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Bauer Gear Motor
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Boston Gear
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Minimize the Impact of Power Failures in Mines

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Svendborg Brakes®
Altra Industrial Motion

Minimize the Impact of Power Failures in Mines

The complete braking system consisted of Model BSFK 527 caliper disc brakes, a SOBO® iQ controller, a hydraulic power unit, a brake disc, two dynamometers, and an Ameridrives FS 209 hub.

Conveyor take-up winches are essential components for the mining industry. Therefore, any malfunction or sudden stop of these utilities caused by power failure can affect the entire mining operation. By developing a take-up winch equipped with an innovative braking control system, Svendborg Brakes ensured unprecedented conveyor efficiency and reliability, which in turn improved productivity of a copper mine in Chile.

Mining is among the most challenging industries as work is often conducted in remote locations and under unstable conditions. In particular, power supplies in mines are a primary concern. Even though they have greatly improved over the years, power failures are still quite common. These can heavily affect a mine by forcing the company to suspend operations and by causing damage to any equipment that abruptly stops during power outages.

One of the most important pieces of the mining equipment is the belt conveyor, which transports minerals around the mining site. Tension in a conveyor's belt is fundamental to its operation, as it enables the support of the load between rollers as well as the drive to move the conveyor's belt. Therefore, the conveyors are often equipped with systems such as take-up winches that adjust and maintain the conveyor belt's tension during operation.

During power failures, all equipment suddenly comes to a halt, which can cause considerable stress to equipment that is under load. In fact, even 'smart' winches, which promptly react to any changes in tension, are not operational during power outages, and these will also contribute to the equipment stress. If this stress is not mitigated, multiple pieces of equipment on the conveyor can be damaged.

Creating the Solution

A copper mine in Chile wanted a solution that would minimize the effects of power failures on its operations, particularly on its take-up winch that serves a 2,650-meter-long conveyor. To fulfill its need, the winch manufacturer asked Svendborg Brakes to develop a controlled braking system that would operate even during a power failure; protecting the life of the belt and other mechanical components of the conveyor.

The brand, which is part of Altra Industrial Motion Corporation, has extensive experience in the manufacture and supply of intelligent braking and coupling solutions even to the most demanding industries. Svendborg Brakes was a logical choice to tackle the challenges presented by this particular project.

To develop this innovative solution, Svendborg Brakes worked closely with the original equipment manufacturer (OEM) that supplied

the winch to the Chilean mine. This close collaboration enabled its engineers to complete the project in only two weeks, despite the uniqueness of the solution that was delivered.

Improved Control

Initially, Svendborg Brakes brake controller used a speed feedback signal to control the tension during operation. However, this is generally a static method that cannot help in the event of power failures. Therefore, Svendborg Brakes decided to apply a torque feedback sensor to monitor the line pull instead. In this way, it is also possible to get a close relationship between the physical quantity being monitored and the actual tension.

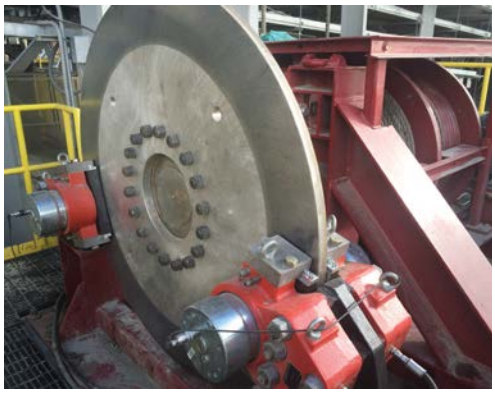
The final product enhanced Svendborg Brakes' Model BSFK 527 dual-spring, hydraulically-released caliper disc brakes with the addition of a SOBO® iQ soft braking control. The latter greatly benefitted the whole system by providing torque-limited braking and a power source in case of a loss of power. During power outages, the UPS backup power source in SOBO® iQ would let the braking system operate long enough to allow the conveyor to stop normally.

More precisely, when the line pull reaches the set limit, the brake torque is being decreased by the SOBO® iQ controller in order to make the winch drum slip. In addition, in the event of a communications failure with the SOBO® iQ, the unit will activate the highest priority braking ramp. Besides the caliper disc brakes and SOBO® iQ, the system also included a hydraulic power unit manufactured in-house by Svendborg Brakes, a brake disc, two dynamometers and an Ameridrives Amerigear FS 209 hub.

A Successful Strategy

As a result of the positive outcome for the Chilean mine conveyor take-up winch project, the system that was developed is now an integral part of Svendborg Brakes' SOBO® iQ offering. This is the only known 'smart' low speed take-up winch that provides parking and tension control during a power failure. No alternative product from any other brake or conveyor manufacturers offers similar performance during a power outage.

Tyler Calvert, Application Engineer at Svendborg Brakes, said: "Our customer directly benefitted from our deeper understanding of the whole mine conveyor system. Our familiarity with the machinery and the knowledge that brakes form part of a much larger interconnected installation, ensured the development of a state-of-the-art product that increased both reliability and cost effectiveness."



The spring-applied, hydraulically released BSFK 527 brakes act on a 1.9 m diameter disc, mounted to the low-speed side of the drive shaft.

About Altra Motion

Altra is a leading global designer and producer of a wide range of electromechanical power transmission and motion control components and systems. Providing the essential control of equipment speed, torque, positioning, and other functions, Altra products can be used in nearly any machine, process or application involving motion. From engine braking systems for heavy duty trucks to precision motors embedded in medical robots to brakes used on offshore wind turbines, Altra has been serving customers around the world for decades.

Altra's leading brands include Ameridrives, Bauer Gear Motor, Bibby Turboflex, Boston Gear, Delevan, Delroyd Worm Gear, Formsprag Clutch, Guardian Couplings, Huco, Jacobs Vehicle Systems, Industrial, Kilian, Kollmorgen, Lamiflex Couplings, Marland Clutch, Matrix, Nuttall Gear, Portescap, Stieber, Stromag, Svendborg Brakes, TB Wood's, Thomson, Twiflex, Warner Electric, and Wichita Clutch.

Svendborg Brakes®
Altra Industrial Motion

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