What is Micro-Surfacing?

• Developed in Europe in 1970’s
• Introduced in U.S. in 1980
  – Now routinely used in more than 40 states
• Used for rut filling & texturing

Micro-Surfacing

• A designed mixture of:
  – polymer modified emulsified asphalt
  – mineral aggregate
  – mineral filler
  – water
  – other additives
• Proportioned, mixed & uniformly spread over a properly prepared surface
  • ISA A-143
  • State DOT specifications
  • ASTM D-6372

Micro-Surfacing

The Right Treatment For:

• Restoring surface quality & skid resistance
• Rut filling
• Quick construction, quick traffic return
• Weatherproofing
  – Sealing
  – Reducing oxidation
• Extending the life of asphalt pavements

Micro-Surfacing Components

Water
Additive
Micro-Surfacing Emulsion
Mineral Filler
Aggregate
Micro-Surfacing Emulsion

Emulsifier
Water
Acid
Polymer
Asphalt

Polymer Modified Emulsion

Micro-Surfacing Machine

1. Aggregate bin
2. Mineral filler bin
3. Additive storage
4. Metered aggregate
5. Metered micro-surfacing emulsion
6. Metered water & additive
7. Pugmill
8. Micro-surfacing
9. Surfacing spreader box
10. Brown to black color
11. Road water spray bar

Micro-Surfacing Machine Schematic

Direction
Mixing time 15 to 45 seconds
Mixture Brown & Homogeneous
Breaking Time 60 to 120 seconds
Mixture Black
Traffic in Approximately One Hour

Slurry Systems how they work through a machine

* Cement drops on Aggregate
* Aggregate and Cement drop into pug mill
* Water and Additive is mixed
* Emulsified Asphalt is added
* Materials are mixed and deposited into lay-down box and spread on road surface

Micro-Surfacing

* Mix can be placed in thicker lifts and still remain stable
* Mix retains macro-texture
* Quick setting for quick traffic return
* Enhanced durability
Micro-Surfacing Machine
Continuous Self-Propelled Unit with Support Unit

Continuous Run & Self-Propelled

Continuous Lay Down

Continuous Run Machine with Support Unit

Support Unit Connected To Continuously Run Machine

Construction
Quality Micro Surfacing Systems
Appropriate Specifications

- Specifications should describe & match the job
- Specifications should describe & meet your expectations

Laboratory Design Procedures

- Pavement description
- Treatment objectives
- Selection of individual components
- Mix formulation
- Physical testing of trial mixes
- Field verification

Types and Application Rates

**Slurry Seal**
- Type I: 6 to 10 lbs./sy
- Type II: 10 to 15 lbs./sy
- Type III: 15 to 25 lbs./sy

**Micro Surfacing**
- Type II: 12 to 24 lbs./sy
- Type III: 18 to 28 lbs./sy
- Rut filling: 30 lbs + (1/2 to 2 inch)

Calibration

**Why Do We Calibrate?**

To obtain the ratio of the mix as set forth in the mix design

Emulsion Calibration Sheet

<table>
<thead>
<tr>
<th>Unit No.</th>
<th>Data __________________________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample 1</td>
<td></td>
</tr>
<tr>
<td>Sample 2</td>
<td></td>
</tr>
<tr>
<td>Sample 3</td>
<td></td>
</tr>
</tbody>
</table>

Emulsion Calibration:

Minimum 10 counts of the Rott-Bell counter per sample
Aggregate Calibration Work Sheet

Calibration Summary

Surface Preparation
- Crack sealing
- Asphalt patching
- Clean the surface (Sweep - wash)
- Pavement marking removal
- Tape - paint
- Cover the utilities
- Remove reflective pavement markers

Crack Filled Street

Asphalt Patch
Road Contaminants

Manhole Protected

Manhole Protected

Stockpile Setup

Stockpile Setup

Stockpile Setup

Ruts < ½” May Be Filled With Scratch Course

The scratch coat is generally 6” less than the width of the lane.
Applying Leveling Course

Leveling Course Applied

Reprofiling Rutted Wheelpaths

For each inch of applied Micro-Surfacing mix, add 1/8" to 1/4" crown to each rutfill to compensate for return traffic compaction

Operating Rut Box

Filling Ruts

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Rut-filling
- Before
- After

Surface Course

Secondary Strike-Off

Joint Matcher

Smooth Ride
Textured Wearing Surface

Removing Drag Marks
The Right Pavements for Micro Surfacing Systems

Shoulder Work

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Right Treatment, Right Time, Right Place

Interstates

Good Straight Edge Lines

Interstates

Secondary State Routes

Residential Streets
Why do Surface Treatments Fail?

- Material incompatibility
- Improper pavement preparation
- Control of materials during application
- Traffic control
- Working too late in the season
- Improper road selection

Can't Work Miracles

Micro Surfacing Systems Can't Work Miracles…

Benefits of Micro-Surfacing

- Restoration of surface properties
- Rut-filling
- Sealing & waterproofing
- Delineates pavement markings & shoulders
- High performance wearing course

Benefits of Micro-Surfacing

- Preserves investment
- Quick traffic, 1 hour or less
- Minimizes traffic disruptions
- Cost effective
- No casting adjustments
- Night time placement

Typical Micro Systems Costs

- Price varies depending upon treatment
  - Surface course
  - Leveling & surface
  - Rut-fill & surface
- Typical life - 5 to 12 years
  - Depends upon condition of pre-existing pavement, construction quality, climate, traffic and other factors

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Nova 99 short.ppt
The Right Treatments
Estimated Life Extension (years)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Good Condition (PCI=80)</th>
<th>Fair Condition (PCI=60)</th>
<th>Poor Condition (PCI=40)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fog Seal</td>
<td>3 - 5</td>
<td>1 - 3</td>
<td>1 - 2</td>
</tr>
<tr>
<td>Chip Seal</td>
<td>7 - 10</td>
<td>3 - 5</td>
<td>1 - 3</td>
</tr>
<tr>
<td>Slurry Seal</td>
<td>7 - 10</td>
<td>3 - 5</td>
<td>1 - 3</td>
</tr>
<tr>
<td>Micro Surfacing</td>
<td>8 - 12</td>
<td>5 - 7</td>
<td>2 - 4</td>
</tr>
</tbody>
</table>

Summary

- Micro-surfacing, the right treatment for
  - Rutilling
  - Texturizing
  - Improving skid resistance
  - Sealing out moisture
  - Ultrathin surfacing
  - Quick construction & traffic return
  - Cost-effective pavement preservation

Thank you!!