

MICRO MILLING

Applications and Advantages for Pavement
Preservation

Presentation Overview

1. Difference between standard milling, fine milling and micro milling
2. Factors that dictate surface texture
3. Applications and advantages of micro milling
4. Job stories

Drum Categories:

- Standard Milling- $5/8$ " (15mm) Spacing
- Fine Milling- $3/10$ " (8mm) Spacing
- Micro Milling- $2/10$ " (5mm) Spacing

Surface Comparison

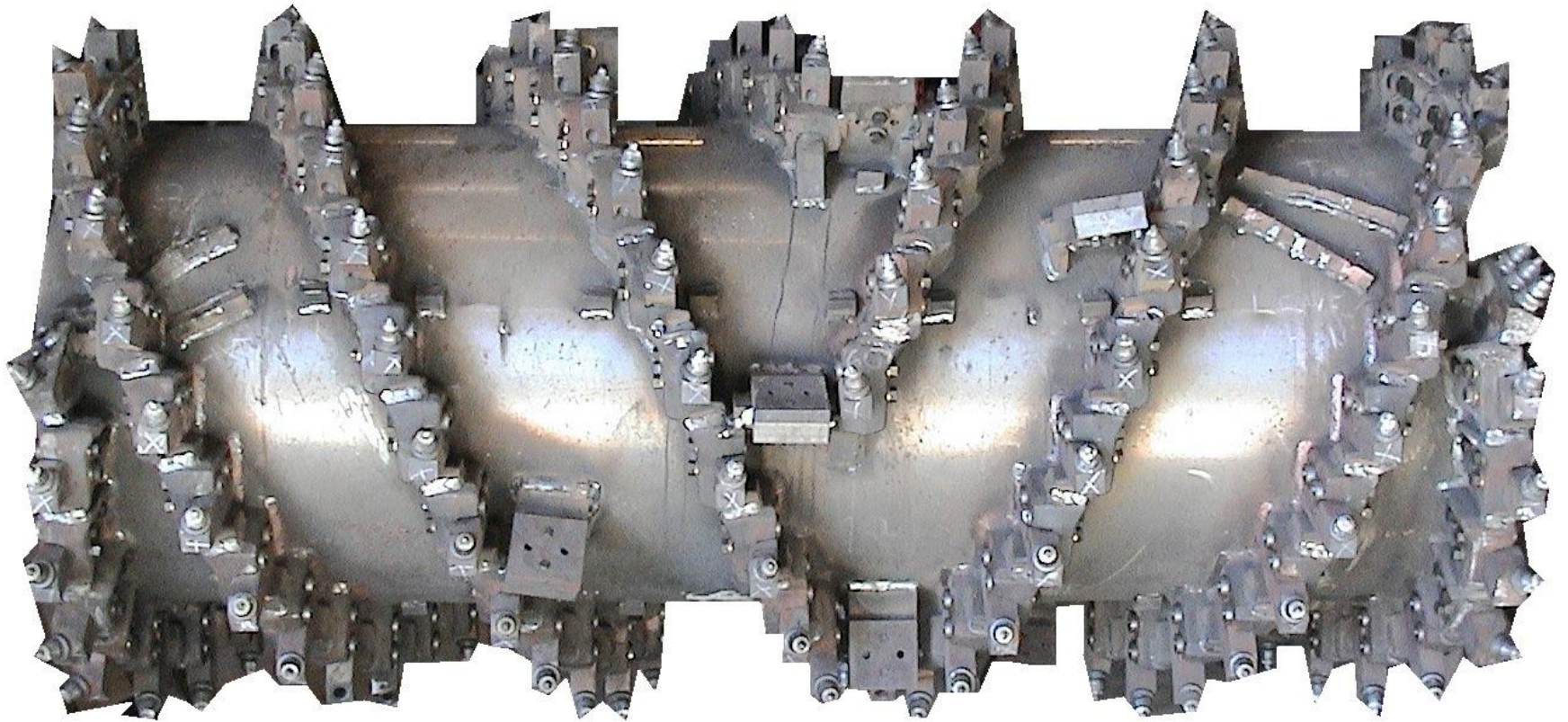


Determining Factors of Surface Texture/Surface Pattern

1. Bit Spacing
2. Forward Cutting Speed
3. Wrap Configuration
4. RPM
5. Diameter of the Drum
6. Drum Maintenance

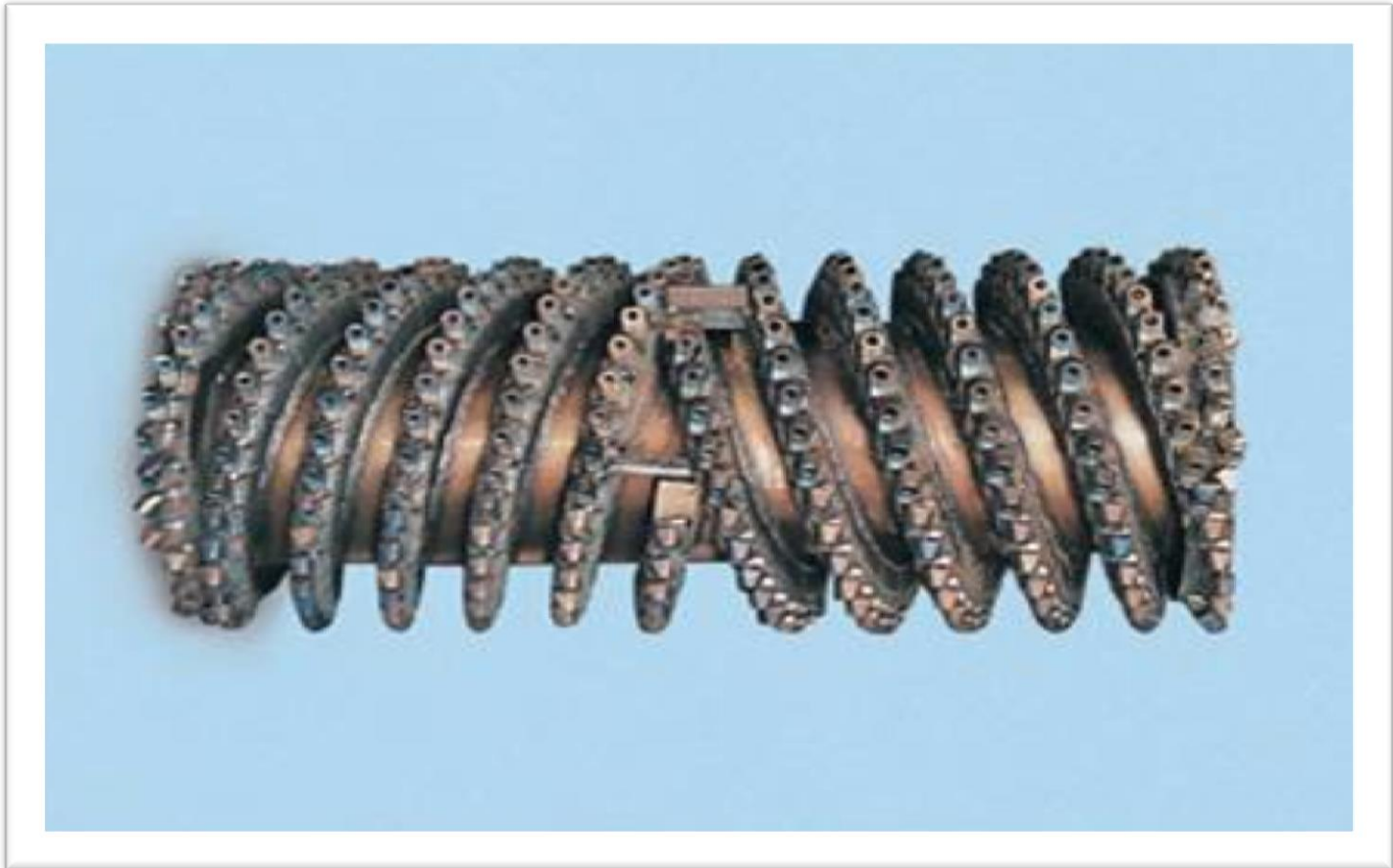
1. BIT SPACING

Standard Milling Drum



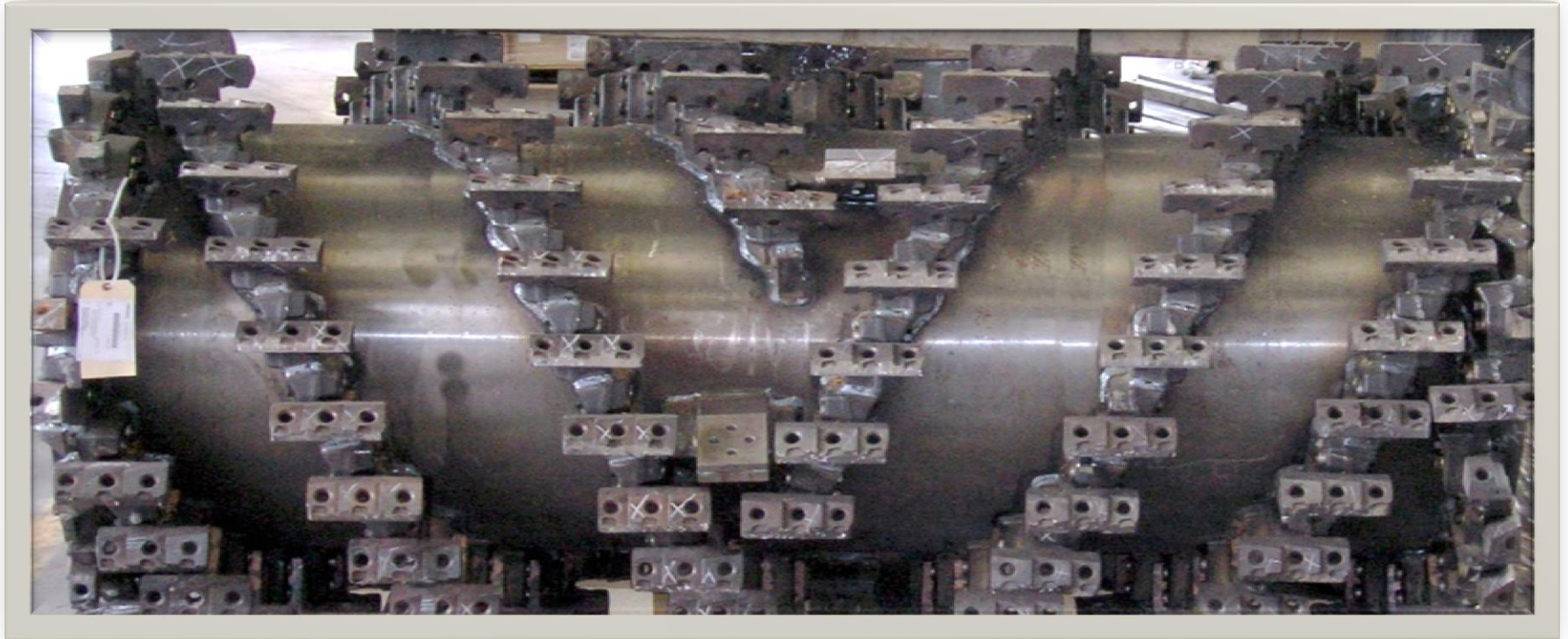
Triple Wrap Lacing at 5/8" (15mm)
Spacing – 150 Bits

Fine Milling Drum



Triple Wrap Lacing at $5/16''$ (8mm)
Spacing - 300 Bits

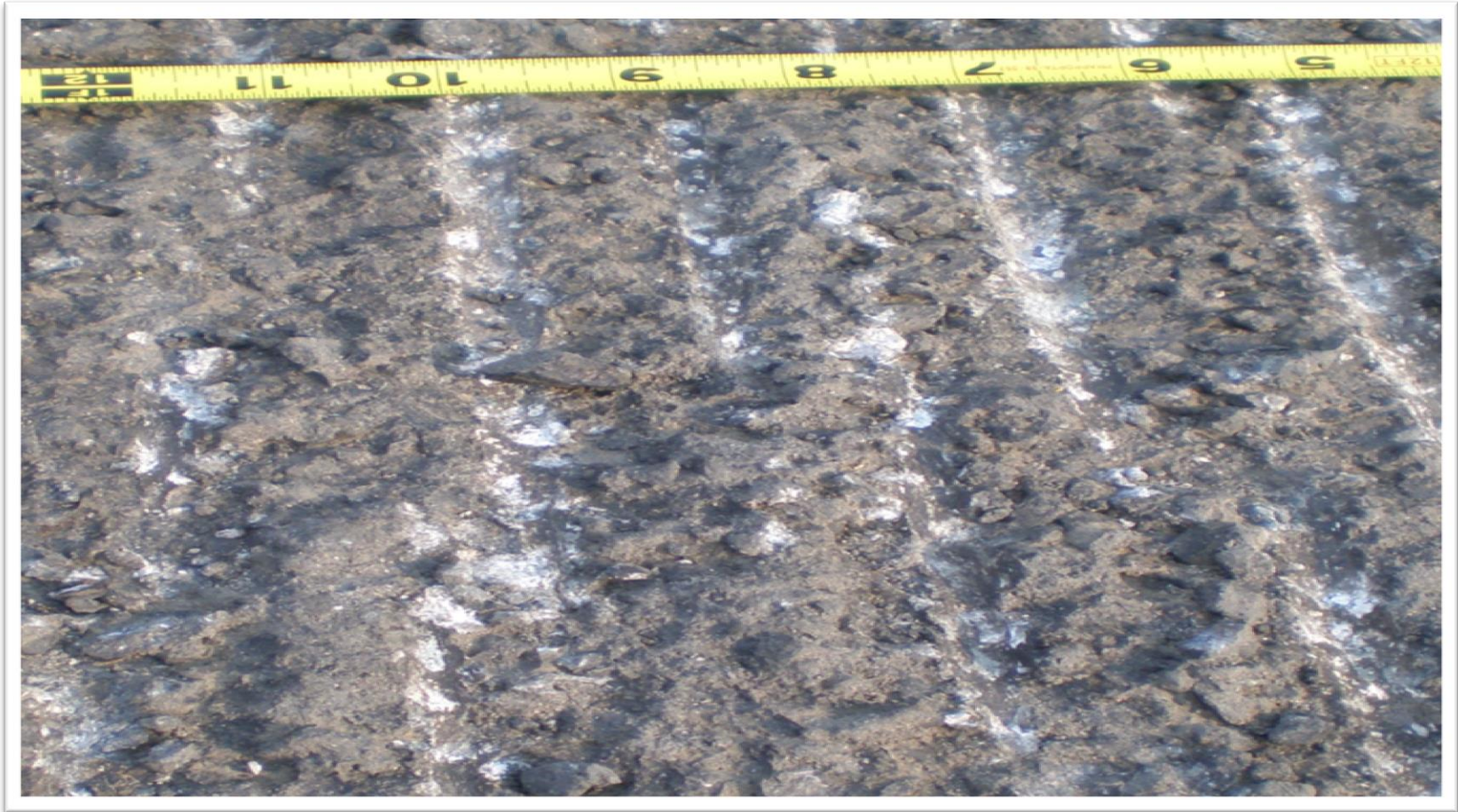
Micro Mill Drum



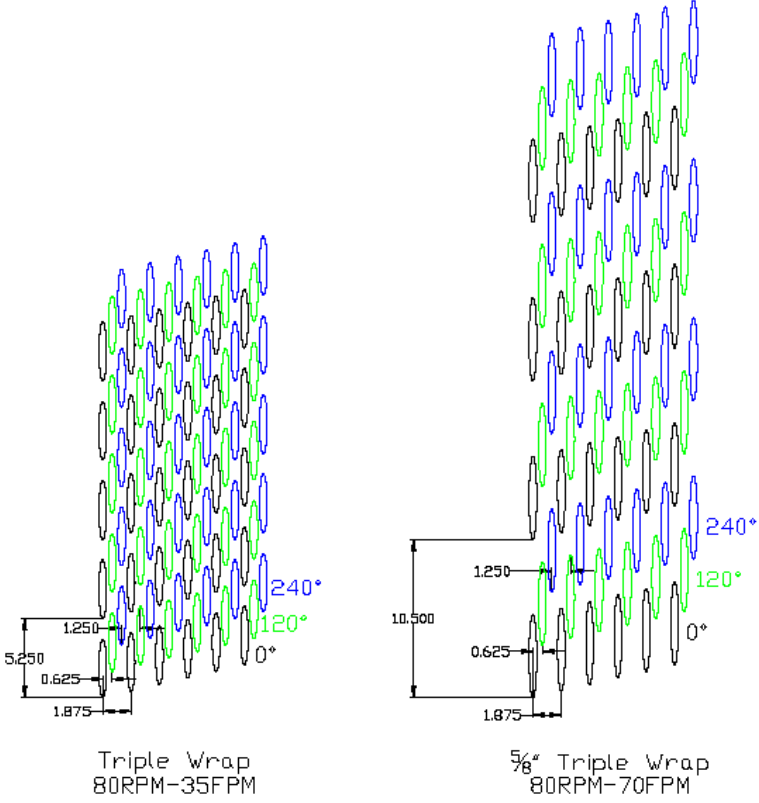
Triple Wrap Lacing at 2/10" (5mm)
Spacing - 450 Bits

2. FORWARD CUTTING SPEED

5/8" (15mm) Standard Drum Bit Strikes



Forward Cutting Speed



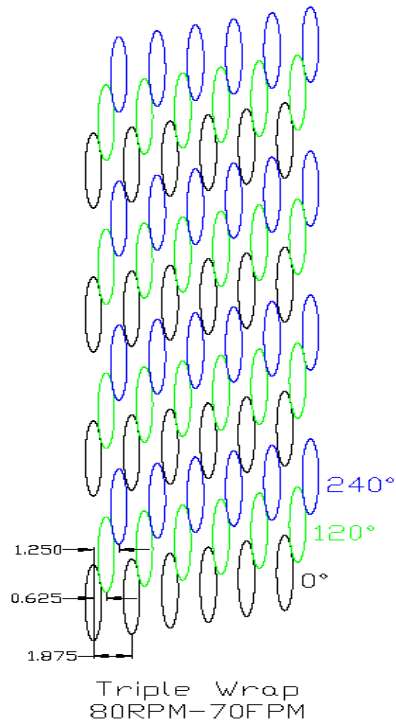
Forward Cutting Speed



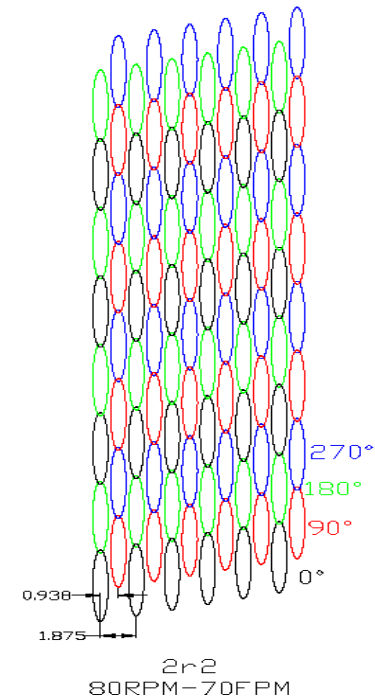
3. WRAP DESIGN

Triple Wrap vs. Quad Wrap

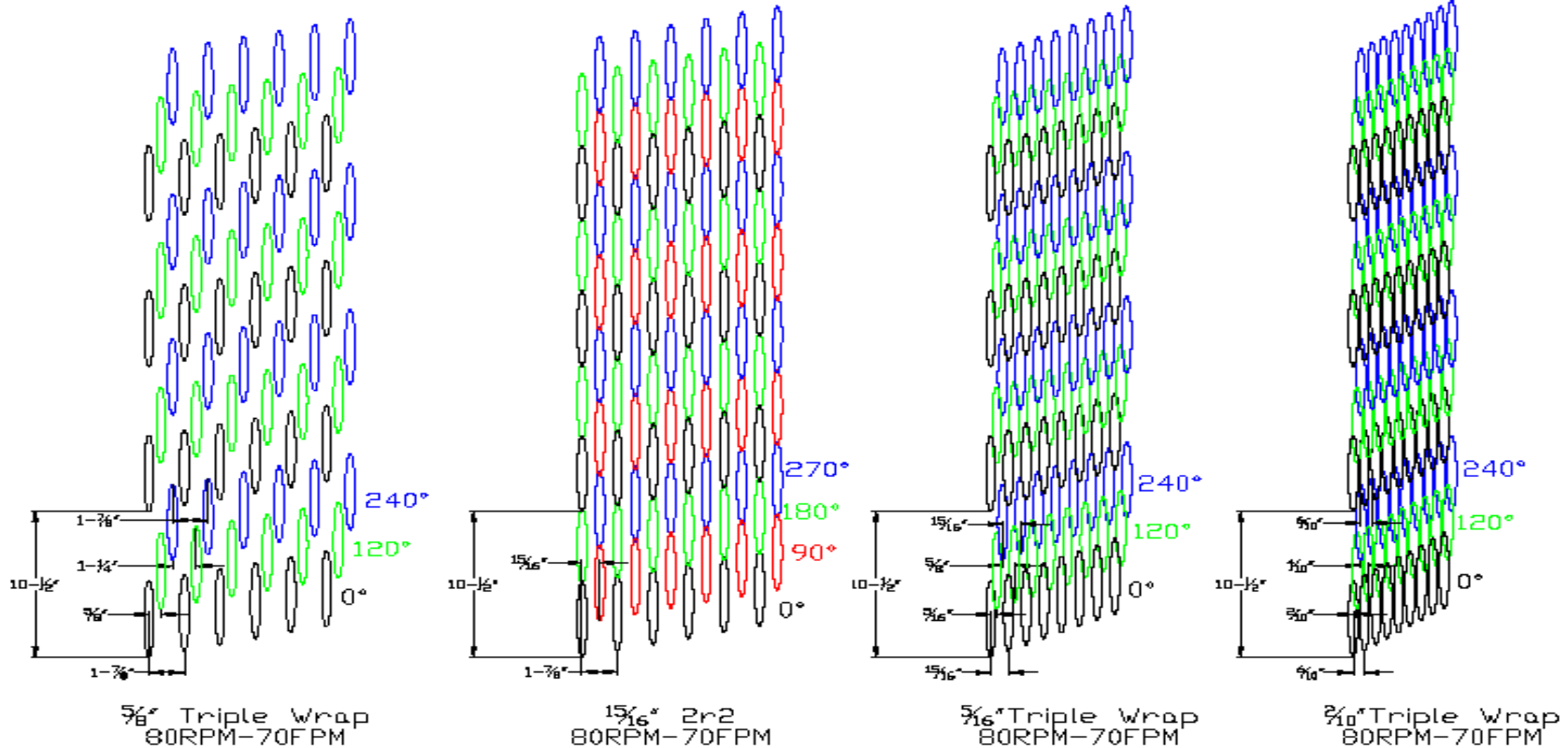
5/8" -15mm Spacing (150 Bits)



15/16" - 22.5mm spacing (200 Bits)



Wrap Design and Micro Milling



Spacing Can Be Misleading



Tighter Spacing Does NOT = Smoother Surface

12mm-.45" vs. 8mm-.3" Triple Wrap
Same Forward Cutting Speed and RPM

2.

Increased Bit Count Does NOT = Smoother Surface



8 mm Triple Wrap Fine Drum (300 Bits) Vs. 22.5mm-15/16" Quad Wrap Standard Drum (200 Bits)
Both Milled at 85' /Minute

Remaining Factors

4. RPMs- Equally important as speed but is far less volatile
5. Diameter of the drum-Usually set by machine manufacturer
6. Cutter drum maintenance



Specifications

Equipment Specs

DO NOT insure end result

Performance Specs

INSURES end result

Allows room for competitiveness and creativity

Performance Based Specs for Micro Milling

- Georgia- Laser Road Profilograph
 - Remove/Replace OGFC
 - Multiple Lifts Required Before Micro Milling Spec
 - Laser Measures the Distance of the Peak/Valley

Performance Based Specs for Fine Milling

- Virginia- Fine Milling Sand Test
 - Smoothness for Safety Reasons
 - Disconnect of Milling and Paving Operations

Micro Milling Applications

- **Ride Corrective Tool Before Preservation Treatment**
- **Surface Preparation Tool Before Preservation Treatment**
- Surface/ Friction Course Removal
- Correctional Work
- Faulted Concrete Correction
- Wheel Rut Removal
- Temporary Driving Surface
- Bridge Deck Repair
- In-field Crushing of Material

Micro Milling Advantages

- Improved Ride on Overlays/Surface Treatments
- Enhances Pavement Life Cycle
- Reduction in Material Cost
- Reduction in Construction Cost
- Safer Driving Surface
- Restores Curb Line
- Reduction in RAP Processing Costs

Pavement Preservation

1. Improve Ride/Smoothness of Road

2. Provides a Better Bonding Surface

- Removal of Old Surface
- Removal of Paint, Oil Slicks
- Reduction in the Size of Surface Cracks

3. Restores Curb Line

4. Less Material Required (vs. standard milling)

- Shallower Grooves .1" vs. .5"
- Improved Spread Rate

5. PUBLIC PERCEPTION

Rt. 111 Imperial County, CA

- Rough Road- 7.3 Magnitude Earthquake
- 22.5 Miles- 11,747 Must Grinds Identified
- Low Volume Road
- Structurally Sound Base
- Minor Number of Structural Repairs Needed

Ride Improvement Options:

1. Thin Lift Overlay/Surface Treatment
 - Too Rough
2. Mill and Fill
 - Too Costly

HYBRID APPROACH

Micro Milling-

- Improve ride

Asphalt Rubber Seal Coat-

- Seal Surface

- Provide a New Wearing Course

RT. 111: BEFORE



1st Phase: Micro Mill Process



2nd Phase: Asphalt Rubber Seal Coat Application



Aggregate Spreading Process



Compacting



AFTER: RT 111



- 61.4% PRI Improvement
- 3.73" per 1/10 of Mile
- Estimated life extension of 10+ Years
- 1/4 Price of Mill and Fill*

Escondido Canyon, L.A. County

Micro Milling Before Cape Seal Surface Treatment

- Improved Ride
- Applied to a Clean and Prepped Surface
- Restored Curb Line



Summary.....

Provides Options!

Ride Improvement Tool

Cost Savings!

Reduction in Material and Construction
Costs

Better Quality Product!

Better Bonding of Surface Treatment

Questions?

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