

# ETF Research Update

May 2024

# NCHRP 9-62 Rapid Tests and Specifications for Construction of Asphalt-Treated Cold Recycled Pavements

<b>Funds:</b>	\$999,737
<b>Research Agency:</b>	Virginia Transportation Research Council
<b>Principal Investigator:</b>	Brian Diefenderfer
<b>Effective Date:</b>	6/1/2017
<b>Completion Date:</b>	8/31/2022
<b>Comments:</b>	Available as WOD 376

**OBJECTIVE** Develop:

- (1) time-critical tests for asphalt-treated CIR, FDR, and CCPR materials and
- (2) a guide specification using these tests for process control and product acceptance that provides the agency with a basis for determining when the pavement can be opened to traffic and surfaced.

**STATUS:** The final report for Phases I-III of the project is available as [\*NCHRP Research Report 960, Proposed AASHTO Practice and Tests for Process Control and Product Acceptance of Asphalt-Treated Cold Recycled Pavements\*](#). The final report for Phase IV is available as Web-Only Document 376 (Rapid Tests and Specification Language for Construction of Asphalt-Treated Cold Recycled Pavements) here: <https://nap.nationalacademies.org/catalog/27289/rapid-tests-and-specification-language-for-construction-of-asphalt-treated-cold-recycled-pavements>

# NCHRP 14-43 Construction Guide Specifications for Cold Central Plant Recycling and Cold In-Place Recycling

<b>Funds:</b>	\$250,000
<b>Research Agency:</b>	National Center for Asphalt Technology
<b>Principal Investigator:</b>	Benjamin Bowers
<b>Effective Date:</b>	5/26/2020
<b>Completion Date:</b>	8/31/2022
<b>Comments:</b>	Report Published as NCHRP Web-Only-Document 363

## OBJECTIVE

Produce proposed AASHTO Construction Guide Specifications for the application of CCPR and CIR in the standard five-part AASHTO format with supporting commentary. The specifications shall include plans for quality assurance and agree with current provisional material specifications and mix design practices for these treatments. The specifications shall enable specifying agencies to tailor their own specifications to the local conditions and environments.

**STATUS:** Project's Report Published as NCHRP Web-Only-Document 363 (<https://www.trb.org/Publications/Blurbs/182965.aspx>).

# NCHRP 14-44 Construction Guide Specifications for Slurry Seals, Scrub Seals, and Tack Coats

<b>Funds:</b>	\$175,000
<b>Research Agency:</b>	University of Arkansas
<b>Principal Investigator:</b>	Andrew Braham
<b>Effective Date:</b>	9/2/2020
<b>Completion Date:</b>	3/1/2022

**OBJECTIVE:** The objective of this research was to develop recommended guide specifications for the construction of slurry seals, scrub seals, and tack coats as used in preservation treatments.

**STATUS :** Research is complete. The research reviewed and evaluated the current practices for the construction of slurry seals, scrub seals, and tack coats and proposed (1) a set of proposed guide specifications for their construction and (2) a set of practices for quality assurance of their construction. The final deliverable includes 3 parts: Part I: Final Report, Part II: Proposed Guide Specifications for Construction of Slurry Seals, Scrub Seals, and Tack Coats, and Part III: Proposed Quality Assurance Guide. Parts II and III have been provided the AASHTO Committee on Materials and Pavements for consideration and possible incorporation into the AASHTO Guide Specifications for Highway Construction; they are not available. Part I is available at [https://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP14-44\\_Part-I\\_FinalReport.pdf](https://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP14-44_Part-I_FinalReport.pdf)

# NCHRP 14-48 Construction Guide Specifications for Pavement Treatments - Sand Seals and Ultra-thin Bonded Surface Treatments

<b>Funds:</b>	\$175,000
<b>Staff Responsibility:</b>	Dr. Amir Hanna
<b>Research Agency:</b>	University of Arkansas
<b>Principal Investigator:</b>	Andrew F. Braham
<b>Effective Date:</b>	10/10/2022
<b>Completion Date:</b>	4/9/2024

**OBJECTIVE:** The objective of this research is to develop recommended guidance for the construction of sand seals and UTBWCs as used in preservation treatments.

**STATUS:** Research in progress.

# NCHRP 10-114 Developing Performance and Safety Specifications for Rejuvenating Seals

<b>Funds:</b>	<b>\$300,000</b>
<b>Staff Responsibility:</b>	Camille Crichton-Sumners
<b>Research Agency:</b>	Auburn University
<b>Principal Investigator:</b>	Dr. Raquel Moraes
<b>Effective Date:</b>	8/4/2022
<b>Completion Date:</b>	8/4/2025
<b>Comments:</b>	Research in progress.

## OBJECTIVES

The objectives of this project are to (1) provide the characteristics of the rejuvenator based on chemistry and rheology; (2) determine how different rejuvenating compounds are penetrating and rejuvenating the underlying pavement; (3) determine how the desired performance for a rejuvenating seal is measured and quantified in the laboratory and field; (4) determine the life extending benefit and impact on friction properties of a rejuvenating seal measured and quantified in the laboratory and field; (5) determine how practitioners may design an optimum dose and/or application rate for a rejuvenator required to provide the desired performance and friction properties; and (6) document suggested practice prepared in conformance with AASHTO standard format.

**STATUS:** Research in progress.

# NCHRP 10-124 Development of Field Test to Determine Actual Percent Embedment of Chip Seal Aggregate

<b>Funds:</b>	\$400,000
<b>Staff Responsibility:</b>	Roberto Barcena
<b>Research Agency:</b>	Auburn University, NCAT
<b>Principal Investigator:</b>	Dr. Adriana Vargas-Nordcbeck
<b>Effective Date:</b>	3/22/2024
<b>Completion Date:</b>	3/21/2027
<b>Comments:</b>	Research in progress.

## OBJECTIVE

The objective of this research is to identify, adapt, or develop a rapid field test method(s) to determine the percentage embedment depth of a uniformly placed chip seal of known aggregate gradation.

The term “rapid” for this project refers to a test method(s) that can be used as part of the quality control (QC) process, and can provide its results after the initial chip seal sweeping, allowing for real-time adjustments during the construction process.

**STATUS:** Research in progress starting March 22, 2024.

# NCHRP Project 20-05, Synthesis Topic 55-04

## Current Practices and Guidelines for Full Depth Reclamation (FDR)

<b>Funds:</b>	\$55,000
<b>Staff Responsibility:</b>	Edward Harrigan
<b>Research Agency:</b>	Auburn University, NCAT
<b>Principal Investigator:</b>	Dr. Jo E. Sias
<b>Effective Date:</b>	10/15/2023
<b>Completion Date:</b>	3/25/2024

**OBJECTIVE:** Document current state DOT practices and guidelines for the use of FDR.

**STATUS:** Work on this synthesis was transferred to 20-05/Topic 55-04A, due to a change in contract type. The work plan and schedule are unchanged.



# NCHRP 10-134 Guidelines for the Selection of Performance-Related Tests for the Acceptance of Preservation Treatments

<b>Funds:</b>	\$400,000
<b>Staff Responsibility:</b>	Amir N. Hanna
<b>Effective Date:</b>	11/1/2024 - estimated
<b>Contract Time:</b>	36 months
<b>Comments:</b>	Proposals Accepted until 5/14/2024.

## **OBJECTIVE**

The objective of this research is to develop guidelines for the selection of performance-related tests for the acceptance of preservation treatments. The research shall focus on chip seals and microsurfacing. For the purpose of this research, acceptance tests include those required for design, production, and placement of the treatment.

# NCHRP 20-44(26) Implementing Guide Specifications for the Construction of Chip Seals and Micro Surfacing.

<b>Funds:</b>	\$200,000
<b>Research Agency:</b>	National Center for Pavement Preservation
<b>Principal Investigator:</b>	Bouzid Choubane
<b>Effective Date:</b>	9/24/2020
<b>Completion Date:</b>	9/25/2023
<b>Comments:</b>	Publication decision pending

## **OBJECTIVE**

The primary objective of this undertaking is to bring awareness and facilitate a wider acceptance and use of these specifications by transportation agencies, both at the state and local levels. The related effort consisted of a series phased activities that included, outreach, in-person and web-based dissemination of information and training, as well as several in-service demonstration projects utilizing these newly adopted AASHTO Guide Specifications.

**STATUS** : Project complete

# NCHRP 9-63 A Calibrated and Validated National Performance-Related Specification for Emulsified Asphalt Binder

<b>Funds:</b>	\$1,000,000
<b>Staff Responsibility:</b>	Roberto Barcena
<b>Research Agency:</b>	The Asphalt Institute
<b>Principal Investigator:</b>	R. Michael Anderson
<b>Effective Date:</b>	5/1/2019
<b>Completion Date:</b>	3/20/2027
<b>Comments:</b>	Research in progress

## OBJECTIVE

The objective of this research is to develop a national performance-related material specification for emulsified asphalt binder for use with chip seals and microsurfacing/slurry seals that (a) is similar in concept and format to AASHTO Standard Specifications M 320, Performance-Graded Asphalt Binder, and M 332, Performance-Graded Asphalt Binder Using Multiple Stress Creep Recovery (MSCR) Test; (b) is calibrated and validated with performance data from field test sections; (c) uses readily available testing equipment (i.e., Superpave test equipment); and (d) reflects varying climatic and traffic conditions.

**STATUS: PHASE 1 Complete ; PHASE 2 Ongoing**

## Submitted for FY25

# Pavement Marking Selection for Bridge and Pavement Preservation Treatments

<b>Funds:</b>	\$400,000
<b>Staff Responsibility:</b>	Unknown
<b>Comments:</b>	In development
<b>Fiscal Year:</b>	3 years proposed

### **OBJECTIVE**

The objective of this research is to determine the optimal pavement marking type for each bridge and pavement preservation treatment type, traffic volume, and if applicable anti-icing and deicing strategies. Identify the compatibility of the markings and treatment types, the needed film thickness of marking, the optimal retroreflective media, and the expected durability of the marking selected.

## Submitted for FY25

# Sampling from Micro Surfacing and Slurry Seal Pavers for Quality Assurance Testing

<b>Funds:</b>	<b>\$300,000</b>
<b>Staff Responsibility:</b>	Unknown
<b>Comments:</b>	In development
<b>Fiscal Year:</b>	30 months proposed

### **OBJECTIVE**

This proposed research seeks to develop a strong sampling method or technique(s) to safely obtain a completed mixture micro surfacing and slurry seal (slurry surfacing) that is representative of the mixture behind the spreader box that is repeatable, reproducible, and captures enough material to conduct testing on the asphalt binder content and gradation of the aggregate. Furthermore, the method(s) developed should include suggested sampling vessels that do not retain excess material that may confound the testing and provide a stable means of transporting the sample to a laboratory for quality assurance testing.

## Submitted for FY25

# Developing Asphalt Emulsion Based High Friction Surface Treatments (HFST)

<b>Funds:</b>	\$450,000
<b>Staff Responsibility:</b>	Unknown
<b>Comments:</b>	In development
<b>Fiscal Year:</b>	3 years proposed

### **OBJECTIVE**

Evaluate the feasibility of asphalt emulsion-based HFST. Key questions to answer are:

- Does asphalt emulsion have equal or better aggregate retention versus polymer binder?
- Does asphalt emulsion-based HFST have equal or better skid resistance in the lab versus polymer binder?
- Does asphalt emulsion-based HFST have equal or better performance in the field?
- Does asphalt emulsion-based HFST have equal or lower life-cycle cost versus polymer binder?

If research supports:

- Develop asphalt emulsion-based HSFT guidance, based on polymer binder HSFT treatments

## Submitted for FY25

# Synthesis Topic: Pavement Preservation Equipment and Quality Assurance

<b>Funds:</b>	\$60,000
<b>Contract Time:</b>	12 months
<b>Staff Responsibility:</b>	Unknown
<b>Comments:</b>	Submitted for Consideration

**OBJECTIVE:** This synthesis seeks to report the current state of construction equipment, specifically pavement preservation equipment, to disseminate an understanding of where the innovations have occurred in this equipment and how it relates to quality assurance. The end product will be a document and related webinar that provides a foundational understanding of current equipment used in pavement preservation, and how various technologies relate to quality assurance.

**STATUS:** Topic submitted.

## Submitted for FY25

**Synthesis Topic: Alternatives to chlorinated solvents for use in asphalt solubility testing, extraction, and other tests.**

<b>Funds:</b>	\$60,000
<b>Contract Time:</b>	12 months
<b>Staff Responsibility:</b>	Unknown
<b>Comments:</b>	Submitted for Consideration

**OBJECTIVE:** This synthesis seeks to report the current state use of solvent extraction, solubility tests, and other tests used in the asphalt industry that use TCE and how they may be affected by discontinuing the use of TCE.

**STATUS:** Topic submitted.



D/09-01 14 Sample Storage Time Impact on Performance Properties for Balanced Mix Design (BMD) 650,000

D/10-01 76 Development of a quality control and quality assurance system for Traffic Speed Deflection Devices 500,000

D/10-02 32 Utility Inspection Processes for Transportation Accommodation and Relocation 500,000

16 Guide for Successful Implementation and Integration of Digital Construction Inspection Technologies into DOT Workflows

D/10-03 600,000

D/10-04 34 Rightsizing Pay Factors to Incentivize Quality Highway Construction 500,000

**D/10-06 45 Developing Asphalt Emulsion Based High Friction Surface Treatments (HFST) 450,000**

13 Guidebook for Using Digital Project Delivery Practices to Integrate Design and Construction, Improve Productivity, and Manage Risk

D/10-08 375,000

D/18-01 11 Concrete Shrinkage Measurement and Management Practices 600,000

F/13-01 26 Use of UAS to Enhance the Design, Maintenance, Inspection, and Construction of Transportation Infrastructure. 500,000

G/03-01 50 Integrating the Use of New Software Subsystems and Software Within Evolving Traffic Management Systems 350,000

G/03-02 72 Audible Indications for Accessible Pedestrian Signals 450,000

G/07-01 9 Update of the AASHTO Guide for the Planning, Design and Operation of Pedestrian Facilities 1,000,000

**G/17-01 63 Pavement Marking Selection for Bridge and Pavement Preservation Treatments 400,000**

G/17-02 21 Updated Guidance on Reduced Left-Turn Conflict Intersections 600,000

G/17-03 36 Centerline Buffer Area Safety Benefit Trade Offs 250,000

G/17-05 47 The Effects of Trees on Road User Safety in Urban and Suburban Contexts 750,000

G/17-06 31 Validity of the 85th-Percentile Speed for Freeways, Expressways, and Rural Highways. 500,000

G/17-07 25 Tools to Support State DOT Implementation of the Safe System Approach 1,000,000

G/17-11 59 Crash Prediction Methods for Long-Term Work Zones 700,000

G/17-13 42 Graphic Resource for Practitioners to Illustrate HSM Prediction Method Data Elements and Definitions 400,000

G/17-17 10 Development