

Redland Brick Inc. Case Study

Ingredient Masters, Inc.

The Making of a Brick Plant

In July 2001, Redland Brick Inc. began production at its new Harmar Plant in Harmar Township (Cheswick), Pa. The state-of-the-art plant is designed to operate very efficiently—from the careful mining, storage and blending of raw materials, to the precise application of coatings and textures, to the uniform drying and firing of the brick and the packaging of the final product. The plant is designed to produce 60 million standard brick equivalents (SBEs) per year and is currently running at about 80% capacity with a 99%+ recovery rate. It is capable of producing a wide variety of shale, fireclay and shale/fireclay mix products in a range of sizes for both residential and commercial markets.

“We decided to do more than modernize our existing plant. Building a new plant has enabled us to more than double production and allows us to produce a variety of new, very high quality products,” says CEO Jim Vinke.

But this new plant was not built overnight. According to Vinke, a significant amount of teamwork, pre-planning, research, and a willingness to work with local



government officials were key to the plant's success. “One of the first things we did was to assemble a team of key Redland personnel that worked together to generate ideas and implement plans for the new plant,” Vinke says. “We built this new plant to meet the needs of our customers, so the input of our sales and marketing people was crucial. When it came to designing and managing the construction of the new plant, the individuals we really relied on, however, were Simon Whalley, our director of manufacturing, John Vrobel, our Harmar plant manager, and their staffs.”

“We looked seriously at this new plant for probably three years before we broke ground, but it took us less than one year to get the permits we needed,” adds Vrobel. “Because we did all of this work early on, the overall project went pretty smoothly.”

Working with the Land

Harmar Township is an area characterized by rolling hills, lush forests and rushing streams—but it's also zoned industrial and contains a wealth of high-quality raw materials, making it an ideal location for a brick plant. Redland Brick was successful in working with the land and the local community to build its new plant.

“Before we could begin construction on the new plant, we had to move about 300,000 cubic yards of material off the site,” says Vrobel. “We also had to deal with the local government on some wetland issues. We worked closely with a wetlands consultant and with the local branch of the Department of Environmental Protection to obtain the necessary wetlands encroachment permits.”

According to Vrobel, keeping an open mind was essential in the permitting process. “If you go in with attorneys, it’s going to lengthen the project by at least twofold. We went in very wide open and worked very closely with the local community leaders and government agencies, and that made the process a lot easier. We had to make some concessions—for example, a trout stream wraps its way around the property. We agreed to leave a wooded corridor between our property and the stream and to leave the stream open to fishing. But that was a tradeoff we were willing to make for being able to use the site.”

Choosing the Right Equipment

Selecting equipment for a new plant can be a difficult and time-consuming process. This was especially true for Redland Brick’s Harmar plant, whose goal is to achieve “100% customer satisfaction on every order.” Reaching that level of quality with the least amount of rejects requires sophisticated, reliable equipment and a high level of support from the equipment suppliers.

“We did a lot of homework in the planning process,” says Vrobel. “We traveled quite a bit to Europe to look at machinery that suppliers had built and installed in brick plants over there, and we ran tests using our material in some of the equipment we were considering.”

Crushing, Grinding and Mixing

The company chose MECO to provide project management assistance, as well as civil engineering for the concrete design in the grinding plant. For Redland Brick, “value”—the



investment vs. the return—was often a key tiebreaker when evaluating similar types of equipment from different suppliers. For its grinding room, for instance, the company selected a Stedman Mega Slam’ as its primary crusher and a Stedman Grand Slam’ as its secondary crusher.

“We were looking at equipment from a few different companies, and

these machines were the best value,” says Vrobel. “They offered both ease of maintenance and low repair costs. Some of the other Redland Brick plants have also used these machines with a great deal of success, so we knew they would be reliable. We ran full-scale trials on both machines with our material before we bought them.”

Working with MECO, Redland selected Handle, a German company, to design and build the grinding plant. Although a number of companies bid on the project, Handle’s proposal was the most impressive. “There aren’t many companies in the U.S. that will put together a grinding plant like this,” Vrobel says. “Additionally, our parent company, Belden, had used Handle for some of the engineering and design in their new grinding plant as well and had been pleased with the results.”

The raw materials-local shale and imported fireclay-are sized to -10 mesh using two Mogensen screen banks, and then proceed to a Handle double-shaft mixer, where a precise amount of water is added. According to Vrobel, this type of mixing system is unusual for a U.S. plant but is often seen in Europe. “Adding water at this stage in the process improves the extrusion qualities by giving the moisture time to even out in the material, and it also eliminates any dust issues,” Vrobel says.

Handle also supplied two excavators, which are used to remove the blended material from the storage bunkers; a second doubleshaft mixer, which is used to mix Additive A191 and additional water into the formulation; a de-airing double-shaft mixer, which is used to add the final water to bring the moisture content of the clay up to 12.5-13%; and an extruder, a Handle Futura S, which extrudes the brick at up to 28,900 SBE per hour. Three Novatronic controllers are used throughout the process to control the moisture content of the clays.

Blending, Coating and Texturing

Colors, coatings and textures are extremely important in the Harmar product line. The company carefully blends its clays to produce six body colors and adds coatings and textures to many products to further expand its available color and design spectrum. Consistency from batch to batch was a key criterion in choosing the equipment for this portion of the plant. The company chose Ingredient Masters, based in Cincinnati, Ohio, to design the batching system and Hallamshire, based in the UK, to design the texturing and coating operations.

“We found Ingredient Masters at the Powder & Bulk Solids show in Chicago a few years ago when we were looking for a company to do the batching for us, and they were the best value that we could find,” Vrobel says. “The system is completely automated, so it’s much more accurate and much more efficient than the manual batching system we used in our old plant. We can easily do the same operations in half the time with the automated system.”

Raw materials for coatings are stored in several hoppers along a track. A cart holding a 2000-lb stiff-walled super sack moves down the track and gathers a precise amount of material from each hopper using a gain-in-weight system. Once the batch is complete, it is transferred to either a wet or dry blending station for further processing.

The system was custom-designed specifically for the Harmar plant based on the required accuracy, volume/batch size and batch time. According to Vrobel, the company currently processes a batch in approximately 20-40 minutes; however, the system is set up to handle batch times as fast as four minutes. "This provides us with flexibility for any future increases we might face in production," Vrobel says.

The coating and texturing system, designed and built by Hallamshire, is also completely automated and is designed to be modular. The individual mixers, pumps and other equipment can be moved around as needed to produce the desired coating and/or texture. Redland Brick commissioned Hallamshire to oversee the design and installation of both the batching system and the coating and texturing system. Both systems are tied together through a single programmable logic controller (PLC), which was supplied by Ingredient Masters.

"It was difficult to find a company that could envision the type of batching, coating and texturing operation that we were looking for," Vrobel says. "Hallamshire did a good job of taking our vision and putting it together for us.

Cutting, Setting, Firing, Drying and Unloading

After evaluating a number of different systems for cutting, setting, firing, drying and unloading brick, Redland Brick chose Ceric to design and build systems for all of these operations.

"We wanted the cutting machine, setting machine, unloading machine, kiln and dryer all to come from the same company, and Ceric had the best package out of the four or five companies that we evaluated," Vrobel says. "By working with a single supplier for all of these operations, we can much more quickly solve any problems that may arise down the road. It can be easy for companies to pin the blame on somebody else if those operations are split up under different suppliers," he adds.

To control the plant's emissions, the company selected a dry lime injection scrubber from Procedair Inc. "We researched the available scrubbers, and this was the one that we felt would best enable us to meet air quality regulations," says Vinke. "This scrubber has a demonstrated track record of producing the desired results, and we considered it to be the best choice among the options available to us."

Packaging

The company's quest for quality extends to its packaging operation, where it uses three Signode MHT-80 strapping heads to automatically apply plastic strapping to its brick cubes. The plastic strapping prevents the brick in the cubes from shifting and maintains the cubes' neat appearance both in the brickyard and during shipping. "We've used the MHT80s at several of our other plants, and we knew they would be reliable, Vrobel says.

Ensuring Quality from Start to Finish

According to Vrobel, Redland Brick had a rare opportunity with the new Harmar plant-the opportunity to create the ideal brick manufacturing facility. "Everything in this plant is designed for material consistency. By spending a lot of time planning and by working closely with the local community, we were able to take all of the different challenges that we had been facing in our old plant and fixed them in the new plant," Vrobel says.

"We really wouldn't change anything about this new plant," he adds.

Editor's note: Redland Brick Inc. is headquartered in Williamsport, Md., and is a wholly owned subsidiary of The Belden Brick Co. For more information about Redland Brick's Harmar plant, contact the company at 375 Rich Hill, RD 3, Cheswick, PA 15024; (412) 828-6300; fax (412) 828-6604; or visit www.redlandbrick.com.

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