Modern Manufacturing

2006 Discovery Awards
R&D Overview
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State-of-the-Art Soft Mud

E veryone knows that efficient, highly automated manufacturing plants have the best chance of remaining competitive in today’s economy. But streamlining and automating a 40-year-old soft mud “molded” brick plant is no easy task. Just ask Simon Whalley, director of manufacturing for Redland Brick Inc., and Dan Newhouse, plant manager of Redland Brick’s Rocky Ridge, Md., facility. The Rocky Ridge plant, which was built in the 1960s, was inefficient and outdated, and had been operating at its 20 million standard brick equivalent (SBE) per year capacity for quite some time. Its soft mud products had been used by designers, architects, developers and homeowners on a diverse range of projects, from universities to stadiums to dream homes, and demand just kept growing. But so did the cost to manufacture the distinctive-looking product line.

By 2005, Redland Brick executives knew that it was time to make a decision. “We either had to modernize the plant or plan to close it down eventually. We knew that if we could make our products more efficiently, and make more of them, revamping the plant would be a good investment. But our customers expect a certain look and level of quality from our product, and we had to ensure that we would be able to match our existing product line using any new equipment that was installed,” Whalley explains.

Choosing New Equipment
The company evaluated several different vendors and ultimately chose Swindell Dressler Int’l. Co., based in Pittsburgh, Pa., to manage the project. Achieving the plant’s goals—reproducing the existing product line with increased capacity, fuel efficiency and reliability, and reduced labor—required close collaboration between Swindell Dressler and Redland Brick, as well as the various equipment suppliers.

“We sent personnel to the UK and Belgium to evaluate equipment in brick plants there, and we worked very closely with Swindell on the final decision-making process,” notes Whalley. “We also evaluated equipment in similar applications.”

Above: The plant’s new Lancaster 46H Autobrik machine reduces maintenance time and provides a more practical method of improving the quality of the molded brick by allowing the machine settings to be optimized for the many different styles of molded brick that the machine can produce.
at other U.S. plants and worked with the vendors to make adjustments so that the equipment would be better suited to our processes. We found that the vendors we ended up working with were all very receptive to that type of collaboration.”

One of the most crucial areas to be revamped was the forming process. The company’s molded products were made on an old Posey press supplied by Lancaster Products, Lebanon, Pa. “The machine produces a unique soft-mud brick, and we wanted to make sure that we would be able to maintain that look,” says Whalley. “Rather than trying to find another technology from a different vendor, we decided to work with Lancaster Products to upgrade the system to the new 46H Autobrik machine.”

The old single-source belt drive, with its associated gears, slides and cranks, was replaced with individual SEW gear motors with variable frequency drives and hydraulic cylinders. An Allen Bradley PLC controller was added to monitor all rotary and linear motions and precisely control all of the system’s movements. While the old machine required time-consuming mechanical adjustments for timing, speeds, positions and other variables, the PLC control would allow the operator to make these adjustments at the touch of a button on a large touch-screen pendant control panel. The new system would reduce maintenance time and also provide a more practical method of improving the quality of the molded brick by allowing the machine settings to be optimized for the many different styles of molded brick that the machine could produce. The system included an integrated Lancaster twin-screw pre-pugmill and a PugMaster moisture control system designed by E.H. Wright.

Automatically handling the molded brick was the next challenge. “Our product has a lot of irregularities and other characteristics that make automated handling difficult,” explains Whalley.

After evaluating several different options, the company chose a system supplied by Ceratec, based in Ploegsteert, Belgium, that included the complete tray circuit, a setting machine and a deheader. The tray circuit consisted of unloading machines for the dryer cars and pallets, a storage and feeding system for the Autobrik press, and a loading system for the pallets in the dryer cars. The deheader would feed the plant’s existing monorail system, but would be designed to accommodate an automatic packaging machine.

“The Ceratec name is not well known in the U.S., but their systems have been widely used in Europe,” says Whalley. “We were impressed with the efficiency of their equipment and their level of experience with soft-mud brick.”

For the firing process, Redland Brick opted to replace its existing tunnel kiln with a low-profile Swindell Dressler Low-Set™ tunnel kiln. “We couldn’t switch to an alternative fuel like oil or coal because we were concerned that it would affect the overall look of our product. We went with natural gas because that’s what we had been using in the plant, but we wanted the new kiln to be as fuel-efficient as possible,” says Whalley. “We decided to go with a Swindell Dressler low-profile kiln because it provided a faster firing cycle and associated fuel savings, as well as added load stability.”

Reaping the Benefits

Redland Brick was able to keep its existing equipment operating while the new equipment was being installed, but five weeks of downtime were required to make the final switch. “We stockpiled our products and were able to schedule most of the downtime for March, which is our slowest month, to minimize the impact on our customers,” says Whalley.

Redland Brick’s new state-of-the-art soft mud brick plant began operation at the end of March 2006. With the increase in automation, the plant was able to reduce its workforce from 36 to 22 employees for a substantial labor savings. Capacity was doubled to 40 million 56E per year, allowing the company to capture new market share; by mid-June, the plant was running at 75% capacity. The revamped plant is also far more efficient, with a 65% faster firing cycle and a 50% reduction in natural gas use. With all of these benefits, the Rocky Ridge plant is poised to continue serving its growing customer base with a cost-effective manufacturing operation.

“Redland Brick is dedicated to producing high-quality brick in efficient, cost-effective manufacturing plants. The revamp of the Rocky Ridge plant fits into that goal,” says Whalley.