Screening out tough agglomerates

A chemical producer needs help removing unwanted agglomerations.

Recently, a chemical company opening a new $60 million manufacturing plant discovered a major problem. The company built the plant to manufacture a spherical bulk solid product, but the manufacturing process also generated particulate fines that were forming agglomerates.

As the ¼-inch spheres were dried, the fine powder would stick to itself and the product, as well as clump together. These agglomerates needed to be removed before the product could be delivered to the client. Traditional screening methods weren’t working because the agglomerates were similar in size to the product and the screeners weren’t capable of breaking up the agglomerated material.

“We attempted to remove these particulates in the plant by both a gyratory screener and a standard circular vibrating screener,” says the plant’s senior manager. “However, these processes were not vigorous enough to either break up the large agglomerates or break the agglomerates off the product.”

Searching for a solution

With a production deadline approaching, the company needed a fast solution to remove the agglomerates. The company turned to Elcan Industries, a screening equipment supplier based in Tuckahoe, NY.

“Elcan routinely does particle separation work for us,” says the plant’s senior manager. “We knew they had several types of equipment that we could explore to solve this problem.”

The supplier has a 20,000-square-foot testing facility with ten tolling

In order to break apart the unwanted material, Elcan placed hundreds of polyurethane balls in a screener split up until three sections.
bays, where equipment can be set up to either perform a test or full-scale processing. Elcan tested several different models of screeners with the product to try to remove the agglomerates. One option was a tumbler screener that used air wands underneath the screen to push the material up and break off the agglomerates. However, the agglomerates were too hard to be broken up by the action of blowing the particle up and hitting the roof of the screener.

Next, the supplier tried a high-energy screener that imparts energy directly into the 1,500-micron screen cloth. The hope was that the energy in the screen would break up the agglomerates to a small enough size to pass through the screen cloth.

**Breaking down the agglomerates**

While talking about the problem in a conference room, the supplier’s engineers noticed that if they dropped a marker with enough force, the agglomerates would break, but the final product was strong enough to withstand the impact. The supplier went back to a circular, high-energy screener but added several hundred 35-millimeter polyurethane balls on top of the mesh to impact the mixture of agglomerates and product.

The high-energy screen vibration shot the balls into the air, and when the balls came down, they broke the unwanted material off the product and crushed the agglomerates. This allowed the fine material to pass through the screen while leaving the finished product behind. However, the screener’s circular shape encouraged everything to discharge from the top of the screen, including the balls.

To combat this, the supplier decided to use a rectangular, high-energy screener and placed partitions inside to divide the screen into three sections and prevent the balls from being discharged. A small gap below the partitions allowed the product and agglomerate to pass through freely. The balls broke around 70 percent of the agglomerates in the first

A full-scale system was set up to process the material and separate the unwanted agglomerates from the finished product to help the customer meet a deadline.
section, finished up most of the remaining agglomerate in the second section, and polished off whatever remained in the third section.

A vacuum then sucked down the crushed material through the screen and collected it in a baghouse. The product exited the screener and could then be shipped to the client. The supplier set up four large machines in two of the tolling bays to process the truckloads of product, allowing the chemical company to meet its deadline.  

**Note:** Find more information on this topic in articles listed under “Screening and classifying” in *Powder and Bulk Engineering*’s article index in the December 2016 issue or the Article Archive on *PBE*’s website, www.powderbulk.com. (All articles listed in the archive are available for free download to registered users.)

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