Selecting Projects for Treatments—An Overview

1. Inventory information
2. Current condition
3. Evaluate data
4. Current/projected pavement needs
5. Identify feasible preventive maintenance treatments
6. Conduct cost-effectiveness analysis
7. Select “best” treatment
Presentation Overview

- Background
- What do you have?
- What do you need?
- How do you bridge the gap?

Solutions

- Best practices
- Treatments
- Treatment selection
- Types of pavement
- Inventory
- History
- Current conditions
Cost Savings

What Do You Want/Need From Your Pavement Program?
An Illustration of Cost Savings

Improved Performance

Pavement Condition Rating (PCR)

Costs $4.80 to $7.00 at PCR 50-60

Costs $20.00 at PCR 40-50

Costs $48.00 at PCR 0-40

Years (age)

10 15 20

% of System in Level Good

% of System in Level Deteriorated

Improved Performance

Each $1.00 Spent at PCR 60-100

Savings

An Illustration of Cost
Safer Roads

Customer Satisfaction
Results of doing same thing

Goals and objectives

Preventive maintenance program

Pavement Program

Bridging the Gap—Your

Illustrations of Safe Roads
Defined by the treatment?
Just a fad?

A hoax or a little bit of self-delusion?
Defining Preventive Maintenance—AASHTO

Does not increase structural capacity

Maintains or improves functional condition

Retards future deterioration

Preserves the system

Cost-effective treatments

Planed strategy

"Keeping good roads good"
### Program Objectives

- Needed to distinguish from other activities
- Raise internal and external profile
- Justify actions and expenditures

### Program Objectives

- Guidance on project selection
- Guidance on treatments
- Program monitoring
Background Summary

- Have reasonable goals or objectives
- Have reasonable goals or objectives

Examples of Program Objectives

- Percentages of pavement network in various conditions
- Reduction in crashes
- Reduction in negative customer feedback
- Reduction in various conditions
- Value of network
- Percentages of pavement network
Part II—Approaches to Solutions

Best Practices

Preservation Program

- Dedicated funding
- Appropriate contracting practices
- Ability to demonstrate program benefits
- Upper-level support
- Research and training
- Preservation partnerships
- Test sections
- Preservation engineer

Best Practices

Treatment selection

Preservation

- Appropriate contracting practices
- Ability to demonstrate program benefits
- Upper-level support
- Research and training
- Preservation partnerships
- Test sections
- Preservation engineer

Solutions
Some Elements of Successful Programs

Guidance on Treatments
- How
- Why
- Where
- When
- What

Program monitoring
- Guidance on project selection
- Guidance on treatments

Guidance on Treatments
- Program monitoring
- Guidance on project selection
- Guidance on treatments
Manuals of Practice

Crack Filling and Sealing

Description

Placement of material into individual existing cracks

Purpose

- Provide support to adjacent pavement
- Prevent intrusion of incompressibles
- Reduce water infiltration

Placement of material into individual existing cracks

Reduce water infiltration

Prevent intrusion of incompressibles

Provide support to adjacent pavement
**Crack Filling**

- Non-working cracks
- Crack width: 0.2 in to 1.0 in
- Little crack preparation
- Lower-quality materials
- Often used as stop-gap activity
- Treatment life: 2 to 10 years
- Extension of life: 2 to 4 years

**Crack Sealing**

- Working cracks
- Crack width: 0.2 in to 0.75 in
- Requires crack preparation
- Higher-quality material
- Average cost: $0.60/ft to $1.00/ft
- Treatment life: 2 to 10 years
- Extension of life: 2 to 4 years
### Crack Filling and Sealing

**Measure of Effectiveness**

<table>
<thead>
<tr>
<th>Negatively Affects</th>
<th>Prevents/Delays</th>
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<td>Rutting</td>
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<tr>
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<td>Moisture damage</td>
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<td>None</td>
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**Corrects**

- Limited structural deterioration
- Good base support
- Limited linear cracking
- Little or no raveling at crack face
- Little or no secondary cracking
- Limited linear cracking
- New or recently rehabilitated surface

**Good Sealing Candidates**

- New or recently rehabilitated surface
- Limited structural deterioration
- Good base support
- Limited linear cracking
- Little or no raveling at crack face
- Little or no secondary cracking
- Limited linear cracking
- New or recently rehabilitated surface
Microsurfacing

**Description**

A mixture of high-quality aggregates and polymer-modified emulsion binder

**Purpose**

- Inhibit raveling and surface oxidation
- Improve surface friction
- Fill ruts/minor surface irregularities
- Seal pavement surface

**Other Considerations**

- Polymer-modified emulsion (chemically sets)
- Placed up to several stone thicknesses
- Applicable for night work and high traffic conditions
- Cost: $1.25/yd² to $2.00/yd²
- Treatment life: 4 to 7 years
- Extension of life: 5 to 7 years
- Treatment life: 4 to 7 years

**Mixture of high-quality aggregates and polymer-modified emulsion binder**
### Purpose

Rolled onto the pavement and aggregate chips

Application of asphalt

### Description

**Chip Seals**

- Improve surface friction
- Retard reflection cracking on HMA overlays
- Enrich hardened/oxidized pavement
- Seal pavement

### Measure of Effectiveness

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### Application

*Chip Seals*

- Application of asphalt and aggregate chips

*Microsurfacing*

- Description
  - Seal pavement
  - Enrich hardened/oxidized pavement
  - Retard reflection cracking on HMA overlays
  - Improve surface friction

*Chip Seals*

- Application of asphalt and aggregate chips

*Microsurfacing*

- Description
  - Seal pavement
  - Enrich hardened/oxidized pavement
  - Retard reflection cracking on HMA overlays
  - Improve surface friction
Chip Seal Variations

- Single chip seals
- Double or triple chip seals
- Cape seals
- Fabric and chip seals

Good Chip Seal Candidates

- Relatively smooth surface
- Few or no potholes
- No medium- or high-severity fatigue
- Cracks < 0.25 in wide
- Structurally sound
- In past: low-volume; now: almost any

- Relating < 1 in
- Rutting > 1 in
<table>
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Getting the most bang for your buck

Pavements

Characteristics of candidate

Project Selection
Candidate pavements for preventive maintenance are in ______ condition.

True or False: Preventive maintenance can correct underlying structural problems.

Two measures of functional performance are ______ and ____________.

Candidate pavements for preventive maintenance treatments are in ______ condition.
**Project Selection Tools**

- Decision trees or matrices
- Engineering judgment
- Successful past practice
- Results from test sections
- Engineering judgment
- Decision trees or matrices

**Example Selection Tool:**

### HMA Decision Matrix:

<table>
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<tr>
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<td>M</td>
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- **Traffic:**
  - ADT<2,000
  - 2,000<ADT<5,000
  - ADT>5,000

- **Traffic Damage:**
  - Snow Plow Damage
  - Bleeding
  - Raveling
  - Rutting

- **Improving Friction:**
  - Yes

- **R = Recommended; NR = Not recommended; M = Marginal**

**Common Sense**

- Results from test sections
- Successful past practice

**Project Selection Tools**

- Decision trees or matrices

**HMA Decision Matrix**

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**Common Sense**

- Results from test sections
- Successful past practice
**Select projects to maximize B/C**

**Calculate treatment life cycle costs**

**Consider benefit (B) of applying a**

---

**The „Bang for the Buck“ Concept**

**HMA Decision Tree**

Example Selection Tool:
<table>
<thead>
<tr>
<th>Strategy</th>
<th>Benefit, $M</th>
<th>Cost, $M</th>
<th>B/C</th>
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<tr>
<td>C</td>
<td>250</td>
<td>0.5</td>
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<tr>
<td>D</td>
<td>1000</td>
<td>0.3</td>
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<tr>
<td>E</td>
<td>1500</td>
<td>1.5</td>
<td>333</td>
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**Benefit/Cost Comparison**

**Quantifying Benefit**

**Age, Years**

**Condition Indicator**

**Untreated Pavement Performance**

**Treatment Area**
Program Monitoring

Tracks progress toward objectives
Generates facts about what works
Supports (or justifies) budgets and resource allocation
Communicates program status internally and externally
Generates facts about what works
Tracks progress toward objectives

Summary: It’s an Organized Process

1. Inventory information
2. Current condition
3. Evaluate data
4. Current/Projected pavement needs
5. Identity feasible preventive maintenance treatments
6. Conduct cost-effectiveness analysis
7. Select “best” treatment
Summary (2): Do the Right Thing!

Pavement Condition

- Preventive Maintenance
- Routine/Corrective Maintenance
- Rehabilitation
- Reconstruction

Additional Information

- www.aema.org
- www.igga.net
- www.arra.org
- www.slurry.org
- www.pavementpreservation.org

Time

Pavement Condition

- Good
- Poor

Preventive Maintenance

Rehabilitation

Reconstruction