“Pavement Preservation”
ODOT Leading the Way

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Taking Care of What We Have
Governmental Agency Challenges

• Limited knowledge of current solutions and new technologies

• “In school you were taught how to build it, but not how to maintain what has been built.”

• “We do what we do because that is the way we have always done it…”

• Relationships

• Politics
Governmental Agency Challenges

Decreased or No Change to Road Budgets

• Same Amount of Miles if Not More, and the Cost of Everything Has Gone Up

• “Going Back to Gravel”

• Bottom of Barrel Funding
  • “We’ll see how much we have left over after we see how much salt we use...”
Asphalt Specifications

• “Range of Acceptability”

Asphalt Prices

$60 - $80 / ton or $130 - $170 / CY

• Southwest and Central Ohio

$80 - $110 / ton or $160 - $220 / CY

• Northeast, Northwest, Southeast Ohio
A program employing a network level, long-term strategy that enhances pavement performance by using an integrated, cost-effective set of practices that extends pavement life, improves safety and meets motorist expectations.
FHWA Pavement Preservation Guidelines

Pavement Maintenance

"A planned strategy of cost-effective treatments to an existing roadway system ... that preserves the system, retards future deterioration, and maintains or improves the functional condition of the system (without significantly increasing the structural capacity)."
## Pavement Preservation Guidelines

<table>
<thead>
<tr>
<th>Type of Activity</th>
<th>Increase Capacity</th>
<th>Increase Strength</th>
<th>Reduce Aging</th>
<th>Restore Serviceability</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Construction</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Reconstruction</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Major (Heavy) Rehabilitation</td>
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<td>X</td>
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<tr>
<td>Structural Overlay</td>
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<tr>
<td>Minor (Light) Rehabilitation</td>
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<td>X</td>
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<tr>
<td>Preventive Maintenance</td>
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<tr>
<td>Routine Maintenance</td>
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<tr>
<td>Corrective (Reactive) Maintenance</td>
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<tr>
<td>Catastrophic Maintenance</td>
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</table>

Table 1 - Pavement Preservation Guidelines
• Crack Seal Proactive and Preparatory
• Durapatcher Applications
• Mastic Surface Treatments
• Chip Seal Surface Treatments w/o Fog Seal
• Chip Seal Interlayers
• Micro Surfacing
• Thin Hot Mix Asphalt Overlays
ODOT Pavement Maintenance Studies

Crack Sealing

Chip Seal

Micro Surfacing

Thin Hot Mix Overlays
Overband Crack Seal – ODOT Spec #423
Overband Crack Seal

PG 64-22

Type 1 – Blocked with 18% Rubber
Overband Crack Seal

PG 64-22

Type 2 – Liquid with 5% Polyester
  • field mixed Fibers

Type 3 – Liquid with 7% Polypropylene
  • field mixed Fibers

Type 4 – Blocked with 2% Polyester
  • Fibers contained within Block
Overband Crack Seal

PG 64-22

Polyester and Polypropylene Fibers
Overband Crack Seal - Blocked

5,000 lbs. / day @ 7 ft. / lb.
**Overband Crack Seal - Liquid**

7,000 lbs. / day @ 5 ft. / lb.
Overband Crack Seal - Bad
Overband Crack Seal - Good
**Overband Crack Seal Spec Details**

- **Do Not Install Below 45 Degrees**
  - What time of year is the best time to seal?

- **Do Not Install When There is Visible Moisture**

- **Only Seal (¼” – 1”) Wide Cracks**

- **Install Between 2”- 4” Wide**

- **Should Not Be Thicker than 3/16”**
ODOT Pavement Maintenance Study

Crack Seal – State Job #134364

- Started in 2000
- Ended in 2010

3 Items of Interest

1. Do existing Crack Sealing practices enhance pavement performance?
2. Under what are the conditions did Crack Sealing yield enhanced performance?
3. What is the optimum timing for Crack Sealing?
ODOT Pavement Maintenance Study

Crack Seal – State Job #134364

• Product Installation Time Period – 2000 to 2002
• 700 test sections, including “control sections”, were set up across the state

Conclusions

1. Average Performance Gain was 2 to 7 PCR points. Overall average about 4.
2. Additional Service Life of up to 3.7 Years (Depending on Pavement Type).
3. Maximum Effectiveness was obtained with PCR values between 66 and 80.
1. Historically, optimum performance has been realized when pavements are Crack Sealed somewhere in the first 5 years after the new pavement has been installed.

2. Many studies suggest by Crack Sealing within this timeframe, an additional 5 years of pavement life will be obtained.

3. Crack Sealing at a PCR value of 66, when 1/3 of the pavements life is over, will be economically viable to buy time, but maximum “long term” performance will be realized with higher pavement PCR values.
Chip Seal – ODOT Spec #422
**Chip Seal**

**Polymerized Asphalt Emulsion**

.30 - .40 gallons/sy (.35 - .40 is typical)

- **Anionic – Neg. (–) Charge**
  - RS-2
  - RS-2P
  - HFRS-2P

- **Cationic – Pos. (+) Charge**
  - CRS-2
  - CRS-2P
  - SAM-C
Chip Seal

Cover Aggregate
20-22 lbs./sy
#9 or ¼"
#8 or ½"

Crushed Limestone - Porous

Slag - Durable

Natural Gravel - Economical
ODOT Pavement Maintenance Study

Chip Seal – State Job #134299

- 225 Chip Seal Jobs Monitored
- Predominately in 3 of the 12 ODOT Districts

3 Items of Interest

1. Chip Seal Treatment Effectiveness
2. Extension of Pavement Life by Utilizing Chip Seal
3. Optimal Time and Pavement Condition to Chip Seal
ODOT Pavement Maintenance Study

Chip Seal – State Job #134299

- Monitored Time Period – 1999 to 2006
- Measured against previous study on Thin HMA cost benefit ratio

Conclusions

1. Cost-effective Maintenance Treatment when used at the right time.
2. Pavement Life Extension averaged 3-5 years, with some lasting 7 years.
3. Maximum Effectiveness was obtained with PCR values between 66 and 80.
Micro Surfacing – ODOT Spec #421
Micro Surfacing

- Polymerized Asphalt Emulsion
  - Natural Latex - SBR
  - CSS-1hm

- Limestone Aggregate
  - 3/8” to P200’s

- Breaking and Setting Additives
  - Chemical Break and Cure
  - Speed Up or Slow Down

- Portland Cement
  - Cohesiveness
Micro Surfacing

Truck Mount Unit
Micro Surfacing

Continuous Unit
Overband Crack Seal and Micro Surfacing
Polymerized Chip Interlayer and Micro Surfacing
Skid Correction In-Between Lane Lines
Wheel Path Rut Fill

- 5’ in width “Rut Box”
- Fills Ruts up 1½” – 2” in depth
- Followed by Surface Course
Micro Surfacing Spec Details

- Install when Temps are 45 degrees and rising
- May 1st to September 30th – months of application
- Continuous machine used on projects over 15,500 sy
- Single Course Application is now – 21 to 24 lbs./sy
Micro Surfacing Spec Details

421.11 Acceptance

“The pavement is free from excessive scratch marks, tears, rippling and other surface irregularities, longitudinal joints and lane edges coincide with any lane lines and edge lines and transverse joints are uniform, neat and provide a smooth transition.”
ODOT Pavement Maintenance Study

**Micro Surfacing – State Job #134299**

- 214 Micro Surfacing Jobs Monitored
- Jobs were in all 12 ODOT Districts
- General and Priority Routes Were Differentiated

**3 Items of Interest**

1. Micro Surfacing Treatment Effectiveness
2. Extension of Pavement Life by Utilizing Micro Surfacing
3. Optimal Time and Pavement Condition to Micro Surfacing
Conclusions

1. Cost-effective Maintenance Treatment when used at the right time.
2. Pavement Life Extension of Nine (9) Years.
3. Maximum Effectiveness was obtained with PCR values between 61 - 70.
ODOT Pavement Maintenance Study

Micro Surfacing – State Job #134299

• Priority System Routes (Double Course)
• Measured against previous study on Thin HMA cost benefit ratio

Conclusions

1. Cost-effective Maintenance Treatment when used at the right time.
2. Pavement Life Extension of Eight (8) Years.
3. Maximum Effectiveness was obtained with PCR values between 61 - 70.
4. Champion – Franklin County SR 161 – Micro Surfacing in 2004 and was just paved
Thin Hot Mix Asphalt Overlay (Prior to 2006)

- $66,358 / lane mile
- Pavement Life Expectancy – 9 Years

Conclusions

1. Micro Surfacing (Priority / Double Course) - $26,350 / lane mile and PLE – 8 Years
2. Micro Surfacing (General / Single Course) - $17,450 / lane mile and PLE – 9 Years
3. Chip Seal - $11,500 / lane mile and PLE – 3 to 5 Years up to 7 Years
ODOT “Decision Trees”
BRIDGE & ROAD

District Pavement & Bridge Preservation

**Purpose/Applicants**

The pavement and bridge preservation program was created to provide funding for the preservation and rehabilitation of the Priority, Urban and General System pavements and the state maintained bridge structures. The goal of the department’s preservation program funding process is to maintain pavements and bridges at “steady state” conditions, or a relatively low and stable level of deficiencies where a predictable rate of preventive maintenance and regular repairs can efficiently sustain the system conditions.

**Funding**

For pavements, an analysis is performed and funding is provided for minor rehabilitation projects based on the average rate at which the pavements deteriorate. Additional funding is provided for low cost surface treatments. Goal funding is also provided to districts that have dropped below their pavement condition goal levels.

For bridges, funding is provided to address deficiencies in one or more of the bridge condition categories (General Appraisal, Floor Condition, Wearing Surface or Paint Condition). Bridge preservation needs are calculated based on a comparison of current and forecasted bridge conditions vs. bridge conditions goals.
Most people notice when ODOT builds something new. We actually spend 93% of our time and resources taking care of what we already have. While repair costs have gone up, funding has not. So we must constantly do more with less (what cost ODOT $1 in 2006 now costs $1.56 in 2015). We continue to implement new, smarter ways to improve safety and protect the huge investment in the more than 45,000 miles of roads and 14,000 bridges that ODOT maintains.

**Innovators. Again.**

ODOT has spent the last 10 years moving to a more data-focused approach to managing and improving our transportation system. Now we are taking another major step forward with little or no additional funding. Our innovative, three-pronged approach will allow us to redirect an estimated $300 million toward more preservation over the next six years.

**Aggressive Preservation Treatments**

- More chip seal and microsurfacing of roads to extend surface life - at fractions of the cost of conventional overlays.
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