Case history

Farmer reaps big rewards from automated bulk bag filling system

Converting to automatic bulk bag fillers helps a peanut company keep up with demand.

Lee Swinson has never been one to shy away from hard work. At 5 years old he was driving a tractor on his dad's farm. By the time he was 12 years old, he'd rented 20 acres of his own to grow cotton. In 2003, Swinson started growing peanuts. Today, his family's eastern North Carolina farm harvests 10,000 tons of peanuts per year. But Swinson knows that working hard isn't always enough. You also need to work smart.

With that in mind, in 2007, Swinson bought a local candy company and began making the Carolina Crisp Peanut Bar. He knew that, pound for pound, a value-added product (such as candy) is typically much more profitable than a commodity (such as raw peanuts). The move has definitely paid off.

Today, Swinson's company, Golden Grove Inc., Warsaw, N.C., provides a reliable market for his peanut crop. The company makes and sells about 200,000 Carolina Crisp Peanut Bars per year and processes and packages shelled and in-shell peanuts for retail. Golden Grove dries and packs the majority of the peanut harvest into bulk bags for sale on the wholesale market. But efficiently getting those peanuts packed into the bulk bags was proving to be a challenge for the young company.

The operator places a pallet and cardboard slip sheet on the bulk bag filler's weigh platform, then installs an empty bulk bag, attaching each of the bag's four corner loops to the filler's quick-release bag clips.

Working hard was hardly working

Initially, Golden Grove workers filled the bulk bags by hand. "I had a stand that would hold the bulk bag in place while they filled it from smaller bags," says Swinson. It was a slow and tedious process, and it was easy for workers to get bored or distracted. It was also easy for workers to spill peanuts while filling the bulk bags. Spilled peanuts had to be swept up daily and thrown away.

As wholesale demand grew, the manual filling process wasn't able to keep up. Three full-time Golden Grove workers could only fill 20 bulk bags per day. Also, they were only able to get the bags filled to within ±2 pounds of the 900-pound target weight.

With a 10,000-ton harvest and Golden Grove employees filling only 20 bags per day, Swinson clearly needed a new bulk bag filling system.

Answering the call for change

Swinson decided that big changes were needed to boost production, improve filling accuracy, and reduce the chances of contamination and spilling. He turned to Spiroflow Systems, based in Monroe, N.C. Mathias Lee, the material handling equipment supplier's vice president of sales and marketing, visited Golden Grove and recommended an automated gain-in-weight filling system that included a model C1-2 bulk bag filler and control panel.

"I didn't really consider any other options," says Swinson. "Mathias came and visited with us. He was a great guy, and they're a local company. The service has been there along with everything else, so it was just a good fit."

It was such a good fit, in fact, that Swinson had two more identical systems installed about 3 months later as part of a major plant overhaul. "It was at a perfect time," says Swinson, "because rather than trying to fit the new bulk bag fillers into our existing line, we just replaced the entire line and put the three systems at the end of it."

With the new arrangement, large elevator conveyors continuously convey peanuts from upstream color sorters to the bulk bag fillers' supply hoppers. Each hopper's discharge is fitted with

Each bulk bag filler has a control panel with digital weighbatch controls, a slide-gate valve position control, and a bag inflation fan control.

a 10-inch slide-gate valve operated by the control panel. The bulk bag filler is located below the hopper and is designed to fill the company's specified 40-inch-square bulk bags. The filler height can be adjusted to accommodate 50- to 64-inch-tall bags with 8- to 10-inch-long corner loops. All product contact parts on the filler are made of Type 304 stainless steel to meet food safety standards.

The bulk bag filler has a dual-concentric filling nozzle that includes a combination bag inflator and venting system. This system inflates the bag before filling and then vents the displaced air as the bag fills with peanuts. A flexible connection is installed between the hopper's base and the filling nozzle and between the bag inflation fan and the filling nozzle, allowing the scale to move freely for accurate weighing. The filling nozzle also has an inflatable neck seal to firmly hold the bag's spout in place during filling.

Load cells on the bulk bag filler's weigh platform are connected to the control panel, which has a NEMA 4-certified enclosure for safety. The control panel has digital weighbatch controls, a slide-gate valve position control, and a bag inflation fan control.

The installation process only took about 3 days. "The supplier worked onsite to program the control panels," Swinson says. "Once we had the bulk bag fillers in place, the supplier's controls engineer came over the weekend, and we were running by Monday."

Fewer hands do more work

With the installation of the new systems, the company now has a single operator running all three machines and can fill 300 bulk bags per day over two shifts. The operator places a pallet and cardboard slip sheet on the bulk bag filler's weigh platform then installs an empty bulk bag, attaching each of the bag's four corner loops to the filler's quick-release bag clips. The operator then attaches the bag's filling spout to the filler's inflatable neck seal and inflates the seal.

From the control panel, the operator inflates the bulk bag with clean dry air and then starts the filling process. The filler is accurate to within a half pound of the target weight. "The slide gates used for this particular project operate in a bulk-and-dribble capacity to increase accuracy and eliminate over- or underfilled bags," says Lee.

When filling is complete, the operator deflates the neck seal from the control panel and engages the automatic bag-loop release. The operator then uses a forklift to remove the filled bulk bag from the filler. The filling process takes about 10 minutes for each bulk bag.

"It's really pretty simple to run," says Swinson. "The supplier's technician showed our plant manager how to run it during the installation."

Positioned to grow

The new bulk bag filling systems have enabled Golden Grove to increase productivity and keep up with growing wholesale demand. "They delivered the filling speed we needed and more," says Swinson.

By removing all operator contact with the peanuts, the new systems have greatly reduced the risk of contamination. Also, the automated systems have virtually eliminated spillage and greatly increased weighing accuracy. "We have a third party that comes out and audits our scales for accuracy every three months," says Swinson, "and they're always good."

"I can't say enough good things about Spiroflow," says Swinson. "They've got good equipment, good service, and good people."

But Swinson isn't done improving his operation yet. He's currently looking at adding two more bulk bag fillers. "We're constantly trying to find new ways to add value to our crops and make our operation as efficient as possible. Like my dad always said, 'If you don't keep up, eventually you'll be left behind.'" **PBE**

A single operator now runs all three machines, and the company can fill 300 bulk bags per day over two shifts.

Note: Find more information on this topic in articles listed under "Bagging and packaging" in *Powder and Bulk Engineering*'s article index in the December 2014 issue or in 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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