

TTCC TPF-5(437) NC² Overview

Jerod Gross, PE, LEED AP
jgross@snyder-associates.com

IOWA STATE UNIVERSITY
Institute for Transportation

National Concrete Pavement
Technology Center



www.cptechcenter.org

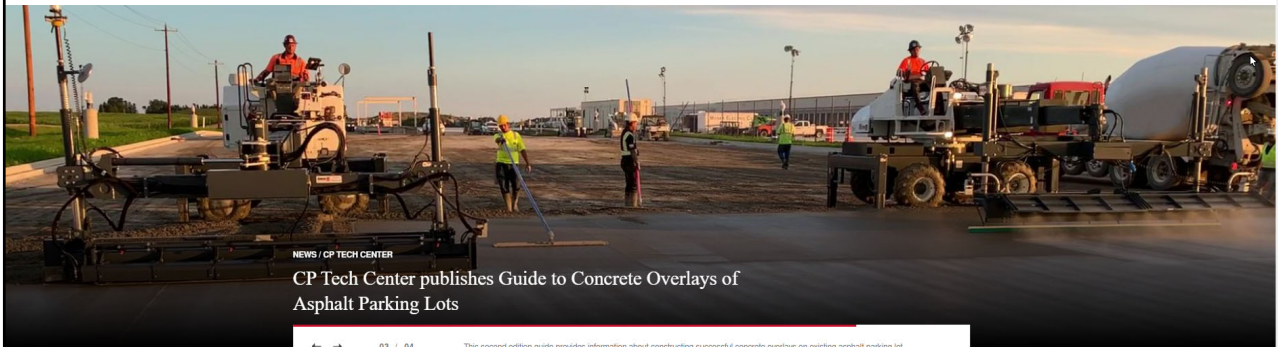
CP Tech Center Website cptechcenter.org

IOWA STATE UNIVERSITY
Institute for Transportation

Search CP Tech Center

ABOUT ▾ NEWS ▾ EVENTS ▾ TOPICS ▾ RESOURCES ▾ RESEARCH ▾ PUBLICATIONS ▾ NC² ▾ CONTACT ▾

CP Tech Center
National Concrete Pavement Technology
Center



NEWS / CP TECH CENTER

CP Tech Center publishes Guide to Concrete Overlays of
Asphalt Parking Lots

← → 03 / 04

This second edition guide provides information about constructing successful concrete overlays on existing asphalt parking lot pavements. (Photo courtesy of Michael Hoelt, K & M Concrete Construction, Inc.)

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

IOWA STATE UNIVERSITY
Institute for Transportation

Search CP Tech Center

ABOUT ▾ NEWS ▾ EVENTS ▾ TOPICS ▾ RESOURCES ▾ RESEARCH ▾ PUBLICATIONS ▾ NC² ▾ CONTACT ▾

CP Tech Center
National Concrete Pavement Tech Center

CP TECH CENTER | ABOUT NC²

About NC²

NC² *Advancing concrete pavement research and technologies*

The National Concrete Consortium (NC²) is a national forum for concrete pavement research and technology transfer initiatives. The NC² Executive Committee is comprised of regional representatives with the Technology Transfer Concrete Consortium (TTCC) and an FHWA Pooled Fund—currently **TPF-5(437)** and formerly **TPF-5(313)** and **TPF-5(159)**. The goals of NC² are:

- Identifying needed research projects
- Developing pooled fund initiatives
- Providing a forum for technology exchange among participants
- Communicating state agencies' research needs to FHWA and industry

The TTCC is **open to any state** desiring to be a part of new developments in concrete paving leading to the implementation of new technologies that lead to longer-life pavements through the use of innovative testing, construction optimization technologies and practices, and technology transfer.

Current NCC Executive Committee Members

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:

Kylie Clute
IOWA DEPARTMENT OF TRANSPORTATION
515-239-1646
kylie.clute@iowadot.us

JOIN THE NC² MAILING LIST

Meetings are open to all interested parties, including agency personnel, industry representatives, consultants, and academics. To be added to the mailing list for upcoming meetings, please contact.

About NC²



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

NC² E-News

• News from the Road

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

News from the Road

"News from the Road" highlights recent news articles and completed projects that helps the concrete pavement community meet the research program goals in member states.



Evaluation of Concrete Pavement in Wisconsin

The goal of this research evaluation from Wisconsin was to investigate buckling of concrete pavement that impact buckling, and identify methods to reduce buckling.

[Read this report here](https://wisconsin.dot.gov/documents/2/research-reports) or copy and paste its URL into your browser: <https://wisconsin.dot.gov/documents/2/research-reports>



Use of Recycled Concrete Aggregate in Pavement Mixes

The main tasks of this research report from Tennessee were to evaluate recycled concrete aggregate from various sources in Tennessee and influence the performance of Tennessee concrete pavement.

[Read this report here](https://www.tn.gov/content/dam/tn/dot/planning/research/final-reports/res202006_Final_Report_Approved.pdf) or copy and paste its URL into your browser: https://www.tn.gov/content/dam/tn/dot/planning/research/final-reports/res202006_Final_Report_Approved.pdf



Evaluation of Sustainable and Eco-Friendly Stabilization of Cohesive Soils for Transportation Infrastructure

This research from Texas A&M University studied the use of a geopolymer as a green alternate replacement for portland cement to stabilize cohesionless sandy soils in coastal areas.

[Read this report here](https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1113&context=transep_pubs) or copy and paste its URL into your browser: https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=1113&context=transep_pubs



Optimal Approach for Addressing Reinforcement Corrosion for Concrete Bridge Decks in Illinois

This report from the Illinois Center for Transportation at University of Illinois presents the results of a comprehensive literature review focusing on corrosion performance of reinforced concrete bridge decks, with a particular emphasis on the relative performance of alternative corrosion-resistant reinforcement types.

[Read this report here](https://apps.ict.illinois.edu/projects/getfile.asp?id=10126) or copy and paste its URL into your browser: <https://apps.ict.illinois.edu/projects/getfile.asp?id=10126>



Plant Bowen Will Showcase Largest Coal Ash Beneficial Use Project in the US

This article from Power Magazine describes a plan by Georgia Power to start harvesting previously landfilled fly ash from its 3.4-GW Plant Bowen station in Bartow County, Georgia, for use in concrete mixes and construction projects.

[Read this article here](https://www.powermag.com/plant-bowen-will-showcase-largest-coal-ash-beneficial-use-project-in-the-u-s/) or copy and paste its URL into your browser: <https://www.powermag.com/plant-bowen-will-showcase-largest-coal-ash-beneficial-use-project-in-the-u-s/>



Evaluation of Penetrating Sealers for Concrete

This report from the CP Tech Center at Iowa State University analyzed three different water penetrating sealers for their ability to increase concrete pavement durability by reducing moisture and chloride ion penetration. [Read this report here](#)

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_overlay_s_winter_2023_MB.pdf

"Moving Advancements into Practice"
MAP Brief Winter 2023
Best practices and promising technologies that can be used for concrete concrete paving

Concrete Overlays

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 Placement Solution (TOPS) program. Potential TOPS benefits for concrete overlays include: improved safety, improved performance, related investments, cost savings, and environmental benefits. This program provides technical support and educational materials to state highway agencies (SHAs), <https://roads.fhwa.dhs.gov/transportation-act/actives-initiatives/>.

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-bound (COA-B)
- Concrete on asphalt-bound (COA-U)
- Concrete on concrete-bound (COC-B)
- Concrete on concrete-bound (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 structural 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 distressed 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 as well as the design for bonded concrete overlays. The existing pavement serves as a uniform support layer.

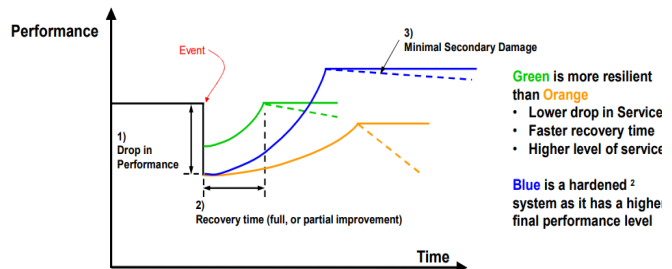
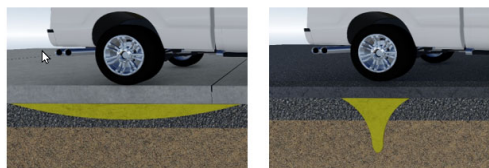
Concrete on Concrete (COC)
If the existing pavement is concrete and is in fair or good condition, a COC-B overlay can restore or increase the pavement's original structural value. Special design and construction considerations need to be followed for this type of overlay to be successful in this type of overlay is not common. If the existing pavement is concrete and is in poor or distressed 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 membrane granular or a thin (1 to 2 in.) layer of hot-cast 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



Pavement Resilience with respect to an event (eg. Flooding) should be characterized by three parameters:

1. Drop in performance, induced by the event (eg. reduced ability to carry load).
2. Recovery time to reinstate or improve performance.
3. Ability to withstand loading while in a weakened state (emergency & recovery activities)

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 (NCC) 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 Restraint 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
 Credit your state benefit from being part of NC²-led developments in concrete paving leading to the implementation of new technology! To view or join the TTCC pooled fund, see the TPF-5437 web page or contact:
 Kathy Clute
 POOL ESTABLISHMENT OF TRANSPORTATION
 515-239-1646
 khyte.clute@ncwadot.us

FOR MORE INFORMATION
 For NC² Resource Library questions, contact:
 Jale Adams
 ASSOCIATE DIRECTOR, CP TECH CENTER
 515-294-7323
 jadam@cpatc.edu

CEMENT RECIPROCALITY 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 (NCC) 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 NCC 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-CCA 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 II 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.)

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 Magnesium-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!

More Pet Pictures

- From Anonymous



19

Thank You

Jerod Gross, PE, LEED AP
jgross@snyder-associates.com
515-669-7644

John Adam, PE
jfadam@iastate.edu
515-294-7323



Duke & Lucy