Case note
ABB drive retrofit boosts sugar centrifuge production and uptime

Syrup flows throgh the perforated centrifuge bowl, as it is spun.

ABB industrial drive provides savings and increases throughput

The Sugar Cane Growers Cooperative of Florida in USA is a 54-member sugar farmers' cooperative that provides its members assistance with agricultural administration and processing operations for their more than 70,000 acres of sugarcane. At its Belle Glade plant, 24,000 tons of sugar are ground daily, producing 350,000 tons of raw sugar annually, on average. Because sugar cane must be processed within a day of harvest, high throughput is essential.

The Sugar Cane Growers Cooperative decided to replace the drive control on a Titan 1750 centrifuge, which has a 450 hp (335 kW) motor, one of the operation's two largest centrifuges. The existing drive was outdated and was subject to frequent and expensive repairs, resulting in shutdowns that reduced production capacity.

The previous unit failed at least once or twice a year, costing the Cooperative thousands of dollars in replacement parts and crippling the entire production line. Reliability was therefore a major criterion, in addition to a drive that could reharness the power lost when the centrifuge recycled.

Hummel Industrial Sales of Fort Lauderdale supplied an ABB regenerative drive for speed and torque control. "We retrofitted with this AC drive, because it offered the Sugar Cane Growers processing plant everything they needed, like a compact drive footprint, regenerative capability, and exact motor sizing," says Chris Visage, territory manager for Hummel Industrial Sales. "The resulting improvement in cycle time will increase throughput and eliminate bottlenecks at the centrifuge, without adding a new larger motor."

The drive provides precise, rapid motor-speed response based on exact variations of the centrifuge load. This cut the centrifuge cycle time from 44 to 32 seconds, a 20 percent savings over the previous drive. Direct torque control (DTC) enables the drive to quickly slow the load down at the end of the cycle, saving seconds in unload/reload operations.

Additional time and energy savings are realized, as the energy from the spinning centrifuge, which turns the motor into a generator, is recovered and transferred via the drive to an adjacent centrifuge.

The ABB regenerative drive also enables motors to run at full power at full motor voltage in 80 percent brownout conditions. This ride-through ability means that, even when there's a dramatic short-term reduction in voltage, the drive sustains full power uninterrupted operation. In operating conditions where line voltage from a utility varies, this benefit helps ensure constant, optimum throughput.

Because uptime is paramount during harvest, it was crucial to complete the retrofit installation before the season began. "We were able to install and test this system in five working days time, meeting the co-op's deadline with a month to spare," Visage says.

Installation time was shortened because ABB matched the existing control system from the OEM without using any relays, outside control interfaces, or PLC's. "Our ABB regenerative line was able to to drive the motor and match the input power supply precisely, eliminating any additional spikes and fluctuations," Visage says. "Because the throughput has increased, the co-op will be able to use the existing motor to the fullest, instead of dissipating much of the energy, which was the case with their prior drive."

Because space was scarce, the Cooperative wanted a drive system with a compact footprint that would work with the existing control configuration. ABB's modular design provided a 40 percent savings in floor space over the previous unit and easy maintenance.

Sugar Cane Growers Cooperation worked closely with Miller Bearings, Inc., a distributor for ABB products providing maintenance and service for drive installations. Throughout the project for the Cooperative, a team consisting of Miller Bearings, ABB engineers and sales managers collaborated from start to finish, to size the drive, plan the installation, and commission the drive, ensuring total customer satisfaction.

"ABB has provided us a reliable product and an exellent service team," states Jose Mena, chief electrical engineer at the Belle Glade plant. "Because we have other ABB products at the plant, we knew the realiability factor and anticipated no downtime with the retrofit."

Solved problem

– Frequent tripping results in lost production time

Solution

– Retrofitted with ABB regenerative drive for speed and torque control

Benefits

– Duty cycle increased by 20 percent, significantly improving cycle times and throughput
– Compact footprint results in 40 percent space savings
– Regenerative drive recycles energy and reduces operating cost
– Drive sustains full power for uninterrupted operation

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