Midwestern Pavement Preservation Partnership
Grand Rapids, MI
April 9 – 11, 2001

Introduction – Larry Galehouse, MDOT

The meeting began with self-introductions by each attendee (roster attached) including their reasons for attending the meeting. The most frequently mentioned desires were for common specifications, to learn from others, to have better tracking of cost and performance, and to obtain guidelines (decision trees) for pavement preservation.

Larry mentioned other areas that could be addressed including, training, research, exchange of ideas, texture and smoothness specifications, quality in design and construction, construction worker certification, warranties, pooled funding of research into areas of concern and Federal-aid funding of preventive maintenance.

FHWA Overview – Jim Sorenson

For a long time many SHAs have used a "worst first" approach to fixing their pavements. It has been proven many times that this does not result in the best use of funds. Early and timely application of preventive measures will save money and provide roadway users with a superior product.

The Foundation for Pavement Preservation has been a valuable partner in bringing this new concept to the states. Much interest in preventive maintenance began with the construction of the SHRP SPS 3 and 4 projects. This was followed by the AASHTO Lead State Team on Pavement Preservation. When they were sunseted the responsibility was transferred to AASHTO's Subcommittee on Maintenance. In addition, FHWA's Expert Task Group on Pavement Preservation has been guiding much of the work for the last few years.

A significant impediment has been that top management is concerned that PM takes away some of their decision making authority. And it is not as high profile a topic as capital expenditure projects with their ribbon cutting ceremonies.

Jim briefly reviewed the history of Federal-aid participation in preventive maintenance type activities. Then he passed out the attached table, "Pavement Preservation Eligibility Guidelines." Discussion followed on some examples of tough eligibility questions. Many SHAs use all their Federal-aid on other work and have no desire to spend it on PM.

AASHTO Report – Jim Sorenson

The Standing Committee on Highways assigned Pavement Preservation to the Subcommittee on Maintenance last year. It is under their Pavement Task Force. (Also underway at this time is a reevaluation of the organizational structure of the SOMaint.) One of the key items the Task Force has worked on is the development of research proposals. California will host a forum of researchers early this summer to brainstorm where PM is headed. Ideas will then be submitted at the SOMaint. meeting this summer.

Finally, Jim announced that the second Forum for the Future will be held in San Diego on November 6 – 8.

"Lead State" Report – Roger Olson

Originally had 5 states - Georgia, Minnesota, Wisconsin, Michigan and Texas. Texas dropped out so most of the representation was from the midwest. Main objective was to promote the concept of PM. The team produced award winning videos, made speeches at workshops and trade association meetings, developed displays, authored research protocols, and promoted the use of dedicated funding. Objectives were well accomplished and remaining work was passed on to AASHTO SOMaint.

State Presentations

Montana – Dick Clark

Maintenance and construction are responsible for 24,000+ miles (recently got all the secondary roads), maintenance and construction projects are identified through PvMS, their system is 5% PCCP and 95% ACP, try to leverage all of their dollars with Federal-aid, $15 million program for maintenance (both Federal-aid and state only projects), $40 million for construction

What's working?

PvMS is a guide for project candidates
Guidelines for Project Nomination (agreement with FHWA)
Maintenance crack seal and overlay manuals
Research projects, i.e. crack seal
Marketing plan for acceptance of PP (directed at legislature)

Issues to Share

Data integration at the enterprise level for engineering use
Better pavement performance prediction using mechanistic parameters
Additional marketing for legislatures and public
Integration in project management
Integration into strategic business plan performance measures

Minnesota – Jerry Geib

Have 28,765 lane miles, PMS says 58% is a candidate for PM (19% do nothing and 23% is too far gone), would need $137 million to address all PM needs, have a $40 million program target for this year, guidelines follow Michigan's format, emphasis is on keeping the water out, showed pictures of the various treatments

Issues to share

- Sealant specification issues
- Competent specialty contractors
- Warranties
- Lack of uniform seal coat performance
- Common terminology (especially for emulsions) to aid communication
- Lack of dedicated funding
- Performance measures

Wisconsin – Tom Lorfeld

All maintenance is done by the county highway departments, consistency and uniformity is a major challenge, maintenance is budgeted separately with the roadway getting about $25 million plus up to about $10 million in discretionary funding, another $3 million is done through construction contracts, total is thus about $38 million, have a new manual for pavement maintenance which has distress pictures and fix matrices to help the counties, the manual also has tables of expected lives for the strategies, all maintenance is done without Federal-aid

What's working?

- Low-end type maintenance work is very cost effective
- Some proprietary products like Novachip and Italgrip
- Warranties for pavement construction
- Spray injection pothole patching

Issues to share

- Dedicated funding is the number one issue
- Raised pavement markings
- Retrofit dowels – poor performance of grout backfill
- Uniformity, because of their many county maintenance organizations

Illinois – Dave Lippert

IDOT is responsible for 16,707 miles. "Illinois First" program nearly doubled their available budget to a total of $10 billion (2002 – 2006). PM is done by contract - crack sealing 2-3 years after bituminous overlay, SMART overlays (whatever you can do for

$120,000/mile =~1.25-1.5”), don’t use seal coats or microsurfacing very much, use some ¾” overlays sometimes called Half-SMART. IDOT has no problem using all their Federal-aid so PM is state funded.

What’s working?

- Crack sealing
- Microsurfacing
- SMART
- Major overlays
- Experimental
  - Novachip
  - UTW PCC inlays
  - Rubblizing
  - Unbonded overlays

Issues to share

- Tech transfer and/or training
- Cost effectiveness research activities
- Cost allocation study based upon SHRP climate regions

Indiana – Bill Flora

Indiana has 11,300 miles of state maintained highways. Spend about $70 million on contract PM (out of $700 million total for construction). Have a strategic goal to develop a Pavement Preservation Program (IPPP). The IPPP is under development. It will be an integral part of PMS. Working on treatments, triggers, and funding. Strongly feel that the pavement treatment should not determine roadway design standards (safety upgrade issue).

Issues to share

- Scope creep
- Cost estimates (final vs. programming estimates)
- Triggers for pavement treatments
- Staffing shortfall
- Confusion about definitions (PM means different things to others)
- Integrating maintenance management into pavement management

Ohio – Aric Morse

While the philosophy of PM is supported they have no dedicated funding. Funding is based on specific PM needs by District. Performance standards are being developed (like “underdrains to be cleaned every 3 years”). Candidate projects are selected using snapshots of distress (conservative). Ohio’s priority currently is training on use of

project selection procedures (general query language – GQL) and philosophy of PM. ODOT is responsible for 19,000 centerline miles and has a $1.2 billion dollar budgets.

Nebraska – Wayne Teten

Since they have no PM program he has no slides to show what they don't have. However, they do PM. They just don't have the formal accoutrements. Because of their huge imbalance in population density around the state, a big concern is equity between rural and urban areas. They have $310-320 million/year program. Nebraska spends $12-13 million/year on 2" overlays which covers about 150 miles. About $15 million/year is spent by the Districts on pavement maintenance. Do some very low quality chip seals (armor coating) and are looking for ideas to do it better. Another $3 million/year is spent on contract maintenance. Finally, about $10 million/year is spent on diamond grinding.

Issues to share

Treatment selection (rutting is one major area of concern)
Extent of PCCP patching versus overlays
Right techniques and specifications
Crack sealing methods and materials and timing
Winter patching material specifications
Edge drain use and maintenance
Determining optimal timing
Use of millings in chip seals

Kansas – Kirk Fredrichs

KDOT has responsibility for 10-11,000 miles. Their PMS is used to divide projects into reconstruction and substantial maintenance. All the usual PM strategies are used.

Issues to share

Dowel bar retrofit performance needs to be evaluated and reported
Routine maintenance is not tracked by PMS
Best ways to share experiences
Truck volumes and overweights
Daylighting of open graded base courses
Edge drain maintenance and inspection

Michigan – Larry Galehouse

All areas of MDOT are involved with PM, it is not just a maintenance activity or responsibility. Their PMS is at the heart of the program. It helps select among PM, rehabilitation, or reconstruction. Legislative goal is to have 95% of the Interstate and 75% of the rest in good condition by 2007. The capital PM program has a one-year

cycle. MDOT has a well documented PM program to guide their Districts. A lot of effort has gone into performance evaluations of PM treatments. Over 1992 – 2000 they have done 270 PM warranty projects for $126 million. Non-warranty has been 351 projects for $151 million. No formal program to evaluate warranty projects has been established yet.

Issues to share

Training on a continuing basis
Tracking of cost effectiveness
Need for consistency of performance of various treatments
Objective warranty performance criteria
Prequalification of contractors
Crack sealant reservoirs
Pavement marking adhesion to chip seals and microsurfacing
Consistent CPR performance
Threshold limits

Summary and Ranking of Issues

The group consolidated and summarized the above issues into 5 areas. Teams were then formed to rank the issues in their respective areas:

Preservation Policy
Construction Specifications
Research
Materials
Training

Listing of the issues each team considered are attached. The teams first chose champions (state, industry, and FHWA) for their topic. The issues were then clarified with further discussion and ranked. Assignments were made to prepare summaries of the deliberations and each team reported on their work. Team rosters and their outputs (what, when, who) are attached.

Overview of Foundation for Pavement Preservation – Bill Ballou

Mission – to support research to educate government and industry in the economic, safety, and performance advantages of pavement preservation.

The organization sprung from an initial emphasis on slurry seal applications, which was broadened to encompass all aspects of PM. Participants include industry, public agencies, academia, and consultants. An international member is being recruited. The key benefit of their work is the way funding is leverage through matching by other entities like FHWA or pooled funds. Newsletters ("Pavement Preservation Today"), booths, tool kits, a website (www.fp2.org), training courses, university curricula, case

studies, brochures, and a glossary of terms publication have been developed to promote PM. A legislative outreach program has been instituted. An international scanning tour will be conducted this year. "Pavement Preventive Maintenance Guidelines" has been published. Forum for the Future II will be held in November in San Diego in conjunction with the National Pavement Preservation Conference. Regional workshops have been held. A research problem statement workshop will be held near the end of June in Sacramento.

International Slurry Seal Association -Chris Anspaugh

Want to fit their product into the bigger picture of PM. Their annual workshop is a good place to learn about the product, quality control, inspection, etc. More information can be obtained at www.slurry.org.

Asphalt Emulsion Manufacturers Association - Dr. Alan James

Founded in 1973 with about 100 members, most from the U.S. Emulsion producers and related industries are represented. Emulsions are used in many PM techniques. The group is an excellent source for emulsion information such as an available CD/Manual on the basics of asphalt emulsions and a book on "Recommended Performance Guidelines." Their website (www.aema.org) has many of these items as well as proceedings from recent conferences.

Asphalt Recycling and Reclaiming Association – Dr. Alan James

Membership includes contractors, equipment manufacturers, other suppliers, consultants and users. They encompass a variety of binders and techniques. Their website is www.arra.org.

Ohio Pavement Preservation Association – Michael Beckingham

Their group is really working for the DOTs because they share the same goals – to get better performing pavements. Main effort has been to develop meaningful and useful specifications.

Michigan Road Preservation Association – Randy Terry

Organized in late 1998 to address technical issues of PM cooperatively with MDOT. Members do slurry seals, microsurfacing, and crack sealing. See their website at: www.m-rpa.org. Goal is to educate users on the quality, safety features, and effective uses of PM. They also want to define and develop quality specifications for PM concepts. Another goal is to insure that adequate funding is available for PM and that proper strategies are selected. Finally, they promote the use of PM and have developed a number of promotional and education tools.

Thin HMA Overlays – John Becsey

These are defined as about 1½“ thick and when used for PM must be placed on structurally sound pavements. Sometimes cold milling is used to prepare for the overlay. In Michigan the technique costs about $2.38/yd^2. Ultra-thin HMA overlays are 0.6 – 0.8 inches thick and are used as an alternative to chip seals or microsurfacing. It is currently limited to low volume roads but hope to expand it to higher volumes (with more stringent controls on material quality). Cost is about $1.18 to 1.83/yd^2 depending on material quality.

Concrete Pavement Preservation – John Roberts

For concrete pavement issues visit www.pavement.com. For grooving and grinding go to www.IGGA.net. Their industry has learned that you can't simply place a concrete pavement and than forget it. PCCP needs PM. The chief benefit of PM is that it results in smoother roads and smoother roads last longer. Of all the CPR strategies two of the most valuable are diamond grinding/grooving and dowel bar retrofit. All treatments must be applied at the right time to the right pavement.

Crack and Joint Sealants- Jim Chehovits

When done right, 10+ years of life are possible for PCCP joint sealants (SHRP SPS-2 finding). If the joint is to remain unsealed, the saw cut should be as narrow as possible.

For asphalt pavements 6+ years of life are achievable for crack sealants and sealing can extend pavement life from 2 to 5 years. Hot rubberized sealant with a reservoir has been found to be the most cost effective. Hot rubberized with an overband was next followed by silicone with reservoir and asphalt filled. Working cracks should be sealed while non-working cracks should be filled. When routing, be sure to cut both sides of the crack and make it wide enough for the anticipated movement. Wide and shallow routing works well for large movements. Specified application temperature should be followed to achieve better adhesion in less favorable conditions. Detacking solutions are water based and applied to crack sealants to reduce pickup by traffic and pedestrians. Presealing of longitudinal construction joints is being increasingly used, especially on warranty projects. Overlay bumps are produced when the sealant sticks to the overlay which interrupts displacement during compaction. A crack vacuum system is being used in the Phoenix are to remove debris while reducing particulate air pollution.

Ultrathin Bonded Wearing Courses and Macrosurfacing - David Moellering

Ultrathin bonded wearing courses (Novachip) uses a polymer modified emulsion membrane, a gap-graded hot mix, and a specially engineered machine for application. Splash and spray are reduced, as is noise.

Macrosurfacing is a chip seal-like treatment that uses a single special machine to spray the emulsion and spread the chips. The emulsion has special chemistry for rapid, controlled breaking. The surface is immediately rolled and brooming is done in about an hour.

By K. Herbold
5/2/01

Reports from the 5 Issue Teams

Materials –

Team members: Lee Gallivan, Jim Forbes, Reid Knutson, Bill Lohr, Pete Miller, Ryan Rizzo, Wes Shemwell, and Tom Wood

Champions: Tom Wood (SHA), Lee Gallivan (FHWA), and ??? (Industry volunteer needed)

Initial discussion concluded that maybe this topic should simply be added to the specifications topic. But given the issues they were to address they feel that chip seals should be their top issue. They would like to produce a summary of best practices. This could be done with a survey among the states and should be ready by the next meeting.

Their second ranked topic was winter patching materials.

Research –

Team members: Steve Bower, Jim Chehovits, Dan DeGraaf, Dave Lippert, Chris Williams, Aric Morse, Roger Olson, and Dave Smiley

Champions: Roger Olson, Aric Morse, and Dave Smiley (all SHA)

Subdivided their topics into “general” and “specific” topic areas.

General:
Cost effectiveness and proper timing of PP
Consistency/uniformity of treatments and performance
Warranty criteria
Cost allocation (Phase II to #2)
Better pavement performance models using mechanistic procedures

Specific:
Determine optimal crack sealing reservoir width
Benefits of edge drain retrofit
Consistency/uniformity of CPR treatments and performance
Adherence of paint markings to chip seal surfaces
Millings in chip seals?
Improve winter patching materials

Training –

Team members: Bill Ballou, Gary Chapman, Lee Gallivan, Jerry Geib, John LaVoy, and Tom Wood

Champions: Gary Chapman (Industry), Jerry Geib (SHA), and Lee Gallivan (FHWA – temporary)

Main key is to coordinate with the Midwest Training and Certification group. Also want to survey the SHAs about what is available. Certification training information should be provided to Tom Wood at tom.wood@dot.state.mn.us.

Specifications –

Team members: Steve Krebs, Andy Ilieff, Dave Rose, Dan Anderson, Bill Christensen, Mike Hutchens, Jim Murner, Dan DeGraaf, Dave Solsrud, and Kirk Fredrichs

Champions: Steve Krebs (SHA), Andy Ilieff (SHA), Kirk Fredrichs (FHWA), and Mike Hutchens (Industry)

The group whittled their 10 items down to 4:

Develop warranty specifications performance standards
DBR issues
Crack seal reservoirs and materials
Improve specifications for other agencies doing or contracting PM work

They assigned team members to each topic. Summary reports are planned by mid-July.

Policy –

Team members: Chuck Boan, Dick Clark, Bill Flora, Larry Galehouse, Dave Holtz, Tom Lorfeld, Bob McQuiston, Wayne Teten, and Mark Wikelius

Champions: Wayne Teten (SHA), Bob McQuiston (FHWA), and Chuck Boan (Industry)

The team grouped their issues into 3 areas as follows:

1) Public Awareness
    a) Dedicated funding
    b) Marketing strategy for PP
    c) Track cost effectiveness PP
    d) Common terminology
2) Strategy Selection
    a) Determine proper timing
    b) Determine threshold limits for treatments
    c) Increase understanding of optimal timing for PP
        i) Thin mill & overlay vs functional overlay vs structural overlay
        ii) When to stop patching concrete pavement and start an HMA overlay
3) Data Integration
    a) Enterprise database

b) Merge preservation strategy into DOT's plan
c) Integrate PP into project management
d) Integrate Maintenance Management into Pavement Management

Public Awareness will be top priority followed by Strategy Selection and then Data Integration. The existing FP^2 contractor, Kelly Rossman, is developing a communications plan. The team will send roadblock and barriers issues to her. The team recommends that SHAs work with their public affairs staffs to get the information out about the purpose and accomplishments of this meeting.

Preservation Policy (High Priority)

a) Need for dedicated funding
b) Develop performance standards for preservation treatments
c) Determine proper timing of treatments
d) Data Integration at the Enterprise Level (data warehouse) for Engineering Use
e) Create Marketing Strategy for legislatures, public, etc
f) Merge Preservation Strategy into DOT Business Plan
g) Integrate Pavement Preservation into Project Management
h) Record Routine Maintenance activities in the Pavement Management System
i) Track cost effectiveness of treatments
j) Determine threshold limits for preservation action
k) Enhance the understanding about optimal timing of preservation treatments
l) Increase the understanding of when to Concrete Patch vs. Hot Mix Overlay
m) Develop Construction Technician (Worker) Certification Program

Preservation Policy (Medium Priority)

a) Determine cost effectiveness of treatments
b) Redefine Pre-qualification requirements

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Construction Specifications (High Priority)

a) Improve performance/consistency of Concrete Pavement Restoration (CPR) treatments
b) Warranty Criteria needs definitive and objective measures
c) Create optimal Crack Sealing Reservoir Width
d) Eliminate failing 15' concrete slabs on daylight open-graded sections
e) Develop process for edge drain inspection
f) Eliminate Dowel Bar Retrofit (DBR) failures
g) Improve preservation treatment performance of counties, cities, etc. performing work
h) Develop Performance Warranties
i) Eliminate/Reduce Crack Sealant variations
j) Develop Performance Standards for each Preservation Treatment

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Research

a) Determine proper Timing of Pavement Preservation
b) Improve Pavement Performance predictions using mechanistic parameters
c) Implement cost allocation study
d) Conduct “cost effectiveness” research activity
e) Develop more objective measures for Warranty Criteria
f) Determine optimal crack sealing reservoir width
g) Improve Paint Adhesion to chip seals and micro-surfacing
h) Develop consistency of Concrete Pavement Restoration (CPR) treatments
i) Determine if asphalt pavement millings can be used in chip seals
j) Improve performance of winter patching materials

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Materials

a) Obtain improved performance of various treatments
b) Understand reason for non-uniform performance from chip seals
c) Study performance variability of identical fixes
d) Determine if asphalt pavement milling can be used for chip seals
e) Improve performance of winter patching materials
f) Reduce/correct the high frequency of rutted pavements

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Training

a) Construction Technician (Worker) Certification Program
b) Understand performance variables of identical fixes
c) Learn about the optimal timing of preservation treatments
d) Justify edge drain retrofits to public
e) Improve consistency of Concrete Pavement Restoration (CPR) treatments
f) Manage truck overloads and the problems they create
g) Communicate the cost-effectiveness of pavement preservation
h) Learn about other DOT's long term performance of Dowel Bar Retrofits
i) Eliminate DBR failures
j) Improve performance of counties, cities, etc. performing pavement preservation work
k) Need for disseminate common terminology and definitions
l) Enhance Contractor competency
m) Learn Preservation Marketing techniques for legislators, public, etc.
n) Implement regular and ongoing training for state highway agencies, counties, municipalities, contractors, and consulting engineers.

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