EARLY FAILURE DETECTION OF LINERS AT MAJOR IRON ORE PRODUCER, USING WORLD'S FIRST MILL CONDITION MONITORING TECHNOLOGY

Our patented CrusherMapper™ solution enables metallurgists and maintenance personnel to make informed decisions on reline scheduling and crusher operations to optimize maintenance operations.

This unique condition monitoring service provides one of the largest open-pit mines in the world, with reliable forecasting to optimize maintenance planning and minimize unnecessary liner changeout shutdowns.

CHALLENGES

- Short wear life of crusher liners
- High maintenance costs
- Frequent shutdown cycles causing production losses

SOLUTION

- 3D Scan on crusher mantle and concave liners using CrusherMapper
- Detailed report

RESULTS

- Early detection of liner failure
- Reliable reline forecasts
- Optimized concave and mantle lifecycle and design
- Improved performance

About the mine/customer

The mine is situated near the town of Kathu in the Northern Cape Province. This flagship operation is one of the largest open-pit mines in the world – some 14km long. The mine has sufficient reserves to sustain a 14-year life of mine.

The bulk of iron ore production comes from the mine, with most of it being exported. Mining is done using opencast methods and then the ore is transported to the beneficiation plant where it is crushed, screened and beneficiated. Beneficiation is done through dense media separation and jig technology. The jig plant at the mine is the largest of its type in the world.

History

We were approached by our customer who showed interest in our CrusherMapper service on our website and requested additional information on our contacts page.

Contact was made with the customer and a meeting was arranged to understand our customer needs and present our CrusherMapper service.

Challenges

Our customer had very little information on liner wear patterns and interval changes and required longer life from their liners. A solution was sought to identify problem areas and recommendations to reduce shutdowns and liner changeouts which were causing high maintenance costs and production losses.

Solution

Scanning

The crusher was scanned using a state-of-the-art laser scanner which provides over 1 million reference points on the liners. The specially calibrated terrestrial laser scanner captured all liner surfaces in-situ, as opposed to conventional methods where only a few arbitrarily selected points are measured.

A second scan was performed and the data was compared to the first scan to ascertain differences and exact wear patterns of the liners.

3D Modelling

Following the scan, the raw data was uploaded and processed to deliver a high definition 3D model. The model is colour coded according to liner thickness and provides point thickness measurements on all wear surfaces to an accuracy of ±3mm. The software automatically detected high wear zones, asymmetric wear patterns and damage to the liners, identifying exact problem areas.

Reporting

Our qualified metallurgists processed the data using specialised software to produce a detailed report. Precise wear curves and intelligent forecasting based on trend data with cross-sections, longitudinal profile curves and reline efficiencies for both the concave and mantle liners were provided.

Critical thresholds were established to define reline criteria to make informed decisions based on automated, consistent and repeatable measurements followed by rigorous statistical analysis.

These parameters have a significant influence on crusher performance and frequently involve consideration of wear asymmetries around the concave liner. Preferential dumping geometries, unsuitable feeding arrangements and the effect of typical localized high wear zones were highlighted in the analysis.

The report included:

- Concave liner thickness measurements
- Mantle thickness measurements
- Measurements of open and closed side settings
- Condition of spider arm
- Reline schedule

Results

Periodic scans were conducted by our technicians who were available on-site to deliver essential information and support our customer. Broken/cracked liners are immediately identified as well as high wear areas.

We provided accurate data and a detailed report on liner wear with recommendations.

Planning and reliable forecasting are now achievable to minimize unnecessary changeout shutdowns and reduce costs.

Conclusion

The detailed report and analysis from the scan were greatly appreciated and received by our customer which led to additional order placements of a further two scans. We are now listed as a vendor and look forward to building a strong relationship with this customer.