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Meeting High Expectations for High Altitude Mine Conveyors



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Meeting High Expectations for High Altitude Mine Conveyors

Advanced braking systems by Svendborg Brakes selected for overland conveyors at Escondida mine in Chile



Model BSFK 535 caliper brakes (left) are installed on the OLAP conveyors and Model BSFB 650 brakes are utilized on the OLP1 conveyor braking systems.



Pairs of SOBO® controllers and SOBO® hydraulic power units were installed on the OLAP conveyors. All Svendborg Brake power units are designed and manufactured in-house to ensure compatibility with other Svendborg braking system components. Units are equipped to monitor oil level and temperature, motor and pump function, and system pressure.

Located at 3,200 meters (2 miles) above sea level in the Atacama Desert in northern Chile, the Escondida mine currently produces more than 1,100 kt of copper annually. In 2015, the massive open pit mine also generated approximately 88 kozt of gold and 4,800 kozt of silver.

In 2012, the mine started construction of two major expansions: the Organic Growth Project 1 (OGP1) and the Oxide Leach Area Project (OLAP).

Commissioned in 2015, the OGP1 allows the mine to access higher grade ore and includes a new 152,000 tpd processing plant. The project also utilizes four overland conveyors driven by 5 x 5MW direct drives.

The entire four-flight direct drive conveyor system spans 10,632 m (6.6 miles) in length with the largest flight being 3,942 m (2.4 miles) long. At the time, this was the largest gearless drive conveyor in the world.

The 1,800 mm (5.9 ft.) wide belt conveyors, travelling at 6.4 m/s (21 ft/s), move copper ore at a rate of 12,550 t/h. The high altitude conveyors operate in a wide range of extreme temperatures from -10°C to +40°C (14°F to 140°F).

The Svendborg Solutions

Svendborg Brakes worked closely with the conveyor OEM to design a complete intelligent braking solution to meet the challenging requirements for the four-flight gearless conveyor system. Tilman Speer, International Sales Manager at Svendborg Brakes, explained, “Due to the direct drive set up of these OGP1 conveyors, the required braking torque was extremely high.”

Groupings of two or six Model BSFB 650 spring-applied, hydraulically-released, dual-spring caliper brakes, acting on large 2.7 m (8.8 ft.) diameter steel brake discs, serve as on/off holding brakes at the head and tail of the various conveyor flights.

“Two popular Svendborg Brakes SOBO® controllers, paired with custom SOBO hydraulic power units, were installed in one of the center conveyor sections to meet additional safety requirements,” said Speer. “The redundant systems are identical and each is capable of stopping the conveyor by itself in case of an emergency.”

The OLAP, commissioned in 2014, features a robust leaching pad combined with three downhill overland conveyors with a total elevation drop of 207 m (679 ft.).

The entire three-flight conveyor system spans 4,778 m (2.9 miles) in length with the largest flight being 2,740 m (1.7 miles) long. These 1,524 mm (5 ft.) wide belt conveyors, traveling at 4 m/s (13 ft/s), move copper ore at a rate of 4,125 t/h.

Svendborg Brakes supplied braking systems provide emergency stopping and parking for 4 x 450 kW drives. Each system included a pair of model BSFK 535 spring-applied, hydraulically-released, dual-spring caliper brakes, a SOBO controller and a custom SOBO hydraulic power unit (HPU).

According to Speer, “The most important Svendborg Brakes criteria for the OLAP conveyor system was to provide safe and reliable braking and parking in emergency situations, while not affecting normal operation.”

Svendborg Brake’s unique soft braking control (SOBO) provides a range of safety and durability benefits in heavy industrial applications including mining. Deceleration and the stopping of heavy conveyor loads is critical, and controlled braking is essential for a significant reduction of torque peaks, preventing damage to the belt and mechanical components.

Specialized hydraulic power units, manufactured in-house by Svendborg Brakes, are engineered to meet any mining requirement. In order to minimize downtime, the units are equipped to monitor oil level and temperature, motor and pump function, and operational pressure.

Comprehensive Service and Support

Svendborg Brakes provided complete single-source braking solutions and support from concept and design through packaging and commissioning.

“We were very responsive during the conveyor system concept phase as the designs went through various changes and modifications,” Speer said. “Svendborg Brakes’ experienced project managers provide superior oversight and control of every project from order placement through installation.”

Svendborg Brakes has a global network of qualified local technicians who can commission and service its brake systems. “Our service technician team, based in Chile, speaks Spanish and is available on short notice. They have all the required South American certifications to work at mine sites throughout the continent,” said Speer. “These were very important Svendborg Brakes advantages for this particular project.”



The entire four-flight, direct drive OGP1 conveyor system spans 10,632 m (6.6 miles) in length with the largest section being 3,942 m (2.4 miles) long.



Pairs of Model BSFB 650 spring-applied, hydraulically-released, dual-spring caliper brakes, acting on 2.7 m (8.8 ft.) diameter steel brake discs, are positioned at the tail of the various OGP1 conveyor flights.



Groupings of six Model BSFB 650 spring-applied, hydraulically-released, dual-spring caliper brakes, acting on 2.7 m (8.8 ft.) diameter steel brake discs, serve as on/off holding brakes at the head of the various OGP1 conveyor sections.

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.



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