Pavement Preservation Techniques

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Introduction

- Definition of Pavement Preservation
- INDOT Status
- Fog Seal
- Chip Seal
- Full Depth Reclamation

Definition

- **Pavement Preservation** is "a program employing a network level, long-term strategy that enhances pavement performance by using an integrated, cost-effective set of practices that extend pavement life, improve safety and meet motorist expectations."

Source: FHWA Pavement Preservation Expert Task Group

INDOT's Pavement Preservation Status

- Looking at new and improved pavement preservation materials and methods
- Revising current specs and techniques
- Hosting Pavement Preservation related training:
  - National Center for Pavement Preservation (2007)
  - National Highway Institute (2008)
  - Asphalt Emulsion Workshop (April 2008)

Midwest Pavement Preservation Partnership (MPPP)

- Provides a regional partnership of state, provincial, and local agencies, as well as contractors and material suppliers.
- Goal is to promote pavement preservation through sharing experiences.

See NCPP's website for details:

www.pavementpreservation.org

Fog Seal

- Definition:
  - A fog seal is a light application of a diluted asphalt emulsion to the pavement surface.
- Benefits of a Fog Seal:
  - Seal surface (waterproof)
  - Arrest stone loss (light raveling)
  - Improve appearance (contrast)

Asphalt Rejuvenation

- National Sealer/Binder Study
- Application of a rejuvenating agent to an asphalt surface
- Chemically softens the top layer (~1/2”)
- Reduces age related hardening

Report Available on NCPP’s Website:
www. pavementpreservation.org

Fog Seal Applications

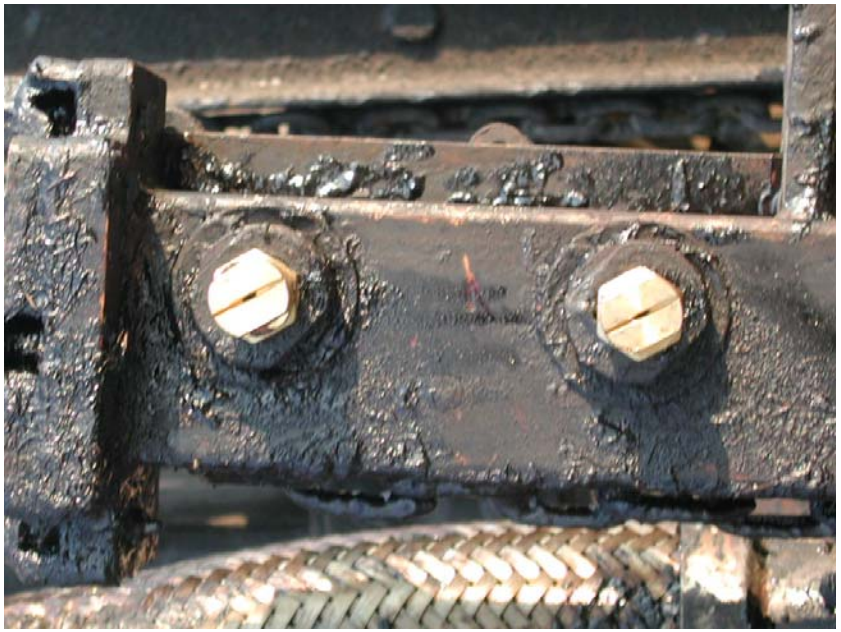
- Aged, brittle, “dry” pavement
- Chip sealed surfaces
  - Reduce dust
  - Lock in loose chips
    - Less chance of windshield damage
    - Reduce snow plow damage
  - Provide black surface
    - Better pavement marking contrast
    - Black surface = higher heat absorption = faster cure
- Shoulders

Beware: Fog Seal

- Friction problems
  - Ensure surface to be treated can absorb the sealant
    - Open grade
    - High macrotexture (like a chip seal)
  - Overall good friction
    - Fog seal may cause an initial drop in friction numbers
- Stripping problems
  - Fog seal, by definition, seals the pavement surface

Equipment

- Asphalt Distributor
  - Ensure proper nozzles
    - Low application rate (0.10 gal/SYD)
  - Ensure proper calibration
    - Low application rate – little wiggle room
- Power Brooms
  - Clean, dust free surface a must



Material

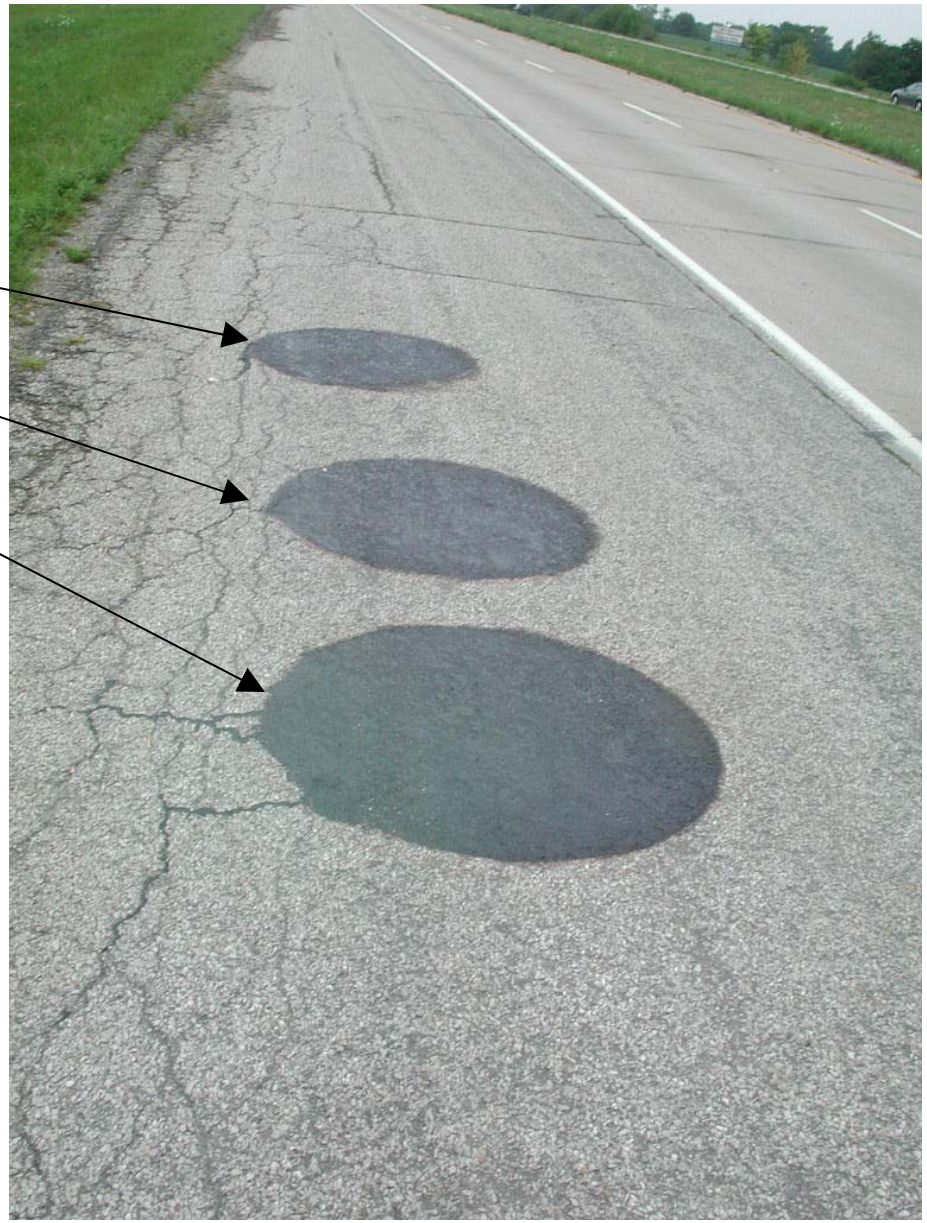
- Diluted Asphalt Emulsion
  - Want in range of 30% asphalt (can do less)
  - Need hard base asphalt (don't want a tacky surface)
  - Fairly slow setting (needs to penetrate small cracks and voids before setting)
  - Apply at ~125^{o} F
- Sand – want on site to blot any puddles

US 36 Full Width Shoulders

- First INDOT Experience
- East of Danville to CR 525 E in Hendricks County

Determine Application Rate

- 3 Test Patches:
  - 0.08 gal/SYD
  - 0.10 gal/SYD
  - 0.12 gal/SYD



Application

- Good practice – start and stop on building paper.

Application

During Application

~20 Minutes

After Cure

Before Treatment

After Treatment

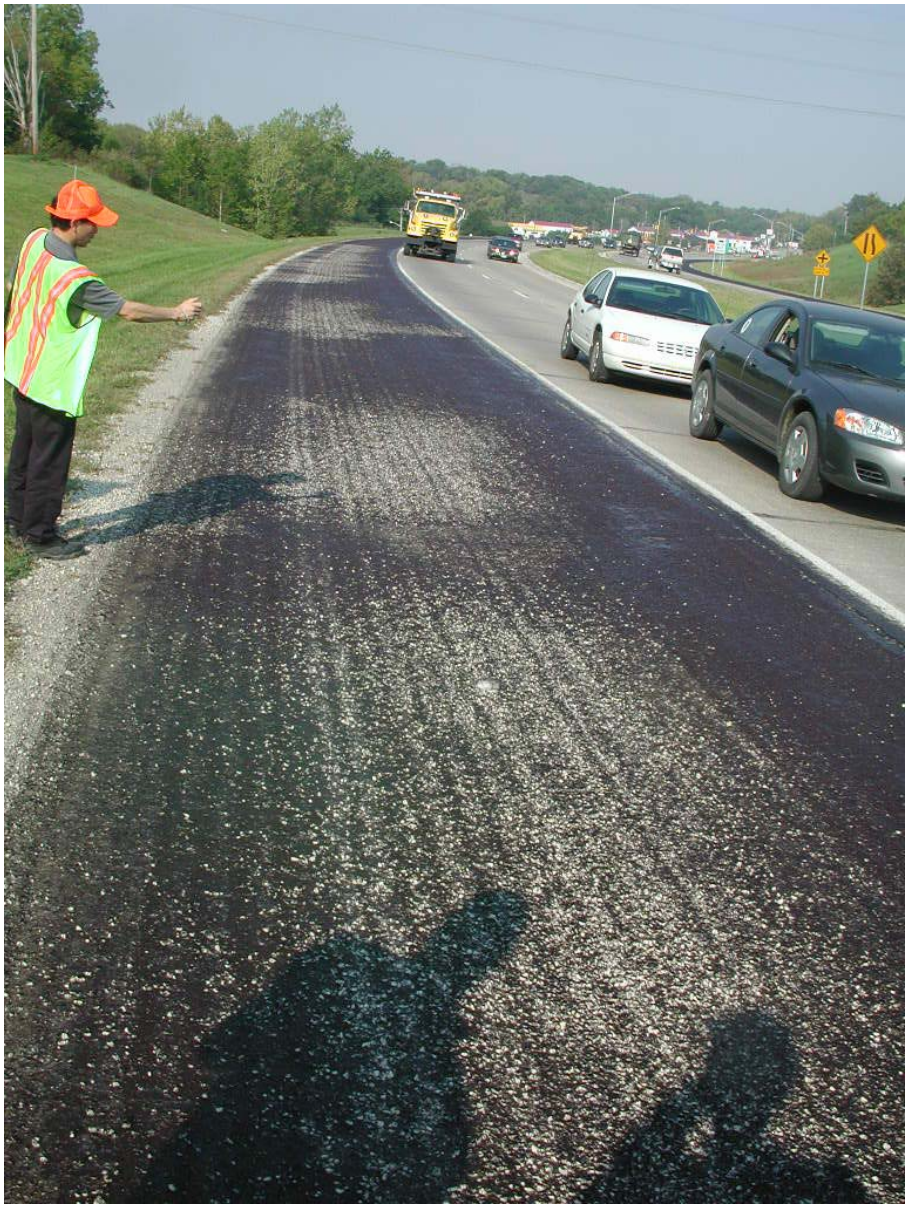
Finished Product

US 231 HMA

US 36 PCCP

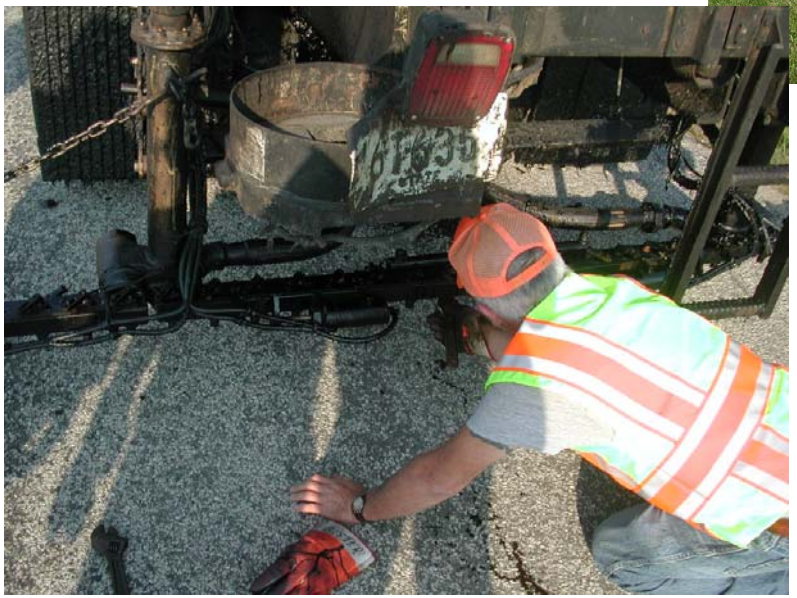
Problems Encountered

- "Shadowing"
  - Solution: Slow down distributor



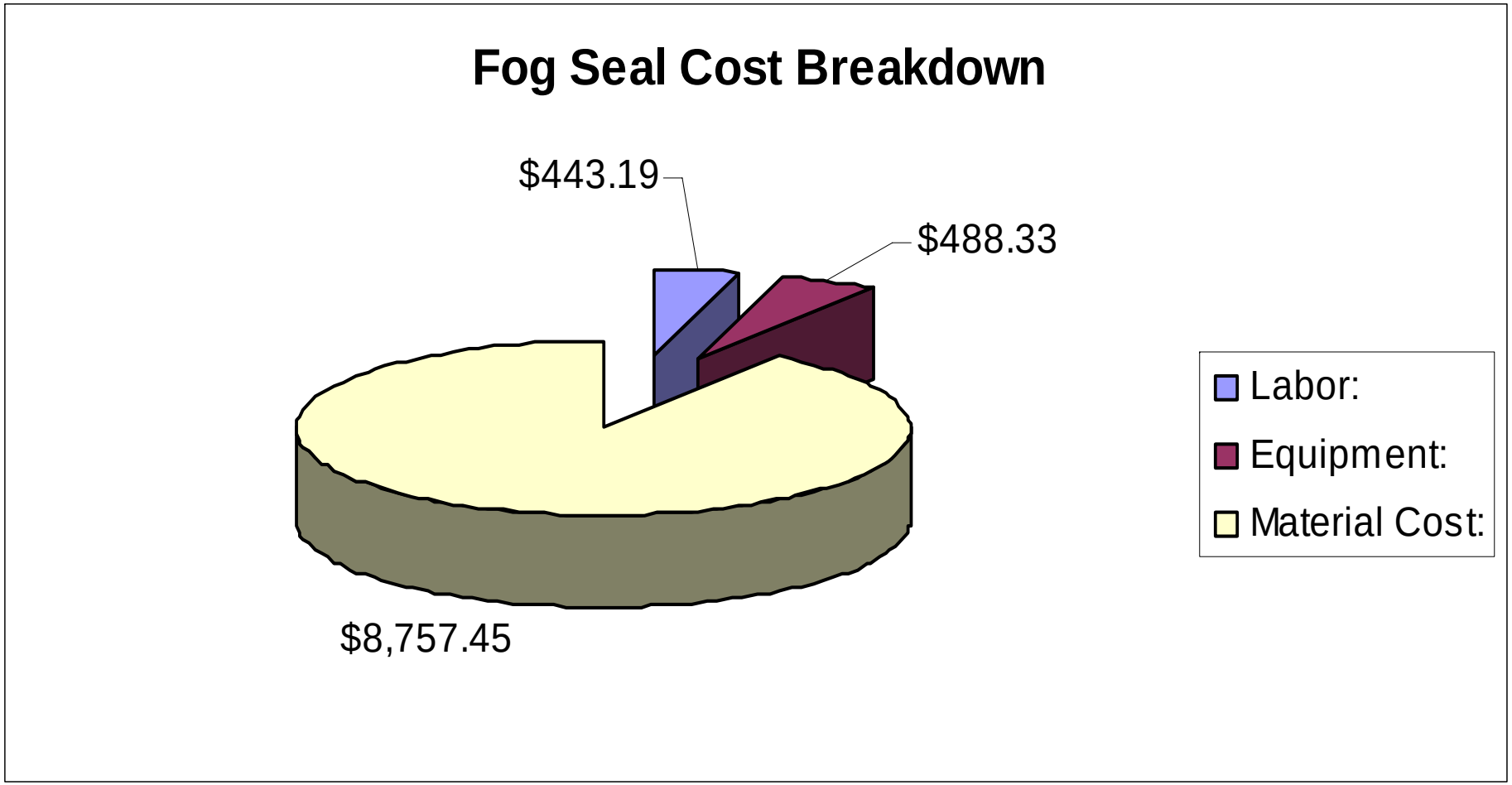
Problems Encountered

- Clogged Nozzles
  - Solutions:
    - Ensure distributor was emptied of previous material.
    - Ensure proper calibration.



Fog Seal Cost

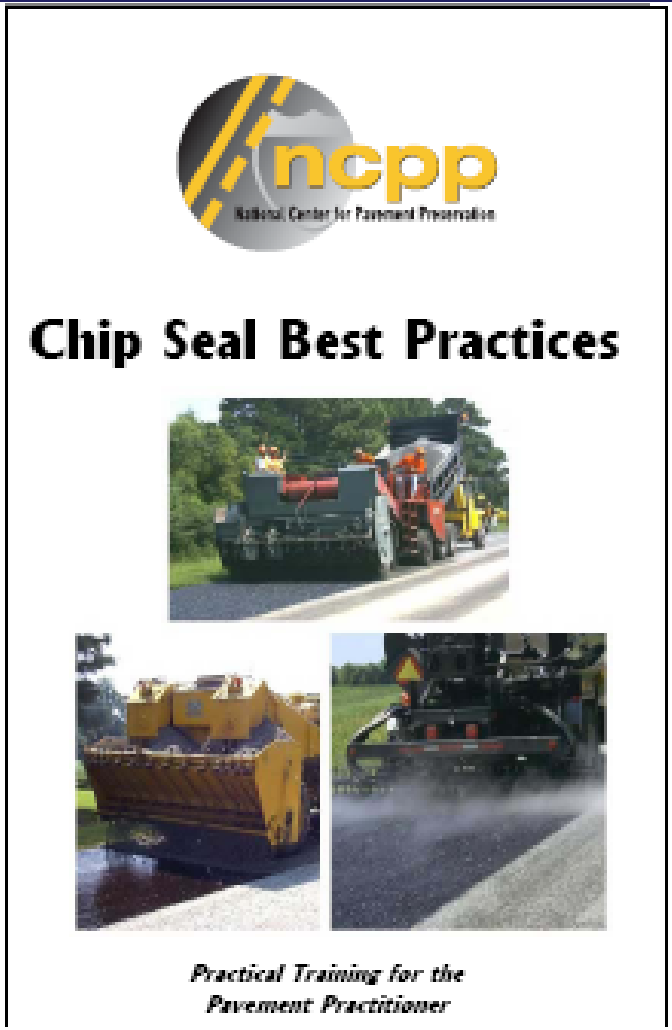
- US 36 Shoulder Costs: $0.16/SYD



Chip Seal

- Definition:
  - A chip seal consists of an application of asphalt material to the pavement surface, followed immediately by a layer of coarse aggregate.
- Benefits of a Chip Seal:
  - All of a Fog Seal, plus
  - Provides new wearing surface
  - Improves friction numbers

Chip Seal Best Practices Training



- Dr. Scott Shuler (Colorado State University) will give an abbreviated version of NCPP's "Chip Seal Best Practices Training"
- Wednesday morning, 10:30 session, Room ???

Chip Seal Study

- 3 year JTRP study into chip seals
- Will explore different materials
  - Aggregate (see display)
  - Emulsions
- Will develop a design method for INDOT
- Study includes a survey of practice
  - Please fill out and return!

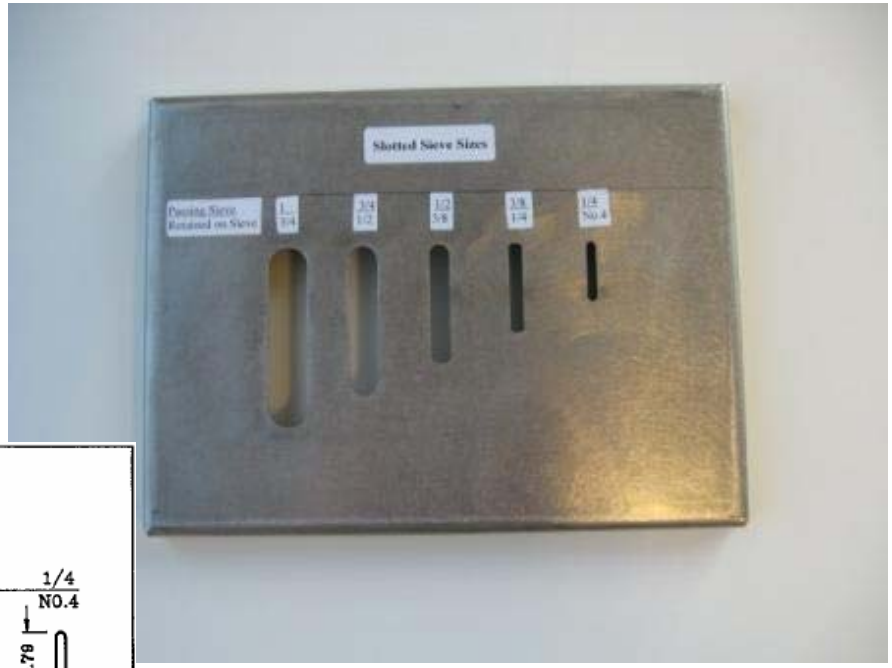
Chip Seal Design

- INDOT currently experimenting with chip seal designs – using combination of MNDOT and PennDOT methods
  - MNDOT is computer based – available on their website:

    http://www.mnroad.dot.state.mn.us/research/MnROAD_Project/restools/sealcoatprogram.asp
- Design gives target/starting application rates for stone and emulsion

Chip Seal Design – cont'd

- Requires common lab tests on aggregate:
  - Gradation
  - Unit Weight
  - Absorption
  - Flakiness Index
    - FI of 0 is perfect cube



Slotted Sieve Sizes[1]

Aggregate Fractions[2]

Passing Sieve	1	3/4	1/2	3/8	1/4
Retained on Sieve	3/4	1/2	3/8	1/4	NO.4
	2.36	1.97	1.57	1.18	0.78
	0.525	0.375	0.263	0.184	0.131

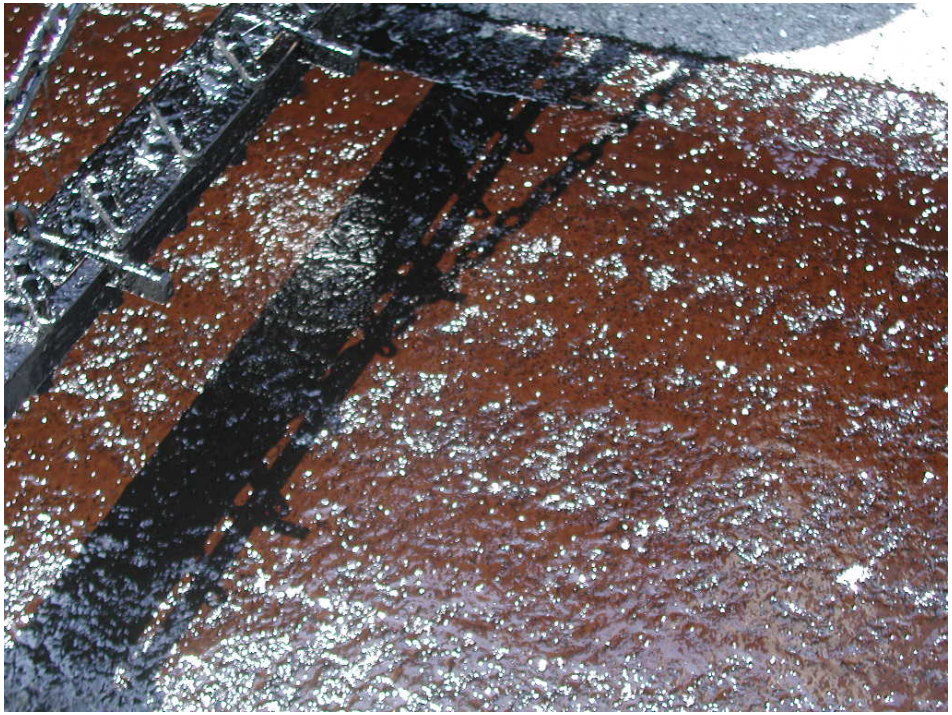
Note:
[1] Not to Scale. Slot dimensions shown in inches.
[2] U.S. standard sieve sizes.

Chip Seal Best Practices

- Clean pavement prior to sealing

Chip Seal Best Practices

- Apply stone IMMEDIATELY after emulsion



Chip Seal Best Practices

- Don’t overapply stone: Ideally, 1 stone thick

Chip Seal Best Practices

- At least 3 complete roller coverages, 1st should be before emulsion sets.

Chip Seal Best Practices

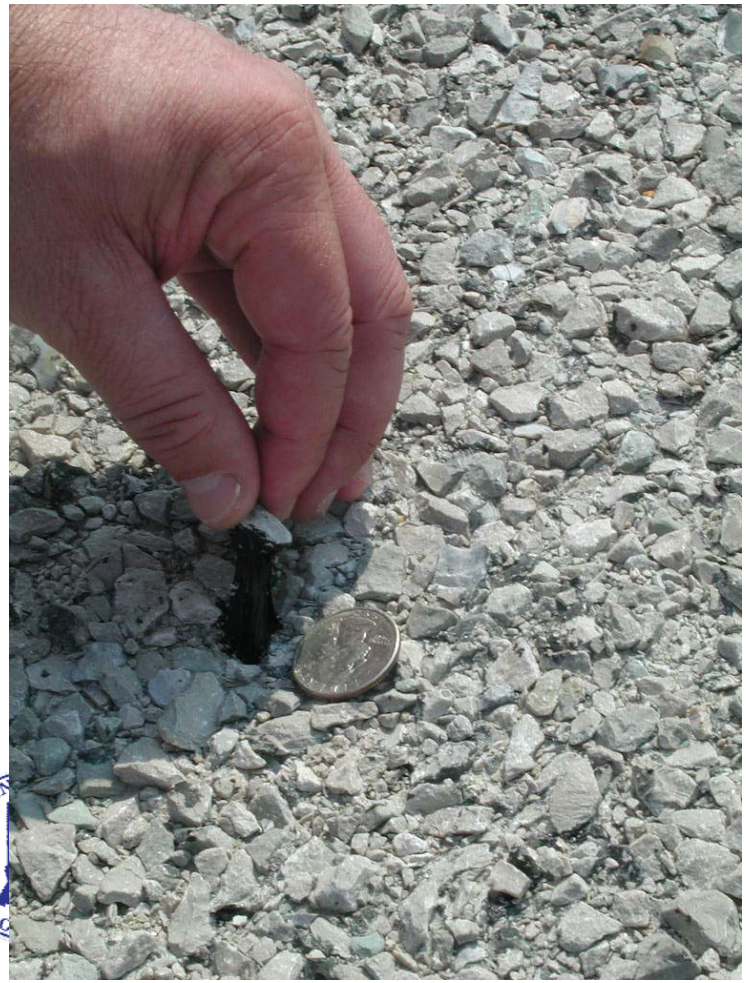
- Joints – watch overlap when starting or stopping

Chip Seal Best Practices

- Sweeping – if possible, lightly broom at end of day.

Chip Seal Best Practices

- Polymer modified emulsion (AE-90S)

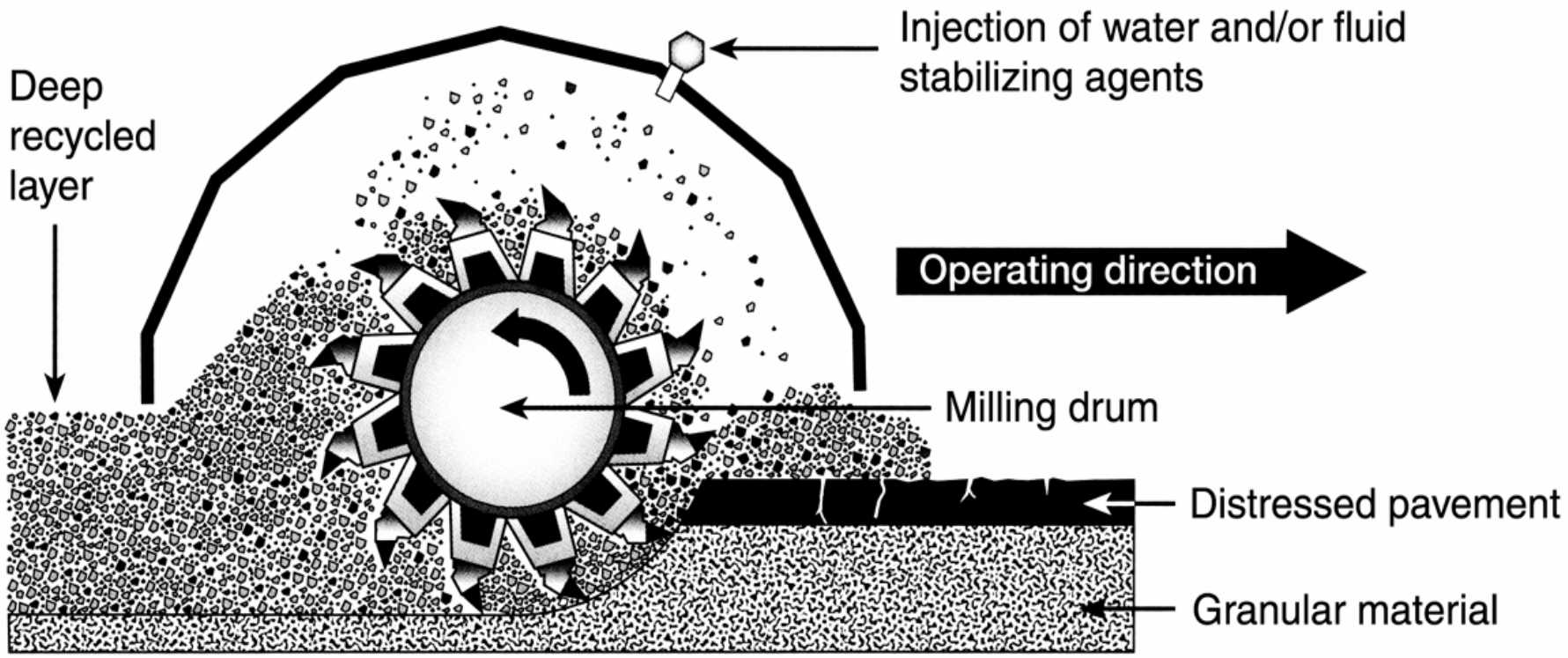


Full Depth Reclamation

- Definition: Pavement is pulverized, full depth, mixed with emulsion and cement, graded, compacted, and topped with a new wearing course.
- Benefits:
  - Equivalent to a major rehabilitation
  - Can widen and correct cross slope problems
  - Useful for projects where an overlay would require extensive deep patching

FDR Information Booklets available

FDR Process


Injection of water and/or fluid stabilizing agents
Deep recycled layer
Operating direction
Milling drum
Distressed pavement
Granular material

Full Depth Reclamation Process

- Pulverization – pavement is ground up, down to subbase (typically 8”)

Full Depth Reclamation Process

- Initial grading – after pulverization, material is rough graded and compacted.

Full Depth Reclamation Process

- Injection – material is re-pulverized, injected with emulsion and cement, and final graded and compacted.

Full Depth Reclamation Process

- Wearing course – after minimum 5 day cure, FDR is capped with a wearing course.
  - INDOT used 4” HMA – total structure of 12”

Questions???

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