safety improvements protects employees, while supporting innovation and fostering productivity in its business operations.

Sensors and software for YOUR industry

Industry	Bulk Material	Sensors	Software	Applications
 Agriculture Farming Livestock	Grain Flour Beans Fertilizer Seed Liquids Bins, silos, tanks, piles, domes	Rotary level indicator Capacitance probe Vibrating rods Diaphragm switch Tilt switch Radar SmartBob 3D sensors Ultrasonic Flow detector	BinCloud BinView AgriView Binventory FeedView 3D Multivision	Prevent overflows Process control Inventory management Remote monitoring Monitor piles Flow detection Bin aeration Dust detection Aeration Ag Chemical Storage
 Bioenergy	Corn DDG Biomass Wood pellets Wood fiber Forest residue Bins, silos, tanks, piles, domes	Rotary level indicator Capacitance probe Vibrating rods Diaphragm switch Tilt switch Radar SmartBob 3D level scanner Ultrasonic Flow detector	BinCloud BinView Binventory 3D Multivision ResinView	Prevent overflows and outages Process control Inventory management Remote monitoring Flow detection Slurry tank detection Measure DDGS
 Cement	Sand Gravel Clinker Rock Powder Bins, clinker silos, tanks, piles, domes, chutes, crushers	Rotary level indicator Capacitance probe Vibrating rods Diaphragm switch Tilt switch Radar SmartBob 3D level scanner Ultrasonic sensor Flow detector Plugged chute detector Airbrator Diffuser air pad	BinCloud BinView Binventory 3D Multivision CementView	Prevent overflows and outages Process control Inventory management Remote monitoring Monitor piles and bunkers Inventory domes Plugged chutes Measure crusher levels ESPs or clinker silos Prevent conveyor overloads Silo aeration
 Food processing	Brewing Foodstuffs Solids Slurries So much more... Silos, mixers, batching tanks, conveyors, pipelines	Rotary level indicator Capacitance probe Vibrating rods Diaphragm switch Tilt switch Radar SmartBob 3D level scanner Ultrasonic sensor Flow detector Airbrator Diffuser air pad	BinCloud BinView AgriView Binventory 3D Multivision	Prevent overflows Inventory management Remote monitoring and VMI Process control Sanitary level measurement Detect levels in mix or slurry tank Detect levels on conveyors Flow detection Silo aeration
 Mining	Lump coal Ores Aggregates Fine alumina powder Silos, crushers, conveyors, domes	Rotary level indicator Capacitance probe Vibrating rods Diaphragm switch Tilt switch Radar SmartBob 3D level scanner Ultrasonic sensor Flow detector Airbrator Diffuser air pad	BinCloud BinView Binventory 3D Multivision CementView	Inventory management Monitor piles Prevent overfills or outages Detecting plugged chutes Measuring inventory in domes Level measure in crushers or bins Prevent overloading Process tanks Remote monitoring Silo aeration Dust detection
 Plastics	Resins Flakes Powders Granules Regrind Silos, bins, containers, hoppers, tanks	Rotary level indicator Capacitance probe Vibrating rods Diaphragm switch Tilt switch Radar SmartBob 3D level scanner Ultrasonic sensor Flow detector Airbrator Diffuser air pad	BinCloud BinView ResinView Binventory 3D Multivision	Prevent silo overfill Eliminate outages Inventory management Remote monitoring Vendor managed inventory Flow detection Bin Aeration Dust Detection