Next Two Steps in Improving HMA

56th Annual Bituminous Conference

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Next Steps in HMA Improvement

- Tack Coat
- Hamburg Wheel
- QCP
- FRAP
- Super Pave
- Field VMA
- PFP
- Field VMA
- Tack Coat
1. What is the leading HMA distress driving pavement rehabilitation?
   a. Loss of Friction
   b. Wheel Path Rutting
   c. Raveling
   d. Premature Cracking
   e. Raveling & Cracking at the Centerline Joint
1. What is the leading HMA distress driving pavement rehabilitation?
   a. Loss of Friction
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   c. Raveling
   d. Premature Cracking
   e. Raveling & Cracking at the Centerline Joint
Why the Poor Performance?
How many years?
How many years?
Maintenance - Disruptive and Dangerous
Next Step in HMA Improvement

Super Pave
FRAP
PFP
QCP
Hamburg Wheel
Tack Coat
Long Joint Seal
Efforts to Minimize Permeability along Longitudinal Joints

- 2001/2002 Longitudinal Joint Sealants
  - IDOT worked w/ 2 companies to Develop a Longitudinal Joint Sealant (LJS)
  - LJS is a Band of Asphalt Binder that Seals a lift of HMA from the Bottom Up.
- Here is How it Works:
Joint Sealant Concept

- Band melts up into the joint thus:
  - Increasing density
  - Decreasing permeability
  - Increasing joint life
Asphalt Materials/Hendy Quickseam
Longitudinal Joint Seal
Longitudinal Joint Seal 12 Yrs Later
Longitudinal Joint Seal 12 Yrs Later
Shear Tears
Heavy Duty Pressure Distributor for Applying LJS
Heavy Duty Pressure Distributor for Applying LJS
Paving over LJS
Licensed Subcontractor ≈ 11 Trucks
Cost Comparison

- Inlay: $8.00 / lineal ft
  - Includes: traffic control, mobilization, milling, priming, paving, pavement marking
Cost Comparison

- **Microsurfacing:** $4.81 / lineal ft
  - Includes: crack seal, traffic control, pavement marking/removal
Cost Comparison

- Route and Seal: $2.00 / lineal ft
  - Includes: crack seal, traffic control
Cost Comparison

- Longitudinal Joint Seal: $2.00 lineal ft
Also Works as a Tack Coat
Implementation Goals:

- 2016 – 2 Projects per District
- 2017 – 50% of Projects per District
- 2018 – Full Implementation
Next Step in HMA Improvement
Next Step in HMA Improvement
Illinois Flexibility Index Test  I-FIT

- A Performance Test Just Like Hamburg Wheel
- Uses a Semi-Circular Bend (SCB) Test Fixture with a Gyratory or Core Specimen
- The Test Can Be Completed in a Day
- Owners Can Use the Results for QA
- Contractors Can Use the Results for Optimizing Profit and Trouble Shooting
- Material Suppliers Can Use the Results for Marketing Products/Modifiers
Illinois SCB set-up
Note:
Dimensions shown are in millimeters.
FI -vs- Years

Lab Mix

Plant Mix

Early Years Absorption / Oxidation

Later Years Oxidation / Fatigue
FI -vs- Years

Severe Production Induced Damage  Cold Stockpiles
FI -vs- Years

Severe Production Induced Damage

Cold Stockpiles
Silo Storage
FI -vs- Years

Severe Production Induced Damage
Cold Stockpiles
Silo Storage
Wet Recycle
FI -vs- Years

Severe Production Induced Damage
FI -vs- Years

Severe Production Induced Damage

Premature Failure
Possible Solution:
Add a Modifier to Production Mix to Minimize Damage
FI -vs- Years with Modifier

FI -vs- Years

Lab Mix

Plant Mix
The Department

- is looking at the January and March 2016 lettings for Experimental Feature Projects
- has On-going Round-Robin Testing with Private Labs with SCBs
- is Testing any Contractor Plant Produced Mix Delivered for Testing
- has Two more SCBs on Order

Industry has Begun Testing

Academia is Researching More Applications of the I-FIT protocol