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Case Study

ETHANOL PLANT:
3DLevelScanner touts accurate, reliable volume

Ethanol operations face plenty of challenges including bulk inventory measurement. Dust, accuracy and reliability all must be considered with raw material storage. Our case study looks at extreme amounts of dust, especially during fill rates of up to 580 tons per hour which made it extremely difficult to track the filling and emptying processes. Using just a single measurement did not account for topography of material in bins. Multiple points created an average level measurement.
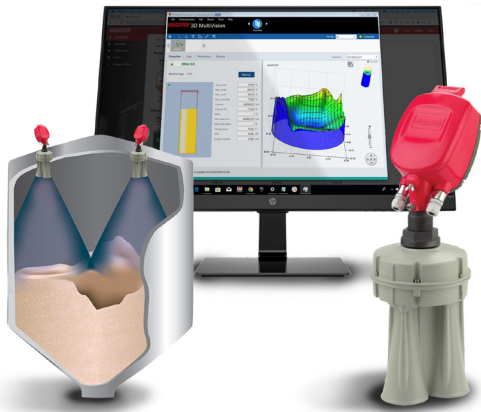
CHALLENGE DUST, 580 TON PER HOUR FILL RATE

This ethanol plant faced three different types of challenges – dust, accuracy and reliability. There were extreme amounts of dust, especially during fill rates of up to 580 tons per hour which made it extremely difficult to track the filling and emptying processes. They had been using guided wave radar – a single point measurement technology – in a very large bin of uneven topography. Using just a single measurement was not providing an adequate level of accuracy, as the level of material varied significantly in different areas of the bin. Also, the sensing cables on the guided wave radar were breaking, making taking measurements impossible and causing operations to shut down until the cable could be recovered from the material contents and then replaced.

Solution:

The MV model of the 3DLevelScanner was mounted on a 150' tall, 75' diameter, concrete silo containing whole corn. The silo offsets fill, with multiple discharge sites in a very dusty and noisy application. Using the advanced parameters of the 3D Level Manager software, the device was optimized to track during a rapid and extremely dusty filling cycle. With multiple discharge sites and empty rates of up to 150 tons per hour, the 3DLevelScanner was able to provide a far more accurate volume than the previously installed, single-point guided wave radar device. After the success of the first unit, the customer purchased three additional units for its other large silos.

Benefits:

The 3DLevelScanner was able to meet the challenge of a dusty environment and was optimized to track during the filling and emptying processes. The low frequency, acoustic waves are able to penetrate the dust generated during fill, unlike radar which works at a higher frequency. Using the MV model which takes multiple measurements within a 70° beam angle the inventory accuracy was improved significantly, enabling the plant to optimize its filling and emptying schedules and railcar traffic. The non-contact device eliminated the risk of breaking cables, preventing work stoppages while providing plant personnel inventory measurement data when it was needed.

Application:

Material: Corn
Bin: Concrete silo with flat top and bottom
Size: 15-' tall x 75' diameter
Class: Class 2, Div 1 inside and outside silo
Model: MV

HUGE CORN SILOS TOO MUCH FOR SINGLE-POINT MEASURE

Corn is delivered by trucks or rail to the plant where it is analyzed, unloaded and pre-cleaned prior to conveying into large storage silos generally designed to supply the plant for seven to ten days. The large size of the silos makes it problematic for conventional single-point instrumentation to yield accurate measurement of the volume of stored material. Plus, corn storage silos may have multiple fill or discharge points creating uneven topography, which could deem a single measurement point unreliable. It is essential to know the silo contents in order to closely monitor inventory levels, replenish optimally, and ensure an ongoing production process. The BinMaster 3DLevelScanner system for large silos overcomes this problem. Accurately measuring the amount of grain in the silos in real-time is important, giving plant managers an understanding of how much grain was used in the manufacturing of ethanol, allowing them to better calculate the cost of goods sold and the profitability of the plant.

DRIED DISTILLER GRAINS

Wet distiller's grains are often sent through a drying system to remove moisture and extend shelf life. The resulting DDGS (dried distillers grain with solubles) is commonly used as a highprotein ingredient in cattle, swine, poultry and fish diets. DDGS is removed from the production process by conveyor to an adjacent dedicated DDGS storage silo or warehouse. The DDGS is stored in very large silos, warehouses, or open bins. The material (containing about 10% fat and corn oil) is sticky and can settle irregularly in the silo. The uneven topography presents a real problem for end users trying to assess inventory levels. BinMaster's 3DLevelScanner system solves this problem by measuring multiple points and providing a very accurate volume reading and optional visual profile of the material in the silo, warehouse, or open bin

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