Carmeuse Preps Aggregate for Rail

BY TOM SACCAMOZZONE

Eriez offers magnetic lift and separation, metal detection, fluid recycling, flotation, materials feeding, screening, conveying and controlling equipment. Eriez manufactures and markets these products through 12 international subsidiaries located on six continents.

Aggregates producers in the Northeast have a variety of uses for their materials beyond asphalt mix production. For example, flue gas desulfurization (FGD)—a technology used to remove sulfur dioxide from the exhaust flue gasses of fossil fuel plants—relies on a wet-scrubbing technique using slurry from limestone to scrub the gases. For a typical coal-fired power plant, FGD will remove 95 percent of the sulfur dioxide in the flue gases.

A portion of East Coast utilities rely on crushed limestone that comes from the Middletown, Virginia, mine of Carmeuse Lime & Stone. At this cavernous mine, a network of rock crushers, feeders and conveyors load 4,000 tons of rich limestone per hour onto railcars destined for the power plants.

Carmeuse manufactures and distributes up to 7 million tons per year of finished limestone product. The company also produces another 25 million tons of high purity chemical limestone and aggregates and 2 million tons of high-grade silica sand products. More than 32 manufacturing facilities supply and serve 33 states and provinces in the eastern United States and Canada.

The lime, limestone and industrial sands aggregates are not only used for flue gas desulfurization, but also for road construction, water treatment, paper and glass production, masonry, mortars and other building materials. The company has a corporate history that dates back almost 150 years.

Kemper Equipment, Honey Brook, Pennsylvania, worked with Carmeuse Lime & Stone to design, engineer and supply the rail load out system for the Middletown site. The system includes a scalping screen, cone crusher, Kemper conveyors, and Eriez® mechanical feeders, suspended magnet, and metal detector. Kemper has sourced Eriez equipment on various projects for more than 20 years.

Family-owned Kemper Equipment distributes crushing, screening and washing equipment of major suppliers. Kemper also manufactures custom conveyor systems, hoppers, bins and other support structures in its 30,000 square foot facility in Hazleton, Pennsylvania.

“Power plants will take the crushed limestone, grind it and use that for the scrubbing agent,” observed Andy Wright, project manager who oversees Carmeuse mining operations in Virginia, Pennsylvania and Tennessee. “The power plants get limestone that has been crushed into particles ¾-inch in size or less.

The limestone goes through several crushers and has tramp metal removed in the process before being loaded onto the train cars. Through a series of conveyor belts, we have the capability to load 100 cars in six hours.”

Removing Tramp Metal

During the initial phase of mining the limestone, massive rocks are fed through a primary crusher, reducing their size to approximately 8 inches in diameter, according to Wright. The crushed rocks then pass under an Eriez suspended permanent magnet to remove any large pieces of tramp metal imbedded in the rocks during the mining process.

“The Eriez magnet removes any stray metal from the rocks before they proceed along the conveyor line to the cone crusher, which is more sensitive to metal particles; anything metal is bad for that cone crusher,” Wright said. “Metal can come from a lot of places, but a lot of times it’s from a tooth off a loading bucket. We don’t want any teeth to enter the crusher.”

The Eriez suspended permanent magnet in use at the Carmeuse Middletown mine automatically removes large amounts of ferrous materials conveyed in heavy burden depths on almost any type of conveyor or chute. The uniquely designed magnetic circuit is long and flat, providing a large area of magnetic coverage with a maximum depth of field and with less head room required than an electromagnet.

Safety Checkpoints

After the 8-inch-diameter rocks pass under the suspended magnet, they process through an Eriez MetAlarm metal detector that detects any nonferrous tramp metal.

“The suspended magnet picks up any large piece of ferrous tramp metal, but should any ferrous, nonferrous or stainless steel metal pass by it, the metal detector detects it and stops the conveyor,” Wright said. “Occasionally, the magnet can’t pull a piece of metal that is really imbedded in the rock. That’s why we have the Eriez metal detector on the other side before the rocks proceed to the cone crusher.”

The MetAlarm metal detector uses pulse induction technology that offers balance coil detection

sensitivity and performance. Higher detection sensitivity is designed to ensure even the smallest problematic tramp metal can be detected, thus providing better protection for crushers, screens and conveyor belts. Adequate protection saves time and money with less equipment downtime.

Move Crushed Limestone

The cone crusher at the Middletown mine takes the 8-inch-diameter rock and reduces it further to what Wright described as “3/4 x 0,” meaning the rock is now ¾-inch to non-measurable in size before final transport to awaiting railcars.

Eight Eriez Model HVF 36-inch-wide x 60-inch-long mechanical feeders take the ¾-inch x 0 limestone and deposit it onto a series of conveyor belts, which load up the railcars. The eight feeders convey 500 tons of crushed limestone per hour, for a total load out of 4,000 tons per hour, according to Wright.

“These feeders are very low maintenance and fit into a compact footprint, which is ideal for a mining site,” he said. “Their low profile allows us to put them into a smaller work area and because they have a variable frequency drive for control, it makes for a simpler, cleaner installation.

“In my job at Carmeuse, I have used a lot of Eriez products because it is a good company to work with,” Wright continued. “If there is a problem, they take care of it. We’ve used Eriez equipment from the beginning of this Middletown mine.”

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