

# Europe's first Dodge® CST drive system improves conveyor reliability at Norwegian mine

Dodge® controlled start transmission (CST) drive system provides mine's conveyor with the reliability required to overcome lost production from breakdowns.

Europe's first Dodge® controlled start transmission (CST) drive system, – part of ABB's motors portfolio – is helping prevent repeated breakdowns of a 700 meter (m) conveyor at a Norwegian mine, saving up to NOK 1 million (\$120,000/107,000€) in lost production each time.

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. A 15 year old conveyor transferred ilmenite ore from the primary crusher to mountain silos, where it is stockpiled before crushing, blending and milling to produce titanium dioxide (TiO<sub>2</sub>), a powder used in the whitening of products from paints to toothpastes.

The mine's maintenance team was struggling with repeated breakdowns of the conveyor's existing mechanical drive system, which peaked during the harsh winter of 2010 to 2011.

"Everything that we do in the mine is geared towards doubling the waste-to-ore ratio," says Knut Petter Netland, Titania's Mine Manager. "Failure to control this aspect of productivity means we face a massive increase in production costs. The conveyor's capacity was not good enough. The reliability was not good enough. And the stockpiles between the primary crusher and the milling plant were too small."

Initially, the hydraulic couplings that provide the conveyor's soft start were to be replaced with an electrical option but this was dismissed due to the need for a new supply network, additional mountain top electrical room and costly cabling.

With the help of Kellve Sweden AB, a specialist in mining conveyors, the CST was selected. The 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. 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.

Although there are over 3,000 CST installations across the world, this would be Europe's first. As such, Bent Haaland, Titania's Project Leader for the conveyor refurbishment, contacted two mines in the USA to determine their experiences: "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."

With the decision made, ABB's specialists in customized bulk material handling solutions engineered an integrated package that includes motors, CST reducers, high and low speed couplings and pulley assemblies with bearings.

Installed during a three week planned shutdown, the CST system also features an ABB PLC control together with an industrial VPN router that provides a means of support 24 hours a day, assisting in system monitoring or troubleshooting and supporting the system without the cost of time and travel to the site.

"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. "And so far that trust has paid off. The reliability has been good."

These sentiments have been echoed by Titania's deputy leader for mine maintenance, 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."

ABB ([www.abb.com](http://www.abb.com)) is a leading global technology company in power and automation that enables utility, industry, and transport & infrastructure customers to improve their performance while lowering environmental impact. The ABB Group of companies operates in roughly 100 countries and employs about 135,000 people.

#### **Images:**



**Image 1.** Europe's first Dodge® controlled start transmission (CST) drive system helps avoid daily repairs to the conveyor, gearboxes, idlers and pulleys.



**Image 2.** The CST provides efficient transmission of motor power and torque with consistent smooth start-up and shut-down, thereby eliminating belt shock waves and extending conveyor belt life.

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