

Getting Into the Global Game

Automated material handling enables a Gulf Coast sulfur distributor to tap overseas markets.

The U.S. is the world's leading producer of sulfur, a commodity that's integral to the global fertilizer and manufacturing industries. Primarily, sulfur is a recovered residual byproduct stemming from the processing of natural gas and crude petroleum. For Martin Midstream Partners L.P. (MMLP), sulfur is a rapidly growing segment of its business. MMLP is a publicly traded limited partnership with a diverse set of operations focused primarily in the United States Gulf Coast region. MMLP's primary business lines include: terminalling and storage services for petroleum products and by-products; natural gas gathering, processing and LPG distribution; marine transportation services for petroleum products and by-products; sulfur gathering, processing and distribution; and fertilizer manufacturing and distribution.

In 2005, MMLP entered the prilled sulfur business when it acquired the assets of Bay Sulfur located at the Port of Stockton in California, and most importantly, when it began construction of a new \$18 million sulfur processing facility at its Neches deep water marine terminal near Beaumont, Texas.

The now completed Neches facility includes molten sulfur storage, sulfur processing, dry bulk storage, automated stockpiling, reclaiming, and ship loading systems. At the site, molten sulfur is processed into pellets or prills at a rate of 2,000 metric tons per day. Consequently, this vast output means that the prills must be properly stockpiled and stored at the facility until they are loaded onto ships or barges. Automated material handling via the use of telescoping radial stacking conveyors, tripper conveyor systems, and mechanical ship loaders, has allowed MMLP to stockpile and distribute "sulfur prills" – the widely accepted sulfur form for overseas shipments.

West Coast sulfur producers have long been involved in sulfur prill formation. This has allowed them to tap into high volume overseas markets, since production has continually exceeded local demand. Gulf Coast producers, who have historically not been involved in sulfur prill formation, have been limited to U.S. markets. Until recently, this has not been a problem because the demand for sulfur in the Gulf Coast was higher than the production levels. With the recent increased capacity of several refineries, the increased quantity of high sulfur crude being processed and a declining demand for the product has caused the Gulf Coast to look for export options. So when MMLP started manufacturing and stockpiling sulfur prills at their Neches facility, they had finally brought the Gulf Coast into the global sulfur game.

"By adding automated stockpiling, conveying and loading systems, we've opened ourselves up to a huge number of new overseas markets. Before these systems were installed, we didn't have that luxury along the Gulf Coast," says Keith West, project engineer for MMLP.

West oversaw the installation of the material stockpiling and conveying equipment and worked closely with the system's manufacturer, Superior Industries, a company that designs and builds conveyor systems for the aggregate and marine material handling industries. Its customized stockpiling and conveying systems include automated telescoping radial stacking conveyors, tripper systems, and other equipment, for barge and ship transport on either inland or ocean waterways.

"To capitalize on the competitive advantage of inland or ocean transport, one's material handling and stockpiling systems must be equally as efficient. Effective material handling is a major part of maintaining profitability," says Superior Industries President Paul Schmidgall. "For example, telescoping radial stacking conveyors create larger volume stockpiles in a variety of configurations. This maximizes stockpiling capabilities in ports where space is often restricted," he says.

A Customized Solution

"The challenge for Superior Industries was to integrate their stockpiling and conveying systems with our new mechanical ship loader," says West. "This was our first major-type conveying project, and their engineers worked closely with us on working any bugs out and getting us up and running on time," he adds.



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West says that the sulfur material handling process begins with Superior's 150-foot TeleStacker™ conveyor, a telescoping radial stacker that is operated via simple touch-screen programming. "With the TeleStacker we can cost-effectively and safely store and stockpile large volumes of material within a defined area, until it is time to load it onto the large marine conveying system," he says. "Its biggest advantage is the automation. We can be hands-off and let it stack on its own."

When it is time to reclaim the prills for shipping, material is loaded into hoppers and conveyed on portable conveyors to a large marine belt conveyor where it is transferred to Superior's custom-designed tripper system, which works in conjunction with the mechanical ship loader.

Essentially, trippers are devices (consisting of a frame supporting two idling pulleys, one above and forward of the other) used to discharge materials from a belt conveyor at points upstream from the head pulley. The material on the belt is discharged to a chute as the belt wraps around the upper pulley. The chute can be arranged to catch and divert the discharged material in any desired direction. Augmented by moveable gates, material can be discharged to either or both sides of the belt conveyor.

At MMLP's Neches facility, West explains that the tripper system (with its tripper car or discharge point) is connected to the mechanical ship loader. The ship loader actually "drags" the tripper car with it as it moves from hatch to hatch within the ship. The tripper car allows the product to discharge from the tripper conveyor onto the shiploader and thus into each hatch.

"We load varying quantities of sulfur into each hatch. Every ship is different, and the system must be able to adjust to each one. But typically there are between 5 and 7 hatches on a ship, and we are loading from 30,000- to 60,000-metric tons per ship. We average about one ship per month, with material being transported to almost any international market, from South America to Southeast Asia," says West.

Moving with the Sulfur Market

As the sulfur content of diesel and other fuels decreases, sulfur production increases. Sulfur prilling facilities, such as MMLP's Neches facility, provide refiners with an alternative market for the sale of their residual sulfur. An average of 90 percent of global sulfur production comes from these recovered sources. Currently, the agriculture industry is the leading sulfur consumer worldwide.

Obviously, the Gulf Coast region is a major hub for the petroleum refining and natural gas gathering and processing industries. With the addition of effective material handling and ship loading systems at Neches, MMLP can effectively capture the full potential of a global sulfur market.