Guide Specification Internal Curing
(Scheduled for Publishing - January 2018)

Sponsoring States

• Michigan
• Georgia
• Iowa
• Oklahoma
• Pennsylvania
What Is Internal Curing

• Internal Curing (IC) has been defined in 2013 by the American Concrete Institute as: “a process by which the hydration of cement continues because of the availability of internal water that is not part of the mixing water.”
What are the Benefits of IC

- Reduced Autogenous Shrinkage
- Increased Cement Hydration
- Improved Curing when Short Cure Times are Permitted

[Graph showing autogenous shrinkage strain over time]

Barrett (2013)
Applications

- Bridge Decks
  - Shown to reduce cracking
  - Long service life

- High Early Strength Patches and Overlays
  - Reduced built-in-stress caused shrinkage restraint
  - Increased water curing after opening

- Note: Research underway to determine the influence of IC on curling and built in stress

- Note: Reduction in curing time is underway
Internal Curing Agents - LWA

• IC Concrete is most commonly made by replacing a portion of the fine aggregate in concrete with prewetted fine light weight aggregate LWA.

• Water remains in the fine LWA during mixing and until the time of set.

• At the time of set capillary stresses developed in the concrete draws the water out of the fine LWA and curing the concrete section.
Internal Curing Agents - SAP

• Superabsorbent Polymers (SAP) are an alternative to LWA and are used to absorb additional mix water before setting (additional mix water is added to the mixture that results in a portion of the pore solution being absorbed by the SAP that is not considered in determination of the w/cm).

• The Internal Curing Specification is developed for LWA with potential SAP applications on the horizon and a test for absorption in the appendix.
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What is Currently Missing

- Currently, there are several groups ‘trying internal curing’ but we do not have a ‘best practices’ or ‘case studies’ document
- The US is rapidly implementing this (more rapidly than other countries)
- A listing of case studies of where this was used, what was obtained and the cost-benefits would be useful to other agencies

This would also help to track performance over time and to keep track of projects for monitoring
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Future-

• Move it into AASHTO Specification
• Develop Detailed Case Studies
  – Bridge Decks
  – Concrete Overlays
  – Concrete Pavement Patching
• Development Detailed Training Video