Pavement Preservation Specialists

MIDLAND

All States Materials Group®

Vestal Asphalt Inc.

Suit-Kote

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Pavement Preservation Specialists

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  - Bearcat Manufacturing, Inc.
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  - Highway Rehab. Corp.
  - Maxwell Products, Inc.
  - McAsphalt Industries, Ltd.
  - Meadwestvaco Corp.
  - Tracey Road Equipment, Inc.
  - UltraPave

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Thin Surface Treatments for Pavement Preservation

Quick Set Slurry Seal, Micro Surfacing and Paver Placed Surface Treatment

The Liquid Asphalt Distributors Association of New York

Chris Dooling & Dane Mellon
The Gorman Group

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Presentation Outline

- *Pavement Preventive Maintenance*
  - *Non Structural Overlays*
- *Pavement Preservation Effectiveness*
- *Quick Set Slurry Seal & Micro Surfacing*
- *Paver Placed Surface Treatment*
- *Details of Processes*
- *Uses*

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Preventive Maintenance

- *PM is a subset of Pavement Preservation*
- *Definition of Preventive Maintenance*
  - *Any planned activity performed in advance of a critical repair. The activity may correct minor defects as a secondary benefit.*
  - *PM extends the service life, without significantly improving the structural capacity.*
  - *PM is meant to delay the development of distress.*

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Non-Structural Overlays - PM

- *Chip Seals - Single, Double, Triple, Fiber Reinforced*
- *Quick-Set Slurry*
- *Micro-Surfacing*
- *Paver-Placed Surface Treatment*
- *6.3mm Polymer Modified HMA*
- *Hot Mix Asphalt (HMA) 40mm-50mm*
- *Heater scarification of HMA (surface prep for overlay treatments)*

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Non-Structural Overlays - PM

- Conditions for Use
  - Pavement is in good condition
  - Pavement rating condition of Fair or better
  - Low severity cracking, raveling and rutting

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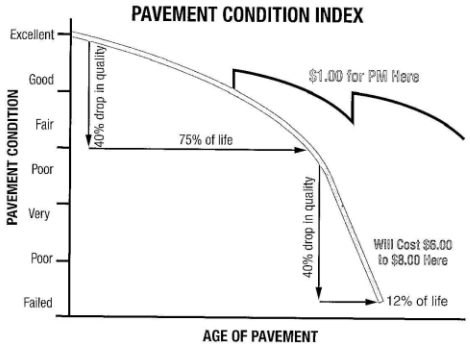

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Quick Set Slurry Seal & Micro Surfacing

Process description

- A pavement wearing course consisting of a mixture of quick-set emulsified asphalt, fine crushed aggregate, mineral filler, water and field control additives.

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Quick Set Slurry Seal & Micro Surfacing

- What are the similarities?
- Placed with the same equipment
- Essentially the same material make-up

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Quick Set Slurry Seal & Micro Surfacing

What are the differences?

- Number of layers
- Addition of polymer to micro surfacing
- Suitability for traffic volumes
- Ability of micro surfacing to fill ruts

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Laboratory Mix Design Procedure

- Consistency
- Mix Time
- Set Time
- Cure Time
- Wet Track Abrasion Loss
- Loaded Wheel Test
- Excess Asphalt by LWT Sand Adhesion
- Wet Cohesion testing

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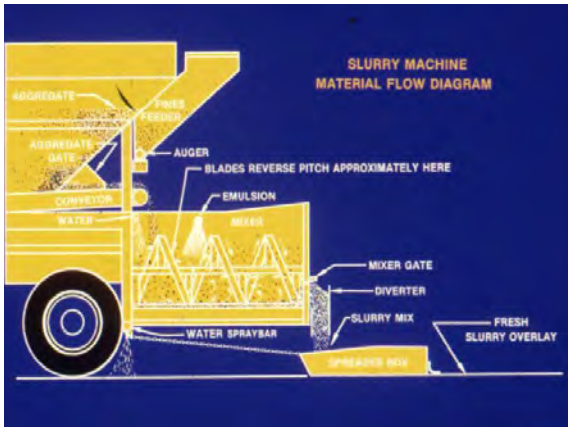

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Calibration

Materials Method Number NY8.4M

- Emulsion
- Aggregate
- Mineral Filler
  - Minimum every 90 days, each mixing unit

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Preparation Work

- Both Quick Set Slurry Seal and Micro Surfacing
  - Clean Pavement
  - Cover Roadway Structures

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Quick-Set Slurry Seal

- Quick-Set Slurry is a preventative maintenance technique that:
  - provides a fine aggregate wearing course
  - seals the pavement
  - reduces oxidation

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Quick-Set Slurry Seal

- Conditions for use
- Low severity cracking, raveling and rutting
- Low Volume Traffic
  - < 4000 lane AADT or 8000 AADT
  - < 10% truck traffic

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Quick Set Slurry Seal - Typical Application Rates and Thickness

Type 2	Type 3
10.1 - 15.8 lbs/sy	14.7 - 26.0 lbs/sy
1/8 to 1/4 inch depth	1/4 to 3/8 inch depth

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Quick-Set Slurry Seal

- Advantages
  - Quick single pass operation
  - Improve surface friction
  - Fill minor surface irregularities
  - Seals pavement surface
  - Open to traffic in <1 hr
  - Minimal elevation change
  - Mainline paving saving lines
  - CPDM Chapter 10 Section 10.2.2.3
- Disadvantages
  - No cross slope correction
  - Night work not recommended
  - 7 days for permanent markings
  - Climate conditions may effect set time

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Expected Failure Modes

- Reflective cracking
- Potholes
- Raveling
- Abrasion at intersections (turning/scrubbing areas)

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Seasonal Limitations

- Temperature - 10°C (50°F) and rising
- Do not pave in the rain

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Quick-Set Slurry Seal

- A design mixture of emulsified asphalt, mineral aggregate, water, and specified additives - proportioned, mixed, and uniformly spread over a properly prepared surface.
  - Expected Service Life 3 to 5 years
  - State Specifications
  - ISSA A-105
  - ASTM D-3910

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Micro Surfacing

- Micro Surfacing is a pavement wearing course consisting of:
  - Polymer Modified Quick Set Emulsified Asphalt
  - Fine Crushed Aggregate
  - Mineral Filler
  - Water and Field Control Additives

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Differences between Quick Set Slurry and Micro Surfacing

- Micro Surfacing - Polymer and chemical modification accelerates set times and curing of the system
- Micro Surfacing - Accelerated curing due to polymer and chemical modification allows "stacking" of aggregate thus truing & leveling and rut fill capabilities
- Quick Set Slurry Seal - Used on lower volume roadways

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Micro Surfacing - Traffic requirements

- Appropriate for high volume roads
- Appropriate for low volume roads
- No traffic volume restrictions

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Comparison of Type 2 & 3 Micro Surfacing

- Type 2 is used to correct surface oxidation and restore friction. Best used on moderate traffic roads.
- Type 3 is used to fill minor surface irregularities and restore friction. Best used on higher traffic roads.

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Micro Surfacing Aggregate Gradations

Type 2 or 2MS

Screen		% Passing
U.S.	(metric)	
3/8	(9.5)	100
#4	(4.75)	90-100
#8	(2.36)	65-90
#16	(1.18)	45-70
#30	(600)	30-50
#50	(300)	18-30
#100	(150)	10-21
#200	(75)	5-20

Type 3 or 3MS

Screen		% Passing
U.S.	(metric)	
3/8	(9.5)	100
#4	(4.75)	70-90
#8	(2.36)	45-70
#16	(1.18)	28-50
#30	(600)	19-34
#50	(300)	12-25
#100	(150)	7-20
#200	(75)	5-20

**ALL AGGREGATE MUST MEET APPROPRIATE FRICTION REQUIREMENTS

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Typical Application Rates and Thicknesses

Type 2	Type 3	RUT FILL
25 - 39 lbs/sy	35- 56 lbs/sy	UP TO 1 ½ INCH DEPTH
1/2 to 3/8 inch depth	3/8 to 3/4 inch depth	

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Macro Texture – Type 2

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Rut Filling with Micro Surfacing

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Micro Surfacing on Interstate 81

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Seasonal Limitations

- Temperature - 45°F and rising
- If < 32°F within 24 hrs of paving - Not
- Do not pave in the rain

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Expected Service Life

- 8 years with proper maintenance

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Micro Surfacing

- Advantages
  - Work is accomplished one lane at a time, open to traffic within 1 hour
  - Lane closure relatively short
  - Rut Filling
  - Minimal change to pavement elevation
  - Minimum dead load increase on bridges
  - Edges/transitions easily feathered out
  - Minimum loss of curb reveal

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Constructibility Disadvantages

- Surface preparation required to achieve service life
- 1 hour cure time before opening to traffic
- Minimal correction to cross slope
- Removal of epoxy markings is required
- 7 day required before permanent pavement markings

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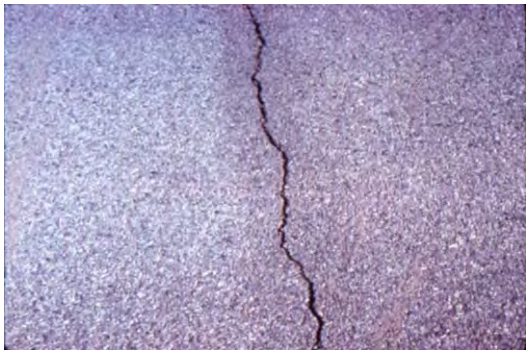

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Quick Set Slurry Seal and Micro Surfacing

- Prevents surface distresses in newer pavements
- Corrects surface distresses in older pavements
- Application of cold thin seals extends pavement life
- SPS-3 Federal study confirms pavement preservation methods are effective

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Paver Placed Surface Treatment

- What is Paver Placed Surface Treatment?
- A pavement preservation treatment
- A gap graded, high friction, low noise, thin hot mix overlay with a heavy polymer emulsion Bond Coat
- Service life of 8 to 10 years
- Developed in Europe

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Paver Placed Surface Treatment

- Differences between Paver Placed Surface Treatment and Dense Graded Hot Mix Asphalt
  - Placed at 5/8" deep
  - Heavy emulsion Bond Coat
  - Open texture
  - Greatly reduced splash and spray
  - Waterproofing
  - Quiet surface
  - Equipment

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Paver Placed Surface Treatment

Hot Mix Asphalt
1/4, 3/8, 1/2 inch
Single sized aggregate
Manufactured fines
PG AC @ 4.8 – 5.2%

Polymer modified CRS-1p
Emulsion bond coat.

Specialized paving Machine
- Sprays polymer modified emulsion
- Places gap graded hot mix to grade
- Smooths the mat

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Application Rates

- Polymer Modified Asphalt Emulsion
  - 0.2 Gal/S.Y.
- Ultra-Thin Hot Mix Asphalt Overlay
  - Type A: 55 – 65 lbs/S.Y.
  - Type B: 60 – 70 lbs/S.Y.
  - Type C: 65 - 75 lbs/S.Y.

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Paver Placed Surface Treatment

Mixture Requirements - Gap Graded

Sieve Sizes (in)	Type A Design Limits (% Passing)	Type A Production Tolerance (%)	Type B Design Limits (% Passing)	Type B Production Tolerance (%)	Type C Design Limits (% Passing)	Type C Production Tolerance (%)
3/4					100	
1/2			100		85 - 100	±4
3/8	100		85 - 100	±4	60 - 90	±4
1/4	85 - 100	±4	30 - 55	±4	30 - 55	±4
No. 4	40 - 60	±3	24 - 45	±3	24 - 45	±3
No. 8	21 - 37	±3	21 - 37	±3	21 - 37	±3
No. 16	16 - 26	±3	16 - 26	±3	16 - 26	±3
No.30	12 - 20	±2	12 - 20	±2	12 - 20	±2
No. 50	8 - 16	±2	8 - 16	±2	8 - 16	±2
No. 100	5 - 10	±2	5 - 10	±2	5 - 10	±2
No. 200	5 - 7	±2	5 - 7	±2	5 - 7	±2
% PG Binder	4.9 - 5.3		4.8 - 5.2		4.8 - 5.2	

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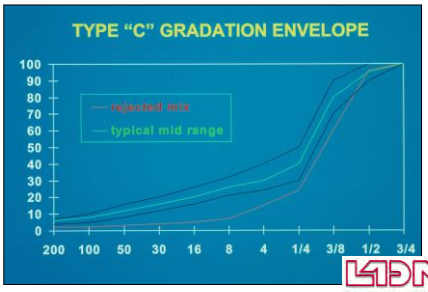
Type "C" Gradation Envelope



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Macro Texture

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Paver Placed Surface Treatment Type A

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Paver Placed Surface Treatment

- *Type A candidate*
  - *Light Traffic*
  - *Urban Areas*
  - *Suburban Areas w/Light Trucks*
  - *Pavement Rating Good or Better*

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Paver Placed Surface Treatment Type B

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Paver Placed Surface Treatment

- *Type B candidate*
  - *Moderate to Heavy Traffic*
  - *Truck Traffic at Moderate Speeds*
  - *Urban or Suburban Areas*
  - *Pavement Ratings High Fair or Better*

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Paver Placed Surface Treatment Type C

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Paver Placed Surface Treatment

- Type C candidate
  - Heavy Traffic
  - High Speed Traffic
  - Heavy Trucks
  - Pavement Rating Fair or Better

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Paver Placed Surface Treatment

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Paver Placed Surface Treatment

- Surface Preparation
  - Rutting – over 1", shim or do not place
  - Cracks – seal over 1/8 inch wide, preferably the previous season
  - Patch potholes
  - Remove pavement markings if required
  - Clean pavement
  - Protect existing structures
  - Cut rebates

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Paver Placed Surface Treatment

- Seasonal Limitations
  - Temperature - 45°F and rising
  - Do not pave in the rain

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Self-Priming Paver

- Screw Conveyors

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Paver Placed Surface Treatment Paver

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Paver Placed Surface Treatment Paver

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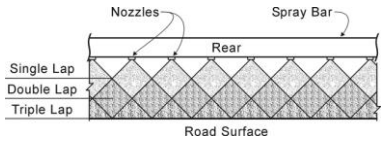
Paver Placed Surface Treatment

- Spray Pattern



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Paver Placed Surface Treatment

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Paver Placed Surface Treatment

Conventional Roller

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Paver Placed Surface Treatment

- Rolling
  - Conventional 10 ton steel wheel rollers
  - No vibration
  - 2 static passes
  - Seat aggregate
  - Roller should be right up with paver

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Paver Placed Surface Treatment

ADVANTAGES

- *Fast application*
- *Ultrathin wearing course*
- *Conserves high quality aggregates*
- *Low surface noise*
- *Reduces "misting" on wet pavements*
- *Macro-texture yields high skid resistance*
- *Corrects road profile*
- *Tacks and seals surface prior to overlay*
- *No curing time required*
- *Suitable for all traffic volumes*
- *Minimal traffic disruption during placement*
- *Suitable overlay for asphalt and concrete pavements*
- *Requires only short single lane traffic closure*
- *Service life up to 10 years*
- *Economical*

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Pavement Preservation

- ***is more cost effective than Worst First***
- ***Quick Set Slurry Seal, Micro Surfacing, and Paver Placed Surface Treatment are cost effective Pavement Preservation treatments when used at the right time on the right road***

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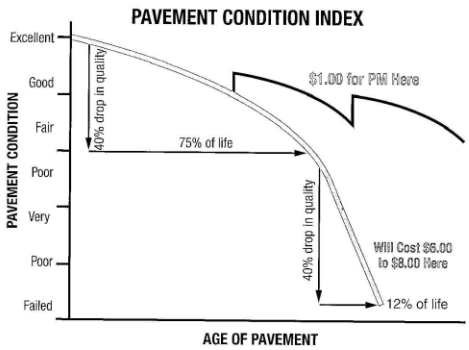

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Thin Surface Treatments for Pavement Preservation

Questions ???

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