The Insider

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...because it's what's inside that counts

Shooting Straight on Multiple Point Measurement

Radars, and lasers and sonics – oh my! We all read the press and scan the ads for the latest level measurement developments that promise to make life easier and data more reliable. Quite frankly, there are a lot of good products out there. Sometimes, there are even different companies selling the same or similar devices. Contrary to some of the superlatives being used to describe each technology, they all have both benefits and limitations. Let's look candidly at which BinMaster multiple-point measurement device might be right for your operation.

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Pump up the Volume with the 3DLevelScanner

The acoustics-based technology used by the 3DLevelScanner sends pulses in a 70° beam angle, taking multiple measurements from the material surface. This dust-penetrating, non-contact device continuously maps the surface of the material to account for changes in level, overall volume and surface topography. The 3DLevelManager software reports the lowest point detected, the highest point detected and the average level based upon a weighted average of all of the measurements detected in the bin. The data is used to provide the user detailed information about the level of material in the bin and calculate an estimation of the volume of material in the bin.

The 3DLevelScanner samples measurements within a 70° beam angle.

Based upon the 70° beam angle, a single 3DLevelScanner will provide the most accurate data in a bin up to 45' in diameter. To get the same level of accuracy for larger diameter bins, multiple 3DLevelScanners mounted in strategic locations throughout the bin may be used. BinMaster determines the optimum number of scanners and their ideal mounting locations by entering the specific information regarding the application into an advanced software program. Often two 3DLevelScanners – one mounted closer to the perimeter and one closer to center, but away from the fill stream – will provide the desired level of accuracy. However, very large bins, such as 132' or 145' diameter, may require additional scanners to meet user objectives. However, a single scanner can be used in a very large bin if the ultimate goal for the system is not precise volume accuracy, but rather continuous, reliable level indication.

Measuring multiple points in a bin provides a great deal more data about the bin material and also allows for the software to calculate the volume of material in the bin with greater accuracy than any single-point measurement device. To get the best performance, it is important that the application information for the vessel and the material being measured is accurate and complete. The number and location of 3DLevelScanners installed in the bin also plays a critical role. The 3DLevelManager

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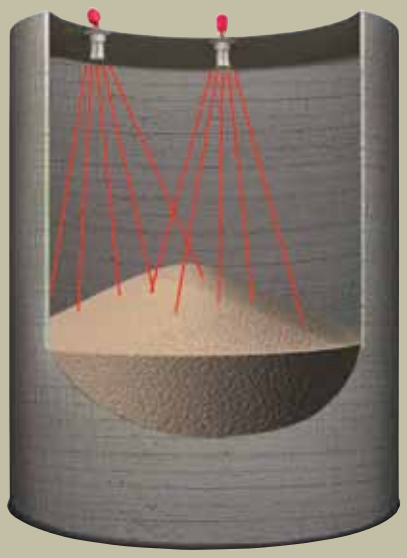
Shooting Straight on Multiple Point Measurement



3DLevelScanners: Two or more may be installed in wide bins to cover more of the material surface. Data from the sensors is combined to provide a single visualization.

software also allows for the input of strapping table data that can take into account the compaction of material at the bottom of the bin and adjust capacity in a cone-bottomed bin.

Another optional feature of the 3DLevelScanner which is available in the MV and MVL models is the ability to generate a visual representation of the bin contents, by taking the X, Y, and Z coordinates of the measurement points and mapping them. The visual mapping feature shows where the high and low measurements are located and can be an indication of the angle of repose. This can be used to detect conditions such as cone up or down or particularly high or low spots in the bin, which can then be taken into account when calculating bin volume.

However, remember that the 3DLevelScanner is not a scale. It does not weigh material in pounds or tons; it calculates the volume of bin material based upon multiple measurement points covered by the surface area of one or more 3DLevelScanners.

SmartBob MultiBob System – Your "Average" Bob

The SmartBob sensor is a mechanical weight and cable-based sensor that drops a weighted probe to the surface of the material and as it descends and then retracts, counts pulses that are used to calculate the distance to the material. Historically, a single SmartBob sensor is installed in a bin at a distance about one-sixth from the outer diameter of the bin. This location is proven to provide a very reliable average level when used in free flowing material on a center-fill, center discharge bin. However, there are instances where multiple measurements may be desired in a bin using a SmartBob system. That's why BinMaster developed the new MultiBob system.

"More data is better in big bins"

For example, wide diameter storage bins that may have multiple fill and discharge points may create uneven material topography in the bin. Flat storage warehouses may fill and pull material from multiple locations in the bins using trucks, loaders or conveyors causing material to pile up. In these instances, measurement data from more than one point in the vessel will provide a more complete picture of inventory status and where to best fill or discharge material.

Unlike the 3DLevelScanner that samples measurement points within a 70° beam angle, a SmartBob sensor takes the measurement in the same place each and every time. Then the eBob software reports the height of the material at that measurement point or conversely, the headroom or distance to the product from the top of the bin. The MultiBob feature in the eBob software reports the measurements for up to 32 SmartBob sensors installed in a single vessel on the same screen. The software then averages the level data reported based upon a weighted average that is assigned by the user. For example, some sensors may be assigned a larger percentage or influence on the average level calculated.

The customer plays a pivotal role in determining how many SmartBob sensors to install in a vessel. An in-depth knowledge of the operation, the storage vessel and its filling and emptying locations and cycles are factors that will contribute to the location and number of SmartBob sensors. A two-sensor installation can be helpful in operations where additional data is need. Often one sensor is installed about one-sixth from the outer perimeter to account for the angle of repose and the second sensor is placed closer to the center of the bin, but away from the fill stream.

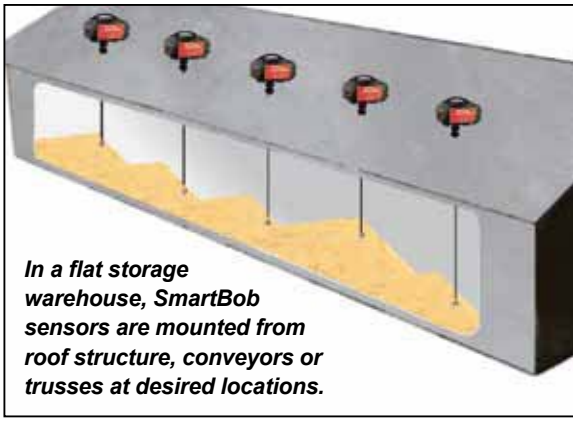
The center sensor can be used to detect a cone up or down condition. Alternatively, the two sensors can be located on either side of the bin and the levels averaged by the eBob software.

For vessels with multiple fill and discharge sites or very wide diameter bins, four or more SmartBob sensors may be used. With knowledge of where material is most frequently loaded into the vessel and pulled from the vessel, BinMaster and the user can determine how many sensors are needed and where to best place the sensors. Material height in

some locations in the vessel may change with greater frequency and therefore, have more influence on the average level calculation. The eBob software allows the user to assign each SmartBob an influence in the calculation of the average level by assigning percentages that add up to 100%. The eBob software allows the user to view the measurement data for each individual SmartBob sensor as well as an average level and estimated percentage full, based on the data for all sensors in the vessel.

With bins getting bigger and demands on storage capacity increasing, the MultiBob system delivers more data than a single-point system at a very affordable cost. The measurement data as reported in feet or meters by the SmartBob sensor is very precise and repeatable. The MultiBob system will calculate the average level reported by all the SmartBob sensors installed in the vessel based upon user inputs. The accuracy of each measurement is very reliable; however caution must be exercised in interpreting the data and using it to calculate volume or weight. The MultiBob system should not be used to extrapolate estimated material weight or volume, as the location and number of measurement points will impact the level of accuracy.

We recognize that level measurement is not a "one size fits all" solution. Call 1-800-278-4241 or email us at info@binmaster.com for a free, no obligation consultation on your vessel measurement needs.



In a flat storage warehouse, SmartBob sensors are mounted from roof structure, conveyors or trusses at desired locations.

MultiBob averages the measurements from up to 32 SmartBob sensors.

Good Vibrations – BinMaster Vibrating Rod Sings New Praises

BinMaster's proven vibrating rod with its single-rod probe design is taking another climb up the charts. This "oldie, but goodie"

is poised to reach new heights with the integration of some fabulous new features. The new die cast aluminum enclosure boasts a USDA recognized powder coat finish and a triple-thread, screw-off cap that provides easy access to the electronic components. Dual conduit entries are now standard, so it's simple to wire. Double-pole, double-throw relays – also now standard – enable diverse uses in a variety of applications. A LED status indicator light on the lid of the new enclosure alerts to the status of the device. A solid light, flashing light, or no light can indicate covered, uncovered or alert conditions.

Unlike a tuning fork, BinMaster's single rod design doesn't allow material to bridge between two probes and give a false alarm. BinMaster vibrating rods are available in insertion lengths starting at 7.37" and can be used for high, mid and low level indication or plugged chute detection. Both flexible (up to 19') and rigid (up to 13') extensions are available for top mount applications when the vibrating rod is being used for high level detection. All models include a switch selectable high/low fail-safe and three selectable sensitivity settings: high for light powders, medium for most materials, and low for heavier materials. With its high sensitivity, it can be used in light, fluffy powders with a bulk density as low as 1.25 lb./ft.^{3}. High temperature units and remote electronics are available for challenging applications.

BinMaster Events

GEAPS
(Grain Elevator Processing Society)
March 3 to 6, 2012
Booth 1022
Minneapolis Convention Center
Minneapolis, MN USA

NPE 2012
(International Plastics Showcase)
April 1 to 5, 2012
Booth 46024
Orange County Convention Center
Orlando, FL USA

PTXi, PBS, Chem Pharm & Pack 2
(Powder Show)
May 8 to 10, 2012
Booth 2425
Donald E. Stephens Convention Center
Chicago, IL USA

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PERMIT NO 40

Remote Monitoring

Start-up Services

North America's 3DLevelScanner Leader

With its 3DLevelScanner in more than 500 bins, tanks and silos across the United States and Canada, BinMaster has more experience with more scanners in more applications than any other company on the continent.

BinMaster's dedicated team of 3D technical and sales specialists is highly trained, responsive and committed to your success – from understanding your measurement objectives, to starting up sensors at your site, to monitoring performance from our engineering laboratory in Lincoln, Nebraska, USA.

3D – It's better with BinMaster.

BINMASTER®

BINMASTER LEVEL CONTROLS
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