echOsonix™

Application Case Study

Gypsum Silo Level Detection

The Application

Gypsum is a mined mineral used in a wide variety of products, including food, pharmaceutical, soil additives and drywall wallboard. Gypsum has a crystalline structure and, when crushed for processing, creates very thick dust. It is very difficult to monitor the level of crushed gypsum. It is very abrasive to contact sensors, and the dust and crystal structure inhibit non-contact signals.

A drywall manufacturer was monitoring level in crushed gypsum silos. The silos always had ultrasonic transmitters on them, but they never have been reliable. Anytime the vessel is nearly full, nearly empty or filling, there is a great deal of fine, thick dust. During these conditions, the ultrasonics would fail due to lost signal. The transmitters are being used for inventory and control of the process. The silos feed into the final production process.

The Solution

SOR® offered this customer the echOsonix U73/RAP to solve this problem. The high power and low frequency of this device provide the penetration capabilities that tough, dusty applications like this require. Dust particles with a crystalline structure will scatter sound energy far more than other structures.

A successful ultrasonic transmitter must have enough power to still receive an echo in these conditions. Any type of dust will absorb some sound energy; crystalline dust also scatters this energy. The U73/RAP has more power than any other ultrasonic on the market. This gives it the capability to penetrate the gypsum dust and receive a readable echo.

The U73/RAP operates at 5 kHz frequency. Lower frequency (longer wavelength) sound penetrates through barriers (like heavy dust) better than higher frequencies. A good example is foghorns on ships. They emit a low tone because the longer wavelength of sound penetrates fog better than high-pitched tones. Most competitive units do not have lower frequencies than about 20 kHz which gives the SOR echOsonix transmitter a distinct advantage in difficult applications.

The Results

When the customer first installed the U73/RAP, it did not work during filling. When the silo is being filled is when the most dust is present. We changed a few parameters to make the unit about 20% more sensitive than the factory settings which allowed it to maintain a lock on the correct echo when heavy dust was present. The unit has been operating flawlessly since these changes. The customer finally has a level-sensing solution for an application that has been a problem since the plant was built.

Ordering Information

Electronics Model **U73-FL7J-00-05**
Remote 110VAC/24VDC Line-powered transmitter
4 x SPDT Relays adjustable over entire range
NEMA 4X Remote electronics housing

Sensor Model **RAP-GC-00-100**
5 kHz Transducer for remote unit
10” 150# Style flanged connection with focusing cone
100-feet remote cable (adjustable in the field)

Contact the factory for more information or alternate product options.
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