Powder and Bulk Engineering

VOLUME 28 NUMBER 5
May 2014 $15.00

Official publication of the annual *Powder Show™ Conference & Exhibition*

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BAGGING AND PACKAGING

Test center

Test center helps seasoning company improve granular product conveying problem

A test center's complimentary material and equipment testing capabilities help a company select mechanical conveying equipment.

When your company is faced with handling an unfamiliar material for a new process, or if you simply need a new piece of equipment to replace an old one or solve a material handling problem, you often must consider a broad range of material handling options. An equipment supplier's test center can allow you to weigh equipment options and make evidence-based decisions to help design a new installation or improve your existing one. A test center can provide test results showing the optimal equipment choice and configuration for your application, material, and safety needs.

Needing a new conveying solution

McClancy Seasoning Co., Fort Mill, S.C., found this out firsthand. The company had just picked up a new product containing primarily granulated sugar. The company was using a bulk bag discharger that discharged the product into a small surge hopper. From the surge hopper the product was fed into a bucket elevator that conveyed it to a vertical form-fill-seal (FFS) machine that packaged it into 3-pound bags.

But this system wasn't optimal. For one thing, the bucket elevator wasn't an enclosed system, and this allowed product leakage, which became wasted product. The company wanted a system that would fully enclose the product during conveying and eliminate the leakage, waste, and possible cross-contamination. Looking for a solution, Robert Dial, maintenance manager, and Allen Davis, vice president of operations, went to a local supplier's test center.

Weighing a supplier's equipment options

Spiroflow Systems Inc., Monroe, N.C., supplies bulk solids handling equipment and provides material and equipment testing at its in-house test center. The supplier has had a test center for more than 40 years, but after the company's recent relocation to a larger facility, its new test lab became fully operational in September 2013. The test center has an extensive database of prior test results, and the supplier draws on this database and its engineering knowledge to help customers find the best material handling solution.

The supplier's test lab equipment shown here includes a bulk bag discharger, flexible screw conveyor, aeromechanical conveyor, and bulk bag filler.

McClancy Seasoning had been considering replacing the bucket elevator in its process with a flexible screw conveyor and an aeromechanical conveyor. In the system Dial envisioned, a bulk bag discharger would discharge the product into a surge hopper. The surge hopper would direct the product into a flexible screw conveyor, which would act as a metering device for the aeromechanical conveyor. The aeromechanical conveyor would then transport the product to the existing vertical FFS machine.

During the company's initial consultation with the supplier's sales engineer, the engineer examined the seasoning company's current process and suggested a different system. He recommended using a surge hopper with an attached bin activator under a bulk bag discharger to directly feed material to an aeromechanical conveyor. The supplier said that this system would prevent the existing product conveying problems, improve production, and eliminate the need for a flexible screw conveyor.

Many factors led to Spiroflow's equipment recommendation. First, the equipment would be easy to clean: The bin activator's quick disconnects allow it to be easily taken apart for cleaning, the aeromechanical conveyor can also be taken apart and has washdown gates at the bottom for cleaning, and stainless steel surfaces on all the equipment promote cleanability and a sanitary process. The system would also enclose the material, preventing cross-contamination from outside sources.

In terms of operational efficiency and throughput, the system would have many advantages. The supplier recommended expanding the surge hopper's capacity from 25 cubic feet to 60 cubic feet to allow the forklift operator to spend less time waiting for the product from the bulk bag to discharge into the hopper. This would enable the operator to prepare the next bag, preventing excess downtime. The recommended system would also have a higher projected throughput of up to 30 bags per minute with one FFS machine and even more if additional FFS machines were added in the future. The test center would show the company whether this proposed system would be the better choice.

The test center

The test center is an approximately 40-by-60-foot enclosable area within the supplier's production facility and generally conducts two to three tests

The material and testing equipment are put through pretrial testing to ensure that the customer will see the results that they requested when witnessing the scheduled test, without any unforeseen issues.

An operator is shown using the test lab control panel, which is programmed to run the various pieces of test lab equipment.

per week, depending on demand, cleanup time, and other factors. It's set up for each test's specific requirements and accommodates various equipment types, including bulk bag fillers and dischargers, mechanical and pneumatic conveying systems, and packaging and palletizing equipment. The test center can also incorporate equipment from other suppliers that are necessary for the process being tested.

The supplier suggested adding a piece of equipment we hadn't considered — a bin activator — and that's primarily what drew us to schedule a visit to the test center.

The supplier requires that a customer supply an MSDS for the material it wants tested. Many times a customer may have a hazardous material but, if available, can send a surrogate material with the same physical characteristics to be tested. After the supplier determines the material is safe for testing, the customer is issued a test number and a test request form to specify the desired outcome, such as higher material throughput, reduced material degradation, or a combination of goals.

Once a test number has been issued and the test request form is completed, the customer must provide at least 3 to 5 cubic feet of test material. When this arrives at the test center, testing can be scheduled.

Prior to testing, test center personnel determine a material's bulk density, angle of slide, and angle of repose. Test center personnel and engineers then design the test setup. The material and testing equipment are put through pretrial testing to ensure that the customer will see the results that they requested when witnessing the scheduled test, without any unforeseen issues.

The supplier offers both witness and nonwitness testing. A witness test is when a test is videotaped and the customer is physically present during the testing process. A nonwitness test is when a test is videotaped and uploaded to a private video-sharing platform for remote viewing by the customer.

Deron Seibert, one of the supplier's regional sales managers, says that approximately 20 to 30 percent of tests are witnessed by the customer. But he notes, "In this day and age it's convenient to be able to host a video on the web. Many times travel restrictions and the cost of travel may only allow customers to send one or two people to witness the test. With a video, the customer's entire team can view the test." Having the customer's entire team involved in the testing process means that operators, engineers, and management can see the system in operation, make comments and suggestions, and avoid issues that may go unnoticed if only one or two people witness the test.

Ideally the customer can view the video within a day or two so the testing equipment can be left in place in the test center. That way, if the customer requests changes, the system is still set up and additional testing can be performed.

Whether the tests are witnessed or nonwitnessed, the supplier will communicate with the customer after the testing is complete to verify that the results are in alignment with what the customer wanted to see. The supplier will also provide a written test report. Testing material is then returned to the customer, who may perform independent material testing to verify that issues such as material degradation haven't occurred during testing.

Satisfying solution

McClancy Seasoning wanted to see how the supplier's equipment setup would improve its throughput. "The supplier suggested adding a piece of equipment we hadn't considered — a bin activator — and that's primarily what drew us to schedule a visit to the test center," said Dial.

After McClancy completed the necessary forms and supplied the test material, the supplier scheduled a time for the tests that would allow Dial and Davis from McClancy to visit the test lab and see the recommended equipment in action.

Once Dial and Davis witnessed their material being handled using the supplier's recommended combination of a bulk bag discharger, larger surge hopper, bin activator, and aeromechanical conveyor, they were satisfied that this was the solution they were looking for. According to Dial, "Spiroflow is really easy to work with, responsive, and showed me what I wanted to see. And because of the test center, I was able to convince my boss to go with the bin activator, which is a lot easier to clean and more efficient than what we initially asked for." **PBE**

Note: Find more information on this topic in articles listed under "Mechanical conveying" in *Powder and Bulk Engineering*'s article index in the December 2013 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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