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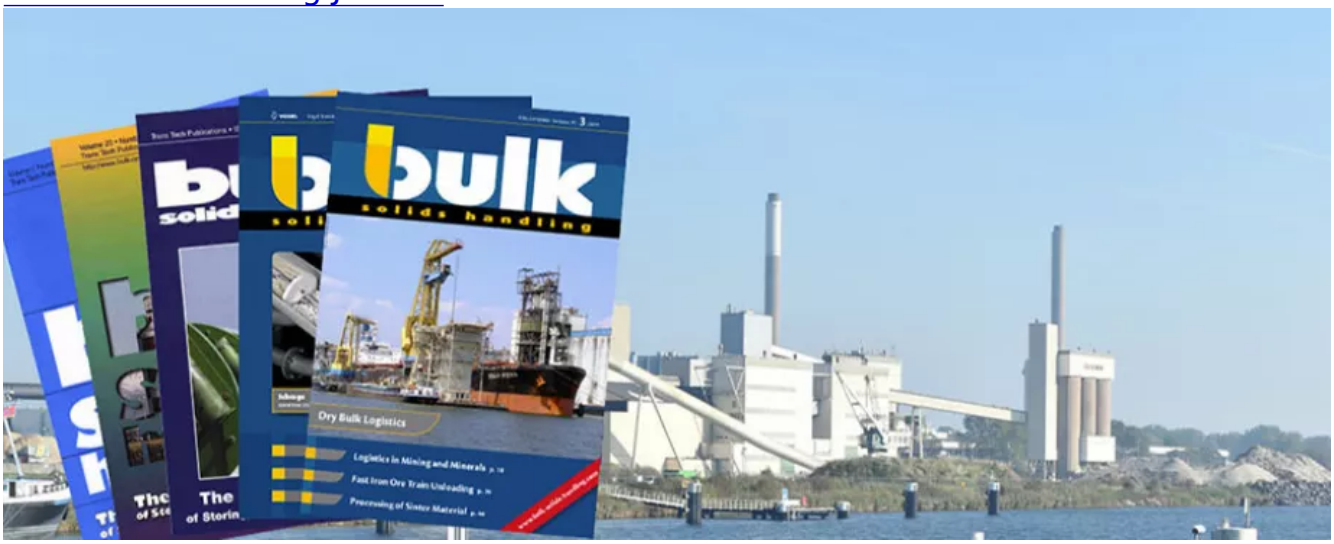

Technical Article

Determination of Contents in Storage Bins and Silos

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Modern process plant relies heavily on control systems for reliable and efficient operation. A control system generally consists of the storage bin* a sensor or transducer and electric signal conditioning circuitry. In most applications the transducer is the most vulnerable part of the control system. In many bulk materials handling installations the penalty for poor choice of transducer to measure bin contents may be material runout or equipment breakdown resulting in expensive plant downtime and loss of production.

The paper presents an overview of the various methods used to determine storage bin contents for auditing and process control purposes. Errors in the determination of both volumetric and mass contents are discussed. The problem of determining contents of individual bins in a common support structure where "difficult" materials are stored is also discussed and a solution given by way of a case study.

It is important that all of the factors discussed are considered and understood when designing an effective and reliable contents monitoring system to suit the requirements of bulk materials handling plant.

The development of sophisticated and powerful microprocessor based process controllers in recent years has placed an even greater demand on the transducers on which they depend for signal input. Increased understanding of bulk solid material behavior under various storage and flow conditions ha led to improved design of storage and handling facilities and in modern installations smooth controlled flow of materials is achievable when these available design techniques are utilized. The function of reliable bin level transducers then is extremely important.

Many large scale storage systems have been damaged and conveyor gantries back filled with consequent expensive downtime when reliable bin level transducers have not been installed or when transducers have failed Many failures occur under conditions where particular transducers have been unsuited In many installations the use of a high accuracy, high cost transducer is not warranted for the functions which it is expected to perform. On the other hand, "initial cost" basis for choosing a transducer for level indication and control can lead to an unworkable solution.