

Titania Mine

Controlled start transmission improves conveyor reliability



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Operating since 1960, the Titania A/S mine located in Sokndal, Norway, is the world's largest open cast ilmenite mine, producing nearly 850,000 metric tonnes per year.

The challenge

A 15 year old conveyor transfers ilmenite ore from the primary crusher to mountain silos. Here it is stockpiled before crushing, blending and milling to produce titanium dioxide (TiO₂), a powder used in the whitening of products from paints to toothpastes. The mine suffered daily repairs to the conveyor, gearboxes, idlers and pulleys, costing up to NOK 1 million (\$120,000) in lost production each time.

The unreliable conveyor system that followed the primary crusher was hindering any increase in productivity.

"The capacity was not good enough," says Knut Petter Netland, Titania's Mine Manager. "The reliability was not good enough. And the stockpiles between the primary crusher and the milling plant were too small. Several times a year we had a breakdown and the repair time was too long. We had to close the milling

Europe's first Dodge® controlled start transmission (CST) drive system is installed on a 700 meter (m) conveyor at a mine in Norway, providing the reliability required to overcome lost production from breakdowns.

operation before we could start the mining operation again. It was an unacceptable situation."

Kellve Sweden AB, a specialist in mining conveyors, worked with Titania to determine the conveyor system specifications including tonnage, daily operating hours and the environmental conditions.

The solution

After dismissing an electrical option due to cost, the Kellve team suggested a mechanical solution, ABB's Dodge controlled start transmission (CST) drive system.

CST is a 2-in-1 gearbox that combines a planetary gear reducer with an integral wet clutch system. When coupled to an AC induction motor the CST gearbox converts the motors high-speed, low-torque input to a low-speed, high-torque output, delivering smooth control, with enough power to drive the largest and longest conveyors.

Not only does ABB offer all the products including gearing, bearings, pulleys, motors and PLCs, its Dodge System-1 group provides the engineering expertise to design and analyze complex conveyor applications to prove the system will perform as designed.



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01 Because the CST provides efficient transmission of motor power and torque with consistent smooth start-up and shut-down, belt shock waves are eliminated, extending conveyor belt life. This also reduces the need for maintenance on other system components.

The benefits

CST is a rugged but cost effective system, engineered to provide a smooth start-up and shut-down of long conveyor belts. Because the CST provides precisely controlled transmission of motor power and torque, it minimizes the loads and stresses on all conveyor components. The multi-plate system built into the CST absorbs shock loads from the conveyor, protecting the motor, reducer, pulley assemblies, idlers and belt splices. This adds to the overall reliability of the entire conveyor system.

Customer statement

Although there are more than 3,000 CST installations across North and South America, Asia and Russia, this would be the first installation in Europe.

Bent Haaland, Titania's Project Leader for the conveyor refurbishment, contacted two North American mines to gauge their experiences of the CST. "The two mines I asked were surprised by my questions. The feedback we got from them was very positive. They didn't have any incidents or plant stops. So they really reassured us with claims of 98 percent availability and extremely low overall maintenance costs."

"While it's not always a good thing to be Europe's first, when it is backed by a well-known name like ABB, you know you can trust them," says Knut Petter Netland, Titania's Mine Manager. "And so far that trust has paid off. The reliability has been good."

Those sentiments have been echoed by the mine's Maintenance Manager, Stig Olsen: "For me it's big, it's strong, it seems to run and run and run. The solution is robust, it's reliable and it brings lower maintenance."

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