

CASE STUDY

Plastic Pellet Level Monitoring

ABM's Remote Level Solution Reliably Measures a Plastic Pellet Storage Silo

Industry

Plastics

Application

Storage Silo Level Monitoring - Plastic Pellets

Product

ABM Non-Contact Ultrasonic Level Sensor and Cellular Gateway



Figure 1: ABM's Ultrasonic Level Sensor and Cellular Gateway installed on top of the tank.

BACKGROUND

A customer required level monitoring for a plastic pellet storage silo. Reliable measurement of the silo was needed to ensure a consistent supply of inventory was available for production, avoiding downtime.

Various other level solutions had been tried, but none could provide the customer with reliable data. Level measurement of plastic pellets can be challenging due to the characteristics and behaviour of the product at various heights and processing stages (i.e. filling and emptying).

ABM's non-contact Ultrasonic Level Sensor with mounting accessory and Cellular Gateway with remote support service (Fig. 1) was selected as the ideal solution for the application.

PROBLEM

Due to the difficult nature of level measurement in plastic pellet silos, a primary concern from the customers was how the sensor would measure the surface of the material as it changes during processing, including a steep angle of repose (filling), flat surface, or a concave surface (emptying) and provide an accurate volume reading.

In addition, radio frequency (RF) transmitters posed a challenge for installation as RF interference could introduce noise into the sensor's electronics (Fig. 2), affecting its accuracy and reliability.

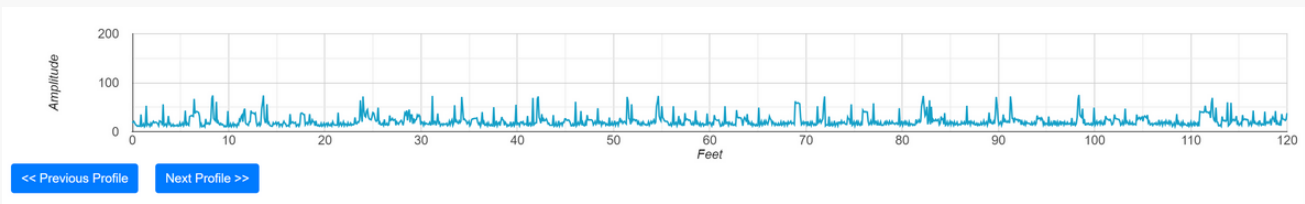


Figure 2: Echo profile with RF interference.

SOLUTION

Sensor Mounting and Angular Adjustment

Proper installation was the first priority to ensure good operation at the site. ABM's swivel Aiming Mount accessory was used to mount the sensor inside the tank. A conductive flange and installation inside the tank shielded the sensor and eliminated the effects of RF interference as shown in Figure 3.

The swivel aiming mount enabled a greater range of angular adjustment to point the sensor toward the discharge hole of the silo.

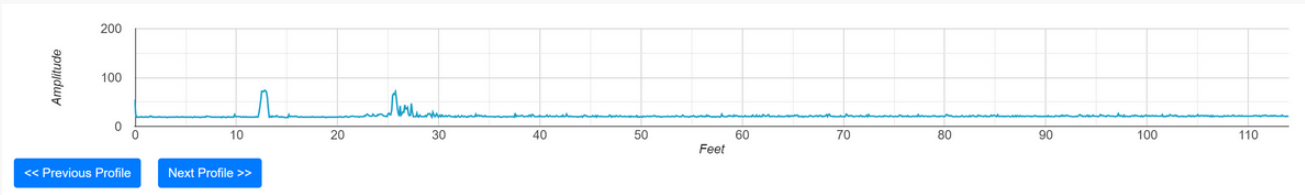


Figure 3: Echo profile with RF interference eliminated.

ABM Advantage

The customer's concerns about reliable measurement were resolved with ABM's advanced ultrasonic level sensor and remote support from experienced technical engineers to set up and calibrate the sensor for optimal performance.

Advanced Self-Adjusting Sensors

Reliable and consistent echoes are essential for any level application, especially plastic pellets, where the material shape can change rapidly.

ABM's self-adjusting sensors continually monitor conditions in the environment and automatically adjust the transmitted energy and transmitted pulse amplitude, and receiver sensitivity to match the current tank conditions.

This advanced design allows the sensor to get consistent echoes from all surface layer profiles and tank conditions (i.e. flat, concaved, piled, steep angle of repose, filling) as shown in Figure 3.

Remote Monitoring and Support

A key component of ABM's remote monitoring platform is the 24/7 online remote support customers receive from experienced engineers to optimize their sensor's performance.

For this project, engineers analyzed the echo profiles of the material during processing to capture the distinct signatures commonly expected with plastic pellets in silos. Corrections were made to ensure an accurate volume reading would be obtained while filling and emptying the silo.

With ongoing monitoring, ABM engineers detected an irregular instance in the data, indicating multiple reflections (Fig. 4). Again, the engineers corrected the issue, applying a narrower filter that eliminated the influence of false secondary echoes.

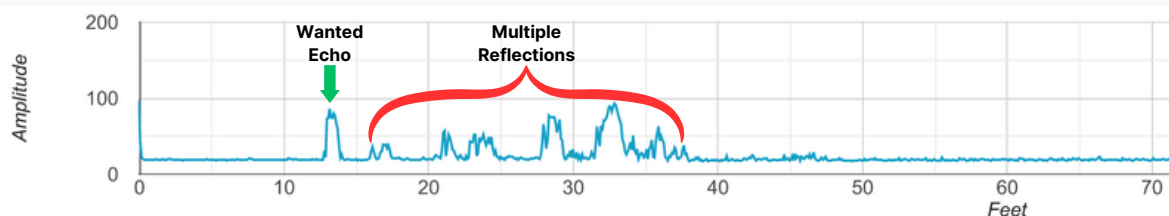


Figure 4: Echo profile with multiple reflections.

Figure 5 below displays the captured events on the distance graph, with two irregular spikes followed by smooth operation after the correction.

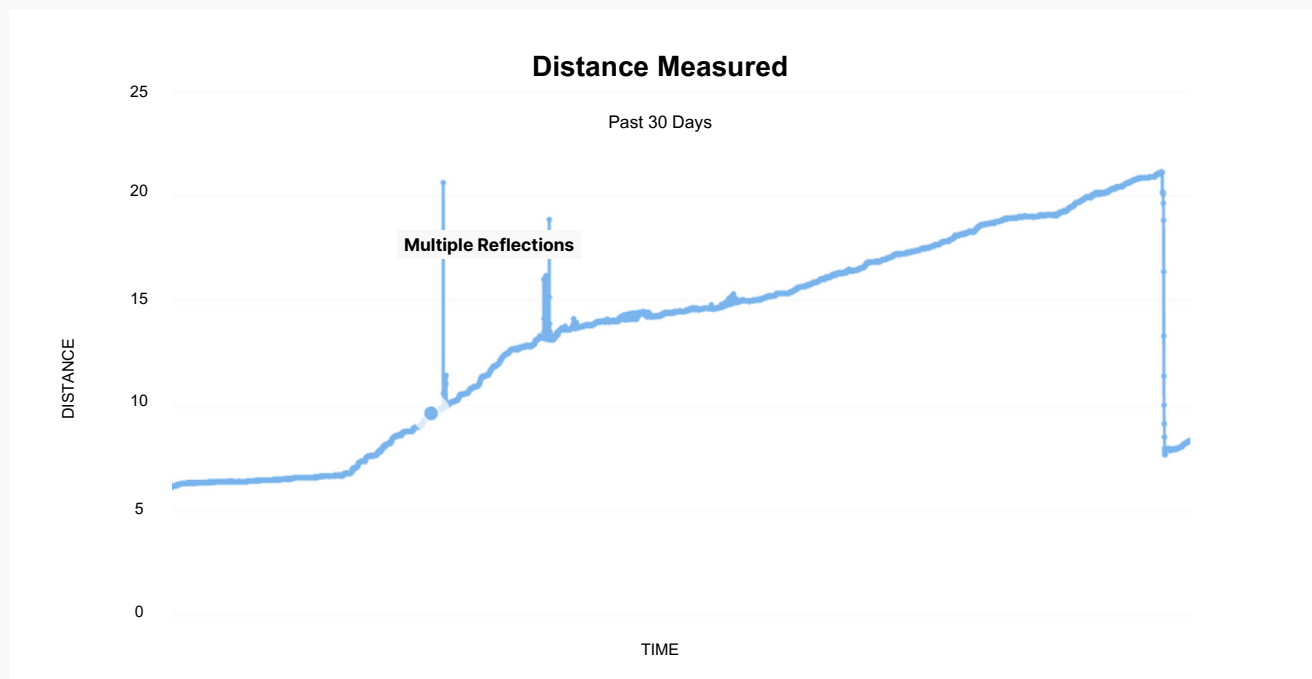


Figure 5: Distance from the sensor versus time. The highlighted spikes indicate the influence of multiple reflections.

CONCLUSION

The use of ABM's ultrasonic level sensor and remote support for measuring the level of plastic pellets in a silo has proven to be a reliable and efficient solution. The sensor's accuracy, dependability, and cost-effectiveness have been invaluable in helping the customer manage inventory, prevent overflows, and enhance operational efficiency.

ABM SENSOR TECHNOLOGY

730 The Kingsway, Peterborough
Ontario K9J 6W6 Canada
E: info@abmsensor.com
T: +1 705.740.2010

