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Pavement Preservation

WAPA Annual Conference

November 27th, 2018

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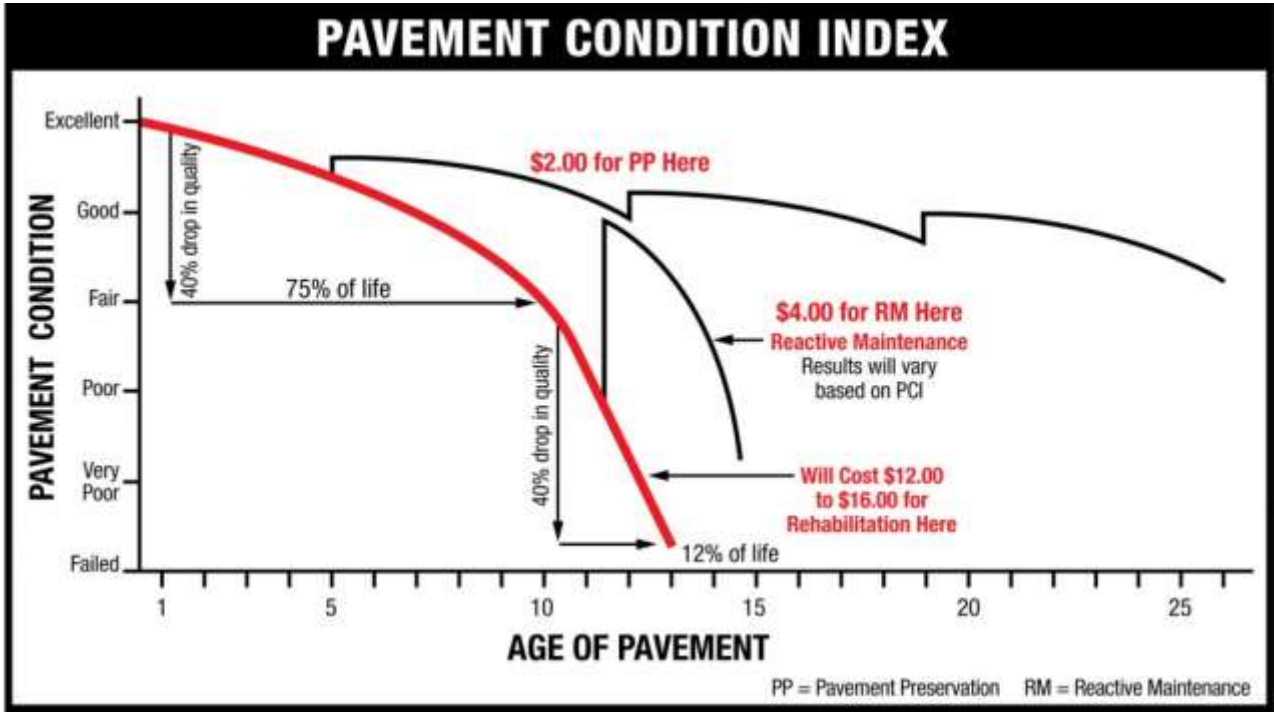
Pavement Management

- Pavements must be routinely inspected/monitored
- Maintenance actions must be performed in a ***timely*** manner



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What-Why-When

- **Type of distress**-indicates what the problem is
- **Level of severity**-indicates how bad the problem is
- **Amount of distress**-indicates how much repair must be done

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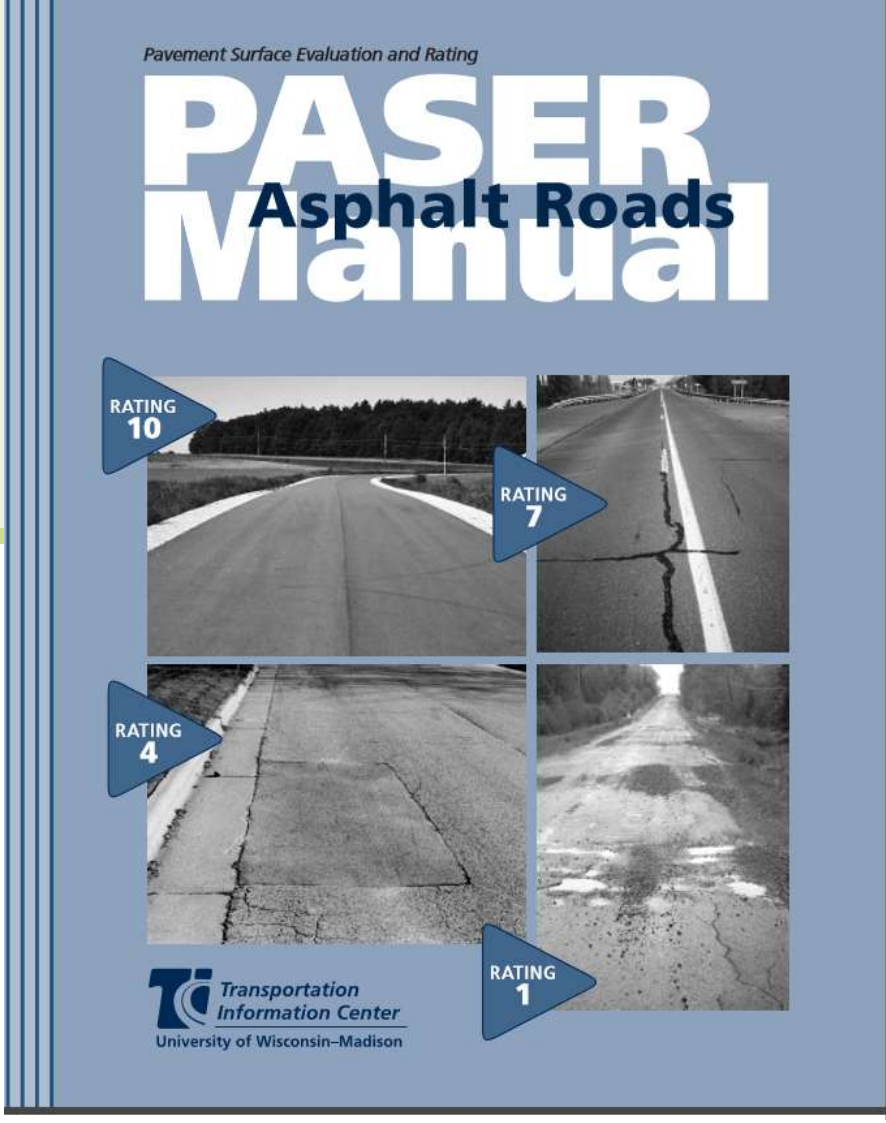
PASER Manual



Pavement Surface Evaluation and Rating

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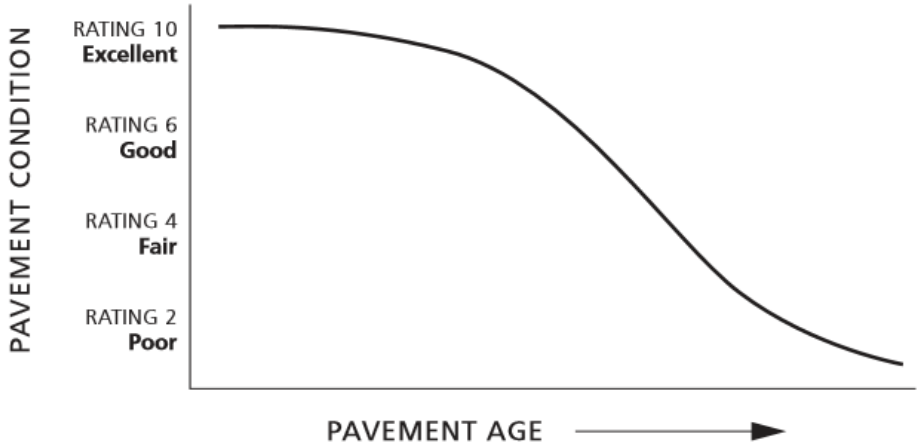
PASER Manual

"This manual is intended to assist local officials in understanding and rating the surface condition of asphalt pavement. It describes types of defects and provides a simple system to visually rate pavement condition."

Transportation Resource Center

University of Madison

Pavement Deterioration Curve



In addition to indicating the surface condition of a road, a given rating also includes a recommendation for needed maintenance or repair. This feature of the rating system facilitates its use and enhances its value as a tool in ongoing road maintenance.

RATINGS ARE RELATED TO NEEDED MAINTENANCE OR REPAIR

Rating 9 & 10	Routine maintenance
Rating 6 - 8	Preservation treatments
Rating 5	Rehabilitation
Rating 3 & 4	Structural improvement
Rating 1 & 2	Reconstruction

*** WAPA Recommendations*

Rating 9 or 10 [Very Good to Excellent]

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Crack Fill

- Timely Maintenance Saves Money
  - The first line of defense against water intrusion is crack sealing
  - Proper crack filling can prevent costly water damage and greatly increase the life of your pavement
  - Cracks should be filled in the first year they form

What Causes Pavements to Crack?

- This environment will prematurely crack and age roadway surface
- Leaving the deterioration untreated leads to costly rehabilitation and reconstruction repairs
  - Quality of the pavement
  - Traffic (quantity/type)
  - Climate (freeze-thaw cycles)

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Crack Fill

- Water Penetration
  - Water penetrates through the cracks in the pavement and into the sub base
  - The base is then softened which leads to cracks working their way up to the surface
  - Then to “alligatored” areas and eventually potholes

Crack Fill

- When's the Best Time to Apply?
  - Late spring – after moisture is out
    - Want cracks at mid-range of opening/closing
  - Fall – before salt use – keeps salt solution on surface during winter
  - Winter – too wide – excessive material
  - Summer – too tight – can't get material in

Crack Routing Procedures

- OLD

Photo Above: No Dust Suppression System

- NEW

Photo Above: New OSHA Required Routing, Effective Dust Suppression System

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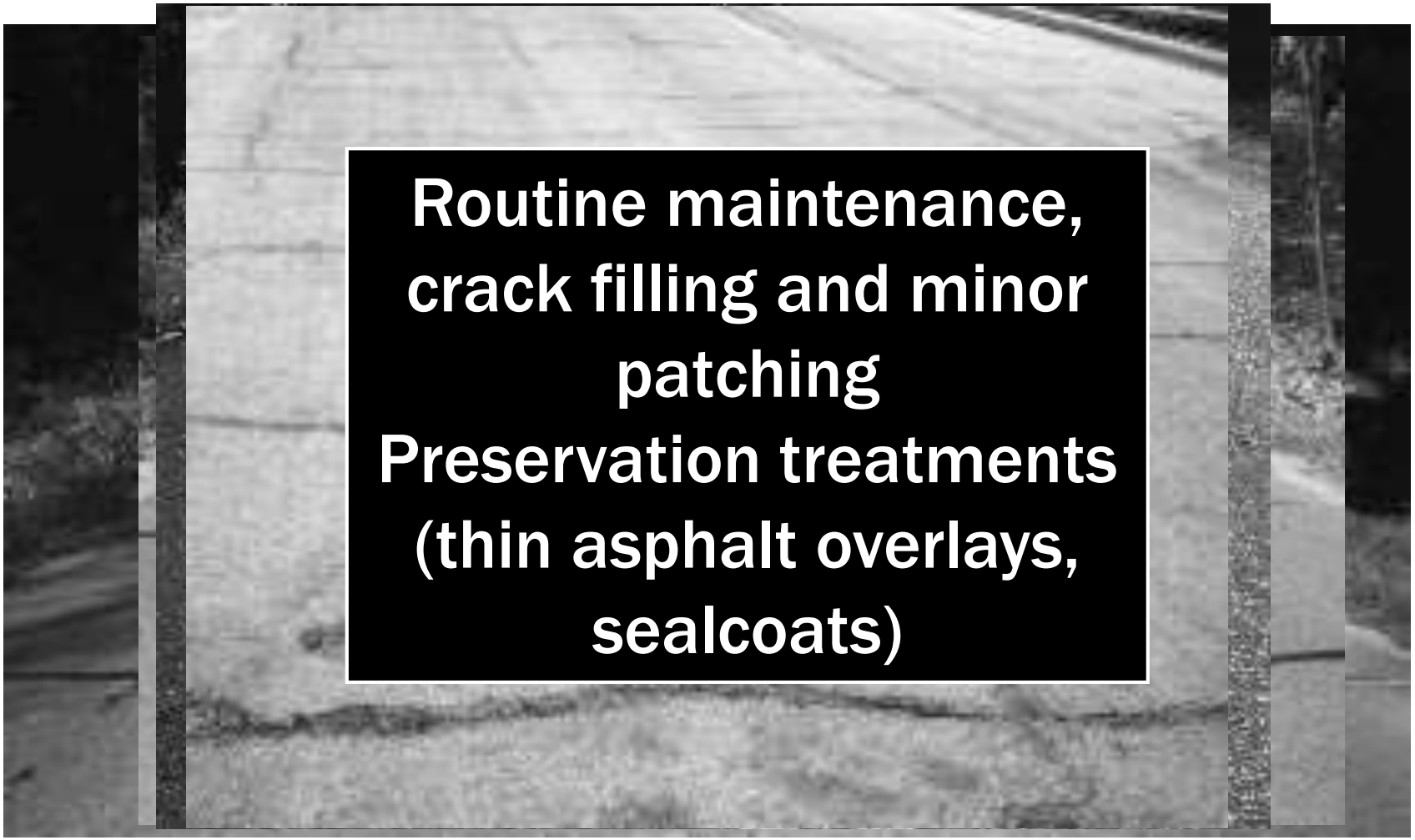
Crack Neglect

Rating 6 - 8 [Good to Moderate]



Patching

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Asphalt Pavement Surface Treatments

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Surface Treatments

- Very thin 1/4” to 1+” thick

Used for:

- Raveled and polished surfaces
- Oxidized pavement surfaces
- Bleeding and flushing
- Slight to moderate cracking
- Slight-moderate surface irregularities
- PASER rating of 6 through 8

NOT used for:

- Severe Cracking
- Severely deteriorated surfaces
- Base and subbase problems
- Drainage problems

Surface Treatment Benefits

- Seal pavement surface
- Provide a new wearing (driving) surface
- Improve pavement surface friction
- Slow pavement weathering and aging
- Improve the surface appearance

Surface Treatment Types

- Chip Seal (w/ Fog Seal)
- Scrub Seals
- Slurry Seal
- Micro Surfacing
- Cape Seal
  - Chip covered with Micro
- Combinations
- Thin asphalt overlays

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Chip Seal

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Chip Seal

- Application of asphalt emulsion covered with aggregate then compacted
  - Seal narrow cracks and bind together cracked pavement
- Fog seal spray application locks down chips and absorbs any excess asphalt emulsion providing a black pavement surface color

Chip Seals

FAHRNER asphalt sealers llc
Pavement Maintenance Contractors
EEO/AA Employer

Chip Seal

- When to apply a chip seal?

  Chip seals can be applied at any time until the distresses become too severe

  - Chip seals can be applied multiple times over the pavement's life cycle

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Scrub Seals

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Scrub Seals

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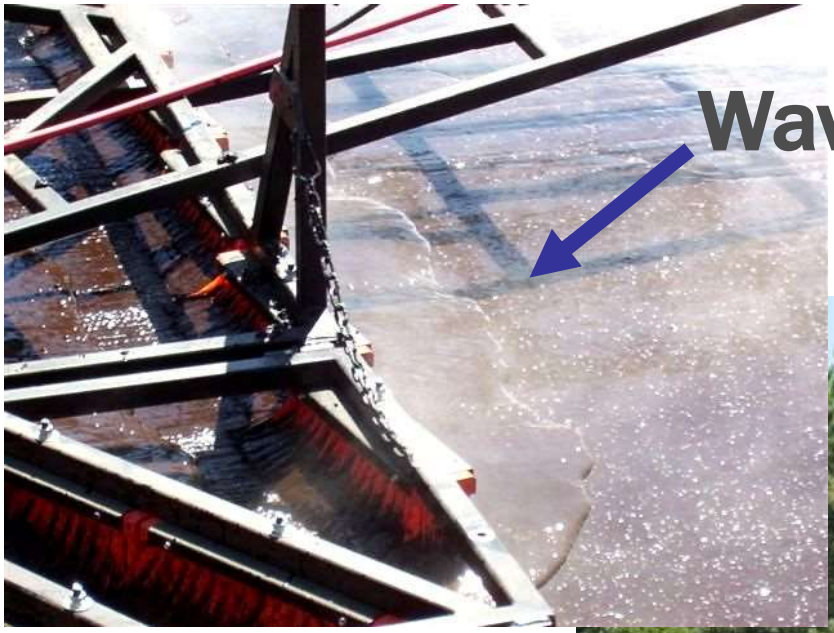

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Scrub Seal

- Similar to chip seal application of asphalt emulsion covered with aggregate
- Asphalt sprayed through a series of brooms placed at different angles into small cracks
- Chip spreader applies sand and other fine aggregate, which is broomed into the surface, forcing the sand into the emulsion-filled cracks
- Rolled with a rubber tire roller

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Slurry Seal
Micro Surfacing

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Slurry Seal

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Slurry Seal

- Mixture of emulsified asphalt, well graded fine aggregates, mineral filler and water
- Used to renew pavement surfaces and retard moisture/air intrusion into underlying pavement
- Applied from 1/8” to 3/8” thick and will fill minor cracks, restore a uniform texture and restore friction loss

Micro Surfacing

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Micro Surfacing

- Mixture of polymer modified asphalt emulsion, crushed dense graded aggregate, mineral filler, additives, and water
- Flows out of box containing an auger to uniformly distribute mixture
- Screed like drag produces smooth driving surface
- Provides resurfacing from 3/8” to 3/4” thick and returns traffic use in a couple hours

Micro Surfacing

- Slurry seal's uncle, chemically driven
  - Difference in how they "break" or harden
  - Slurry relies on evaporation while microsurfacing contains chemical additives which allow it to break without relying on sun or heat for evaporation to occur
  - Micro application hardens quicker and can be used when conditions wouldn't allow slurry to be placed

Micro Surfacing

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Thin Asphalt Overlays

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Thin Asphalt Overlays

- What is a Thin Asphalt Overlay?
  - A fine graded asphalt mixture ≤ 1½" thick
  - Fine graded mixtures like 12.5mm (#4), 9.5mm (#5), or 4.75mm (#6)
- Can be dense-graded, hot mix, warm mix, or stone matrix asphalt

Project Selection

- Visual Survey
- Structural Assessment
  - No structural improvement required
- Drainage Evaluation
  - What changes are needed
- Functional Evaluation
  - Ride quality
  - Skid resistance

- Discussion with Maintenance Personnel

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When to Use Thin Asphalt Overlays

- Raveling

- Polishing

When to Use Thin Asphalt Overlays

- Longitudinal Cracking in wheel path

- Longitudinal Cracking outside of wheel path

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When to Use Thin Asphalt Overlays

- Low Severity Thermal Cracking

- Low Severity Rutting

When Not to Use Thin Asphalt Overlays

- Roads with unrepaired structural damage and/or insufficient structural capacity
- Bottom-up cracking
- Stripped layers
- Alligator Cracking
- Reflective Cracking
- Excessive rutting

- Excessive thermal cracking

Materials for Thin Asphalt Overlays

- Quality aggregates must be used
- Polymerized binders may be specified depending on application and condition of existing pavement

Construction – Paving and Compacting

- Paving
  - Best to move continuously
  - MTV or windrow can help
  - Cooling can be an issue
    - 1” cools 2X faster than 1.5”
  - Warm mix can help
- Compaction
  - Seal voids & increase stability
  - Low permeability
  - No vibratory on < 1”

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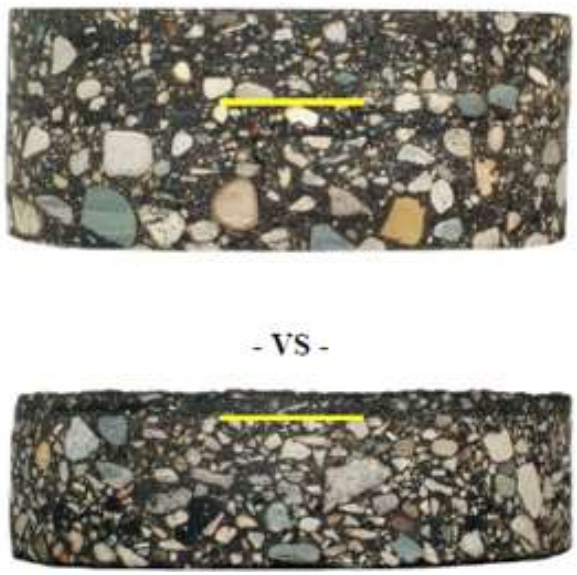
Conclusions

- Thin Asphalt Overlays for Pavement Preservation
  - Improve Ride Quality
  - Reduce Distresses
  - Maintain Road Geometrics
  - Reduce Noise
  - Reduce Life Cycle Costs
  - Provide Long Lasting Service
  - Provide Structure



- Place before extensive rehab required

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Example/Scenario

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Step by Step Process

- Identify pavement distress
- PASER Rating score
  - Recommended practices/option
  - What are my expectations
  - What is my budget
- Core if necessary
- Discuss, partner, collaborate and ensure proper application for the project

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Example

- What is the PASER rating?
  - 6
- What are the treatment options?
  - Surface treatments or thin asphalt overlay

Treatment Selection Based on Distress

Pavement Distress	Severity Level	Chip Seal	Scrub Seal	Microsurfacing	Thinlay	Mill & Overlay	Reconstruct
	Low			X	X		
Rutting	Medium			X	X		
	High					X	X
Fatigue	Low	X	X	X	X		
Cracking	Medium				X	X	
	High					X	X
Roughness/	Low		X	X	X		
Ride	Medium				X	X	
	High					X	X
Thermal	Low	X	X	X	X		
Cracking	Medium		X		X		
	High					X	X
	Low	X	X	X	X		
Raveling	Medium	X	X	X	X		
	High				X	X	
Delamination	NA					X	
Friction/Texture	NA	X	X	X	X	X	

Example

- Which treatments are the right for the project?
  - Chip Seal
  - Scrub Seal
  - Microsurfacing
  - Thin asphalt overlay

Estimated Life Extension

Treatment	Good Condition (PASER Rating 7 or more)	Fair Condition (PASER Rating 5-6)	Poor Condition (PASER Rating 4 or less)
Thin Overlay > 1"	10-14 years	9-12 years	4-6 years
Thin Overlay < 1"	8-12 years	7-10 years	2-4 years
Microsurfacing	6-8 years	4-6 years	2-4 years
Chip Seal	4-5 years	3-4 years	1-3 years
Scrub Seal	N/A	5-7 years	3-5 years

Approximate Cost of Treatments

Treatment	Cost Per Mile	Cost Per Square Yard	Annualized Cost ($/SY/YR)
Chip Seal	$18,000 - $27,000	$1.40 - $2.10	0.39
Chip Seal (w/ Fog)	$22,000 - $31,000	$1.70 - $2.40	0.41
Scrub Seal	$21,000 - $38,000	$1.60 - $3.00	0.31
Microsurfacing	$29,000 - $39,000	$2.25 - $3.00	0.38
Thin Overlay < 1"	$32,000 - $52,000	$2.50 - $4.00	0.33
Thin Overlay > 1"	$43,000 - $65,000	$3.30 - $5.00	0.35

- 1 mile of road = 5280 (length) X 22 (width) = 12907 SY

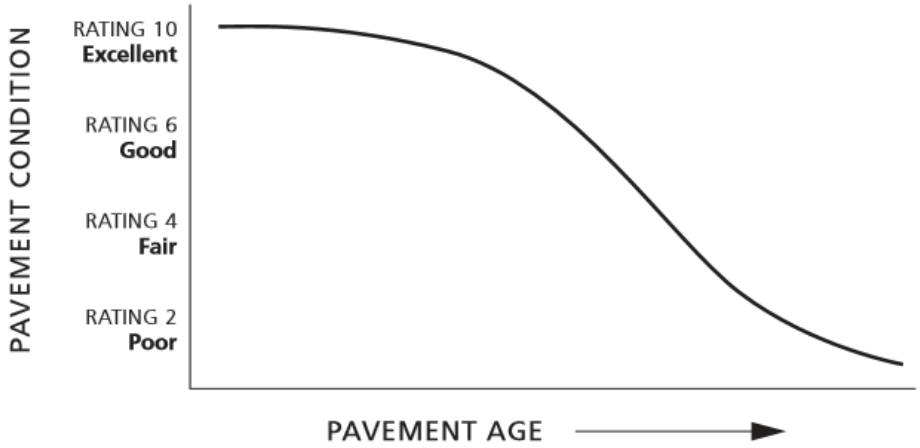
Notes:

Numbers above are for single application layer and do not include crack filling, milling, patching, paint removal, pavement markings, etc.

Example

- What provides me the biggest bang for the buck?
  - Chip Seal 3-4 years ($0.39/sy/yr)
  - Scrub Seal 5-7 years ($0.31/sy/yr)
  - Microsurfacing 4-6 years ($0.36/sy/yr)
  - Thin asphalt overlay <1” 7-10 years ($0.33/sy/yr)
  - Thin asphalt overlay >1” 9-12 years ($0.35/sy/yr)

Pavement Deterioration Curve



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Safety

Watch For Us Campaign

WATCHFOR.US

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Watch For Us Campaign

- Wisconsin Statistics 2016 data
  - Construction Zone Crashes 2,811
  - Construction Zone Fatalities 9
  - Construction Zone Injuries 1,112

- http://watchfor.us/

Contacts

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