As operators seek to optimise income from mining, operational excellence and the ability to find new productivity gains are coming into focus.

Tactics can include a re-evaluation of a mine’s maintenance and procurement approach. The two are entwined because a tendency to exhaust equipment and/or rely on tried, tested and sometimes underperforming components can lead to more frequent downtime.

Whether it’s a planned service or an emergency shutdown, any interruption to operations can have costly consequences.

An example where this is being put into practice is in milling technology for mineral processing, where new equipment and processes are being introduced to optimise production efficiency. This includes reducing the number of production lines in action at any one time, increasing mill sizes to enable the same, if not greater, throughput levels.

One of the key advantages to this approach is that scheduled and unscheduled downtime is reduced. However, the activity levels of each mill must be closely managed to ensure that productivity remains high.

Similarly, components used within the mill must guarantee optimum performance and reliability, so that unexpected maintenance or replacement is minimised.

POOR LINING DESIGNS

Liners play an important role in protecting the interior mill shell from impact and wear, while transferring energy to optimise grinding efficiency. These conflicting requirements mean that the lining must be carefully designed to ensure optimum, long-lasting performance and reduced load stress on the mill.

A key consideration is the material used to make the lining and lifter bars. For some materials, such as composite steel linings, the wear life can be unpredictable due to the quality of the steel, bonding techniques and the cracking of inserts. This can become a safety hazard, requiring frequent maintenance and replacement, not to mention the additional load in the mill. The result is a loss in efficiency and throughput, increase in power draw and downtime losses, all affecting the dollar per tonne recovery.

RUBBER VS COMPOSITE STEEL

Used in most secondary, tertiary and a number of primary milling applications, rubber mill linings are almost...
Rubber mill linings are easily monitored and wear life is predictable. Some components can also be designed with wear indicators incorporated, making it easier to identify when the lining needs to be replaced and, therefore, when to schedule appropriate maintenance. As the pressure to reduce unplanned downtime builds, in order to improve efficiency and mill productivity, the ability to measure liner wear becomes invaluable.

An all-rubber lining has also been successfully developed for composite lifter bar solutions. Trelleborg recently developed and supplied a long-lasting rubber lifter bar solution for a ball mill in Australia. The success with the special 1605AM rubber compound and design has given Trelleborg the opportunity to offer its clients an alternative to composite steel lifter bars.

Composite lifters can not only add to the load in the mill, but are also difficult to handle in confined spaces and take much longer to install, adding to downtime and installation costs. The lifter bars made with the new 1605AM rubber compound come with benefits such as: easy handling, quick installation time, reduced power draw and noise pollution. The reduction in overall weight decreases the impact on rotating components.

Downtime is a significant issue faced by the mining industry, and the mining and material-processing industry is always looking for ways to enhance availability of the mills that grind and blend materials. Rubber lifter bars offer increased operational efficiencies, significantly reduced downtime, simple wear monitoring and life predictability. In addition, when compared with steel, a rubber solution also provides superior resistance to the severe impact, high temperature and abrasion caused by the comminution of the ore within the mine’s grinding mill, enhancing the life of the mill.

Composite steel is currently the traditional material of choice for primary and some secondary milling applications and, until now, has provided a whole-life performance that alternatives could not. However, the development of special-grade rubber compounds and various face angles to suit any application offer greater...
value and performance versus composite steel lifter bars, without compromising the available volume and throughput in the mill.

**CONCLUSION**

Accessible measures and practices are available to help operators to get the most out of every mill.

Though considered just one of many components vital to mining operations, the lining of a grinding mill plays a key role in optimum comminution and mineral dressing. Lines are subjected to severe impact and abrasion from the mineral being ground and the media introduced into the mill to help break down the product.

As such, a high-quality and high-wearing lining is an important part of keeping a mill online and operations running to plan.

“The activity levels of each mill must be closely managed to ensure that productivity remains high”

Rubber mill linings are easily monitored and wear life is predictable

Grind down your maintenance costs

Köppern roller presses have been proven successful throughout the world in plants specializing in the energy-saving high pressure grinding of various ores and minerals like iron ore, copper, gold and molybdenum. Additionally, the Köppern Hybridur® tires feature an extremely wear-resistant surface that provides enhanced roller protection when grinding abrasive ores.

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