

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

Current and Completed Projects Related to Maintenance (1997 - 2025)

Prepared for the AASHTO Committee on Maintenance Meeting,
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More information is available on the Cooperative Highway Research Programs' WWW Homepage
<http://www.trb.org>

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I. Pavements

1. Completed

- Project 1-48: Consideration of Preservation in Pavement Design and Analysis Procedures (NCHRP Report 810)
- Project 9-41: Construction and Maintenance Practices for Permeable Friction Courses (NCHRP Report 640)
- Project 9-50: Performance-Related Specifications for Emulsified Asphaltic Binders Used in Preservation Surface Treatments (NCHRP Report 837)
- Project 10-82: Performance Related Specifications for Pavement Preservation Treatments (Phase I)
- Project 10-82A: Performance Related Specifications for Pavement Preservation Treatments (NCHRP Report 857)
- Project 14-14: Optimal Timing of Pavement Preventive Maintenance Treatment Applications (NCHRP Report 523)
- Project 14-17: Manual for Emulsion-Based Chip Seals for Pavement Preservation (NCHRP Report 680. Also AASHTO Code: MECB-1-UL)
- Project 14-31: Developing a Pavement-Maintenance Database System (NCHRP Report 820)
- Project 14-33: Quantifying the Effects of Preservation Treatments on Pavement Performance (NCHRP Research Report 858)
- Project 14-37: Guide Specifications for the Construction of Chip Seals, Microsurfacing, and Fog Seals (contractor's report available on project web page)
- Project 14-38: Guide for Timing of Asphalt-Surfaced Pavements Preservation (contractor's report available on project web page)
- Project 14-43: Construction Guide Specifications for Cold Central Plant Recycling and Cold In-Place Recycling (NCHRP Web-Only-Document 363)
- Project 14-44: Guide Specifications for the Construction of Slurry Seals, Scrub Seals, and Tack Coats (Part I of the contractor's report available on project web page; Parts II and III submitted to AASHTO)
- Project 14-46: Guidelines for Maintenance and Construction of Rumble Strips (contractor's report available on project web page)
- Project 14-48: Guidance for the Construction of Sand Seals and Ultra-thin Bonded Wearing Courses (contractor's report available on project web page; proposed guidance on construction and quality assurance submitted to AASHTO)
- Project 20-50(2): LTPP Data Analysis: Relative Performance of Jointed Plain Concrete Pavements with Sealed and Unsealed Joints (NCHRP Web Document 32)
- Project 20-50(03/04): LTPP Data Analysis: Effectiveness of Maintenance and Rehabilitation Options (NCHRP Web Document 47)
- Project 20-07(64): Maintenance Manual (published by AASHTO as "AASHTO Maintenance Manual: The Maintenance and Management of Roadways and Bridges," 1999)

Pavements - Completed (continued)

- Project 20-07 (170): Review and Revision of the AASHTO Maintenance Manual (published by AASHTO as “AASHTO Maintenance Manual for Roadways and Bridges,” 2007, Code: MM-4)
- Project 20-07(184): Pavement Preservation: Practices, Research Plans, and Initiatives (submitted to AASHTO Committee on Maintenance)
- Project 20-07(203): Chapter on Systems Operations and Management (incorporated into the “AASHTO Maintenance Manual for Roadways and Bridges,” 2007)
- Project 20-07(251): Consideration of Pavement Preservation in the AASHTO Mechanistic-Empirical Pavement Design Guide
- Project 20-07(380): Proposed AASHTO Manual for the Maintenance of Roadways and Bridges (submitted to AASHTO Committee on Maintenance)
- Project 20-07(339): Best Practices for Crack Treatments for Asphalt Pavements (NCHRP Report 784)
- Project 20-44(26) Implementing Guide Specifications for the Construction of Chip Seals, Micro Surfacing, and Fog Seals (contractor’s report available on project web page)

2. In Progress

- Project 10-124: Development of a Field Test to Determine Chip Seal Aggregate Embedment
- Project 10-134: Guidelines for the Selection of Performance-Related Tests for the Acceptance of Preservation Treatments

II. Bridges and Structures

1. Completed

- Project 10-97 Detection and Remediation of Soluble Salt Contamination Prior to Coating Steel Highway Structures (NCHRP Research Report 912)
- Project 12-100: Guidelines for Maintaining Small Movement Bridge Expansion Joints (agency research report is available on project web page)
- Project 12-115: Guidelines for Risk-Based Inspection and Strength Evaluation of Suspension Bridge Main Cable Systems (NCHRP Web-Only Document 353).
- Project 12-117: Guidelines for Corrosion Protection of Steel Bridges Using Duplex Coating Systems (NCHRP Research Report 1048).
- Project 14-15: Framework for a National Database System for Maintenance Actions on Highway Bridges (NCHRP Report 668)
- Project 14-23: Practical Bridge Preservation Actions and Investment Strategies (un-reviewed reports on Phases I & II are available on project web page)
- Project 14-27 Guide for the Preservation of Highway Tunnel Systems (NCHRP Report 816)
- Project 14-28 Condition Assessment of Bridge Post-Tensioning and Stay Cable Systems Using NDE Methods (NCHRP Research Report 848)
- Project 14-29: Assessing, Coding, and Marking of Highway Structures in Emergency Situations (NCHRP Report 833)
- Project 14-30: Spot Painting to Extend Highway Bridge Coating Life (NCHRP Web-Only Document 251)
- Project 14-32: Proposed Revisions to the AASHTO Movable Bridge Inspection, Evaluation, and Maintenance Manual (published by AASHTO as the Movable Bridge Inspection, Evaluation, and Maintenance Manual, Code: MBI-2)
- Project 14-36: Proposed AASHTO Guide for Bridge Preservation Actions (NCHRP Research Report 950)

Bridges and Structures - Completed (continued)

- Project 14-45: Guidelines for Response Planning, Assessment, and Rapid Restoration of Service of Bridges in Extreme Events (NCHRP Research Report 1098 and NCHRP Web-Only Document 390)
- Project 18-06A: Service Life of Corrosion-Damaged Reinforced Concrete Bridge Superstructure Elements (NCHRP Report 558)
- Project 20-07(234): Guidelines for Selection of Bridge Deck Overlays, Sealers, and Treatments (submitted to AASHTO Committee on Maintenance)
- Project 20-07(387): Maintenance Actions to Address Fatigue Cracking in Steel Bridge Structures (agency report available on project web page)
- Project 20-07(399): Identifying Bridge Maintenance and Preservation Activities which Minimize Environmental Impact (agency research report available on project web page)

III. Snow and Ice Control

I. Completed

- Project 06-12: Improved Visibility for Snow Plowing Operations (summarized in NCHRP Research Results Digest 250)
- Project 06-13: Snow and Ice Control: Guidelines for Materials and Methods (NCHRP Report 526)
- Project 06-14: Feasibility of Using Friction Indicators to Improve Winter Maintenance Operations and Mobility (NCHRP Web Document 53)
- Project 06-15: Testing and Calibration Methods for RWIS Sensors (NCHRP Web Document 87)
- Project 06-16: Guidelines for the Selection of Snow and Ice Control Materials to Mitigate Environmental Impacts (NCHRP Report 577)
- Project 06-17: Performance Measures for Snow and Ice Control Operations (summarized as a NCHRP Research Results Digest 335, research report available as NCHRP Web-Only Document 136)
- Project 06-18: Guide for Snow and Ice Control Operations (the guide provided to AASHTO; contractor's report available on project web page)
- Project 06-19: Guidebook for Mechanical Methods for Snow and Ice Control Operations (the guidebook provided to AASHTO; contractor's report available on project web page)
- Project 14-34: Guide for Performance Measures in Snow and Ice Control Operations (NCHRP Research Report 889)
- Project 20-36: Highway Research and Technology--International Information Sharing: Research Results Digest 204, Winter Maintenance Technology and Practices--Learning from Abroad, and Research Results Digest 238, Report on the 1998 Scanning Review of European Winter Service Technology
- Project 20-7(83): Guide for Snow and Ice Control (published by AASHTO as "Guide for Snow and Ice Control," 1999, Code: GSIC-1-UL)
- Project 20-07(117): Benefit/Cost of RWIS and Anti-Icing Technologies (available as a SICOP web document)
- Project 20-07 (147): Update of the Design Guidelines for the Control of Blowing and Drifting Snow (available as a SICOP web document, "Controlling Blowing and Drifting Snow with Snow Fences and Road Design")
- Project 20-07(200): Synthesis of Vehicle Based Winter Maintenance Technologies (available as a SICOP web document)
- Project 20-07(250): Update the AASHTO Guide for Snow and Ice Control (submitted to AASHTO Committee on Maintenance)

Snow and Ice Control - Completed (continued)

- Project 20-07(287): Grand Challenges: A Research Plan for Winter Maintenance (submitted to AASHTO Committee on Maintenance)
- Project 20-07(300): Methods for Estimating the Benefits of Winter Maintenance and Operations (submitted to AASHTO Committee on Maintenance)
- Project 20-07(318): Revised Chapter 8, Winter Operations and Salt, Sand and Chemical Management, of the Final Report on NCHRP 25-25(04) (submitted to AASHTO Committee on Maintenance)
- Project 20-07(329): Alternative Delivery Methods for Winter Maintenance Operations (submitted to AASHTO Committee on Maintenance; summarized in NCHRP Research Results Digest 387)
- Project 20-44(37): Workshops on Performance Measures in Snow and Ice Control Operations

2. Anticipated/Pending

- Project 10-147: Protocols for Evaluating Liquid Deicer Properties and Performance

IV. Equipment Management

1. Completed

- Project 05-24: Guidelines for Vehicle and Equipment Color, Marking, and Lighting (NCHRP Research Report 1085)
- Project 13-02: Guidelines for Warning Lights for Highway Maintenance and Operations Equipment (NCHRP Report 624, "Selection and Application of Warning Lights on Roadway Operations Equipment." The guidelines portion of the report are published by AASHTO, Item Code: WL-1)
- Project 13-03: Decision Making for Outsourcing and Privatization of Vehicle and Equipment Fleet Maintenance – Phase I (Phase II of the research was conducted under NCHRP Project 13-3A)
- Project 13-03A: Decision Making for Outsourcing and Privatization of Vehicle and Equipment Fleet Maintenance (NCHRP Report 692, also available as AASHTO Publication Code EFM-1)
- Project 13-04: Guide for Optimal Replacement Cycles of Highway Operations Equipment (NCHRP Research Report 879)
- Project 13-05: Guide for Utilization Measurement and Management of Fleet Equipment (NCHRP Report 957)
- Project 13-06: Guide for the Formulation of Long-Range Plans for Replacement Needs and Budget of Highway Operations Equipment – Phase I (contractor's report on Phase I available on project web page)
- Project 13-06A: Guide for the Formulation of Long-Range Plans and Budgets for Replacement of Highway Operations Equipment (NCHRP Research Report 1017)
- Project 13-07: Guide to Calculating Ownership and Operating Costs of Department of Transportation Vehicle and Equipment Fleet (NCHRP Research Report 944)
- Project 13-08: Guideline for Decision Making for Repair vs. Replacement of Highway Maintenance Equipment (NCHRP Research Report 1046)
- Project 13-09: Maximizing Proceeds from the Fleet Vehicle Asset Disposal Sales Process (NCHRP Research Report 1074)
- Project 20-07(309): Challenges and Opportunities: A Strategic Plan for Equipment Management Research (submitted to AASHTO Committee on Maintenance)

2. In Progress

- Project 23-40: Optimizing Maintenance Technician Staffing Levels for Highway Maintenance Fleets

V. Roadway/Roadside

1. Completed

- Project 14-16: Guidelines for Vegetation Management (published by AASHTO as “Guidelines for Vegetation Management,” 2011, Code: GVM-1-M-UL)
- Project 14-22: Effective Removal of Pavement Markings (NCHRP Report 759)
- Project 14-26: Culvert and Storm Drain Inspection Manual (submitted to AASHTO Committee on Bridges and Structures)
- Project 14-40: Transforming Roadside Management and Technology Practices for the Benefit of Safety, Ecology, and Economy (contractor’s report available on project web page)
- Project 14-41: Permanent Vegetation Control Treatments for Roadsides (agency report is available as NCHRP Web-Only Document 350)
- Project 14-47: Tools and Technology for Roadside Landscape Asset Management (NCHRP Research Report 155 and NCHRP Web-Only Document 429)
- Project 20-129: Guide for Addressing Encampments on State Transportation Rights-of-Way (discontinued, interim report available on project web page)

2. In Progress

- Project 25-69: Guide to Increasing and Sustaining Native Flora in Roadside Vegetation

3. Anticipated/Pending

- Project 25-71: Prevention and Control of Wildfires Through Roadside Vegetation Management

VI. Asset Management/General

1. Completed

- Project 08-71: Methodology for Estimating Life Expectancies of Highway Assets (NCHRP Report 713)
- Project 14-09(3): Maintenance Contracting (NCHRP Report 344)
- Project 14-09(4): Role of Highway Maintenance in Integrated Management Systems (NCHRP Report 363)
- Project 14-11(2): Enhancements to Program for Effective Motivation of Highway Maintenance Personnel (summarized in NCHRP Research Results Digest 257; a training course, “Effective Motivation of Highway Maintenance Personnel: Tools for Peak Performance,” is available on a CD-ROM).
- Project 14-12: Highway Maintenance Quality Assurance (NCHRP Report 422 “Maintenance QA Program Implementation Manual”)
- Project 14-13: Customer-Driven Benchmarking for Highway Maintenance Activities (Report is available as NCHRP Web Document 58; Guide published as NCHRP Report 511)
- Project 14-18: Determining Highway Maintenance Costs (NCHRP Report 688)
- Project 14-20: Consequences of Delayed Maintenance (Phase I)
- Project 14-20A: Consequences of Delayed Maintenance of Highway Assets (NCHRP Report 859)
- Project 14-21: Resource Allocation Framework to Meet Highway Asset Preservation Needs (NCHRP Report 736)
- Project 14-24: Guidance for Communicating the Value of Highway System Maintenance and Preservation (NCHRP Report 742)
- Project 14-25: Guide for Selecting Level-of-Service Targets for Maintaining and Operating Highway Assets (summarized in NCHRP Research Results Digest 396)
- Project 14-33: Quantifying the Effects of Preservation Treatments on Pavement Performance (NCHRP Research Report 858)

Asset Management/General - Completed (continued)

- Project 14-42: Determining the Impact of Connected and Automated Vehicles Technology on State DOT Maintenance Programs (NCHRP Research Report 1084)
- Project 19-07: GASB 34 – Methods for Condition Assessment and Preservation (NCHRP Report 608)
- Project 20-24(11) Asset Management Guidance for Transportation Agencies (AASHTO; also summarized as NCHRP Research Results Digest 266, and includes Project 20-07(134), Asset Management Education and Communication Materials)
- Project 20-57 Analytic Tools to Support Transportation Asset Management (NCHRP Report 545. The software tools, AssetManager NT and AssetManager PT, and other user guides are available on CD-Rom CRP-CD-57)
- Project 20-60: Performance Measures and Targets for Transportation Asset Management (NCHRP Report 551)
- Project 20-68A: US Domestic Scan Program (11-01, Leading Practices in Large-Scale Outsourcing and Privatization of Maintenance Functions; 14-01, Leading Management Practices in Determining Funding Levels for Maintenance and Preservation; and other topics). Scan reports are available on project web page.
- Project 20-74: Developing an Asset Management Framework for the Interstate Highway System (NCHRP Report 632)
- Project 20-74A: Development of Levels of Service for the Interstate Highway System (NCHRP Report 677)
- Project 20-7(206): A Model Guide for Condition Assessment Systems (submitted to AASHTO Committee on Maintenance)
- Project 20-7(340): National Training: Challenges and Opportunities (submitted to AASHTO Committee on Maintenance)
- Project 20-7(357): Guidelines for Collecting, Processing, and Managing Roadway Asset Inventory Data (submitted to AASHTO Committee on Maintenance)
- Project 23-08: A Guide for incorporating Maintenance Costs into a Transportation Asset Management Plan (NCHRP Report 1076)

2. In Progress

- Project 08-136: Guidebook on Using Performance-Based Management Approaches for Maintenance
- Project 19-25: Identifying Funding Needs for Maintenance and Preservation of Existing Transportation Assets and System Infrastructure Additions
- Project 23-38: Incorporating Risk Management into Maintenance Practice

3. Anticipated/Pending

- Project 23-47: Guide for Successful Strategies and Programs for Pavement Preventive Maintenance Inspector Training

VII. Synthesis of Information Related to Highway Problems

1. Completed

- NCHRP Synthesis 272: Management Practices for Environmental Issues Related to Highway and Street Maintenance
- NCHRP Synthesis 275: Historic Highway Bridge Preservation Practices
- NCHRP Synthesis 283: Fleet Management and Selection Systems for Highway Maintenance Equipment
- NCHRP Synthesis 284: Performance Survey on Open-Graded Friction Course Mixes

Synthesis of Information Related to Highway Problems – Completed (continued)

NCHRP Synthesis 285: Maintenance of Highway Edgedrains
NCHRP Synthesis 303: Assessment and Rehabilitation of Existing culverts
NCHRP Synthesis 330: Public Benefits of Highway System Maintenance and Operation
NCHRP Synthesis 341: Integrated Roadside Vegetation Management
NCHRP Synthesis 342: Chip Seal Best Practices
NCHRP Synthesis 344: Winter Highway Operations
NCHRP Synthesis 353: Inspection and Maintenance of Bridge Stay Cable Systems
NCHRP Synthesis 354: Investigation and Management of Bridges with Fracture-Critical Details
NCHRP Synthesis 363: Control of Invasive Species
NCHRP Synthesis 389: Performance-Based Contracting for Maintenance
NCHRP Synthesis 394: Reducing Litter on Roadsides
NCHRP Synthesis 411: Microsurfacing
NCHRP Synthesis 426: Performance-Based Highway Maintenance and Operations Management
NCHRP Synthesis 425: Waterproofing Membranes for Concrete Bridge Decks
NCHRP Synthesis 449: Strategies to Mitigate the Impacts of Chloride Roadway Deicers on Natural Environment
NCHRP Synthesis 452: State Department of Transportation Fleet Replacement Management Practices
NCHRP Synthesis 463: Pavement Patching Practices
NCHRP Synthesis 465: Thin Asphalt Concrete Overlays
NCHRP Synthesis 470: Maintenance Quality Assurance Field Inspection Practices
NCHRP Synthesis 483: Training and Certification of Highway Maintenance Workers
NCHRP Synthesis 500: Control of Cracking in Bridge Decks
NCHRP Synthesis 562: Repair and Maintenance of Post-tensioned Concrete Bridges
NCHRP Synthesis 565: Maintenance and Surface Preparation Activities Prior to Pavement Preservation Treatments
NCHRP Synthesis 568: Portland Cement Concrete Pavement Joint Sealant Practices and Performance
NCHRP Synthesis 587: Use of Smart Work Zone Technologies for Improving Work Zone Safety
NCHRP Synthesis 591: Use of Safety Management Systems in Managing Highway Maintenance Worker Safety
NCHRP Synthesis 623: Wintertime Pavement Maintenance Practices
NCHRP Synthesis 627: Practices for Controlling Tunnel Leaks
NCHRP Synthesis 629: Practices for Capturing and Integrating Cost Data in Maintenance Management Systems
NCHRP Research Results Digest 365: Sustainable Pavement Maintenance Practices

2. In Progress

Topic 55-14: Maintenance Practices for Wide Cracks and Joints in Flexible and Composite Pavements

3. Anticipated/Pending

Topic 56-16: Data Collection and Management to Expedite Pothole Repairs