

COPROD for Simba

Rock drilling system for underground production drilling



Double your drill length, speed, and precision

With a strong track record from surface drilling, we are now bringing the successful COPROD system to the Simba production drill rig family. Compared to traditional drilling methods, such as tophammer and ITH, COPROD offers up to 3 times higher penetration rate with excellent precision.

By separating the rotation and percussion in dual drill strings, power is transferred straight from the rock drill to the drill bit with jointless inner rods, allowing for very efficient and consistent drilling along the full hole length.

COPROD is compatible with the Simba E60 S and E70 S. These rigs come configured for COPROD drilling from the factory and have a lot of commonalities with Top Hammer rigs.

⊕ Main benefits

Quality - Excellent hole accuracy in combination with faster drilling provide huge downstream value benefits

Sustainability - Less blast induced damages, increased ore recovery and lower dilution enable optimization and a more sustainable mining operation

Productivity - Up to 3 times faster drilling compared to ITH and Top Hammer drilling

COPROD for Simba

Less drilling and blasting

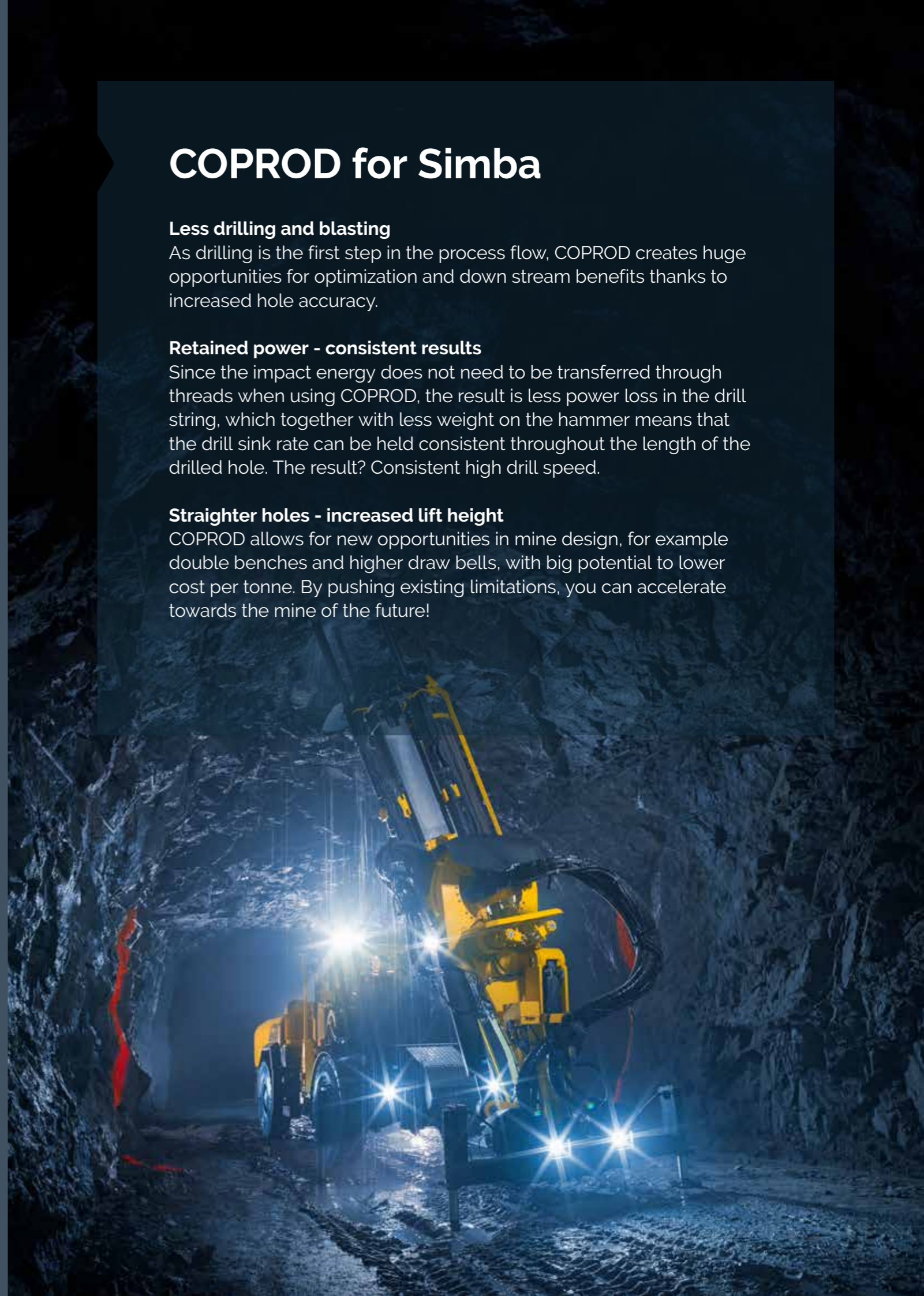
As drilling is the first step in the process flow, COPROD creates huge opportunities for optimization and down stream benefits thanks to increased hole accuracy.

Retained power - consistent results

Since the impact energy does not need to be transferred through threads when using COPROD, the result is less power loss in the drill string, which together with less weight on the hammer means that the drill sink rate can be held consistent throughout the length of the drilled hole. The result? Consistent high drill speed.

Straighter holes - increased lift height

COPROD allows for new opportunities in mine design, for example double benches and higher draw bells, with big potential to lower cost per tonne. By pushing existing limitations, you can accelerate towards the mine of the future!



Agnostic and economical

Epiroc's approach is agnostic and value-driven. When introducing new technology, such as COPROD, we will support your change management journey with extended partnership services - as well as digital tools to measure and follow up pre-defined KPIs.

By utilizing the productivity boosting features and options available for the Simba COPROD rigs, such as digital drill plans and teleremote operation with ABC Total, the only reason you need to visit the rig is for daily maintenance. MyEpiroc will let you know if something is out of the ordinary.

Enjoy the excellent fragmentation which enables smoothness throughout the entire mining operation, from drilling and blasting to loading and hauling.

Even afterwards, reconciliation will become easier since each drill hole is recorded and reported in a format which can be imported directly into your planning tool for a truly agnostic solution.

If profitability is important in you mining operations - can you afford to not go for COPROD?

+ Automation

Being able to drill longer and straighter holes with a reliable drilling system like COPROD, sets the prerequisites for autonomous drilling of a full ring. This combined with the Powerbit X drill bit and E-tramming functionality, enables the operator to stay out of hazardous areas while simultaneously increase productivity in the mining operation.

+ Real mine coordinates

Epiroc's well-renowned Rig Control System together with Total station navigation enables the usage of real mine coordinates, which facilitates the communication between the drill rig and the back office. This makes reconciliation easier and contributes to live work elimination, since the surveyor does not have to do any painting/mark up of the face.

+ Long holes win in the long run

Economy is always an important challenge in mining operations. COPROD is the solution for those who are ready to take the next leap forward with the profitability of their mining operations and to think long term. COPROD can lower your cost compared to ITH or Top Hammer when including productivity benefits. COPROD also opens doors to larger scale of mining and new alternative mine designs thanks to longer holes with excellent precision. In the long run, the ultimate goal is to lower the cost per tonne of your mining operations.

How does it work?

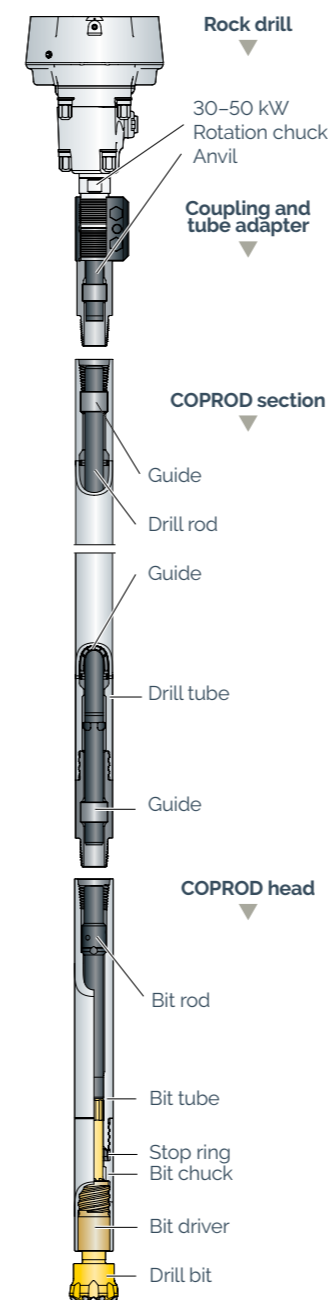


Figure 1. COPROD drilling system.

COPROD combines a threaded drill tube with an unthreaded drill rod. The drill tube provides rotation while the impact rod, fitted in floating suspension inside the tube, transmits impact energy and feed force. The flushing air passes between the tube and the rod through the bit rod to the front of the drill bit.

When the COPROD sections are joined, the impact rods stand on top of each other inside the drill tube. This means that the impact energy is directly transmitted to the rock without passing a single thread. This results in superior drilling performance and hole straightness, high energy efficiency and low wear and tear on components. Thanks to the unique double recoil dampening system of the COP rock drills, the rod ends remain in permanent contact, energy losses are almost zero, and drilling efficiency is maintained from start to finish of the hole.

During drilling operations, if the bit enters a cavity and drops down in its splines in the bit chuck, the Rig Control System (RCS) detects it and percussion is interrupted. Rotation is maintained, however, and percussion restarts automatically when the bit meets resistance again.

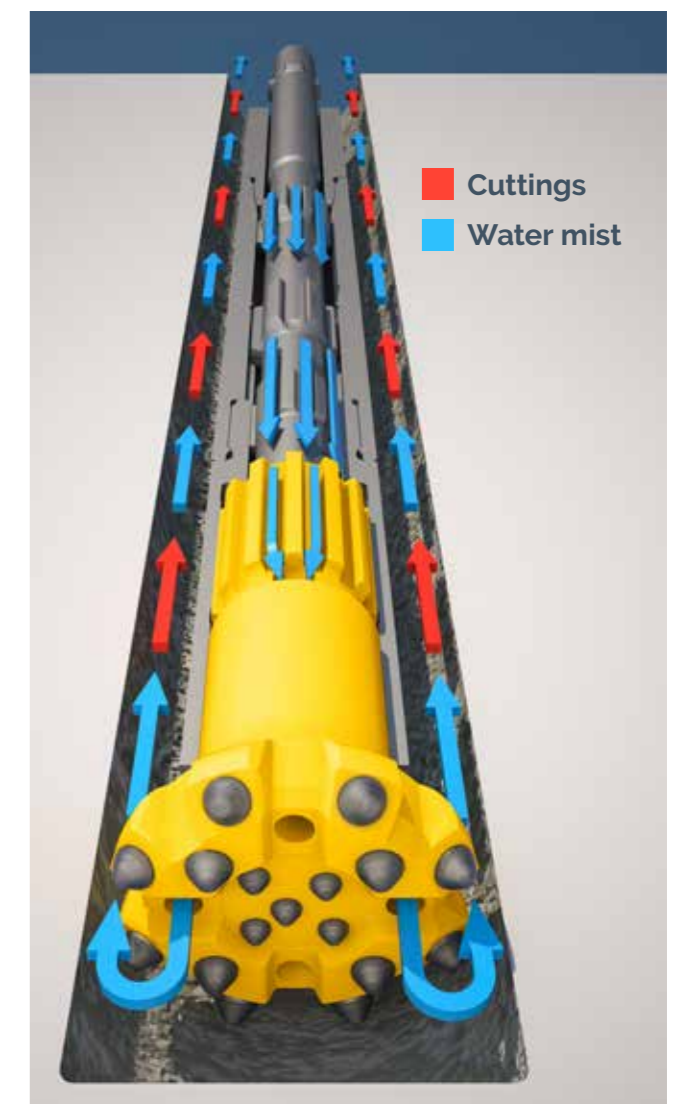
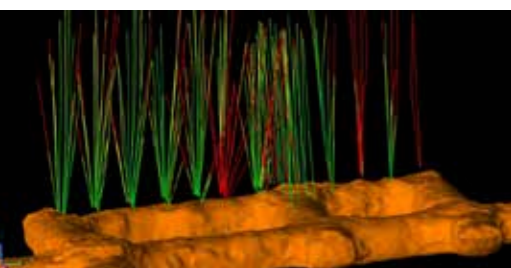


Figure 2. COPROD drilling method with flushing of the drill cuttings.

Water mist (a mixture of pressurized air and water) enters the bit via a center channel (Figure 2), which connects to the cylindrical surface in the bit rod. A small amount of water mist, containing a little oil, escapes via the splines in the chuck and the bit, and lubricates them. On its way up, the water mist travels between the smooth outside of the tubes and the hole wall, providing a constant cross section, and ideal conditions for flushing the drill cuttings. COPROD offers unique features for drilling holes fast and straight. And the more troublesome the ground becomes, the more this incomparable drilling system comes into its own.



Customer case

Simba COPROD at Pucobre, Chile

The goals

- Increase productivity and lower cost
- Better fragmentation
- Reduce boulder frequency
- Hole quality assurance
- Increase burden = 25% reduced D&B budget
- Reduce dilution – increase ore recovery
- Downstream process improvement
- Load and haul, crushing, etc.

Pucobre mine challenges

- Cost escalation
- Complex recovery mining
- Challenging rock conditions
- Demand for longer holes

Project challenges

- Change management
- Digital data follow up
- Root cause analysis

4 phase project

1 INSIGHT

KPI's

3 months (Nov 2022)
Quality assurance in place: measure angle of drill, collar position, in-hole deviation

2 CONTROL

2 months (Jan 2023)
Smooth operation, measurements done

3 OPTIMIZE

2 months (Mar 2023)
Increase burden to +2,4 m, Better fragmentation, Reduced dilution to 5%. 2,4 m = 17% savings

4 IMPLEMENTATION AND FINE TUNING

9 months (Dec 2023)
Increase burden to +2,7 m, Testing boundaries. 2,7 m = 26% savings

The results

from +45 000 m of drilling



Improved hole quality

Superior precision in the drilling which gives optimal blasting results, even with increased burden from 2,0 m to 2,4 m. Less drilling and explosives that gives 19% less cost.



Sustainability

Better precision gives increased ore recovery, lower dilution and reduced drill induced damages. Reduced consumption of explosives due to increased hole spacing and burden.



Productivity

Increased penetration rate and precision gives many downstream benefits:

- Better fragmentation
- Less dilution
- Improved ore recovery



Total station navigation and Simba COPROD drill rig at Pucobre mine.

Boom position

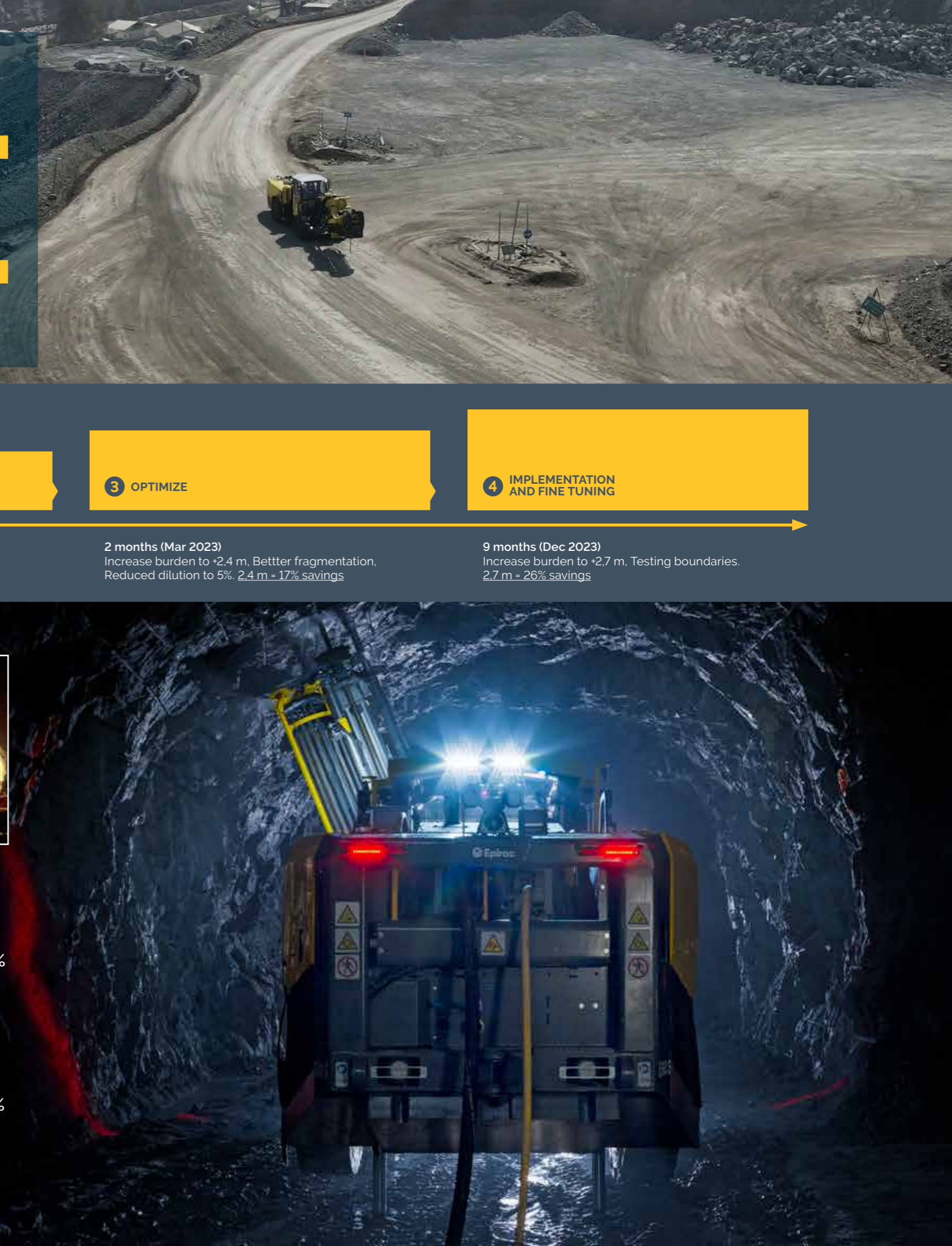
Baseline: 2,63%
Actual: 0,85%

Penetration rate (m/min)

Baseline: 0,78
Actual: 1,07

Drill precision (in-hole deviation)

Baseline: 9,85%
Actual: 1,96%



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