

# CASE STUDY

## DIFFERENTIAL ENERGY™ APPLIED TO IMPROVE FRAGMENTATION

### PROJECT SUMMARY

#### OPTIMIZING FRAGMENTATION TO IMPROVE FOR DOWNSTREAM OPERATIONS

This limestone quarry in the Laurentian region in Quebec, Canada uses a 1070G blend-like product, with an average density of 1.20 g/cc, for most of its operation. A pattern of 3.96 x 4.27 m, on 102 mm diameter, 2.1 m stemming, 0.15 to 0.3 m of subdrill, bench height varies from 10.7 to 17 m yields somewhat satisfactory results.

The client would like to improve the fragmentation by reducing fines and getting more material in the 150 to 500 mm size. Moreover, a different supplier is servicing the pit since its opening, more than a few decades ago.

### TECHNOLOGY APPLIED

#### DIFFERENTIAL ENERGY APPLIED TO IMPROVE FRAGMENTATION

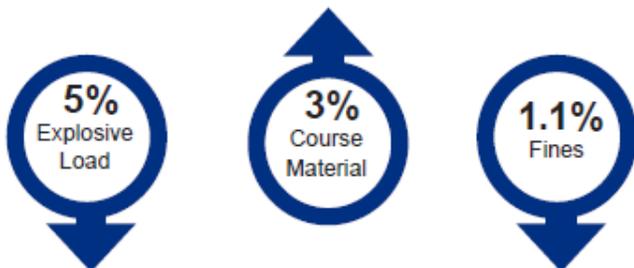
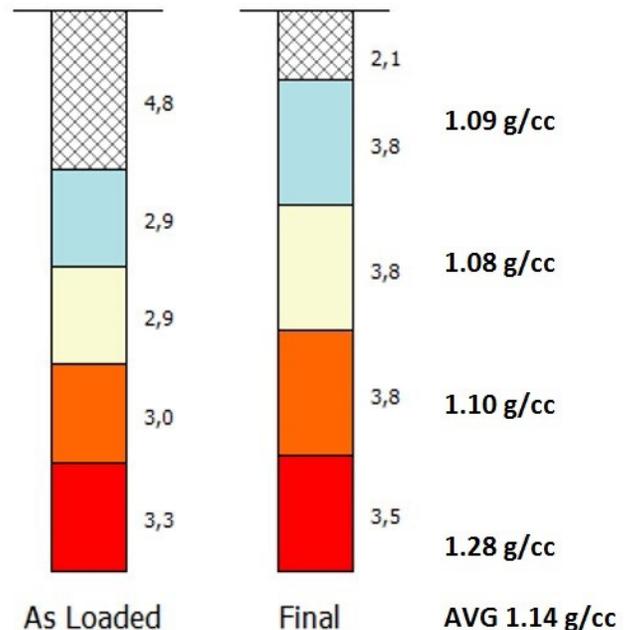
Dyno Nobel proposed conducting a trial shot using its DIFFERENTIAL ENERGY product; ΔE.

For the purpose of the test, the same blast parameters were kept in order to compare the performance of bulk emulsion only. Moreover, it was possible to introduce ΔE next to 1070G blend in the same blast. Four different segments of the product, with different densities, were introduced into the boreholes. This reduced the density from 1.20 to 1.14 g/cc.

### RESULTS

#### IMPROVEMENT IN FRAGMENTATION AND REDUCTION IN POWDER FACTOR

Following the trial shot, a fragmentation analysis using WipWare tools was conducted to quantify changes, if any, in order to compare the 2 products; ΔE vs 1070G blend. Based on numerous picture analysis, it was determined that ΔE helped to increase coarser material (150-500 mm) by 3%, while reducing the fines by 1.1%, as the client requested. Furthermore, it was determined the ΔE helped reduce the explosive load per meter of blast hole by 5%.



# CASE STUDY

## NEXT STEPS

### PUTTING THE RIGHT ENERGY IN THE RIGHT PLACE

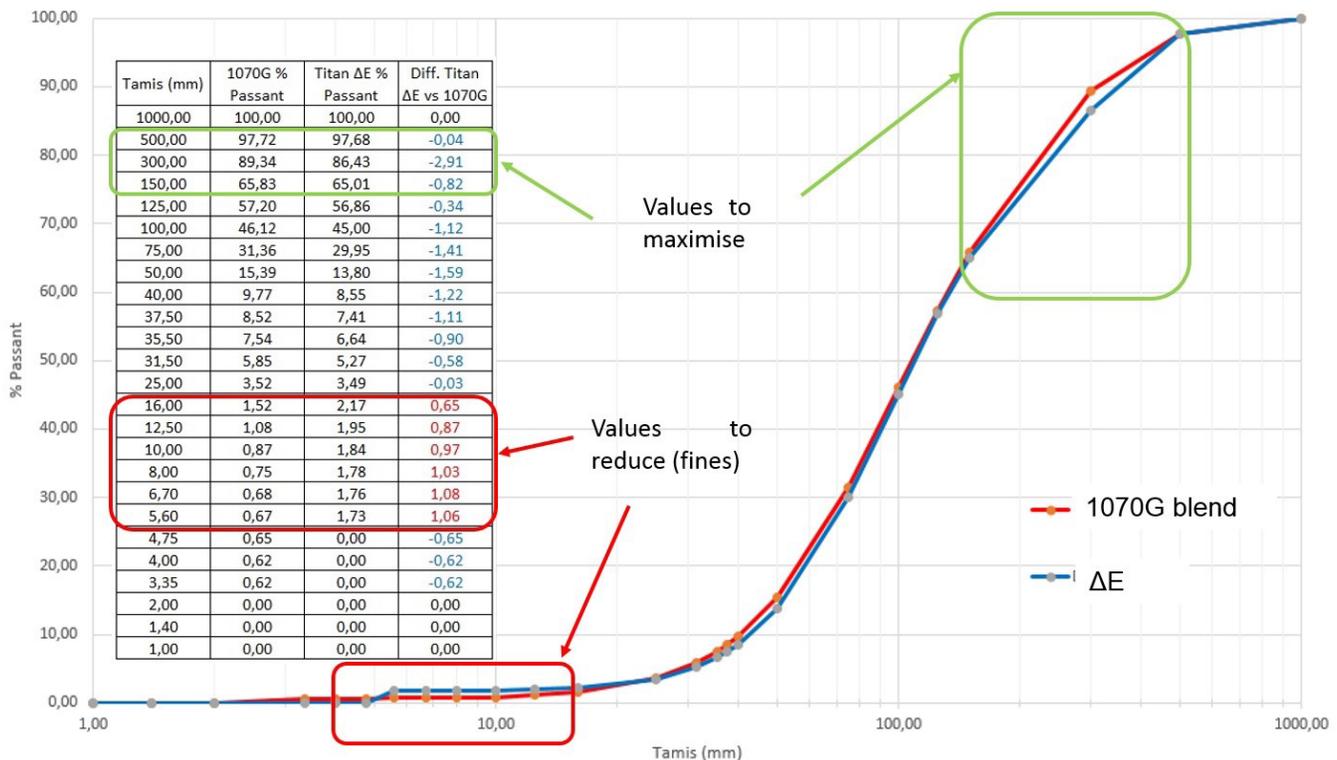
More testing is necessary to better predict the adequate segment densities in order to optimize the fragmentation as well as modifying blasting parameters to better distribute the energy throughout the shot. Even though the client was satisfied with Dyno Nobel's product, it was said that no immediate change in supplier will be made because of existing contractual obligations.

The client was satisfied with Dyno Nobel's product and committed to giving special consideration to Dyno Nobel's DIFFERENTIAL ENERGY product in the future due to the improved results and lesser cost.

### Success Story Summary

Area:	Quebec, Canada
Industry:	Limestone Quarry
Products Used:	DIFFERENTIAL ENERGY™ WipWare Tool

Fragmentation en fonction du produit



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