PM Soil-Cement Compaction Device – Overview of Applications for Pavement Design and Construction Quality Assurance

AASHTO Subcommittee on Materials (SOM)

Plenary Session II

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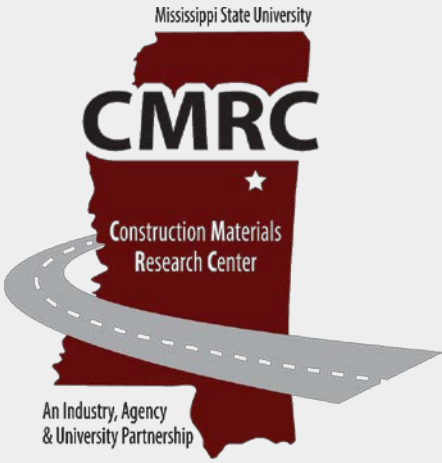

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(MDOT Primay Point of Contact for PM Device, Graduate Work Developed and is Implementing PM Device)

Objectives and Scope
(Play 6 Minute Video)

- <u>Objectives:</u>
  1. Demonstrate feasibility of compacting soil-cement into plastic molds via the Plastic Mold Device (PM Device)
  2. Discuss applications of the PM Device

Timeline

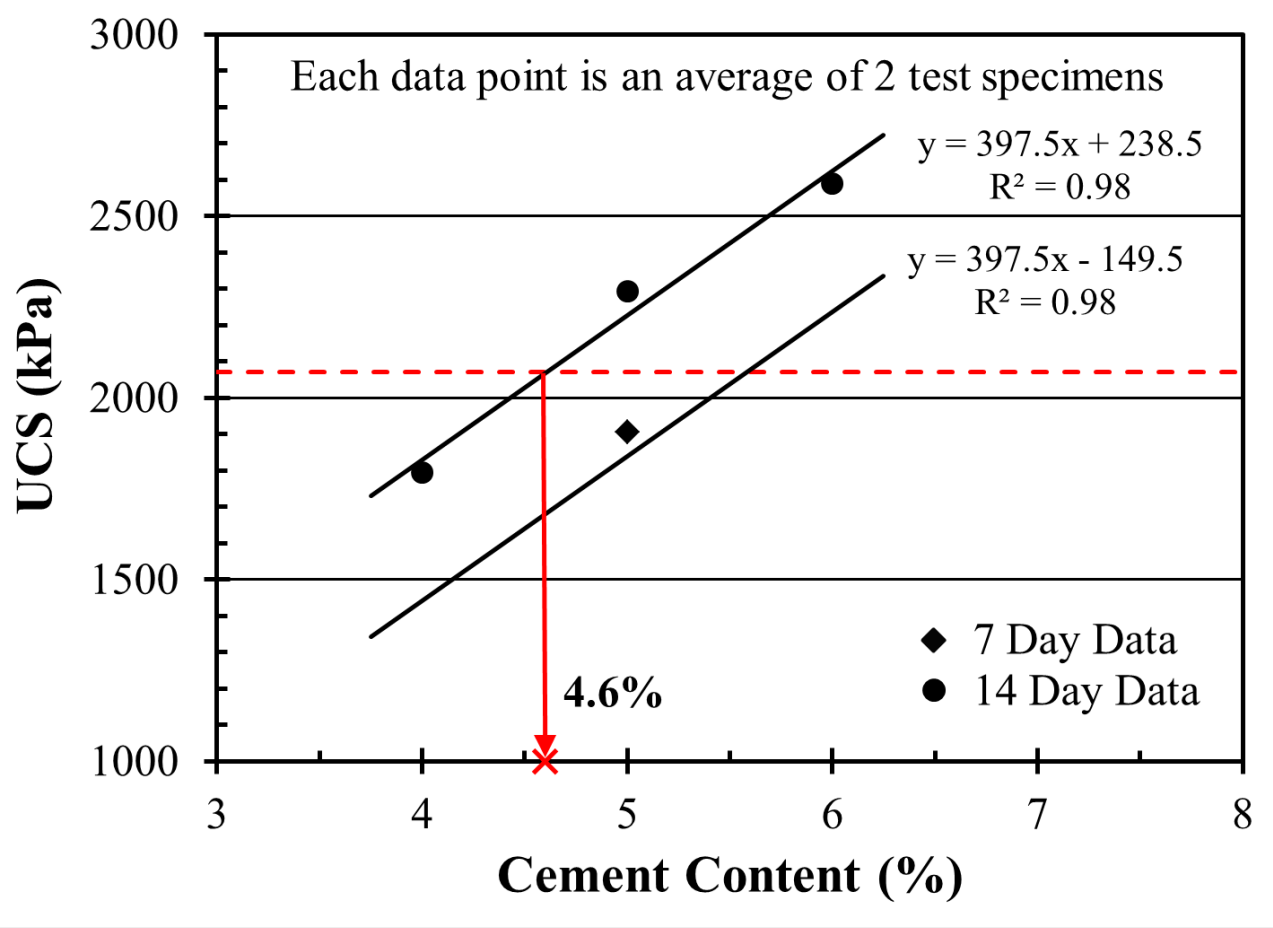
- 2008 – MDOT State Study 206 Begins
- 2012 – ACI Mid-South Chapter Presentation
- 2012 – AASHTO SOM (Biloxi) CMRC Exhibit
- 2013 – MDOT State Study 206 Completed
- 2015 - TRB Presentation – Session 810
- 2016 – TRB Presentation – Session 737
- 2016 – AASHTO SOM Presentations
- 2016 – TRB Webinar (Fall)
- 2016 to TBD – Attempt to Develop AASHTO Test Method (Tech Section 1b)

Potential Uses and Impacts

- Uses:
  1. Laboratory mixture design
  2. Field quality control operations
  3. MEPDG material inputs (e.g. elastic modulus)
- Impacts:
  - There is a disconnect between these uses and the PM device could possibly interface all three activities
  - **Increased** mix design reliability, **reduced** variability, **verified** mix and pavement design properties during construction, **improved** continuity to all soil-cement activities (pavement design, material design, & construction)

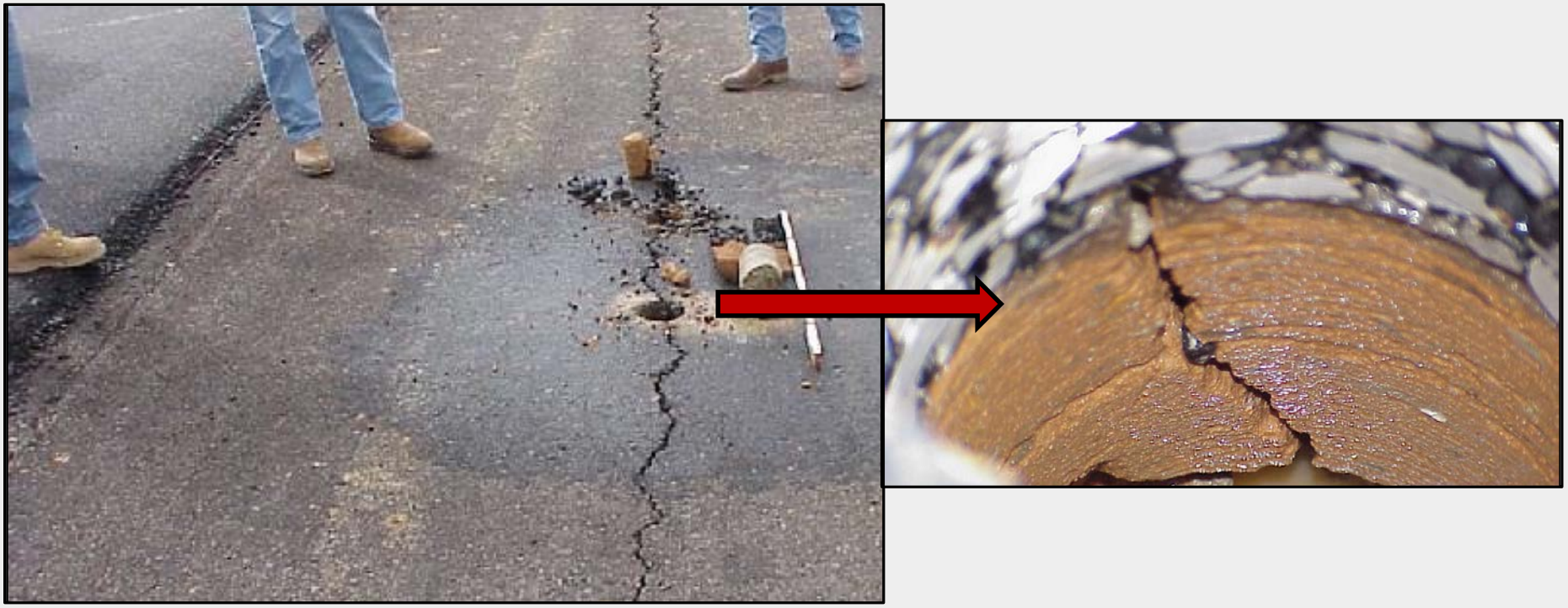
Increased Mix Design Reliability and Direct Verification of Mix Design

(Note increased reliability solely for mix design does not come from PM Device vs. Proctor mold)



Reduced Variability From Improved QC Tool

- Nobody wants this to be their boots



Vehicle to Directly Tie MEPDG to as Built Pavement Properties

- For example, an MEPDG design uses 500,000 psi as an input for a soil-cment base layer, and with that modulus determines 6 inches of asphalt are needed. During mix design, the PM Device is used and determines 4.5% cement is needed to achieve 500,000 psi at full pay in place density. During construction, a representative modulus of 400,000 psi is measured with the PM Device. The agency can use this information in several ways. One option is to re-design the needed asphalt thickness with the MEPDG (7 in for this example). The agency could then, for example, require 1 in of extra asphalt at contractor cost and leave layer in place or remove layer (this is hypothetical – several scenarios are being evaluated within Mississippi).

Summary

- PM Device is believed to be an advancement in soil-cement arena, mainly because it can bring everything together in a way that, for example, a Proctor specimen will never be able to.
- Technical Section 1b later this morning has an expanded technical presentation regarding the PM Device where data is shown.

Questions?


Mississippi State University
CMRC
Construction Materials
Research Center
An Industry, Agency
& University Partnership