What’s New in Pavement Preservation?

A look into MnDOT

Thomas J. Wood

MnDOT
Topics

- When to chip seal
- Fog Sealing
- Micro Milling & PMT
- Micro Surfacing Research
- Texas Under Seal (TUS)
When to Apply Chip Seal

• Built aging study
  – Because 15 years take 15 years

• 3 inch Mill & Fill 1999
  – PG 58-28 binder
  – Chip seal 1 mile section each year starting in 2000
  – Last sections was chip seal 2004
TH56 Cores

- Cores
  - Remove chip seal (if any)
  - Cut into two 25-mm layers
  - Test for fracture energy (cracking potential)
  - Recover component asphalt to check aging
Disk-Shaped Compact Tension Test: DC(T)
DC(T) Results: TH-56

TH56: DC(t) Data @ -24°C

Higher fracture energy is better

Chip Seal Time


- Top 25m
- Bottom
Asphalt Institute’s Findings

- Sealing improves resistance to aging (cracking)
- Sooner is better when sealing
  - Waiting for 3 or more years to seal after construction produced similar results as unsealed pavement related to DCT
  - Sealing after 1 or 2 years showed improvement in resistance to aging (cracking)
MnDOT’s Pavement Management Ride Data

TH 56 IRI Average

Crack Leveling Done

5 to 6 years
Control Section Never Chip Sealed
Last Section Chip Sealed 2004
Value of Fog Sealing
Why Fog Sealing Shoulders
(Picture taken in 2009)
Fog Sealing still working after 4 years

- B/W Cells 19-18 (0.1)
- B/W Cells 18-17 (0.15)
- B/W Cells 17-16 (0.2)
Micro Milling with PM Treatments
Micro Milling with Chip Seal or Micro Surfacing

• Why?
  – Need lower cost alternative to 1 ½ inch over lay
  – To improve ride

• What are the performance targets
  – Equal to 1½ inch over lay
Micro Milling with Chip Seal or Micro Surfacing

- Quicker than overlay
- Less costly overlay
  - Chip seal 40% of the cost of 1½ inch overlay
  - Micro Surfacing 60% cost of 1 ½ inch overlay
Micro Milling
Micro Milling with Chip Seal
Results for Chip Seal

Southbound RWP TH89 RP 60-74 Micro Mill / Chipseal

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Micro Milling with Micro Surfacing
Results using Micro Surfacing

TH 12 Micro Milling & Micro Surfacing Ride Data

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TH 64 Pre Condition
Current Condition
Micro Surfacing Research
On Going Research Efforts

• How to reduce snow plow damage
• Hard based asphalt  PG 64-22 (CQS-1Hp)
• Softer base asphalt  PG 58-28 (CQS-1p)
  – 2013 and 14 allowed
On Going Research Efforts

• Required in 2015
• Allowed PG 49-34 construction season 2015
  – Two project built successfully so far with PG 49-34
• Have seen less snow plow damage on pavement markings with softer based asphalt
On Going Research Efforts

- Smoother surface
- Allow use of SBS modified asphalt in place of latex modifications
  - Contractor/Supplier choice
On Going Research Efforts

• Working on higher asphalt content micro surfacing
  – Normal asphalt content 7 to 8%
  – Testing performance of micro with 10 to 12% asphalt content
On Going Research Efforts

• Hypothesis is higher asphalt content will
  – Reduce reflective cracks
  – More durability/longer life
On Going Research Efforts

• Results
• No issue with tracking or rutting
• Appears to increase wear resistance
  – Less snow plow chatter marks
• Has greatly reduced # of cracks
• Seem to heal during hot weather
TH 23 Pre-Condition
Hard Based Micro Surfacing
TH 23 Current Condition
TH 64 Pre Condition
Soft Based Micro Surfacing
Current Condition
Texas Under Seal
Texas Under Seal

- Chip Seal applied before HMA Overlay
  - Milled surface
  - Non milled surface
- ⅜” minus chip
- CRS-2p
- Light on cover aggregate
- Can pave as soon as rolling & sweeping is completed
Texas Under Seal

• Why does it perform
  – Acts as stress relief membrane?
  – Super Tack?
    • Have had other tack methods with higher peak strengths
  – Limits water infiltration from base?

• As of end of 2015 construction year 11 projects have been built