Classifier conversion improves performance of roller mill at Volclay Siam

Company increases output of bentonite clay thanks to more efficient milling.

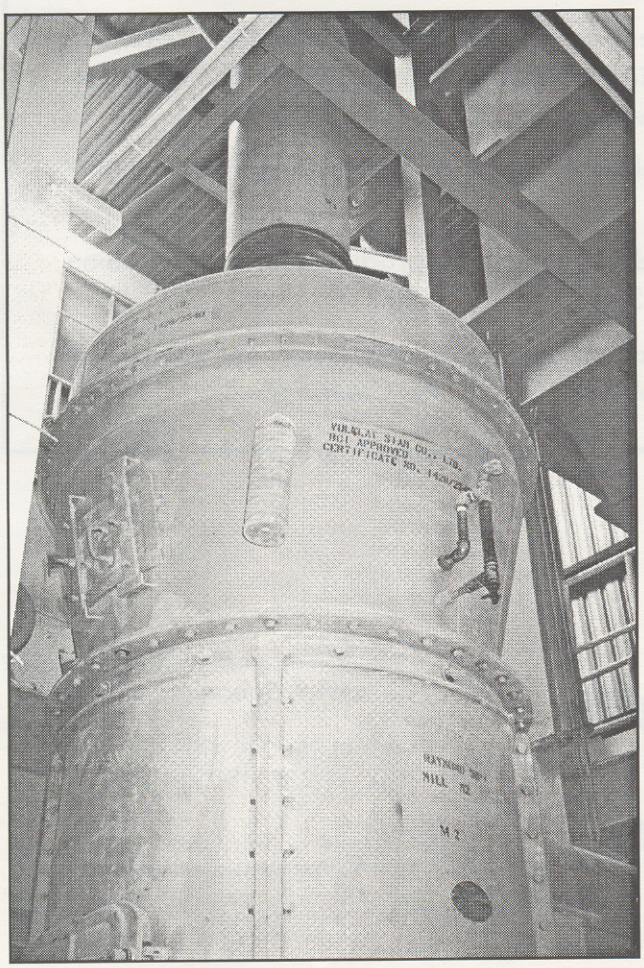
Volclay Siam Ltd. processes bentonite clay at a factory in the Rayong province of Thailand, about 2 hours south of Bangkok. The business is a part of AMCOL International, a group of companies that supplies specialty minerals to a range of industries.

Bentonite is a mineral with a variety of uses. It acts as a glue for sand molds in foundries; a lubricating agent in well drilling; a binder in medicinal tablets; a viscosity-enhancing additive in body lotion; and a clumping material in cat litter. Volclay Siam opened it doors in April 1998. Today, the company controls direct domestic sales to all foundries in Thailand and controls export sales to other industries in China and Taiwan.

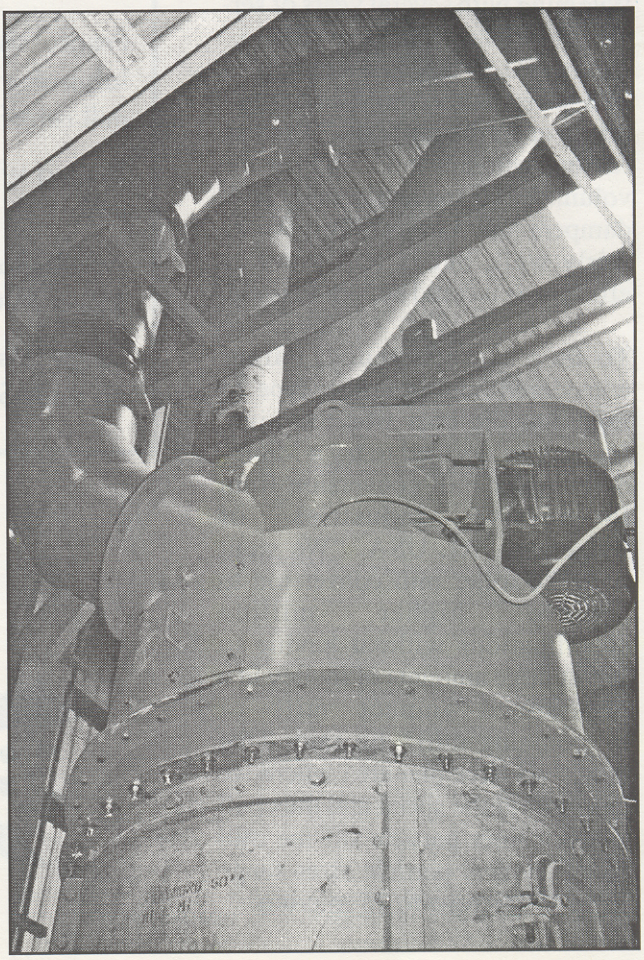
The process

"Processing the bentonite is really quite simple," said Hugh Parker, who is responsible for sales and operations at Volclay Siam, a US$4

Roller mills, the industry standard for mineral processing, leave room for improvement.



This roller mill is still using its original classifier. Without varible-speed motors on the fan or rotor, workers use dampers to control air volume and thus control particle size.



This roller mill, fitted with a conversion classifier, gives workers better control over the top size cut of fine particles. It also lifts the fine particles out of the grinding zone more quickly, thus increasing efficiency and throughput.

million operation. "We run dried, crushed material through two 50-inch (1,250-millimeter) roller mills." The fine product then moves to one of two packing lines that put the bentonite in 1-metric-ton bulk bags, 100-pound bags, 50-kilogram bags, or 25-kilogram bags.

Parker said that roller mills have been standard equipment in the industry for more than 70 years. They operate using several rolls that are attached with arms, spider-like, to a central shaft. As the shaft turns, centrifugal force drives the rollers against the surface of a grinding ring. Air enters from below the grinding ring and flows upward, carrying particles to a classifying section. Particle size relates directly to the volume of air passing through the mill.

The problem

"Our mills had a previous life in Wyoming with several years of service there before they arrived here," Parker said. "They do not have variable-speed motors on either the mill drives or on the mill fans." For that reason, workers must control the volume of air inside the mills with dampers and baffles. "This works fairly well, but is really not as efficient as it could be," Parker said.

To increase efficiency, Parker considered adding a new type of mill, but the cost was too high. Instead, he decided to try a Micro-Sizer roller mill conversion from Progressive Industries of Sylacauga, AL USA. "We went with the roller mill conversion to achieve higher milling specifications without having to invest large amounts of money in a high-speed impact mill or micronizing mill," he said. That way, "we have one area where we can control the speed and thus pull a much finer particle off the mill face." Typical particle sizes range from 45 microns to 75 microns.

The conversion

"Particle size for most of our traditional business is generally not a big issue, but for some industries, particle size does matter," Parker said. "The volume of air going into the mill is the critical aspect of controlling particle size and volume." Using the roller mill conversion enables Volclay to control the air volume better than before. It also improves grinding efficiency by removing the fine particles from the grinding area more quickly than the old classifier that came with the mill. This reduces the load on the mill.

Volclay removed the original classifier from one of its two roller mills in December 1999 and replaced it with the roller mill conversion. The conversion classifier mounts directly above the mill. It uses a wheel with vertical blades to create a force of air within the mill that lifts the fine bentonite from the lower portion of the mill. This enables the mill to work more efficiently.

At the same time, the acceleration of the air and particles creates a centrifugal force that improves the precision of the cut size for fine particles. Oversize particles return to the grinding bed. Overall, the conversion improves control over the top size of the particles, reduces energy usage and maintenance, and increases production. "Expectations have been met," Parker said. "The mill operates smoother and quieter, and we get more throughput while milling our traditional materials. It's as much as 35 percent."

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