CPTech Center
Research Overview
What Are We There For?

• To make your life better
  • Problem solving
  • Implementing the latest and greatest
  • Saving money by doing good things
  • Building better concrete pavements
Next Publications

• Guide to Cement Stabilized Subgrade Soils (PCA)

• Cellular Concrete (PCA)
Education/Workshops

- Topics available
  - IMCP
  - Best Practices
  - Materials and Mixtures
  - RCA
  - Cement Based Systems
  - Inspectors
  - Overlays
  - Preservation
Collaboration

- State and local agencies through NC\(^2\)
- Industry through the trade associations
- Academia through projects

34 States + IL Tollway & MB
Research Needs

• Phone survey with NC2 states and Chapter States
  • Research
    • Patches
    • Super absorbent polymers
    • Thin overlays in urban settings
    • Curing
  • Syntheses
    • Rapid setting systems
    • Load transfer alternatives
Performance Engineered Mixtures

• Reviewing specs with states
• Training on how to do tests
• Testing the tests in the field
• Data, data, data
• Helping contractors with mixtures
FHWA Cooperative Agreement

- WA1
  - Reclaimed fly ash
  - Construction byproducts
  - Recycled concrete
- WA2
  - Preservation guidance updated
  - Overlays guidance updated
  - CRCP
FHWA Cooperative Agreement

• WA4
  • QC guidance
  • Precision & bias for PEM tests

• WA6
  • Implementation
FHWA Cooperative Agreement

• Communication Challenge!
  • Traditional
    • Books
    • Lectures
  • And now?
    • Video
    • e-docs
    • Other?
Air void systems

- Struggled to find field failures purely due to low air
- C672 predicted field performance as well as other methods
- SAM performance reviewed
Internal Curing Overlays

- Performing OK
- Still understanding warping data
Joint Free Overlay

- Worth County
  - 6-inch overlay
  - Integral 3 ft. shoulders
  - 7.5 pcy macrofibers
  - 600 ft section with no joints!
  - Cracked at ~60 feet at last visit

- Traffic circle in MN
Mixture Proportioning

• How to design mixtures with fibers
• Effects of aggregate form
• Effects of low cement content on early age properties
• VKelly for structural concrete
• Tarantula for airfields
Sealants

Aiming to develop acceptance protocol:
• 5 classes of product
• Various permeability tests
• Contact angle
• Freeze thaw
• U/V exposure
• Field applications
Vibration

We need to understand
• The relationship between vibration energy and
  • Air movement
  • Water movement
  • Aggregate movement
• As a function of mixture
  • Water content
  • PSD
  • Workability
  • Thixotropy
Scaling

• Trying to understand fundamentals of scaling…
  • Hydration
  • Workmanship
  • Or chemical?

![Diagram showing relationships between Slag Cement Content, Hardened Properties Improvement, Sorptivity, Compressive Strength, Abrasion Resistance, and Salt-Scaling Resistance.]
Overlays

- Understand geotextile interlayers
- To bond or not to bond
- Fibers
- Life cycle
Thank you for your support

Please let us know how we can help