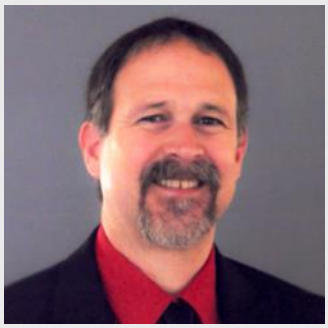
NYSDOT Implementation of Performance Engineered Concrete Mixtures



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NYSDOT is eliminating the current concrete classes, replacing these with performance engineered mixtures (PEM). The change applies to projects let on or after May 1, 2024. These PEM, by virtue of design, can lessen environmental impacts by limiting the required amount of cement in the mixture while concurrently improving strength and durability.

To maintain NYSDOT certification, it is anticipated that Portland Cement Concrete (PCC) facilities will be required to have a minimum of two (2) PEM approved by the State by January 2025. One of these mix designs must be a 555/557 Mix (substructures/superstructures) and the second mix design will be selected by the producer. If these mix design requirements are not attained, the PCC facility may not receive NYSDOT approval to continue production.

Concrete bridge deck placement.

To receive approval for a mixture, the PCC facility must develop a homogenous PCC mixture using only approved materials listed under Standard Specification 501. This mixture must meet the performance requirements associated with the application, and be designed in accordance with ACI 211.1 (Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete) and the provisions of AASHTO R101 (Developing Performance Engineered Concrete Pavement Mixtures). New mix designs must be submitted at a minimum of 60 days prior to placement to provide time for review and evaluation of trial batch results.

Results of standard tests, such as air content, temperature, slump, and compressive strength, must be provided with each PEM submittal. In addition, the following performance tests are now required:

- AASHTO T358 – Surface Resistivity
- AASHTO T395 (Super Air Meter) – Freeze-Thaw Durability
- ASTM C666 – Freeze-Thaw Durability

In addition to the above performance tests, the PEM must optimize combined aggregate grading using either the Tarantula curve (as defined by the Federal Highway Administration), Shilstone method, or the 8–18 method, to minimize paste content and water demand while maintaining workability. Additional tests may be required, depending on the application of the PEM.

Corresponding to the implementation of PEM, there will be revisions to the NYSDOT Standard Specifications and new Materials Procedures will be issued to specify new requirements for PCC facilities, design and approval process for PEM, and Quality Assurance and Quality Control procedures for both plant and field inspections.

ATL is experienced in optimizing and designing concrete mixtures and performing laboratory trial batches to meet NYSDOT or other project specific requirements. For more information, contact Steve Moore, PE at 518-383-9144, info@atlantictesting.com, or visit AtlanticTesting.com.

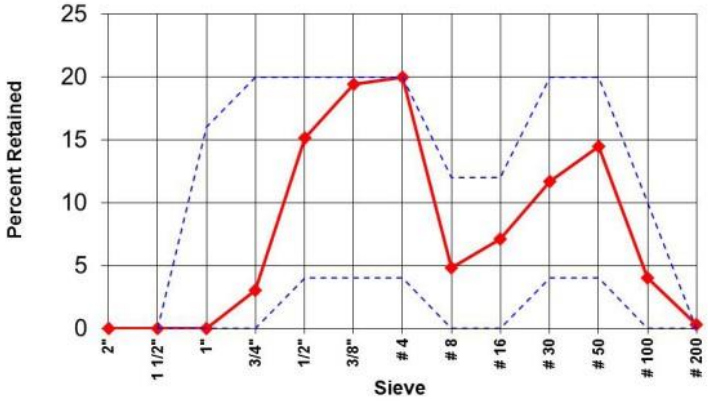

Figure 4 from FHWA-HIF-15-019, Tarantula Curve: Provides a theoretical envelope of percent retained for each material size. Similar to the haystack curve, but resembles the profile of a tarantula with decreased material retained on the #8 and #16 sieve sizes.

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