

CASE STUDY

GOLD MINE EXPANDS PATTERN FOR 11% COST REDUCTION USING DIFFERENTIAL ENERGY™

PROJECT SUMMARY

DIFFERENTIAL ENERGY EXPANDS PATTERN AND REDUCES COSTS

Implementing DIFFERENTIAL ENERGY at a gold mine enabled pattern expansion and reduced costs on drilling and blasting.

BACKGROUND

A GOLD MINE LOOKS TO DECREASE COSTS

A gold mine in Northwestern Ontario desired to implement DIFFERENTIAL ENERGY technology in conjunction with their current bulk emulsion of choice, TITAN® Site Mixed Emulsion (SME), to decrease costs through pattern expansion beginning in January 2021. They were looking to gain downstream improvements in fragmentation, dig rates, and crusher energy consumption.

DynoConsult® proposed a basic loading design for each blast hole type that would optimize energy distribution throughout the hole. To track progress, the customer collected information for each blast and reviewed it each month to discuss areas for improvement.

PROJECT GOALS

MAXIMIZE PATTERN EXPANSION TO REDUCE COSTS

One of the major goals the mine had for this project was to maximize pattern expansion to reduce drilling costs. Based on the results of trial blasts, they wanted to implement DIFFERENTIAL ENERGY on all production blasts in February 2021.

To ensure that expansion did not negatively impact downstream processes, the following goals were set:

- Fragmentation: P80 < 389mm, P50 < 154mm
- Dig rates: Shovel A and B < 2.95min, Shovel C < 2.01min

These goals were established using baseline data collected prior to implementing DIFFERENTIAL ENERGY.

AT A GLANCE



11% REDUCTION IN DRILLING COST



5% PATTERN EXPANSION



2% REDUCTION IN EXPLOSIVE MATERIAL COSTS

CHALLENGE

- Decrease costs through pattern expansion

SOLUTION

- Introduce DIFFERENTIAL ENERGY to optimize energy distribution

OUTCOME

- 11% reduction in drilling cost in one month
- 5% expansion of pattern
- 2% reduction in explosive material costs with no negative impact on downstream processes



TITAN SME

CASE STUDY

TECHNOLOGY APPLIED

TITAN SME AND DIFFERENTIAL ENERGY

The gold mine was already using TITAN SME because it could be safely made on the bench. TITAN SME is formulated to be sensitized during the borehole loading process, so it can be transported as an oxidizer in Canada. It also allows the average density to be varied by chemical gassing as necessary.

With TITAN SME already in use, no hardware modifications to the bulk trucks were necessary to trial DIFFERENTIAL ENERGY. Using DIFFERENTIAL ENERGY technology, the mine's planners were able to provide a loading design that optimized the energy distribution in the holes directly to the bulk trucks. With improved use of energy and better blasting results, the customer confidently decided to decrease their costs by expanding the pattern.

PRODUCTS/ TECHNOLOGY & SERVICES USED



TITAN SME



DIFFERENTIAL
ENERGY

VALUE ADDED

REDUCED OVERALL DRILL AND BLAST COSTS

After the data tracked by the customer was reviewed, the overall drilling and blasting cost was found to have decreased after DIFFERENTIAL ENERGY was fully implemented in January 2021. In both February and March, drilling costs decreased by 11% and 5% respectively, and explosive material costs were decreased by 2%. This significant reduction in overall drilling and blasting costs at the gold mine was due to the pattern expansion of 4% in February and 5% in March.

The pattern expansion did not negatively impact downstream processes. The fragmentation remained below the baseline target set by the customer. In February and March, the P80 was 320 mm and 343 mm respectively. This represented a decrease of P80 fragmentation size of 18% in February and 12% in March. Similarly, the P50 fragmentation size decreased from the target size by 42% in February and 36% in March.

The shovel dig time at the mine also remained within the baseline targets. For Shovels A and B, the dig times were within 0.1 minutes of the baseline target of 2.95 minutes. Preliminary crusher energy consumption data also showed a decrease after DIFFERENTIAL ENERGY was implemented in February.

The customer was confident in the DIFFERENTIAL ENERGY technology and used the benefits of an optimized energy distribution in the hole to expand their pattern and decrease overall costs.

Date	Explosive Material Cost (\$/t)	Drilling Cost (\$/t)	Pattern Footage (m ²)		avg. P80 (mm)		avg. P50 (mm)		avg. Shovel A & B (min)		avg. Shovel C (min)	
12/2020			27.7		389	Baseline	154	Baseline	2.91		1.62	
1/2021	0%	0%	27.9		297	↓ -24%	75	↓ -51%	2.71		1.63	
2/2021	↓ -2%	↓ -11%	29.0	↑ 4%	320	↓ -18%	90	↓ -42%	3.05	↑ 12%	1.51	→ -7%
3/2021	↓ -2%	↓ -5%	29.3	↑ 5%	343	↓ -12%	99	↓ -36%	2.95	→ 9%	1.82	↑ 12%

Summary Table of Results

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