



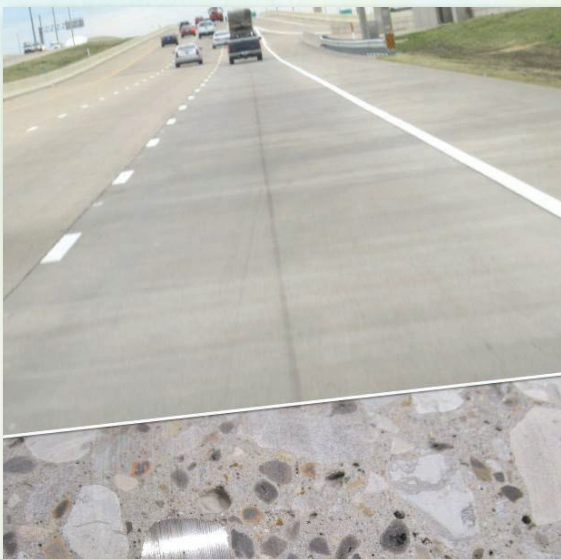
Expanded Shale, Clay and Slate Institute
Rotary Kiln Structural Lightweight Aggregate

Call for Internally Cured Concrete Pavement Demonstration Projects

The Expanded Shale, Clay and Slate Institute is seeking interested parties to be involved in constructing and evaluating internally cured concrete (ICC) pavements. This program will focus on incorporating internal curing (IC) in new concrete pavements to avoid problems resulting from insufficient traditional curing. The enhanced curing conditions provided by IC will improve concrete properties, lower maintenance and extend the pavement service life. Test sections are sought to demonstrate this proven technology.



Internal Curing using prewetted expanded shale, clay or slate (ESCS) lightweight aggregate is a simple and practical way of supplying additional curing water throughout the concrete mixture. This is done by replacing some of the conventional sand in the mixture with an equal volume of prewetted ESCS fine aggregate. IC is often referred to as "curing concrete from the inside out."



ESCSI will assist state DOT's in executing field trials using ICC by:

- Providing technical guidance (including presentations and training)
- Working together with the state DOT in selecting the appropriate roadway test sections
- Providing guidance in designing and implementing monitoring programs
- Assisting in analyzing data to determine the effectiveness of the technology

The DOT will be responsible for:

- Building the test section in conjunction with a traditional pavement for comparison
- Instrumenting the pavement for data collection
- Preparing and testing concrete samples
- Collecting and evaluating data from the field trial
- Contacting the FHWA Mobile Concrete Lab for availability and testing assistance

Want your state to participate?

All efforts will be conducted in collaboration with state DOT personnel to ensure full implementation of the field trial.

For detailed information contact:

John Ries or Abigail Gabbard, ESCSI at
info@escsi.org or 801-272-7070
www.escsi.org/pavements



How will ICC Pavements affect our transportation system?

The two key benefits of ICC are improved durability and longer service life. These benefits result from a reduction in unit weight, elastic modulus and coefficient of thermal expansion, as well as an increase in strength, reduced cracking and less curling. These effects amount to a significant positive impact on slab fatigue damage and associated slab cracking in jointed concrete pavements. Likewise, ICC leads to tighter crack openings and reduced punch-out failures in continuously reinforced concrete pavements.

Society benefits from Sustainability with:

- Increased service life and lower life cycle cost
- More efficient use of cement and higher percentage of SCMs usage

Concrete benefits from Internal Curing with:

- Increased cement hydration and SCM reaction
- Reduced modulus of elasticity, coefficient of thermal expansion and shrinkage (resulting in fewer micro-cracks, less overall cracking and tighter cracks)
- Improved interfacial transition zone resulting in lower permeability and less chloride ion penetration
- Improved durability and reduced curling



Construction process benefits from Internal Curing with:

- Compensation for poor jobsite curing as well as support for proper curing
- Fewer drying shrinkage cracks
- Tolerance of higher curing temperatures without cracking or strength reduction
- Improved workability and finishability (less stickiness associated with SCMs)

References

- Rao, Chetana and Darter, Michael (Sept 2013), Evaluation of Internally Cured Concrete for Paving Applications
- Bentz, Dale and Weiss, W. Jason (Feb 2011), Internal Curing: A 2010 State-of-the-Art Review, NISTIR 7765
- Cusson, Lounis, & Daigle (2010). Benefits of Internal Curing on Service Life and Life-Cycle Cost of High-Performance Concrete Bridge Decks – A Case Study. Cement and Concrete Composites, 32 (5), 339-350
- ACI (308-213)R-13, Internally Cured Concrete Using Prewetted Absorptive Lightweight Aggregate
- ACI 213R-14, Guide for Structural Lightweight-Aggregate Concrete
- ASTM C1761/C1761M-13, Standard Specification for LW Aggregate for Internal Curing of Concrete
- Weiss, W.J., Bentz, D.P., Schindler, A., and Lura, P., Internal Curing: Constructing More Robust Concrete, Structure, 10-14, January 2012
- ESCSI (Feb 2012) Internal Curing-Helping Concrete Realize its Maximum Potential #4362.1



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