THE AUSTIN ADVANTAGE

OPTIMIZING BLAST EFFICIENCY IN VEINS WITH RED D GEM

GENERAL **INFORMATION**

Location: San Julian Mine, Chihuahua State, Mexico

Industry: Underground Gold and Silver Mine

Products Used: Red D GEM, Paradigm, E*STAR, Hydromite

Project Lead & Author: Ricardo Medina, Sales and Technical Services Rep.

THE **HISTORY**

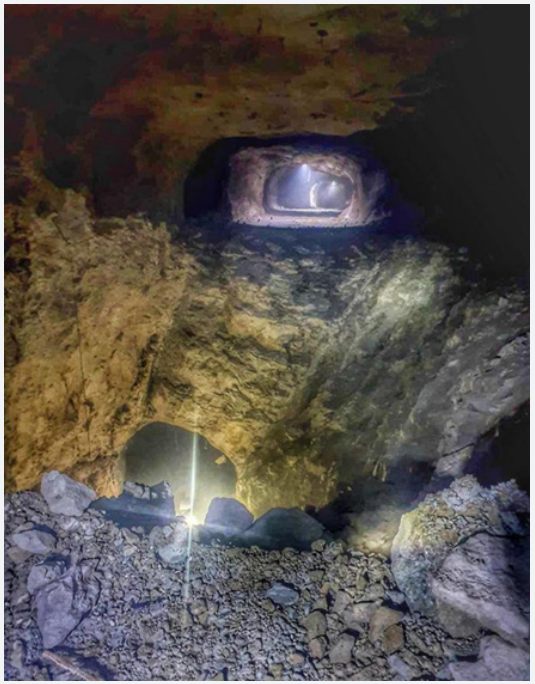
The mine is divided into two large sections. One of them is constituted for a Disseminated Ore Body (DOB), where Austin has participated in loading long hole stopes in a fan shape and developments with the RED D GEM System since 2018. They have seen good results in optimizing operational costs, controlling overbreak, ore grade recovery, and blast vibrations.

The other area of the mine is constituted of Vein Ore Deposits. Epithermal quartz veins with variable lengths, thicknesses, orientations, and dips have been identified in the area. For this reason, this deposit is currently mined using various extraction methods, including Long Hole Blast and Cut and Fill.

Considering the mine results achieved with the RED D GEM in the DOB area, the mine's operational management was looking to apply a similar blast optimizing process using bulk emulsion in vein long hole stops.

THE **GOALS**

1. Reduce Operational Costs
2. Increase Productivity
3. Control Overbreak
4. Improve Blast Vibrations
5. Implement Innovative Techniques: Utilize the RED D GEM system to achieve better results compared to the traditional method



CUSTOMER **CHALLENGE**

The main challenge for this project was to design the rings considering the rock properties and the effects of the explosives on them. Overbreak beyond the planned limits is one of the biggest concerns for miners and planners, not only for stability issues but also for dilution and ore grade recovery. For this project, controlling the damage without sacrificing productivity was one of the goals.

To have a good design representing the damage contours most realistically, geotechnical information must be gathered, and then all information must be together. The second challenge was to design the burden and spacing considering the break overlap between rings and between holes in the same ring to have enough energy to break the rock but not too much to have a high powder factor because one of the goals of this project was to reduce the powder factor compared with the traditional loading process with ANFO.

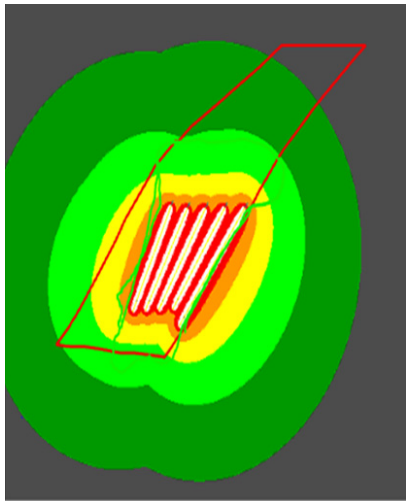
THE **AUSTIN** SOLUTION

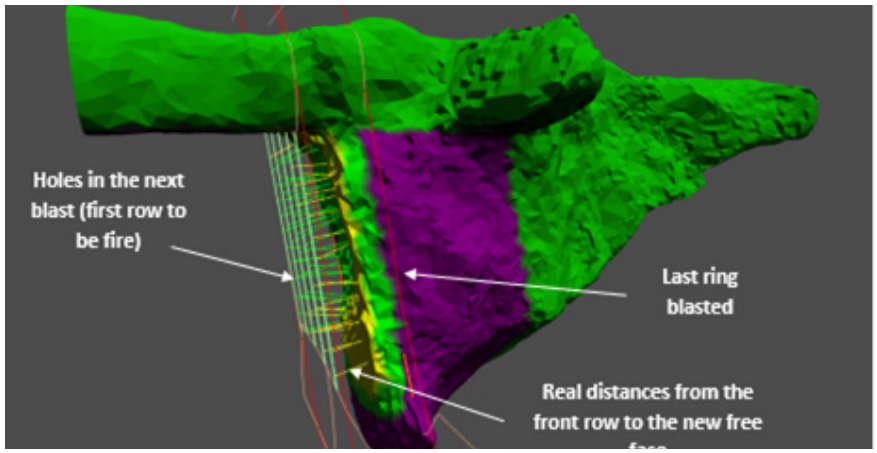
Using Paradigm software to model the damage contours for each combination of blasthole diameter, explosive, and rock properties, the drilling pattern dimensions, considering the burden and spacing, could be analyzed and adjusted.

Comparing the scans of the voids after blasting with the vein model, it was possible to adjust the ring design and the distance from the hanging wall and footwall to the holes in each ring to minimize the overbreak and underbreak.

Seismic monitoring was also applied to design the burden and spacing and avoid hole venting. Analyzing the records from each blast identified missing holes in the blast sequence, and the burden and spacing were adjusted to avoid interference between holes.

Also, by analyzing the back break between rings, it was possible to adjust the burden to avoid collapsing the holes in the front row for the next blast without having an excessive burden.





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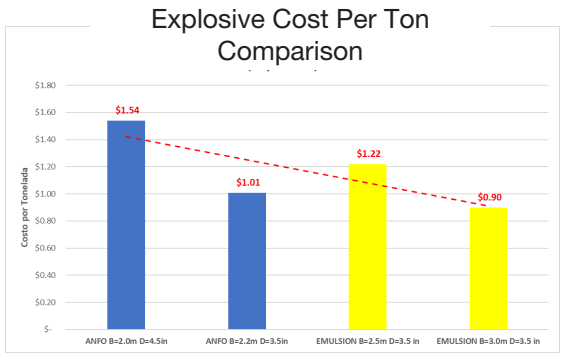
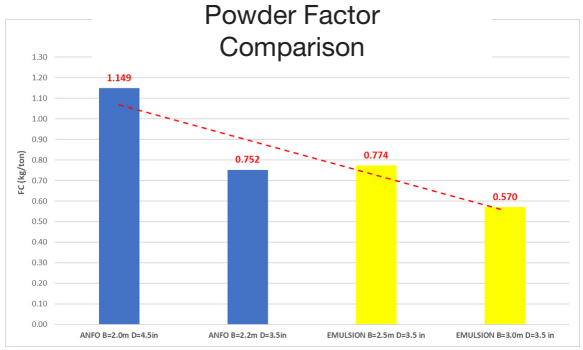
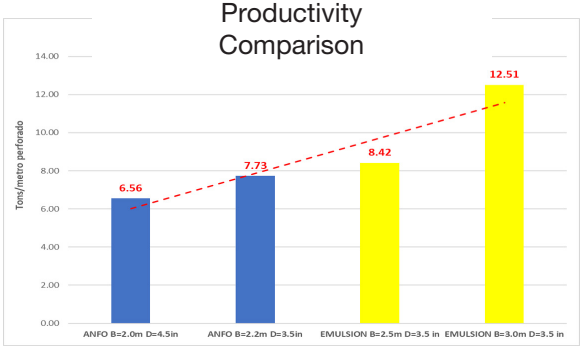
THE **OUTCOME**

The results achieved with the RED D GEM can be summarized in the following points:

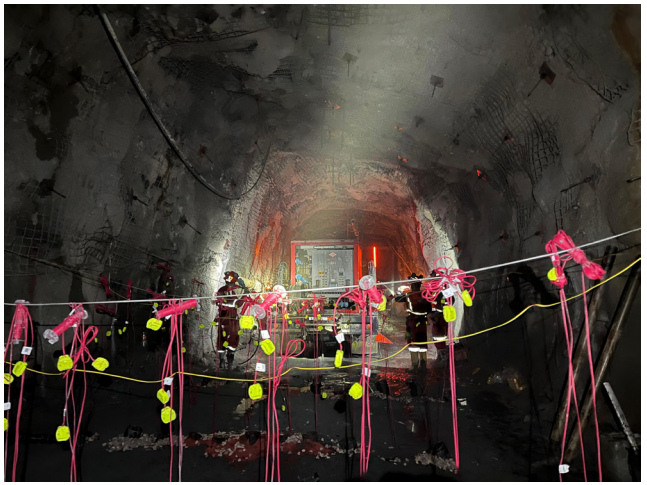
- Compared to traditional methods, the implementation of bulk emulsion loading has resulted in a 50% decrease in explosive consumption, representing substantial savings for mining operations.
- An impressive 90% increase in productivity per meter drilled has been observed, demonstrating the effectiveness of this innovative technique.
- In terms of costs, a 41% reduction in estimated cost per ton has been recorded, specifically in explosive consumption, drilling steel, and drilling time, reflecting a significant positive economic impact for mining operations.







These results are a testament to the transformative potential of technology in the mining industry. The implementation of Red D Gem and Paradigm is opening a path towards more efficient and profitable operations, establishing a new standard for blast optimization.



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