Preserving Performance using Thinlay™

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Deterioration is caused by many different forces that affect pavement performance. However, pavements deteriorate predominantly due to the vehicle loads and environmental elements they are exposed to over their lifetime.

Why Preservation?

• Focus change from new construction to preservation
• US highway and road network
  • $1.75 trillion
  • 8% expansion (1980-2009)
• Preservation of existing system is focus & challenge for pavement managers
• Cost effective solution
Why this Matters!

- Easy to say and EXTREMELY difficult to do!
- New FHWA Guidance
- FHWA EDC-4
  - [http://goaspha.lt/2qBfTSt](http://goaspha.lt/2qBfTSt)
- Optimizing our infrastructure
- Agencies requirements for Funding
  - Doing More with less

Right Product → Right Place → Right Time

The Holy Grail!
Background Research Thinlays

• History of success on low traffic roads
• Perception they won’t work on high traffic roads
• NCAT Pavement Test Track since 2003
• Preservation on Lee Road 159 since 2012
• Preservation on US-280 since summer 2015
• Preservation in Minnesota since summer 2016
• Low macrotexture and/or friction is only concern
• Combination of rutting & cracking performance.
Treated vs. Untreated \( @ \) Year 5

Every section has benefited from pavement preservation.
Benefits of Preservation

![Graph showing the benefits of various preservation methods.](graph.png)
Question? What to do with this pavement?
What is a Thinlay?

- Surface mix generally placed < 1 inch thick
- Thickness / NMAS requires small aggregates
- Typically combination of screenings & hard sand
- High binder content to get film thickness & voids
- Some ability to correct for ride and cross slope.
Why use Thinlay? Benefits

- User Delays Minimized
- No Cure Time
- Ease of placement
- Staged construction
- Safety
- Restore skid resistance
- No loose stones or dust
- Pavement Smoothness
- Lower IRI
Thinlay Benefits

- Pavement Structure
- Maintain grade & x-slope
- Withstand heavy traffic
- Seal the pavement surface
## Thinlay Benefits

- Increased Service Life
- The 1” Difference

### Asphalt Thickness VS. Fatigue Life

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<th>Thickness</th>
<th>Microstrain</th>
<th>Reps to failure</th>
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<tbody>
<tr>
<td>2</td>
<td>-652</td>
<td>30,234</td>
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<tr>
<td>3</td>
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<td>6</td>
<td>-242</td>
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Thinlay Benefits

Sustainable

• Lower Road Noise
• RAM compatible
Noise can be reduced

Smaller Aggregate = Less Noise
Thinlay Project Selection

- Thinlays are not appropriate for pavements with structural failure
Thinlay Project Selection

- Pavement Management System
- Current project-specific performance data

Need to know:
- Type of distress
- Extent
- Severity

Site Visit
- Validate data
Thinlay Project Selection

- Raveling
Thinlay Project Selection

- Longitudinal Cracking
Thinlay Project Selection

• Longitudinal Cracking (Wheelpath – minor)
Thinlay Project Selection

- Transverse Cracking
Thinlay Project Selection

- Alligator (Fatigue) Cracking
Thinlay Project Selection

- Rutting or Fatigue (Structural)
Thinlay Project Selection

- Rutting or Shoving (Surface Failure)
## Surface Preparation

<table>
<thead>
<tr>
<th></th>
<th>Mill</th>
<th>Fill Cracks with Mix</th>
<th>Clean and Tack</th>
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<tr>
<td>Raveling</td>
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<tr>
<td>Rutting</td>
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<td></td>
<td>✔️</td>
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</table>
Recommended Mix Types
Surface Courses

Min Lift Thick Range, mm

Mix Type

DFG 4.75
DFG 9.5
DFG 12.5
DFG 19
SMA 9.5
SMA 12.5
SMA 19.0
OGFC 9.5
OGFC 12.5
DCG 9.5
DCG 12.5
DCG 19.0

Low Traffic
Medium Traffic
High Traffic
Mix Type Recommended

NMAS factors
- Local Materials
- Thickness
  - Geometric/Cross Section
  - Surface Prep.
- Traffic

WMA
- Assist in paving over crack sealer
- Achieve density at lower temperatures
  - Increase compaction time
Recycled Asphaltic Material

- RAP/RAS – Processed
  - Consistency
  - Max size ≤ NMAS

- Benefits
  - Stabilize costs
  - Sustainable
  - Reduce demand for virgin AC & Agg
  - Improve rutting performance
  - Helps prevent scuffing

- Maximize usage
  - Maintain Volumetrics, Gradation
Asphalt Binder

- Performance Grade (PG) System
  - Climate
  - Traffic
- Modification option
  - Polymer
  - Assists in Reducing Cracking
Plant – QC – Prep – Construction

- Production and Construction BMP’s
- Mixture QC
- Surface Preparation
  - Crack Fill
  - Bumps & Dips
  - Tack
Construction – Project Site

- Dragging
- Grade (mat thickness)
- Contamination
Construction – Project Site

- Rolling
- Static
  - Mat thickness < 1”
Thinlay Resources

download

Download

NCHRP Synthesis 464:

TRB SHRP Report S2-R26-RR-2

NAPA Thinlay Web Link

NAPA Position Paper

Asphalt. AMERICA RIDES ON US
Summary

- Thin Overlays for Pavement Preservation
  - Improve Ride Quality
  - Reduce Distresses
  - Maintain Road Geometrics
  - Reduce Noise
  - Lower Life Cycle Costs
  - Provide Long Lasting Service

- Place before extensive rehab required

- Expected performance
  - 10 years or more on asphalt
  - 6 to 10 years on PCC
Thank You

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