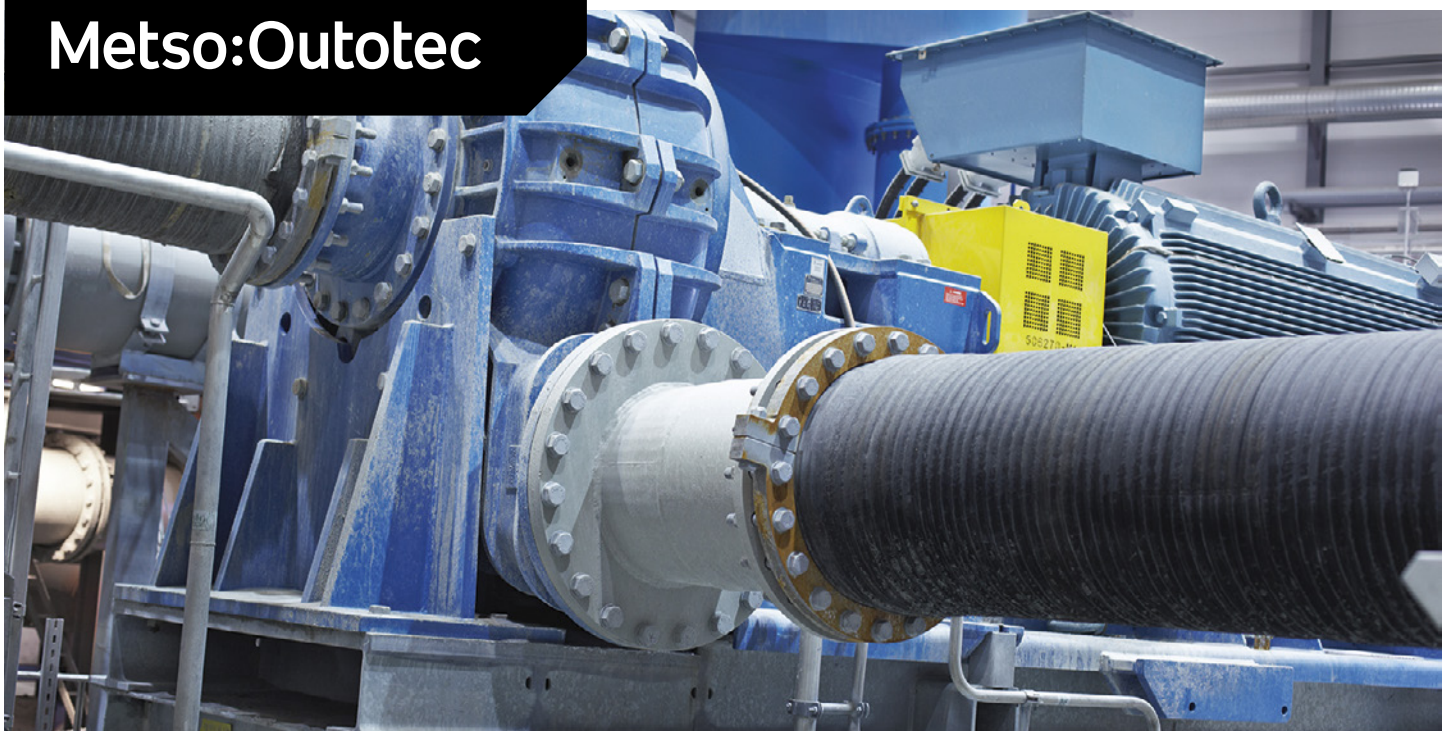
Metso:Outotec



Case study

Pumps upgrade significantly reduces plant shutdowns at Mungari Gold Mine

Close collaboration between Mungari and Metso Outotec results in a new robust design, delivering longer pump wear and reduces shutdowns from 3 to 1 per year.

Evolution Mining is a leading, growth-focused and globally relevant gold company. Formed in late 2011, it operates five wholly owned mines across Australia and Canada.

One of Evolution Mining's mines is the Mungari gold operation located 20 km west of Kalgoorlie in Western Australia. The operation started in 2014 and is now a key asset in Evolution Mining's portfolio.

Challenges

- Extremely abrasive ore
- Short life of pump wear parts
- Future increased throughput

Solution

- Close collaboration
- Extensive site trials on new polyurethane material

Results

- Longer wear life
- Opex and capex savings
- Shutdowns reduced 3 to 1 p.a
- Improved availability
- Increased capacity of existing pumps

Tails line with two heavy duty HR pumps at Mungari - changeouts now saving 120 hours' manpower per annum

The operation consists of underground mining at Frog's Leg, open pit mining at White Foil and Cutters Ridge with a considerable regional tenement package to the north around Castle Hill hosting a total mineral resource of 51 million tonnes grading 1.47g/t gold for 2.4 million ounces. Metso Outotec supplied all of the heavy-duty pumps (Orion HR series) and vertical sump pumps (Sala VS & ST series) — 25 in total — for the Mungari plant when it was constructed in 2013.

Ore abrasiveness a challenge for pump reliability

With a mixture of open pit and underground mining, the Mungari site presents considerable variability in the nature of the ore. While the ore from the underground mine is reasonably soft, the open pit ore is quite hard and high in extremely abrasive silica.

The hard ore presented a problem for the heavy-duty pumps in the tailings circuits. Mungari runs parallel tailings trains with three pumps in each train. These Metso Outotec HR Series heavy-duty pumps were originally supplied with rubber liners and high chrome impellers. Due to the abrasive nature of the ore, it was found that the rubber liners needed to be changed out every 2,500 to 3,000 hours.

"Due to the ore type and wear dynamics of the tails slurry being pumped, we were impacted by premature failure of the standard rubber pump case liners," said Simon Edwards, Superintendent — Planning and Logistics at Evolution Mining.

At times, they didn't achieve the hours site was expecting. "This was causing unplanned maintenance in the tails line and increased cost associated with labour and replacement components."

Metso Outotec heavy duty HR pumps at Mungari - robust design reduced shutdowns from 3 to 1 pa

The pump now has a lifecycle of around 8000 hours, and the tails pump train no longer represents a high maintenance asset."

Simon Edwards, Superintendent — Planning and Logistics, Evolution Mining

Solving the reliability problem with polyurethane
In 2016, Metso Outotec in close collaboration with Mungari site maintenance, undertook a thorough investigation of the tails pump system, monitoring slurry density, systems pressures and overall pump performance to determine the root cause of the premature failures. As a result, Metso Outotec recommended replacing the rubber impeller liners with alternative liners made of polyurethane.

The mine agreed to trial one pump with the new liners. The trial took place for a period of one year between 2017 and 2018. The trial was so successful that Mungari decided, in 2019, to upgrade the other two pumps in the first train. The complete train ran with the upgraded pumps for another year, after which the pumps in the second train were also upgraded. By 2021 both trains were upgraded and operational.

A close collaboration
During the assessment and trial process, Metso Outotec collaborated closely with the Mungari mine team to track the pump reliability. All the data gathered was compared and reviewed by Metso Outotec pump experts, who then worked closely with the site to resolve any issues as and when they arose.

Mungari focuses on latest best practices so updated documentation to support the maintenance and operation of the pumps was also supplied by Metso Outotec.

Robust design - increased throughput, fewer shutdowns
Evolution Mining was also interested in achieving an increase in mine throughput. When the mine first started operations, it reached its design capacity of 1.5Mtpa within six weeks, and there had long been a goal of increasing throughput to exceed 2Mtpa. The robust design of the pumps assists with this increased throughput.

As a result of the upgrades, the Mungari mine has seen a significant improvement in the reliability and performance of its tail pumps.

"The pump now has a lifecycle of around 8000 hours, and the tails pump train no longer represents a high maintenance asset," said Simon Edwards.

Previously, the pump liners needed to be changed out every 2,500-3,000 hours. Changeouts are now only necessary once a year instead of three times, saving 120 hours of manpower per annum.

As the Mungari mine is continuing to increase the tonnages through the plant, Metso Outotec is collaborating closely with the site to ensure optimal performance and reliability without having to replace them with more costly larger pumps.

Metso Outotec is a frontrunner in sustainable technologies, end-to-end solutions and services for the aggregates, minerals processing and metals refining industries globally. By improving our customers' energy and water efficiency, increasing their productivity, and reducing environmental risks with our product and process expertise, we are the **partner for positive change.**

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