Value Engineering using Reinforcing Fibers for Micro Surfacing
FIBER
START
Let me introduce you to another type of fiber...

Fiber for Reinforcing Micro Surfacing & Slurry Seal
Why Not?

- Egypt mud bricks reinforce horsehair and straw
- Portland Cement discovered
- The concept of composite material
- Shotcrete
- Synthetic Fibers for Asphalt
- Roman concrete at the Pantheon
- Asbestos fibers used in concrete
- Synthetic fibers enter US market
- The application of steel, glass and synthetic fibers

Timeline:
- 1484 BC: Mesopotamia: Straw used in sunbaked bricks
- 1277 BC
- 25 BC - 300 AD: Roman concrete at the Pantheon
- 1824
- 1900
- 1950's
- 1960's
- 1970's
- 1978
- 2000's
Invented in Germany in the early 1930s. Helps replace the fines in the existing surface that have raveled out over time and adds a new skid resistant driving surface. When applied, slurry seal has a brownish color and is easy to spread into tight corners. After smoothed, it is left to cure for up to 24 hours before available for traffic.
MICRO SURFACING

A second generation of slurries created to correct moderate to severe raveling and filling voids. Has added capabilities thanks to the use of high-quality, carefully monitored materials, including advanced polymers and other modern additives – such as fibers. This allows for a more durable skid resistant surface that is traffic ready in less than 1 hour.
Another Tool...

Thin pavement preservation treatments consisting of a mixture of asphalt emulsion, aggregate, mineral filler, and water which dries to a hard black finish.

Also, a cost-effective method to renew the road surface and seal minor cracks and other irregularities.

Used as a preventative maintenance tool.
Why use Reinforcing Fiber in MicroSurfacing?

Fiber has shown:

- Increased Pavement Durability*
- Reduced Surfacing Cracking*
- Increased Pavement Flexibility*
- Reduced Setup and Cure Time*
- Reduced Mineral Requirement*

* BASED ON LAB & FIELD TESTS OF AR GLASS FIBER
Flexural Tension Test
(ISSA TB-146)

NO FIBER

0.2% FIBER
Surface-EXT™ Flexural Tension Test

No Fiber

.2% Surface-EXT
Fiber vs No Fiber

Micro surfacing with fiber demonstrated better resistance to cracking under flexural tension than without fiber.

<table>
<thead>
<tr>
<th>Test Sample</th>
<th>Average Flexural Bend (mm)</th>
<th>Range (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micro Surfacing</td>
<td>9</td>
<td>5-15</td>
</tr>
<tr>
<td>Micro Surfacing w/ fiber</td>
<td>54.5</td>
<td>34-95</td>
</tr>
</tbody>
</table>

ISSA (1989)  TB 146 Flexural Tension Test Method for Determination of Cracking Resistance of Slurry Mixes pp1
Length
Dosage

0.2% - 0.4% of the Dry Aggregate Weight
Chemistry

A ¼” pre-chopped AR glass fiber used in MicroSurfacing and Slurry Seal to improve flexibility and fatigue.

less cracking = longer life
Selecting the Correct Fiber

Is the fiber affected by the chemistry of any of the additives or the emulsion?

Alkali vs Non-Alkali

Alkali Resistant Glass Fiber
Fiber intact – No deterioration

Non-Alkali Resistant Fiber
Deterioration starts after a few hours.
Is the fiber visible on the pavement surface?
Surface Texture Uniformity
(High Friction Surface)
Pavement Condition Index

“Right Treatment – Right Road – Right Time”

Cost data from national averages compiled by ISSA.
Typical Fiber Reinforced Slurry Surfacing Project
5-1-13

BEFORE
Typical Fiber Reinforced Slurry Surfacing Project

1-3-17

AFTER
Selecting the Correct Feeding System

Select a dispenser that is:

- Easy to use
- Dispenses and distributes your fiber evenly
- Can produce your desired application rates
- Works well with your equipment
Selecting the Correct Feeder

Volumetric Feeder – dispenses pre-chopped

The solution for automatic disbursement of pre-chopped fibers into slurry pavers. Its proven accuracy saves you both time and money while taking the guesswork out of fiber usage.
Ranger

- Accuracy Saves Money
- Easy Installation gets you up-and-running quickly
- De-clumping eliminates waste
- Loading is simple
- Low maintenance
- Easy to use
EASY INSTALLATION

- Compact in size, making it easy to maneuver
- 2 brackets, 1 connection to a 12 VDC power source and 3 hydraulic hoses are all you need
- Easily attaches to trucks & pavers
- Available in 24” and 36”
- Does not hinder the paving process
Application Equipment

Truck Mounted Unit

Continuous Run Machine
EASY LOADING

- Drum holds 80 lbs.
- The Ranger has a window so operators can instantly recognize when its time to add additional fibers.
- Optional extension can be added to increase the drum’s capacity.
- Available in 40 lb bags of pre-chopped ¼” length fibers.
Fibers Directly into Pugmill
MicroSurfacing & Slurry Seal
Main Uses

- Sealing pavement against water, oxidation
- Filling cracks, raveling
- Surface texture improvement
- Re-profiling and rut-filling
- Color
- Fast – Open to traffic less than 1 hour
- Increase friction resistance
- Lower cost than mill & fill
- No need to raise drains, covers, curbs
- Improves pavement durability and extends life

Where to Use

- Roadways
- Parking Lots
- Airport areas
- Interstates
- Shoulders
PARKING LOT TEST SECTION

ISSA - LAS VEGAS, NV

- 2017 & 2018
- Micro Surfacing project
- Surface-EXT™
BOLEYN ROAD
FLORIDA

- Micro Surfacing project
- Surface-EXT™
Average Cost of Maintenance

- 1 1/2” HMAC w/Milling: $118,500.00 - $143,500.00
- 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

Per mile 20’ wide
Fiber vs Non Fiber

With Fiber

Without Fiber
Use as a Tack

- Micro Surfacing project
- Fiber Tack Coat
Review...

- Another Tool in the Tool Box
- Adds Durability & Extends Life
- Mitigates Cracking
- No Changes to Mix Design
- Easily Fed and Distributed
- Low Cost
- Aesthetically Pleasing
THANK YOU

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