Combination Treatments for Pavement Preservation

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...Preservation involves a paradigm shift from “worst first” to more proactive “optimum timing”...

FHWA Action Memo
May 12, 2005
“...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.”

FHWA Pavement Preservation Expert Task Force
An Effective Preservation Program

- Addresses good pavement ahead of distresses, (typically 4–7 yrs. old)
- Applied @ the right time pavement is restored to almost new condition
- Cumulative effect of treatments postpone rehab and reconstruction
- Less expensive in the long run
- Less disruptive to traffic
Pavement Preservation

- Minor Rehabilitation
- Routine Maintenance
- Preventive Maintenance
“...consists of non-structural enhancements made to the existing pavement sections to eliminate age-related, top-down surface cracking that develops in flexible pavements due to environmental exposure. Because of the non-structural nature of minor rehabilitation techniques, these techniques are placed in the category of pavement preservation.”

AASHTO Hwy Subcommittee on Maintenance
“...a planned strategy of cost effective treatments to an existing roadway system and it’s appurtenances that preserves the system, retards future deterioration, and maintains or improves the functional condition of the system without significantly increasing the structural capacity.”

AASHTO Standing Committee on Highways
“...something that you put on a road a year before you need it...”

Mid 1970's
Maintenance Engineer VDOT
Pavement Preservation is not new...

…it’s just doing the right thing, at the right time, to the right pavement.
• Thin & Ultra-Thin HMA overlays
• Hot-in-Place Recycling
• Cold-in-Place Recycling


- Crack Treatments
- Fog Seals
- Chip Seals
- Slurry Seal
- Micro Surfacing
- Micro Milling
Crack Treatments

- Crack Filling – Non-working cracks
- Crack Sealing – Working (thermal) cracks, rout for longer life

- Typically hot applied
  - Asphalt rubber
  - Fiber added to PG Graded asphalt
- Waterproof pavement prior to other treatments
Fog Seals

- Inexpensive way to rejuvenate and seal pavements
- Site selection critical (good condition, chip seal, rumble strips, slurry seal, etc.)
- Slow setting emulsion diluted up to 3 parts water, no cover aggregate used
- Application rate varies w/surface (0.1–0.15 gal/SY)
- Life span 1–2 years, can re-apply
Chip seals, also referred by other names including surface treatments, bituminous surface treatments, surface dressings, and seal coats, are an application of asphalt (commonly asphalt emulsion) directly on the pavement followed by an application of aggregate chips. The resulting treatment is then rolled to embed the chips in the binder.

Chip seals are effective in sealing the pavement and improving surface friction. Although they historically are used on low volume roadways, many agencies have been experimenting with them on higher volume roadways; e.g., Washington State has used chip seals on pavements with 80,000 ADT.
Slurry Seal

- Blend of crushed aggregate (#10 stone) & asphalt emulsion
- Match aggregate to desired texture
- Mixed and spread in a mobile operation as thin wearing surface
- Cape Seals
- Can be used as a SAMI
- Over old slurry
Microsurfacing

- Similar in many ways to Slurry with regard to site selection, Cape Seals on busier roads
- Polymer modified emulsion
- Can place multiple lifts, using different sized aggregates
- Level consolidation ruts prior to HMA
Recycling

• Hot in Place
  • Surface recycling, re-working top ¾” – 1”
  • Interrupt top-down cracking
  • Add rejuvenator to oxidized pavement
  • Prepare surface for other treatments

• Cold in Place
  • Mill up to 4” of existing surface
  • Re-size millings, blend with emulsion
  • Place new surface, can be sealed w/slurry or other treatments
**Thin HMA Overlays**

- **Non-structural overlays**
  - Thin Bonded Wearing Course
  - 4.75 mm HMA

- **Place on prepared surface**
  - Micro Milled
  - Crack sealed
  - Rut Filled w/Microsurfacing
• Successful jobs start with sound pavements

• Do we sometimes push the limits?

• Combining treatments may give sense of security...be realistic
Crack Treatment
Combination Benefits

- Eliminates moisture intrusion into base
- Maintains flexible seal of crack if surface fractures
- Cost effective combination. Surface Treatments alone are thin, brittle overlays w/little crack penetration
**HIP (Surface Recycling) Benefits**

- Eliminate surface cracking and old patches
- Restore road profile
- Add rejuvenator to older asphalt pavements
- Uniform template for variety of surfacing choices (Slurry, Micro, Chip seal, HMA)
Double Chip Seal Benefits

- Smaller cover aggregate “locks in” larger surface treatment stone
- Excess whip-off eliminated
- More acceptable surface during cure time prior to Slurry/Micro
- Less surface voids allow for lighter slurry application
• Rupturing prior to micro or HMA
• Double Micro applications
  • Over milled surface
  • Using two different aggregate sizes for desired texture
  • Same aggregate size both applications
  • In combination w/crack sealing

• Unique situations
...some other Slurry Surfacing Combinations...