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Industry 4.0:
Sensors and cloud software provide answers for worker shortage, safety and inventory management

While manufacturing managers were implementing the Industry 4.0 philosophy, COVID-19 hit. The pandemic brought worker and supply chain shortages and accelerated the effort to boost technology in manufacturing. BinMaster sensors and cloud software fit perfectly into Industry 4.0 goals.

SENSOR SYSTEMS FOR SAFETY

It was a cold day in February when Matthew made his rounds. His daily routine included measuring bulk materials stored in a large vessel. As he'd done so many times, Matthew entered the vessel to measure, but this time, he was quickly engulfed by the material and suffocated. It's one of many similar heartbreaking stories told by OSHA.

$120,000. That's the average direct and indirect cost of a workplace injury in 2022 according to Optimum Safety Management. Bigger than money, is the devastating toll an injury can take on employees and families.

The sad reality is that Matthew would be alive today, if his bulk storage included inventory sensors and software. BinMaster built this technology with safety in mind.

"A lot of companies assemble parts, sell them, and move on. We believe we're doing things that can save lives," said Scott Hudson, BinMaster Executive Vice President, Sales & Marketing. "Our employees know they are involved in a greater purpose, and we're very proud of that."

Sensor technology can eliminate the activities surrounding the measuring of bulk material inventory in bins, silos and other containers requires walking, climbing and working at height.

Statistics on those activities are eye-opening:

> 300,000 ladder injuries in the U.S. (Bureau Labor Statistics 2017)
> 211,000 slip, trip and fall injuries in the U.S. (National Safety Council 2020)
> 44,400 accidents involved falling from heights (Height, Lift & Shift 2019)

Danger of entrapment in a bin or silo is real. According to OSHA, more than 900 cases of bulk storage engulfment has been reported in the U.S. during the past 50 years with a fatality rate of 62 percent.

Technology takes some activity (and associated risk) out of the equation.

BinMaster has developed a host of sensors to monitor inventory of liquids and bulk materials in a storage container. That inventory data goes to an IoT device pushing critical reports straight to the computer, phone or tablet of a manager. Essentially, technology can replace walking, climbing, and heights experienced multiple times a day.

INVENTORY MANAGEMENT OF BULK MATERIALS

While safety is the No. 1 benefit for sensors and software...production, accuracy and planning are all boosted with inventory management like BinMaster. Manufacturers have been transforming with technology since before the pandemic. It's called Industry 4.0. Sensors and cloud software are considered a foundation of Industry 4.0.

BinMaster technology fits into the category of Internet of Things (IoT) which describes a wireless network of devices embedded with sensors for the purpose of connecting and exchanging data. IoT is growing in the manufacturing industry, however many processes have yet to incorporate the potential.

IoT inventory sensors and software:

> Provide insights for data-driven decisions to increase efficiency and drive down costs
> Shorten lead times for production
> Reduce carrying costs and last-minute purchases
> Reduce waste on bulk inventory that could spoil
> Accurate inventory feed data to Enterprise Resource Planning systems
> Streamline transportation and timely ordering

From a business standpoint, inventory manage-

ment serves a great purpose for inventory balancing, planning and control. For balance, it's important to have the right amount of inventory to avoid lost orders and money tied up in safety stock. Control refers to managing the physical and logistics of inventory and how those match.

"We've put a lot of effort into developing cloud software to present sensor data in a way that managers can maximize their decisions," Hudson said. "We realize that different materials require different sensors and software which account for workplace conditions, company goals, and even the bulk density of the product."

BinMaster sensors begin the process of real-time inventory measurements. For decades, the company has invented, refined and added sensors for nearly every bulk storage situation. It monitors inventory and provides key performance indicators (KPI) to meet business objectives.

SENSORS, WORKER SHORTAGE AND INDUSTRY 4.0

The U.S. is battling its biggest worker shortage in 80 years. Analysts at Goldman Sachs, a financial service company, said in the first quarter of 2022, there were 4.6 million more jobs than there were potential workers.

Worker shortages, exasperated by COVID-19, have spawned a renewed emphasis on technology with some organizations and individuals changing the nature of hands-on work.

A lack of raw materials can result in serious issues. A recent McKinsey survey of Asian manufacturers stated that struggles with material shortages were a common issue with 45 percent of respondents. Thirty percent of those surveyed also pointed to worker unavailability as an issue.

The survey suggested that manufacturing leaders are tackling supply chain issues with digital solutions. Leveraging Industry 4.0 solutions, 39 percent have implemented a control-tower approach to increase supply chain transparency. About 25 percent are fast-tracking automation to stem worker shortages.

Automation already plays a prominent role in readjusting job duties. Industry 4.0 automation calls for both "robots" and humans to optimize production and improve quality. According to a study by Deliotte and the Manufacturing Institute, the skills gap will result in 2 million unfilled jobs by 2025 and most of those jobs might be considered dangerous, involved tedious repetition or are, "simply unpleasant."

WHAT ROLE DOES BINMASTER PLAY?

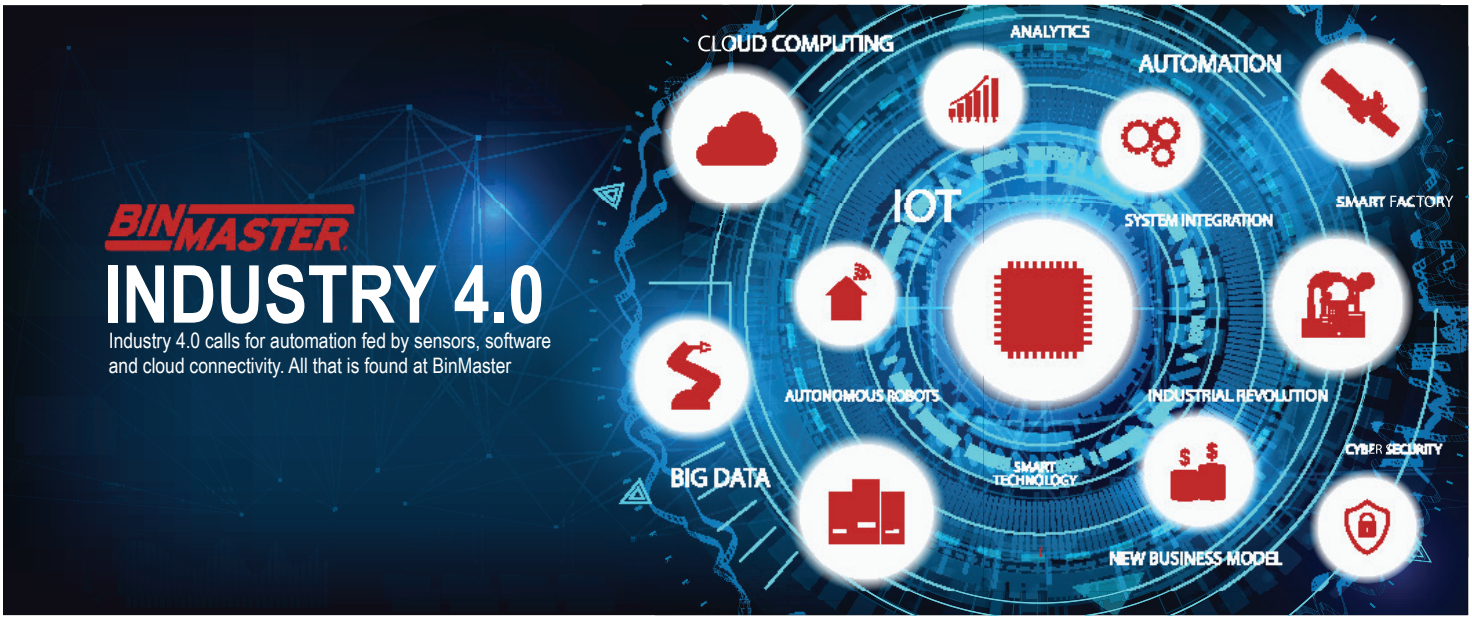
BinMaster sensors and software are the answer to worker shortages and safety as well as manufacturing management's quest to achieve Industry 4.0 operations. In most ways, BinMaster systems are automatic. They feed data to inventory managers for smart decision making. BinMaster also removes a key set of activities which requires an employee to walk, climb and maneuver at heights.

BinMaster got its start in the '60s when a local seed company asked Garner Industries to fabricate a switch to alert when bins were full. Today, BinMaster is a privately held, independent US manufacturer of point and continuous level indicators and inventory management systems used for monitoring bulk solids or liquids in bins, tanks, silos, and hoppers. More than just level sensors, the company offers complete solutions using wireless devices and web applications to send data to a control room, console, smartphone, tablet, or PC. Robust, custom systems can be developed for a single site or networked across a multinational operation.

BinMaster is certified to ISO 9001 quality management systems—requirements. For more information about BinMaster, visit www.binmaster.com.

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



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