# PAVEMENT PRESERVATION MAINTENANCE FOR MUNICIPALITIES

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Pavement Engineering Services

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Definition

INTRODUCTION

## ❖ Preventative Maintenance Defined:

The planned strategy of cost effective treatments to an existing roadway system and its appurtenances that preserves the system, retards future deterioration, and maintains or improves the functional condition of the system (without increasing structural capacity).

- AASHTO's Standing Committee on Highways

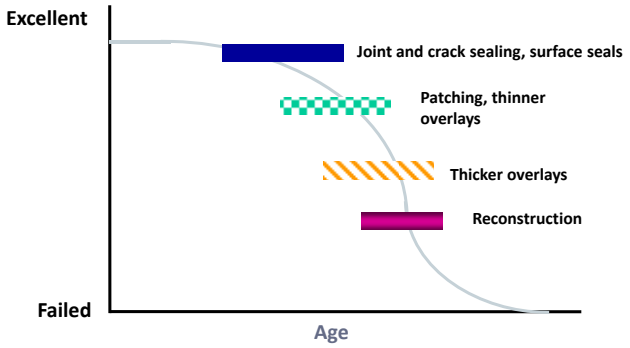
What is Pavement Management?

PAVEMENT MANAGEMENT & PRESERVATION OVERVIEW

## Network Level Pavement Management

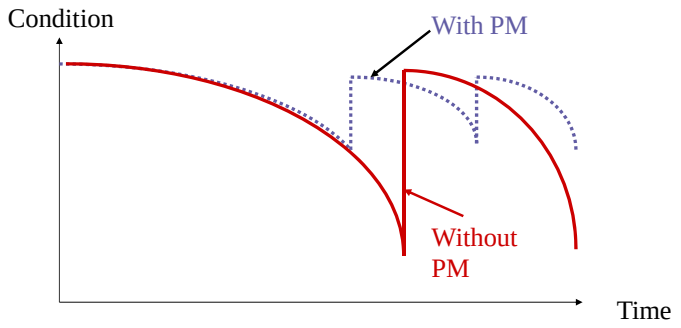

Treatment Rules

PAVEMENT MANAGEMENT & PRESERVATION OVERVIEW




Importance of Preventive Maintenance

PAVEMENT MANAGEMENT & PRESERVATION OVERVIEW



## CRACK SEALING & CRACK FILLING

**Crack sealing is intended to:**

- Preserve the intended design life
- Extend the service life of the existing HMA by reducing moisture infiltration
- Prepare the existing pavement prior to construction of an HMA overlay



### The Selection Process

**Selection Factors Affecting Performance:**

- Candidate pavement
- Sealant Type
- Configuration

A typical roadway is expected to need a crack seal treatment in the first 3-5 years, and then every about 5 years there after.

CRACK SEALING & CRACK FILLING

### The Selection Process

**Choosing a Candidate Pavement:**

Design Considerations –

- Pavement Condition and Crack Characteristics
- Planned Rehabilitation
- Climate Conditions
- Materials and placement configuration

| | Distress Type | Extent of Problem: Minor ⟷ Major |
|---|---|---|
| Surface Related | Linear Cracking (T&L) | Effective / Marginal / No Impact |
| | Block Cracking | Effective / Marginal / No Impact |
| | Roughness (Distortion) | No Impact |
| | Raveling | No Impact |
| | Friction Loss (Polished Agg.) | No Impact |
| | Flushing/Bleeding | No Impact |
| | 'Stable' Rutting | No Impact |
| | Moisture Damage | Effective / No Impact |
| Base Related | Fatigue Cracking (Alligator) | Effective / No Impact |
| | Roughness | No Impact |
| | Potholes/Non-Utility Patches | No Impact |
| | 'Unstable' Rutting/Shoving | No Impact |

Effective | Marginal | No Impact

CRACK SEALING & CRACK FILLING

### The Selection Process

**Choosing a Sealant Type:**

- **Thermoplastic** – commonly used for HMA pavements

  Asphalt-based materials
  *(e.g., ASTM D 3381, D 3405, D 1190, D 244)*

  Typically soften with heat and harden upon cooling with some being hot applied and others cold applied

  - Rubberized Asphalt
  - Fiberized Asphalt
  - Asphalt cement
  - Asphalt rubber cement
  - PVC coal tar

  *Installed cost*: $1.06/ft*

**Thermosetting** – not commonly used in HMA pavements

One or two-component materials
Set obtained by Chemically cured methods or Solvent release

*Installed cost*: $1.50/ft*

* Prices in 2008 dollars and may vary significantly depending on local conditions

## PATCHING

**The goal of patching is to:**

- Extend the service life of the existing HMA.
- Prepare existing pavement prior to construction of an HMA overlay.



### The Selection Process

Selection Factors Affecting Performance:

- Candidate pavement
- Choosing a Method
- Material Selection



### The Selection Process

Choosing a Candidate Pavement:

Design Considerations –

- Patching may not be appropriate for all applications
- Temporary patches ARE temporary
- Structural design may not be adequate
- Winter: Throw & Roll, Automated
- Summer: Automated, Semi-Permanent, Partial or Full Depth Permanent Patching

| | Distress Type | Extent of Problem: Minor ⟷ Major |
|---|---|---|
| Surface Related | Linear Cracking (T&L) | |
| | Block Cracking | |
| | Roughness (Distortion) | |
| | Raveling | |
| | Friction Loss (Polished Agg.) | |
| | Flushing/Bleeding | |
| | 'Stable' Rutting | |
| | Moisture Damage | |
| Base Related | Fatigue Cracking (Alligator) | |
| | Roughness | |
| | Potholes/Non-Utility Patches | |
| | 'Unstable' Rutting/Shoving | |

Effective | Marginal | No Impact



### What to Expect

Limitations & Effectiveness:

- Asphalt patching is not recommended for permanent repair of rigid pavements
- Hot-mix, full-depth patches provide maximum effectiveness
- Not cost-effective when pavement is extensively deteriorated
- Semi-Permanent patching may not solve underlying soil or drainage issues.

## CHIP SEAL & RUBBER CHIP SEALS



### The Alternative Purpose

Chip sealing is intended to:

- Provide a new wearing course
- Increase surface friction which improves skid resistance
- Seals and bridges cracks which delays reflective cracking

Selection Factors Affecting Performance:

- Candidate pavement
- Sealant and Aggregate Type
- Configuration

CHIP SEAL & RUBBER CHIP SEAL

### The Selection Process

Choosing a Candidate Pavement:

Design Considerations –

- Pavement Condition and Crack Characteristics
- Roadway Classification
  - abrasive texture
  - stones can 'kick'
- Application Quantity (single or double)
- Rubber Additive and Quantity

| | Distress Type | Extent of Problem: Minor ⟷ Major |
|---|---|---|
| Surface Related | Linear Cracking (T&L) | |
| | Block Cracking | |
| | Roughness (Distortion) | |
| | Raveling | |
| | Friction Loss (Polished Agg.) | |
| | Flushing/Bleeding | |
| | 'Stable' Rutting | |
| | Moisture Damage | |
| Base Related | Fatigue Cracking (Alligator) | |
| | Roughness | |
| | Potholes/Non-Utility Patches | |
| | 'Unstable' Rutting/Shoving | |

Effective | Marginal | No Impact

CHIP SEAL & RUBBER CHIP SEAL

### The Selection Process

Choosing a Sealant Type:

- Typical Asphalt –

  Asphalt Cement
  Emulsion (CRS2 or RS2) or Latex modified emulsion
  Cut-back Asphalts (not commonly used)

- Crumb Rubber –

  Combined with asphalt cement
  Generally 10% to 20% rubber

  - Open to traffic in 35 to 75 minutes
  - Same Day Sweeping
  - Provides increased flexibility helping to delay reflective cracking and increase the life of the surface treatment.

## The Selection Process

CHIP SEAL & RUBBER CHIP SEAL

### The Configuration:

- Single Chip –
  - Most cost effective being conducted in a single application
  - Thickness is determined by the size of aggregate being used
  - It usually has a very rough surface

- Double/Multiple Chip –
  - Increased costs due to multiple applications
  - Thickness can range from 10mm to 25 mm depending on the No. of layers
  - Increased thickness provides a longer service life
  - Multiple layers allow for smaller aggregate to be used on the upper lifts

## The Application Process

CHIP SEAL & RUBBER CHIP SEAL

### The Application Process:

- Chip Seal
  1. Apply a layer of liquid
  2. A uniformly graded layer of stone, varying in size but usually from 3/8" to 1/2" in size and free of fines is spread
  3. A roller is used to initially seat the aggregate in the liquid
  4. Sweeping is performed 24 hours after application

- *Multiple Layer Chip Seal*
  1. Apply a layer of liquid
  2. A uniformly graded layer of stone, varying in size but usually from 3/8" to 1/2" in size and free of fines is spread
  3. A roller is used to initially seat the aggregate in the liquid
  4. Steps 1 to 3 are repeated for the number of desired layers
  5. Sweeping is performed 24 hours after application

## What to Expect

CHIP SEAL & RUBBER CHIP SEAL

### Limitations & Effectiveness:

- Good skid resistance
- Seals weathered pavement
- No structure adjustments (except for repairs)
- No shoulder work, curb work, or driveway aprons needed

- Thickness limited to stone size
- May be abrasive
- Loose chips may 'kick' under traffic

### Cost Considerations*

- Sealant Type – Use of Additives or Rubber
- Number of Layers – Single or Multiple
- Patching or Crack Sealing repairs prior to Chip Seal

Single Chip Installed cost: $1.65 - $1.85 SY  w/ 10% rubber: $2.50 - $2.75 SY
w/ 20% rubber: $3.50 - $4.00 SY
Double Chip Installed cost: $2.65 - $2.85 SY

*Prices in 2008 dollars and may vary significantly depending on local conditions

## What to Expect

CHIP SEAL & RUBBER CHIP SEAL

### Service Life:

- Traditional Single Chip Seals
  - 1 year service life when placed on roadways with poor base distresses
  - 3 to 5 year service life when placed on oxidized weather/block cracked surface treated roadway: less with HMA roads
  - 5 to 8 year service life when placed on sound base, fair to good condition surface treated or HMA roadway

- Double Chip Seals and Rubber Chip Seals
  - Double Chip Seals can increase the service life by 1.5 times
  - The Addition of 20% Rubber also can increase the service life of a single chip seal by 1.5 times and retards reflective cracking better than double chip

## CAPE SEALS

A Cape Seal is a chip seal followed by a slurry seal to bind the stones.




### The Selection Process

Choosing a Candidate Pavement:

Design Considerations –

Same as Chip Seal candidates with additional desirable Effects

- Reduces road noise
- Reduces dust
- Provides a seal to bind stones preventing stones from kicking loose
- Limits the amount of roadside build-up of loosened aggregate

| | Distress Type | Extent of Problem: Minor ⟷ Major |
|---|---|---|
| Surface Related | Linear Cracking (T&L) | |
| | Block Cracking | |
| | Roughness (Distortion) | |
| | Raveling | |
| | Friction Loss (Polished Agg.) | |
| | Flushing/Bleeding | |
| | 'Stable' Rutting | |
| | Moisture Damage | |
| Base Related | Fatigue Cracking (Alligator) | |
| | Roughness | |
| | Potholes/Non-Utility Patches | |
| | 'Unstable' Rutting/Shoving | |

Effective | Marginal | No Impact



### What to Expect

Limitations & Effectiveness:

- Good skid resistance
- Half the weight of traditional overlay (Bridge Decks)
- Seals weathered pavement
- Will not delaminate when used over PCC
- Less abrasive than a standard Chip Seal
- Slurry seals in chips which may otherwise 'kick' under traffic
- Limits roadway noise
- No structure adjustments

- Thickness limited to stone size
- Slurry seal equipment is not as common as chip seal equipment
- Nearly twice the cost as a standard chip seal
- User delays exist during application (4-6 hour lane/road closures)



### What to Expect

Cost Considerations*

Sealant Type – Use of Additives or Rubber

Number of Layers – Single or Multiple

Patching or Crack Sealing repairs prior to Chip Seal

Equipment Availability

User / Traffic delays due to Slurry

*Single Chip Installed cost:* *$1.65 - $1.85 SY*
*Slurry Seal Installed cost:* *$1.65 - $1.85 SY*

*Cape Seal Installed Cost :* *$3.30 – $3.70 SY*

Service Life is similar to a chip seal

*Prices in 2008 dollars and may vary significantly depending on local conditions

## MICROSURFACING

**Microsurfacing is intended to:**

- Provide a surface seal of paving surface
- Provide a new wearing course without milling
- Increase surface friction which improves skid resistance
- Minor leveling can be accomplished for rutting with initial application
- Inhibit raveling and surface oxidation
- Return lanes to traffic relatively quickly (within one hour)



### The Selection Process

**Choosing a Candidate Pavement:**

Design Considerations –

- Pavement Condition
- Base Materials & Drainage
- Limited Curb Reveal, Multiple Structures, Overhead Restrictions
- Equipment Availability
- Minimal User Delays
- Limited availability of sound aggregates

| | Distress Type | Extent of Problem: Minor ⟷ Major |
|---|---|---|
| Surface Related | Linear Cracking (T&L) | |
| | Block Cracking | |
| | Roughness (Distortion) | |
| | Raveling | |
| | Friction Loss (Polished Agg.) | |
| | Flushing/Bleeding | |
| | 'Stable' Rutting | |
| | Moisture Damage | |
| Base Related | Fatigue Cracking (Alligator) | |
| | Roughness | |
| | Potholes/Non-Utility Patches | |
| | 'Unstable' Rutting/Shoving | |

MICROSURFACING

### The Selection Process

**The Configuration:**

- A polymer modified emulsion mixed with a combination of aggregate, and mineral filler.
- Designed for a typical ½" lift thickness, multiple lifts can fill ruts

**The Application Process:**

1. Existing Pavement should be swept
2. Test strip should be run to calibrate process
3. Microsurface machine mixes aggregate and emulsion in pugmill
4. Auger driven spreader box distributes aggregate-emulsion mixture onto roadway
5. Emulsion "breaks" and mixture cures on roadway

MICROSURFACING

### What to Expect

**Limitations & Effectiveness:**

- Good skid resistance
- Reduced quantities of aggregate reduce costs (material, trucking, fuel)
- No structure adjustments
- User delay - roads can be returned to traffic in 1 – 4 hours
- Not desirable if structural support is necessary
- Quality aggregates are necessary to ensure durability

**Service Life:**

- Generally will perform adequately for 6 to 8 years
  *Longer when combined with heater scarification techniques*

**Cost Considerations:**

- Patching or Crack Sealing repairs prior to Microsurfacing
- Equipment Availability
- Reduced material handling costs
- Minimized User / Traffic delays

*Installed cost:* *$2.75- $3.00 SY**

*Prices in 2008 dollars and may vary significantly depending on local conditions

## ULTRATHIN HMA BONDED WEARING SURFACE (FORMERLY NOVA CHIP®)

**Ultrathin HMA Bonded Wearing Surface is intended to:**

- Provide a surface seal with a level paving surface
- Provide a new wearing course without milling
- Increase surface friction which improves skid resistance

- Increase output, 3 times faster than lay down of conventional HMA
- Return lanes to traffic quickly (within 5 to 10 minutes)

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NOVA CHIP®

## The Selection Process

### Choosing a Candidate Pavement:

Design Considerations –

- Pavement Condition
- Base Materials & Drainage
- Limited Curb Reveal, Multiple Structures, Overhead Restrictions
- Equipment Availability
- Very Minimal User Delays
- Limited availability of sound aggregates

| | Distress Type | Extent of Problem: Minor ⟷ Major |
|---|---|---|
| Surface Related | Linear Cracking (T&L) | |
| | Block Cracking | |
| | Roughness (Distortion) | |
| | Raveling | |
| | Friction Loss (Polished Agg.) | |
| | Flushing/Bleeding | |
| | 'Stable' Rutting | |
| | Moisture Damage | |
| Base Related | Fatigue Cracking (Alligator) | |
| | Roughness | |
| | Potholes/Non-Utility Patches | |
| | 'Unstable' Rutting/Shoving | |

Effective | Marginal | No Impact

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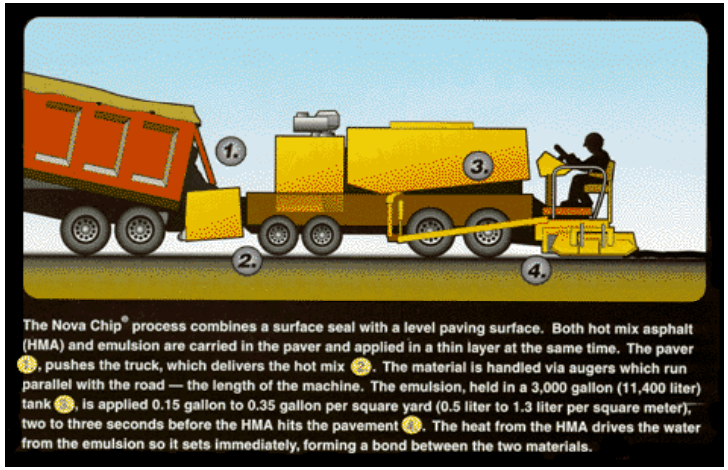
NOVA CHIP®

## The Application Process




The Nova Chip® process combines a surface seal with a level paving surface. Both hot mix asphalt (HMA) and emulsion are carried in the paver and applied in a thin layer at the same time. The paver (3.), pushes the truck, which delivers the hot mix (1.). The material is handled via augers which run parallel with the road — the length of the machine. The emulsion, held in a 3,000 gallon (11,400 liter) tank (4.), is applied 0.15 gallon to 0.35 gallon per square yard (0.5 liter to 1.3 liter per square meter), two to three seconds before the HMA hits the pavement (2.). The heat from the HMA drives the water from the emulsion so it sets immediately, forming a bond between the two materials.

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NOVA CHIP®

## What to Expect

**Limitations & Effectiveness:**

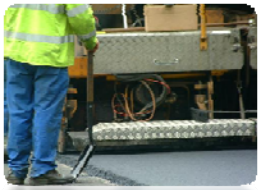
- Good skid resistance
- Open-Graded filled with soft polymer allows for material realignment during freeze/thaw and maintains a surface seal
- Reduced quantities of aggregate reduce costs (material, trucking, fuel)
- Reduced roadway noise and water spray
- No structure adjustments
- Output is 3 times that of conventional HMA
- Roads can be returned to traffic in minutes minimizing user delays
- No drop off's between lanes has positive safety benefits

- Not desirable if structural support is necessary
- Quality aggregates are necessary to ensure durability

**Installed cost:** *$4.25- $4.75 SY**

**Service Life:** Generally will provide 7-10 years of performance

*Prices in 2008 dollars and may vary significantly depending on local conditions



## THIN HMA OVERLAY & ULTRA-THIN HMA OVERLAY

**Thin and Ultra-Thin HMA Overlay's are intended to:**

- Improved Surface Friction
- Seal Pavement Against Elements
- Provide a new wearing course without milling
- Improved Structural Benefit
- Improve Ride Quality
- Correct Surface Irregularities

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### The Selection Process

**Choosing a Candidate Pavement:**

Design Considerations –

- Pavement Condition
- Base Materials & Drainage
- Curb Reveal, Multiple Structures, Overhead Restrictions
- Storm water runoff issues with increased elevation
- Minimal User Delays
- Increased Structural Support (minimal)

| | Distress Type | Extent of Problem: Minor ⟷ Major |
|---|---|---|
| Surface Related | Linear Cracking (T&L) | |
| | Block Cracking | |
| | Roughness (Distortion) | |
| | Raveling | |
| | Friction Loss (Polished Agg.) | |
| | Flushing/Bleeding | |
| | 'Stable' Rutting | |
| | Moisture Damage | |
| Base Related | Fatigue Cracking (Alligator) | |
| | Roughness | |
| | Potholes/Non-Utility Patches | |
| | 'Unstable' Rutting/Shoving | |

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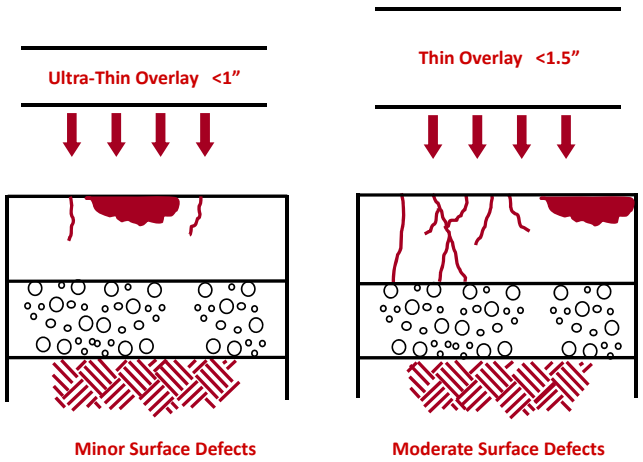
### The Selection Process

**The Configuration:**

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### What to Expect

**Limitations & Effectiveness:**

- Improves ride ability and surface friction
- Added structural support
- Improves profile, crown, and cross-slope

- Structures and Curbs may need to be adjusted
- Costly alternative if no structural support is needed
- Thin lift thickness cools quickly making ultra-thin lifts difficult to work with

**Cost Considerations***

- Leveling courses to correct grade and slope & structure adjustment
- Localized Patching & Crack Sealing

- 1" Installed cost: $3.50 – $4.00 SY
- 1.5" Installed cost: $5.25 – $5.75 SY

**Service Life**

- Thin HMA Overlay: 5 – 10 years
- Ultra-Thin HMA Overlay: 4 – 6 years

*Prices in 2008 dollars and may vary significantly depending on local conditions

## HEAT PLUS THIN HMA OVERLAY OR MICROSURFACING

### The Alternative Purpose

Heat plus Thin Overlay or Microsurfacing is intended to:

- Rejuvenate oxidized or stripped materials to enhance structural integrity
- Correct grade and distress concerns prior to a thin overlay (no leveling)
- Maintain in-place materials to be utilized in the pavement structure

When combined with a Thin HMA overlay or Microsurface.

- Provide a thick and structurally sound rehabilitation technique using all of the existing material and nearly half the new material of a structural overlay



### The Selection Process

Choosing a Candidate Pavement:

Design Considerations –

- Pavement Condition
- Base Materials & Drainage
- Limited Curb Reveal
- Prior Surface Treatments
- Weather Considerations (Should be 70 deg. F for rejuvenator to work into mix)
- Equipment Availability
- Minimal User Delays

| | Distress Type | Extent of Problem: Minor ⟷ Major |
|---|---|---|
| Surface Related | Linear Cracking (T&L) | Effective / Marginal / No Impact |
| | Block Cracking | Effective / Marginal / No Impact |
| | Roughness (Distortion) | Effective |
| | Raveling | Effective / No Impact |
| | Friction Loss (Polished Agg.) | Effective |
| | Flushing/Bleeding | Effective / Marginal |
| | 'Stable' Rutting | Effective / Marginal |
| | Moisture Damage | Effective / No Impact |
| Base Related | Fatigue Cracking (Alligator) | Effective / Marginal / No Impact |
| | Roughness | Effective |
| | Potholes/Non-Utility Patches | Effective |
| | 'Unstable' Rutting/Shoving | No Impact |

Effective | Marginal | No Impact



### The Selection Process

The Configuration:

- Heater Scarification
  - Heats and Scarifies the top 1-2" of existing HMA and adds a rejuvenator
  - Mixes and levels the material using a standard auger system and screed
  - Conventional compaction procedures
- Heater Scarification plus Thin HMA Overlay or Microsurfacing
  - Same procedure as simple heater scarification but the rejuvenated mix is placed as a leveling course by the primary screed.
  - A Thin HMA Overlay or Microsurface is then placed (usually <1")
  - Conventional compaction procedures are utilized
- Heater Scarification *(with remixing)* plus Thin HMA Overlay or Microsurfacing
  - Used when aggregate is needed to improve strength or stability
  - Similar to Heater Scarification plus Thin HMA Overlay or Microsurfacing but mix is added to the rejuvenated mix prior to using it as a leveling course

## The Application Process

The Application Process:

HEAT PLUS THIN HMA OVERLAY OR MICROSURFACING

## The Application Process

Quality Control:

- Capable of selecting candidate pavements
- Provide in-place material testing
- Determine proper blending quantities of rejuvenator and mix
- Can provide guidance in the material selection and configuration process
- Ensure proper prior maintenance is conducted
- Aid in determining weather restrictions
- Ensure proper application and finishing techniques
- Maintain records helpful in future budgeting

HEAT PLUS THIN HMA OVERLAY OR MICROSURFACING

## What to Expect

Limitations & Effectiveness:

- Application of rejuvenating agents restores flexibility to the brittle asphalt
- Cracks are interrupted and filled
- Pavements are corrected without application of a leveling course
- Use of in-place material reduces the amount of new asphalt applied in the overlay
- Only can adequately address shallow surface distress problems ( < 2" )
- Pavements exhibiting delamination in the top 2" should not be considered
- Heavily rutted, heavily patched, or chip sealed roadways are poor candidates

HEAT PLUS THIN HMA OVERLAY OR MICROSURFACING

## What to Expect

**Cost Considerations:**

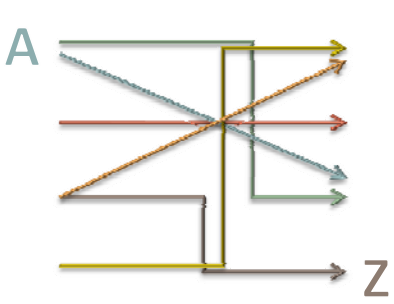
- Two-Step Rehabilitation Method
- Equipment Availability
- No leveling course necessary
- Reduced material handling costs
- Rejuvenated layer provides a distress-free, smooth, and stable base increasing the service life of the follow-up treatment.
- Minimized User / Traffic delays

**Installed cost*:** *$3.50 – 3.75 SY Heater Scarification Only*
*$6.25 – 6.75 SY Heat plus Microsurfacing*
*Note: minimum quantities may exist (20,000 SY)*

**Service Life:** Generally will provide 8 to 12 years of performance

* Prices in 2008 dollars and may vary significantly depending on local conditions

HEAT PLUS THIN HMA OVERLAY OR MICROSURFACING





## MATCHING TREATMENTS TO PAVEMENT DISTRESSES

- Overview
- Pavement Distress Surveys
- Pavement Conditions & Treatment Alternatives
- Cost Considerations

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### Overview

Performance of surface treatments is highly dependent upon:

- Existing surface conditions
- Traffic conditions
- Climatic conditions

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### Pavement Distress Surveys

| TYPE OF TRAFFIC | TYPE OF SURFACE TREATMENT |
|---|---|
| Residential | "Lighter" surface treatment |
| Collectors | "Heavier" surface treatment |
| Arterials | Generally not appropriate |

| TYPE OF DISTRESS | TYPE OF SURFACE TREATMENT |
|---|---|
| Less severe cracking | "Lighter" surface treatment |
| More severe cracking | "Heavier" surface treatment |
| Distorted pavement surface | "Leveling" surface treatment |

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### Pavement Distress Surveys

Maximum Allowable Distresses

| | Distress Type | Extent of Problem: Minor ⟷ Major |
|---|---|---|
| Surface Related | Linear Cracking (T&L) | |
| | Block Cracking | |
| | Roughness (Distortion) | |
| | Raveling | |
| | Friction Loss (Polished Agg.) | |
| | Flushing/Bleeding | |
| | 'Stable' Rutting | |
| | Moisture Damage | |
| Base Related | Fatigue Cracking (Alligator) | |
| | Roughness | |
| | Potholes/Non-Utility Patches | |
| | 'Unstable' Rutting/Shoving | |

Effective | Marginal | No Impact

## Pavement Conditions & Treatment Alternatives



### Cracking
- Crack Sealing
- Crack Filling
- Chip Seal
- Rubber Chip Seal
- Cape Seal
- Nova Chip®
- Heater Scarification Plus …
- Thin HMA Overlay

### Oxidation
- Fog Seal
- Sand Seal
- Slurry Seal
- Heater Scarification
- Microsurfacing

### Rutting
- Nova Chip®
- Heater Scarification Plus…
- Thin HMA Overlay
- Microsurfacing

### Friction
- Slurry Seal
- Chip Seal
- Rubber Chip Seal
- Microsurfacing
- Nova Chip®

## Cost Considerations



Prices in 2008 dollars and may vary significantly depending on local conditions

| Treatment | Unit Cost | Estimated Life (Years) | Cost/Year |
|---|---|---|---|
| Crack Seal (fiber) | $5.50/gal | 4 | $1.38/gal/YR |
| Crack Seal (rubber) | $10.00/gal | 7 | $1.42/gal/YR |
| Chip Seal | $1.80/SY | 7 | $.26/SY/YR |
| Chip Seal (double) | $2.80/SY | 10 | $.28/SY/YR |
| 10% Rubber Chip Seal | $2.65/SY | 9 | $.29/SY/YR |
| 20% Rubber Chip Seal | $3.75/SY | 12 | $.31/SY/YR |
| Cape seal (with regular Chip Seal and slurry) | $3.50/SY | 8 | $.44/SY/YR |
| Microsurfacing | $2.85/SY | 7 | $.41/SY/YR |
| Nova Chip® | $4.50/SY | 8 | $.56/SY/YR |
| Ultra Thin HMA Overlays | $3.75/SY | 10 on Surf Trmt 7 on HMA | $.38/SY/YR on Surf Trmt $.54/SY/YR on HMA |
| Thin HMA Overlays | $5.50/SY | 9 | $.61/SY/YR |
| Heat Scarification Plus Thin HMA Overlay | $7.25/SY | 14 | $.52/SY/YR |
| Heat Scarification Plus Microsurface | $6.50/SY | 12 | $.54/SY/YR |