Definition

Laboratory designed mixtures of asphalt emulsion, aggregate, mineral filler, water and other additives accurately proportioned, mixed and uniformly spread over a properly prepared surface.

Governing Specifications

<table>
<thead>
<tr>
<th>Slurry Seal</th>
<th>Microsurfacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISSA A 105</td>
<td>A 143</td>
</tr>
<tr>
<td>ASTM D 6372</td>
<td>D 3910</td>
</tr>
<tr>
<td>FAA P-626</td>
<td>P-635</td>
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<td>P-635</td>
</tr>
</tbody>
</table>

• Department of Transportation (State)
• Special Provisions and Local Specifications
Two Primary Uses

• Preventive Maintenance
  – To prevent surface distresses in good pavements

• Corrective Maintenance
  – To correct surface distresses in older pavements

Capabilities

**Slurry Seal**
- Seals the surface (prevents further weathering of the underlying pavement)
- Restores surface texture (improved safety)
- Provides new durable wearing surface
- Fills cracks and voids
- Corrects other distresses

**Microsurfacing**
- Seals the surface (prevents further weathering of the underlying pavement)
- Restores surface texture (improved safety)
- Provides new wearing durable surface
- Fills cracks and voids
- Corrects other distresses

**Raveling**
- Light flushing

**Leveling Course**
- Rut Filling

Cold Weather Applications

Steep grade

French Alps

Issa Products Group
WHY BEST PRACTICES

Cold Weather Applications

French Alps

L’Isieran Pass: second highest pass in Europe
Altitude: 2769 m
Temperature: 5 °C

Inspector’s Manual
Calibration

<table>
<thead>
<tr>
<th>No.</th>
<th>CALIBRATION SUMMARY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>We calibrated for crack detection at 11/10/2011.</td>
</tr>
<tr>
<td>2</td>
<td>The crack was at least 2 inches wide.</td>
</tr>
<tr>
<td>3</td>
<td>The crack was visible on the road surface.</td>
</tr>
<tr>
<td>4</td>
<td>The crack was filled with a crack filler.</td>
</tr>
<tr>
<td>5</td>
<td>The crack was filled to the road surface.</td>
</tr>
<tr>
<td>6</td>
<td>The crack was filled to the road surface.</td>
</tr>
<tr>
<td>7</td>
<td>The crack was filled to the road surface.</td>
</tr>
<tr>
<td>8</td>
<td>The crack was filled to the road surface.</td>
</tr>
</tbody>
</table>

Crack Half Filled

CRACK FILL
Roadway Contaminant

Stock Pile

Machines
Secondary Strike Off  Changing Texture

Cutting Straight Edge  Making Good Joint

Removing Drag Marks
Start - Stop Joint

Good Longitudinal Joint

Joints
Expandable Box

Good Straight Longitudinal Lines
Good Acceptable Edge Lines

Finished Edge
Good Rut Work

Correct Patching Method

Extra Traffic Control Dusting Intersection
Successful Construction

Cold Weather Applications

24 hours after application

After 3 years, road reported to be in acceptable shape.

Cold Weather Application
Kaysville, Utah

Before After

Can you use Slurry & Micro
to hold a road?
(Buying time/reactive maintenance)

• YES!
• When doing so make sure all parties involved know what the project objectives are
• Have realistic expectations
What Is The Difference between Slurry and Microsurfacing?

- **Specifications**
  - Materials (capabilities)
  - Construction Process
  - Mix Design Requirements
  - Application Equipment

- **Slurry** designed for one stone thickness; Micro allows stone stacking.
- **Nighttime applications** with Micro; Micro is generally quicker traffic system.
- More stringent performance criteria for Micro.
- Conventional Slurry equipment can only apply Slurry; Micro equipment can apply both Slurry & Micro.

Average cost of Maintenance

- **1 1/2” HMAC** $95,000.00 - $103,500.00
- **Milling – Less than 3”** $23,500.00 – $40,000.00
- **Slurry Seal** $19,500.00 - $23,500.00
- **Micro Surfacing (single)** $24,000.00 - $27,000.00
- **Micro Surfacing (double)** $48,000.00 - $54,000.00
- **Chip Seal** $18,000.00 - $25,000.00

Per mile at 20’ wide
**Contributing Cost Factors**

- Location of project
- Quantity of Work
- Mobilizations required
- Traffic Control
- Production constraints
- Materials & Freight
- Warranties
- Bid timing

**Advantages**

- 1/4 to 1/3 cost of Hot Mix
- No milling required
- No build up at curb line
- Utility casting adjustment not necessary
- Minor inconvenience to traveling public
- High production levels leads to less time on project
- Eco-Friendly (cold technology)

- Hot Mix appearance
- Has high friction surface
- Minimal loose aggregate
- Protects underlying pavement (5-8 years)
- Extends pavement life
- Excellent wearing course
- Proven performer
- Corrects minor surface distresses

**Eco-efficiency Analysis:**

- Life Cycle Approach to Balancing Costs and Environmental Impacts
Eco-Efficiency

Assessing Environmental Impacts

Life-cycle data is gathered in six environmental categories and depicted on an environmental fingerprint. The data are then weighted, aggregated and normalized to obtain an overall environmental impact.

Balancing Costs and the Environment

The most eco-efficient product has the lowest combined environmental impact and cost. Eco-efficiency is measured from the diagonal line.
Microsurfacing clearly demonstrates lower environmental burden in all impact categories relative to the Mill and Fill (HMA) alternative.

For this study, the microsurfacing alternative is the most eco-efficient. Based on the 1 mile stretch of a 12 ft urban lane, microsurfacing relative to Mill and Fill will:

- require over 1.2 million pounds less material
- save energy and reduce dependence on fossil fuels
- significantly reduces waste and material sent to landfill (34 tons)
- have a smaller carbon footprint. Reduction equivalent to:
  - equivalent uptake of 3 acres of forest over the same 40 years
  - taking over 20 cars off the road for 4 years.

Conclusions
Microsurfacing is the more eco-efficient pavement preservation technology!

- Microsurfacing shows clear ecological advantages in all 6 impact areas.
- Microsurfacing has the lowest life cycle cost.

- Preventive maintenance of a 1 mile stretch of a 12 foot lane of an urban road to a similar profile and performance using best engineering practices over a 40 year period
Keys To Success

• Proper site selection
• Good specifications (enforced)
• Proper roadway preparation
• Proper equipment (match equipment to project)
• Accurate equipment calibration
• Material consistency (use materials with history of past performance)
• Contractor performance (use seasoned workforce)
• Quality project inspection
• Agency – Industry Partnering
• Information

Sources of Information

International Slurry Surfacing Association
www.slurry.org

Asphalt Institute
www.asphaltinstitute.org

BASF Corp
www.basf.com/asphalt

Learn from the mistakes of others -- you won’t live long enough to make them all yourself...
Questions?

Thank You!