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EXPLORATION TECHNOLOGY

MINING CONVEYORS

MINERAL ANALYSIS

ELECTRIFYING MINES

SOFTWARE

For highly contaminated environments like mining conveyors, SKF recommends the three-barrier solution, as contaminants must pass through three barriers to reach the bearing

these bearing failures and how to implement the solution accompanied by case studies where adopters have significantly reduced unplanned downtime, extended bearing service life, reduced maintenance expenditures and ultimately improved their bottom line.

For example, environmentally friendly and cost-effective, the SKF three-barrier solution for conveyors can extend bearing service life without solid lubricants, taconite seals or large quantities of grease. Lubricated for life in most applications, the SKF solution for conveyors consists of four components: sealed SKF Explorer spherical roller bearings and sealed CARB bearings; SKF plummer (pillow) block housings; standard SKF L or S-type seals; and SKF LGGB2 biodegradable grease.

"SKF Explorer spherical roller bearings can accommodate very heavy radial and heavy axial loads in applications prone to misalignment or shaft deflection. Efficient contact seals and factory-filled high quality grease make the units ready to use. They provide a significant improvement in key operational parameters and have proven to last several times longer than competitor's bearings when tested under typical heavy-duty conditions." All SKF spherical roller bearings have been upgraded to the new SKF Explorer performance class specifications, featuring a combination of high-quality steel and an improved heat treatment process.

Conveyor monitoring with X-rays

The CBGuard system from **CBG Conveyor Belt Gateway** the company says, "is substantially increasing the safety and operating efficiency of conveyor belts in the mining industry. Conveyor belts are subjected to exceptionally high stress. Apart from countless bends, the belts suffer from permanent material loading impact; from worn, failing or wrongly adjusted conveyor parts, and from foreign objects. A failure or damage of the conveyor belt often has dramatic consequences. It is essential to detect such failures immediately when they occur, in order to be able to take appropriate measures before things get worse."

The CBGuard monitoring system uses radiographic technology, similar to that used in medical diagnostics. "No other method available today delivers such a wealth of precise information about every detail of a conveyor belt. It is working continuously 24/7, whenever the belt is in operation. Its smart software not only generates a live video with marked deficiencies of the belt, but also tells you exactly what kind of damage it is, how severe it is and where it is. The software generates an intelligent, holistic analysis of any kind of threat to the belt. Arising damages, not still visible from the outside, can " Serious damage, for instance broken or corroded steel cords, trigger an alarm, which advises the belt operator to carry out the repair as soon as possible.

In the case of beginning imminent catastrophic failures, the CBGuard will automatically stop the conveyor. The CBGuard scanner also measures the belt thickness and yields timely information about the upcoming need for a replacement belt. Hence, the maximum lifetime can be obtained from the conveyor belt. The company says it can be seen as an important part of a mine's preventive maintenance programme.

"The CBGuard digitises the entire conveyor belt; every cubic millimetre of the belt is captured. That way, it can be integrated into the Industrial Internet of Things. In combination with other elements of the logistical chain, the optimal time of the next maintenance stop can be scheduled. The condition of the belt can be observed from any place in the world in real-time over the internet. A video can be played at any time at any speed, reproducing the entire image of a belt."

Originally, the request for CBGuard came from underground coal mining, because a visual assessment of the conveyor belt is difficult in those conditions. Under the Safety First rules, belts were replaced, because it was only assumed they were not reliable anymore. Assets were burned because of lack of information. In other places, large belt lengths were replaced prematurely, although only small parts were worn out.

There are now hundreds of CBGuard systems operating in mining

Double belt for underground

With underground mines going deeper to access untapped reserves, there is a need to build higher powered conveyors with ultra-high tension belts. Some of these systems are pushing the physical limits of steel cord belting and their splices. When mining depths exceed the limits of traditional conveyors, the result is multiple conveyor flights with undesirable transfers where there is always a greater risk of reduced reliability associated with the potential for belt rips, accelerated belt cover wear, transfer chute blockage, liner wear and the generation of dust. Multiple conveyor flights also increase the capital cost especially for underground applications where more excavations are required.

In an effort to reduce the number of transfers and to operate in the range of proven conveyor belt tensions, **thyssenkrupp** has developed a method that allows for longer conveyor flights thereby improving the reliability of the material handling system. The new development, referred to as 'Double Belt', takes the booster belt or linear drive technology, which has been proven over decades, to a higher level by essentially doubling up steel cord belts along the entire conveyor length. "Unlike booster belt applications where a finite belt length is used to reduce the tension in the main conveyor belt, the Double Belt equally shares the tensile forces developed by conveyor friction and the lifting of the material load. The two belts are locked together by friction so load sharing of the belts is