CP Tech Center Update

Dan King, P.E.
National Concrete Pavement Technology Center
deking@iastate.edu

NATIONAL PAVEMENT PRESERVATION CONFERENCE
npc23
IMPACTS AND BENEFITS FROM PAVEMENT PRESERVATION

ncpp
National Center for Pavement Preservation
MICHIGAN STATE UNIVERSITY

AASHTO TSP2 PAVEMENT PRESERVATION

ROCKY MOUNTAIN WEST PAVEMENT PRESERVATION PARTNERSHIP
SOUTHEAST PAVEMENT PRESERVATION PARTNERSHIP
MIDWESTERN PAVEMENT PRESERVATION PARTNERSHIP
NORTHEAST PAVEMENT PRESERVATION PARTNERSHIP

Our Mission

National Concrete Pavement Technology Center

Tech Center

- Make concrete pavements better through:
  - Education and training
  - State of the art guidance
  - Implementing best practices
  - Providing strategic solutions
  - Independent, third party expertise
  - Leveraging funding

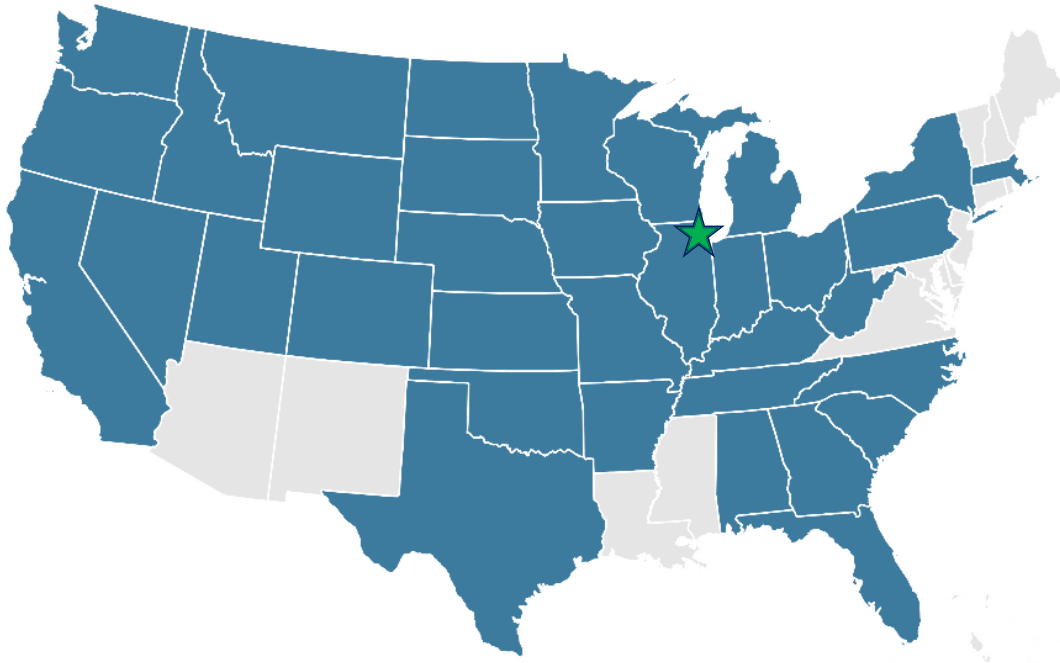
IOWA STATE UNIVERSITY
Institute for Transportation

Education and Training

- Who do we reach?
  - Decision makers
  - Agency and industry practitioners
  - Faculty and students
- How?
  - Written guidance and resources
  - In-person workshops and seminars
  - Webinars and digital media
  - Industry meetings and involvement

National Concrete Consortium (NC^2)

- Consists of representatives from 35 state DOTs & IL Tollway
- Meets twice per year with a state-generated agenda
- Last met last week in Portland, OR
- Next meeting: April 9–11, 2024 in Birmingham, AL
- Current topics
  - Type IL cements: what's next?
  - CRCP
  - Concrete pumping
  - Cold weather concrete
  - FHWA low carbon program
  - State-specific issues



Workshops

- Training opportunities available to NC² states:

2022–2023

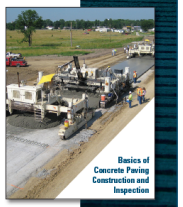
TRAINING OPPORTUNITIES FOR TTCC STATES

INSPECTORS' WORKSHOP

1 day

Intended for inspectors as well as engineers, this workshop provides guidance and instruction on the basics of concrete paving. The training material highlights the importance of quality, discusses key safety issues, and overviews concrete materials and properties, paving operations, testing, and overall inspection practices. The workshop is beneficial as a refresher course for those experienced in concrete paving but also presents less experienced participants with the fundamentals needed to prepare for an upcoming paving project. Topics include the following:

- Why is inspection necessary?
- What is quality assurance (QA) for concrete paving?
- What is concrete?
- What do you need to start a project?
- What kinds of equipment are used?
- What happens before you start paving?
- What happens when you are finally paving?
- What is the inspector's role?
- What do you look for in urban paving?
- What about all the other road building stuff?
- What kind of paperwork do you need to fill out?

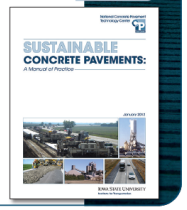


SUSTAINABLE CONCRETE PAVEMENTS WORKSHOP

½ day

This workshop is based on the CP Tech Center publication *Sustainable Concrete Pavements: A Manual of Practice*. The workshop provides a clear, concise, and cohesive discussion of pavement sustainability concepts and of recommended practices for maximizing the sustainability of concrete pavements. It also includes an update on recent developments in the sustainable pavement arena, including embodied carbon concepts, use of environmental product declarations (EPDs), and life-cycle assessment (LCA). Topics include the following:

- Design of sustainable concrete pavements
- Sustainable concrete pavement materials
- Construction considerations
- Impact of the use phase
- Concrete pavement renewal
- End-of-life recycling strategies
- Assessment of pavement sustainability

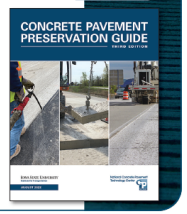


CONCRETE PAVEMENT PRESERVATION WORKSHOP

1 ½ days

This workshop is based on the third edition of the CP Tech Center's *Concrete Pavement Preservation Guide*. The material presented in the workshop presents strategies for both optimizing the performance and lowering the life-cycle cost of concrete pavements. Topics include the following:

- Preventive maintenance
- Evaluation of concrete pavement
- Slab stabilization and slab jacking
- Partial-depth repairs
- Full-depth repairs
- Retrofitted edge drains
- Load transfer restoration
- Diamond grinding and grooving
- Joint and crack sealing
- Overlays (new addition to the guide)
- Strategy selection

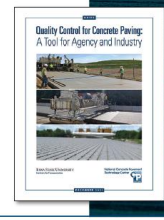


QUALITY CONTROL FOR CONCRETE PAVING WORKSHOP

1 day

This workshop is based on the CP Tech Center guide *Quality Control for Concrete Paving: A Tool for Agency and Industry*. The material in this workshop can help both contractor and agency personnel become familiar with the components of comprehensive quality control (QC) plans for concrete paving projects, improve existing QC programs and plans, appropriately incorporate QC requirements into specifications, and understand the elements of an agency's QA program and why contractor QC is an important part of that program. Topics include the following:

- Common agency QC requirements
- Tools, processes, and procedures to meet these requirements
- Continuous improvement activities
- Efficiency, productivity, profit, and safety benefits of good quality control

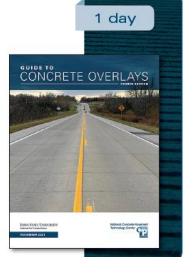


CONCRETE OVERLAYS WORKSHOP

1 day

This workshop is based on the fourth edition of the CP Tech Center's *Guide to Concrete Overlays*. The material in this workshop aims to increase the technical proficiency of experienced engineers in the use of concrete overlays on existing asphalt, composite, and concrete pavements; provide less experienced participants with the essential knowledge to address the needs of various types of concrete overlay projects; and help all participants recognize the versatility of concrete overlays. Topics include the following:

- Project evaluation and selection
- Design details and procedures
- Construction and maintenance of traffic
- Recent case studies that exemplify project selection and construction for various overlay types
- Current information on continuously reinforced concrete pavement overlays, geotextile separation layers, and fiber reinforcement

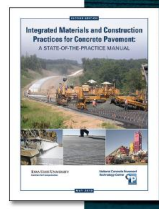


INTEGRATED MATERIALS AND CONSTRUCTION PRACTICES FOR CONCRETE PAVEMENT (IMCP) WORKSHOP

1 day

This workshop is based on the second edition of the CP Tech Center's comprehensive training tool and reference guide, *Integrated Materials and Construction Practices for Concrete Pavement: A State-of-the-Practice Manual*. The workshop highlights the key points of the manual to help engineers understand concrete pavement construction as an integrated system involving several practices that affect each other. The workshop also helps practitioners understand and implement technologies, tests, and best practices to identify materials, concrete properties, and construction practices that optimize concrete performance. Topics include the following:

- Sustainability
- Design of concrete pavements
- Materials
- Cement hydration basics
- Fresh concrete properties
- Hardened concrete properties
- Mixture design and proportioning
- Construction of concrete pavements
- Quality and testing
- Troubleshooting



RECYCLING CONCRETE PAVEMENT MATERIALS WORKSHOP

1 day

This workshop is based on the CP Tech Center's *Recycling Concrete Pavement Materials: A Practitioner's Reference Guide* and its accompanying tech brief. Both publications provide comprehensive resources that can help practitioners determine whether recycled concrete aggregate (RCA) is a good match for a project, what applications make the most sense, and how to specify and perform field inspections. Topics include the following:

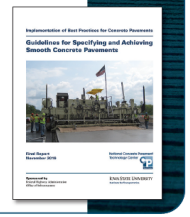
- Engineered nature of RCA
- Breadth of applications for RCA
- Usage and performance expectations of RCA
- Production of RCA
- Mixture design basics when using RCA
- Quality control when using RCA
- Potential benefits of using RCA

SPECIFYING AND ACHIEVING SMOOTH CONCRETE PAVEMENTS WORKSHOP

½ day

Agencies aim to implement reasonable specifications regarding smoothness limits and incentive/disincentive levels. Likewise, contractors attempt to account for the impacts that various construction factors, such as the concrete mixture, paving equipment, and paving crew, have on pavement smoothness. This workshop, based on the CP Tech Center's *Implementation of Best Practices for Concrete Pavements: Guidelines for Specifying and Achieving Smooth Concrete Pavements*, outlines best practices that can help agencies and contactors specify and build smooth concrete pavements. It also highlights real-time smoothness technology and showcases field trials. Topics include the following:

- Specifications and design
- Construction of smooth concrete pavements
- Measurement of smoothness



PERFORMANCE ENGINEERED MIXTURES (PEM) WORKSHOP

1 day

Recent developments in concrete testing technologies have yielded methods that are better predictors of long-term performance than traditional measurements of concrete acceptance such as strength, slump, and air content. Transportation Pooled Fund program TPF-5(368), Performance-Engineered Concrete Paving Mixtures, assists states in the adoption of test methods and technologies that will help them deliver on the promise of long-term concrete durability. This workshop details the various components of the PEM program, including the suite of tests that better predict long-term performance of concrete pavements. Topics include the following:

- PEM tests for strength, including maturity testing
- PEM tests for workability, including the VKelly and Box tests
- PEM tests for cold weather, including the super air meter (SAM) and oxychloride tests
- PEM tests for transport, including resistivity testing

For more information and dates, visit the CP Tech Center website: **cptechcenter.org**

National Concrete Pavement Technology Center | Iowa State University Institute for Transportation

Workshops

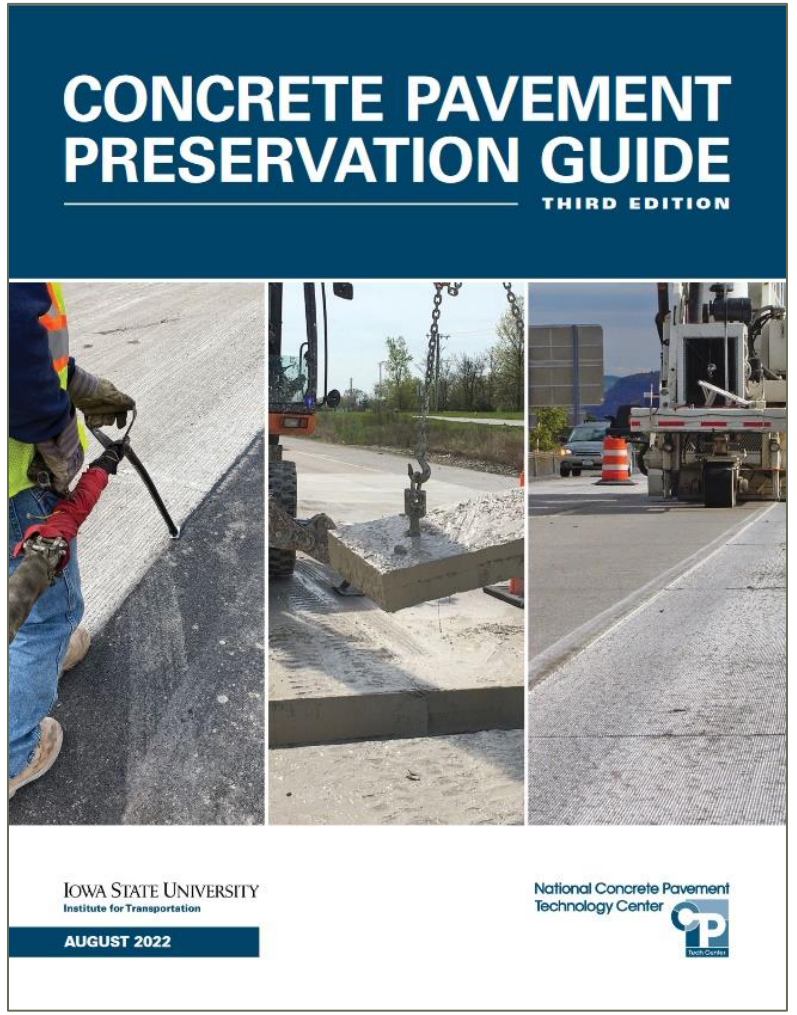
- 2023 workshops:
  - Bridge deck curing (UT)
  - Concrete pavement preservation (ID, PA)
  - Inspection (ND, SD, AL)
  - Quality control (TX, SD, PA, IL Tollway)
  - Smoothness (TX, KS)
  - Concrete recycling (CO, KS)
  - Roundabouts (MN)
  - Performance engineered mixtures (WV, AR)
  - Concrete Overlays (VA, CA)

FHWA Cooperative Agreement

- Guide to Concrete Overlays (4th Edition)
- Guide to Quality Control for Concrete Paving (new)
- **Concrete Pavement Preservation Guide (3rd Edition)**
- Upcoming:
  - Precision and bias statements for PEM tests
  - New AASHTO standard for maturity testing
  - Guidance on blended cements & SCMs
  - Sustainability resources:
    - Carbon footprint evolution
    - Reduced carbon concrete paving specification

Concrete Pavement Preservation Guide

- Third edition published in 2022
  - Last updated in 2014
- Available at https://cptechcenter.org
- Comprehensive guide to the selection, design, and construction of concrete pavement preservation treatments
- Useful information for designers, pavement management engineers, inspectors, and contractors

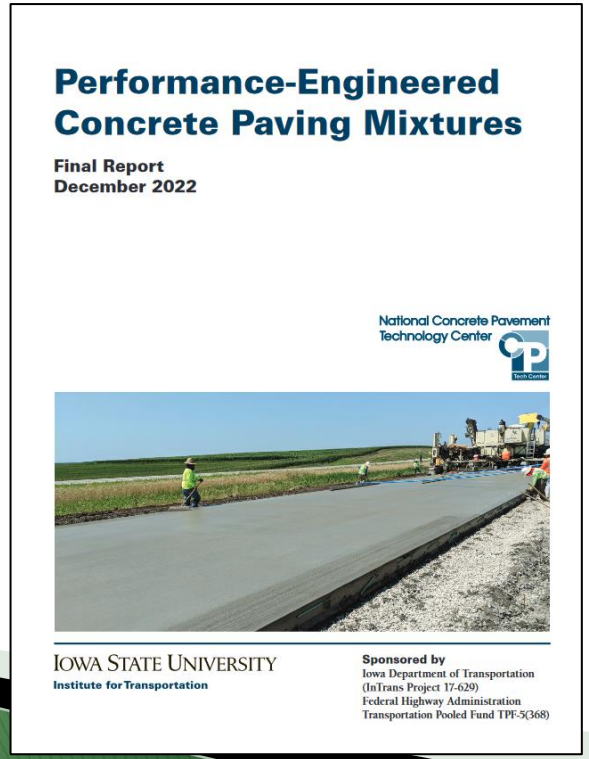


FAA Cooperative Agreement

- Priority research topics:
  - ASR testing and mitigation
  - Mixture proportioning
  - Rapid repairs
  - Quality control
  - Rubber removal
  - Diamond grinding
  - Panel size and thickness
  - Concrete pavement resilience
- Technology transfer

Transportation Pooled Fund Projects

- Performance Engineered Mixtures (PEM)
  - Developing a better specification for concrete paving mixtures
  - Subject of tomorrow's presentation
  - Final report published earlier this year



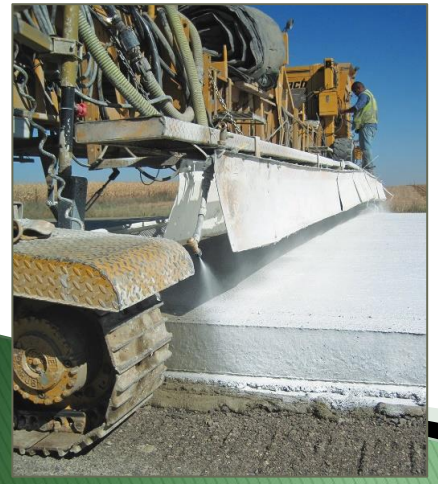
Transportation Pooled Fund Projects

- Performance Centered Concrete Construction (P3C)
  - Moving beyond PEM, the construction process is just as crucial to long-lasting concrete pavements as mixture design and proportioning

Image: ACPA

Transportation Pooled Fund Projects

- P3C project goals:
  - Provide additional tools to monitor the mixture through the batching and paving process to ensure delivery of quality concrete
  - Investigate feedback loop approaches to adjusting the mixture based on what's happening at the grade
  - Continue to assist agencies on specification improvements



Thank You!

- Check out the CP Tech Center's concrete pavement preservation resources page: