



WBE certified company

# ***NYS DOT Implementation of Performance Engineered Concrete Mixtures***



**Steven N. Moore, PE**  
**Senior Engineer**  
*Atlantic Testing Laboratories*

NYS DOT 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 NYS DOT 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 NYS DOT approval to continue production.

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.



Concrete bridge deck placement.

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, a WBE certified company, 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](tel:518-383-9144), [info@atlantictesting.com](mailto:info@atlantictesting.com), or visit [AtlanticTesting.com](http://AtlanticTesting.com).

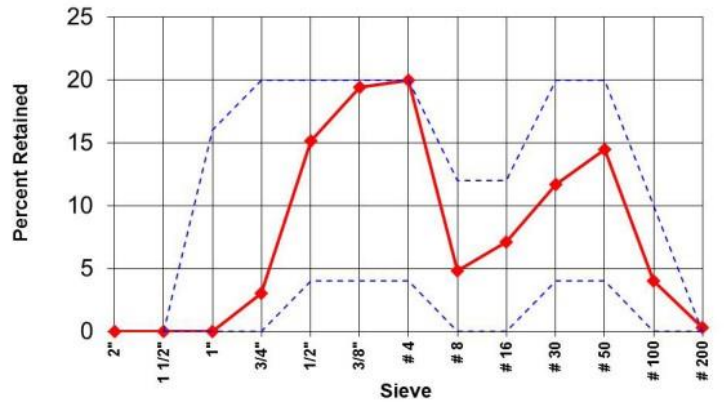


Figure 4 from FHWA-HIF-15-019, Tarantula Curve: Provides a theoretical envelope of percent retained for each material size. Similar to the haystack curve, but resembles the profile of a tarantula with decreased material retained on the #8 and #16 sieve sizes.

## ASSOCIATED SERVICES

[Construction Materials Engineering and Testing](#)  
[Laboratory Services](#)



This document is for general informational purposes only and is provided with the understanding that the authors are not herein engaged in rendering professional advice or services. Site specific circumstances make each project unique. As a consequence, information in this document may be incomplete, inaccurate, or inapplicable to particular situations or conditions. Any use of this information should take into account all relevant factors and sources of information applicable to a project. We do not accept responsibility for any omission, inaccuracy, or error in this document, or any action taken in reliance thereon.