NELSON TESTING LABORATORIES

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March 31, 2014

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REPORT OF TESTS

SUBJECT: **Physical Analysis of Concrete**

PROJECT: **MATRIX Construction Products – Comparative Study**

MATERIALS: Delivered to NTL on February 20, 2014

NTL PROJECT: 14-1033(A)

PAGE: 1 of 4

TEST METHODS: California Test 521, "Method of Test for Compressive Strength of Molded Concrete Cylinders"

TEST OVERVIEW

The purpose of this testing was to examine the effect incidental mixing of MATRIX CP's BIG-FOOT® has on the compressive strength of a concrete matrix used in the construction of drilled-shaft (caisson) foundations. This study simulated incidental mixing of BIG-FOOT® slurry by addition of 10% by volume of various concentrations of BIG-FOOT® slurry to a concrete blend. For this testing the compressive strengths of concrete using four slurry viscosities were compared to the concrete strength of a sample mixed in tap water without BIG-FOOT®.

LABORATORY PROCEDURE

1. The following slurries were mixed and their viscosities checked with a Marsh Funnel.

   a. Tap water with a pH of 9.

   b. Slurry mixed with 4 lb. BIG-FOOT and 7 lb. soda ash per 1,000 gallons of tap water.

   c. Slurry mixed with 5 lb. BIG-FOOT and 7 lb. soda ash per 1,000 gallons of tap water.

   d. Slurry mixed with 6 lb. BIG-FOOT and 7 lb. soda ash per 1,000 gallons of tap water.

   e. Slurry mixed with 8 lb. BIG-FOOT, 4.5 lb. FORTIFY, and 7 lb. soda ash per 1,000 gallons of tap water.

2. The individual slurries were then diluted with tap water in a volume ratio of 1:9 (slurry: tap water). Using each slurry, five different concrete mixtures were created using Quikrete 5000 Concrete mix.

3. Each concrete mixture was placed into three 4 x 8-in cylindrical concrete molds to give a total of fifteen concrete samples cylinders (three for each mixture).

4. The concrete cylinders were cured for 28 days and then tested for compressive strength in accordance with California Test 521, Method of Test for Compressive Strength of Molded Concrete Cylinders.

TEST DATA

Batch Date: February 20, 2014

Test Date: March 20, 2014

Concrete: Quikrete 5000

Marsh Funnel: Mix B – 55 seconds
Mix C – 59 seconds
Mix D – 60 seconds
Mix E – 92 seconds

TEST RESULTS

California Test 521 – Compressive Strength (psi)

Results:

	Sample 1	Sample 2	Sample 3	**Average**	*Std. Dev.*
Mix A	6,670 psi	6,340 psi	6,510 psi	**6,510 psi**	*135*
Mix B	4,940 psi	4,780 psi	4,980 psi	**4,930 psi**	*41*
Mix C	4,890 psi	4,510 psi	4,290 psi	**4,560 psi**	*248*
Mix D	3,410 psi	3,500 psi	3,390 psi	**3,430 psi**	*48*
Mix E	3,240 psi	3,030 psi	2,940 psii	**3,070 psi**	*122*

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Respectfully submitted,

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Mark R. Nelson
President

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Addendum – A-1

PICTURES

Quikrete 5000

Marsh Funnel