KISTLER-MORSE
Measure of Success

Application Note

Surge Hopper Level Control for Plastics Pellets

A leading plastic pellets manufacturer was looking for a means to prevent surge hopper overfills. Kistler-Morse (KM) exceeded their expectations by providing continuous level monitoring and control in their rail-car load out surge hopper by utilizing KM's ultra-*wave*™ Ultrasonic Level System combined with the industry leading UC24PP ultra-*cell*™ transducer.

Problem:

During railcar load out, it is necessary to momentarily stop the flow of plastic pellets to the railcar during compartment and/or car change over. A surge hopper is provided between the rail car feed system and the load out silo to absorb the pellet flow during the change over. This offers multiple benefits:

1. No interruption, which provides a smooth continuous flow from the silo.
2. Having knowledge of material in transit is not an issue prior to changeover.
3. Material degradation and pneumatic transport costs are reduced.

In the past, choices for controlling the transport system based on surge hopper levels were limited. Point level provides on/off control only. This precludes the use of a variable speed transport system based on level. The only alternative with this type of system is to size the surge hopper based on the material in flight from the farthest point and the average amount of time required to change compartments and/or cars.

Another method is level by weight. This method is expensive, requires extensive maintenance and, at best, is a ±10% level system. This is due to material density, angle of repose and compaction. However, it does offer the advantage of providing continuous information for purposes of control.

Application:

A surge hopper, 152" X 120" with a 96" cone was utilized. High and low point level devices were used to provide on/off level control. The requirement was control during brief interruptions due to compartment and railcar change. If the operator ran into problems during the change, there was no warning to operations prior to an automatic system shut down. This interruption required a sequenced restart that cost time and product handling issues.

Solution:

The manufacturer installed a KM non-contact ultrasonic level system to monitor the surge hopper and provide the level information to the operator and control system. The equipment selected was the ultra-*wave*™ Ultrasonic Level controller and the UC24PP ultra-*cell*™ transducer. This equipment was selected because the material being monitored was plastic pellets which offer unique characteristics for any non-contact solution. KM developed the UC24PP specifically for these demanding plastics application requirements by tailoring the frequency, power, and response of the transducer to plastic pellets.

The transducer location was optimized to minimize interference from the fill stream and airflow. After installation, transducer aiming was performed on an empty vessel. An illustration of the effectiveness of the narrow beam transducer was the ability to see to the bottom of the rotary pocket as it rotated slowly. System tuning was accomplished during dynamic conditions to insure proper operation of the system during all phases of pellet transfer cycles. The output was constantly data logged and monitored during the evaluation period prior to implementation into the control system.

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