

Maker of grain storage equipment sows seeds of growth by installing powder line

To combat lagging turnaround times and liquid coating deficiencies, a manufacturer installs a powder line in-house that can coat all of its parts while enabling 1-day turnaround.

Grain Systems International offers grain drying and storing solutions to the world. Its plant in Assumption, Ill., fabricates the main components of the grain bins and other storage and drying equipment. Its sister plant in Paris, Ill., manufactures the materials handling equipment such as the transfer conveyors used to move grain from bin to bin. Grain Systems International also finishes equipment for the poultry and swine divisions within the GSI group.

The company has been using powder for 6 years. Its liquid coating capabilities became overloaded and couldn't efficiently process the production volume. Powder proved more appealing than liquid because of its reclaim capability and improved aesthetics. Powder's improved ultraviolet-light protection also offered the company a big advantage because most of its products function in outdoor environments.

In addition to powder coating for the other business divisions, the company finishes welded steel assemblies and other components used in constructing the grain bins. Previously, the company had a powder coating line only in Paris, Ill. As a result, the Assumption plant had to ship its parts to Paris—an hour and a half drive. During the busy season,

some of the work would also be outsourced to other coaters. The company was losing time and money associated with the travel costs to

get the parts powder coated. Furthermore, it lacked the capacity to handle all its work. "We wanted to bring coating in-house and reduce



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Drawing a line

To confront these issues, Grain Systems International began considering options for installing a powder coating line at the Assumption, Ill., plant. The company considered building a line incorporating used equipment. In addition, it had two system suppliers quote on a new system. Ultimately, it awarded the project to General Automatic Transfer, Fenton, Mo., based upon its price and equipment.

In designing the new line, Ginder used the existing Paris line as a baseline to specify a better system. After studying the existing line and the lessons learned through coating runs, Grain Systems specified a host of design improvements to be incorporated into the Assumption line. For example, the Paris line existed in

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tight confines. As a result, loading and unloading occupied the same space. “This caused a lot of traffic and a problem with getting parts on the line and keeping the line running,” Ginder said. To remedy these problems, the new line design placed load and unload functions in separate places and increased the size of each. Overall, Grain Systems wanted a larger line that could improve production efficiencies as well as accommodate larger parts.

Navigating the new system

The main processing challenges the line has to deal with involve part size and parts mix. The new line can accommodate the largest part Grain Systems International makes—a 1,500-pound I-beam. The line also processes structural pieces such as a 20-foot-long angle iron. In addition to these heavy and long parts, the line must also process small, lightweight parts. Handling this varied part mix efficiently proved crucial in shaping the line. Said Ginder: “That was a big thing—to try [to] get as much product through as possible without compensating for one thing and making it worse [for] another.”

The line started coating parts at production levels in October 2006. Currently, nine people operate the line for one shift. Scheduling part runs poses a challenge. Workers receive the manufactured components and stage them by color. From there, the workers loading the line determine what needs to be run for the day based on the quantity of parts in the different-colored staging areas. Next, workers in the load area tag and hang the parts onto the 1,350-foot-long conveyor that carries the parts through the system.

The parts mix consists of steel and galvanized steel. The substrate determines the type of surface preparation. The steel components get shot blasted. Galvanized steel parts pass through a three-stage washer consisting of an iron phosphate for 90 seconds, a rinse for 45 seconds, and a sealer rinse for 45 seconds. Madison Chemical, Madison, Ind., supplies the pretreatment chemicals. When



Two powder coating booths housed in an environmental room apply powder by using a combination of automatic and manual equipment.



Grain Systems International powder coats components used on its line of grain storage and drying equipment.

switching from one surface preparation to another, workers leave a gap in the line. After exiting the washer, parts make a 7-minute pass through a dry-off oven set at 350°F.

Next, the components enter an environmental room that houses two powder coating booths supplied by Wagner Systems, Carol Stream, Ill. The environmental room controls the temperature and humidity to allow the powder to stay dry and flow evenly, and to keep dust and other contaminants from interfering with the coating application. The booths can be rolled on and off line as needed, allowing the line to keep running while workers perform off-line color changes. On average, workers do one color change per day and as many as three color changes per shift. Automatic guns coat most of the parts; however, on some parts such as large welded pieces with multiple angles, a spray gun operator manually applies powder at one of the booths' touch-up stations.

The company applies three main colors—red, gray, and white—and four others less frequently. The company reclaims the large-volume colors and sprays to waste the others. The company applies powders supplied by DuPont Powder Coatings, Houston. The variety of colors supports sales and establishes brand

recognition as well as marking the company's growth. "If someone is out in the field, they can look at a certain piece of equipment and say 'that's a grain bin from Grain Systems' or they establish that color with our name," Ginder said. "We've bought several other companies over the last 20 years and have brought their colors with us."

After exiting the powder room, parts enter a convection cure

oven and undergo a 30-minute cure cycle at 450°F. To ensure temperature uniformity, workers run an oven profiler supplied by Datapaq, Wilmington, Mass. For the majority of parts, the oven can be kept at a constant temperature. For some of the thicker and heavier components or small pieces, workers have to increase or decrease the temperature accordingly. Finally, cured parts leave the oven and continue along the line to cool down before arriving at the unload area.

Learning from the past and building a bigger future

By installing the new powder line, Grain Systems International has reduced its lead-time while improving finishing quality. Without having to transport parts between the Assumption and Paris plants, lead times dropped from 3 days to 1 day. By addressing shortcomings with its Paris powder coating line, such as the small oven, the company has boosted production efficiencies. "They actually stopped the line to cure some of the heavier parts," Ginder said. "By increasing the oven size on this line, we don't have to stop the line. We have improved our production efficiencies with the new line while reducing the number of people needed to run the line compared with the Paris line."

The new line has also improved the company's overall coating capabilities. Previously, workers applied liquid coatings to heavier parts in a manual booth. The automated powder line with its large part window has virtually rendered liquid coating obsolete. "It was just better to go ahead and powder coat our parts," Ginder said. "It's more cost-effective."

In addition, the new line was designed with increased capacity, allowing Grain Systems International to grow without pain. Built on the lessons learned with the company's coating line in Paris, the new line relieves the coating burden previously shouldered by the Paris line. Now, the company plans to take the advantages achieved with the new line and apply it to the coatings operation at its other location. "We will update the Paris line and do coating out of both locations," Ginder said. "This will make both plants self-sufficient. All the materials handling equipment is done out of the Paris plant and that keeps them busy—we're anticipating running two shifts at both plants during our busy season. That leaves us with one shift of potential growth for each system to handle a future increase in business volume." **PC**

Systems supplier: **General Automatic Transfer, Fenton, Mo. 636/343-6370. www.gat-systems.com**

Powder coatings: **DuPont Powder Coatings, Houston. 713/939-4000. www.dupontpowder.com**

Application equipment: **Wagner Systems, Carol Stream, Ill. 630/784-8900. www.wagnersystemsinc.com**

Oven profiler: **Datapaq, Wilmington, Mass. 978/988-9000. www.datapaq.com**

Pretreatment chemicals: **Madison Chemical, Madison, Ind. 812/273-6000. www.madchem.com**