PAVEMENT PRESERVATION

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Presentation Outline

1. Background / Statistics
2. Institutionalizing Pavement Preservation – 20 years of history
3. Training
4. Research
5. Marketing / Communications
The RC is Serving customers nationwide
Without Pavement, We Would Be Stuck in the Mud!
Office of Asset Management, Pavement and Construction

4 Teams

- Design and Analysis
- Materials
- Construction
- Asset and Pavement Management

New –
Office of Program Performance Management
also with 4 New Teams
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Northwest Pavement Management Association    October 24, 2012
1. How Big is the U.S. Roadway Network?
__________________ Centerline-Miles.

2. What Percentage of the Roads are Owned by:
   A. Federal Government? ______%
   B. State Government? ______%
   C. Local Government? ______%

3. How Much of the Network is Paved? ______ %
   Unpaved? ______%
Less Than 100 Years Ago...
We’ve Come a Long Way ...
National Statistics:
4,059,340 miles of Roads  603,310 Bridges
2.99 trillion vehicle-miles / year
## Public Highway Ownership

<table>
<thead>
<tr>
<th>Jurisdictions</th>
<th>Miles</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal</td>
<td>131,559</td>
<td>3</td>
</tr>
<tr>
<td>States</td>
<td>784,310</td>
<td>19</td>
</tr>
<tr>
<td>Locals</td>
<td>3,143,471</td>
<td>78</td>
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<tr>
<td><strong>TOTAL:</strong></td>
<td><strong>4,059,340</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

2010 Conditions and Performance Report, FHWA

http://www.fhwa.dot.gov/policy/2010cpr/chap2.htm#1
National Statistics:
2.5 Million Miles of Paved Roads

Paved vs. Unpaved Roadways-U.S. Total
2,523,468 miles vs. 1,438,727 miles

- Paved - Urban Local 16%
- Paved - Rural Minor Collector 21%
- Paved - Rural Local 5%
- Paved - High Type Rigid 1%
- Paved - High Type Composite 2%
- Paved - High Type Flexible 13%
- Paved - Low Type 2%
- Paved - Intermediate Type 4%

Unpaved 37%
FHWA’s “3 E’s”

ENGINEERING
• Use Good Engineering Design to Assure Long-Life Pavements and Assets.

ECONOMICS
• Use Life-Cycle Cost Analysis for Project Selection.

ENVIRONMENT
• Consider Recycling First
• Be Good Stewards of the Environment
OUR SOCIETY DEPENDS ON OUR INFRASTRUCTURE FOR THE MOVEMENT OF BOTH PEOPLE AND GOODS!

The infrastructure includes:

- Roads
- Bridges
- Airports
- Water Systems
- Wastewater Systems
- Gas
- Electric
- Telephones
- Waterways
- Coastal Facilities
- Parks

ECONOMIC TRANSACTIONS

SOCIAL INTERACTIONS

INFRASTRUCTURE
2003 Challenges

Congestion

Aging Infrastructure

Freight Movement
What is Pavement Preservation?

Applying the *right* treatment...

...to the *right* road.

...at the *right* time...
What is Pavement Preservation?

**Includes:**
- Preventive Maintenance
- Minor Rehabilitation (non-structural)
- Some Routine Maintenance

**Does Not Include:**
- New Pavement Construction
- Reconstruction
- Major Rehabilitation (increase in structural capacity)
- Corrective Maintenance
Pavement preservation is a program employing a network level, long-term strategy that enhances pavement performance by using an integrated, cost-effective set of practices that extend pavement life, improve safety and meet motorist expectations.
Performance Curves / Costs of Repairs

1. Initial Design
2. Terminal Serviceability
3. 75% of Life
4. 40% Drop in Quality
5. 12% of Life

- $1.00 to Preserve / Maintain Here
- $4-$5?
- $11-$14?
- $32-$58?

Pavement Condition

Pavement Life

Northwest Pavement Management Association
October 24, 2012
“Selecting a Preventive Maintenance Treatment for Flexible Pavements”
Dr. R. Gary Hicks, P.E., Stephen B. Seeds, P.E., David G. Peshkin, P.E., March 2000
The Pavement Preservation Concept

Original Pavement

Time (Years)

Very Good

Good

Fair

Poor

Very Poor

Rehabilitation Trigger
Presentation Outline

1. Background
2. Institutionalizing Pavement Preservation – 20 years of History
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The Federal Role:

Promote uniformity, quality, and safety aspects of highway construction and maintenance.

Develop, promote, and provide new technologies and training.

Stewardship of the Federal-aid program and its investments.
Pavement Preservation Expert Task Group (PPETG)

Brainchild of Jim Sorenson

Formed in 1992

Composed of Representatives from State DOTs, Industry, and Academia

Purpose: Advise and Support FHWA efforts.
Benefits of Preservation

Improved Customer Satisfaction
• Keeps them (and you) happy.

Lowers User and Agency Costs in the Long-Term
• Saves them (and you) money.

Improved Safety
• Keeps them (and you) safer.
Partnerships Are Required

- FHWA
- Academia
- State DOTs
- Local Governments
- Private Sector

Northwest Pavement Management Association   October 24, 2012
Foundation for Pavement Preservation

Formed in 1992
AEMA, ARRA, ISSA founding members
Worked with FHWA and PPETG to produce many products
Jerry Eller, former FHWA Chief Engineer eventually became the Executive Director
AASHTO Subcommittee on Maintenance
Pavement Task Force
STATEMENT OF DIRECTION

“The purpose of the Pavement Task Force is to promote the preservation of pavements.”
AASHTO Support for Pavement Preservation
Subcommittee on Maintenance, Charleston, SC
A formal agreement between –
Foundation for Pavement Preservation & Michigan State University
NCPP Grand Opening Ceremony
October 17, 2003
Memorandum on Preventive Maintenance Eligibility

From: King W. Gee, Associate Administrator for Infrastructure

Dated: October 8, 2004

http://www.fhwa.dot.gov/preservation/100804.cfm
Eligible Activity Examples

Roadway Activities:

- Crack Sealing and Joint Repairs
- Seal Coats (fog seals, slurry seals, chip seals)
- Pavement Patching and Thin Overlays
- Shoulder Repair
- Restoration of Drainage Systems

Bridge Activities:

- Seismic Retrofit
- Scour Countermeasures
- Painting.
Definitions Memorandum

From: David R. Geiger, P.E.
Director, Office of Asset Management

Dated: September 12, 2005

http://www.fhwa.dot.gov/pavement/preservation/091205.cfm
Categories of Pavement Preservation

- Pavement Preservation
  - Minor Rehabilitation
  - Preventive Maintenance
  - Routine Maintenance
# Pavement Preservation Guidelines

<table>
<thead>
<tr>
<th>Type of Activity</th>
<th>Increase Capacity</th>
<th>Increase Strength</th>
<th>Reduce Aging</th>
<th>Restore Serviceability</th>
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</thead>
<tbody>
<tr>
<td>New Construction</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Reconstruction</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Major (Heavy) Rehabilitation</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Structural Overlay</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Minor (Light) Rehabilitation</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Preventive Maintenance</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Routine Maintenance</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Corrective (Reactive) Maintenance</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Catastrophic Maintenance</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
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</tbody>
</table>
Stresses and Strains -- but Preservation is Non-Structural!

Tire has a total load $P$, spread over a circular area with a radius of $a$, resulting in a contact pressure of $p$.

No horizontal boundary, assume layers extend infinitely.

Figure 2. Layered Elastic Model Representation of a Pavement.

www.asphaltalliance.com
Transportation System Preservation Technical Services Program

Resolution PR-10-05
Approved by the Board of Directors
May 8, 2005
Transportation System Preservation Technical Services Program (TSP²)

Phase 1: Pavement Preservation

Phase 2: Bridge Preservation

Phase 3: Regional Partnerships
The TSP² Website:  www.tsp2.org

- Bulletin Board System
- LISTSERV Email Lists
- Technical and Document Resource Library for Pavement and Bridge Preservation
- Help Desk Requests
- Education / Training Materials

www.tsp2.org
www.pavementpreservation.org

Midwestern
Northeast
Southeastern
Rocky Mountain West

www.tsp2.org
Pavement Preservation Partnerships

If your State, Municipality, or County is not a member yet...
Please get a flyer ....
And Join Us in preserving our existing assets in good condition!

Northwest Pavement Management Association      October 24, 2012
FP², Inc.

In 2007, the Foundation for Pavement Preservation was dissolved, and FP2, Inc. was created.

Changed from a 501 c(3)
To a 501 c(6) organization to enable a higher level of political involvement under the IRS codes.
Pavement Preservation Journal

Published by FP2, Inc.

1st Published in 2007

Supported through advertising

www.fp2.org
MAP-21 – the New Law

Moving Ahead for Progress in the 21st Century Act (MAP-21) surface transportation legislation enacted July 6, 2012 contains language both specifically, and more generally, helpful to pavement preservation. (quote from www.fp2.org)

http://www.fhwa.dot.gov/map21
Focus the Federal aid program on the following national goals:

1) SAFETY
2) INFRASTRUCTURE CONDITION
3) CONGESTION REDUCTION
4) SYSTEM RELIABILITY
5) FREIGHT MOVEMENT / ECONOMIC VITALITY
6) ENVIRONMENTAL SUSTAINABILITY
7) REDUCED PROJECT DELIVERY DELAYS
Summary of Key Points

1992 – PPETG and the Foundation for Pavement Preservation were formed.

FHWA, AASHTO, Industry, and Academia have worked hard to advance Pavement Preservation in many different ways.

MAP-21 has codified Pavement Preservation into Federal Law.

Local Involvement can be stronger!
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National Highway Institute Training

131103 A, B, C – Pavement Preservation: Design and Construction of Preventive Maintenance Treatments


131106 – Transportation Asset Management

131114 - Pavement Preservation: Optimal Timing of Pavement Preservation Treatments

131115 – Pavement Preservation: Preventive Maintenance Treatment, Timing, and Selection

131116A – Pavement Management: Characteristics of an Effective Program

www.nhi.fhwa.dot.gov
NHI Preservation Training - FREE

131110 – Pavement Preservation Treatment Construction
– WEB-BASED

• HMA Treatments
• PCC Treatments
• HMA Overlay Inspection

TCCC: www.nhi.fhwa.dot.gov/tccc
Crack Seal Application
Chip Seal Application
Thin Hot-Mix Asphalt Overlay
Fog Seal Application
Slurry Seal Application
Microsurfacing Application
Hot In-Place Recycling
Cold In-Place Recycling
Fabric Interlayer Application
Joint Sealing
Diamond Grinding
Dowel Bar Retrofit
Partial-Depth Repair
Full-Depth Repair
Download the FREE Checklist Apps

Using your smart phone, go to the Android Marketplace or Blackberry App World to download the FREE app.

Just do a search on “FHWA” and the application will pop up!
A Quick Check of Your Highway Network Health

by Larry Galehouse, Director,
National Center for Pavement Preservation
and
Jim Sorenson, Team Leader,
FHWA Office of Asset Management
Transportation System Preservation Research Roadmap

Research Efforts through the Transportation Research Board
Pavement Preservation (AHD18)

Committee Scope:
This Committee is concerned with identifying and supporting research on the application of scientific principles to quantify preservation activities and their benefits to the transportation roadway infrastructure; developing, applying and evaluating scientific approaches to assess materials, processes, methods and procedures involved in cost-effectively extend the performance-life of transportation pavement sections and networks; and, promoting an understanding and use of effective preservation practices and procedures through dissemination and education activities for practitioners and researchers.

http://pavementpreservationcommittee.org/
NCHRP:
National Cooperative Highway Research Program

Founded in 1962.
NCHRP: National Cooperative Highway Research Program

$34 Million per Year
under SAFETEA-LU

www.trb.org
Research Examples

“CHIP SEAL BEST PRACTICES”
NCHRP Synthesis 342 (2005)

“MICROSURFACING”
NCHRP Synthesis 411 (2010)
SYNTHESIS STUDY
Overview of Successful Practices in the United States, Canada, and Overseas.

Literature Search and Surveys.

43 BEST PRACTICES IDENTIFIED

Northwest Pavement Management Association    October 24, 2012
NCHRP Project 20-07/Task 339

Synthesis Study on Best Practices for Crack Sealing and Crack Filling of HMA Pavements
1. Background
2. Institutionalizing Pavement Preservation – 20 years of History
3. Training
4. Research
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Pavement Preservation: 
A Call to Action

As the demand and cost for maintenance on public roads keep increasing, there is a focus on the need for effective pavement preservation. pavement preservation, when properly implemented, can extend the life of a pavement, reduce the amount of maintenance required, and save money in the long run. 

Preservation of pavements involves the application of materials that are placed on the surface of the pavement to improve its performance. The materials, known as sealers, can help prevent water penetration, which is a major cause of pavement failure. By keeping the pavement dry, the materials help extend the life of the pavement and reduce the need for costly repairs. 

Preservation materials can be applied using a variety of techniques, including slurry sealing, chip seal, and microsurfacing. Each technique involves spreading a thin layer of material on the surface of the pavement, followed by a roller to compact the material. 

Preservation is a key component of pavement management, which is the process of planning, designing, constructing, operating, and maintaining a transportation system. Pavement management involves the use of data and analysis to make informed decisions about the maintenance of a transportation system. 

Preservation is an essential part of a successful pavement management program, as it helps extend the life of a pavement, reduce the need for costly repairs, and save money in the long run. By focusing on pavement preservation, we can ensure that our transportation system is efficient, safe, and cost-effective.
CD’s

Pavement Preservation 2: State of the Practice

National Pavement Preservation Forum II
COMPENDIUM

A collection of articles about Pavement Preservation that have been published over the past couple of years.
Advances in Technology Mean New Opportunities….

Webinars – APWA, LTAP Centers, TLN system, and many more.

On-Line Libraries:

NCPP – [www.pavementpreservation.org](http://www.pavementpreservation.org)

Electronic Journals: The Pavement Preservation Journal

PowerPoint Presentation Postings – RMWPPP presentation….
Cost of Delaying Maintenance

Timing Belt Replacement: $400

Engine Replacement: $2,500
Cost of Delaying Maintenance

Teeth Cleaning: $75

Root Canal: $1,000
Nothing Beats a Conference

Northwest Pavement Management Association

Thank You for the Invite!
Concluding Remarks

http://www.pavementvideo.org/CPAR/CPAR%20Video.mp4
1997 Challenges for Preservation

- Public perception
- Management perception
- Shortage of applicable research
- Absence of relevant training
- Poor data tracking
- Dedicated funding
- Safety – TEA-21 required a plan to address safety issues for Federal funding.
RESEARCH NEEDS REMAIN…

1. Treatment Impact on Pavement Performance (Service Life Extension)

2. Economic Evaluation of Treatment Effectiveness

3. Construction and Monitoring of Treatment Test Sections
Preservation and Asset Management won’t bring short-term glory, but they will bring long-term satisfaction!
Pavement Preservation Mantra:

Apply the *right* treatment...

...to the *right* road...

...at the *right* time.

Use Engineering!
\textit{Right Road... Right Time.}  USE PMS
Partnerships are Required

1 FHWA
52 State DOTs (including DC and PR)
3,034 County governments;
35,933 Municipal, Town and Township governments.
4,140 Colleges and Universities
_____ contractors/industry reps.

UNITED WE STAND....
FHWA Supports Pavement Preservation!

Left to right: Associate Administrator for Infrastructure King Gee; Administrator Tom Madison; James B. Sorenson, Highway Engineer; and Executive Director Jeff Paniati.
THANK YOU!

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