2013 AASHTO Subcommittee on Maintenance Conference with the Subcommittee on Asset Management

VERMONT
VT Agency of Transportation

2013 Meeting Agenda

July 20–25, 2013
Burlington, Vermont
2013 AASHTO SUBCOMMITTEE ON MAINTENANCE CONFERENCE
with the Subcommittee on Asset Management

MEETING AGENDA

SATURDAY, JULY 20, 2013
8:00 a.m.–5:00 p.m. Pre-Conference Meeting/AASHTO SICOP Meeting ........................................... Diamond I
This meeting is for winter maintenance planning technical services program members.

SUNDAY, JULY 21, 2013
10:00 a.m.–5:00 p.m. Registration/Information Desk Open ............................................................. Diamond Foyer
1:00 p.m.–5:00 p.m. AASHTO SCOM Leadership Meeting ......................................................... Diamond Ballroom
This meeting is for SCOM Chairs, Vice Chairs and FHWA Liaisons. All others by invitation only.
Vendor Setup
6:00 p.m. Vendor/SCOM Introduction Meeting ............................................................. “G” Restaurant

MONDAY, JULY 22, 2013
7:00 a.m.–5:00 p.m. Registration and Information ............................................................. Diamond Foyer
7:00 a.m.–9:00 a.m. Breakfast .................................................................................................. Exhibit Hall
7:15 a.m.–8:00 a.m. New Member Orientation Breakfast ................................................... Diamond I
Jennifer Brandenburg, North Carolina Department of Transportation, Presiding
8:00 a.m.–9:45 a.m. Opening Session .................................................................................. Emerald III
Carlos Braceras, Utah Department of Transportation, Presiding
Color Guard/National Anthem
Welcome
Governor Peter Shumlin (invited)
Secretary Brian Searles, Vermont AOT

AASHTO Update
Michael Lewis, RIDOT

SCOM Update
Carlos Braceras, UDOT

Subcommittee on Asset Management Update
Ananth Prasad, FDOT

9:45 a.m.–10:15 a.m.
Break ................................................................. Exhibit Hall

10:15 a.m.–Noon
FHWA Update ........................................................ Emerald III
Butch Wlaschin

Hurricane Irene Recovery
Brian Searles, Vermont AOT

National Performance Measures
Ananth Prasad, FDOT

Noon–1:00 p.m.
Lunch .............................................................. Exhibit Hall

1:00 p.m.–3:00 p.m.
Technical Working Groups Breakout Sessions
Bridge ................................................................. Diamond I
Highway Safety and Reliability ................................ Emerald II
Equipment ........................................................ Diamond II

3:00 p.m.–3:30 p.m.
Break ................................................................. Exhibit Hall

3:30 p.m.–5:30 p.m.
Technical Working Groups Breakout Sessions
Roadway/Roadsides ........................................ University Amphitheater
Pavement ............................................................ Emerald I

5:30 p.m.
Adjourn
Dinner on your own

TUESDAY, JULY 23, 2013

7:00 a.m.–12:00 a.m.
Registration and Information ................................ Diamond Foyer

7:00 a.m.–8:00 a.m.
SCOM Leadership Breakfast ................................... “G” Restaurant
This meeting is for SCOM Chairs and Vice Chairs

7:00 a.m.–9:00 a.m.
Breakfast .......................................................... Exhibit Hall

8:00 a.m.–9:45 a.m.
Technical Working Groups Breakout Sessions
Pavement ........................................................ Emerald I
Equipment ........................................................ Diamond II
Roadway/Roadsides ........................................ University Amphitheater

9:45 a.m.–10:15 a.m.
Break ................................................................. Exhibit Hall

10:15 a.m.–Noon
Technical Working Groups Breakout Sessions
Bridge ................................................................. Diamond I
Highway Safety and Reliability ............................ Emerald II
12:30 p.m. Technical Tour and Lunch .................. Colchester Fort Ethan Allen Maintenance Facility

Gather in conference area for transportation to the maintenance facility.

Fort Ethan Allen was a U.S. Army installation in Vermont, named for American Revolutionary War figure Ethan Allen. First serving as a cavalry post in 1894, today it is the center of a designated national historic district. “The Fort” is also home to the Vermont Agency of Transportation Maintenance District 5 Headquarters, Maintenance Garage, and Northwest Regional Construction office. This new state of the art facility is designed to house maintenance staff and equipment, and was the first facility in Vermont to co-locate our maintenance crews with our regional construction staff.

Although the maintenance facility will be inactive during the technical tour, AASHTO members and guests who visit the Fort will be in a garage environment and will be moving around and near large equipment. Clothing such as scarves and other items that could become snared or entangled are discouraged. Comfortable shoes are recommended.

6:00 p.m. Adjourn (Dinner on your own)

WEDNESDAY, JULY 24, 2013

7:00 a.m.–5:00 p.m. Registration and Information ........................................ Diamond Foyer

7:00 a.m.–8:00 a.m. Federal Highway Administration Breakfast Meeting .................. “G” Restaurant

This meeting is for all FHWA staff.

7:00 a.m.–9:00 a.m. Breakfast .................................................................................. Exhibit Hall

TRACK I—SUBCOMMITTEE ON MAINTENANCE

8:00 a.m.–9:45 a.m. Technical Working Groups Breakout Sessions

Bridge .................................................................................................................. Diamond I

Equipment .......................................................................................................... Diamond II

Highway Safety and Reliability ........................................................................ Emerald II

9:45 a.m.–10:15 a.m. Break ...................................................................................... Exhibit Hall

10:15 a.m.–Noon Technical Working Groups Breakout Sessions

Roadway and Roadside .................................................................................. University Amphitheater

Pavement ........................................................................................................ Emerald I

TRACK II—SUBCOMMITTEE ON ASSET MANAGEMENT

8:00 a.m.–Noon The Subcommittee on Asset Management Business Meeting

Agenda provided at the meeting.

Ananth Prasad, FDOT, Chair

Tim Henkel, MnDOT, Vice Chair

The Subcommittee on Asset Management Business Meeting will include presentations and discussion on various topics related to asset management implementation and MAP-21 asset management requirements. FHWA will provide an update on the rulemaking process, the TAM webinar series, and the Transportation Asset Management Plan development project. TRB will provide an update on the 10th National Conference on Transportation Asset Management. The subcommittee will work on new research problem statements to be submitted for NCHRP funding.

Noon–1:00 p.m. Lunch General ........................................................................... Exhibit Hall

Lunch—TRB Maintenance and Operations .................................................. Emerald II Management Committee
PEER EXCHANGE ON TRANSPORTATION ASSET MANAGEMENT

FHWA and AASHTO are sponsoring this peer exchange that will focus on how state DOTs are integrating maintenance and asset management and to better understand the transportation asset management plan requirements of MAP-21. The peer exchange is divided into two parts. Part I of the peer exchange is set up as a joint plenary session between the Subcommittee on Maintenance and Subcommittee on Asset Management. All conference attendees are invited to attend, listen, and discuss. Part II of the peer exchange is invitation only and will be a more detailed discussion focused on the Transportation Asset Management Plan requirements within MAP-21.

Part I: Integrating Maintenance and Asset Management

1:00 p.m.–3:00 p.m.
Welcome and Opening Remarks
Carlos Braceras, Utah DOT
Butch Wlaschin, FHWA
Tim Henkel, Florida DOT

Peer Exchange Overview and Objectives
State DOT Examples of Integrating Maintenance and Asset Management

3:00 p.m.–3:30 p.m.
Break

3:30 p.m.–5:00 p.m.
Integrating Maintenance into a Transportation Asset Management Plan
• Requirements of MAP-21
• What is a TAMP & FHWA TAMP Project Overview
• Lessons Learned

5:00 p.m.
Adjourn (All TWG submittals due)

5:30 p.m.
Spirit of Ethan Allen Dinner Cruise
Buses will begin boarding at 5:30 p.m. at conference area lobby and will transport attendees the short distance to the Burlington waterfront. Boarding of the “Spirit of Ethan Allen” will begin at 6:00 p.m. at the waterfront, and the ship will depart at 6:30 p.m.

THURSDAY, JULY 25, 2013

7:00 a.m.–Noon
Registration and Information ............... Promenade Hall (Located near Emerald Ballroom)

7:00 a.m.–9:00 a.m.
Breakfast .............................................................. Emerald I & II

8:00 a.m.–11:00 a.m.
Subcommittee on Maintenance Business Meeting† ......................... Emerald III
Chris Christopher, Washington Department of Transportation, presiding
Jennifer Brandenburg, NC Department of Transportation, presiding

Technical Working Group Reports
• Bridge
• Equipment
• Highway Safety and Reliability
• Pavement
• Roadway and Roadside

Reports and Resolutions
West Virginia 2014

†Conference participants who are non-SCOM members are invited to attend the Business Meeting as observers. All Subcommittee on Asset Management attendees are welcome to attend.

11:00 p.m.
Adjourn
Proactive measures pay off. Prevent potential problems with preservation treatments. Spend a little now, save for the life of your road.

Preserve.

Find out more at savemyroad.com
PEER EXCHANGE ON TRANSPORTATION ASSET MANAGEMENT

Part II: TAMP Requirements in MAP-21

This session is by invitation only and will be a more detailed discussion focused on the Transportation Asset Management Plan requirements within MAP-21. Invited states will share how they are preparing for MAP-21 and coming requirements.

1:00 p.m.–5:00 p.m. Discussion Topics

• Incorporating Risk into a TAMP
• Economic Analysis
• Financial Plans

Group Discussion and Peer Exchange Wrap-Up
Introducing AMAC (Advanced Mobile Asset Collection), a revolutionary, state-of-the-art traffic sign technology.

AMAC collects measurements from a vehicle moving at highway speeds, providing both sign retroreflectivity measurements and GPS data for a complete sign management program.

- MUTCD Code
- Sign Retroreflectivity
- Sign Luminance
- Sign Dimension
- Sign Offset and Height
- Overhead and Post-Mounted Signs
- Inventory with GPS Data
- Integratable into Existing GIS Databases
- Fully Customizable Reporting

SIGN RETROREFLECTIVITY AND MANAGEMENT Are YOU Ready?

Visit us at Booth 29

LOCATIONS WORLDWIDE

Visit us at Booth 29
Introducing **AMAC** (Advanced Mobile Asset Collection), a revolutionary, state-of-the-art traffic sign technology.

**AMAC** collects measurements from a vehicle moving at highway speeds, providing both sign retroreflectivity measurements and GPS data for a complete sign management program.

- MUTCD Code
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- Overhead and Post-Mounted Signs
- Inventory with GPS Data
- Integratable into Existing GIS Databases
- Fully Customizable Reporting

**INDEPENDENTLY TESTED AND VERIFIED BY THE TEXAS TRANSPORTATION INSTITUTE (TTI).**

“We have recently tested the sign retroreflectivity measurement capability of the **AMAC** system and found it provides an efficient method for obtaining accurate retroreflectivity measurements of traffic signs in all positions.” - Dr. Paul J. Carlson, TTI

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MONDAY, JULY 22, 2013
Diamond II

1:00 p.m.–3:00 p.m.

Welcome and Introductions

New or Updated Publications
A. 2013 AASHTO Equipment Reference Book
   • Information listed on EMTSP Website—Not published

Review Completed Research Projects

Completed Activities for the Past Year
A. Equipment TWG
B. Equipment Management Technical Services Program (EMTSP)

Review Current Research Projects
B. Next Steps

TUESDAY, JULY 23, 2013
Diamond II

8:00 a.m.–9:45 a.m.

New Business

Activities for the Coming Year
A. Follow through on priorities established for NCHRP Project 20-7–Task 309
B. Continue overseeing EMTSP
C. Continue other activities as listed in the TWG Work Plan

Discuss New Research Projects
A. Top research priorities from poll taken in Mobile, AL

Open Discussion
AASHTO Subcommittee on Maintenance  2013 Meeting Agenda

**WEDNESDAY, JULY 24, 2013**

**Diamond II**

8:00 a.m.–9:45 a.m.

**EMTSP Oversight Panel Meeting**

A. Review EMTSP Budget and Work Plan

B. Review Accomplishments

C. Regional Partnerships Update
   - Northeast
   - Midwest
   - West
   - Southeast

D. EMTSP Strategic Plan
   - Review for Currency and Relevance
   - Review and Update Action Items

E. Website Enhancements
   - Listserv functionality
   - AASHTO Equipment Reference Book Items
   - Others
Pavement

Chair: Eric Pitts, GDOT
Vice Chair: Anita Bush, Nevada DOT (Environmental and Workforce Development)
Vice Chair: George Conner, AL DOT (Performance Management and Research)
FHWA Liaison: Steve Mueller, FHWA

MONDAY, JULY 22, 2013
Emerald I

3:30 p.m.–5:30 p.m. Welcome and General PTWG Committee Business
• Overview of Pavements TWG
• Membership
• Mission Statement and Goals
• Focus Areas

Updates from AASHTO Partners
• NCHRP Update—Amir Hanna
• TRB Update—James Bryant
• SHRP2 Updates for Pavement Preservation R-26—David Peshkin
• FHWA Update—Thomas Van, Steve Mueller
• Industry Update—FP2 - James Moulthrop
• Regional Pavement Preservation Partnerships Updates, Updates from TSP2/NCPP (including National Conference and International Conference)–Larry Galehouse and Partnership Chairs

PTWG Annual Meeting Business
• SCOM Survey Reports—Authors of Surveys
• Pavement TWG Research Problem Statements and Schedule
• Introduction and Call for Resolutions

Technical Presentation
• Case Study: Integrating Pavement Maintenance into a Successful PMS/TAM System

TUESDAY, JULY 23, 2013
Emerald I

8:00 a.m.–9:45 a.m. Technical Presentations
• Pavement Preservation Sections at the NCAT Test Track and Experimental Roadway
• Micromilling to Improve Smoothness
• Performance Measures for Pavement and Pavement Maintenance in Asset Management Systems

PTWG Annual Meeting Business—Updates on Resolutions/Research Problem Statements
WEDNESDAY, JULY 24, 2013
Emerald I

10:15 a.m.–Noon

Technical Presentation
• RSL = 0 Definition

PTWG Annual Meeting Business
• Discussion and Approval of:
  • 2013 Pavements TWG Research Problem Statements
  • 2013 Resolutions
  • 2013/2014 Work Plan
• Other Business
MONDAY, JULY 22, 2013
Emerald II
1:00 p.m.–3:00 p.m.
Welcome/Introductions
Steve Lund, MNDOT

- Review Statement of Work & 2013 Work Plan
- Development of TWG 2014 Work Plan

National Performance Standards, “How the HS&R TWG Can Participate”
Matthew Hardy, AASHTO

Research Need (Statements) Status of Current Efforts and Identification and
Discussions of New Needs
Jim Feda, SC

Winter Maintenance Tech Service Program
Lee Smithson, (SICOP Coordinator)

- 2013 National Winter Maintenance Peer Exchange September 10–11, 2013,
  Vancouver, WA

MAP-21 Requirements
Rick Nelson, NV and Gummada Murthy, AASHTO

TUESDAY, JULY 23, 2013
Emerald II
10:15 a.m.–Noon
Extreme Weather Events Conference–Report Out
Paul Pisano, FHWA

Automated Processes to Collection Mobile Data for Winter Maintenance
Operations
Steven J. Cook, PE, Michigan Department of Transportation

Safety Topic: Portable Workzone Safety Barrier Systems
Open Discussion

Reliability Topic: Detour Preparations
Open Discussion

Research Needs Statement Continued from Monday
Jim Feda, SC
WEDNESDAY, JULY 24, 2013
Emerald II

8:00 a.m.–9:45 a.m.

FHWA Update
Paul Pisano

- Road Weather Management
- Work Zone Management
- Other FHWA news

User Delay Cost as a Function of Winter Maintenance Regain Time, Traffic Incident and Work Zones
Steven J. Cook, PE, Michigan Department of Transportation

Round Table Discussion on Promoting Completed Research and Achieving Technology Transfer
Wilf Nixon, Chair of Surface Transportation Weather Committee; Max Perchanok, Chair of Winter Maintenance Committee; and Lee Smithson, AASHTO SICOP Coordinator

Results of the Week
Steve Lund, MN
Roadway/Roadsides

Chair: Mike Mattison, NDOR
Vice Chair: Beth Wright, MoDOT (Environmental and Research)
Vice Chair: Jerry Hatcher, TDOT (Performance Management & Workforce Development)
FHWA Liaison: Chris Newman, FHWA

MONDAY, JULY 22, 2013
University Amphitheater

3:30 p.m.–5:30 p.m.
- Introductions, Webinar Overview, Poll Results, Research Review
  Mike Mattison, NDOR
- Arizona's New Features Inventory System
  Lonnie Hendrix, ADOT
- Culvert Management in 4 States
  Marie Venner
- Asset Management of Roadway/Roadside Features and MAP-21
  Matt Hardy, AASHTO

TUESDAY, JULY 23, 2013
University Amphitheater

8:00 a.m.–10:30 a.m.
- NCHRP 20-7 Research Projects
  Mike Mattison
- NHI Maintenance Academy in Tennessee
  Chris Harris, TDOT
- Automated Data Collection
  Rob Zilay, Dye Management
- Maintenance Quality Assurance and MAP-21
  Panel Discussion
- Research Needs with Respect to Roadway/Roadside Resolution Proposals
  Mike Mattison

WEDNESDAY, JULY 24, 2013
University Amphitheater

10:15 a.m.–Noon
- Winter Maintenance Environmental Impacts
  Wayne Lupton, Envirotech
- CalTrans Lifecycle Cost Analysis Tool
  Rob Zilay, Dye Management
- Work Zone Safety and How Highway Maintenance Impacts Traveler Safety
  Beth Wright, MoDOT, Jerry Hatcher, TDOT
- Research Needs with Respect to Roadway/Roadside Resolution Proposals
  Mike Mattison
AASHTO, the Subcommittee on Maintenance, and the Subcommittee on Asset Management would like to thank our Sponsors for their support.
Chair: Pete Weykamp, NYSDOT
Vice Chair: Vacant (Environmental and Research)
Vice Chair: Jeff Milton, VDOT (Performance Management and Workforce Development)
FHWA Liaison: Vacant

MONDAY, JULY 22, 2013
Diamond I
1:00 p.m.–3:00 p.m. Welcome & Review of Work Plan & Developing Objectives for 2013-14
Accomplishments: Research
Jeff Milton
TSP2 Update
Ed Welch
MAP-21 Update
Anmar Ahmad
Defining “State of Good Repair”
Open Discussion
“Technologies for Sealing Bridge Decks”
Lorella Angelini
Update on “Environmental Requirements for Bridge Cleaning & Washing”
Chris Keegan

TUESDAY, JULY 23, 2013
Diamond I
10:15 a.m.–Noon Developing Research Needs Statements
Florida DOT’s Paint Calculator
Tim Latner

WEDNESDAY, JULY 24, 2013
Diamond I
8:00 a.m.–9:45 a.m. Performance Measures
Open Discussion
AASHTO Subcommittee on Maintenance (SCOM)
Joint Summer Meeting w/Asset Management
Chairman’s Meeting
Sunday, July 21, 2013, 1:00 pm to 5:00 pm
Sheraton Hotel, Diamond Ballroom - Burlington, VT

SCOM Leadership (SCOM Vice-Chairs, TWG Chairs and Vice-Chairs, Secretary) along with FHWA, AASHTO, TRB, and NCHRP liaisons, and other designated guests are invited to attend the Chairman’s meeting in preparation for the annual meeting.

• Call to Order / Introductions – Carlos Braceras, UT

• Avenues For Getting SCOM Work Done – Carlos
  o Technical Work Groups (TWGs)
    ▪ Focus upon SCOM strategic elements for workgroup. Each TWG have 2 elements. These elements are aligned with national AASHTO strategic plan.
  o NCHRP Research (20-7, Annual Program)
    ▪ This is a tool we use to move forward the program. This tool is used to set direction and to accomplish work to move the program forward.
  o Scan Tours
    ▪ Please consider both international and domestic scan program.
  o Center for Environmental Excellence
    ▪ Grant proposals.
  o TIG – is a tool we can use and we need to explore usage
  o Technical Service Programs
Current maintenance related AASHTO programs - pavement preservation, bridge preservation, equipment, and snow and ice removal.

Concern expressed about long-term viability and funding of AASHTO supportive services program. Every three years each program is reevaluated for products produced strategic plan, and funding support.

As an SCOM/TWG we need to emphasize the TSP accomplishments, costs, and bills.

TC3 – is a new technical supportive services program recently approved as a supportive services program. This new program showed up as $20,000 in the July AASHTO bill.

Arizona is hosting NHI-Maintenance Academy November 2013.

- Other

- Joint Summer Meeting Updates and Logistics – Scott Rogers, VT - Done

- Professional Development Hours-Gummada Murthy
  - No certificate from AASHTO. However, check-off sheet within packet and information that support PDH.

- White Paper on MAP21 Performance Measures – Gummada Murthy
  - Presentation – Identification of AASHTO identified national performance measures they are recommending to FHWA for implementation of MAP-21.
  - No current performance measure for maintenance in respect to MAP-21 implementation.
  - AASHTO will share with SCOM members AASHTO recommended performance measures to USDOT.
  - April 1, 2015 implementation date of performance management targets. April 1, 2016 State DOT report to USDOT targets. April 1, 2017, MPO and other locals are required to submit to USDOT targets. 2 years after establishment of goal, owner submits status report to USDOT.

  - Handout document outlining framework to capture national data on how everyone is measuring national maintenance measures.
  - NCHRP synthesis was funded to do something similar.
  - This could possibly be housed with Larry Galehouse.
Resolution to be drafted by TWG regarding framework of support and activities.

- Future Conference Budget Model/Planning Efforts – Gummada Murthy, All
  - Presentation
  - Co-locating of events help boost numbers of attendees.
  - Action: produce list of basic and desired needs for hosting agency.
    - General session, leadership meetings, joint meetings, and technical working groups.

- Center for Excellence Operations – John Conrad
  - Presentation
  - Highway Safety and Reliability TWG will consider draft resolution and move resolution forward.

- History of SCOM Resolutions – Jameelah Hayes (Moved to Thursday report out)

- Technical Work Group Reports “Work PlanMondayJun2013#” Reports – TWG Chairs, Vice-Chairs, and FHWA Liaisons (Work plans tied to SCOH Strategic plan, updates, highlights of past year activities, outline for the breakout meetings, etc)

  - Bridges – Jeff Milton, VA (Pete Weykamp reported)
    - 2 research projects advanced (NCHRP funded one and FHWA funded 2nd project)
    - Looking for new TWG chairperson
    - and more,

  - Equipment – Ron Pruitt, AL
    - Approved equipment research project funded
    - Approved 2-resolution
    - 36 states participating in equipment TSP
    - Orlando, FL, next equipment workshop
    - and more,

  - Highway Safety & Reliability – Steve Lund, MN
    - Statement of direction and work plan is posted on SCOM website
    - Vancouver peer exchange in November
    - Job hazard analysis development
    - and more,

  - Pavements – Eric Pitts, GDOT
    - 1st pavement preservation partnership meeting in Nashville
    - Supporting national center TSP (38 states contributing)
      - Includes pavement and bridge
- NCAT performing research on preservation treatment strategies
- Research on best practices of crack sealing
- and more,
  - Roadway/Roadside – Mike Mattison, NE
    - Webinar series – automated asset management data collection (LiDAR), environmental effect of chlorides, night-time advanced warning systems.
    - Moving forward resolution for joint meeting with rest area conference. Move forward resolution.
    - and more,
- Reminders – Chris Christopher/Jennifer Brandenburg
  - Monday, 7:15 am – New Members/New Attendees Breakfast
  - Tuesday, 7:00 am - Vice-chair Breakfast with TWG’s chair/vice-chair
  - Wednesday, 5:00 pm – Electronic copies of revised work plans, resolutions, and research problem statements are due to the Secretary of SCOM (use the template from Bryan C.)
  - Thursday Business Meeting – Each TWG Chair is prepared to present:
    - Key work plans topics/issues discussed in their TWG
    - Research Problem statements
    - Research Implementation Recommendations
    - Resolutions (if applicable)
    - Technical Services Program – key highlights, areas of focus
- Research Update – Chris Christopher, WA
  - Chris gave handout example and update of current projects
- TRB Update – James Bryant, TRB
  - Update of joint TRB meetings and introduction.
- FHWA Updates – Bryan Cawley, FHWA
  - Offer to support a Maintenance Peer Exchange
- NCHRP Update – Amir Hanna, NCHRP
  - Handout of update
- Other updates – All
- New Business and General Discussion – Carlos Braceras, UT
- Future Meetings – Bryan Cawley, FHWA
  - 2014 – Charleston, West Virginia
  - 2015 – Des Moines, Iowa
  - 2016 – Omaha, Nebraska
o 2017 – NASHTO (Connecticut, Delaware, DC, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont)
FHWA Update
AASHTO Subcommittee On Maintenance
2013 Annual Meeting
Burlington, VT

Butch Wlaschin, P.E.
Director, Office of Asset Management,
Pavements & Construction
Overview

- MAP-21
- Current Issues
- FHWA Programs and Initiatives
MAP-21

• 2-year Bill
• Current Funding Levels Extended
• Notable Provisions
  • NHPP - STP
  • Asset Mgmt Plan requirement
  • Performance Management
  • Goals - Targets
Current Issues

- Pavement condition (IHS and NHS)
- Bridge Condition (IHS and NHS)
- Performance of IHS
- Minimum Condition for IHS
- Reestablish criteria for PMS and BMS
MAP-21

• Collaborative effort with AASHTO
• Outreach to Partners – AGC, ARTBA, NACE etc.

• Rule making – 18 months
MAP-21

• Other provisions:
• Accelerated Project Delivery
• Innovative Project Delivery
• Advanced Modeling
• Buy America
• Value Engineering
MAP-21

• FHWA issued guidance documents with key questions and answers

• If you have questions – need clarification, send us an email
MAP-21

• There are several rules coming out: Planning, Safety, Asset Management, 3 performance rules, plus one more

• Asset Management and Infrastructure Performance of most interest to you.
MAP-21

- Asset Management
- Establishing a process:
  - Strategic Vision and Goals
  - Inventory and condition
  - Gap Analysis
- Life-cycle coast and Risk Management
  - Financial Plan
  - Investment Strategy
MAP-21

• Asset Management

• New minimum requirements for PMS and BMS

• Needs to include preservation

• Due out for public comment in the fall
MAP-21

- Asset Management
- Focuses on Long Term
- With short term performance measures
- Looks at life cycle costs and risk
  - Keys to long term performance
  - Stay away from worst-first
- Is Maintenance at the table discussing Asset Management?
MAP-21

- Infrastructure Performance Measures
- Pavement and Bridge
- Bridge pretty straightforward
- New definitions / concepts
- Deteriorated condition
- Avoiding poor
MAP-21

• Infrastructure Performance Measures

• Pavement
• Still linked to IRI, but other aspects

• Matrix – IRI, Rutting, cracking, faulting

• Group road segments as Good Fair Poor

• Establish minimum condition for the Interstate
Every Day Counts

• Announced July 25, 2012
• Continued Focus on:
  • Shortening Project Delivery
  • Enhancing Safety
  • Protecting the Environment
• New and Continuing Technologies
Construction Web Based Training

• Bridge Sliding
• Intelligent Compaction
• Stringless Paving
• Automated Machine Guidance
• Bridge Preservation
Technical Briefs

• 3, 4, 5D Modeling
• Automatic Machine Guidance
• Intelligent Compaction
• Stringless Paving
SHRP2

• More later

• Focus on RENEWAL

• R26 Preservation

• 9-10 states each received $120K
• Technical assistance
SHRP2

- RENEWAL
- Precast Concrete
- NDT projects
- Composite Pavements
- Long Life pavements
Thank You

- Contacts:
  - Bryan Cawley, Team Leader
  - Construction Management
AASHTO Annual Meeting

2013 Subcommittee on Maintenance/Subcommittee on Asset Management Conference

July 20-25, 2013
Burlington, Vermont
Climate Change Basics

- **1950s**: 1.09:1
- **60s**: 0.77:1
- **70s**: 0.78:1
- **80s**: 1.14:1
- **90s**: 1.36:1
- **2000s**: 2.04:1

Record highs and record lows.
U.S. Daily Highest Max Temperature Records set in June 2012

Out of a possible 171,442 records: 2,284 (Broken) + 998 (Tied) = 3,282 Total
What have we observed?

Wetter Trends

The wettest days are wetter
RECENT MONTHLY MEAN CO$_2$ AT MAUNA LOA

PARTS PER MILLION

YEAR

2009 2010 2011 2012 2013 2014

380 385 390 395 400
At Burlington International Airport, it was the *wettest year on record* with 50.92" of rain. Burlington also had its *3rd snowiest winter* on record with 128.4"

- **March 6 - 7, 2011 Winter Storm**
  2" rain/25.8" snow, high winds

- **April 13 - June 19, 2011 Lake Champlain Record Flooding**
  103.38 feet – Previous record 101.8 feet

- **May 26 - 27, 2011 Flash Flooding and Severe Weather Central Vermont**

- **August 28, 2011 Tropical Storm Irene**
Since 1927 Vermont has experienced a large-scale disastrous flood once every 14 years.

From 1973-2011, Vermont suffered approximately 25 disastrous floods of regional scale as depicted on this map.

Data Source: VT DEC Rivers Program
RT 2 Causeway Lake Champlain Flooding
Damage caused by flash flooding ~ Cabot, Vermont
August 28, 2011 ~ Tropical Storm Irene

- Six lives lost
- Thirteen Vermont communities isolated
- 2000 road segments damaged
- 300 bridges damaged
- Over 3500 homes and businesses damaged
- Several rail and major telecommunication lines damaged
The Flood

Rochester

Dummerston

Plymouth

Bennington

Pittsfield

Mendon

Killington
The opening was celebrated on November 4th.
VT Rail Bridge
114 Chester
VTrans Employees: Approximately 700 were assigned to IRENE recovery tasks
DOT Partners
- Maine – 150 people, 145 pieces of equipment
- New Hampshire – 75 people, 60 pieces of equipment

Hundreds of National Guard Troops:
- Vermont – 200 people, numerous equipment
- Maine – 220 people, numerous equipment, Command & Control function for out-of-state troops
- Illinois – 145 troops, 8 aircraft, 23 vehicles
- Ohio – 93 people, 29 pieces of equipment
- New Hampshire – 8 people, 2 aircraft
- South Carolina – 51 people, 23 pieces of equipment
- West Virginia – 30 people, 10 pieces of equipment
- Virginia – 16 people, 6 pieces of equipment

Over 200 Private Contractors and Consultants
- Approximately 1800 people from the private sector, primarily from Vermont

Medical Assistance from LA, ME, AR, MO, NH, ID and FL

Regional Planning Commissions – Outreach to local government, funded by VTrans
Incident Command System (ICS)

Systematic tool for command, control and coordination of an emergency response

- Part of National Incident Management System (NIMS)
- ICS originally developed by fire chiefs in 1968 to respond to forest fires out west
- NIMS born in response to 9/11
- Flexible
- Scalable
- Off the shelf
- Training readily available - FEMA
The ICCs are operated by a Unified Command (UC) in Montpelier. The UC role was to set priorities, provide overall management through directives, and take the lead on communication and public information. The UC was given direction by the Secretary’s Office.
Emergency Response Goals

- Establish emergency access to cutoff/isolated towns & locations within communities
- Establish access for utility companies to restore power to areas that are still cut off
- Establish mobility (public access) to towns that currently have emergency access only
- Establish mobility along East/West corridors (to include truck traffic/commerce)
- Inspect all bridges of concern
- Prepare state roads for winter operations
Emergency Response Lessons Learned

- Use of ICS is crucial to success
- Choose leaders early
- Train leaders intensely
- Enhance technology available to ICS leaders
- Train all staff in ICS
- Adopt SOP that incorporate structure of UC and role of IT
- Communicate – constantly
- Celebrate milestones
Irene Response Sparked Innovation

- Use of cross-functional teams
- Infusion of tech-savvy staff
- Empowering staff to make decisions at local level
- Close roads more frequently for repairs
- Streamline design process
2013 Year-to-date Rainfall
2013 Vermont /NE Rainfall to date
Vermont’s Transportation Resilience Plan

Vulnerability Assessment

Risk Assessment

Adaptation Strategies

Implementation Actions

FEH Boundary
Flood Zone
State Structures
River Channel
2013 Revenue Package (2 years)

- Decrease per gallon tax ~ 19¢ to 12.3¢
- 4% assessment on gas at distributor
- 3% increase diesel tax
- Bonding ~ bridges
- Net “per gallon equivalent” = 6.7¢
  - Floor ~ $3.79 gallon
  - Ceiling ~ $5.00 gallon
Adaptation/Resilience

Natural Resources
Rivers
Agency of Natural Resources
FEMA

Infrastructure
Roads
Agency of Transportation
FHWA
Tropical Storm Irene August 27, 2011
Hurricane Sandy October 22, 2012 – October 31, 2012
National Performance Measures
Performance Management Overview

Ananth Prasad
July 22, 2013
What is performance Management?

- Goals/Objectives
- Performance Measures
- Target Setting
  - Evaluate Programs, Projects, and Strategies
- Allocate Resources
  - Budget and Staff
- Measure, Evaluate, and Report Results
  - Actual Performance Achieved

Quality Data
Core Principles of Performance Management

• Policy Driven
  – Well-defined goals and objectives

• Performance-based
  – Objectives can be translated into quantitative measures

• Analysis of Options and Tradeoffs
  – Tools and data available to evaluate alternatives

• Decisions Based on Quality Information
  – Decisions made using credible and current data
MAP-21 Policy Areas

- Performance Measures
- Performance Plans
- Target Setting
- Making Progress
- Sanctions
- Reporting
Performance Measures

Key Implementation Issues

• Define a limited set of appropriate and credible performance measures

• Address six issues:
  1. Is the measure focused?
  2. Has it been developed in partnership?
  3. Is it maintainable to accommodate changes?
  4. Can it be used to support investment decisions, policy making and target setting?
  5. Can the measure be used to analyze performance trends?
  6. Has the feasibility and practicality to collect, store and report data been considered?
SCOPM Activities

- Develop Recommendations on National-level Performance Measures
- Develop Recommendations on Target Setting and Reporting
- Explore Communication Options
SCOPM Task Force Purpose

- Assist SCOPM and AASHTO recommend a limited number of national performance measures to meet MAP-21 requirements
  - Including issues related to the recommended performance measures
  
  
  http://scopm.transportation.org

- Help prepare AASHTO members meet new Federal performance management requirements

- Develop strategies for communicating national performance measure reporting requirements

- Helping educate the general public on the need for transportation investment in our nation
Overarching Principles

1. **There is a Difference**—National-level performance measures are not necessarily the same performance measures State DOTs will use for planning and programming of transportation projects and funding.

2. **Specificity and Simplicity**—National-level performance measures should follow the SMART and KISS principles:
   - SMART: Specific, Measurable, Attainable, Realistic, Timely
   - KISS: Keep it Short and Simple

3. **Possession is 9/10ths of the Law**—National-level performance measures should focus on areas and assets that States DOTs have control over.
4. **Reduce and Re-use**—The initial set of national-level performance measures should build upon existing performance measures, management practices, data sets and reporting processes.

5. **Ever Forward**—National-level measures should be forward thinking to allow continued improvement over time.

6. **Communicate, Communicate, Communicate, Communicate**—Messaging the impact and meaning of the national-level measures to the public and other audiences is vital to the success of this initiative.
Safety
Recommended Measures

- **Number of Fatalities**—Five-year moving average of the count of the number of fatalities on all public roads for a calendar year.

- **Fatality Rate**—Five-year moving average of the Number of Fatalities divided by the Vehicle Miles Traveled (VMT) for a calendar year.

- **Number of Serious Injuries**—Five-year moving average of the count of the number of serious injuries on all public roads for a calendar year.

- **Serious Injury Rate**—Five-year moving average of the Number of Serious Injuries divided by the Vehicle Miles Traveled (VMT) for a calendar year.
Pavement Recommended Measures

- **Interstate Pavement in Good, Fair and Poor Condition based on the International Roughness Index (IRI)**—Percentage of 0.1 mile segments of Interstate pavement mileage in good, fair and poor condition based on the following criteria: good if IRI<95, fair if IRI is between 95 and 170, and poor if IRI is greater than 170.

- **Non-Interstate NHS Pavement in Good, Fair and Poor Condition based on the International Roughness Index (IRI)**—Percentage of .1 mile segments of non-Interstate NHS pavement mileage in good, fair and poor condition based on the following criteria: good if IRI<95, fair if IRI is between 95 and 170, and poor if IRI is greater than 170.

- **Pavement Structural Heath Index**—Percentage of pavement which meet minimum criteria for pavement faulting, rutting and cracking.
The first measure is required in MAP-21 and AASHTO supports this as an initial measure. However, this measure could steer a State DOT to implement a worst-first approach for maintaining bridge condition. Therefore, AASHTO is exploring the second measure.
Where must measures be established?

1. Performance of the Interstate System
   <double blue line>
2. Performance of the National Highway System (excluding the Interstate System)
   <red line>
System Performance
Virginia: Interstates (I-66)
System Performance
Virginia: NHS (Route 50)
Virginia: Arterials

Columbia Pike: Fairfax, VA
- Posted Speed Limit: 40 MPH
- Design Speed: 50 MPH
- Land Use: Low Density

Columbia Pike: Arlington, VA
- Posted Speed Limit: 25 MPH
- Design Speed: 35 MPH
- Land Use: Medium Density
System Performance
Recommended Measures

- **Annual Hours of Delay (AHD)**—Travel time above a congestion threshold (defined by State DOTs and MPOs) in units of vehicle-hours of delay on Interstate and NHS corridors.

- **Reliability Index (RI$_{80}$)**—The Reliability Index is defined as the ratio of the 80th percentile travel time to the agency-determined threshold travel time.
Freight Recommended Measures

- **Annual Hours of Truck Delay (AHTD)**—Travel time above the congestion threshold in units of vehicle-hours for trucks on the Interstate Highway System.

- **Truck Reliability Index ($RI_{80}$)**—The RI is defined as the ratio of the 80th percentile total truck travel time needed to ensure on-time arrival to the agency-determined threshold travel time (e.g., observed travel time or preferred travel time).
For purposes of carrying out section 149, the Secretary shall establish measures for States to use to assess:

1. Traffic Congestion
2. On-Road Mobile Source Emissions
• **On-road Mobile Source Emissions**
  – **Criteria Pollutant Emissions**—Daily kilograms of on-road, mobile source criteria air pollutants (VOC, NOx, PM, CO) reduced by the latest annual program of CMAQ projects.

• **Traffic Congestion**
  – **Annual Hours of Delay (AHD)**—Travel time above a congestion threshold (defined by State DOTs and MPOs) in units of vehicle -hours of delay reduced by the latest annual program of CMAQ projects.

*These measures apply only to MPOs that serve Transportation Management Areas (TMAs) with populations of over 1,000,000 and that are nonattainment or maintenance areas.*
Target Setting

• Provide maximum flexibility
• Focus on what matters: the right outcome
• Align targets with system ownership and funding levels
• Base target setting on longer term trend data
• Coordinate target setting through a continuing, cooperative and comprehensive process
• Tell the story: performance is more than just a number
Target Setting (continued)

- Avoid unachievable targets or the “one size fits all” approach
- Allow for appropriate timeliness for target achievement
- Guard against unintended consequences
- Complement flexibility in target setting with transparency and accountability
- Allow flexibility for DOTs and MPOs to use risk-based target setting approach
Communications Workshop

• Held workshop on March 25 and 26 in Salt Lake City, UT
  1. Offer input to FHWA/U.S. DOT on communicating national performance information that is provided by the states;
  2. Develop guidance for the states on communicating national performance measures; and
  3. Identify a clear set of next steps to move the states’ agenda forward.

• National Communications Template

• States’ Messages
  – Freight: FL, MN
  – Bridge: TN, MD, WI, KS
  – Pavement: MO, OK
  – Safety: AZ, CA, NE, UT, VT, MN

• Determine National Performance Measure Information Management Approach
Next Steps

• Prepare for responding to NPRM
• Coordinate performance-related response to NPRM
  – SCOPM will work with subject-matter experts from various committees
• Implement Final Rule
### USDOT Implementation of MAP-21 Performance Provisions: Nine Interrelated Rules

#### Planning
- **Metropolitan and Statewide Planning Rule**
  - Establish a performance-based planning process at metropolitan and state level.
  - Define coordination in the selection of targets, linking planning and programming to performance targets.

#### Highway Safety
- **Safety Performance Measure Rule**
  - Propose and define fatalities and serious injuries measures, along with target establishment, progress assessment and reporting requirements.
  - Discuss the implementation of MAP-21 performance requirements.

- **Highway Safety Improvement Program (HSIP) Rule**
  - Integration of performance measures, targets, and reporting requirements into the HSIP.
  - Strategic Highway Safety Plan updates.

- **Highway Safety Program Grants Rule**
  - State target establishment and reporting requirements.
  - Highway safety plan content, reporting requirements, and approval.
  - *Interim Final Rule issued by NHTSA in January 2013.*

#### Highway Conditions
- **Pavement and Bridge Performance Measure Rule**
  - Propose and define pavement and bridge condition measures, along with minimum condition standards, target establishment, progress assessment and reporting requirements.

- **Asset Management Plan Rule**
  - Contents and development process for asset management plan.
  - Minimum standards for pavement and bridge management systems.

#### Congestion/System Performance
- **System Performance Measure Rule**
  - Define performance of the interstate system, non-interstate national highway system, and freight movement on the interstate system.
  - Finalize interpretation of scope of CMAQ performance requirements, including congestion and on-road mobile source emissions.
  - Summarize MAP-21 highway performance measure rules.

#### Transit Performance
- **Transit State of Good Repair Rule**
  - Define state of good repair and establish measures.
  - Transit asset management plan content, target establishment and reporting requirements.

- **Transit Safety Plan Rule**
  - Define transit safety standards.
  - Transit safety plan content and reporting requirements.

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*The Federal Transit Administration plans to issue an Advance Notice of Proposed Rulemaking (ANPRM) for each of these two proposed rules in the summer of 2013, providing an additional comment period.*

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#### Anticipated Coordinated Performance Measure Effective Date

- **Indicates the comment period**
- **Q4 2013**
- **Q1 2014**
- **Q2 2014**
- **Q3 2014**
- **Q4 2014**
- **Q1 2015**
- **Q2 2015**
- **Q3 2015**
- **Q4 2015**
ARTBA Contract Administration Committee
Annual Meeting
June 3, 2013 | Washington, DC

Construction Peer Network

Chris Schneider
Office of Asset Management,
Pavement and Construction

U.S. Department of Transportation
Federal Highway Administration

ARTBA
Purpose

• To improve the quality of construction and the delivery of highway projects. The goals are to:
  
  – Foster communication and innovation among the highway construction community
  – Identify best construction processes and practices
  – Share widely, and encourage implementation of, successful processes and practices; and
  – Identify opportunities for continuous program improvement
Desired Outcomes

• Improved communication/understanding
• Identification of successful construction practices
• Implementation & adoption of successful practices
• Written Media (reports, case studies, new or improved specifications and guidance documents)
CPN Process

involves two steps -

• Collect information
  – Program Information Tool (survey, voluntary)

• Share information & facilitate implementation
  – Regional peer exchanges with DOTs and other stakeholders
PI Tool Focus Areas

1. Project Supervision and Staffing
2. Construction Safety
3. Construction Administration
4. Construction Quality
5. Innovation
6. Communications/Data/Information Sharing
PI Tool Design

- Steering Team Driven
- Simple, Yet Informed on a Variety of Topics
- Easily Implemented
- Designed to Maximize Participation
**PI Tool Question Structure**

**Core Element** (Key Process)

**Frequency** (How Often?)

**To What Extent**

**Priority**

**Peer Exchange-Worthy**

---

**Determine Levels of Staffing**

<table>
<thead>
<tr>
<th>How often does your agency use this process? Please select the best response.</th>
<th>To what extent has the process or procedure been implemented? Please select the best response.</th>
<th>Select this box if use of this process is a high priority for your agency.</th>
<th>Select this box if you feel that a Peer Exchange on this topic would be useful.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>Rarely (&lt;5% Frequency)</td>
<td>Occasionally (&lt;20% Frequency)</td>
<td>Often (&lt;75% Frequency)</td>
</tr>
</tbody>
</table>

**Determine Staffing Levels on a Project**
- (methods to ensure enough staff)
- (methods to reduce staffing needs)

**Determine Staffing Levels for Current Construction Season**

---
Peer Exchanges

Boise, ID
July 9-10, 2013

Salt Lake City, UT,
November 14-15, 2012

Detroit, MI
July 11-12, 2012

Orlando, FL
March 6-7, 2013

Providence, RI
March 6-7, 2012

SW  NW  SE  Midwest  NE
Southwest Peer Exchange

16 “key takeaways”-

• Determining Staffing Levels on Projects
  – Utilizing Maintenance Personnel for Construction Inspection
  – Using a Statewide Program for Total Staffing Needs

• Assessing Inspection LOE with Risk-based Processes
  – Using Checklists to Improve Construction Inspection
  – Using Web-based Videos to Train Inspection Forces

• Implementing the Digital Jobsite
  – Paper to a Digital (Electronic) Worksite
  – Automated Machine Control
Southeast Peer Exchange

12 “key takeaways”-

- Implementing Innovative Practices and Tools for Inspection
  - Implementing Intelligent Compaction
  - Using RFID Tags for Inspection Information
  - Use of Field Data Collection Technologies such as Tablets, Video, LiDAR, and Maturity Meters

- Using Innovative Methods to Resolve Contract Claims and Disputes
  - Joint Utility Plan
  - Use of Partnering, Industry Input, and Dispute Review Boards
Summary Reports

AASHTO SOC Website:
http://construction.transportation.org/Pages/ConstructionPeerNetworking.aspx
Popular Exchange Topics

1. Assess inspection levels of effort with risk-based processes (Construction Quality)
2. Develop and track meaningful performance measures (Construction Quality)
3. Implement innovative practices and tools for inspection (Construction Quality)
4. Use innovative methods to resolve contract claims and disputes (Innovation)
5. Implement the digital jobsite (Construction Admin)
6. Allow contractors to develop and/or utilize innovative construction methods (Construction Admin)
Bridge Coating Assessment

- Is Corrosion > 20%?
  - Y: Overcoating meet SSPC TU3*?
  - N: Calculate cost to remove and replace ($rr)

- Is Corrosion > 10%?
  - Y: Calculate cost to overcoat ($oc)
  - N: Continue monitoring

- Overcoating meet SSPC TU3*?
  - Y: Calculate cost to overcoat ($oc)
  - N: Remove and Replace

- Calculate cost to remove and replace ($rr)
  - $rr < $oc?
    - Y: Overcoat
    - N: $oc < $sp
  - $rr ≥ $oc?
    - Y: Aesthetic Issue?
    - N: Calculate cost to spot

- Aesthetic Issue?
  - Y: Overcoat
  - N: $oc < $sp

- $oc < $sp?
  - Y: Spot Paint
  - N: Overcoat

*SSPC TU3 - Society of Protective Coatings Technology Update 3. This update is utilized to assess whether the risk of overcoating an existing coating is warranted. Risk is assessed on adhesion and existing coating thickness. These parameters are usually quantified during an on-site condition assessment per ASTM standards.
### Bridge Paint Cost Analysis Tool

**Painting Costs $/ft²**

<table>
<thead>
<tr>
<th></th>
<th>Pb</th>
<th>No Pb</th>
<th>Expected Service Life</th>
<th>Maintenance of Traffic Required (Days)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spot Paint</td>
<td>$10.00</td>
<td>$7.00</td>
<td>4.5</td>
<td>30</td>
</tr>
<tr>
<td>Over Coat</td>
<td>$5.00</td>
<td>$3.00</td>
<td>9</td>
<td>75</td>
</tr>
<tr>
<td>Remove &amp; Replace</td>
<td>$9.00</td>
<td>$5.00</td>
<td>20</td>
<td>100</td>
</tr>
</tbody>
</table>

*The values in this table need to be specific to the structure.*

#### 20 year Coating Maintenance Combinations

- **Remove and Replace**
  - 1
- **Overcoat**
  - 2
  - 1
- **Spot Paint**
  - 1
  - 3
  - 5

**Green Input Parameters**

**Red Calculated Parameters**

#### Example Conditions

<table>
<thead>
<tr>
<th>Maintenance of Traffic Cost ($/day)</th>
<th>650</th>
</tr>
</thead>
<tbody>
<tr>
<td>ft²</td>
<td>150,000</td>
</tr>
<tr>
<td>Pb Present</td>
<td>yes</td>
</tr>
<tr>
<td>Corrosion</td>
<td>11%</td>
</tr>
<tr>
<td>Interest rate</td>
<td>3%</td>
</tr>
</tbody>
</table>

#### 20 year analysis

**Remove and Replace**

- Future Value of MOT at yr 20: ($118,349.07)
- Future Value Cost to Remove and Replace: ($2,576,368.32)
- Present Value Cost of Paint without MOT: $1,350,000.00
- Present Value Cost of Paint with MOT: $1,415,000.00

**2 overcoats and 1 spot paint (5% progressive corrosion)**

- Future Value of MOT at yr 20: ($177,247.85)
- Present Value Cost to Overcoat: ($750,000.00)
- Value of Initial Overcoat at yr 20: ($1,365,566.25)
Value of second Overcoat at yr 20  ($1,042,796.57)
Value of Spot paint at yr 20  ($334,453.47)
Total Future Value Cost at year 20  ($2,920,064.13)
Present Value Cost  $1,603,765.55

1 Overcoat and 3 spot paints (5% progressive corrosion)
Future Value of MOT at yr 20  ($166,934.11)
Present Value Cost to Overcoat  ($750,000.00)
Value of Initial Overcoat at yr 20  ($1,365,566.25)
Value of First Spot Paint at yr 20  ($333,694.90)
Value of Second Spot Paint at yr 20  ($382,729.81)
Value of Third Spot Paint at yr 20  ($414,085.25)
Total Future Value Cost at year 20  ($2,663,010.32)
Present Value Cost  $1,462,585.76

5 spot paints (5% progressive corrosion)
Future Value of MOT at yr 20  ($149,300.12)
Present Value Cost to Spot Paint  ($165,000.00)
Value of Initial Spot Paint at yr 20  ($300,424.57)
Value of 2nd Spot Paint at yr 20  ($381,861.75)
Value of 3rd Spot Paint at yr 20  ($437,974.56)
Value of 4th Spot Paint at yr 20  ($473,855.96)
Value of 5th Spot Paint at yr 20  ($493,717.03)
Total Future Value Cost at year 20  ($2,237,134.00)
Present Value Cost  $1,228,684.81
AASHTO Subcommittee on Maintenance - Bridge Technical Working Group (BTWG)

Research Update

July 22, 2013

J. L. Milton

Vice Chair – BTWG
Bridge Preservation Specialist
Virginia Department of Transportation
Complete NCHRP Projects

Active NCHRP Projects

Active NCHRP Projects

Active NCHRP Projects

• NCHRP 14-30 – “Spot Painting to Extend Highway Bridge Coating Life” – Negotiations with selected research agency underway

• NCHRP 20-07 Task 330 – “Waterproofing of Bridge Decks Using Pavement Preservation Products” – Project tentatively selected
NCHRP Problem Statements Developed by the BTWG at the 2012 SCOM Meeting:

• Quantifying Environmental Benefits of Bridge Preservation
• Reducing Traffic Impacts When Performing Bridge Maintenance and Preservation Actions
NCHRP Problem Statements Developed by the BTWG at the 2012 SCOM Meeting:

• Investigation of the Use of Reduced Residual Compressive Stresses for Arresting Steel Girder Cracks Induced by Out-of-Place Bending

• Identifying and addressing failures of small movement bridge expansion joints
NCHRP Problem Statements Developed by the BTWG at the 2012 SCOM Meeting:

• Current Practices, Benefits, and Environmental Requirements for Bridge Cleaning and Washing
• Detection and Remediation of Chloride Contamination Prior to Coating Structural Steel
NCHRP Problem Statements Developed by the BTWG at the 2012 SCOM Meeting That Were Recommended and Funded:

• Identifying and addressing failures of small movement bridge expansion joints – New Project # 12-100 – Funded for $150,000

• Current Practices, Benefits, and Environmental Requirements for Bridge Cleaning and Washing – Funded by FHWA – Research underway by the University of Washington
Possible NCHRP Problem Statements for Consideration by the Bridge Technical Working Group at the 2013 Meeting:

- Reducing Traffic Impacts When Performing Bridge Maintenance and Preservation Actions – this was re-submitted in the Spring 2013 Call for Projects – check Status
- Resubmit - Quantifying Environmental Benefits of Bridge Preservation
Possible NCHRP Problem Statements for Consideration by the Bridge Technical Working Group at the 2013 Meeting:

• Resubmit - Investigation of the Use of Reduced Residual Compressive Stresses for Arresting Steel Girder Cracks Induced by Out-of-Place Bending
• Resubmit - Detection and Remediation of Chloride Contamination Prior to Coating Structural Steel
Possible NCHRP Problem Statements for Consideration by the Bridge Technical Working Group at the 2013 Meeting:

- Structural Rehabilitation of Corrugated Metal Pipe through Application of a Centrifugally Cast Cementitious Material – considered at the 2012 meeting, but not submitted
- Bridge Deck Joint Performance Synthesis – previous Synthesis 319 prepared in 2003
Possible NCHRP Problem Statements for Consideration by the Bridge Technical Working Group at the 2013 Meeting:

• Synthesis – Maintenance for Fatigue Cracking in Steel Bridge Superstructures – previously submitted by TRB Structures Maintenance Committee (AHD30) – not selected, but received positive comments – support from an ASHTO Subcommittee should be beneficial for this project
Bridge Washing

CHRIS KEEGAN, P.E.
Olympic Region Operations Engineer.

Lynn Peterson
Secretary of Transportation

AASHTO SCOM
Burlington, Vermont
July 21 to 25, 1913
DETERMINING THE COST/BENEFIT OF ROUTINE MAINTENANCE CLEANING OF STEEL BRIDGES TO PREVENT STRUCTURAL DETERIORATION FINAL REPORT
Chloride levels decreased with a washing cycle of once per day, but no change was observed with washing cycles of once per week or once per month.
Bridge Washing

- 2010 – 7 bridges, cost: $98,289 = $14,041/bridge
- 2011 – 8.5 bridges, cost $91,219 = $10,731/bridge
- 2012 – 12 bridges, cost: $87,350 = $7279/bridge
- 2013 – 16 bridges, cost $93,600. = $5850
- 51% reduction in cost per bridge
<table>
<thead>
<tr>
<th>Bridge #</th>
<th>Bridge Name</th>
<th>Hand clean then flush</th>
<th>Flush Only</th>
<th>Traffic Control</th>
<th>Cleaning 1922</th>
<th>Total</th>
<th>Hand clean Then Flush Cost</th>
<th>Flush Only Cost</th>
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<tbody>
<tr>
<td>1</td>
<td>101/150 Humptulips River</td>
<td>X</td>
<td></td>
<td>$ 1,763.50</td>
<td>$ 6,315.55</td>
<td>$ 8,079.05</td>
<td>$ 8,079.05</td>
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<tr>
<td>2</td>
<td>101/308 Calawah River</td>
<td>X</td>
<td></td>
<td>$ 1,015.51</td>
<td>$ 4,022.76</td>
<td>$ 5,038.27</td>
<td>$ 5,038.27</td>
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<tr>
<td>3</td>
<td>101/310 Sol Duc River #1</td>
<td>X</td>
<td></td>
<td>$ 1,964.66</td>
<td>$ 6,806.21</td>
<td>$ 8,770.87</td>
<td>$ 8,770.87</td>
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<tr>
<td>4</td>
<td>101/314 Sol Duc River # 2</td>
<td>X</td>
<td></td>
<td>$ 2,345.82</td>
<td>$ 8,920.47</td>
<td>$11,266.29</td>
<td>$11,266.29</td>
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<tr>
<td>5</td>
<td>101/316 Sol Duc River # 3</td>
<td>X</td>
<td></td>
<td>$ 719.09</td>
<td>$ 4,174.87</td>
<td>$ 4,893.96</td>
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<tr>
<td>6</td>
<td>101/320 Sol Duc River # 4</td>
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Average to hand clean and flush $9,211.55
Average cost just to flush $6,312.94
## BRIDGE CLEANING
### OLYMPIC REGION 2013

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<td>$2,071.08</td>
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</table>

Average to hand clean and flush: $8,450.02
Average just to flush: $4,983.11

- Clean and flush Cost per square foot $1.43
- Flush only Cost per square foot $0.53

* Hand cleaned the Big Quilcene only. Did not flush. Paint chipped off.
Skagit River Bridge
Floor beam 6 after cleaning
Span 6 L4 Typical rust exposed after cleaning
Result

• $2 million dollars taken from roadway markings to clean bridges this biennium.

• Recommendations:

• - Purchase a UB -40. It along with the 4 inspection UBITS will get the program going.

• - Contract with USDA to remove pigeons from selected bridges.

• - Clean 32 bridges, newly painted bridges or inspection repair to clean before next inspection.
MAP-21 Update

AASHTO SCOM, BTWG Meeting, Burlington, VT
July 22, 2013

Anwar S. Ahmad, P.E.
Bridge Preservation Engineer
Federal Highway Administration
Office of Bridge Technology
MAP-21 Performance Requirements

- National Goals
- Measures
- Targets
- Plans
- Reports
- Accountability
National Goals - 23USC150(b)

Focus the Federal-aid program on the following national goals:

1) **SAFETY**

2) **INFRASTRUCTURE CONDITION** - maintain the highway infrastructure asset system in a state of good repair.

3) **CONGESTION REDUCTION**

4) **SYSTEM RELIABILITY**

5) **FREIGHT MOVEMENT AND ECONOMIC VITALITY**

6) **ENVIRONMENTAL SUSTAINABILITY**

7) **REDUCED PROJECT DELIVERY DELAYS**
## Group Measures Based on Readiness

<table>
<thead>
<tr>
<th>PROGRAM</th>
<th>MEASURE CATEGORY</th>
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<td><strong>STATUS I</strong>&lt;br&gt;4th Qtr CY2013</td>
<td>Serious Injuries per VMT&lt;br&gt;Fatalities per VMT&lt;br&gt;Number of Serious Injuries&lt;br&gt;Number of Fatalities</td>
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<td><strong>STATUS II</strong>&lt;br&gt;4th Qtr CY2013</td>
<td>Pavement Condition on the Interstates&lt;br&gt;Pavement Condition on the Non-Interstate NHS&lt;br&gt;Bridge Condition on NHS</td>
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<td><strong>STATUS III</strong>&lt;br&gt;1st Qtr CY2014</td>
<td>Traffic Congestion&lt;br&gt;On-road mobile source emissions&lt;br&gt;Freight Movement&lt;br&gt;Performance of Interstate System&lt;br&gt;Performance of Non-Interstate NHS</td>
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</tbody>
</table>
Requirements for Asset Management

- Each State is to develop a risk-based asset management plan for the National Highway System (NHS) - *(23 U.S.C. 119(e)(1), MAP-21 § 1106)*

- USDOT is to issue a regulation not later than 18 months after date of enactment, *(23 U.S.C. § 119(e)(8), MAP-21 § 1106)*
Asset Management Plans

- National Highway Performance Program
- Developed using process approved by USDOT
- Recertified every 4 years
Asset Management Plan

- Plan Contents
  - pavement and bridge inventory and conditions on the NHS,
  - objectives and measures,
  - performance gap identification,
  - lifecycle cost and risk management analysis,
  - a financial plan, and
  - investment strategies
Bridge Element Level Inspection Data

- National Highway System
  - 3/12/13 Guidance memorandum
  - Begin collecting by Oct 1, 2014
  - Begin reporting by April 2015

Memorandum

Subject: INFORMATION: Collection of Element Level Data for National Highway System Bridges
Date: March 12, 2013

Original Signed by
M. Myers, P.E., S.E.
Director, Office of Bridge Technology

To: Federal Lands Highway Division Engineers
   Director of Technical Services
   Division Administrators

This memorandum provides initial guidance on the collection of element level data for bridges on the National Highway System (NHS). Section 1111 of the Moving Ahead for Progress in the 21st Century Act (MAP-21) modified 23 U.S.C. 144, which requires each State and appropriate Federal agency to report bridge element level data to the Secretary.

The following are frequently asked questions and answers regarding the collection of element level data for NHS bridges:

When does the requirement to collect element level bridge inspection data for NHS bridges take effect?
In accordance with 23 U.S.C. 144(b)(2), commencing on October 1, 2014, State and Federal agencies that have not already done so are to begin collecting element level data as each NHS highway bridge is field inspected in accordance with 23 CFR 650 Subpart C.

When will the element level data for NHS bridges be reported to the Federal Highway Administration (FHWA)?

As a supplement to the National Bridge Inventory (NBI) data submission due April 1, 2015, and every year thereafter, each State and Federal agency will also provide element level bridge inspection data for bridges on the NHS to the FHWA for inclusion in the NBI.

How will the data be submitted?
Initially, the element level bridge inspection data is to be submitted as an extensible markup language (XCLM) file separate from the NBI 432 character text file. Both the NBI...
Element Level Inspection Data

- Non-National Highway System
  - Study to be conducted
  - Federal Register Notice (3/22/13)
MAP-21 Rulemakings

- Asset Management
  - Draft rule written - currently undergoing legal review.
  - Expect NPRM to be issued late fall 2013, with final rule late Summer 2014.

- Performance Measures
  - 3 separate rules
    - Bridge conditions on NHS to be part of 2nd rule by end of CY 2013
    - Will cover measures for pavements and bridges, data standards, target setting, assessing progress, and reporting
NBIS Regulations Update

- Mandated by MAP-21
  - Methodology, training, and qualifications for inspectors
  - Frequency of inspections
- Three years to complete (October 2015)
NBIS Update
Risk-based inspection intervals

Is 24 months the right interval for both of these bridges?
NBIS Update
Procedure for National Certification of Inspectors
NBIS Update
Procedures for Reporting “Critical Findings”

- Relate to structural or safety-related deficiencies of highway bridges

- Monitoring activities and corrective actions taken in response to a critical finding
**Question:** How will a State justify proposed bridge projects under MAP-21?

**Answer:** There are four main programs that provide funding for bridge projects.

- National Highway Performance Program (NHPP)
- Surface Transportation Program (STP)
- Highway Safety Improvement Program (HSIP)
- Congestion Mitigation and Air Quality Improvement Program (CMAQ)

Each of these programs include eligible activities and Eligibility requirements.
National Highway Performance Program- 23 USC 119

- Funds an enhanced National Highway System,
- Combines NHS, IM and Bridge Programs from past legislation
- Requires a risk-based asset management plan
- States set targets for conditions and performance
National Highway Performance Program- 23 USC 119

- Eligible Facility = Any facility on the NHS
- Eligible Project = Supports the national performance goals and meets at least one listed purpose
- NHS performance targets set by state as part of an asset management plan
  - Law sets standard for NHS bridges -- no more than 10% of deck area may be structurally deficient
  - Risk and performance based
  - In line with national goals, specified in law (23 USC 150)
Eligible Activities Include:

• Construction, Replacement, Rehabilitation, Preservation, Inspection, Evaluation, Inspector Training

• Protection – scour countermeasures, seismic retrofits, impact protection, security, extreme events

• Costs associated with obtaining, updating, and licensing software and equipment required for asset management

• Inspection and evaluation of other infrastructure assets (Signs, walls, drainage structures)
Surface Transportation Program- 23 USC 133

- Eligible Facility = Any facility including bridges and tunnels on public roads of all functional classifications
- Eligible Activities Include:
  - Construction of new bridge or tunnel on a Federal-aid Highway, replacement, rehabilitation, preservation, protection, application of de-icing chemicals, inspection, evaluation, inspector training
**Question:** What if a State Doesn’t have an approved Asset Management Plan?

**Answer:** If no approved asset management plan in place, Federal share for NHPP will be limited to 65%
Question: Does MAP-21 require agreements between State agencies and FHWA for the use of federal funds for preventive maintenance on highway bridges?

Answer: MAP-21 doesn’t require agreements; however, preventive maintenance activities are eligible for federal-aid funding provided that the activities are cost effective means of extending the useful life of a Federal-aid highway per 23 USC 116(e).

Programmatic agreements between a state agencies and FHWA are encouraged for efficiency purposes. Lack of such agreements would require project approval on a case by case basis.
Thank You

Questions

Anwar S. Ahmad, P.E.
Bridge Preservation Engineer
Federal Highway Administration
Telephone: (202) 366-8501
Email: Anwar.Ahmad@dot.gov
A Rational Approach for Planning Bridge Repainting Projects

Presentation prepared by Jeff Pouliotte, FDOT
Presented by Tim Lattner, FDOT
Purpose

• At the 2012 SEBPP Annual Meeting Jeff was asked to provide guidance to help other Southeastern States plan for and execute bridge repainting projects

• To achieve this objective a Team of Bridge Practioners and Paint Experts were assembled

• It was decided that a Report was needed to:
  – Develop a rational cost effective approach to evaluate paint options
  – Provide general guidance on what to do to achieve maximum service life for the option selected
SEBPP Paint Group Team

- Jeff Pouliotte, Florida DOT (SEBPP Member)
- Paul Vinik, Florida DOT (NTPEP Member)
- Wayne Fleming, Virginia DOT (NTPEP Member)
- Jeff Milton, Virginia DOT (SEBPP Member)
- Ed Welch, TSP-2
- Anwar Ahmad, FHWA
- Brian Hunter, North Carolina DOT
- Aaron Dacey, North Carolina DOT (SEBPP Member)
- Bruce Johnson, Oregon DOT
- Richard Kerr, Florida DOT (SEBPP Member)
Approach

• Paint Options:
  – Remove and Replace existing coating system
  – Overcoat existing coating system
  – Spot paint areas on the structure where the existing coating system needs restoration

• As part of the Report, create Flowchart that rationally depicts how to evaluate Paint Options

• Create Spreadsheet Calculator to perform life cycle cost analyses to evenly evaluate and aid in the selection of the appropriate Paint Option
Variables in Economic Analysis

- Cost of Painting per square foot
- Expected service life
- Duration of Maintenance of Traffic (MOT)
- Cost of MOT per day
- Surface area of the steel to be painted
- Presence of Heavy Metals
- Percent of Corrosion
- Current Interest Rate
Best Practices

• Field Evaluations
• Surface Preparation
• Coatings Application
• Quality Control
• Personnel Qualifications
• Contractor Qualifications
• Quality Assurance
• Inspection and Compliance Evaluations
Flowchart to select Paint Option

*SSPC TU3 - Society of Protective Coatings Technology Update 3. This update is utilized to assess whether the risk of overcoating an existing coating is warranted. Risk is assessed on adhesion and existing coating thickness. These parameters are usually quantified during an on-site condition assessment per ASTM standards.
Flowchart to select Paint Option

Bridge Coating Assessment

- Is Corrosion >20%? (Y/N)
  - Y: Overcoating meet SSPC TU3*?
    - N: Calculate cost to remove and replace ($rr)
    - Y: Calculate cost to overcoat ($oc)
  - N: Continue monitoring

- Is Corrosion >10%? (Y/N)
  - Y: Aesthetic Issue?
    - N: Calculate cost to spot
    - Y: Continue monitoring

*SSPC TU3 - Society of Protective Coatings Technology Update 3. This update is utilized to assess whether the risk of overcoating an existing coating is warranted. Risk is assessed on adhesion and existing coating thickness. These parameters are usually quantified during an on-site condition assessment per ASTM standards.
Flowchart to select Paint Option

*SSPC TU3 - Society of Protective Coatings Technology Update 3. This update is utilized to assess whether the risk of overcoating an existing coating is warranted. Risk is assessed on adhesion and existing coating thickness. These parameters are usually quantified during an on-site condition assessment per ASTM standards.

1. Remove and Replace
   - Y → Aesthetic Issue?
   - N → Calculate cost to spot
2. Aesthetic Issue?
   - Y → $rr < $oc?
   - N → Overcoat
3. $rr < $oc?
   - Y → $oc < $sp
   - N → Overcoat
4. $rr < $sp
   - Y → Overcoat
   - N → Spot Paint
5. $oc < $sp
   - Y → Overcoat
   - N → Spot Paint
Draft Report

A Rational Approach
for Planning Bridge Repainting Projects

Southeast
Bridge Preservation Partnership

April 9, 2013

Paul Vinik, P.E.
State Structural Materials Systems Engineer
Florida Department of Transportation

Jeff Pouliotte, P.E.
State Structure Maintenance Engineer
Florida Department of Transportation

Curtis "Wayne" Fleming
Senior Materials Office Technician
Virginia Department of Transportation
New Florida Bridge
Questions?

Jeff Pouliotte
Florida Department of Transportation
850-410-5691
Jeffrey.pouliotte@dot.state.fl.us
A Rational Approach
for Planning Bridge Repainting Projects

April 9, 2013

Paul Vinik, P.E.
State Structural Materials Systems Engineer
Florida Department of Transportation

Jeff Pouliotte, P.E.
State Structure Maintenance Engineer
Florida Department of Transportation

Curtis “Wayne” Fleming
Senior Materials Office Technician
Virginia Department of Transportation
Introduction

The objective of a good bridge preservation program is to maximize service life while minimizing cost. This document is intended to help guide engineers to achieve this goal using a rational decision process and cost estimation calculation. A cost comparison spreadsheet, and process map (flow chart) have been developed as a part of this report. By using these tools an engineer can input project specific parameters and evenly compare the cost of all three alternative painting schemes. These schemes are: remove and replace the existing coating system, overcoat the existing coating system, or spot paint specific areas on the structure where the existing coating system needs restoration. By utilizing time-value of money calculations, the cost of these three schemes can be compared, allowing a cost effective engineering decision to be made and implemented with regard to restoration and preservation of existing steel bridges.

The estimation of cost requires that parameters such as estimated service life, cost for maintenance of traffic and other project and geographic specific variables be entered by the user. A definition of the input parameters is provided below:

1) **Painting cost per square foot** of structure (with and without lead). This has to be evaluated per structure, since labor costs, location (over land or water, etc.), and structure type (truss, built up girders, rolled girders, box girders, etc.) play a big role in the cost to paint a structure.
2) **Expected service life.** Unknowns such as whether the structure is in a coastal location or inland and the existing condition of the structure will affect the expected service life of the newly applied coating and must be taken into account.
3) **Maintenance of traffic duration.** How long will maintenance of traffic be required? This will depend on the size of the structure, accessibility and the number of hours per day the contractor can work, and therefore has to be determined on a project by project basis.
4) **Cost per day for Maintenance of Traffic.** This will change relative to the extent of traffic control needed on a daily basis. For example, is the structure 6 lanes in an urban area or 2 lanes in a rural area?
5) **What is the surface area of the structure?**
6) **Heavy metals present?**
7) **Percent corrosion?** What is the amount of corrosion present on the structure that will need to be addressed prior to painting?
8) **The current interest rate.**

By entering this information the spreadsheet will calculate the cost of the three coating schemes, which can be utilized in conjunction with the flow chart to determine the most economical long term decision.
Bridge Coating Assessment

Is Corrosion >20%?

Y

Is Corrosion >10%?

Y

Continue monitoring

N

Calculate cost to remove and replace (Srr)

N

Overcoating meet SSPC TU3*?

Y

Calculate cost to overcoat (Soc)

N

Aesthetic issue?

Y

Calculate cost to spot

N

$rr < Soc?

Y

$rr < $sp

N

Overcoat

N

Soc < $sp

N

Spot Paint

Y

Remove and Replace
### Painting Costs S/R2*

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*The values in this table need to be specific to the structure.

### 20 year Coating Maintenance Combinations

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<td>650 Maintenance of Traffic Cost ($/day)</td>
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<td>150,000 Pb</td>
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<tr>
<td>yes Pb Present</td>
</tr>
<tr>
<td>19% Corrosion</td>
</tr>
<tr>
<td>3% Interest rate</td>
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### 20 year analysis

**Remove and Replace**

- Future Value of MOT at yr 20: ($128,349.07)
- Future Value Cost to Remove and Replace: ($2,803,255.07)
- Present Value Cost of Paint without MOT: $1,200,000.00
- Present Value Cost of Paint with MOT: $1,265,000.00

**2 overcoats and 1 spot point (5% progressive corrosion)**

- Future Value of MOT at yr 20: ($177,247.85)
- Present Value Cost to Overcoat: ($750,000.00)
- Value of Initial Overcoat at yr 20: ($1,365,566.25)
- Value of second Overcoat at yr 20: ($1,042,796.57)
- Value of Spot paint at yr 20: ($461,864.31)
- Total Future Value Cost at yr 20: ($3,047,814.98)
- Present Value Cost: $3,673,742.48

**1 Overcoat and 3 spot points (5% progressive corrosion)**

- Future Value of MOT at yr 20: ($466,934.11)
- Present Value Cost to Overcoat: $750,000.00
- Value of Initial Overcoat at yr 20: ($1,365,566.25)
- Value of First Spot Paint at yr 20: ($550,542.35)
- Value of Second Spot Paint at yr 20: ($528,311.65)
- Value of Third Spot Paint at yr 20: ($541,496.09)
- Total Future Value Cost at yr 20: ($3,163,070.45)
- Present Value Cost: $3,706,279.77

**5 spot points (5% progressive corrosion)**

- Future Value of MOT at yr 20: ($549,300.12)
- Present Value Cost to Spot Paint: $285,000.00
- Value of Initial Spot Paint at yr 20: ($1,169,915.17)
- Value of 2nd Spot Paint at yr 20: ($573,792.61)
- Value of 3rd Spot Paint at yr 20: ($604,822.04)
- Value of 4th Spot Paint at yr 20: ($519,657.79)
- Value of 5th Spot Paint at yr 20: ($621,127.87)
- Total Future Value Cost at yr 20: ($3,086,615.60)
- Present Value Cost: $3,695,239.40
Suggested Guidelines to achieve Quality Steel Bridge Repainting Projects

There are many alternatives and inputs associated with this decision process. It is difficult to execute this scheme without a fundamental structural and coatings knowledge base. In order to assist the responsible party, the following references and insight are provided:

- Like any other contracted project, in order to obtain representative bids that can be compared fairly, a well defined scope of work is critical.
- A specification or contract must be developed that clearly articulates the required levels of surface preparation and coating application. This contract should include quality control inspection frequencies and methodologies for verification of contract requirements.
- A strong quality assurance program should be implemented to verify that contractor quality control is effective. Quality assurance should incorporate hold-point-inspections to verify work is compliant with the contract. A hold-point is defined in the contract as a stoppage of work until quality assurance testing and compliance evaluation up to the present time is complete. Hold-point-inspections typically include:
  - Surface contamination assessment prior to abrasive blasting.
    - ASTM D 4417: Standard Test Methods for field measurement of surface profile of blast cleaned steel
    - SSPC AB1/AB2/AB3: Standards for the cleanliness of abrasives used to blast clean steel.
    - SSPC SP1: Solvent Cleaning
    - SSPC SP6: Commercial Blast Cleaning
    - SSPC SP10: Near White Blast Cleaning
    - SSPC Vis 1: Guide and Reference photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning
  - Prime, intermediate and finish coatings application including stripe coating.
    - SSPC PA1: Shop, Field and Maintenance Painting of Steel
    - Coating Manufacturer’s Product Data Sheet
    - SSPC PA2: Measurement of Dry Coating Thickness Using Magnetic Gages
    - Department of the Navy Tech Data Sheet 82-08: Paint Failures – Causes and Remedies
- In addition to those above, the following technical updates, guides and standards are available and are often incorporated into contract documents:
  - ASTM D-610 Test Method for Evaluating Degree of Rusting on Painted Steel Surfaces
  - ASTM D-714 Test Method for Evaluating Degree of Blistering Paints
  - SSPC Technology Update No. 3 Overcoating
The theoretical design life of a bridge has until recently been 50 years, but with the evolution of new design guidelines and construction materials the anticipated service life for newly constructed bridges is 75 years or greater. The anticipation of a longer service life for coated steel bridges can only be achieved in an economical fashion if bridge practitioners take advantage of the tools at their disposal, and base repainting decisions on well thought out economic evaluations. It is also essential to have properly qualified (NACE Certified) contractor and inspection personnel, a good quality control plan and practices, quality assurance inspections to ensure that the plan is being followed, and the Institutional courage to hold Contractors to their contractual obligations.
AASHTO TSP·2
Bridge Working Groups

SCOM-2013

SEBPP
WBPP
NEBPP
MWBPP
SE Working Groups

Bridge Painting: Chair – Jeff Paulette, FL
- Developing a Painting Cost Analysis Tool
- Survey best practices in Maintenance Painting and future needs

Bridge Preservation Performance Measures: Chair – Ben Whiter, Bentley Systems
- Seeking examples from SE States & input from ongoing national activities

Website Development: Chair - Jeff Milton, VA
- Supporting developments by NCPP of tsp2.org

Bridge Deck Preservation: - Atiq Alvi, T. Y. Lyn
- Work & Coordinate with other Regional Working Groups
Western Working Groups

Bridge Preservation Activities Matrix: Chair - Chris Keegan, WA

- Bridge specific; similar to auto maintenance and service manuals;
- Assist in future decisions for maintenance / preservation work; include:
  - List of cyclical and preventive actions for maintaining & extending bridge life
  - Suggested products to use, and those originally applied to the structure.
  - Appropriate action / strategic intervals
  - Cost of inaction

Deck Treatments: Chair – Mike Johnson, CA

- Develop a Matrix of Products with specifications and attributes, noting State usage with some form of rating.
Qualifying a Systematic Preventive Maintenance Program:
Chair – Chris Keegan, WA

- Identify Western states with SMPs qualified for FHWA funding
- Identify states that have not been able to qualify their programs for FHWA funds and assist them in developed a qualified program.
NE Working Groups

Deck Overlays & Protection: Chair – Dick Dunne, Michael Baker
• Development of a Matrix. Communicate nationally

Deck Joint Repair: Chair - Yared Tesfaye, DC
• Develop examples of innovative methods & best practices

Beam End Treatments: Chair - Brad Grisley, NYDOT
• Share practices and details

Bridge Washing: Chair – Greg Roby, MDDOT
• Funding, permitting & environmental issues

Corrosion Mitigation: Chair - Regis Doucette
• Maintenance Options, Research
MW Working Groups

Outreach to Local Agencies: Chair – Scott Stotlemeyer, MODOT
- MI Bridge Conference, CRAM, & TARC in Michigan
- Ask other MWBPP states for suggestions on reaching local agency groups
- Include FHWA, NACE, & APWA in this outreach & promotion
- Attempt to increase attendance of locals and groups at the Annual Meeting – possible attendance funding?

Preservation Matrix: Chair - Dave Juntunen, MIDOT
- Identify Bridge Preservation techniques where they excel and provide networking and contact information for others
- Identify the top five bridge preservation strategies that would benefit most

Deterioration Modeling: Chair Fouad Jobber, NEDOT
- Synthesis of existing Modeling
The Equipment TWG session was opened by Tim Cunningham on July 22, 2013 at 1:05 pm. Meeting closed at 4:30 pm.

Attendance
Tim Cunningham requested all in attendance to sign the attendance sheet followed by introductions by all in attendance.

- Scott Capps, NCDOT Maintenance & Equipment Engineer discussed the NCDOT audit on training along with equipment utilization. A pilot program in conjunction with the AEMP Curriculum was utilized for the NCDOT’s “Fleet Management Training Program”. Mr. Capps discussed the various aspects of the program and how it evolved. Mr. Capps discussed issues found when the test was taken and the process used to create test questions. Due to this, it was determined to look at AASHTO to see how it would work to achieve AASHTO certification from this course. Mr. Capps felt it was worth looking into taking this course. A question was posed as to whom or what organization could provide the certification for taking this course. A discussion followed on the accreditation process. Larry Galehouse from NCPP provided his opinion on the training and some feedback he has received to date on this. Mr. Galehouse discussed how Ferris University sets up their Equipment Management Course. Their exam taken turned out not to be a measure of what was taught. Options were discussed as to the different ways to proceed on the course and testing materials. The EMTSP panel needs to discuss the options as to proceed with taking the course and accreditation. The EMTSP panel will discuss this issue during one of the next teleconference calls. Discussion on possibly creating a “research statement” to develop training modules for equipment managers or to establish a pool fund with a set amount to be spent and to vote on to approve the training.

- Discussed was the status of 13-04, Strategic Plan for Equipment Management Research. The process to proceed was explained by Amir Hanna from the TRB. Anyone still interested on becoming a panel member can email Amir at ahanna@nas.edu.

- Bruce Erickson discussed the NCHRP Project 43-14, Synthesis of Fleet Replacement Practices on how it has proceeded to date and that it should be ready to be published, hopefully by this fall.
Jim Feda represented the TC3; Technical Services Program provided an overview on the Transportation Curriculum Coordination Council. The aim of the TC3 is to provide maintenance technical training in various disciplines in highway maintenance. Mr. Feda stated that the TC3 take present Power Point presentations used for training and can create additional training programs. Scott Caps discussed what NCDOT has done for their training program and asked other states if they would consider sharing training materials and convert these training programs into pre-requisite courses on equipment management. Mr. Feda discussed the Fleet Management Matrix as presented by the EMTSP which as actually created by Jim Smith. A discussion followed on the training concepts of the TC3. Most of the training modules have “Knowledge checks” to see if the participants know the subject matter. Modules can last up to 2 hours. There is a catalogue of training that is presently available on the web site which is www.tccc.gov. The EMTSP will review the present listed competencies by skill levels to make them more generic or just list them as Level I, II, III or IV.

The Equipment TWG session was opened by Tim Cunningham on July 23, 2013 at 8:00 am. Meeting closed at 12:00 pm.

**Attendance**
Tim Cunningham requested all in attendance to sign the attendance sheet.

- Ron Pruitt reported on the discussions from the SCOM Leadership Breakfast. Ron Pruitt asked the attendees to think about new agenda items were requested to the group for the 2014 national Equipment Conference in June of 2014.
- Tim Cunningham reviewed the NCHRP Problem Statement 13-04, Guidelines for the development of Highway Operations Equipment Replacement Lifecycle Criteria. This was a successful problem statement that has been approved by SCOM and is moving forward.
- Tim Cunningham opened the discussion on the proposed research project, Guidelines for the Development of Highway Operations Equipment Utilization Measurement and Management. This was the priority that was voted on at the 2012 National Equipment Conference in Mobile, Alabama. A group discussion followed on all aspects of the draft research problem statement. Revisions to the draft proposal were completed.
- Tim Cunningham discussed what would be the next research problem statement for 2014. Discussed the results of the 2012 ballot taken at the National Equipment Conference. A group discussion took place on the present list to possibly making a new survey to see if there are other new ideas or issues that have developed since then. There was a group discussion on self-sustaining equipment replacement financing. Discussed
was the possibility of doing a 20-7 project instead of a full research project. Pro’s and Con’s were discussed on this. One item suggested that was not on the list was succession training for upcoming equipment managers. Ron Pruitt stated that since the present listed research problems were part of the “Road Map”, the items or sub-sets should be addressed prior to adding new items. The group reviewed the draft synthesis report of NVHRP Project 43-14 on Fleet Replacement Practices. It was discussed that at the next national meeting, a review should be done to see if changes are needed to the list, by either adding or removing items. At present, it would take many years to complete what is on the present list even if they were selected for research problem statements or by 20-7 projects. It was decided to think about what item should be submitted next year or wait until we find out if the 2013 Research Problem Statement gets approval and funded.

- Meeting closed at 12:00 pm.

Minutes respectfully submitted by,
Dick Baron, NCPP
FHWA/MDOT/UMTRI Integrated Mobile Observations 2.0 (IMO)

Michigan Department of Transportation
Steven J. Cook, P.E.
Tim Croze, P.E.
Matt Pratt, TMC

University of Michigan Transportation Research Institute
(UMTRI)
Ralph L. Robinson
Bruce Belzowski
FHWA/MDOT/UMTRI IMO 2.0 Architecture
Michigan I-94 Corridor

MDOT Vehicles - FHWA Data Collection

- Vehicle Positioning GPS
- Photo Image
- Smartphone
- 3-axis accelerometer
- Surface Temp & Atmospheric conditions
- Road Surface Roughness and Distress

20 with phones & 10 with S.P.
40 vehicles with phone & OBD key & 10 with S.P.

Data Users: UMTRI, NCAR, MDOT
MDSS & DUAP & TOC/Navteq & RITIS/Atkins

- Cellular Service Providers Network Operations Center
- NCAR
- UMTRI MS SQL Server
- Transportation Operation Center
- Traffic Management Systems
- Winter Maintenance Operations

UMTRI
MS SQL Server

20 with phones & 10 with S.P.
40 vehicles with phone & OBD key & 10 with S.P.
MDOT Fleet Vehicles for IMO 2.0

- Vehicles traverse portions of I-94 on a regular basis
- 20 snowplows and 30 light fleet vehicles on the southwest portion of I-94 (Southwest Region, 4 counties)
- 7 light fleet vehicles on the middle portion of I-94 (University Region, 2 counties)
- 3 light fleet vehicles on the southeast portion of I-94 (Metro Region, 3 counties)
DataProbe App on Droid Smartphone

- DataProbe: Android application runs on Droid phones.
- Has Bluetooth, a USB port and a 3-axis accelerometer
- Droid mounted in a windshield docking station
- DataProbe can work alone or in combination with other data sources

- DataProbe gathers one set of data every second
- Five minutes (300 seconds) of data is collected in a data file and prepared for sending
- When the Droid has a cellular connection made (4G/3G), DataProbe sends available files (1MG) to UMTRI virtual servers.
- Collected to date: 135,000 vehicle miles of data (over 25 GB of data)
System Components

- Road Surface Temperature
- 12v switched vehicle power
- CAN to Bluetooth
  - Powered by CAN connector
  - NDA/PIDS have been secured with Ford & GM
- Droid Interfaces with two Bluetooth devices
  - Powered by USB connector take-out
  - Vehicle Switched Powerpoint
DataProbe Data Sources

- Flexible configuration
- Near real time data access with cellular services
- Not all CAN networks have desired data
  - Varies by model year and car line
- Surface Patrol requires hardware installation

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<th>OBDKey</th>
<th>Surface Patrol</th>
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<tr>
<td>Number of vehicles</td>
<td>(60)</td>
<td>(40)</td>
<td>(20)</td>
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</table>
Mobile Device and OBD Install

- Droid in WMT’s is mounted to ceiling (left)
- Droid in light fleet is mounted to dash (center left)
- Light fleet vehicles have OBD key (lower left)
- Display contents will vary based on system configuration/mode (below)
Surface Temperature Sensor Placement

- Surface temp sensor on sedans mounted on engine fire wall (left ex. of pilot trunk install)
- Surface temp sensor on WMT’s mounted between air tanks (below)
- Humidity sensor mounted on front lip of trunk decklid (below)
- Sensor data broadcast via serial Bluetooth adaptor
Roadway Camera Images

- Images (jpg files) taken with the Droid camera of the roadway
- Images can be triggered manually, on ABS lockup, or remotely
  - Optionally, a single or three image sequence can be captured
  - Three image sequence separated by two seconds between them
- All images are sent to servers within five minutes
Pushing Messages to Driver

- Operations center may send text message to driver of fleet vehicle for 10 second display
- Current display data is replaced with incoming text
  - Example text:
    - “Call the office when available”
    - “Redeploy to Exit 112”
    - “Take photos of problem area”
- No driver physical interaction required to get text display
- Display annunciation (“beep”) heard when text received
## Web Portal for Sending IMO Messages and Images

**DATAPROBE FLEET COMMUNICATIONS**

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<th>Location</th>
<th>Driver</th>
<th>Year</th>
<th>Model</th>
<th>Config</th>
<th>In Service</th>
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<th>Send Message</th>
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- **Operator types messages, selects vehicle, then clicks SEND**
- **Operator selects images to be taken then clicks SEND**
- **Identifies which vehicles are currently in-service**
- **Vehicle fleet details maintained by administrator/operator**
Data Management and Distribution

- Data files (csv) sent to UMTRI servers are tested for validity
  - Files are stored on a secure University of Michigan Virtual Server with access to files limited to specific UMTRI, Intersog, and MDOT staff

- Non-valid files received at UMTRI are not re-transmitted
  - Containing errors (CRC checking)
  - GPS data without three or more satellites
  - Vehicle speed over file duration never over 0 mph (vehicle setting stationary for more than 5 minutes)

- Valid files are sent via FTP to Connected Vehicle servers
  - NCAR
  - Meridian (MDSS)
  - DUAP (Mixon-Hill)
  - Navteq (DMS Travel Times)
  - Atkins (RITIS 4DX: User Delay Cost I-94)
Risk Severity Summary

Top 3 Issues:
• Bluetooth interface to Surface Patrol
• Lack of GM CAN PID support
• Random interaction between car and OBD device
Applications

- Weather and road condition data into MDSS
- Real time road quality monitoring
- Fleet monitoring and management (miles, hours, routine maintenance, etc.)
- Targeted individual messages (augments DMS)
- Provide travel times and incident updates
- Remote imaging and physical monitoring of environment
- Visibility monitoring (snow, fog, rain, etc.)
- Emergency detection (ABS lockup & differential wheel speed reports)
- Slippery surface notification
- Weather ground truth augments ESS (surface temperature, dew point, etc.)
- Vehicle/device health monitoring (are devices installed on vehicles working?)
- Vehicle diagnostics
- Performance Management
- Regain Times
# Summary IMO 2.0 Schedule

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<td>4</td>
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</table>

### System requirements & build
- Design imaging function
- User Interface
- Software development & test
- Mounting - 19 variations
- Power strategy

### System testing

### Server deployment
- Configure, install & test
- Transfer data process
- Connected vehicle servers

### Build and Launch
- Procure components
- Install Surface Patrols
- Install Droids and test
- Deploy vehicles

### Data collection
- Monitor & validate operation
- Maintain vehicle system operation
- Reports
Contact Information

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Ralph Robinson
Co-Principal Investigator
UMTRI
rrobins2@chartermi.net
734-451-1825
NATIONAL SYMPOSIUM: IMPACTS OF EXTREME WEATHER ON TRANSPORTATION

Synthesis of Overarching Themes, Best Practices, and Lessons Learned
Extreme Weather

- Not only are certain types of extreme weather getting worse, but public expectations of DOT response have greatly increased.

Examples of extreme weather:
- Alabama experiences wet and dry cycles that trigger landslides and sinkholes.
- Longest flood in U.S. history experienced in Iowa.
- Seasonal timing of lake-effect snow in Michigan is getting harder to predict.
- Frequency and magnitude of flooding has changed in western Washington.
Overarching Themes

- State DOTs handle a diversity of extreme weather events, from 8-hour dust storms to blizzards in April.
- However, there are strong similarities between many of the emerging best practices and data needs for all extreme weather types.
- The community of practice present at this symposium represents a wealth of knowledge on how to handle these events — there is a tremendous need to share experiences.
“Wish List” for Increasing Resilience to Extreme Weather

- Weather forecast needs (across all types of extreme weather)
  - **Real-time data** on actual weather conditions during an event.
  - Ability to translate weather forecasts into metrics that matter to specific types of transportation decision making.
  - Information on the reliability of weather forecasts.
  - Weather forecasts that match the timing of our budget cycles.

- Institutional understanding within state DOTs
  - To what extent can we use known threshold points (e.g., 3 inches of snow/hour) to make management decisions?
  - What level of risk is acceptable to us?
Best Practices: Communication and Outreach

- Use many communication channels to provide real-time information (Twitter, calls, texting, traditional media outlets, etc)
- Build relationships with stakeholders (e.g., commercial carrier services) ahead of time
- Methods of ensuring interoperability can save time and resources
Lessons Learned: Operations and Maintenance

- Designing a transportation system to cover all extreme events at every location is impractical and very expensive — emergency response and maintenance can be a more efficient option.

- Performance metrics (such as user delay costs) can provide helpful ways of measuring efficiency and effectiveness of O&M tactics.

- Technologies are rapidly emerging to collect real-time information on road weather conditions (e.g., using data collected by vehicles).
Lessons Learned: Design

- Context-sensitive design changes may be warranted in critical and vulnerable areas.

- Need to increase awareness in your organization regarding extreme weather planning and design across functional areas (e.g., VTrans/ANR river channelization)
  - Training
  - Updated data and models reflecting recent trends

- Partnerships with information providers to understand what data exists and associated uncertainties

- Regulatory partners are important

- Guidance manuals must reflect flexibility and may be used to justify augmentation to standard design approaches
Lessons Learned: Vulnerability Assessment and Asset Management

- Asset management systems and spatial data on asset locations enable effective vulnerability assessments.
- Drawing on the institutional knowledge of maintenance staff and working with locals to understand vulnerability is key.
Learning from the Past and Sharing Best Practices

- Let’s learn from past experiences through post-event “de-briefs” and events such as this one.
- This field is rapidly evolving; it is critical for state DOTs to share best practices with each other.
Next Steps

- Coordinate with the AASHTO Center for Excellence on the Environment on:
  - Real-time information gathering, processing, sharing
    - Human-based approach (e.g., UDOT Condition Reporting System)
    - Automated approach (i.e., connected vehicles)
- Document best practices
- Center of Excellence:
  http://Environment.transportation.org
Michigan DOT
Highway Operations Performance Management with User Delay Cost
AASHTO Subcommittee on Maintenance
Burlington, VT - July 22-25, 2013
Overview

• Performance Management vs. Performance Measures/Metrics
• User Delay Cost (UDC)
• Performance Management Process – 4DX
• Outcomes
GIG GOOD GOVERNMENT IN ACTION

TRAVEL TIME TO
M-8 5 MI 6 MIN
I-696 10 MI 13 MIN

RITIS

User Delay Cost
Performance Measures
Congestion Scan
Bottleneck Ranking

Wildly Important Act
Focus on the Lead Measure
Keep a Compelling Scoreboard
Create a Cadence of Accountability

Third Party Data Provider

Transportation Operations Center

www.michigan.gov/mdot
User Delay Cost

- Traditional project level taken to system operations level
  - Calculation based on travel volumes, speeds
  - Sensor and probe vehicle data (Navteq)
- Performance measurement tool evolution
  - “Red Images” 2011 & 2012
  - Regional Integrated Transportation Information System (RITIS) in 2013
RITIS – Congestion Scan

Speed on I-94 between ROTUNDA DR/EXIT 209 and I-75/CHRYSLER FWY/EXIT 216

Data shown is averaged on Nov 29, 2012 at 10 minute intervals.
Discipline 1: Focus on the Wildly Important

*Incremental*

**WHIRLWIND** *(THE DAY JOB)*

80% of activities produce 20% of results

*Transformational*

**GOALS** *(NEW ACTIVITIES)*

20% of activities produce 80% of results

Wildly Important Goal
Managing UDC with 4DX

WIG: Limit 2013 User Delay Cost to $304.4 Million by 12/31/13

**Winter Weather Lag:**
Regain Time < 2 hours 80% of the time
- Lead 1: Perform After Storm Huddles 80% of the time
- Lead 2: Compliance with Salting Policies 80% of the time

**TIM Lag:**
Limit 1+ Lane Closure 2+ hour Incidents to 203
- Lead 1: Perform Post Incident Reviews 50% of the time

**Work Zone Lag:**
Limit Non-Recurring Construction UDC to $80.3M
- Lead 1: Perform WZ Reviews 80% of the time
- Lead 2: Compare Predicted vs. Actual UDC
Taylor TSC U&P - Monthly Average of Days Permits are Issued
# Cadence of Accountability

<table>
<thead>
<tr>
<th></th>
<th>Account</th>
<th>Report on last week’s commitments.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Review the Scoreboard</td>
<td>Learn from successes and failures.</td>
</tr>
<tr>
<td>3.</td>
<td>Plan</td>
<td>Clear the path and make new commitments.</td>
</tr>
</tbody>
</table>
GOOD GOVERNMENT IN ACTION

Director: Grand Champion
Owner of MDOT’s WIG
Hosts Monthly Review Sessions

COO and CAO: Chief Champions
Co-owner of MDOT’s WIG
Host Monthly Accountability Sessions

Bureau/Region/Office Leaders: Champions
Owner of area WIG; Host Weekly Accountability Sessions

Managers - Owner of area Sub-WIG; Train/Host Weekly Accountability Sessions;
Coaches assist managers

Work Areas: Own and act on lead measures; Use Scoreboards and report weekly

MDOT’s GGiA Roles and Accountability Structure
Michigan’s Implementation

• 2011: I-94 Southwest Region
• 2012: I-94 Corridor-wide
  – 3 regions, 8 TSCs, and Central Office Operations Field Services office
• 2013: Statewide, multiple routes
  – Part of a larger adoption of 4DX/GGiA to drive higher Customer Satisfaction
  – Mostly freeway, all 7 regions
Regain normal speeds in two hours or less, 80 percent of the time for winter weather events.
Limit the number of traffic incidents closing one or more lanes lasting longer than two hours to 203.
Limit the 2013 user delay cost to $304.4 million, between 1/1/13 and 12/31/13.
Continue to Improve

- Previous goal – Regain normal speeds in two hours or less, 80% of the time for winter weather events
- Proposed goal – During a winter event, maintain an average speed of traffic within 10 mph of normal speeds, 80% of time.

<table>
<thead>
<tr>
<th>Location</th>
<th>All Day</th>
<th>AM Peak(6-9)</th>
<th>PM Peak(3-7)</th>
<th>6am-6pm</th>
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<tbody>
<tr>
<td>Grand Region</td>
<td>74%</td>
<td>45%</td>
<td>67%</td>
<td>68%</td>
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<tr>
<td>US-127(Isabella Co.)</td>
<td>91%</td>
<td>82%</td>
<td>100%</td>
<td>89%</td>
</tr>
<tr>
<td>I-94(Jackson TSC)</td>
<td>79%</td>
<td>75%</td>
<td>80%</td>
<td>80%</td>
</tr>
<tr>
<td>I-94(Taylor TSC)</td>
<td>51%</td>
<td>41%</td>
<td>65%</td>
<td>58%</td>
</tr>
<tr>
<td>I-94(Marshall TSC)</td>
<td>68%</td>
<td>73%</td>
<td>57%</td>
<td>74%</td>
</tr>
</tbody>
</table>
Outcomes

• Active Response & Proactive Management of Work Zones, Traffic Incidents, Weather Events
• Broad Front Line Staff Engagement
• Rapid Adoption of Best Practices & Collaboration, esp. TIM
• Better Transparency into Day to Day System Operations
Summary

• Performance Measures should be those that:
  – Facilitate Performance Management
  – Drive Performance Improvement

• Desired Outcomes:
  – Improving Travel Reliability & Traffic Flow
  – Driving Cultural and Behavior Changes to Actively & Proactively Operate the System Better
Questions?

MDOT wants to deliver outstanding customer service. Please tell us:
What is a Center of Excellence?

- Team, shared facility or an entity collaborating to pursue excellence in a particular area
- Leadership
- Knowledge synthesis
- Identify best practices and guidance
- Identify research needs
- Workshops and training
- Facilitate peer to peer relationships and community forums
Why Now?

- **Issues**
  - Lack of awareness of current activities related to travel time reliability and transportation systems management and operations (TSM&O)
  - Strong desire to draw on practitioner knowledge through best practices and peer exchanges
  - Resources are spread across multiple agencies and organizations NTOC, Operations Academy, FHWA, AASHTO, ITE, ITS America, etc.
Why Now?

- Momentum and opportunities
  - SHRP2 Reliability Research product implementation underway:
    - Organizing for reliability (L01/L06)
    - Regional operations forums (L36)
    - Knowledge Transfer System, or KTS (L17)
  - Completion of NCHRP Project 20-7/298, study of potential audience, scope, and business models for an Operations Center of Excellence
  - AASHTO SSOM revitalization & leadership
    - Board of Directors resolution
    - NCHRP project to update SSOM strategic plan and develop OCoE business plan
Strengths of the Organizations

- **AASHTO - Voice of Transportation for the State DOTs**
  - Established program and committee structure that mirrors State DOT operations
  - Lead agency with FHWA for SHRP2 program implementation
  - History of Centers of Excellence and Technical Services Programs supported by state DOT financial contributions

- **ITE - Large international membership of public and private sector traffic and safety engineers, M&O/ITS practitioners, and transportation planners**
  - Technical program services to membership and supporting infrastructure
  - Connections to universities and student members entering profession
  - Functions as the host for the NTOC program with FHWA financial support

- **ITS America - 400 organizational members nationally and another 1,000 unique members in its state and regional chapters**
  - Membership is 50-50 public/academic-private
  - Programs have a strong technology focus
  - Strong contribution as a knowledge source and support for the operations community of practice.
Potential NOCoE Business Models

1. **Single Association Model** – One association involved in NOCoE branding and staffing

2. **Cooperative Model** – NOCoE established through shared governance, co-branding, and resource support

3. **Collaborative Model** – NOCoE created as a new stand-alone nonprofit entity with its own brand, cost sharing by participant organizations

4. **Existing University Transportation Center Affiliation Model** – Associations sponsor in conjunction with UTC

5. **Private Model** – Led by an industry association affiliation
Recommendations

- The *Cooperative Model* lends itself best to the strengths and opportunities provided by each association
- Build the OCoE on the foundation provided by ITE’s NTOC program
- Prepare an MOU between AASHTO, ITE, and ITS America
- Work with FHWA to establish the OCoE in conjunction with the development of the SHRP2 Enhanced Knowledge Transfer System
- Development a business plan:
  - General OCoE description
  - Products, services & branding
  - Operational plan
  - Management & organization
  - Financial plan
  - Start-up expenses & capitalization
  - Performance measures
# AASHTO NOCoE Path...

<table>
<thead>
<tr>
<th>2013 SSOM Meeting</th>
<th>2013 AASHTO Spring Meeting</th>
<th>2013 SSOM Activities</th>
<th>2013 AASHTO Annual Meeting</th>
<th>2014 Spring Meetings</th>
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<tbody>
<tr>
<td>SSOM Revitalized</td>
<td>SCOH Adopted NOCoE Resolution</td>
<td>Established NCHRP 20-7 Project Scope and Panel</td>
<td>Present SSOM Strategic Plan and OCoE Business Plan to SCOH and AASHTO BoD for Approval</td>
<td>SSOM Develops OCoE Technical Service Program Requirements</td>
</tr>
<tr>
<td>SSOM Strategic Plan Updated with strong Emphasis on CoE</td>
<td>SCOH Approved NCHRP 20-7 Project to develop SSOM Strategic Plan and OCoE Business Plan</td>
<td>Includes ITE and ITSA Members Webinar to Address TSP formation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OCoE Task Force Established</td>
<td></td>
<td></td>
<td></td>
<td>Ballot TSP Resolution</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Present Resolution to SCOH and BoD</td>
</tr>
</tbody>
</table>

## AASHTO / SSOM Efforts

- SSOM Passed Resolution to Develop Business Plan and Establish OCoE
- AASHTO BOD Approved OCoE Concept Directed SSOM to Develop Business Plan and report back at Annual Meeting
- Panel met in May Workshop on SSOM Strategic and OCoE Business Plan Scheduled for August
- Anticipate SCOH and BoD approving OCoE Business Plan at 2013 AASHTO Annual Meeting
- If TSP formation approved, AASHTO will invoice DOTs for TSP contributions beginning July 2014

## NOCoE Outcomes

- SSOM Revitalized
- SSOM Strategic Plan Updated with strong Emphasis on CoE
- OCoE Task Force Established
- SCOH Adopted NOCoE Resolution
- SCOH Approved NCHRP 20-7 Project to develop SSOM Strategic Plan and OCoE Business Plan
- Established NCHRP 20-7 Project Scope and Panel Includes ITE and ITSA Members Webinar to Address TSP formation
- Present SSOM Strategic Plan and OCoE Business Plan to SCOH and AASHTO BoD for Approval
- SSOM Develops OCoE Technical Service Program Requirements
- Ballot TSP Resolution
- Present Resolution to SCOH and BoD
# National OCoE Path...

<table>
<thead>
<tr>
<th>SHRP2 L17 KTS Soft Launch</th>
<th>KTS and NTOC</th>
<th>Enhanced KTS</th>
<th>NOCoE</th>
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<tbody>
<tr>
<td>Soft Launch</td>
<td>Phase 1</td>
<td>Phase 2</td>
<td>Phase 3</td>
</tr>
<tr>
<td>Identify Target Audience</td>
<td>NTOC + KTS Web Portal Integration</td>
<td>Expand Integration of EKTS and NTOC Web Portal</td>
<td>Integrated Web Platform</td>
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<tr>
<td>Provide Outreach</td>
<td>Merge NTOC and SL KTS</td>
<td>EKTS IT development</td>
<td>Other Defined Services</td>
</tr>
<tr>
<td>IT/Systems Support</td>
<td></td>
<td>EKTS Soft Launch</td>
<td></td>
</tr>
<tr>
<td>Feedback and Input</td>
<td></td>
<td>EKTS Fully Functional</td>
<td></td>
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<tr>
<td>to Enhanced KTS</td>
<td></td>
<td></td>
<td>EKTS Fully Functional</td>
</tr>
<tr>
<td>Establish and Hold</td>
<td>Merge NTOC Governance with KTS Advisory Board</td>
<td>Evolve KTS Advisory Board into Interim OCoE Board</td>
<td>Interim OCoE Board will become Full NOCoE Board</td>
</tr>
<tr>
<td>Advisory Board Activities</td>
<td></td>
<td>EKTS IT development</td>
<td>AASHTO TSP to Support NOCoE and Fully Functional</td>
</tr>
<tr>
<td>Content Management</td>
<td></td>
<td>EKTS Soft Launch</td>
<td>NOCoE is established</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EKTS Fully Functional</td>
<td></td>
</tr>
</tbody>
</table>

**Lead for National OCoE Advisory Board** – AASHTO w/ITE and ITS America Reps  
**Lead for NOCoE Operations** – ITE  
**Lead for NOCoE Industry Partnerships** – ITS America
Questions?
2013 National Winter Maintenance Peer Exchange

“Sustainable Winter Maintenance Service—Moving from Art to Science”

Vancouver, Washington

September 10-11, 2013
Draft Agenda

• Overview of MAP-21
  – Impact on winter maintenance
    • Safety, congestion reduction, system reliability and environmental sustainability
  – Performance and outcome-based program

  – Best Practices and knowledge gaps
Draft Agenda

• FHWA Report on Road Weather Management Program
• Research Progress Reports (RNS 2007, 2009, 2011)
• Research Needs Statements (new)
• Best Practices Presentations
• Techniques for Promoting Research and Improving Technology Transfer
• Breakout Sessions
  – Management
  – Maintenance Operations
  – Road Weather Information Systems
Micro-milling for Enhancing Smoothness, Work Flexibility and Pavement Quality

James Tsai, Ph.D., P.E.
Associate Professor
Georgia Institute of Technology

Eric Pitts, P.E.
State Maintenance Engineer
Georgia Department of Transportation

July 23, 2013
Outline

- What is micro-milling?
- Advantages of micro-milling
- Georgia’s micro-milling and thin overlay projects
- I-95 micro-milling thin overlay
  - Pre-treatment (deep patching)
  - Micro-milling
  - Quality control of micro-milled surface
  - Paving
- Conclusions and Recommendations
Conventional vs Micro-Mill

- Conventional Mill
- Micro-mill
Advantages of Micro-milling

Micro-milling offers several advantages over conventional milling:

• **Improve smoothness, safety, and comfort**
  – The micro-milled surface can provide smooth, safe, and comfortable riding surfaces for vehicles traveling at the highway speed. The IRIs on the I-95 project were lower than 825 mm/km, which is the requirement on the newly paved pavements.

• **Improve work flexibility**
  – The micro-milled surface can be opened to traffic with no further treatment. Thus, the contractors have flexibility in arranging the paving tasks, especially on the high-volume traffic projects with limited construction periods (e.g., night construction).

• **Improve overlay quality**
  – The smooth micro-milled surface creates a better bond with the overlay than conventional milled surface does.

• **Save materials and costs**
  – The smooth micro-milled surface texture allows to use thinner pavement layers or even only the porous surface course on the top of the micro-milled surface.
Smoothness and Work Flexibility: Open Traffic on the Micro-milled Surface (I-75)
Improved Overlay Bonding Quality with Smooth Micro-milled Texture

Flat surface

Thickness: 0.3 mm
Surface area

Smoothly milled surface texture

Roughly milled surface texture

Tack coat ~ 0.06 gal/yd²
~ 0.3 l/m² ~ 0.6 l/m²
emulsified asphalt
Georgia’s Micro-milling and Thin Overlay Projects

• I-75
  – A 15.6-mile project on I-75 south of Macon
  – Micro-milled a deteriorated OGFC surface and placed a 1¼” PEM on a largely sound dense-graded HMA
  – completed in 2008

• I-95
  – A 14.1-mile project on I-95 near Savannah
  – Micro-milled a deteriorated OGFC surface and placed a 7/8” PEM on a largely sound SMA
  – completed in 2011

• I-285
  – completed in 2011
I-95 Micro-milling and Thin Overlay Project
Project Highlights

• Micro-milling has been utilized by states such as Virginia and Maryland, to provide good ride quality on the milled surface.
• The Georgia Department of Transportation (GDOT) uses micro-milling to cost-effectively preserve highway pavements.
• On Interstate 95 (I-95), it mill only 7/8” of the top OGFC and inlay 7/8” of OGFC without disturbing the underlying SMA and base that are still LARGELY sound.
• The estimated savings compared to the traditional pavement preservation method is more than $58,000 per lane mile. The saving is approximately $4.8 millions for 14 miles with 6 lanes.
Background – Project location

• I-95 starts from Florida and ends in Maine. The total centerline miles are approximately 1,925.
• The project locates in Georgia: 14.095 centerline miles

<table>
<thead>
<tr>
<th>County</th>
<th>Beginning MP</th>
<th>Ending MP</th>
<th>Total Length (mile)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bryan</td>
<td>86.19</td>
<td>91.26</td>
<td>5.074</td>
</tr>
<tr>
<td>Chatham</td>
<td>91.26</td>
<td>100.28</td>
<td>9.021</td>
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</table>
Background – Traffic Volume

- Three lanes in each direction; AADT is 66,890 in 2009; Average trucks are about 10,000

Annual Average Daily Traffic for I-95 in Bryan and Chatham Counties
Background – Condition Before Micromilling
Background – Pavement Design

• Built as continuously reinforced concrete pavement in 1971

• Widened from 2 to 3 lanes and resurfaced in 1995

• 7/8” micro-milling and resurfacing in 2010

Micro-milling

A: 7/8” OGFC
B: 1.5” SMA
C: Asphaltic Concrete “B”
- 2in (19 mm)
D: Asphaltic Concrete
Base- 4 in (25 mm)

E: Graded Aggregate
Base- (GAB) - 12 in

1. 15 year to the first treatment.

2. 7/8” (2.2 cm) milling and resurfacing

Conventional Milling
Procedures of Micro-milling Thin Overlay

- Pre-treatment (deep patching)
- Micro-milling
- Quality control of micro-milled surface
- Paving
Deep Patching

- Identify the locations for deep patches
- Mill out a 2” deep and 1.5 ft wide trench for deep patching
- Place a rubber mat to prevent cracking
- Pave the milled area
The asphalt surface the areas that had deeper damage than 7/8 inches, such as severe load cracking, would have to be repaired using deep patching before micromilling.

Markings used to indicate where deep patching was required.

Damage that was deeper than 7/8” has to be repaired using the deep patching.

Markings pused to indicate where the deep patch repair would end.
Mill and Place Rubber Mat
Pave Milled Areas
Deep Patched Pavement Surface
Micro-milling
Set the Mill Depth at 7/8”
Mill 7/8” OGFC
Sweep the Milled Surface Using A Power Broom
Micro-milled Pavement Surface
Quality Control of Micro-milled Surface
New Performance Indicator: Ridge-To-Valley (RVD)

Sample length

RVD: 3.2 mm (mean value)

Used to make sure the smoothness of the milled surface to prevent from trapped water.
GDOT’s Vehicle (LRP)
Micro-milling Acceptance

Run IRI and RVD for every 0.5 miles

<table>
<thead>
<tr>
<th>Miles</th>
<th>From</th>
<th>To</th>
<th>Rough Dist</th>
<th>IRI 1</th>
<th>IRI 2</th>
<th>HCS IRI</th>
<th>MPD</th>
<th>% Error</th>
<th>RVD</th>
<th>95% RVD</th>
<th>Text Pos</th>
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<tbody>
<tr>
<td>86.500</td>
<td>87.000</td>
<td>0.50</td>
<td>647</td>
<td>802</td>
<td></td>
<td>547</td>
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<td>1.300</td>
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<td>87.000</td>
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<td>88.325</td>
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<td>721</td>
<td>748</td>
<td></td>
<td>563</td>
<td>1.085</td>
<td>1.242</td>
<td>2.713</td>
<td>4.072</td>
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</tbody>
</table>
Micro-milled Surface Texture

Smooth Section

Rough Section

Travel Direction

Travel Direction
Paving
(7/8” OGFC thin overlay)
Tack coat
Compaction
Paved OGFC Surface
Conclusions

- Micro-milling is an effective pavement preservation method, providing various advantages over traditional milling method.
  - Smooth and safe rideability
  - Work flexibility
  - Better resurfaced layer bonding
- Micro-milling and thin overlay can result in a great amount of saving when it has been applied adequately on a largely sound pavement.
- I-75 and I-95 micro-milling thin overlay projects have demonstrated the performance of micro-milling.
Recommendations

• Determination of adequate pre-treatment methods for low severity level distresses, such as load cracking, can be further refined.
• The benefit of micro-milling thin overlay needs to be quantified using a long-term performance.
• The condition (optimal timing) of applying micro-milling resurfacing can be further studied.
• The specifications, including quality acceptance specification, performance indicators, such as RVD, can be further studied and standardized.
Q/A
Quality Acceptance for Micromilled Pavement Surface

- Ensure the micro-milling operation produces a uniform pavement texture true to line, grade, and cross section.
- Micro-mill additional depth to eliminate excessive scabbing of the in place material as directed by the Engineer.
- Micro-milled pavement surface acceptance testing will be performed using the Laser Road Profiler method in GDT 126. Micro-milled pavement will be evaluated on individual test sections, normally 0.50 mile (0.50km) long. **Ensure indices meet target 825 mm/km and not exceed the correction index of 900 mm/km.**
- Micro-milled pavement surfaces are subject to visual and straightedge inspections. Ensure a 10 ft. straightedge is kept at the micro-milling operation to measure surface irregularities of the milled pavement surface. **Any areas exceeding 1/8 in (3.2 mm) between the ridge and valley of the mat surface or fail to meet pavement surface acceptance testing using the Laser Road Profiler shall require** the underlying layer be removed and replaced with material as directed by the Engineer at no additional cost to the Department. All corrective work shall be performed in a minimum 1000 ft section.
- Ensure the cross slope is uniform and no depressions or slope misalignments greater than 1/4 in per 12 ft (6 mm in 3.6 m) exist when the slope is tested with a straightedge placed perpendicular to the center line.
I-75 Case

- I-75 Project:
  - A 15.6-mile project on I-75 south of Macon.
  - Micro-milled a deteriorated OGFC surface and placed a PEM overlay with an approximate thickness of 1.25 in. (32 mm) on top of the largely sound underlying layer, 12.5-mm dense-graded HMA.
  - Traffic and weather:

<table>
<thead>
<tr>
<th>Project</th>
<th>Current average daily traffic</th>
<th>Monthly average temperature (°F/°C)</th>
<th>Average Annual Precipitation (in./mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-75</td>
<td>54,090</td>
<td>January: 31.4 (0.3) July: 90.6 (32.6)</td>
<td>44 (1125)</td>
</tr>
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</table>
I-75 Case (cont’d)

• Micro-milled surface texture:
  ➢ Most of the milled surface for this project had smoothness readings ranging from 650 to 825 mm/km.
  ➢ RVDs were estimated using the data collected by the CTM and ULIP on ten 150-ft test sections. The use of 3.2 mm as the threshold value for the RVD was recommended.

• Performance:
  ➢ The PEM overlay conditions were monitored in late November 2010 (3-years after the construction) and no delamination or other distresses were visible on the overlay.

• Cost savings:
  ➢ The estimated cost savings for the construction project was $58,000 per lane mile, compared with conventional milling and overlay.
  ➢ The total cost savings for the project of 15.6 miles (3 lanes per direction) was approximately $5.4 million.
Productivity

• Micro-milling
  • I-75: 14 ft/min to 28 ft/min (With the milling equipment used for this construction project, by keeping the milling speed to about 20 ft/min or slower the micro-milled surface texture depths could meet the 1.6 mm and 3.2 mm requirements.)
  • I-95: ~ 35 ft per minute

• Paving (OGFC)
  • I-95: ~ 20 ft per minute
NCAT Pavement Test Track at Auburn University

- Pavement Preservation
Track Research Sponsors

Private Sector Sponsors
- Cargill Deicing Technology FP2
- Kraton Polymers
- Modified Asphalt Solutions
- Oldcastle Materials
- Polycon Manufacturing
- Shell Sulfur Solutions
- Trinidad Lake Asphalt

FHWA

2012, Pre-2012

National Center for Asphalt Technology at Auburn University
2012 Preservation Group (PG) Study
Pretreatment Characterization
L1 – Rejuvenating Fog Seal
L2 – FiberMat Chip Seal
L3 – Untreated Control
L4 – Untreated Control
L6 – Chip Seal
L7 – Chip Seal with Crack Sealing
L8 – Triple Layer Chip Seal
L9 – Double Layer Chip Seal
L10 – Cape Seal (Micro Surface on Chip Seal)
L11 – Micro Surface
L12 – Micro Surface with Crack Sealing
L13 – Double Layer Micro Surface
L14 – Micro Surface on FiberMat (FiberMat Cape)
L15 – Micro Surface on Scrub Seal (Scrub Cape)
L16 – Scrub Seal
L16 – Scrub Seal
L17 – Subsection Distress Data Demonstration
L18 – Thin HMA Overlay on FiberMat (HMA Cape)
L19 – Thin HMA Overlay
L20 – Thin HMA Overlay on 100% RAP Mix Base
L21 – Polymer Thin HMA Overlay
L22 – Bonded Thin HMA Overlay
L23 – 50% RAP
Thin HMA Overlay
L24 – 5% RAS
Thin HMA Overlay
L25 – HiMA
Thin HMA Overlay
Lee Road 159 Construction Overview

• FiberMat by Strawser on 7/17/12
• Week of 8/6/12 was busy and challenging
  – Chip/scrub seals & micro surface by Vance Brothers
  – 100% foamed recycle mix by Lanford Brothers
  – Inbound thin overlays by East Alabama Paving (EAP)
• Outbound thin overlays by EAP on 8/13/12
• Outbound bonded with Astec spray paver 8/28/12
• FiberMat by Strawser on 9/19/12 (+W2_{lightweight})
159 Testing Overview

• Weekly
  – ARAN Van (rutting, roughness, texture)
  – Video for crack mapping
  – Visual inspections with notes/pictures

• Monthly
  – Wet ribbed surface friction
  – Subgrade moisture measurements
  – Falling weight deflectometer (FWD)

• Other
  – Ground penetration radar (GPR)
Pretreatment Characterization
Pretreatment Characterization
Lee Road 159 Implementable Findings
Lee Road 159 Implementable Findings
Lee Road 159 Implementable Findings
Lee Road 159 Implementable Findings

- Prevention
- Rehabilitation
- Reconstruction

Time / Traffic

- Control
- Treatment A
- Treatment B

Life Extending Benefit
Condition Improving Benefit
Track PG Section Planning

**Initial "S" Proaction**

1st "S" Reaction

2nd "S" Reaction

1st "N" Reaction

2nd "N" Reaction

CTR = Control
CHP = Chip Seal
SCR = Scrub Seal
FIB = Fiber Seal
MIC = Micro Surface
REJ = Rejuvinator

Proaction = Summer 2012
1st Reaction = IRI or Cracks
2nd Reaction = Recurrence
OVR = Plant Mix Overlay
INL = Plant Mix Inlay
MM = Micro Mill Inlay
Preservation Summary

- Collaborative plant mix / preservation effort
- Excellent construction quality with all treatments
- Crack sealing appears to be beneficial in all cases
- Preservation treatments reduce subgrade moisture
- Objective life extending benefit curves expected
- “Final” results presented at 2015 Track Conference
- Expect extension of project in 2015 research cycle
Performance data for each section will soon be available for viewing by positioning your mouse over the section in question and left-clicking. Based on feedback from our research sponsors, the performance reports have been revised to include crack maps. The 2012 performance reports will be a fully integrated and active part of the web presentation.

Click here for a recent rutting bar graph with ESAL update.
Click the layout below for information specific to each section.

- N1 - N11, S5 - S6, and S8 - S13 are structural sections
- All other sections have deep perpetual foundations
- Research cycle of surface placement shown by color
- Off-Track test sections on Lee Road 159 shown below

1,725,738 ESALs on the Track as of 2300 hours on March 9, 2013 (17% of the 10,000,000 ESAL goal). Rut depths recently averaged 4 mm, while roughness.
End-of-Cycle Track Conference

- WMA & high RAP/RAS/GTR mixes
- Optimized structural design
- Pavement preservation
- Implementation

Pavement Test Track Conference
February, 2015
The Hotel at Auburn University and Dixon Conference Center

www.ncat.us
Questions?

Dr. R. Buzz Powell, PE
Assistant Director & Test Track Manager

277 Technology Parkway
Auburn, AL 36830

Phone: (334) 844-6857
Cell: (334) 750-6293

Email: buzz@auburn.edu
Web: www.pavetrack.com
Twitter: www.twitter.com/pavetrack
TSP•2 Update
AASHTO SCOM – Pavement Technical Work Group
Burlington, Vermont
July 23, 2013

Larry Galehouse, PE, PS
Director, National Center for Pavement Preservation
Registered Conference Delegates = 552
Field Demo Attendees = 370
Treatments Demonstrated
  Live = 5
  Pre-placed = 16
Exhibitor Displays = 47
Opening Plenary Session
Demo Site

Concrete Display
- Diamond Grinding
- Longitudinal Grooving
- Dowel Bar Retrofit
- Saw & Seal
- Compression Sealant

Equipment Display
- Roadtec & Wirtgen

Crack Seal Display
- Pavecoat
- Liquid Road
- TRMSS
- Gilsonite

Scrub Seal
- Pass Fog Seal
- Chip Seal
- Fiber Mat
- Micro Surface
- Skidbrader & Reclamate Seal
Live Demonstrations
Live Demonstrations
Pre-Placed Demonstrations
TSP•2 Website

Video
Public Education Campaign

Changing Course to Preserve America's Roads
<table>
<thead>
<tr>
<th>Panel Member</th>
<th>Representing</th>
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</thead>
<tbody>
<tr>
<td>John Barton, Texas DOT, Chair</td>
<td>Standing Committee on Highways</td>
</tr>
<tr>
<td>Jennifer P. Brandenburg, NC DOT, Vice Chair</td>
<td>Subcommittee on Maintenance (SCOM)</td>
</tr>
<tr>
<td>Gregg Freeby, Texas DOT, Vice Chair</td>
<td>Subcommittee on Bridges &amp; Structures</td>
</tr>
<tr>
<td>Peter J. Weykamp, New York State DOT</td>
<td>Region 1 – NASTO (SCOM)</td>
</tr>
<tr>
<td>Eric C. Pitts, Georgia DOT</td>
<td>Region 2 – SASHTO (SCOM)</td>
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<tr>
<td>Nancy Albright, Kentucky TC</td>
<td>Region 3 – MAASTO (SCOM)</td>
</tr>
<tr>
<td>Lloyd Neeley, Utah DOT</td>
<td>Region 4 – WASHTO (SCOM)</td>
</tr>
<tr>
<td>Bruce V. Johnson, Oregon DOT</td>
<td>Subcommittee on Bridges &amp; Structures</td>
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<tr>
<td>Judith Corley-Lay, NC DOT</td>
<td>Subcommittee on Design</td>
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<tr>
<td>Colin Franco, Rhode Island DOT</td>
<td>Subcommittee on Materials</td>
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<tr>
<td>Barton Newton, California DOT</td>
<td>Subcommittee on Bridges &amp; Structures</td>
</tr>
<tr>
<td>Vacant</td>
<td>Subcommittee on Trans Asset Mgmt.</td>
</tr>
<tr>
<td>Erle Potter, Virginia DOT</td>
<td>Equipment Management TSP</td>
</tr>
<tr>
<td>Butch Wlaschin, FHWA</td>
<td>FHWA Liaison</td>
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</table>
2013 Partnership Meetings

Rocky Mountain West: October 7-9
Anchorage, Alaska

Midwestern: November 11-13
Indianapolis, Indiana

National Pavement Preservation Conference
September 26 – 30, 2016
Nashville, TN
Updating
Transportation System Preservation
Research, Development, and
Implementation Roadmap
**Background**

- **Peer-reviewed White Papers:**

<table>
<thead>
<tr>
<th>Pavement Preservation</th>
<th>Bridge Preservation</th>
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<tbody>
<tr>
<td>Asset Management</td>
<td>Asset Management</td>
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<tr>
<td>Design</td>
<td>Decks and Joints</td>
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<tr>
<td>Construction</td>
<td>Superstructures</td>
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<tr>
<td>Materials</td>
<td>Substructures</td>
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<tr>
<td>Contracting Methods</td>
<td>Project Selection</td>
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<tr>
<td>Performance</td>
<td>Performance</td>
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</tbody>
</table>

- **Roadmap ➔ Framework ➔ Strategic Approach**

- **Roadmap ➔ 38 Pavement & 25 Bridge R&D Problem Statements**
The Project Addresses These Problems

- After Roadmap was Developed ➔ Undocumented Research Results
- Lack of Coordination ➔ Duplication ➔ Waste of Resources
Project Objectives

• Update / Expand Roadmap
  - *Identify and Document R&D Preservation Projects*

• Identify Gaps
  - *Roadmap Strategies & Problem Statements*

• Online Database
  - *Develop / Maintain / Update*
  - *Users Search / Contribute Updates*
Project Tasks

1. Literature Review
2. Survey of Agencies
3. Identification of Ongoing Research Activities
4. Development & Maintenance of Web Site
5. Identification & Validation the Research Need Gaps
Project Team

AASHTO Oversight Panel

Larry Galehouse
Project Manager

Dr. Haider
Pavement Preservation

Literature Review

John O’Doherty
Database Administrator

Survey of Agencies

Ongoing Research Activities

Online Database & Web Services

Identifying and Validating Gaps

John Hooks
Bridge Preservation

ncpp
National Center for Pavement Preservation
## Project Timeline

<table>
<thead>
<tr>
<th>Task No.</th>
<th>Description of the task</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
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<tr>
<td>1</td>
<td>Literature review</td>
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<td>2</td>
<td>Survey of agencies</td>
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<td>3</td>
<td>Ongoing research activities</td>
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<tr>
<td>4</td>
<td>Development and Maintenance of Web site</td>
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<tr>
<td>5</td>
<td>Identifying and Validating the Research Need Gaps</td>
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<td>Deliversables</td>
<td>S, P</td>
<td>S, P</td>
<td>S, P</td>
</tr>
</tbody>
</table>

*Note: S = Status report, P = Progress report*

Start Date: November 15, 2012
Florida Pavement Preservation Council

- Established for local agencies (cities and counties)
- NCPP Provides Training Classes
- Council Coordinator – Chuck Williams
Georgia – Carolina Pavement Preservation Council

- Established for local agencies (cities and counties)
- NCPP Provides Training Classes
- Council Coordinator – Bill Evans (Georgia)
- Council Coordinator – Huley Shumpert (South Carolina)
Pavement Preservation Courses

Existing Courses

- Applied Asset Management
- Pavement Preservation Concepts
- Chip Seal Best Practices
- Slurry Seal & Micro-Surfacing
- Top of the Curve: Fog Seals, Rejuvenators, Crack Sealing and Filling
- Basic Concepts for Pavement Preservation

Under Development

- Cold In-place Recycling
- Milling Technology and Practice
Scholarship

James B. Sorenson Memorial Pavement Preservation Scholarship
Questions?

Larry Galehouse, P.E., P.S.
Director
National Center for Pavement Preservation
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Okemos, Michigan 48864
(517) 432-8220 • Fax: (517) 432-8223
e-mail: galehou3@egr.msu.edu
www.pavementpreservation.org
www.tsp2.org
Pavement Preservation Industry Update

Jim Moulthrop
Executive Director
FP² Inc.

2013 AASHTO Subcommittee on Maintenance
July 22, 2013
Burlington, VT
Presentation Outline

• What is FP² Inc.?  
• Supporters  
• MAP-21  
• NCAT Preservation Group Study  
• ADA  
• Q/A
What is FP²

• What is FP² Inc?
  ➢ An Industry supported trade association

• Purpose of FP² Inc?
  ➢ Promoting the importance of protecting and preserving the huge investment in our nation’s pavement infrastructure
Supporters

- Who supports FP² Inc?
  - Associations
  - Contractors
  - Material Suppliers
  - Chemical suppliers
  - Equipment manufactures
  - Consultants
What do we do?

- FP² Inc. financially supports
  - The National Center for Pavement Preservation at Michigan State University
- FP² Inc. works closely with
  - Regional Preservation Centers in California and Texas
  - Regional Preservation Partnerships in the Northeast, Southeast, Midwest, and Rocky Mountain West
  - Federal Highway Administration
MAP-21

• 600 page, 27 month, reauthorization bill signed by the President on July 6, 2012
• 125 rulemakings statutorily mandated by Congress
• Many other changes to law which Agency must analyze….more rulemaking
MAP-21

- Pavement Preservation language is included in the policy and definition sections of the statute

- Pavement Preservation projects are now eligible to receive federal funds

- Helped to frame the debate for Asset Management and Pavement Preservation
MAP-21-What’s Next?

• The Agency is in the process of reviewing and interpreting the new law

• FP2 will remain engaged in this process to ensure that preservation outcomes remain at intended

• Next round of legislation-when?
NCAT Preservation Group Study

• Seven states and FP2 Inc. are full funding partners for the three year study
• Twenty Five test sections constructed on Lee County, AL 159 in August, 2012
• Several treatments on the NCAT track
NCAT Pavement Test Track at Auburn University

- 2012 Pavement Preservation Study
Off-Track “PG” Test Section

NCAT Pavement Test Track

Martin Marietta Quarry + EAP Plant

Lee Road 159
PG Sections on Lee Road 159

- Martin Marietta Quarry
- EAP’s Auburn Plant
- Lee Road 159
NCAT Preservation Group Study

- Monitoring continues under the current contract
- Continued monitoring being discussed
- “Trigger Values” for preservation treatments on the track are under discussion with the funding partners
Americans with Disabilities Act

- The issue—“Alterations” to the pavement surface
- Title II, Section 202 in the original ADA act deals with alterations
- Act mandates compliance when reconstruction, rehabilitation, resurfacing, and widening are planned
- Maintenance activities are exempt
Americans with Disabilities Act

- 1993 lawsuit, Disabled in Action vs. Penn DOT and the City of Philadelphia
- Sorenson’s activities regarding waivers for preservation treatments
- Architectural & Transportation Barriers Compliance Board (now US Access Board) request for public comment on Accessibility Guideline for Pedestrians in the Public R/W in mid-2011
Americans with Disabilities Act

• FP² Inc. provided comments in November 2011 specifically exempting preservation treatments

• Attempted to follow course of action-demonstrations between DOJ and FHWA

• Joint DOJ/DOT Joint Technical Assistance document dated June 28, 2013 “clarifies” the original intent of ADA regarding alterations
Americans with Disabilities Act

**Includes:**
- Overlays w/wo milling
- New layers of Asphalt
- PCC rehab and reconstruction
- OGFC
- Microsurfacing
- Thin lift overlay
- Cape Seals
- CIR

**Excludes:**
- Striping
- Crack sealing
- Chips Seals
- Fog seals
- Scrub seals
- Dowel bar retrofit
- Diamond grinding
- Patching
ADA-what’s next?

- FHWA webinars
- FP² Inc. funded studies to develop cost data?
- Other actions?
FP² Inc.-what’s next?

- Fall PP Partnership meetings, Anchorage & Indianapolis
- Strategic Planning meeting in October, 2013
- Engage with Congress on new transportation legislation
Questions?
Pavements Working Group
AASHTO Standing Committee on Highways, Subcommittee on Maintenance
July 22, 2013  3:30 pm - 5:30 pm
Burlington, Vermont

Eric Pitts, Georgia DOT – Chair
Anita Bush, Nevada DOT – Vice Chair
George Conner, Alabama DOT – Vice Chair
Steve Mueller - FHWA Liaison
Monday July 22, 2013 PTWG AGENDA

Self-Introductions
   Please Sign Attendance Sheet

Welcome and Opening Remarks
   Overview of Pavement TWG
      Membership
      Mission Statement and Goals
      Focus Areas

Presentations and Updates from AASHTO Partners
   NCHRP Update – Dr. Amir Hanna
   TRB Update – Dr. James Bryant
   SHRP2 Updates for Pavement Preservation
      R-26 – Mr. David Peshkin
   FHWA Update – Mr. Steve Mueller
   Industry Update – FP2 – Dr. James Moulthrop

PTWG Annual Business Meeting
Pavement TWG Research Problem Statements and Schedule
Introduction and Call for Resolutions

Adjourn at 5:30 pm
Welcome and Opening Remarks
Eric Pitts, GDOT, PTWG Chair

1. Self-Introductions
   Please Sign Attendance Sheet

   Your Top 3 Issues in PAVEMENT MAINTENANCE
   Use Sticky Notes – one issue per sticky
   Put each sticky onto white board (10 min)
   (Vice Chairs will sort into categories – report later.)

   Please Use Notecards for Work Plan Goal Changes or additions.
   We will collect the notecards later in the meeting.

2. Overview of Pavement TWG
   Membership
   Mission Statement and Goals
   Focus Areas
Membership

- Each State is allowed 3 delegates to the AASHTO SCOM
  - Pavements account for approximately 50% of every State DOT budget.
  - One delegate per state – minimum – recommended for PTWG membership.
AASHTO SCOM Meeting Locations

2017 NASHTO – Need Volunteer (NY, NH, ME, PA, DE, RI, MD, MA, VT)
2016 Omaha, Nebraska
2015 Des Moines, Iowa
2014 Charleston, West Virginia
--- 2013 Burlington, Vermont ---
2012 Seattle, Washington
2011 Louisville, Kentucky
2010 Savannah, Georgia
2009 Annapolis, Maryland
2008 Monterey, California
2007 Madison, Wisconsin
2006 Charleston, South Carolina
2005 Lincoln, New Hampshire
2004 Bismarck, North Dakota
2003 Duluth, Minnesota
2002 Orange Beach, Alabama
2001 Hershey, Pennsylvania

Everyone please stand,
When your first meeting is called,
Please sit down.

Last DOT person standing
wins a prize!
SCOM VISION

“The SCOM will be the leader for preserving and maintaining a world class highway system.”
SCOM Mission:
The mission of the Subcommittee on Maintenance is to provide technical and policy guidance to the member states and support to the AASHTO organization to preserve and maintain a healthy and reliable highway infrastructure that meets the performance expectations of its customers.
# 2013 Pavement Technical Working Group

## SCOM Organizational and Functional Matrix

<table>
<thead>
<tr>
<th>Technical Working Groups (Communities of Interest)</th>
<th>Strategic Focus Areas</th>
</tr>
</thead>
<tbody>
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<td><strong>Pavement</strong></td>
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<td><strong>Bridge</strong></td>
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<td>Roadway/Roadside</td>
<td>Performance Management</td>
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<td>Traffic Services</td>
<td>Management Systems</td>
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<td>Vegetation</td>
<td>Contract Maintenance</td>
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<td>Safety Appurtenances</td>
<td>Performance Measures</td>
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<td>Signs, Striping</td>
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<td>Drainage</td>
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<td>Lighting</td>
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<td><strong>Equipment</strong></td>
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<tr>
<td><strong>Highway Safety and Reliability</strong></td>
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<tr>
<td>Snow and Ice</td>
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<tr>
<td>Emergency Response</td>
<td></td>
</tr>
</tbody>
</table>

## Primary Activities
- Writing Guidelines and Standards, Updating Manuals, Identifying and Communicating Good Practices, Project/Program Delivery, Website maintenance, Newsletters, Basic Governance, Technical Service Group Coordination
2013 / 2014 Work Plan Goals (1/3)

• Sustain high level of maintenance interest and involvement in the area of System Preservation.

• Promote the Transportation System Preservation Technical Services Program. (TSP^2)

• Assist in the development and implementation of performance measures that can be effectively utilized by member agencies and to meet the requirements of MAP-21.

• Support the expansion of Regional Pavement Preservation Partnerships.

• Assist in the implementation and reviews of the 2008 Pavement Preservation Roadmap, and in the development of an updated roadmap with the AASHTO TSP2 Program.
2013 / 2014 Work Plan Goals (2/3)

• Review TRB/NCHRP Completed Research for possible publication as AASHTO Manuals.
  • MORE on this in a few moments
• Assist in the implementation of SHRP-2 products that are useful to pavement preservation and maintenance, especially R-26 and R-23.
• Enhance the Internal Communications of the PTWG by: expanding the membership list; improving the e-mail address list; and conducting quarterly telephone conference calls and/or webinars.
• Work to confirm and enhance the linkage of pavement preservation activities to overall crash reductions in comparison to traditional rehabilitation and reconstruction activities.
2013 / 2014 Work Plan Goals (3/3)

• Support the development and promotion of life cycle assessment methodologies that demonstrate the environmental-friendliness and sustainability benefits of pavement preservation techniques and strategies.

• Work to develop a guideline that will uniformly define the Remaining Service Life (RSL) of zero for use by our member agencies.
Research ➔ AASHTO Documents? 1/2

– 2009 10-81 Challenges and Successes in Attracting and Retaining a Skilled Transportation Workforce – NCHRP Report 685
Research ➔ AASHTO Documents? 2/2

– 2010 14-22 Effective Removal of Pavement Markings – will be NCHRP Report
– 2011 14-24 Communicating the Value of Preservation: A Playbook – NCHRP 742
Presentations and Updates from AASHTO Partners

NCHRP Update – Dr. Amir Hanna
TRB Update – Dr. James Bryant
SHRP2 Updates for Pavement Preservation
  R-26 – Mr. David Peshkin
FHWA Update – Mr. Steve Mueller
Industry Update – FP2 – Dr. James Moulthrop
PTWG Business

• Report on Issues Sticky Ideas – George/Anita
• 2014 Work Plan
• Call for Research Needs Statements
  – Topic Identification and Volunteers
• Call for Resolutions
  – Topic Identification and Volunteers
• MAP-21 Performance Measures - Pavements
  – Subcommittee Volunteers to Track & Report
• Other topics of interest to PTWG
2014 Work Plan

• Focus Areas - Research
• Focus Areas - Workforce Development
• Focus Areas - Performance Measures
• Focus Areas – Environment

Changes from 2013 Work Plan???
Research Needs Statements Topics

- Proposed Topics for Environmental Excellence Workplan
- Research Implementation Recommendations
- New Research Problem Statements
- Proposed Resolutions
Proposed Resolutions
MAP-21 Performance Measures for Pavements - Volunteers
Pavements Technical Working Group

NEXT MEETINGS

Tuesday July 23, 2013  8:00 am - 9:45 am
Wednesday July 24, 2013  10:15 am - 12:00 pm

Emerald 1 Room
2013 Work Plan Accomplishments

• Focus Areas
  – Research
  – Workforce Development
  – Performance Measures
  – Environment

• Reports

• Task Forces
Pavements Technical Working Group
AASHTO Standing Committee on Highways, Subcommittee on Maintenance
July 23, 2013  8:00 am - 9:30 am
Burlington, Vermont

Eric Pitts, Georgia DOT – Chair
Anita Bush, Nevada DOT – Vice Chair
George Conner, Alabama DOT – Vice Chair
Steve Mueller - FHWA Liaison
Tuesday July 23, 2013 PTWG AGENDA

Please Sign Attendance Sheet

PTWG Annual Business Meeting
Review of Pavement Maintenance Top 3 Issues
MAP-21 Performance Measures for Pavements Volunteers
Pavement TWG Research Problem Statement Topics and Volunteers
Pavement TWG Resolution Topics and Volunteers

Presentations
Pavement Preservation Sections at the NCAT Test Track and Experimental Roadway
  Dr. Buzz Powell, Auburn University
Micromilling to Improve Smoothness
  Dr. James Tsai, Georgia Tech
National Center for Pavement Preservation and TSP2
  Mr. Larry Galehouse, Executive Director, Michigan State University
Regional Partnerships: Northeast, Southeast, Midwestern, Rocky Mountain West

Adjourn at 9:45 am
PTWG Business

• Report on Issues Sticky Ideas – George/Anita
• 2014 Work Plan Updates
• Research Needs Statements
  – Topic Identification and Volunteers
• Resolutions
  – Topic Identification and Volunteers
• MAP-21 Performance Measures - Pavements
  – Subcommittee Volunteers to Track & Report
Pavement Maintenance Issue Categories 1/3

• **Data:**
  – **Collection**
    • Types of Data Needed
    • Integration of Maintenance Data into PMS
    • IRI Low Speed Measurement
  – **Analysis** Decision Tools, Trigger Values, Defining Good/Fair/Poor
  – **Quality & Accuracy** Inspection

• **Performance:**
  – Treatment Performance
  – **Performance Measures**
    • Useful, Meaningful
    • Demonstrate Impacts of Preservation
  – Modeling
Pavement Maintenance Issue Categories 2/3

• **FUNDING:** x12

• **Implementation:**
  – Innovation / Success of Innovative treatments
  – Speed of Introduction
  – Size of the Toolbox
  – Using more than HMA Overlays

• **ADA x4**

• **Overweight Vehicle Damages**
  – Rural Roads – Gas Wells
  – Super-Single Tires
Pavement Maintenance Issue Categories 3/3

- **Materials** - Costs, Quality of Asphalts, Consistency of Materials
- **Communication/Marketing for Preservation** x3
- **Pavement Cracking Issues** x5
- **Construction Issues** — drainage, subbase, compaction, joint separation, edge stiffening, rutting
- **Human Resources**
  - Training
  - Loss of Experienced Employees
  - Contractor Availability in Remote Locations
- **Pavement Widening**
- **Helping Local Agencies**
- **Political Interference with Established Needs**
2014 Work Plan

- Focus Areas - Research
- Focus Areas - Workforce Development
- Focus Areas - Performance Measures
- Focus Areas – Environment

Changes from 2013 Work Plan????
Research Needs Statements Topics

Test methods for PP treatments... synthesis – Anita/David

Data for timing of PP treatments?....trigger values

Data collection, data quality

Training, communication, knowledge loss
MAP-21 Performance Measures for Pavements - Volunteers
Presentations

Pavement Preservation Sections at the NCAT Test Track and Experimental Roadway
   Dr. Buzz Powell, Auburn University

Micromilling to Improve Smoothness
   Dr. James Tsai, Georgia Tech

National Center for Pavement Preservation and TSP2
   Mr. Larry Galehouse, Executive Director,
   Michigan State University

Regional Partnerships: Northeast, Southeast, Midwestern, Rocky Mountain West
Pavements Technical Working Group

NEXT MEETINGS

Wednesday July 24, 2013  10:15 am - 12:00 pm
Emerald 1 Room
ARIZONA DEPARTMENT OF TRANSPORTATION

FEATURE INVENTORY SYSTEM (FIS) USER INTERFACE

Presented by
Lonnie D. Hendrix, P.E.
Assistant State Engineer, Maintenance

Prepared by Feature Inventory Services Team July 2013
Feature Inventory System (FIS) User Interface

FIS Database
- Microsoft® SQL Server Spatial® 2008 R2

Feature Inventory System (FIS) User Interface
Written using Microsoft® Visual Studio® 2010 in C Sharp®.Net 4

Feature Inventory System Data Collection Application (FISDC v 3.5)
Written in C Sharp® .Net 2
ADOT FEATURE INVENTORY SYSTEM (FIS) USER INTERFACE
FIS Dashboard
- User configurable
- Interactive Widgets

Charts Section
- Pages through multiple charts
- Interactive
- Details Link Query Results
- Exportable

Example 1.1

Example 1.2

Example 1.3
FIS User Interface - Dashboard

Welcome Dane Stephenson
Environment: Production
Layout: Save / Edit

Example 1.1

We are proud to be releasing a wide range of new enhancements to the Features Inventory System. Many of these site features are designed to improve and enhance how information is delivered to Users of the system. In addition, a set of powerful tools have been added to give Users and Managers an in-depth look...
Live Interactive Chart
Chart Details

Chart: Avondale Org Pipe Opening Debris/Sediment Rating Comparison

Template Description: Attribute Value Comparison: Attribute (Debris/Sediment Rating) Grouped By (Org)

Group Name: 7871
Group Description: Org - (7871) Avondale
Set Name: 75% - 100%
Set Description: Debris/Sediment Rating: 75% - 100%
Value Type: Count
Count Value: 23
Numeric Value: 2.5

Chart Output (Group Data): Select a chart template...
Chart Output (Set Data): Select a chart template...

View Group Detail  View Set Details
FEATURE INVENTORY SYSTEM (FIS) USER INTERFACE

Results Grid

- Tabbed/ Paged/ Scrollable Navigation
- Columns are Filterable/ Sortable
- Narrow by Feature
- Rows are Selectable
- Links to Asset Detail Pages
- Can be displayed within the built-in Mapping Utility
- Exportable to Excel Reports
- Exportable to Multiple GIS Formats

All Database Queries are displayed in the…..

Chart Detail Query Results

Asset Details

- General
- Location
- Inventory Attributes
- Interface Attributes
- Feature Attributes
- Reasons
- Criticality

Example 2.1

Example 2.2

Example 2.3

Example 2.4

Live Interactive Map

Reports with Hyperlinks
Chart Detail Query Results

![Chart Detail Query Results](image)

Example 2.1
Asset Details

![Image of Asset Details](image)

- **General (General Attributes):**
  - Are Both Ends on the Same Side of the [Not Set]
  - Road?:
  - Diameter: 18"
  - Number of Openings (each): 1
  - Erosion Treatment: No
  - End Treatment: Flared Metal End
  - Opening Location: Inlet
  - Asphalt Coated: N

- **Condition (Condition Assessment):**
  - Debris/Sediment Rating: 75% - 100%
  - Collapse Rating: 0%
  - Corrosion Rating: 0%
  - Erosion Rating: None

**Other Review Reasons (Other Review Vegetation Overgrowth Reasons):**
- Multiple Opening/Worst Condition: [Not Set]
Live Interactive Map
# Feature Inventory System (FIS) User Interface

## Reports with Hyperlinks

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<tr>
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<th>B</th>
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Example 2.4
Asset Detail Pages

- Tabbed/Scrollable Navigation
- Displays all attributed information
- Location also links to built-in Mapping Utility
- “Edit” and “Change Request” buttons link to fillable forms to submit changes
FIS Mapping Utility

- Built within the FIS User Interface
- Live Interaction
- Multiple Imagery Datasets and Additional Layers for visual reference
- Basic Tools
- Advanced Tools
- “Location of Interest” Search Box - recognizes ADOT Route Milepost and Offset System
ADOT FEATURE INVENTORY SYSTEM (FIS) USER INTERFACE

SR-85 Pipe Opening "Further Review Needed"
SR-85 NB MP 149 0.26 RS

Monday, July 08, 2013 @ 8:14:39 AM
FIS Mapping Utility Continued...

- Built in Photolog Viewer
- View both Camera Views at once
- Photolog Van Location displayed on Map
- Photolog Van location on Map advances as User advances through the Images
- Still have complete interaction with Assets using Map tools
- Click on Image to view high resolution Image
FEATURE INVENTORY SYSTEM (FIS) USER INTERFACE

Excel Reports

- Advantages of Excel
- Locked Column Header Row
- Locked Asset ID Column
- Features Sheet Options
- Auto-Adjust Column Widths
- Links back to FIS UI Asset Detail Pages (Internal Only)
Questions regarding the Feature Inventory System (FIS), the Feature Inventory System Database, the Feature Inventory System Data Collection Application (FISDC), or the Feature Inventory System User Interface (FIS UI) contact:

Bob Harris  
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bharris@azdot.gov

Dane Stephenson  
Team Lead, Feature Inventory Services  
602-712-7666  
dstephenson@azdot.gov

Steven Moore  
Team Lead, Feature Inventory Services  
602-712-8115  
smoore@azdot.gov
Asset Management
MAP-21 and Maintenance/Preservation

Stephen Gaj
Leader, Asset Management Team, FHWA

Martin Kidner
State Planning Engineer
Wyoming DOT
What is asset management?

- Asset management is a strategic and systematic process of operating, maintaining, and improving physical assets, with a focus on engineering and economic analysis based upon quality information, to identify a structured sequence of maintenance, preservation, repair, rehabilitation, and replacement actions that will achieve and sustain a desired state of good repair over the lifecycle of the assets at minimum practicable cost. (23 U.S.C. 101(a)(2), MAP-21 § 1103)
What requirements does MAP-21 have pertaining to asset management?

- Each State is required to develop a risk-based asset management plan for the National Highway System (NHS) to improve or preserve the condition of the assets and the performance of the system. (23 U.S.C. 119(e)(1), MAP-21 § 1106)

- USDOT is required to issue a regulation not later than 18 months after date of enactment, after consultation with the States and other stakeholders, which will establish the process to develop the State asset management plan for the NHS. (23 U.S.C. § 119(e)(8), MAP-21 § 1106)
Asset Management Plans

- National Highway Performance Program
- Developed using process approved by USDOT
- Recertified every 4 years
Highway Asset Management Plan

- Plan Contents
  - Pavement and bridge inventory and conditions on the NHS,
  - Objectives and measures,
  - Performance gap identification,
  - Lifecycle cost and risk management analysis,
  - A financial plan, and
  - Investment strategies

- (preservation)
Other Assets

- Signs
- Pavement markings
- Rumble strips
- Line striping
- Guardrails and traffic barriers
- Traffic signs
- ITS equipment
- Lighting
- Curbing
- Truck weight and inspection stations
- Pedestrian/bicycle-related assets
- Etc.
Asset Management Basics: Five Core Questions

1. What is the current state of my assets?
2. What is my required level of service/ performance?
3. Which assets are critical to sustained performance?
4. What are my best “Operations and Maintenance” and “Capital Improvement” investment strategies?
5. What is my best long-term funding strategy?
Does your organization have an inventory of pavement markings, signs, guardrail, and/or other traffic and safety-related assets? Check Yes if your agency maintains any inventory data for at least one safety-related asset.

[Pie chart showing 76% (58) Yes, 24% (18) No]
For those who answered “NO” to the previous question

Which of the following best describes your agency's views on safety asset data:

- We plan to create a safety asset inventory in the near future (29%)
- A safety asset inventory would be of value but we don't have the resources to collect and maintain the data (53%)
- The value of a safety asset inventory asset is not sufficient to justify its costs (6%)
- Other (specify below) (12%)
Please indicate the extent of your asset inventory

- Traffic Signals
- Signs
- Lighting
- Guardrail
- Traffic Barriers
- Road Edge Definators
- Pavement Markings
- Rumble Strips
- Other (specify below)

Legend:
- Green: No Inventory
- Red: Inventory in selected districts/regions
- Purple: Inventory based on sampling
- Blue: Full inventory for higher road classes only
- Orange: Full inventory for all roads we maintain
What inventory information do you maintain for each asset?
How do you assess and track condition for each asset?

![Graph showing assessment methods for different assets](image-url)
Has your agency established performance measures and/or targets for any of your safety-related assets?

- Yes: 62% (16)
- No: 38% (10)
Other assets

- Slopes
- Earth retaining structures
- High mast lighting
- Culverts/Storm Sewers
Risk:
Geotechnical Asset Impact on Performance

- Bridge and Pavement measures can't do it all
2009 Rocks Side on I-40 in NC

- 53-mile section closed for 6 months
- ADT 24,000
- $13.7M to $19.2M direct costs
- $174.9M indirect costs

Source: NCDOT
Issues and Recommendations:

- DOTs should establish an asset management approach as a way of doing business
- Collect and use data on traffic and safety assets to improve safety. Tying crash type to asset (WY)
- Improve asset inventories and data quality. Data accuracy (location) and trained personnel were identified as key issues
- Sharing data throughout the organization, important when programming projects and safety analysis (analysis includes what upgrades are likely to yield the most benefit) (OR)

MAP-21: Asset Management
Issues and Recommendations:

- Prioritize what asset data to collect – data collection is expensive (ND applies a “purpose, scope, and use” approach for asset data)
- Link between asset management and the State’s SHSP overall was weak.
- Look for links to safety (such as pavement rutting)
- Risk assessment (WA)
- Public input such as call database
- Other assets
Asset Management – This is how we do business:

- Preserve our assets and minimize their whole life costs.
- Operate in a financially sustainable manner.
- Provide a framework to improve performance on a long-term basis.
- Break down silos - integration.
- Convey investment needs and support DOT budget requests through providing a transparent, credible, and objective process.
Resources Are Available

- NHI Transportation Asset Management Training Course
- AASHTO Asset Management Guide – A Focus on Implementation
- FHWA Office of Asset Management
- AASHTO Asset Management Subcommittee
- TRB Asset Management Committee
- Other
Maintenance Life Cycle Cost Analysis

July 2013
Project Overview

• Life cycle cost analysis (LCCA) is a systematic way to determine the overall cost of a project or asset

• Moving Ahead for Progress in the 21st Century (MAP-21) lists LCCA as a component of a Transportation Asset Management (TAM) Plan

• LCCA uses historical data and asset life expectancy to support the most economical alternative
Goals

• Decrease roadway system maintenance needs and worker exposure during maintenance via:
  – Task 1
    • Summarize literature review and Integrated Maintenance Management System (IMMS) data analysis results
  – Task 2
    • Develop a spreadsheet-based analysis tool, instruction manual, and document a data update process
  – Task 3
    • Document life cycle costs to level of service (LOS) framework and recommendations for implementation
Outcomes

• DMG created three tools to address the goals
  – IMMS expense data tool
  – Overall maintenance budget tool
  – Attenuator LCCA tool

• DMG developed the tools to allow for annual inventory and cost data updates


• Caltrans maintenance costs are charged to activities
  – Required activity-to-asset mapping; many-to-many relationships

• Tool designed to filter expense data by FY, district, county, route, and climate region

• Inventory filter automatically matches

• Tool displays cost per asset for all assets
  – Each filter independently applied
  – Dollars adjusted for user-defined inflation
IMMS Expense Data Tool

- Processes IMMS expenditure, IMMS labor, total inventory data inputs, and allocates them across the related IMMS assets
- Allows user to calculate the IMMS maintenance costs and effort to maintain each asset per year
- Provides Caltrans with a “cost per asset” value
## IMMS Expense Data Tool

### Query Tool Tab

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<th>B</th>
<th>C</th>
<th>D</th>
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### IMMS Expense Data Tool

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<td>13 Cable Barrier</td>
<td>M710</td>
<td>$922,234</td>
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<tr>
<td></td>
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<td>M920</td>
<td>$434,662</td>
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<td>$28,977.47</td>
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<td></td>
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<td>K712</td>
<td>$808,160</td>
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<td></td>
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<td>C410</td>
<td>$13,380,185</td>
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<tr>
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<td>26 Ferry Boat</td>
<td>J300</td>
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<td>$2,583,304.56</td>
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8
## IMMS Expense Data Tool

### Asset LCC Report Tab

<table>
<thead>
<tr>
<th>IMMS Asset</th>
<th>Asset Description</th>
<th>FY 2007-08</th>
<th>FY 2008-09</th>
<th>Average Annual Labor Hours</th>
<th>IMMS Inventory</th>
<th>Annual Cost per Unit</th>
<th>Unit of Measure</th>
<th>LOS</th>
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</thead>
<tbody>
<tr>
<td>A110</td>
<td>Travelway Flexible</td>
<td>$ 55,048,126</td>
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<tr>
<td>B110</td>
<td>Travelway Rigid</td>
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<td>$ 4,110,510</td>
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<td>17,747</td>
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<td>Linear Mile</td>
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<tr>
<td>C111</td>
<td>Shoulders Unsurfaced</td>
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<td>$ 13,824,919</td>
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<td>8,453</td>
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<tr>
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<td>Fence (Chain Link)</td>
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<td>$ 273</td>
<td>Linear Mile</td>
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<td>C940</td>
<td>Sound Walls</td>
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<td>1,063</td>
<td>$ 273</td>
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<td>C950</td>
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<td>M221</td>
<td>Pavement Markings Plastic</td>
<td>$ 5,489,487</td>
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<td>Attenuators</td>
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<td>2,078</td>
<td>$ 1,098</td>
<td>Each</td>
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Overall Maintenance Budget Tool

- Adds maintenance contract and major maintenance expenditures to supplement the IMMS expense data
  - Contract and major maintenance data not available at county and route levels
- Displays maintenance expenditures and labor hours attributed to each asset type for past five years
- Shows inventory count and level of service (LOS)
# Overall Maintenance Budget Tool

## Query Tool Tab

<table>
<thead>
<tr>
<th>Asset</th>
<th>Description</th>
<th>Sum of Adjusted FY12 $</th>
<th>Sum of Labor Hrs</th>
<th>Sum of Adjusted FY12 $</th>
<th>Sum of Labor Hrs</th>
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<td>$108,445,847</td>
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<td>33,877</td>
<td>$1,220,170</td>
<td>28,708</td>
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<td>10,536</td>
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<tr>
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### Overall Maintenance Budget Tool

#### Query Tool Tab

<table>
<thead>
<tr>
<th>Asset</th>
<th>Description</th>
<th>Total Sum of Adjusted FY12 $</th>
<th>Total Sum of Labor Hrs</th>
<th>Inventory</th>
<th>Average LOS</th>
<th>Average $ per Inventory</th>
<th>Average Hrs per Inventory</th>
<th>Avg. $ per LOS</th>
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<tbody>
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<td>$1,431,917</td>
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<td>C411 Fence (All Other)</td>
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<td>178</td>
<td>C320 Curb &amp; Dikes</td>
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<td>D310 Roadside Area</td>
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<td>E410 Landscape with Auto</td>
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<td>71</td>
<td>$190</td>
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</tbody>
</table>
Individual Asset Tools

• Attenuator LCCA Tool
  – Compares maintenance expenditures for each of the ten different types of attenuators used by Caltrans
  – Generates reports that calculate attenuator maintenance expenses and inventory counts
  – Serves as a proof-of-concept for broader application
## Attenuator LCCA Tool

### Detailed Inventory Count Tab

<table>
<thead>
<tr>
<th>Product Image</th>
<th>Manufacturer</th>
<th>Product Name</th>
<th>Protection</th>
<th>Initial Cost</th>
<th>District</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
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</thead>
<tbody>
<tr>
<td>Trinity Industries Inc</td>
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<td>Trinity Industries Inc</td>
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<td>ENERGITE III System</td>
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<td>QUADGUARD System</td>
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<td>10</td>
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| Total | 64 | 24 | 82 | 582 | 91 | 140 | 522 | 66 |
| # Type | 5 | 4 | 9 | 9 | 6 | 6 | 7 | 4 |
| District | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
# Attenuator LCCA Tool

## Average Cost by Attenuator Type

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<tr>
<th>DIST</th>
<th>ADIEM</th>
<th>CAT 350</th>
<th>Other</th>
<th>QUADGUARD</th>
<th>REACT 350</th>
<th>TAU II</th>
<th>TRACC</th>
<th>SAND BARREL</th>
<th>SCI-100GM</th>
<th>Grand Total</th>
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<td>$0</td>
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<td>$0</td>
<td>$1,016</td>
<td>$5,242</td>
<td>$2,963</td>
</tr>
<tr>
<td>12</td>
<td>$0</td>
<td>$1,389</td>
<td>$0</td>
<td>$1,619</td>
<td>$5,391</td>
<td>$978</td>
<td>$6,680</td>
<td>$2,774</td>
<td>$6,822</td>
<td>$3,150</td>
</tr>
<tr>
<td>16</td>
<td></td>
<td>$3,586</td>
<td>$4,615</td>
<td>$7,381</td>
<td>$3,138</td>
<td>$2,501</td>
<td>$9,885</td>
<td>$18,408</td>
<td>$2,592</td>
<td>$4,245</td>
</tr>
</tbody>
</table>

The numbers above are arbitrarily defined to the attenuator type.
This tool is meant to show proof of concept.
Once each work order references a specific inventory ID number, these results would be accurate.
Attenuator LCCA Tool

• Costs not tied to specific attenuator
  – Instead tied to attenuator maintenance activity
  – Since activities are associated with individual unit, costs will be allocated by attenuator type
• As Caltrans collects asset-specific cost data, the tool will provide average historic LCCA data for each attenuator type
Questions?

ROB ZILAY  
VICE PRESIDENT

JONATHAN FISHER  
SENIOR CONSULTANT

Dye Management Group, Inc.  
10900 NE 4th Street, Suite 1910 - Bellevue, WA 98004  
Office: 425.637.8010 | Mobile: 813.909.3160

AASHTO  
The Voice of Transportation  
SUBCOMMITTEE ON MAINTENANCE
Environmental Impacts of Winter Maintenance
Wayne Lupton

- Retired from CDOT after 32 years as Director of Maintenance & Operations
- Past AASHTO Snow and Ice chair
- Work for Envirotech Services, Inc. since 2007
- wlupton@envirotechservices.com
- 970-397-2912
One treatment will not work everywhere
Materials

- Salt and Sand
- Salt
- Ice Slicer
- Magnesium Chloride
- Cold Temperature Modified Magnesium-Chloride
  - Apex
  - Caliber M-1000
- Calcium Chloride
- Non-chloride
  - Apogee
  - Potassium Acetate
With all of the product options available today, how do you choose?

- Performance
- Corrosion
- Toxicity
- Price
- Safety
Sand clean up from retention ponds on Straight Creek

- The contractor cleaned sand out of the creek and built 11 sand retention ponds.
- The cost of the clean up project was approximately $11,000,000
Excessive sand use contributed to poor air quality in Denver metro area (*Brown Cloud* effect).

- In the 1980s EPA cited PM-10 violation
- Passed Regulation 16 to reduce amount of sand used on roads in 1989
- The PM-10 standard includes Particulate Matter particles with a diameter of 10 micrometers or less (0.0004 inches or one-seventh the width of a human hair).
Impaired Waters and Total Maximum Daily Loads

Under section 303(d) of the Clean Water Act, states, territories, and authorized tribes are required to develop lists of impaired waters. These are waters that are too polluted or otherwise degraded to meet the water quality standards set by states, territories, or authorized tribes. The law requires that these jurisdictions establish priority rankings for waters on the lists and develop TMDLs for these waters. A Total Maximum Daily Load, or TMDL, is a calculation of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards.

Basic Information

- National Summary of Impaired Waters and TMDLs
- Geographic Information Systems (GIS) Data Downloads

Example TMDLs

- Pathogens
- Nutrients
- Sediment
- Mercury
- Metals (other than mercury)
- More Example TMDLs...

303(d) Impaired Waters and TMDL Laws and Regulations

Where You Live

Features

- November 15, 2010 Memorandum re. Integrated Reporting and Listing Decisions Related to Ocean Acidification
- Northeast Ecoregion

Water Quality

- Water Quality Standards
- Water Quality Trading
- Watershed Academy
- Webcasts
- Watershed Central
Maryland Previously 303(d)-Listed Waters Now Attaining All Applicable Water Quality Standards

No previously 303(d)-listed waters reported as now attaining all applicable water quality standards.

Maryland 2010 Causes of Impairment for 303(d) Listed Waters

NOTE: Click on a cause of impairment (e.g. pathogens) to see the specific state-reported causes that are grouped to make up this category. Click on the "Number of Causes of Impairment Reported" to see a list of waters with that cause of impairment.

<table>
<thead>
<tr>
<th>Cause of Impairment Group Name</th>
<th>Number of Causes of Impairment Reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrients</td>
<td>109</td>
</tr>
<tr>
<td>Cause Unknown</td>
<td>77</td>
</tr>
<tr>
<td>Turbidity</td>
<td>52</td>
</tr>
<tr>
<td>Polychlorinated Biphenyls (PCBs)</td>
<td>31</td>
</tr>
<tr>
<td>Pathogens</td>
<td>17</td>
</tr>
<tr>
<td>Metals (other than Mercury)</td>
<td>15</td>
</tr>
<tr>
<td>Salinity/Total Dissolved Solids/Chlorides/Sulfates</td>
<td>13</td>
</tr>
<tr>
<td>Mercury</td>
<td>5</td>
</tr>
<tr>
<td>Trash</td>
<td>3</td>
</tr>
<tr>
<td>pH/Acidity/Caustic Conditions</td>
<td>2</td>
</tr>
<tr>
<td>Sediment</td>
<td>2</td>
</tr>
<tr>
<td>Total Toxics</td>
<td>1</td>
</tr>
<tr>
<td>Ammonia</td>
<td>1</td>
</tr>
<tr>
<td>Pesticides</td>
<td>1</td>
</tr>
</tbody>
</table>

Total: 333 Causes of Impairment

Maryland Cumulative TMDLs by Pollutant
### SHA approach to BAY TMDL Implementation

The numbers for the Bay TMDL only …..

<table>
<thead>
<tr>
<th>Current Imperviousness Acres</th>
<th>SHA permit area</th>
<th>Treatment Required by Goal Year</th>
<th>Waste Load Allocations</th>
<th>2017 Cost Assumed average Urban BMP Cost – $167,000 / Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Year 2017</strong></td>
<td><strong>Year 2020</strong></td>
<td></td>
</tr>
<tr>
<td>24,758</td>
<td>MS4 Phase I</td>
<td>6,690 Paved Acres (PA)</td>
<td>4,952 PA</td>
<td>TBD Nitrogen Phosphorous Sediment</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$1,117,230,000</td>
</tr>
<tr>
<td>4,400 (Estimated @ 2200 acres per county)</td>
<td>MS4 Phase II</td>
<td>880 PA</td>
<td>880 PA</td>
<td>TBD Nitrogen Phosphorous Sediment</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$146,960,000</td>
</tr>
<tr>
<td>26,400 Estimated</td>
<td>Non-MS4</td>
<td>None</td>
<td>Unknown</td>
<td>Various Local TMDL</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Unknown</td>
</tr>
</tbody>
</table>
The Vermont Lake Champlain Phosphorus TMDL being developed by EPA

EPA disapproved the 2002 Vermont phosphorus TMDL for Lake Champlain on January 24, 2011 (see disapproval letter below) and EPA is now developing a new Lake Champlain TMDL for Vermont. A description of key steps and an anticipated schedule for TMDL development is available below. Summaries of work planned for two key steps in the process – the lake modeling component and the watershed analysis component – are also available below. Information on upcoming public meetings in Vermont is included below as well.

For questions on the TMDL development process and status, contact Lynne Hamjian (hamjian.lynne@epa.gov or 617-918-1601). For questions on technical aspects of the TMDL such as the lake modeling project, contact Eric Perkins (perkins.eric@epa.gov or 617-918-1602).

- 2002 TMDL Disapproval Letter and Determination (PDF) (20 pp, 524K)
- TMDL Development Process – Schedule and Key Steps (September, 2011 update) (PDF) (2 pp, 14K)
- Summary of in-lake modeling component (PDF) (1 pg, 14K)
- Summary of watershed analysis component (PDF) (1 pg, 12K)
- Information on October, 2011 public meetings
Salt Truck
Salt Dust
Reducing sanding materials use 36.7% (a net savings of $75,872) in our initial year (2009) while learning was good.

Reducing sanding material use 46.3% (a net savings of $109,355) in the second year (2010) is right on track.

Reducing our material usage wasn’t detrimental to our efforts in trying to provide safe travel conditions for the road user:
- Poor road crashes went down by as much as 20% and injury crashes were reduced by nearly two-thirds in 2009.
- Road Closures are being reduced by 1/3.

Cost Savings and improved mobility and safety all can be attributed, in part, to this change in practice.

No serious problems have been observed when using pre-wet sand in blowing snow conditions.
CALIBRATION
Do not over apply at the end of the storm
Do not over apply
Only use what is needed
Only use what is needed
Give the product time to work no matter what product you are using.
Chloride Reduction
Chloride Reduction
Washing equipment
RWIS with Camera
I-25 over St. Vrain River

I-25 frontage

I-25 NB
Test & Evaluation # 28

- Test Section right side
- Control section left side
Monitoring Highway Assets with Remote Technology
For the Michigan Department of Transportation

July 2013
Outline

• Project Scope
• Summary of Technologies
  – Aerial Imagery with LiDAR
  – Mobile Imaging/Photologging
  – Manual Data Collection
• Pilot Project Overview & Results
• Comparisons Between Methods
• Moving Forward
Project Scope

• MDOT’s decline in resources necessitates that asset location, quantity, and condition information be efficiently and effectively monitored

• Explore remote technologies for inventory collection

• Potential benefits
  – Lowering costs
  – Decreasing worker exposure

• 27 assets provided by MDOT for collection

• Pilot route in MDOT’s Southwest Region
Technology and Tools

- Based on literature review and Research Advisory Panel feedback, chose technologies for 150-mile pilot study:
  - Aerial Imagery w/LiDAR
  - Mobile imaging/photologging
  - Manual data collection with handheld GPS
Methodology

• 5 mile tech overlap for data validation
• Conducted pilot project to demonstrate procedures for data collection
• Yellow – Manual
• Blue – Aerial LiDAR
• Purple - Photolog
Pilot Process

- Measured 27 asset types using combination of 3 technologies
- Recorded location of assets
- Performed QC/QA
  - Quality Control – Validate results from each technology against results from manual data collection
  - Quality Assurance – Compare collected data from each technology to MDOT inventory of route, where available
- Loaded pilot data into existing MDOT enterprise GIS
- Conducted a benefit-cost analysis using validated data collection costs
• Collected inventories on 17 MDOT highway assets over 50 centerline miles

<table>
<thead>
<tr>
<th>Asset</th>
<th>Summarized Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total lane miles</td>
<td>140.67</td>
</tr>
<tr>
<td>Concrete surface lane miles</td>
<td>6.76</td>
</tr>
<tr>
<td>Bituminous surface lane miles</td>
<td>133.91</td>
</tr>
<tr>
<td>Paved shoulder miles</td>
<td>103.19</td>
</tr>
<tr>
<td>Gravel shoulder miles</td>
<td>57.86</td>
</tr>
<tr>
<td>Curb miles</td>
<td>25.66</td>
</tr>
<tr>
<td>Number of sweepable approaches</td>
<td>50</td>
</tr>
<tr>
<td>Linear feet of guardrail</td>
<td>46,034</td>
</tr>
<tr>
<td>Number of guardrail endings</td>
<td>259</td>
</tr>
<tr>
<td>Number of catch basins</td>
<td>640</td>
</tr>
<tr>
<td>Ditch miles</td>
<td>8.24</td>
</tr>
<tr>
<td>Linear feet of existing ROW fence</td>
<td>13,237</td>
</tr>
<tr>
<td>Mowable acres</td>
<td>136.77</td>
</tr>
<tr>
<td>Number of delineators</td>
<td>229</td>
</tr>
<tr>
<td>Number of signals</td>
<td>164</td>
</tr>
<tr>
<td>Number of signs</td>
<td>1,335</td>
</tr>
<tr>
<td>Number of attenuators</td>
<td>99</td>
</tr>
</tbody>
</table>
Aerial Imagery with LiDAR

• Advantages:
  – Eliminates worker exposure
    • Creates safer roadway
  – Collect data once; used by many
  – Fastest data collection

• Disadvantages:
  – Data collection perspective
    • 900’ above assets
Mobile Imaging – Automatic Road Analyzers (ARAN)

- Images captured approximately every 20 feet
- Collected inventories on 17 MDOT highway assets over 47.5 centerline miles

<table>
<thead>
<tr>
<th>Asset</th>
<th>Summarized Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total lane miles</td>
<td>113.751</td>
</tr>
<tr>
<td>Concrete surface lane miles</td>
<td>Total concrete lane miles = 5.309</td>
</tr>
<tr>
<td></td>
<td>Average concrete lane width (feet) = 10.583</td>
</tr>
<tr>
<td>Bituminous surface lane miles</td>
<td>Total asphalt lane miles = 105.05</td>
</tr>
<tr>
<td></td>
<td>Average asphalt lane width (feet) = 13.498</td>
</tr>
<tr>
<td>Paved shoulder miles</td>
<td>42.373</td>
</tr>
<tr>
<td>Gravel shoulder miles</td>
<td>13.457</td>
</tr>
<tr>
<td>Curb miles</td>
<td>9.38</td>
</tr>
<tr>
<td>Number of sweepable approaches</td>
<td>115</td>
</tr>
<tr>
<td>Linear feet of guardrail</td>
<td>31,194</td>
</tr>
<tr>
<td>Number of guardrail endings</td>
<td>150</td>
</tr>
<tr>
<td>Number of catch basins</td>
<td>135</td>
</tr>
<tr>
<td>Ditch miles</td>
<td>46.892</td>
</tr>
<tr>
<td>Linear feet of existing ROW fence</td>
<td></td>
</tr>
<tr>
<td>Mowable acres</td>
<td>123.113</td>
</tr>
<tr>
<td>Number of delineators</td>
<td>952</td>
</tr>
<tr>
<td>Number of signals</td>
<td>Signals = 67</td>
</tr>
<tr>
<td></td>
<td>Lights on signals = 138</td>
</tr>
<tr>
<td>Number of signs</td>
<td>1675</td>
</tr>
<tr>
<td>Number of attenuators</td>
<td>0</td>
</tr>
</tbody>
</table>
Mobile Imaging - ARAN

• Advantages:
  – Collect images once; used by many
  – Less time required compared to manual collection
  – Collected from vehicle at highway speeds
  – Reports height, width, and depth of assets

• Disadvantages:
  – Inability to gather inventory data on assets not easily visible from driving lanes (e.g. culverts)
  – Difficulties capturing mowable area measurements
Mobile Imaging w/LiDAR – Mobile Asset Collection (MAC)

- Vehicle using mobile LiDAR and ROW imaging
- Collected inventories on 17 MDOT highway assets over 47.5 centerline miles

<table>
<thead>
<tr>
<th>Asset</th>
<th>Summarized Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total lane miles</td>
<td>144.85</td>
</tr>
<tr>
<td>Concrete surface lane miles</td>
<td>51.06</td>
</tr>
<tr>
<td>Bituminous surface lane miles</td>
<td>93.79</td>
</tr>
<tr>
<td>Paved shoulder miles</td>
<td>95.26</td>
</tr>
<tr>
<td>Gravel shoulder miles</td>
<td>4.42</td>
</tr>
<tr>
<td>Curb miles</td>
<td>15.03</td>
</tr>
<tr>
<td>Number of sweepable approaches</td>
<td>1,211</td>
</tr>
<tr>
<td>Linear feet of guardrail</td>
<td>28,403</td>
</tr>
<tr>
<td>Number of guardrail endings</td>
<td>123</td>
</tr>
<tr>
<td>Number of catch basins</td>
<td>379</td>
</tr>
<tr>
<td>Ditch miles</td>
<td>80.17</td>
</tr>
<tr>
<td>Linear feet of existing ROW fence</td>
<td>156,229</td>
</tr>
<tr>
<td>Mowable acres</td>
<td>128.60</td>
</tr>
<tr>
<td>Number of delineators</td>
<td>710</td>
</tr>
<tr>
<td>Number of signals</td>
<td>141</td>
</tr>
<tr>
<td>Number of signs</td>
<td>1,354</td>
</tr>
<tr>
<td>Number of attenuators</td>
<td>46</td>
</tr>
</tbody>
</table>
Mobile Imaging with LiDAR - MAC

• Advantages:
  – Collect images once; used by many
  – Less time required compared to manual collection
  – Collected from vehicle at highway speeds
  – Reports height, width, and depth of assets

• Disadvantages:
  – Inability to gather inventory data on assets not easily visible from driving lanes (e.g. culverts)
  – Difficulties capturing mowable area measurements
  – Cost
Manual Data Collection

- Completed on foot and from vehicle
- Uploaded data from GPS to GPX, Excel, and KMZ file formats

<table>
<thead>
<tr>
<th>Asset</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;A&quot; miles (CL miles)</td>
<td>31.3</td>
</tr>
<tr>
<td>Attenuators (each)</td>
<td>0</td>
</tr>
<tr>
<td>Bituminous surface (lane miles)</td>
<td>66.63</td>
</tr>
<tr>
<td>Bridge (each)</td>
<td>35</td>
</tr>
<tr>
<td>Catch basin (each)</td>
<td>399</td>
</tr>
<tr>
<td>Concrete surface (lane miles)</td>
<td>76.08</td>
</tr>
<tr>
<td>Culvert (each)</td>
<td>393</td>
</tr>
<tr>
<td>Curb (miles)</td>
<td>15.85</td>
</tr>
<tr>
<td>Delineator (each)</td>
<td>690</td>
</tr>
<tr>
<td>Designated snowmobile crossings (each)</td>
<td>0</td>
</tr>
<tr>
<td>Ditch (linear miles)</td>
<td>27.58</td>
</tr>
<tr>
<td>Freeway light (each)</td>
<td>289</td>
</tr>
<tr>
<td>Gravel shoulder (miles)</td>
<td>13.56</td>
</tr>
<tr>
<td>Guardrail (linear feet)</td>
<td>41,307</td>
</tr>
<tr>
<td>Guardrail ending (each)</td>
<td>72</td>
</tr>
<tr>
<td>Lineal feet of existing right-of-way (ROW) fence (feet)</td>
<td>129,334</td>
</tr>
<tr>
<td>Lineal feet of soundwall (feet)</td>
<td>0</td>
</tr>
<tr>
<td>Mowable acres (acres)</td>
<td>93.89</td>
</tr>
<tr>
<td>Non-motorized trail (feet)</td>
<td>24,405</td>
</tr>
<tr>
<td>Paved shoulder miles (miles)</td>
<td>48.73</td>
</tr>
<tr>
<td>Pump station (each)</td>
<td>0</td>
</tr>
<tr>
<td>Sign (each)</td>
<td>1007</td>
</tr>
<tr>
<td>Sweepable approach (each)</td>
<td>140</td>
</tr>
<tr>
<td>Total lane miles (miles)</td>
<td>142.71</td>
</tr>
<tr>
<td>Tourist facilities (each)</td>
<td>1</td>
</tr>
<tr>
<td>Traffic signal (each)</td>
<td>356</td>
</tr>
<tr>
<td>Weigh stations (each)</td>
<td>0</td>
</tr>
</tbody>
</table>
Manual Data Collection Summary

• Advantages:
  – Flexibility in collection – specific location or entire route
  – Close proximity to assets
  – Can capture images from multiple angles as needed
  – Report high priority work/safety issues observed

• Disadvantages
  – Time to complete data collection
  – Does not allow ability to review/reassess
  – Worker exposure
Conducted manual data collection, mobile imaging, and aerial LiDAR on same 5 mile stretch

Used to verify accuracy of each technology

5 Mile Overlap Analysis
## 5 Mile Overlap Comparisons

<table>
<thead>
<tr>
<th>Asset</th>
<th>Manual</th>
<th>Mobile Imaging</th>
<th>Mobile Imaging w/LiDAR Correction</th>
<th>Aerial Imaging w/LiDAR Correction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attenuators</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Bituminous lanes (miles)</td>
<td>10.38</td>
<td>10.07</td>
<td>9.9</td>
<td>10.23</td>
</tr>
<tr>
<td>Concrete lanes (miles)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total lanes (miles)</td>
<td>10.38</td>
<td>10.07</td>
<td>9.9</td>
<td>10.23</td>
</tr>
<tr>
<td>Catch basins</td>
<td>22</td>
<td>13</td>
<td>33</td>
<td>15</td>
</tr>
<tr>
<td>Culverts (each)</td>
<td>88</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Curbs (miles)</td>
<td>0.68</td>
<td>0.61</td>
<td>0.65</td>
<td>0.67</td>
</tr>
<tr>
<td>Delineators (each)</td>
<td>7</td>
<td>36</td>
<td>6</td>
<td>26</td>
</tr>
<tr>
<td>Ditches (miles)</td>
<td>7.82</td>
<td>7.64</td>
<td>7.02</td>
<td>0.61</td>
</tr>
<tr>
<td>Guardrails (linear feet)</td>
<td>2,496</td>
<td>2,581</td>
<td>2,472</td>
<td>3,051</td>
</tr>
<tr>
<td>Guardrail endings (each)</td>
<td>5</td>
<td>N/A</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Mowable acres (acres)</td>
<td>7.53</td>
<td>14.07</td>
<td>12.29</td>
<td>14.73</td>
</tr>
<tr>
<td>Gravel shoulders (miles)</td>
<td>1.35</td>
<td>1.12</td>
<td>2.05</td>
<td>2.64</td>
</tr>
<tr>
<td>Paved shoulders (miles)</td>
<td>7.83</td>
<td>6.32</td>
<td>6.66</td>
<td>7.77</td>
</tr>
<tr>
<td>Total shoulders (miles)</td>
<td>9.18</td>
<td>7.44</td>
<td>8.71</td>
<td>10.41</td>
</tr>
<tr>
<td>ROW fencing (linear feet)</td>
<td>3405</td>
<td>3,514</td>
<td>3,897</td>
<td>0</td>
</tr>
<tr>
<td>Signs (each)</td>
<td>88</td>
<td>100</td>
<td>92</td>
<td>63</td>
</tr>
<tr>
<td>Sweepable approaches (each)</td>
<td>20</td>
<td>9</td>
<td>132</td>
<td>9</td>
</tr>
<tr>
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### Method Comparisons

*Hours are specific to the pilot project; hours per mile would decrease based on number of miles involved.*

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Final Research Report

• Develop an implementation plan:
  – Guidance on the next steps for remote sensing technology implementation
  – Training materials
  – Cost estimates
  – Suggested equipment and software
QUESTIONS?

Tim Croze, P.E.
Project Manager
Michigan Department of Transportation
517-322-3394

Rob Zilay
Vice President
Dye Management Group
425-637-8010
Maintenance Condition Rating

Thomas M. Lyden, PE
Administrator
Office of Maintenance

July, 2013
Maintenance Condition Rating

Four major categories, 14 elements within each category
- Barrier
- Pavement
- Pavement Marking
- Traffic Control Device

Minimum 85% rating
- 1/10th mile segments
MCR Methodology

Random sampling
- By county
- 15% system every 6 months
- Consultant, two person team
- Pictures available

Results to districts/counties
- Overall
- Category
Welcome to the Roadway/Roadside Technical Working Group
Roadway/Roadside Technical Working Group

Mike Mattison, Chair - Nebraska Department of Roads

Beth Wright, Vice Chair - Missouri Department of Transportation (Environmental and Research)

Jerry Hatcher, Vice Chair - Tennessee Department of Transportation (Performance Management and Workforce Development)

Will Beatty, FHWA Liason - North Carolina Division

John Perry, FHWA Liason for 2013 meeting - Idaho Division
Roadway/Roadside Technical Working Group

Schedule Change

Lonnie Hendrix flight delayed - Arizona’s New Features Inventory System rescheduled for Tuesday.

Dye Management Michigan DOT Automated Data Collection presentation today.
Roadway/Roadside Technical Working Group

Monday, July 22, 2013

University Amphitheater
3:30 p.m.–5:30 p.m.

Introductions, Webinar Overview, Poll Results, Research Review
Mike Mattison, NDOR

MDOT Automated Data Collection
Steve Cook, MDOT and Rob Zilay, Dye Management

Culvert Management in 4 States
Marie Venner

Asset Management of Roadway/Roadside Features and MAP-21
Matt Hardy, AASHTO
Roadway/Roadside Technical Working Group

Webinar on March 26th
Topics were selected based on feedback at 2012 SCOM meeting. About 30 people participated in the webinar.

**Asset Management**

Automatic Highway Data Collection Program – Jeffrey Beal, Office of Federal Lands
The collection and classification of data for highway features can be very labor intensive. Federal lands Highways uses van mounted cameras, sensor and GPS to collect data, and software that aids in the classification of assets. Keeping the inventory current requires much less effort with the automated systems. Mr. Beal will provide an overview of the system and some of the lessons learned.

**Roadway**

Sequential Barricade Warning Light System – Beth Wright, MODOT
A Technical Innovation Group (TIG) of Lead States including Oklahoma DOT, Missouri DOT, and City of Springfield, Missouri is exploring the use and benefit of sequential warning lights on barricade systems for night time operations. The intent is to improve driver awareness of the work zone taper and reduce intrusion of vehicles into night time work zones. Ms. Wright will present the results of studies done to evaluate the effectiveness of these systems in reducing driver speed and intrusion in the work zones, increasing public and worker safety.

**Roadside**

Deicing Chlorides: No Easy Answers – Monty Mills, WSDOT
Maintaining Level of Service during winter weather presents challenges for many DOT’s. Mr. Mills will provide an overview of current environmental concerns with the use of chloride deicers, the issues surrounding the use of alternative products, and the actions which agencies are taking to reduce chloride intrusion into the environment.
An interest survey was conducted by email following the webinar.

A list of topics relevant to Roadway/Roadside was developed and sent to all SCOM members as well as all who signed in at the breakout sessions last year.

Each person was asked to indicate the 5 topics they were most interested in having on the agenda at the SCOM meeting in Burlington.

Results on next slide...
# Roadway/Roadside Technical Working Group

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**TOTAL Respondents**: 43 | 34
# Roadway/Roadside Technical Working Group

## Top Picks

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Roadway/Roadside Technical Working Group

Research

Identify needs

Write Problem Statements by Wednesday (Beth)

Estimate required effort

>$100k and 1 year in duration - NCHRP
<$100k and 1 year in duration - AASHTO 20-7

Project Panel - define scope, oversee consultant work, provide technical expertise
Monday, July 22, 2013

Chair – Mike Mattison, NDOR – Maintenance Engineer
Vice Chair – Beth Wright, MoDOT, Maintenance Engineer (Environment and Research)
Vice Chair – Jerry Hacher, TDOT, Maintenance Director (PM & Workforce Development)
FHWA Liaison – John Perry, Idaho Division Office, Field Operations Engineer (2013 Meeting)
FHWA Liaison – Will Beatty, North Carolina Division Office

Introductions, Webinar Overview, Poll Results, Research Review
Presenter: Mike Mattison, NDOR, Maintenance Engineer
-Overview of R/R TWG Webinar: March 26, 2013 - Topics included: Automatic Highway Data Collection Program; Sequential Barricade Warning Light System, and Deicing Chlorides.
-R/R TWG Survey: A survey was completed to prioritize the top five topics for the summer TWG meeting in Burlington, VT. These included: 1) Asset Management for roadway and roadside features, 2) Maintenance Training and/or Leadership Development, 3) Maintenance Quality Assurance, 4) Work Zone Safety, and 5) Maintenance activities impact on Highway Safety.
-Research: Identify Needs; Write Research Problem Statement (by Wednesday), Estimate required effort (>$100k / NCHRP, <$100K / AASHTO), Project Panel (define scope, oversee consultant work, and provide technical expertise).

Monitoring Highway Assets with Remote Technology
Presenters: Steve Cook, MDOT & Rob Zilay, Dye Management Group
-Project Scope: declining resources; leverage technologies; cost benefit; and reduced exposure.
MDOT assessed 27 assets near Chicago, IL. Topics: tools, technology, and methodology.
-Pilot Process: measured assets, recorded locations, performed QC/QA, uploaded pilot data, and conducted a benefit cost analysis.
-Summary of Technologies:
  -Aerial Imagery w/LiDAR: Advantages – eliminate worker exposure, collect data once and quickly; Disadvantages – data collection perspective 900’ above assets.
  -Mobile Imaging, ARAN: Pros – collect images once at highway speeds in less time w/ground perspective; Cons – no culverts, ROW fence, or mobile area measurements.
  -Mobile Imaging w/LiDAR: Mobile Asset Collection (MAC): Advantages – same as ARAN, Disadvantages – same as ARAN but it cost approximately 2.5 times more.
  -Manual Data Collection: Advantages – flexibility, close to assets, multiple image angles, view safety issues; Disadvantages – takes longer, no review/reassess, exposed workers.
-Pilot Project Results: manual data collection was used to verify accuracy of each technology.
-Comparison between technologies: 5 mile overlap analysis; ditch and ROW fencing miles were off between methods. Advantages and disadvantages were noted above. Cost per mile (Varies $289 to $933); Hours per mile (Varies 6.7 to 10.2)
-Moving Forward: The final research report will develop an implementation plan, guidance, training, cost estimates, and suggested equipment and software recommendations.

Culvert Management in Four States - DOT Culvert Management Systems and Risk Management
Presenter: Marie Venner, Venner Consulting
-FHWA Study of Culvert Management Systems completed in VT, OR, OH, and LA County; most culverts were installed as part of interstate system, most are steel culverts.
-Large Culverts Management: NBIS large culverts > 10’, data collected every 12-24 months.
-Small Culvert Management: takes longer, MD and OH took 10 years to complete. OH DOT instituted an incentive system for completion of data collection.
-Impetus for Culvert Management System or Initiatives: unexpected voids, key purpose is timely and efficient repairs to extend culvert life; deep ones are difficult to repair.
-CMS Risk Analysis: reduced risk through inventory, knowing locations leads to frequent checking, clearing, and avoidance of emergencies.
-USA Approaches: Risk-based inspections speed up focused inventories and reduce costs.
-Integrated Culvert Management with Maintenance Management Systems is common.
-Weather related disasters involving flooding: global temperature increases allow air to hold more water and increase energy for more and bigger storms; 1,000 year storm frequencies are increasing, wipe out many assets, impact the economy, and disrupt freight deliveries.

Asset Management MAP-21 and Maintenance / Preservation
Presenters: Steve Gaj, FHWA Asset Management Team & Martin Kidner, WYDOT Planning Engr.
-What is Asset Management? MAP-21 Section 1103 and 23 U.S.C. 101(a)(2)
-What requirements does MAP-21 have pertaining to asset management? MAP-21 Section 1106
-Asset Management Plans: National Highway Performance Program, recertified every 4 years.
-Highway Asset Management Plan: Plan Contents and Other Assets
-Asset Management Basics: What is the current state of my assets? What is my required level of service? Which assets are critical to sustained performance? What are my best “O&M” and “Capital Improvement” investment strategies? What is my best long term funding strategy?
-AASHTO – FHWA Peer Exchange: Transportation Safety Asset Management: 76% of states gather more than pavement and bridge data. Most states inventory traffic signals, signs, and lighting, guardrail, and traffic barriers. Inventory of other assets includes: slopes, earth retaining structures, high mast lighting, and culverts/storm sewers.
-Issues and Recommendations: establish an asset management approach, collect and use data on traffic and safety assets, improve asset inventories and data quality, share data throughout the organization, prioritize what asset data to collect, link asset management w/Strategic Highway Safety Plan, link to safety, risk assessment (WA), and public input and other assets.
-Asset Management – This is how we do business: preserve assets, financial sustainability, provide a framework to improve performance, integration and convey investment needs.
Tuesday, July 23, 2013

Research Update
Presenter: Beth Wright, MoDOT, Maintenance Engineer (Environment/Research Vice Chair)
- Overview of Recent Research, 2014 NCHRP Problem Statements
- Possible statements: Collecting automated inventory data assets and condition level and keeping the information up to date; wind driven snow and LED traffic signals; increased driver distraction in work zones; culvert management best practices; and what’s the cost of deferred maintenance (NCHRP 14-20).
- Research in Progress: Highway Safety 20-07 effective strategies to reduce speeds in work zone.
- Completed Research: Development of AASHTO Guidelines for Median Cable Barrier System.

NHI Maintenance Leadership Academy, Chattanooga, Tennessee
Presenter: Chris Harris, TDOT
- Training was held from 8/12 to 10/12 and included 12 days of instructor led course work; 32.5 hours of self-study (Independent Study Workbook and web-based training) and two webinars.
- Modules include: Maintenance Administration, Transportation Asset Management in Maintenance Operations; System & Bridge Preservation; Roadside Maintenance & Drainage; Traffic Services, Safety, & Work Zones; and Environmental Protection. Exams were required.
- Observations and Recommendations: Broad spectrum of issues, knowledgeable instructors, you get out of it what you put into it, multiple state perspectives, comfortable to share thoughts, large commitment of time, and significant financial commitment. Quote “It’s worth every penny!” Upcoming Training: Phoenix, AZ (Fall 2013); Austin, TX (Spring 2014).

Feature Inventory System (FIS) User Interface
Presenter: Lonnie Hendrix, Assistant State Maintenance Engineer, Arizona DOT
- Three items make this system work: an FIS data collector (Yuma 2), an FIS database, and an FIS user interface. Arizona goes to this level of data collection due to recent legal challenges.
- The FIS user interface has a dashboard and charts section with live interactive charts and maps. All database queries display result grids w/chart and asset details/reports with hyperlinks. A mapping utility with built in photolog viewer and Excel reports is also available.
- Issues: keeping data current, getting districts to update the system after maintenance is completed. FIS should also be an integral part of your Maintenance Management System.

Maintenance Quality Assurance (MQA) and MAP-21 Panel Discussion
Presenter: Chair – Mike Mattison, NDOR – Maintenance Engineer
- Utah DOT MMQA+: started in 1997; measures 16 assets with specific performance targets; teams measure data every 6 months or by event with asset conditions reported to maintenance stations. Data quality is always an issue. Budgets are distributed using the results of a measured/unmeasured analysis. Decisions are made about target levels of assets and about where’s the right place to spend funds. UDOT has U-PLAN to identify GIS level information.
Ohio DOT Maintenance Condition Rating: ODOT uses four major categories (barriers, pavements, pavement markings, and traffic control devices) with a total of 14 sub-elements. Minimum 85% rating at 1/10th mile segments and random sampling by county; 15% of the system every 6 months by a two person consultant team; pictures are available. Results are shared with districts/counties on overall data and by individual categories. Quote: “We have found out what is important and know where to emphasize work.”

NC only collects condition data for drainage assets.

There is a need for a research library of maintenance activities noting what the equipment does. MAP-21 is key to reporting assets and developing a Safety Management Plan. What level of detail should we collect? MQA & FIS are very effective for performing condition assessments. Quote: “A random sample of 5% of the system is a good representation of the entire system.”

Wednesday, July 24, 2013

Environmental Impacts of Winter Maintenance
Presenter: Wayne Lupton, Envirotech, Colorado DOT Background
-Quote: “As far as equipment goes, one size does not fit all.” Materials such as salt and sand have drawbacks, as do chlorides and non-chlorides. Snow blowers spread the impact of salt and sand further away from the road effecting slopes and ponds. Sand cleanup is an issue. Not using sand may also be an issue. Street sweeping is optimum after storms and before sand migrates into drainage structures. Some states bury the sand then topsoil and seed over it. Storage may be an issue. Salt residue may be an issue. Vendors spread material throughout your yards. Dust issues on roads may also be created by passing vehicles. Some areas have PM-10 air quality issues. You cannot increase capacity unless you mitigate items.

-Total Maximum Daily Loads (TMDL): this is something we need to deal with. What are your impairments, sediment, siltation, and chlorides? Websites list these by state. Sweeping helps to pick up sand off the roads. We need to clean up sand within 48 hours after the storm event. The cost to mitigate down the road is very expensive and regulations change frequently. Salt has its own effects. Bounce and scatter is an issue, slower speeds help to minimize this as do zero velocity spreaders. Prewetting salt or wetting the road first saves money and lowers salt use. Salt dust can occur. Salt brine helps reduce this. Make sure the concentration is always the same for your circumstances. Salt can kill vegetation. Calibrate your equipment. Do not apply after the storm or over apply. Give products time to work. Chlorides are bad for bridges, reduce their application where possible. A number of states only use salt on their roadways.

Maintenance Life Cycle Cost Analysis (LCCA)
Presenters: Rob Zilay & Jonathan Fisher; Dye Management Group
-Caltrans project: LCCA is required by MAP-21; LCCA uses historical data and asset life expectancy to support the most economical alternative. Goals: decrease roadway system maintenance needs and worker exposure during maintenance. IMMS, analysis tool and LOS framework help to accomplish this goal. Outcomes: IMMS expense data, overall maintenance budget, and attenuator LCCA tools allow for annual inventory and cost data updates. Process Overview: charged data collection to activities and designed tool and inventory filter to query display “cost per asset” value for all Caltrans assets.
Individual Asset Tools: Attenuator LCCA tool, serves as a proof-of-concept for broader application. Detailed inventory count tab, average cost by attenuator type, data is being collected to help determine LCC for each type of attenuator.

Temporary Rumble Strips
Presenter: Howard Holland, Director - Maintenance Division, TX DOT
Quote: “Temporary rumble strips are effective.” Road Quake standards can be found on the TX DOT website. What are Temporary Rumble Strips? Three sections click together for a total weight of approximately 100 pounds. Create similar effect as standard edge center line rumble stripe. The raised rumble strips will move around a little over the course of a day.
Temporary rumble strips are needed due to visual, manual, and cognitive distractions of drivers on a daily basis. Products like this add to the list of methods used to warn and protect workers and abruptly get the motorists attention when entering the work zone.
As of May 2013 TX DOT standard WZ(RS)-12 temporary rumble strips is specified on all construction and maintenance contracts for use when stopping or moving the motorists over. These are used on roadways with a speed limit of 70 mph or less. Do not place on horizontal curves, fresh seal coats, bleeding asphalt, soft pavements, or heavily rutted roadways. The color black works best. Other colors tend to confuse motorists. One set is used in every district.
-Potential changes under review: installation issues; not connecting sections together; noise complaints; and weight.

Summary of 5 Research Statements
Presenter: Beth Wright, MoDOT, Maintenance Engineer (Environment/Research Vice Chair)
Reviewed five draft research problem statements and discussed priorities.
-Life Cycle Management of Small Culverts; 12 votes; forwarded for SCOM vote
-Worker Safety in Work Zones due to Distracted Drivers; 20 votes; forwarded for SCOM vote
-Best practices of managing R&R inventory data; 26 votes; forwarded for SCOM vote
-Wind driven snow and LED traffic signals; 0 votes – added to R&R TWG 2014 Work Plan
-Consequences of deferred maintenance; 18 votes; forwarded for SCOM vote

Miscellaneous Item
-Roadway / Roadsides TWG attendees voted to add a workforce development and training topic to one of the upcoming fall or spring TWG web conferences.
-Attendees List is noted on the next page.
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<td>Todd Matheson</td>
<td>Wisconsin DOT</td>
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<tr>
<td>Name</td>
<td>Organization</td>
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</tbody>
</table>
NHI Maintenance Leadership Academy – Statistics

- Hosted by Tennessee Department of Transportation
- August – October 2012
- Chattanooga, Tennessee
- Two 1-hour webinars
- 12 days of classroom instruction over 8 weeks
- 32.5 hours of self study
- 30 participants from 8 states
  - Georgia (3), Florida (1), Kentucky (1), Mississippi (2), Missouri (2), North Carolina (1), South Carolina, (2) Tennessee (18)
- Participants ranged from Executive Directors to County Maintenance Supervisors
NHI Maintenance Leadership Academy – Fall 2012 Participants
# NHI Maintenance Leadership Academy – Coursework

- Pre-class Orientation Web Conference (August 30, 2012)
- Independent Study Workbook
- Web-based Training Modules

## Agenda

**Orientation Web Conference Date:** August 30, 2012, 2-3:00 PM EST

**Modules A-C Pre-class assignments:** These assignments can be completed anytime after the Pre-Class Orientation and prior to the first day of ILT for Unit 1.

<table>
<thead>
<tr>
<th>(September, 2012)</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
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<tbody>
<tr>
<td>Morning</td>
<td>NA</td>
<td>NA</td>
<td>Pre-class self-study</td>
<td>Pre-class self-study</td>
<td>Pre-class self-study</td>
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<tr>
<td></td>
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<td></td>
<td>Module A&lt;br&gt;Asset Management (30 min. paper self-study)&lt;br&gt;Planning, Budgeting, and Scheduling (1 hr. paper self-study) &lt;br&gt;Module B&lt;br&gt;System Preservation Program (1.5 hrs. paper self-study, 40 min. WBT)</td>
<td>Module B (cont.)&lt;br&gt;Crack Sealing (1 hr. paper self-study)&lt;br&gt;Thin Surface Treatments (1 hr. paper self-study)&lt;br&gt;Dowel Bar Retrofitting (30 min. paper self-study)&lt;br&gt;Thin HMA Overlays and Levelling (1.5 hrs. WBT)</td>
<td>Module C&lt;br&gt;Draight (1.5 hrs. paper self-study, 1.75 hrs. WBT)</td>
</tr>
<tr>
<td>Afternoon</td>
<td>Pre-Class Orientation (30 min. Web conference) – August 30th, 2-3 PM EST</td>
<td>NA</td>
<td>Module B (cont.)&lt;br&gt;Pavement Evaluation and Analysis (1.5 hrs. paper self-study)&lt;br&gt;Shaping – Shoulders (1.5 hrs. WBT)</td>
<td>Module B (cont.)&lt;br&gt;Base and Subbase Stabilization and Repair (1 hr. WBT)&lt;br&gt;Bridge Preservation (2.5 hrs. paper self-study)</td>
<td>Module C (cont.)&lt;br&gt;Sides and Slopers (1.75 hrs. paper self-study)&lt;br&gt;Outdoor Advertising and Letter Control (30 min. WBT)&lt;br&gt;Residential Vegetation Management (1 hr. WBT, 1 hr. paper self-study)</td>
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</table>
NHI Maintenance Leadership Academy – Coursework

• **Module A: Maintenance Administration**
  • Transportation Asset Management in Maintenance Operations
    • Principles of Asset Management
    • Asset Use & Depreciation
    • Remaining Service Life
    • Planning & Budgeting
    • Maintenance Management Systems

• **Module B: System & Bridge Preservation**
  • Routine/Preventive/Corrective/Catastrophic Maintenance
  • Proactive vs. Reactive
  • Treatments
NHI Maintenance Leadership Academy – Coursework

- Module B: System & Bridge Preservation
  - HMA / PCC Pavements
  - Composite Pavements
  - Performance Factors
  - Distresses & Treatment Options
    - Cracking & Crack Sealing
    - Emulsion-Based Treatments
      - Fog Seals, Rejuvenators, Chip Seals, Sand Seals, Slurry Seals, Microsurfacing
  - Dowel Bar Retrofitting
- Bridge Defects, Terminology, & Components
- Bridge Types
- Preservation and Preventive Maintenance Techniques
- Bridge Inspection Reports
NHI Maintenance Leadership Academy – Coursework

• Module C: Roadside Maintenance & Drainage
  • Standards, Policies, Guidelines for Drainage Systems
  • Inventory & Assessment Spreadsheet
  • Soil Types & Compaction
  • Flowable Fill & Trenching
  • Vegetation Management

• Module D: Traffic Services, Safety, & Work Zones
  • MUTCD Part 6 (Work Zones)
  • MUTCD Parts 2 & 3 (Signs & Markings)
  • Guardrails / Barriers
Module F: Environmental Protection

- Oversight Agencies
- Federal/State Agency Coordination
- Maintenance Related Permits
- Air Quality
- NPDES Permits, SWPPP, SPRP/SPCC Plans
- Facilities
- Erosion & Settlement Control
- Groundwater
- Hazardous Materials & Hazardous Waste
- Worker Safety & Training
- Storage, Handling, Disposal
NHI Maintenance Leadership Academy – Observations & Recommendations

- Broad spectrum of issues relating to maintenance covered
- Instructors very knowledgeable and capable
- You get out what you put in
- Multiple state perspective serves to enhance group dynamic
- Participants need to feel comfortable sharing thoughts and experiences
- Requires sizeable commitment of participant’s time
- Significant financial commitment
- IT’S WORTH EVERY PENNY!!!
NHI Maintenance Leadership Academy – Future Sites

• Phoenix, Arizona – Fall 2013
• Texas – Fall 2013?
• North Carolina???
TEMPORARY RUMBLE STRIPS

Howard Holland
Director – Maintenance Division
TEMPORARY RUMBLE STRIPS

Howard Holland
Director – Maintenance Division
# Table of Contents

1. **What are Temporary Rumble Strips?** | 4-5
2. **Why are they needed?** | 6-10
3. **TxDOT Standard **\textbf{WZ(RS)-12}** | 11-16
4. **What We’ve Learned** | 17-18
What are Temporary Rumble Strips?
What are Temporary Rumble Strips?

- Creates similar effect as standard edge/center line rumble stripes
  - Driver will feel & hear the bumps

- Portable (no glue or nails)

- Placed in accordance with TxDOT standard WZ(RS)-13

- Currently only approved strip is RoadQuake 2 by Plastic Safety Systems, Inc.
Why are they needed?

Why is TxDOT now using temporary rumble strips?
Why are they needed?

To ensure driver’s are aware of upcoming work zones in order to protect the workers and the driver
Why are they needed?

Distracted
Visual   Manual   Cognitive
Why are they needed?

Tired Eyes

Sleepy

Inattentive
Adding to the list of methods used to warn and protect
TxDOT Standard WZ(RS)-12

Warning sign and rumble strip sequence in opposite direction is same as below.

● Signs are for illustrative purposes only. Signs required may vary depending on the TxDOT Typical Application, or project specific details for the project.

RUMBLE STRIPS ON ONE-LANE
TWO-WAY APPLICATION

WZ(RS-1a)
70 mph or Less

RUMBLE STRIPS FOR LANE CLOSURE
ON CONVENTIONAL ROADWAY

WZ(RS-1b)
70 mph or Less

GENERAL NOTES:
1. Both rumble strips array should consist of three rumble strips spaced at least 3 ft. To separate, place rumble strips across the lane or directions of traffic.
2. The WZ(RS) rumble strips array should be located under the WZ(RS) sign and spaced as shown. If a sight distance is not available to view both rumble strips array, one WZ(RS) sign and rumble strips array may be located.
3. Temporary rumble strips will be considered satisfactory by TxDOT, and shall be installed at the discretion of the State Traffic Control Devices.
4. Removal or the temporary rumble strips should be accomplished before removing the temporary warning signs.
5. Temporary rumble strips shall not be used on horizontal curves.
6. Temporary rumble strips shall be installed on a solid surface or on pavement.
Began with May 2013 Let Construction & Maintenance project
Understanding the Terminology

1 Complete Set = 4 Arrays = 12 Strips = 36 Units
When should a project use temporary rumble strips?
When should a project use temporary rumble strips?

**Current Requirement**
- One-Lane, Two Way flagging** operation with a posted speed of 70 MPH or less
- Lane closures** on a road or highway with a posted speed limit of 70 MPH or less

**NOTE: Includes Portable Traffic Signals & Automated Flagging Devices**

**Currently Not Allowed**
- Freeways
- Expressways
- If the speed limit is greater than 70 MPH
- On a third lane if more than one lane is closed
Potential Changes Under Review

- Evaluating use on conventional highways of 75 MPH
- Testing on Interstate 35 in Waco, TX
What We’ve Learned

Installation Issues
- Must install properly to be effective and remain in place
- Potential Noise Complaints
- Weight
Do not place on:

- Horizontal Curves
- Fresh Seal Coat Jobs
- Bleeding Asphalt
- Soft Pavement
- Heavily Rutted Roads
TEMPORARY RUMBLE STRIPS

Howard Holland
Director – Maintenance Division
UDOT MMQA+

- Started in 1997.
- 16 measured assets.
- Each asset has a specific performance target.
- Measurement taken twice a year or by event.
- Measurements taken by data collection teams.
- Conditions of assets reported to maintenance stations.
Deficient condition triggers work order.

Data quality always an issue.

Measured asset used in LOM analysis.

Budget distributed using measured/unmeasured analysis.

Defined cost vs target analysis.

Decisions made about target levels of assets and where is the right place to be spending funds.
Closing Session Agenda

- Roll Call
- Special Events
- History of SCOM Resolutions – Jameelah Hayes
- Research Ballot – Chris Christopher
- Technical Working Group Report Out
- Budgeting Maintenance Work
- Maintenance Peer Network Exchange
- TRB Update – James Bryant
- NCHRP Update – Amir Hanna
- Future AASHTO SCOM Meetings
- Other Business / Adjourn
Thank You
Vermont DOT

Thank You
Vendors
2014 West Virginia

• Movie – Ron Smith
# History of SCOM Resolutions

**AASHTO - Jameelah Hayes**

<table>
<thead>
<tr>
<th>Year</th>
<th>Title</th>
<th>Outcome</th>
<th>Approved By</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>1 Promotion of Highway Bridge Measurement Criteria that Promotes Bridge Preservation</td>
<td>Bridge condition assessment criteria that are based on bridge element level inspection condition information.</td>
<td>SCOH</td>
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<tr>
<td></td>
<td>2 Equipment Fleet Management Performance Measures</td>
<td>Endorsement of the use of the key performance metrics for the equipment fleet of utilization, preventive maintenance, retention, and availability/downtime.</td>
<td>SCOH</td>
</tr>
<tr>
<td></td>
<td>3 Establish a Schedule for Alternating Biennial Regional and National AASHTO EMTSP Partnership Meetings</td>
<td>The establishment of biennial National Meetings beginning in 2014 and biennial Regional Meetings beginning in 2013, with the location of the National Meeting being rotated among the four AASHTO regions and including 12-16 hours dedicated for concurrent regional meetings.</td>
<td>SCOH</td>
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<td></td>
<td>4 Support for the FHWA Pavement Preservation Expert Task Group and Requesting Semi-Annual Meetings for the Group</td>
<td>Expresses support for the Federal Highway Administration’s Pavement Preservation Expert Task Group and encourage FHWA to continue to hold PPETG meetings at least twice per year.</td>
<td>SCOH</td>
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**RESEARCH BALLOT (CHRIS C)**

FY 15 Problem Statement Ballot  
AASHTO Subcommittee On Maintenance – Burlington, VT  
July 25, 2013  

<table>
<thead>
<tr>
<th>Potential Problem Statement</th>
<th>TWG</th>
<th>Rank (Importance to you)</th>
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<tbody>
<tr>
<td>1) Condition Based and Non-Condition Based Triggers for the Placement of Thin Surface Treatments Used in Pavement Preservation</td>
<td>Pavement</td>
<td></td>
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<tr>
<td>2) Manufacture, Selection, Application and Performance of Asphalt Emulsion Treatments for Use in Highway Pavement Preservation</td>
<td>Pavement</td>
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<tr>
<td>3) Defining Comparable Pavement Cracking Data</td>
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<td>4) Quantifying the Environmental Benefits of Bridge Preservation Treatments</td>
<td>Bridge</td>
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<tr>
<td>5) Detection and Remediation of Chloride Contamination Prior to Coating Structural Steel</td>
<td>Bridge</td>
<td></td>
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<tr>
<td>6) Maintenance Actions for Fatigue Cracking in Steel Bridge Structures</td>
<td>Bridge</td>
<td></td>
</tr>
<tr>
<td>7) Best Practices For Collecting, Processing, and Managing Roadway/Roadside Inventory Data</td>
<td>Roadway/ Roadside</td>
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<tr>
<td>8) Worker Safety in Work Zones Due to Distracted Drivers</td>
<td>Roadway/ Roadside</td>
<td></td>
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<tr>
<td>9) Determine the Consequences of Deferred Maintenance of Highway Assets Other Than Pavements and Bridges</td>
<td>Roadway/ Roadside</td>
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<tr>
<td>10) Lifecycle Management of Small Drainage Culverts</td>
<td>Roadway/ Roadside</td>
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<tr>
<td>12) Transitioning Toward Performance-Based Winter Maintenance: Developing a Toolkit of Measures, Standards and Monitoring Tools to Fit Any Climate and Budget</td>
<td>Highway Safety and Reliability</td>
<td></td>
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</tbody>
</table>

1. We (SCOM) will submit as appropriate to NCHRP or 20-7  
2. We’ll post it to the AASHTO Maintenance website [http://maintenance.transportation.org/](http://maintenance.transportation.org/)  
3. You’ll see some of these again in March 2014 (or so), slightly modified and with NCHRP numbers.  
4. SCOM will rate the NCHRP proposals based on the results of today’s ranking. You as an independent state will also have the opportunity to rate them through your internal process. Coordinate with your Research Office/Branch as appropriate.
Technical Working Group Reports

- Bridge
- Equipment
- Pavement
- Roadway and Roadside
- Highway Safety and Reliability
2013 Work Plan Accomplishments 1

Workforce development

- Working with TSP.2, ETG, and industry on collection of maintenance training material and make available for practitioners – *On going*
- Supporting FHWA’s Long Term Bridge Performance Program (Bridge Preservation & Durability ETG)
- Supporting FHWA’s Bridge Preservation ETG’s efforts
- Conducted teleconferences with the Bridge TWG members.
2013 Work Plan Accomplishments 2

Research

Submitted a total of 6 RNS. The following two were approved:

• “Identifying and addressing failures of small movement deck joints” - Funded

• Current practices, benefits, and environmental requirements for bridge cleaning/washing – Funded & Completed Phase I
2013 Work Plan Accomplishments 3

Performance Measures

Proposed resolution 12-02 on the promotion of highway bridge management criteria that promotes bridge preservation - *Passed*

- Promote collection & use of element level data - *On Track*
- Transition from SD measurement – *On Track*
- Promote condition-based HI w/o cost dependency – *May need to drop*
- Promote the use of Good, Fair, Poor measurements – *On Track*
Environment

• Completed research on current practices, benefits, and environmental requirements for bridge cleaning/washing – *Funded & Completed Phase I*

• Promote the use of recycled glass for abrasive blasting – *Done through regional partnerships and health and safety*
2014 Work Plan 1

• Focus Areas - Research
  - Modify and resubmit the RNS on quantifying the environmental benefits of bridge preservation treatments.
  - Modify and endorse RNS previously submitted by TRB AHD30 committee on “Maintenance Actions for Fatigue Cracking in Steel Bridge Structures”
2014 Work Plan 2

• Focus Areas – Research
  - Modify and resubmit RNS on detection and remediation of chloride contamination prior to coating structural steel
2014 Work Plan 4

• Focus Areas - Workforce Development
  – Continue working with TSP.2, ETG, and industry on collection of maintenance training material and make available for practitioners
  – Support the FHWA proposed Peer exchange idea for bridge maintenance
  – Support the planning efforts for the TSP.2 2014 national bridge preservation conference
  – Serve as a liaison and facilitator between the TSP.2 regional partnerships and AASHTO Leaderships
2014 Work Plan 5

• Focus Areas - Workforce Development
  – Continue working with TSP.2, ETG, and industry on collection of acceptance and use of materials and products

• Focus Areas - Performance Measures
  – Provide comments on the FHWA NPRM for performance measures on bridges and for asset management.
  – Collaborate with FHWA ETG, and other stakeholders on defining “State of Good Repairs” as it applies to the bridge assets.
2014 Work Plan 5

• Focus Areas – Environment

  – Modify and resubmit the RNS on quantifying the environmental benefits of bridge preservation treatments.
  – Review and provide comments on Phase II of research project “current practices, benefits of environmental requirements for bridge cleaning and washing”
Research 1

• Proposed Topics for Environmental Excellence

Work plan

  – Modify and resubmit the RNS on quantifying the environmental benefits of bridge preservation treatments.
Research 2

• Research Implementation Recommendations
  – NCHRP 14-24, Report 742 “Communicating the value of preservation”
    • Working with FHWA to add a training module to the NHI bridge preservation Course
    • Planning to conduct a workshop during the national bridge preservation conference
    • Recommend that SCOM work with PI to host webinars
    • Recommend that copies of the report “playbook” be provided to state DOTs managers such as public affairs, maintenance and operations, and other groups
Research 3

• New Research Problem Statements
  – Modify and resubmit the RNS on quantifying the environmental benefits of bridge preservation treatments.
  – Modify and endorse RNS previously submitted by TRB AHD30 committee on “Maintenance Actions for Fatigue Cracking in Steel Bridge Structures”
Research 4

• New Research Problem Statements
  – Modify and resubmit RNS on detection and remediation of chloride contamination prior to coating structural steel
Proposed Resolutions

- 13-2 Formalize the organizational relationship between the TSP2 Regional Preservation Partnerships and SCOM - Joint Resolution with Pavement Technical Working Group
Equipment Working Group
2013 Work Plan Accomplishments

• Developed and submitted Resolution 12-03, Equipment Fleet Management Performance Measures
  — Unanimously approved by the AASHTO Standing Committee on Highways (SCOH) in November

• Developed and submitted Resolution 12-04, regarding alternating national and regional EMTSP Partnership Meetings
  — Unanimously approved by the AASHTO Standing Committee on Highways (SCOH) in November

• Updated EMTSP Strategic Plan, assigned responsibilities for each task.

2013 Work Plan Accomplishments 2

• Updated EMTSP website -
  – Modified the EMTSP website to provide similar information as the AASHTO Equipment Reference book to eliminate the need of continuing that publication
  – Modified the website to provide a “clearinghouse” for equipment specifications, surveys, and other links to trade publications and relevant articles.
Coordinated the scheduling of biennial regional partnership workshops with DOT equipment managers, industry partners, academia, and consultants to share the latest technical information, updates on regulations, lessons learned, and best practices:

<table>
<thead>
<tr>
<th>Regional Meeting</th>
<th>Date</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western States Highway Equipment Managers Association (WSHEMA)</td>
<td>August 27-29</td>
<td>Salt Lake City, UT</td>
</tr>
<tr>
<td>Joint Midwest/Northeast EMTSP Regional Meeting</td>
<td>June 23-27</td>
<td>Philadelphia PA</td>
</tr>
<tr>
<td>Southeastern States Equipment Managers Conference (SSEMC)</td>
<td>June 2-6</td>
<td>Little Rock, Arkansas</td>
</tr>
</tbody>
</table>
2013 Work Plan Accomplishments

- Developed and promoted common performance measures for equipment fleet management.
- Determined applicable Performance Measures through the EMTSP regional partnerships that may be adopted by state DOT equipment fleets
  - Developed a format and a process to share the Performance Measures from each State fleet
  - Finalized the definitions of each performance measure and worked with NCPP and the EMTSP Oversight Panel to post each State’s performance measures on the EMTSP website
  - First posting of results from DOTs that have them available have been posted on the EMTSP website
2014 Work Plan

• Focus Areas - Research
• Focus Areas - Workforce Development
• Focus Areas - Performance Measures
• Focus Areas - Environment
Research

Completed Research Projects

NCHRP Project 43-14, *Synthesis of Fleet Replacement Practices*:

- Project has been completed
- Is ready to be published.
Research

Current Research Projects


• Evolved findings from Research Project 20-07/Task 309, A Strategic Plan for Equipment Management Research
• Approved last year by SCOM.
• Selected for funding by the AASHTO Standing Committee on Research (SCOR) as NCHRP Project 13-04.
• NCHRP is currently soliciting panel members.
Research

Proposed Research

• From the Equipment Research Strategic Plan and the top research priorities poll taken in Mobile last year –
  – Will identify unneeded equipment
    • Save $ by not replacing
    • Recoup $ from sale of unneeded equipment

• Request your vote for this important research!
Workforce Development

• Continue working with Jim Feda on incorporating the Equipment TWG’s draft matrix for the Fleet Management portion of the Maintenance Matrix into the TC3 training and certification curriculum and determining next steps for implementation.

• EMTSP Oversight Panel to evaluate NCDOT’s Pilot Fleet Management Training Program and how it could evolve into an AASHTO Equipment Management certification.
Performance Measures

- Continue to encouraged each State fleet to implement the four Performance Measures and share the results.
- Continue refining the definitions of each performance measure.
- Continue posting each State’s performance measures on the EMTSP website.
Environment

• Continue monitoring and disseminating information regarding environmental issues that have potential impact upon highway equipment fleets by utilizing the equipment industry to identify national regulatory changes and communicate to the equipment management professionals.

• Continue posting information on EMTSP website and communicating at partnership meetings
Proposed Resolutions

• None

2014 National EMTSP Partnership Meeting

• Florida DOT has volunteered to host in Orlando – June 9th thru June 12th, 2014
Pavements Working Group
2013 Work Plan Accomplishments 1

✓ Sustain high level of maintenance interest and involvement in the area of System Preservation.
✓ Promote the Transportation System Preservation Technical Services Program. (TSP²)
✓ Assist in the development and implementation of performance measures that can be effectively utilized by member agencies and to meet the requirements of MAP-21.
✓ Support the expansion of Regional Pavement Preservation Partnerships.
✓ Assist in the implementation and reviews of the 2008 Pavement Preservation Roadmap, and in the development of an updated roadmap with the AASHTO TSP2 Program.
2013 Work Plan Accomplishments 2

- Review TRB/NCHRP Completed Research for possible publication as AASHTO Manuals.
- Assist in the implementation of SHRP-2 products that are useful to pavement preservation and maintenance, especially R-26 and R-23.
- Enhance the Internal Communications of the PTWG by: expanding the membership list; improving the e-mail address list; and conducting quarterly telephone conference calls and/or webinars.
- Work to confirm and enhance the linkage of pavement preservation activities to overall crash reductions in comparison to traditional rehabilitation and reconstruction activities.
Support the development and promotion of life cycle assessment methodologies that demonstrate the environmental-friendliness and sustainability benefits of pavement preservation techniques and strategies.

- Work to develop a guideline that will uniformly define the Remaining Service Life (RSL) of zero for use by our member agencies.
2014 Work Plan 1

• Sustain high level of maintenance interest and involvement in the area of Transportation System Preservation.

• Continue to promote the Transportation System Preservation Technical Services Program (TSP²) to AASHTO members.

• Support the expansion of Regional Pavement Preservation Partnerships to include more local public agencies, LTAP Centers, and MPOs.

• Enhance the Internal Communications of the PTWG by: expanding the membership list; improving the e-mail address list; and conducting two telephone conference calls and/or webinars involving roundtable discussions for the members. (September, December)
2014 Work Plan 2

• Focus Areas – Research
  – Assist in the implementation and reviews of the 2008 Pavement Preservation Roadmap, and in the development of an updated roadmap with the AASHTO TSP2 Program.
  – Review TRB/NCHRP Completed Research for possible publication as AASHTO Manuals or presentations in a series of “Pavement Preservation Book Club” webinars.
  – Assist in the implementation of SHRP-2 products that are useful to pavement preservation and maintenance, especially R-26 and R-23.
  – Work to quantify the contributions of pavement preservation to safety and risk-based asset management programs.
2014 Work Plan 3

- **Focus Areas - Workforce Development**
  - Support the efforts of the Transportation Curriculum Coordination Council (TC3) and other groups in the development of training and certification programs for the designs, specifications, construction, and inspection of pavement preservation technologies.
2014 Work Plan 4

• Focus Areas - Performance Measures
  – Assist in the development and implementation of useful and meaningful performance measures that can be used to meet AASHTO members pavement preservation program needs and enhance members ability to communicate the benefits of pavement preservation.
  – Work to develop a guideline that will uniformly define the Remaining Service Life (RSL) of zero for use by our member agencies.

• Focus Areas – Environment
  – Support the development and promotion of life cycle assessment methodologies that demonstrate the environmental-friendliness and sustainability benefits of pavement preservation techniques and strategies.
Research 1

• Proposed Topics for Environmental Excellence Work plan – none submitted

• Research Implementation Recommendations
  – 2011 14-24 Communicating the Value of Preservation: A Playbook – NCHRP 742
  – Other Published Reports to be reviewed this year.
  – Interim Reports deferred until published.
Research 2

• **New Research Problem Statements:**

1. Condition Based and Non-Condition Based Triggers for the Placement of Thin Surface Treatments Used in Pavement Preservation. NCHRP Synthesis


3. Defining Comparable Pavement Cracking Data
Proposed Resolutions

• 13-4 Expressing AASHTO Concerns with the USDOJ/USDOT Technical Assistance Agreement on Pavement Alteration Definitions.

• 13-2 Formalizing the Organizational Relationships Between the TSP2 Bridge and Pavement Regional Preservation Partnerships and SCOM. (Joint Resolution from PTWG and BTWG)
Roadway/Roadside Working Group
2013 Work Plan Accomplishments 1

• Focus Areas
  – Research; Workforce Development; Performance Measures; and Environment

• Hosted technical communication events

• Developed ideas, plans, presentations, and problem statements

• Facilitated discussions of roadway/roadside issues
2013 Work Plan Accomplishments 2

• Focus Areas Continued
  – Research; Workforce Development; Performance Measures; and Environment
• Promoted the Maintenance Leadership Academy
• Created TWG meeting contact list to facilitate communication and outreach
• Elected Second Vice Chair
2014 Work Plan

• Focus Areas – Research, Workforce Development, Performance Measures, and Environment
• Host a fall and spring webinar
• Promote research results, best practices, and implementation
• Develop presentations for 2014 R/R TWG meetings
• Maintenance equipment cleaning best practices
• Wind driven snow and LED traffic signals
Research

• Research Implementation Recommendations

• New Research Problem Statements
  – Life Cycle Management of Small Culverts
  – Worker Safety in Work Zones due to Distracted Drivers
  – Best practices of managing roadway/roadside inventory data
  – Consequences of deferred maintenance
Proposed Resolutions

• 13-3: Promote a joint SCOM and National Safety Rest Area Conference
• PM 2-13: Support and Leadership to Develop a Business Plan for the Establishment of an Operations Center of Excellence (CoE)
Highway Safety & Reliability Working Group
2013 Work Plan Accomplishments

• Organized the 2013 Winter Maintenance Peer Exchange & Website
  – Vancouver, WA, September 10-11, 2013; 32 state DOTs registered

• Integrated web-based AASHTO Computer-based Training with DOTs Learning Management Systems

• Promoted findings of NCHRP 636 (Tools to Aid State DOTs in Responding to Workforce Challenges) & 685 (Strategies to Attract and Retain a Capable Transportation Workforce) regarding workforce attraction & retention
2013 Work Plan Accomplishments 2

- TC3 developed new Job Hazard Analysis e-learning course (along with several others in development or in the queue)
- Supported SHRP2 implementation of L12 – Training Traffic Incident Responders (ties to Every Day Counts initiative)
- Promoted findings of NCHRP 6-17 (Performance Measures for Snow & Ice Control) and 20-68A (Best Practices in Winter Maintenance)
- Implemented results of revised Chapter 8, NCHRP 25-25(04) (Winter Operations and Salt, Sand and Chemical Management), including promotion over the Snow-Ice Listserv
- Co-sponsored (w/SCOTE) the Work Zone Speed Limits and Crash Data Practices problem statement that was approved in the last cycle (under 20-7)
2014 Work Plan

• Focus Areas – Research
  – Conduct the 2013 National Winter Maintenance Peer Exchange (Sept., WMTSP)
  – Promote the most promising results from the 2014 PIARC Winter Road Congress and SIRWEC conference (WMTSP)

• Focus Areas - Workforce Development
  – Refine the Anti-icing/RWIS Computer-based Training and help States connect with the Internet Browser Format and SCORM-compliant version (WMTSP)
  – Identify training needs in the area of highway safety and reliability, and then work with the TC3 to create or locate existing training materials that can be used to meet these needs
  – Promote NCHRP 685 results on workforce attraction & retention
  – Promote SHRP2 L12 training on Traffic Incident Management
2014 Work Plan 2

• Focus Areas - Performance Measures
  – Establish and build connection with the Subcommittees on Perf. Mgmt. and Public Affairs, especially with respect to the link between maintenance and safety and reliability performance measures
  – Promote the findings of 3 key winter maintenance performance management reports: NCHRP 6-17, NCHRP Synthesis 389, and NCHRP 20-68A (WMTSP)

• Focus Areas – Environment
  – Promote sustainability in winter operations via FHWA’s INVEST, APWA’s sustainability efforts, and Salt Institute’s “Safe and Sustainable Snowfighting” (WMTSP)
  – Establish a liaison with the AASHTO Center for Environmental Excellence to build upon the findings of the 2013 Symposium on Extreme Weather Events

• Other Efforts
  – Promote work zone safety via a number of resources and in coordination with other (sub)committees
  – Improve reliability via efforts that connect Maintenance and Operations, including SHRP2 and the emerging Operations Center of Excellence
Research

• Proposed Topics for Environmental Excellence Work plan
  – Real-time collection, processing & sharing of weather and road conditions during extreme weather (both human-based and automated (i.e., connected vehicle) approaches)
  – Post on web (and track hits) of Revised Chapter 8 (NCHRP 25-25(04))

• Research Implementation Recommendations
  – TWG approves advancement of the 5 NCHRP reports
    • 14-20, Consequences of Delayed Maintenance
    • 14-21, Resource Allocation Logic Framework...
    • 20-85, Renewable Energy Guide for Highway Maintenance Facilities
    • 14-24, Communicating the Value of Preservation, A Playbook
    • 20-7(300), Methods for Estimating the Benefits for Winter Maintenance & Operations

• New Research Problem Statements
  – Transitioning Toward Performance-Based Winter Maintenance; developing a toolkit to fit any climate and budget
Proposed Resolutions

• 15-5: Support and Leadership to Develop a Business Plan for the Establishment of an Operations Center of Excellence (CoE) PR 2-13
Resolution Summary

• Proposed Task Force to Review and Make Recommendation Regarding Maintenance Quality Assurance
• Funding Maintenance
• Resolution Ballot
13-5 Proposed Task Force to Review and Make Recommendation Regarding Maintenance Quality Assurance

• Following Approvals from AASHTO BoD and SCOH, the SSOM has commenced efforts in full speed to establish a business plan for the creation of NOCoE.
• The SSOM proposed NOCoE approach was presented at SCOM.
• The SSOM proposed NOCoE approach calls for a collaborative integration with SICOP and S&R TWG work plans - therefore
• The S&R TWG recommends SCOM for endorsement of the NOCoE resolution .
• TWG further advises SSOM to continue to coordination with SICOP, S&R TWG and with SCOM .
13-1 Proposed Resolution

Ignoring bridge preservation and pavement preservation activities for a minute,

1. What maintenance activities are performed using federal-aid funding (This does not include pavement and bridge preservation)?
2. How much in terms of both state and federal funds are spent on each of those activities?
3. What is each state's total maintenance budget, including both state and federal dollars?
<table>
<thead>
<tr>
<th>Number</th>
<th>Nomination</th>
<th>Description</th>
<th>Vote (yes)</th>
<th>Vote (no)</th>
</tr>
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<tbody>
<tr>
<td>13-1</td>
<td>Leadership</td>
<td>Funding Maintenance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13-2</td>
<td>Bridge TWG, and Pavement TWG</td>
<td>Formalize the organizational relationship between the TSP2 Regional Preservation Partnerships and SCOM - Joint Resolution with Pavement Technical Working Group</td>
<td></td>
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<tr>
<td>13-3</td>
<td>R&amp;R TWG</td>
<td>Support the Establishment of a Joint Meeting between the SCOM and the National Safety Rest Area Conference (NSRC)</td>
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<tr>
<td>13-4</td>
<td>Pavement TWG</td>
<td>Resolution Expressing AASHTO Concerns with the USDOJ/USDOT Technical Assistance Agreement on Pavement Alteration Definitions for the Americans with Disabilities Act</td>
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<td>PM 2-13</td>
<td>Leadership and HS&amp;R TWG, R&amp;R</td>
<td>Support and Leadership to Develop a Business Plan for the Establishment of an Operations Center of Excellence (CoE)</td>
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Maintenance Peer Network Bryan C

• Purpose
  – Foster communication and innovation among the highway maintenance community
  – Identify best maintenance processes and practices
  – Share widely, and encourage implementation of, successful processes and practices

• Method
  – FY 2014 - Development of survey tool and focus areas
  – FY 2015 and 2016 - 4 or 5 peer exchanges held
TRB Update – James Bryant

• 2015 Joint SCOM TRB Meeting
  – October, 2013 Identify theme for meeting
  – January 2014, Call for papers
  – July 2014, SCOM review abstracts and identify paper for 2015 joint meeting

• Other items
  – Equipment Conference
  – 2016 Winter Maintenance Conference
NCHRP Update - Amir Hanna

- Recently Published Reports
  - A Framework for a National Database System for Maintenance Actions on Highway Bridges (NCHRP Report 668)
  - Manual for Emulsion-Based Chip Seals for Pavement Preservation (NCHRP NCHRP Report 680)
  - Determining Highway Maintenance Costs (NCHRP Report 688)
  - Decision Making for Outsourcing and Privatization of Vehicle and Equipment Fleet Maintenance (NCHRP Report 692) – Also AASHTO Publication Code EFM-1
NCHRP Update - Amir Hanna 2

- New Projects - 3 Projects related to maintenance (from 8 submitted by SCOM)
  - Project 12-100: Identifying and addressing Failures of Small Movement Bridge Expansion Joints
  - Project 13-04: Guidelines for the Development of Highway Operations Equipment Replacement Lifecycle Criteria
  - Project 14-33: Performance Measures That Consider the Contributions of Preservation to Pavement Performance and Service Life
NCHRP FY 2014 Program

• March 26-27, 2013: FY 2014 projects selected
• April 2013: Program announcement
• April 15, 2013: Solicit panel nominees
• National Academies acceptance
• Panel formation
• July-December 2013: 1st and 2nd panel meetings (develop RFPs and select agencies)
• February 1, 2014: FY 2014 authorization
• February-March 2014: Contracting
NCHRP FY 2015 Program

- July 1, 2013: Solicitation of FY 2015 problem statements
- Sept. 16, 2013: End date for problem statements
- Nov. 18, 2013: Respond to submitters
- December 2, 2013: End date for submitter comment
- January 3, 2013: Mail candidates to SCOR/RAC
- February 21, 2014: SCOR/RAC ballots due
- March 7, 2014: Ballot summary report to SCOR
- March 25-26, 2014: SCOR meeting/project selection
Future AASHTO SCOM Meetings

• 2014 SASHTO – Charleston, West Virginia
• 2015 MASHTO – Des Moines, Iowa
  – Joint TRB Meeting
• 2016 WASHTO – Omaha, Nebraska
• 2017 Rhode Island
• 2018 North Carolina
• 2019 Michigan
Roll Call


We have a quorum and will vote.

Resolution Ballot

- **13-1 Maintenance Funding Survey Resolution**
  Maryland Motion, 2nd Nebraska
  Ya- All Na- 0
  **Passes**

- **13-2 Formalizing the Organizational Relationships Between the TSP2 Bridge and Pavement Regional Preservation Partnerships and SCOM**
  Georgia Motion, 2nd from Iowa
  Ya- All Na- 0
  **Passes**

- **13-3 Support the Establishment of a Joint Meeting between the SCOM and the National Safety Rest Area Conference (NSRC)**
  Nebraska Motion, 2nd from Tennessee
  Ya – All Na- 0
  **Passes**

- **13-4 Resolution Expressing AASHTO Concerns with the USDOJ/USDOT Technical Assistance Agreement on Pavement Alteration Definitions for the Americans with Disabilities Act**
  Alabama Motion, 2nd from Georgia
  Discussion: Provide discretion to chairman to have subsequent discussion and latitude to modify resolution as appropriate.
  Substitute Motion: Take 13-4 off table and work with Pavement TWG to rewrite motion and bring back as and electronic motion before annual meeting in October, 2013.
  NC Motion, 2nd from Maryland
Substitute Motion Passes

- **13-5 Proposed Task Force to Review and Make Recommendation Regarding Maintenance Quality Assurance**
  Rhode Island motion, 2nd from Utah
  Ya-All Na-0
  Passes

- **PM2-13 Support and Leadership to Develop a Business Plan for the Establishment of an Operations Center of Excellence (CoE)**
  Kentucky Motion, 2nd from Ohio
  Ya-All Na-0
  Passes