

Improved slopes through detection of deviations and application of best practices USING TIMINING SICT

Site:
Mine Antucoya

Owner:
Antofagasta Minerals

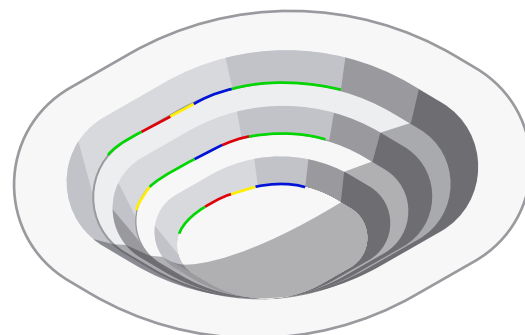
Location:
Antofagasta, Chile

Production:
COPPER, 71.9 kt (2019)

OVERVIEW

Since 2015 Mine Antucoya has been controlling the construction of the pit walls using two metrics in order to improve the stability, safety and economic value of the mine, namely: (1) the Design Factor, to evaluate the as-built compliance to design; and (2) the Condition Factor, to assess the health, damage and scaling of the bench faces.

The monitoring and control using these metrics has resulted in the implementation of new best practices defined in a joint collaboration between the Geotechnical, the Drilling and Blasting and the Loading and Hauling teams. The result is an improved compliance with the Berm Width of the benches which in turn has improved the safety and operational continuity.



**GEOREFERENCED
DISPLAY OF RESULTS**

SOLUTION

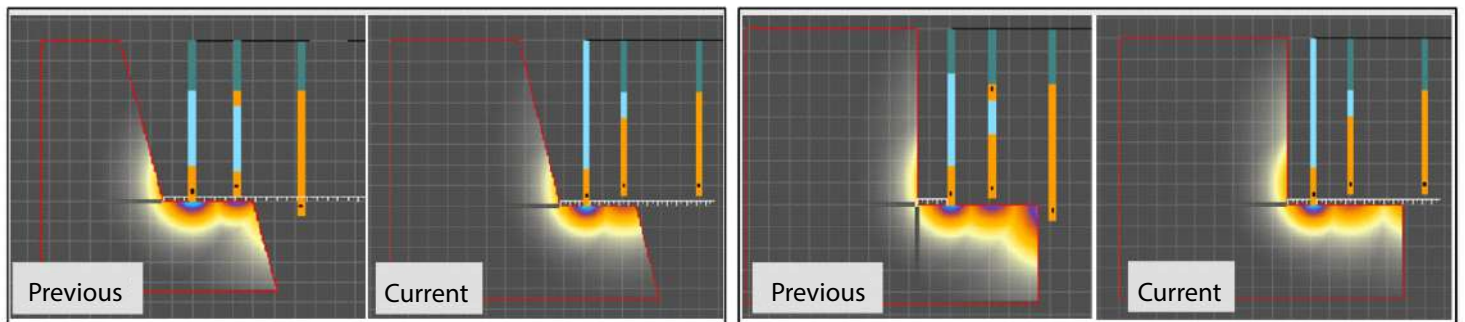
The methodology to improve the slope construction as implemented by the Geotechnical team at Minera Antucoya follows a series of steps which uses TIMining SICT to support the information management and automate the Design Factor calculations:

- Use of the Design Factor to evaluate design parameters such as: Berm Width, Bench Face Angle, Toe Line, etc.
- Evaluation of the Condition Factor through the mapping of elements such as the presence of half barrels, crest fracturing, face profile or the presence of unstable blocks, among others.
- Identification and location of compliance deviations with the design and quality of the bench faces.
- Root cause analysis of the elements that create good or poor slope construction compliance results, based on the correlation with the geotechnical-structural model and the drilling and blasting practices.
- Review of the results of the analysis together with the Drilling and Blasting team, to confirm the root causes of the deviations and collaboratively define the modifications to the process, in order to achieve better slopes.

IMPROVED SLOPES THROUGH DETECTION OF DEVIATIONS AND APPLICATION OF BEST PRACTICES

Using this methodology, the Geotechnical and the Drilling and Blasting teams have a standardised way to see the results of the constructed slopes, allowing them to improve the design of the final wall blasting, introducing the following modifications:

- The production holes were moved away from the future crest of the bench
- A negative sub-drilling was established in the buffer holes (bottom of the hole above the future floor level).
- Changing the load configuration of the buffer row.



IMPACT

The changes in drilling and blasting practices derived from the implementation of this methodology have produced the following impact:

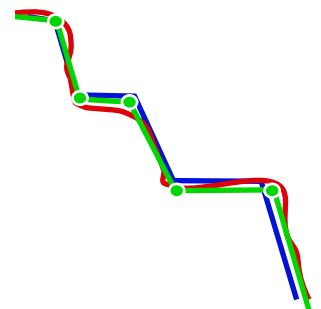
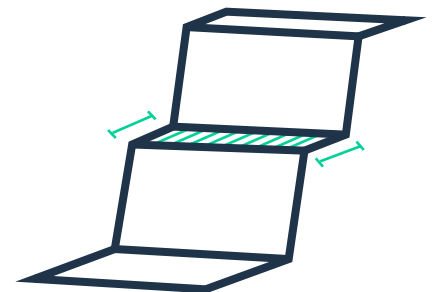
- Increase in the retention capacity of the built benches, given by an **increase of 13% in the Berm Width**; improving from an average of 6.27m to 7.11m in the 4th quarter of 2019.
- Communication and collaboration between the superintendents involved in the pit construction, towards the common goal of improving compliance with the wall design parameters.
- Improvement of scaling and toe line achievement, based on training and objective feedback to shovel operators.

Finally, it should be noted that these improvements have validated the methodology of SICT as a tool to support it.

"The implementation of SICT has allowed us to detect deviations in the construction of benches in a timely manner and to visualize them in a simple and georeferenced way, which has facilitated communication with the different areas, positively impacting the achievement of the berms of the benches built in Antucoya"

- Boris Duarte, Senior Geotechnician, Minera Antucoya.

Berm width control



AUTOMATIC GENERATION
OF RECONCILIATION PROFILES