FINES REDUCTION PROJECT AT WENDLING BOWSER QUARRY

PROJECT SUMMARY

IMPROVING OPERATIONS WHILE REDUCING COSTS

The goal of the study was to achieve the best possible fragmentation with chemical blasting for costs and for bank ton yield from reduced fines. Customer had attended Quarry Academy (QA) and saw opportunity for applying principals discussed at QA to improve his operation and reduce costs.

BACKGROUND

DYNOCONSULT IS CALLED IN TO FIND OPTIMUM CRUSHING PLANT PARAMETERS

The project began in May, 2010 and was concluded by the end of September 2010. During the course of the project, 9 production blasts were studied. The first four blasts were baseline blasts to calibrate the fragmentation model and to decide which future improvements could be compared. The initial site visit was to obtain geologic information and drilling information for calibration of the fragmentation model to the local site conditions. Once the fragmentation model was calibrated, various blast design parameters were modeled to guide the blast designs and produce the desired muckpile fragmentation. During this same time, sieve analysis was performed on samples taken from the discharge of the crushing plant. By separately quantifying the fines produced in the blasting and crushing, it was possible to determine the optimum crushing plant parameters to reduce the fines produced in the crushing.

Wendling Quarries has expanded operations to include 14 counties throughout Eastern Iowa and Western Illinois.

Wendling Quarries currently operates approximately 100 quarries and employs an average of 200 employees that are dedicated to superior customer service. Along with the production of crushed stone, sand, gravel, and asphalt mix, a growing portion of the business has become the processing of recycled concrete and asphalt.

The Wendling accounts are serviced by Quick Supply & Bennet Explosives. In 2009, the General Superintendent of Operations for Wendlng attended the Quarry Academy. Due to what he learned there, he wanted to improve the competitiveness and efficiency of the Wendling operations.

About this time, the competition was attempting to win over Wendling quarries. In conversations with Wendling, Olsen representatives stated they could help Wendling achieve their goals. Wendling then contacted QuickSuppply/Bennet Explosives to see if they could offer a similar program. Quick/Supply Bennet Explosives contacted DynoConsult to ask for assistance the project. It was felt that, should the competition initiate such a project with Wendling, they would win over Wendling quarries.

PROJECT GOALS

WENDLING QUARRIES SEEKS TO IMPROVE COMPETITIVENESS AND EFFICIENCY

1. Primary Objective - Reduce the percentage of material less that ¾ inch output by crushing plat.
2. Secondary Objective – Maintain or reduce historic drill and blasting costs
3. Tertiary Objective – Maintain historic production rates

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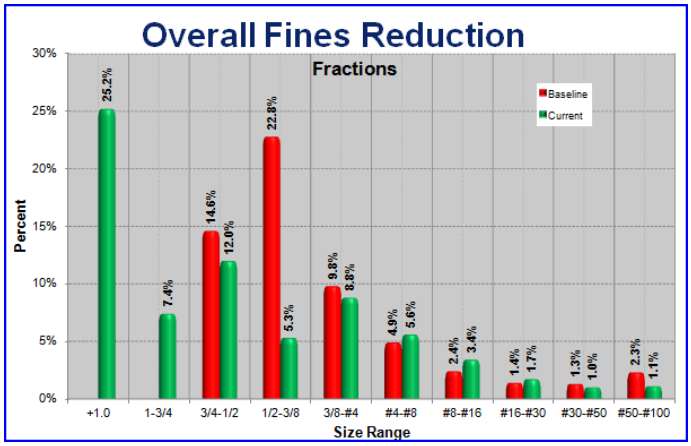
TECHNOLOGY APPLIED

A WIDE RANGE OF TECHNOLOGY IS APPLIED TO INSURE OBJECTIVES ARE ACHIEV

- Fragmentation modeling used to guide blast designs to achieve desired muckpile fragmentation.
- Sieve analysis study looking into changing plant operational parameters to determine optimum operation for desired results.
- Employment of DigiShot® electronic detonators to control muckpile fragmentation.
- DigShot Electronic Detonators
- TITAN® 1000 SD
- FAS-Blast fragmentation modeling
- WipFrag photographic fragmentation analysis



Average % passing ¾ inch (Fines)

All Blasts

Blast	Actual	Model	Diff.	% Diff
12x15	15.74%	15.13%	0.0061	1.97%
13x16, 18 ms	12.81%	14.40%	-0.0160	5.87%
13x16, 25 ms	12.77%	13.75%	-0.0098	3.69%

VALUE ADDED

IMPRESSIVE SAVINGS AND INCREASED SALEABLE PRODUCT

- $24,000 annual savings in D&B savings at the Bowser Quarry
- Potential of $390,000 in D&B costs if techniques employed at other Wending operations.
- Reduced total fines in plant output from 73% to 58%.
- Increased saleable product by 30,800 tons/yr at Bowser Quarry alone.
- Expanded drill patterns by 58%.

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