

Overcoming premature corrosion issues on conveyor cleaners and optimising conveyor belt cleaning in lithium production

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LITHIUM CHALLENGES CONVEYOR BELT CLEANING

The lithium industry creates great challenges for equipment and products used in this very chemical corrosive (alkaline) and mechanical abrasive environment. Conveyor belt cleaners in particular are challenged with the lithium bulk material characteristics. Due to the hardness of the lithium ore, chemical corrosive resistant cleaner blades (as polyurethane) cannot be used. Using traditional tungsten cleaning blades creates the so called “wash-out” phenomena, which lowers the spare part life and even endangers the conveyor belt surface.

THE WASH-OUT PHENOMENA

The most effective and widely used wear material for conveyor belt cleaning blades is tungsten carbide (TC). TC-material is a mixture of fine grained tungsten carbides (size 0,2 – 2,5 micron), matrix material (Co or Ni), some stabilizers (CrO_2) and binding agents (resins). Of any TC alloy the TC grain itself is the wear resistant component, it has always the same hardness of 9.5 Mohs. However, the other components are much softer and can be chemically attacked; thereafter exposed TC particles will not wear down and will get “washed out”.

Most tungsten matrix materials are greatly affected in lithium mining, typically chemically corrosive environments. If the bulk material is also high in water content the “wash-out” will happen even faster, starting at one spot and continuing in both directions, creating possible high spots that can damage the conveyor belt surface.

X4 TUNGSTEN IN LITHIUM

HOSCH and a leading German Tungsten producer have developed a unique type of tungsten for optimised chemical resistance, named X4 tungsten. The binder, particle size, sinter process was fine-tuned and a nearly tension free brazing process was developed to achieve a scraper blade that can operate in the harshest conditions.

The X4 tungsten was successfully used in WA in several lithium projects achieving unmatched spare part lifetimes and cleaning efficiency (references and case studies available).