TTCC TPF-5(437)
NC² Overview

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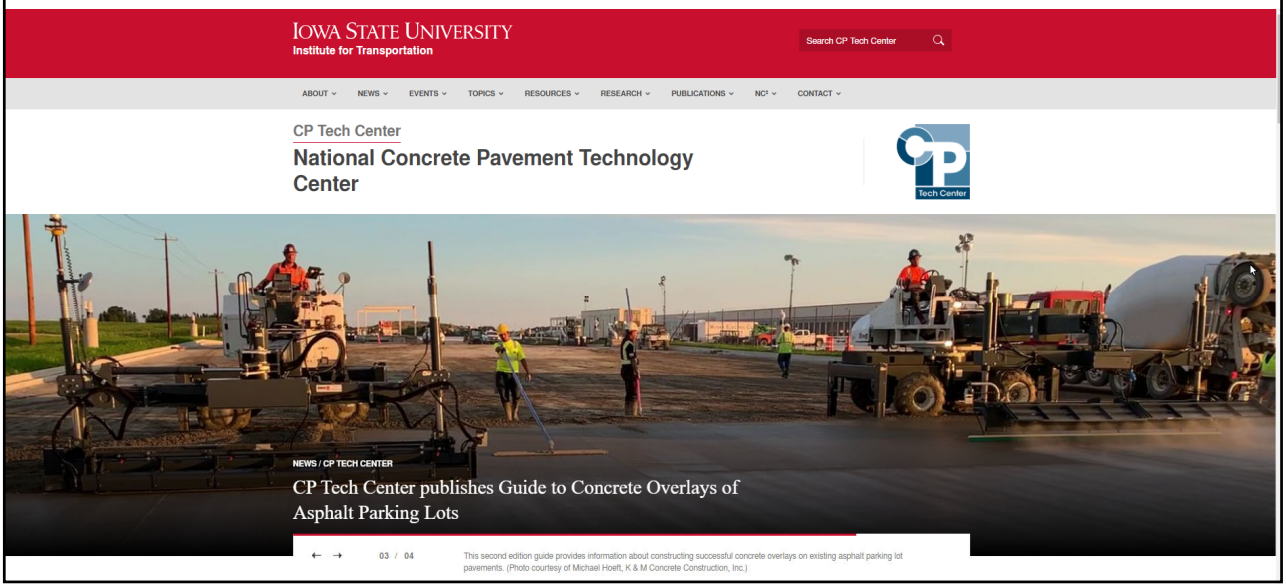
IOWA STATE UNIVERSITY
Institute for Transportation

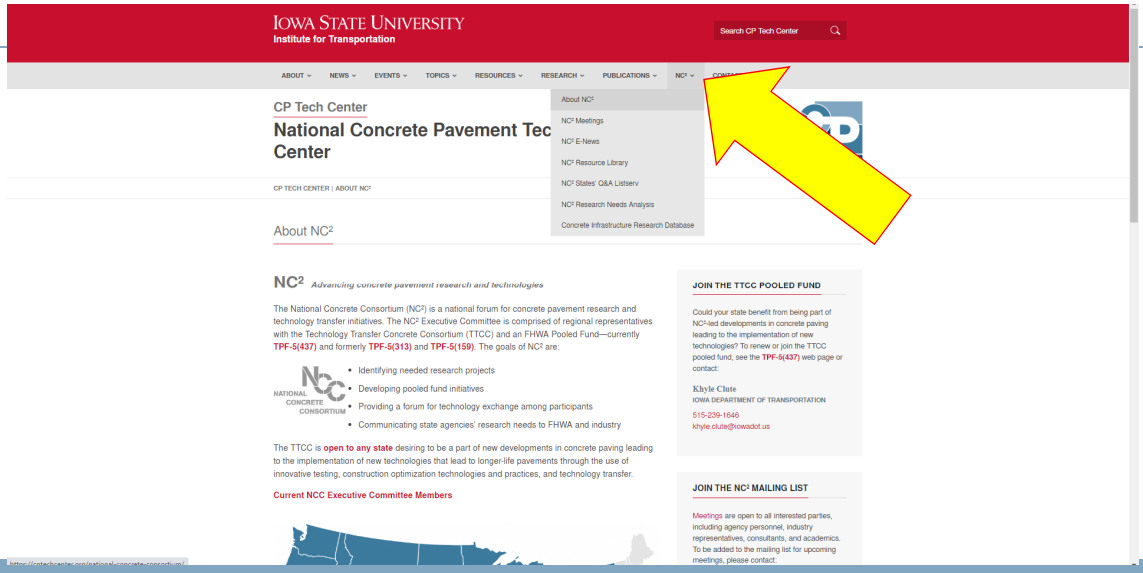
National Concrete Pavement Technology Center

www.cptechcenter.org

CP Tech Center Website
cptechcenter.org



NC² Website
cptechcenter.org/national-concrete-consortium/



About NC²

NATIONAL CONCRETE CONSORTIUM

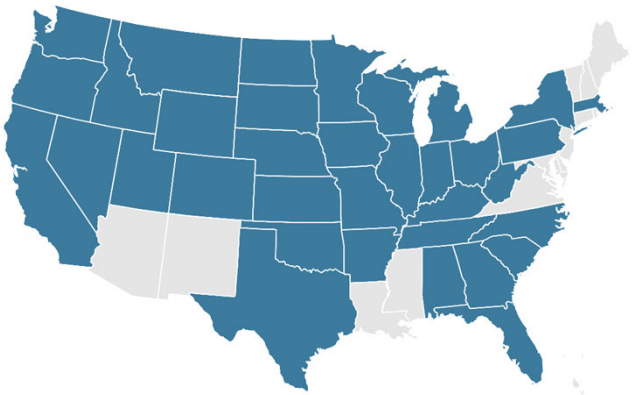
TTCC Objectives:

- Providing a forum for technology exchange among participants
- Identify research priorities by region
- Develop and fund technology transfer materials
- Communicating state agencies' research needs to FHWA and industry

John Adam is your contact:
jfadam@iastate.edu
515-294-7323

About NC²

- TPF-5(437) Commitments
  - 35 states + IL Tollway
- Other information available:
  - Quarterly reports
  - Sign up links



NC² Meetings

- Current & upcoming NC² meetings
  - Sept 12-14, 2023 Portland, Oregon
  - Spring 2024 TBD
  - Aug 25-29, 2024 Minneapolis, MN (ISCP)
- Past NC² Surveys (since 2015)
- Index of NC² Presentations

Where is that one presentation that Tyler did in Nashville?

NC² E-News

- News from the Road

https://mailchi.mp/336c2c2d8b1e/winter-2023-nc2-news?e=1a41ef7ef8

NC² E-News

News from the Road COMING SOON:

- Florida's Test Road
- Fiber Reinforced Concrete for Bridge Deck Overlays
- Fresh Properties of Fiber Reinforced Concrete for PEM
- Evaluation of Current Wisconsin Mixes Using PEM Testing Protocols

US Highway 301, Clay County, Florida

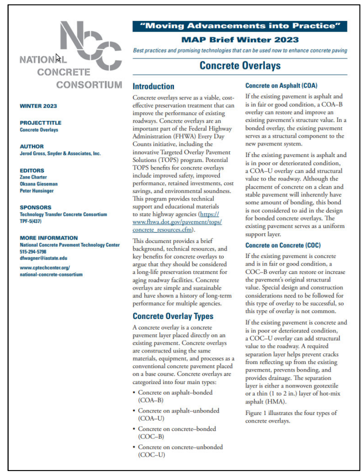
NC² E-News

MAP Briefs

Concrete Overlays (Winter 2022)

- Simplicity
- Sustainable
- Accelerated Construction
- Opening to Traffic
- Performance

https://intrans.iastate.edu/app/uploads/2023/01/concrete_overlays_winter_2023_MB.pdf



NATIONAL CONCRETE CONSORTIUM

"Moving Advancements into Practice"

MAP Brief Winter 2023

Best practices and promising technologies that can be used now to enhance concrete paving

Concrete Overlays

WINTER 2023

PROJECT TITLE
Concrete Overlays

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TPF-5(437)

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Introduction

Concrete overlays serve as a viable, cost-effective preservation treatment that can improve the performance of existing roadways. Concrete overlays are an important part of the Federal Highway Administration (FHWA) Every Day Counts initiative, including the innovative Targeted Overlay Pavement Solutions (TOPS) program. Potential TOPS benefits for concrete overlays include improved safety, improved performance, retained investments, cost savings, and environmental soundness. This program provides technical support and educational materials to state highway agencies (https://www.fhwa.dot.gov/pavement/tops/concrete_resources.cfm).

This document provides a brief background, technical resources, and key benefits for concrete overlays to argue that they should be considered a long-life preservation treatment for aging roadway facilities. Concrete overlays are simple and sustainable and have shown a history of long-term performance for multiple agencies.

Concrete Overlay Types

A concrete overlay is a concrete pavement layer placed directly on an existing pavement. Concrete overlays are constructed using the same materials, equipment, and processes as a conventional concrete pavement placed on a base course. Concrete overlays are categorized into four main types:

- Concrete on asphalt–bonded (COA–B)
- Concrete on asphalt–unbonded (COA–U)
- Concrete on concrete–bonded (COC–B)
- Concrete on concrete–unbonded (COC–U)

Concrete on Asphalt (COA)

If the existing pavement is asphalt and is in fair or good condition, a COA–B overlay can restore and improve an existing pavement's structure value. In a bonded overlay, the existing pavement serves as a structural component to the new pavement system.

If the existing pavement is asphalt and is in poor or deteriorated condition, a COA–U overlay can add structural value to the roadway. Although the placement of concrete on a clean and stable pavement will inherently have some amount of bonding, this bond is not considered to aid in the design for bonded concrete overlays. The existing pavement serves as a uniform support layer.

Concrete on Concrete (COC)

If the existing pavement is concrete and is in fair or good condition, a COC–B overlay can restore or increase the pavement's original structural value. Special design and construction considerations need to be followed for this type of overlay to be successful, so this type of overlay is not common.

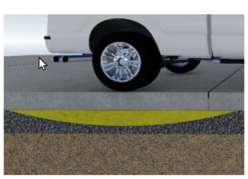
If the existing pavement is concrete and is in poor or deteriorated condition, a COC–U overlay can add structural value to the roadway. A required separation layer helps prevent cracks from reflecting up from the existing pavement, prevents bonding, and provides drainage. The separation layer is either a nonwoven geotextile or a thin (1 to 2 in.) layer of hot-mix asphalt (HMA).

Figure 1 illustrates the four types of concrete overlays.

NC² E-News

SPRING MAP BRIEF COMING SOON:

- Climate Change, Resilience, and Concrete Pavements



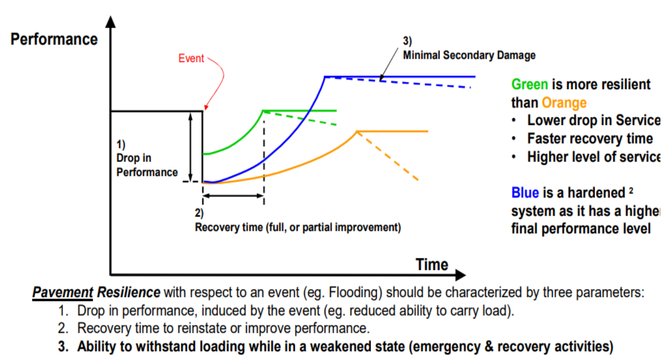
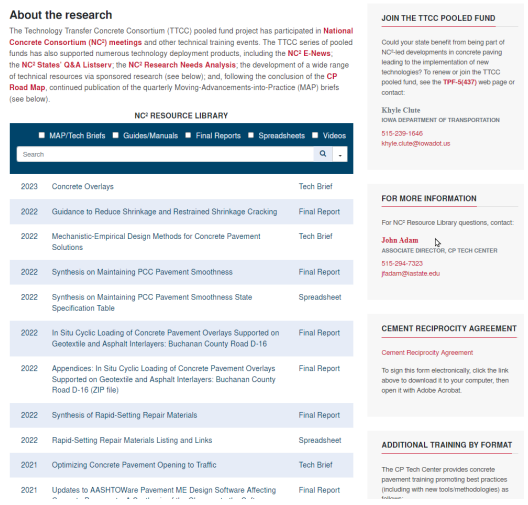


Figure 4: Resilience Framework for Pavements (Mack et al. 2022)

NC² Resource Library

- Search window (back to 2019)
- Webinars

https://cptechcenter.org/research/in-progress/technology-transfer-concrete-consortium-tpf-5313/



About the research

The Technology Transfer Concrete Consortium (TTCC) pooled fund project has participated in National Concrete Consortium (NC²) meetings and other technical training events. The TTCC series of pooled funds has also supported numerous technology deployment products, including the NC² E-News; the NC² States' Q&A Listserv; the NC² Research Needs Analysis; the development of a wide range of technical resources via sponsored research (see below); and, following the conclusion of the CP Road Map, continued publication of the quarterly Moving-Advancements-into-Practice (MAP) briefs (see below).

NC² RESOURCE LIBRARY

MAP/Tech Briefs ■ Guides/Manuals ■ Final Reports ■ Spreadsheets ■ Videos

Search

2023	Concrete Overlays	Tech Brief
2022	Guidance to Reduce Shrinkage and Restrained Shrinkage Cracking	Final Report
2022	Mechanistic-Empirical Design Methods for Concrete Pavement Solutions	Tech Brief
2022	Synthesis on Maintaining PCC Pavement Smoothness	Final Report
2022	Synthesis on Maintaining PCC Pavement Smoothness State Specification Table	Spreadsheet
2022	In Situ Cyclic Loading of Concrete Pavement Overlays Supported on Geotextile and Asphalt Interlayers: Buchanan County Road D-16	Final Report
2022	Appendices: In Situ Cyclic Loading of Concrete Pavement Overlays Supported on Geotextile and Asphalt Interlayers: Buchanan County Road D-16 (ZIP file)	Final Report
2022	Synthesis of Rapid-Setting Repair Materials	Final Report
2022	Rapid-Setting Repair Materials Listing and Links	Spreadsheet
2021	Optimizing Concrete Pavement Opening to Traffic	Tech Brief
2021	Updates to AASHTOWare Pavement ME Design Software Affecting	Final Report

JOIN THE TTCC POOLED FUND

Could your state benefit from being part of NC²-led developments in concrete paving leading to the implementation of new technologies? To renew or join the TTCC pooled fund, see the TPF-5(437) web page or contact:

Khyle Clute
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khyle.clute@iowadot.us

FOR MORE INFORMATION

For NC² Resource Library questions, contact:

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CEMENT RECIPROCITY AGREEMENT

Cement Reciprocity Agreement

To sign this form electronically, click the link above to download it to your computer, then open it with Adobe Acrobat.

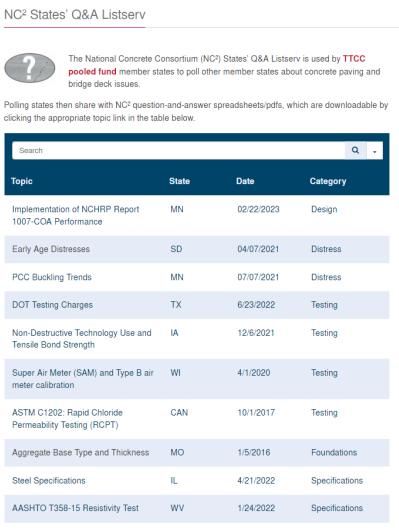
ADDITIONAL TRAINING BY FORMAT

The CP Tech Center provides concrete pavement training promoting best practices (including with new tools/methodologies) as

NC² States' Q & A Listserv

- 2014 to current
- Search types

https://cptechcenter.org/nc2-states-listserv-questions/



NC² States' Q&A Listserv

The National Concrete Consortium (NC²) States' Q&A Listserv is used by TTCC pooled fund member states to poll other member states about concrete paving and bridge deck issues.

Polling states then share with NC² question-and-answer spreadsheets/pdfs, which are downloadable by clicking the appropriate topic link in the table below.

Search

Topic	State	Date	Category
Implementation of NCHRP Report 1007-COA Performance	MN	02/22/2023	Design
Early Age Distresses	SD	04/07/2021	Distress
PCC Buckling Trends	MN	07/07/2021	Distress
DOT Testing Charges	TX	6/23/2022	Testing
Non-Destructive Technology Use and Tensile Bond Strength	IA	12/6/2021	Testing
Super Air Meter (SAM) and Type B air meter calibration	WI	4/1/2020	Testing
ASTM C1202: Rapid Chloride Permeability Testing (RCPT)	CAN	10/1/2017	Testing
Aggregate Base Type and Thickness	MO	1/5/2016	Foundations
Steel Specifications	IL	4/21/2022	Specifications
AASHTO T358-15 Resistivity Test	WV	1/24/2022	Specifications

NC² Research Needs Analysis

- PCC pavement & bridge decks
- What are the hot topics?
- List active research, previously discussed items, and request research needs

Summary of Fall 2022 Discussions

# of States	Topic
13	Fly Ash Alternatives
9	Type IL Performance
6	Bridge Deck Performance / Bridge Deck Overlays
4	Early Opening
4	Sustainability / EPDs
3	Optimized Gradation
3	Transport / Resistivity
3	Maintenance / Repair
Write ins:	Performance of Cementitious Repair Products
	Air Content and Pumping
	PEM for Structures

Concrete Infrastructure Research Database

- Active or Recently Completed Research
- TRB RiP & TRID
- Updated biannually
- 766 projects (147 added in Feb 22')

https://cptechcenter.org/concrete-infrastructure-research-database/

Concrete Infrastructure Research Database

This database of in-progress and recently completed research related to concrete pavements and bridge decks across the US is partially a product of the former **CP Road Map (or Long-Term Plan for Concrete Pavement Research and Technology)**. It is updated twice a year.

Research included is identified via the **Transportation Research Board (TRB) list of Research in Progress (RiP)**, newsletters from across the concrete industry, and agency websites.

Find relevant projects using the search box below. Keywords and researchers are not shown in the table but are included in searches. (You can customize your search by clicking the down arrow to the right of the search box and/or click the "Date" header to sort results by date.)

Search by keyword, researcher name, and/or date

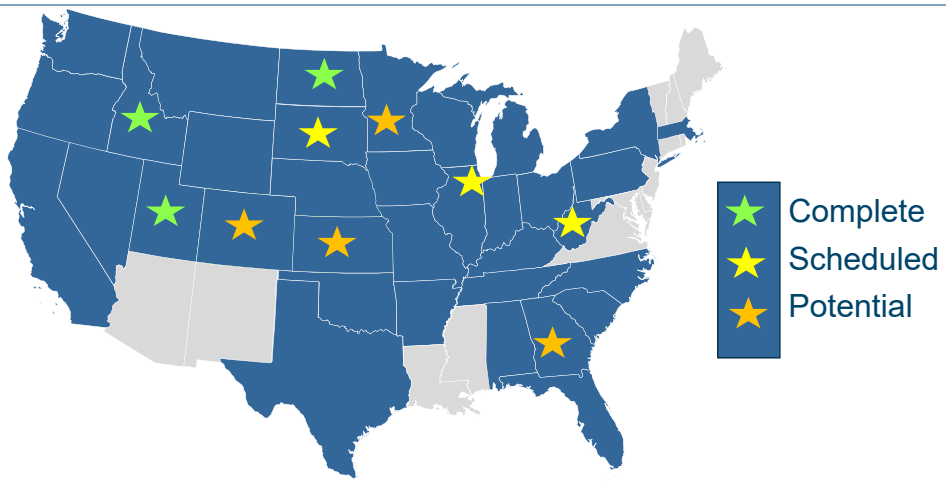
End Date	Title
May 2026	Evaluation of Nano-Materials in Concrete for Improved Durability
March 2026	Use of Fiber-Reinforced Polymer Composites for Bridge Repairs in Montana
October 2025	Design Resilient Modulus for Coarse-Grained Subgrade Soils
October 2025	Alkali-Silica Reaction (ASR) Mitigation in High Alkali Content Cements
October 2025	Mobile Concrete Testing Trailer to Deploy Performance Engineered Mix Design for Concrete, Deploy New Test and Technologies, and Provide National Leadership for Concrete Pavements
September 2025	2317 Effectiveness of Magnesuim-Alumino-Liquid-Phosphate-Based concrete as a Repair Material (MALP)
August 2025	Artificial Intelligence for Pavement Condition Assessment from 2D/3D Surface Images
August 2025	Develop Design Details for CRCP Whitetopping at Intersections
August 2025	Project Level Performance Database for Rigid Pavements in Texas, Phase III
July 2025	Performance Evaluation of Polyester Polymer Concrete Overlays Continuation Proposal—Phase II (TR-772)
July 2025	RES2023-11: The Effect of Extreme Climate Shifts to Pavement Infrastructure in Tennessee

TTCC Training Opportunities

- Inspector's Workshop
- Sustainable Concrete Pavements
- Concrete Pavement Preservation
- Quality Control
- Integrated Materials and Construction Practices (IMCP)
- Recycling Concrete Pavement Materials
- Specifying and Achieving Smooth Concrete Pavements
- Performance Engineered Mixtures (PEM)

CONTACT US!

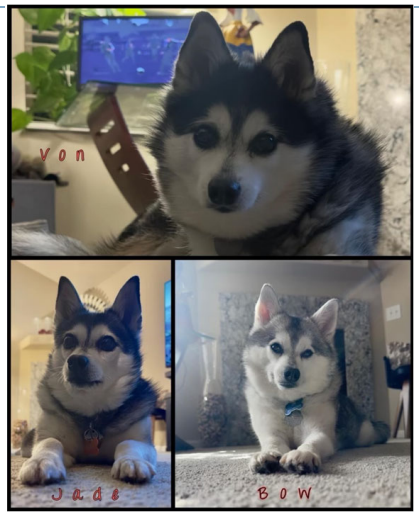
2023 TTCC Training Workshops



17

More Pet Pictures

- From Nebraska



18

More Pet Pictures

- From Anonymous

Thank You

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Duke & Lucy