Executive Summary, Research Readiness Level Assessment, and Technology Transfer

Compressive Strength of Concrete Cylinders by Different Preparation Methods: Sulphur, Neoprene Pads and Grinding

Research Objectives

Compared the effects of four types of cylinder preparation methods prior to compressive strength testing in accordance to ASTM C 39.

Research Benefits

Provided a better COV value preparation method for neoprene pads.

Principal Investigators

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Background

All cylinders were cast and cured from four cubic yards of concrete that was delivered from a Ready-Mix Plant in Lincoln. The concrete that was used in this research was Class 47B with a design strength of 3500 psi at 28 days. All cylinders were tested at 28 days.

Conclusion

Concrete cylinders with end grinding preparation and testing on the bearing plates gave the compressive strength values quite consistent with the concrete cylinders tested on Neoprene pads. Concrete cylinders tested with the preparation of end grinding with neoprene pads achieved relatively higher compressive strength which showed very consistent results. Sulphur preparation produced the lowest compressive strength results.

The dispersion, in terms of Coefficient of Variation (COV), was significantly affected by the Sulphur preparation. The end grinding with bearing plates and the end grinding with neoprene pads had satisfactory COV values of 2.73% and 2.64%. The neoprene pads with no end preparation having the lowest COV of 2.59%.

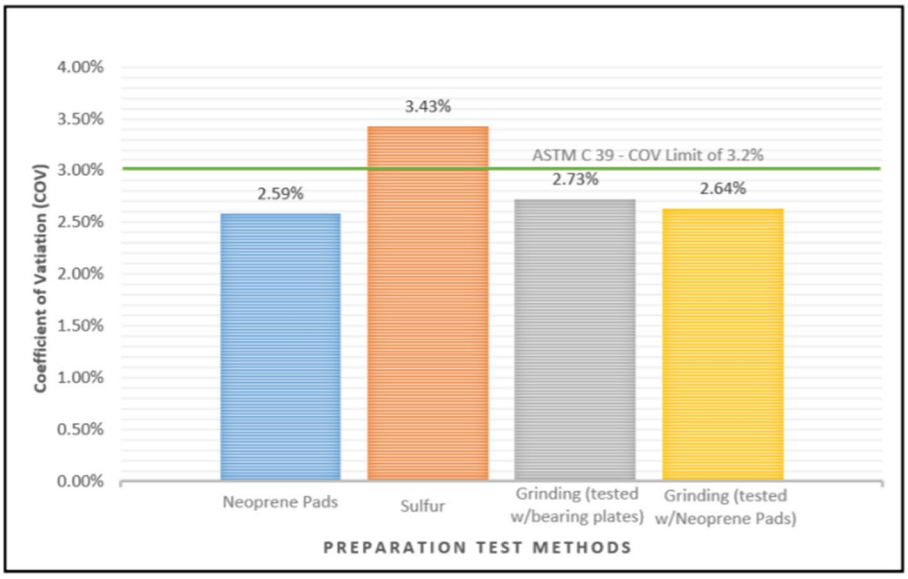

Figure 1 Effects on the COV

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Interested in finding out more?
Final report is available:
HERE

NDOT Recommendations Based Off Research

Due to the results of the research the Department began using neoprene pads for the compressive strength testing without any further end preparations. This includes all the district labs and central lab. This research provided the Department consistency between labs.

by Wally Heyen – Principal Investigator

Research Readiness Level (RRL) Assessment

RRL 5

Level 5: Standard Practice

Research/Technology fully implemented and understood. No follow-up is necessary.

Technology Transfer

Presentation to Nebraska and Concrete and Aggregates Association (NC&AA) -2018

Presentation to Association of General Contractors (AGC)-2018

This brief summarizes of In-House Research Project
"Compressive Strength of Concrete Cylinders by Different Preparation Methods: Sulphur, Neoprene Pads and Grinding"
Nebraska Department of Transportation Research Program