

Long-Term Elimination of SAG Mill Feed Chute Blockages

- **Frequent blockages**
Slabby ore jammed the SAG mill feed chute daily.
- **Lost uptime**
Each blockage caused shutdowns and production loss.
- **Precision scanning**
Makuri laser-scanned the chute for exact fit.
- **Advanced modelling**
DEM and SPH used to optimise material flow.
- **Makuri Optimised design**
Wider opening and improved liner access.
- **Easy maintenance**
Added wheels, jacks, and mobile transport system.
- **Proven results**
Perfect fit and zero blockages in over 3 years.

Challenges

Frequent blockages

Slabby ore pieces accumulated at critical flow points within the feed chute.

High downtime and maintenance costs

Each clearing event caused several hours of production loss.

Difficult maintenance access

The existing chute design made liner changeouts and inspections time-consuming.

Potential installation misalignments

Previous design drawings did not match actual as-built conditions, increasing the risk of fitting errors during replacement.

These challenges were not only reducing overall plant throughput but also creating operational inefficiencies that affected mill performance and safety.

Background

Makuri Technology was approached by a mining operation facing persistent blockages in their SAG Mill Feed Chute. The site was struggling with slabby ore material that regularly jammed in the chute, sometimes multiple times per day.

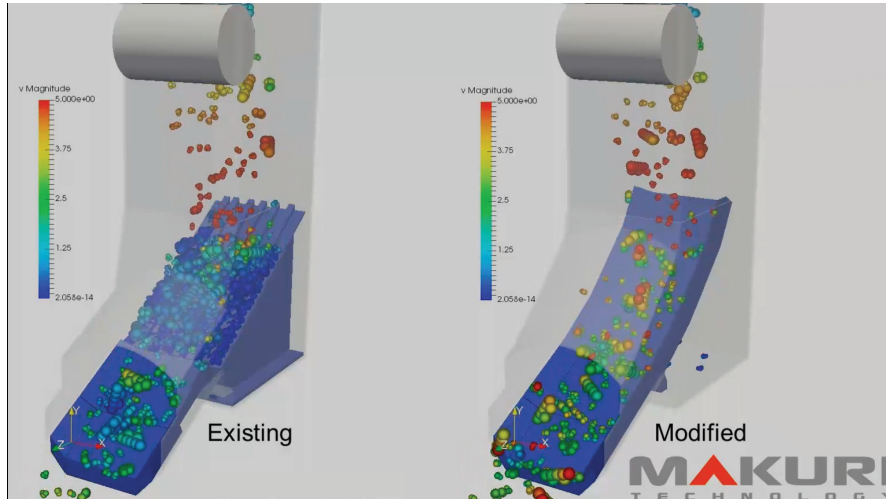
Each blockage event required a shutdown of the SAG mill to clear the obstruction – resulting in significant downtime, production losses, and safety risks to maintenance personnel working near confined spaces. The mine needed a long-term solution to improve flow reliability, reduce manual interventions, and extend operating uptime.



Makuri's Approach

Makuri's team began by conducting an on-site evaluation and laser scan of the existing chute to obtain precise as-built dimensions. This allowed potential fitting challenges to be identified and resolved well in advance of installation.

Using **Discrete Element Modelling (DEM)** combined with **Smoothed Particle Hydrodynamics (SPH)**, Makuri simulated material flow through the chute to analyze performance and optimize design.



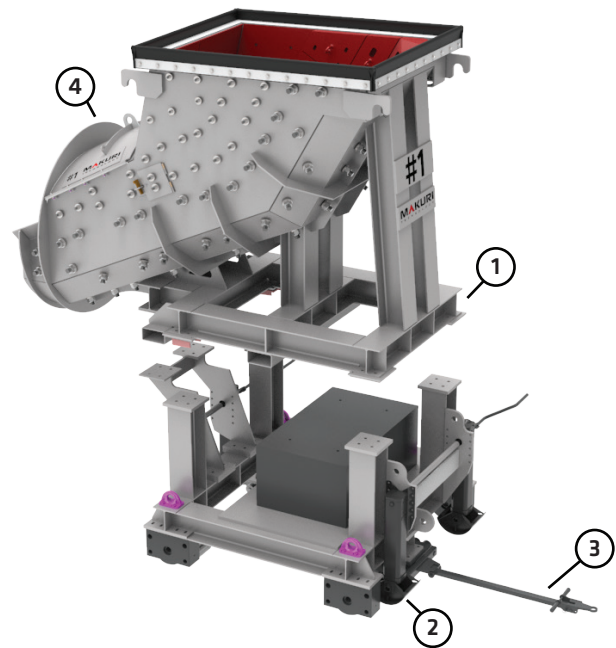
The resulting design achieved:

- Improved material flow through the chute
- Increased open area into the mill
- Enhanced maintainability through modular upgrades

This combination enabled the team to visualize how both dry and wet feed materials would move through the chute, identify potential build-up zones, and refine the geometry for optimal flow performance.

Beyond the flow improvements, Makuri also used the redesign as an opportunity to upgrade the maintenance and operability aspects of the chute:

1. The chute assembly was modularized to simplify liner replacement and minimize exposure time for maintenance personnel.
2. Standardized off-the-shelf wheels and lifting jacks were incorporated, allowing the chute to be easily repositioned or maintained without the need for specialized lifting gear.
3. A third-party transport system was integrated to allow the chute to be moved around the site safely and efficiently during shutdowns or liner changes.
4. A second chute was fabricated and maintained on standby, enabling offline liner changeouts – meaning future replacements could occur outside of normal shutdown schedules, greatly improving plant availability.



Makuri engineers also supervised all stages of manufacturing, ensuring adherence to design tolerances, material specifications, and welding standards. This end-to-end quality assurance process guaranteed that the chute would install and perform exactly as designed.



Implementation and Results

When the chute was delivered to site and installed, it fit perfectly on the first attempt, requiring no modifications or adjustments – a testament to the accuracy of Makuri's design and scanning process.

Since its installation, the chute has operated continuously for over three years without a single blockage. The site has reported a complete elimination of downtime related to feed chute blockages, alongside easier liner management and safer maintenance procedures.

Key outcomes include:

- Zero chute blockages since installation
- Substantial improvement in plant availability and throughput consistency
- Reduced maintenance labor and exposure risks
- Improved liner change efficiency through the dual-chute system
- This project not only solved the immediate operational issues but also set a new benchmark for feed chute performance and maintainability within the operation.



Conclusion

By combining precision field data, advanced simulation, and thoughtful engineering, Makuri delivered a SAG mill feed chute solution that achieved three years of flawless performance – eliminating a long-standing operational bottleneck.

This case demonstrates Makuri's ability to apply innovative design and materials expertise to deliver sustainable improvements in mill performance and reliability.

Contact Makuri today to learn how we can help you eliminate blockages and improve the efficiency of your SAG Mill feed chute systems.

We guarantee our work



find out more at makuritech.com