PAAMA
Pennsylvania Association of Asphalt Material Applicators

Bituminous Seal Coats

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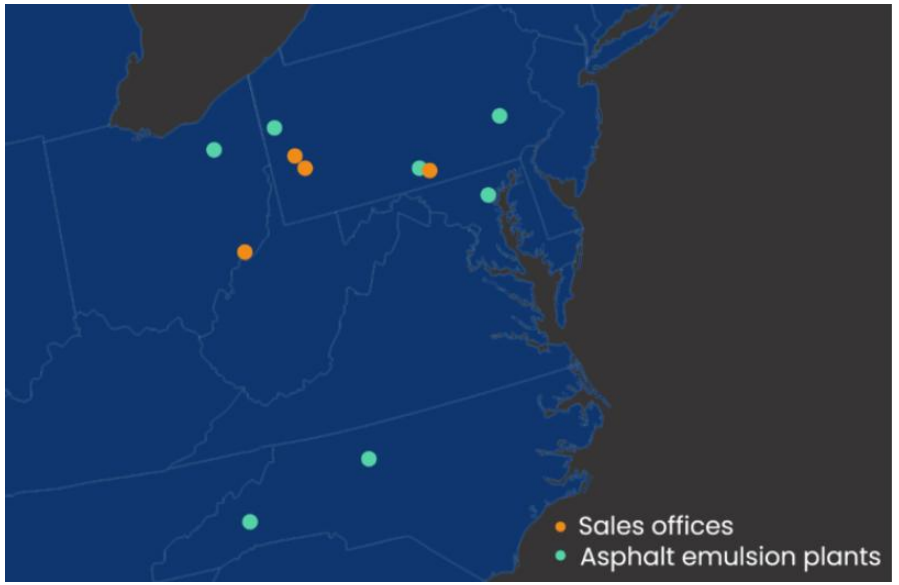
Russell Standard

Agenda

- Russell Standard history
- Pavement Preservation Overview
- Common Pavement Preservation techniques
  - Chip Seals
  - Double Chip Seal
  - Surface Treatment
  - Surface Treatment Special

Who is Russell Standard?

- Established in 1929
- 8 Asphalt Emulsion Plants

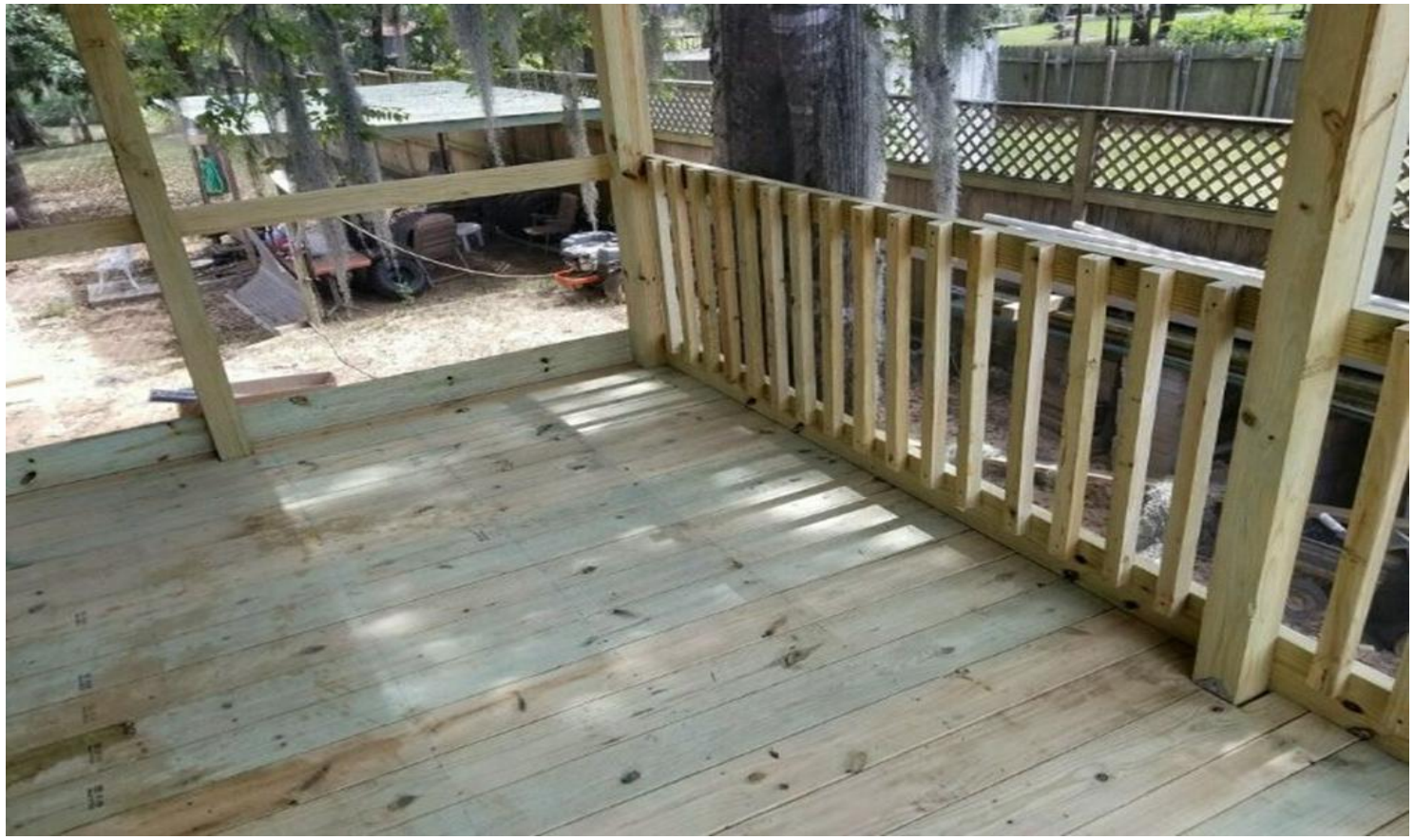


What is Pavement Preservation?

- FHWA definition: Work that is planned and performed to **improve** or **sustain** the condition of the transportation facility in a state of good repair.
- Proactive maintenance of roads to prevent them from getting to a condition where major rehab is necessary. Preventative costs are far less than ultimate repair cost.
- “Keeping good roads good.”
- It is no different that changing the oil in a car.

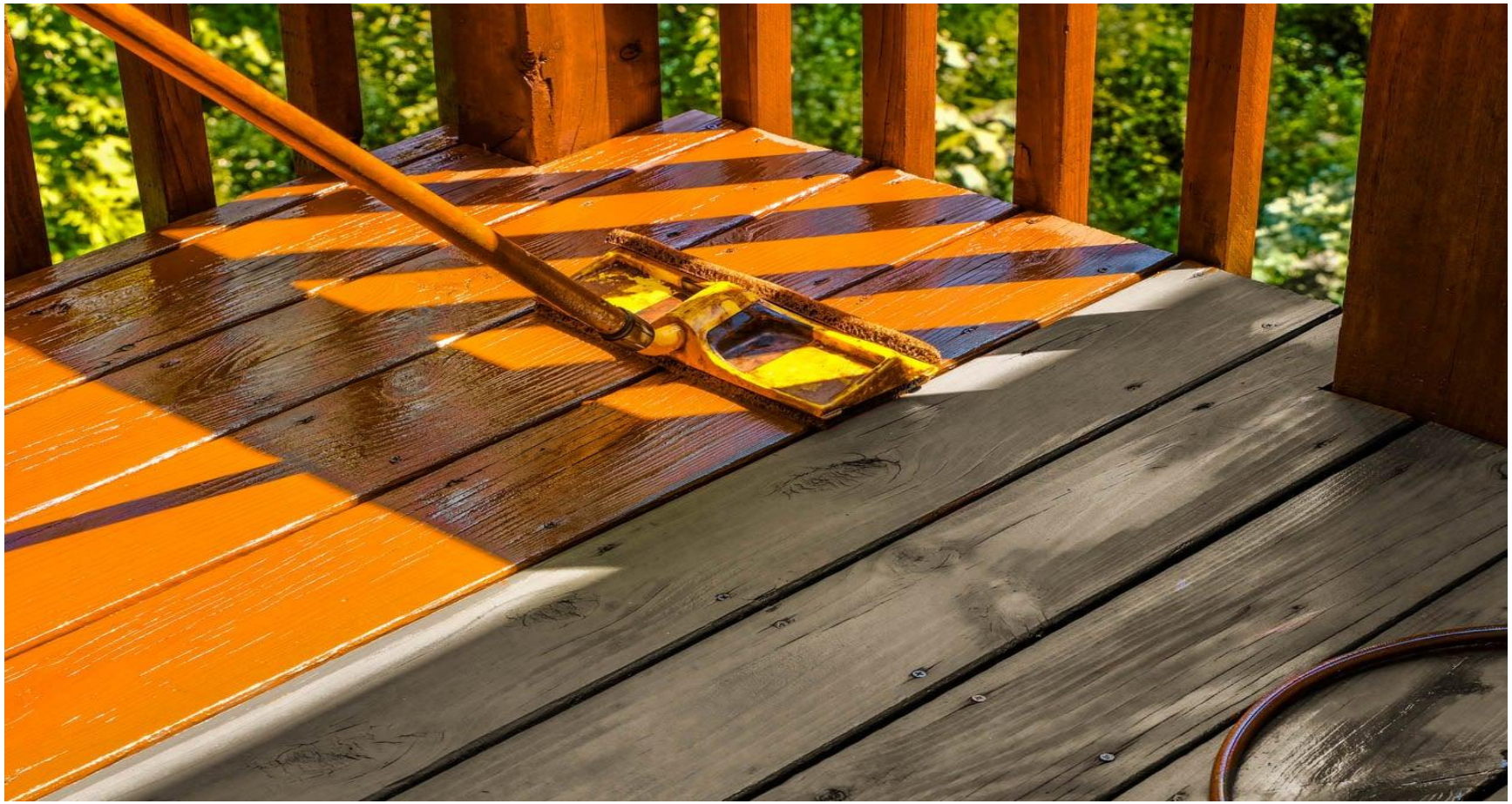
Building a Deck

Let’s imagine you build a deck on the back of your house.



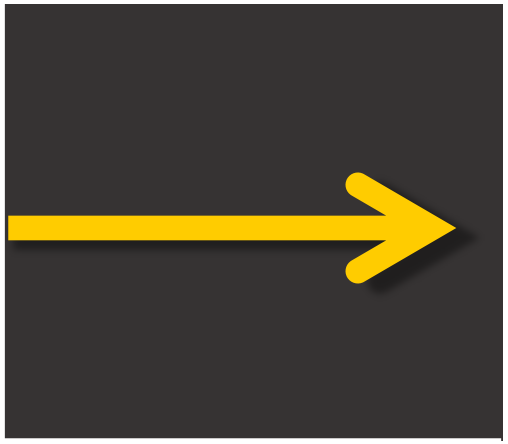
Protecting it from the elements

You stain the deck or paint it. Why? To preserve it!
Rain, snow, sun, and even oxygen are going to wear away at the wood unless you preserve it.

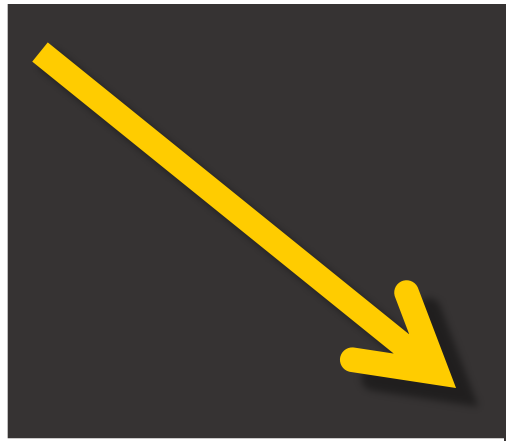


Why Do We Need Pavement Preservation?

Asphalt Cost

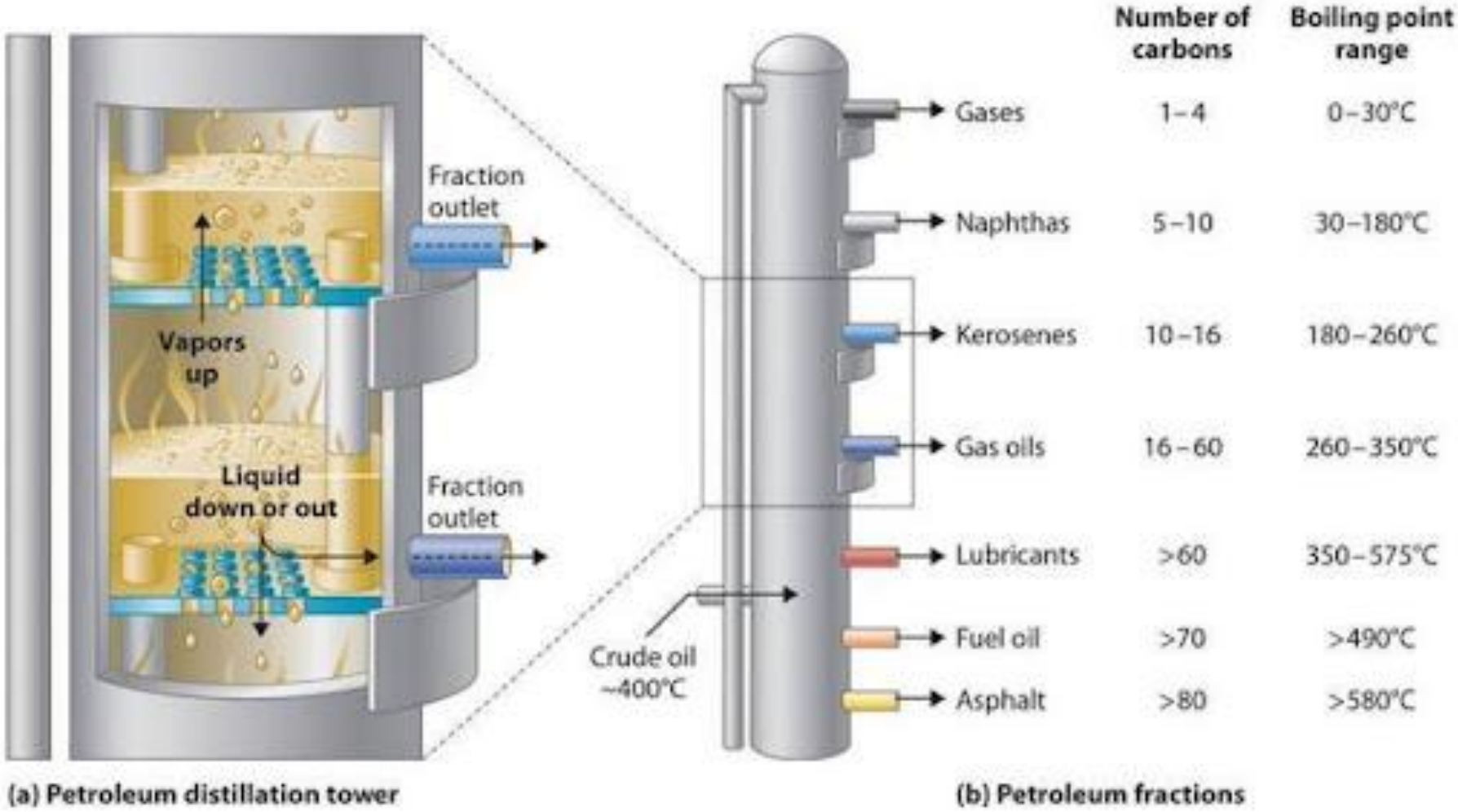


Road Budgets



HMA Life Expectancy

Refiners are getting more for the lighter products, and leaving less in the asphalt



(a) Petroleum distillation tower

(b) Petroleum fractions

Worst First

- Worst first is the concept of addressing the worst, most complained about roads, while ignoring roads that are still in good condition.
- Worst first is not sustainable.
- Shift focus to keeping good roads good.

Reconstruction Candidate

Preservation Candidate

PCI-Pavement Condition Index

- A grading system used to quantify the condition of the road
- 0 to 100
- 100 being a road in perfect condition
- 0 being the worst

Pavement Condition Index
A (85 – 100)

Fatigue Cracking - Low

Oxidation and Raveling – Low

Preventive Maintenance Candidate

TREATMENT OPTIONS

Crack Seal, Chip Seal, fiber reinforced chipseals, Micro Surface, Fog Seal

Pavement Condition Index
B (70 – 84)

Fatigue Cracking - Low

Oxidation and Raveling – Moderate

Longitudinal & Transverse Cracking - Low

TREATMENT OPTIONS

Crack Seal, Chip Seal (Single or Double), Fibermat, Surface Treatment, Fog Seal

Pavement Condition Index
C (55 – 69)

Fatigue, Longitudinal & Transverse Cracking – Moderate

Oxidation and Raveling – High

Longitudinal & Transverse Cracking Moderate

TREATMENT OPTIONS

Crack Seal, fiber reingorced chipseal, Surface Treatment, Double Seal, Cape Seal, Fog Seal

Pavement Condition Index
D (40 – 54)

Fatigue Cracking – High
Potholes
Longitudinal & Transverse Cracking - Moderate

Base Failure

Oxidation and Raveling - High

TREATMENT OPTIONS

FB-Modified

Pavement Condition Index
F (0 – 39)

Fatigue Cracking – High
With High Traffic Volume

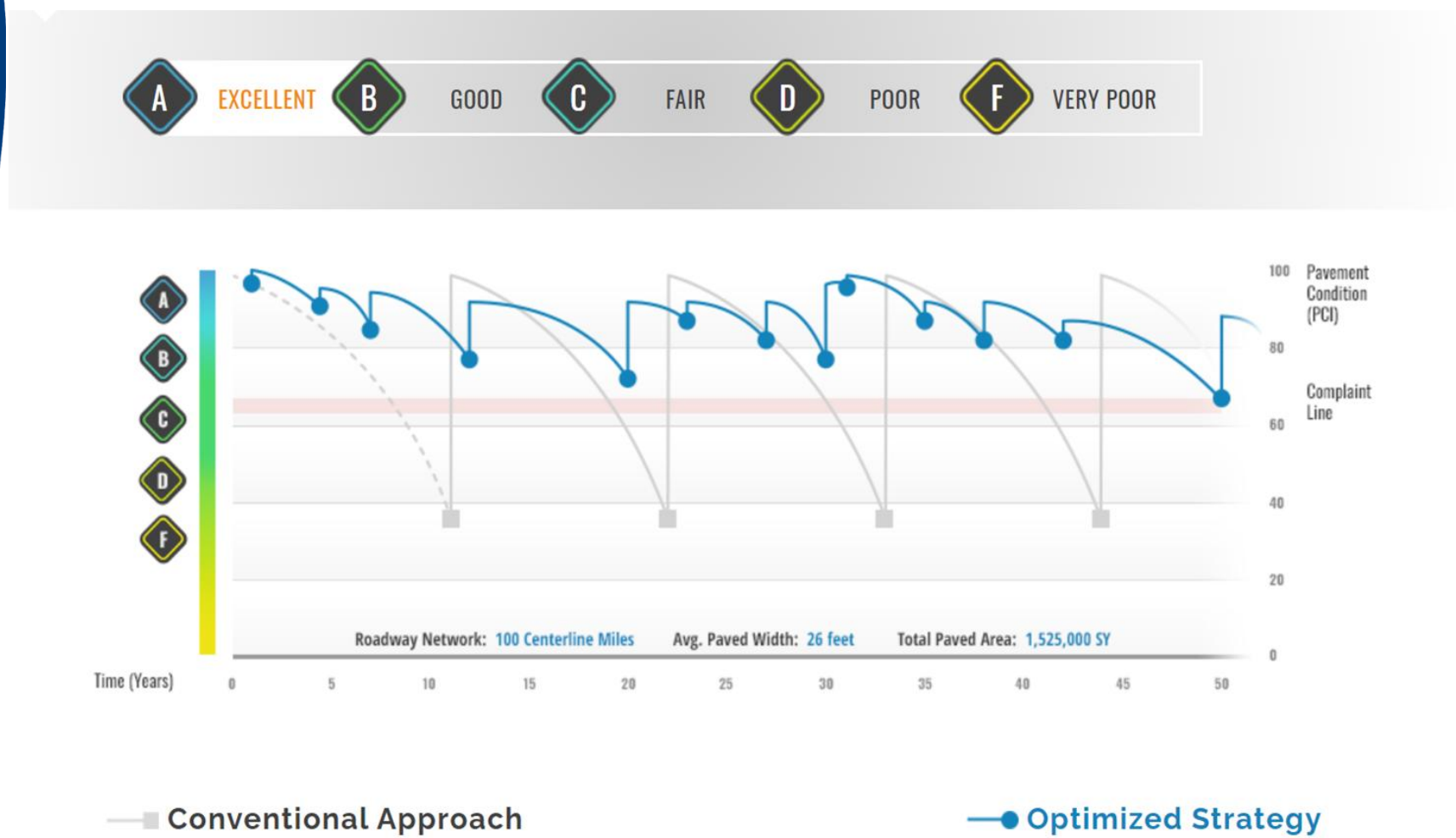
Rutting – High
With High Traffic Volume

Fatigue Cracking with Rutting – High
With High Traffic Volume

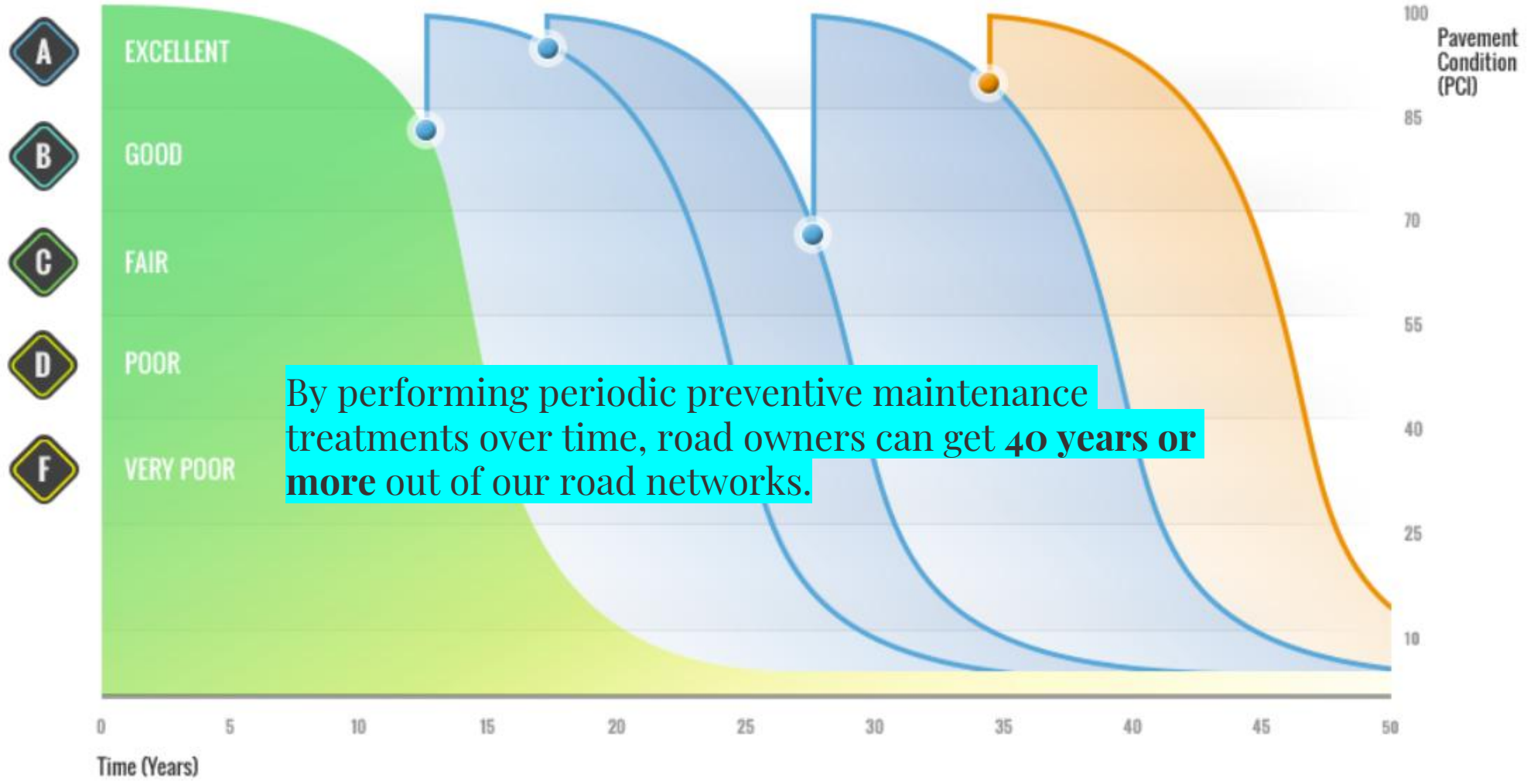
TREATMENT OPTIONS

Reconstruction or Full Depth Reclamation with Hot or Cold Mix Overlay

Pavement Preservation Overview

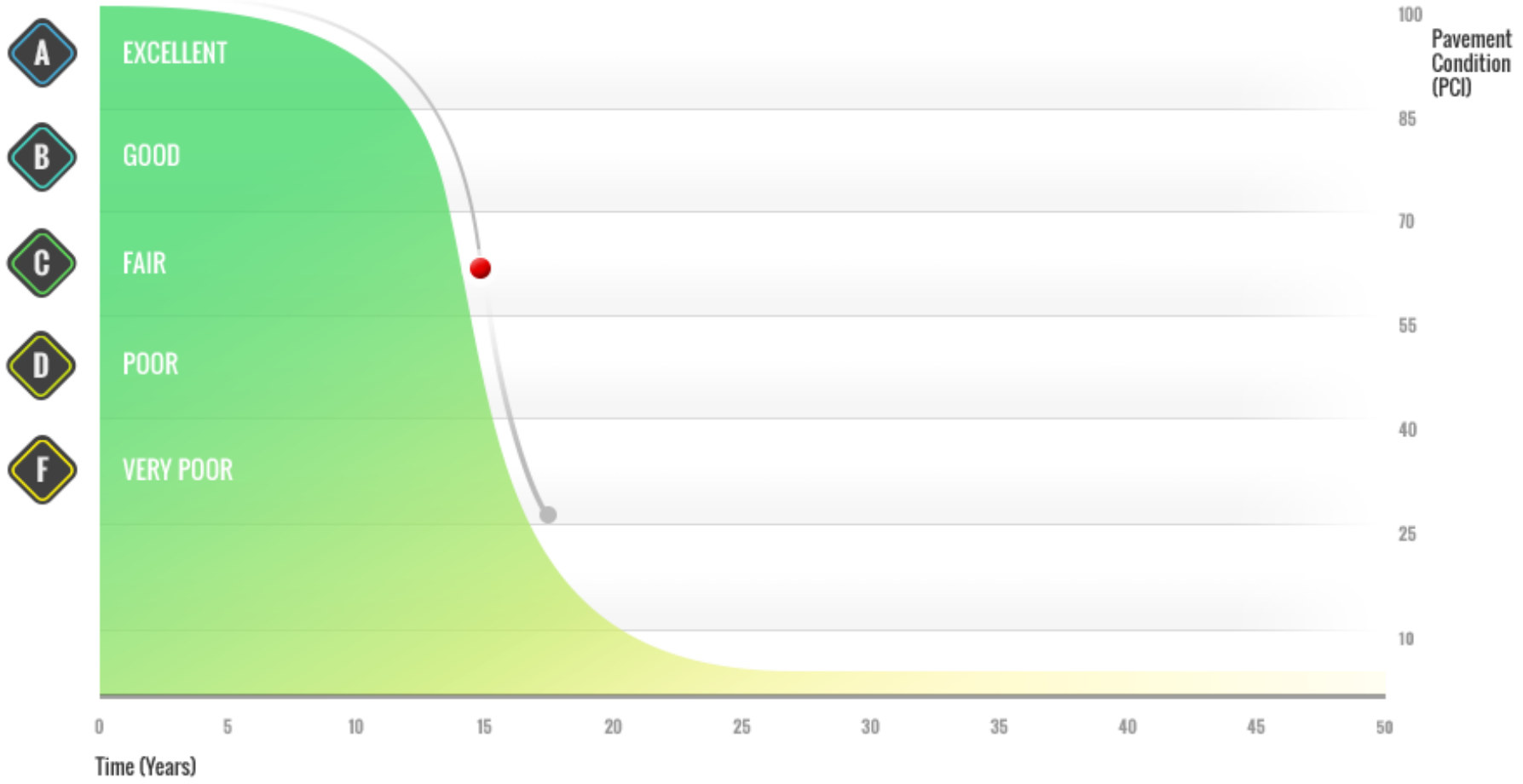


Typical life of an untreated road is ≤ 20 years.



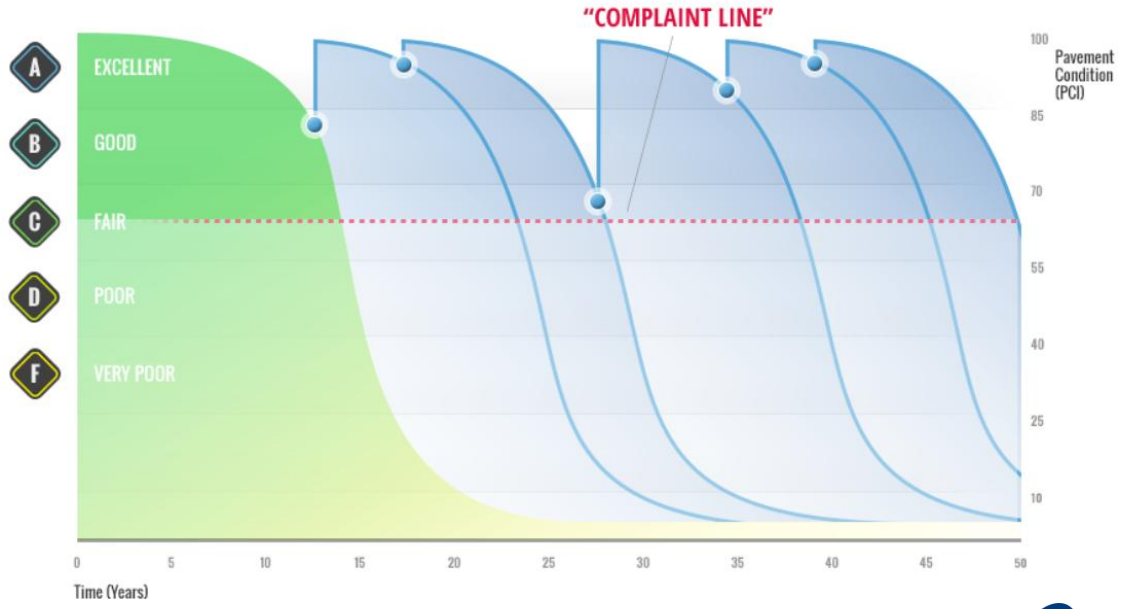
By performing periodic preventive maintenance treatments over time, road owners can get **40 years or more** out of our road networks.

All roads pass a **point of accelerated deterioration** – past this point, costly rehab and reconstruction are the only options.



Complaint Line

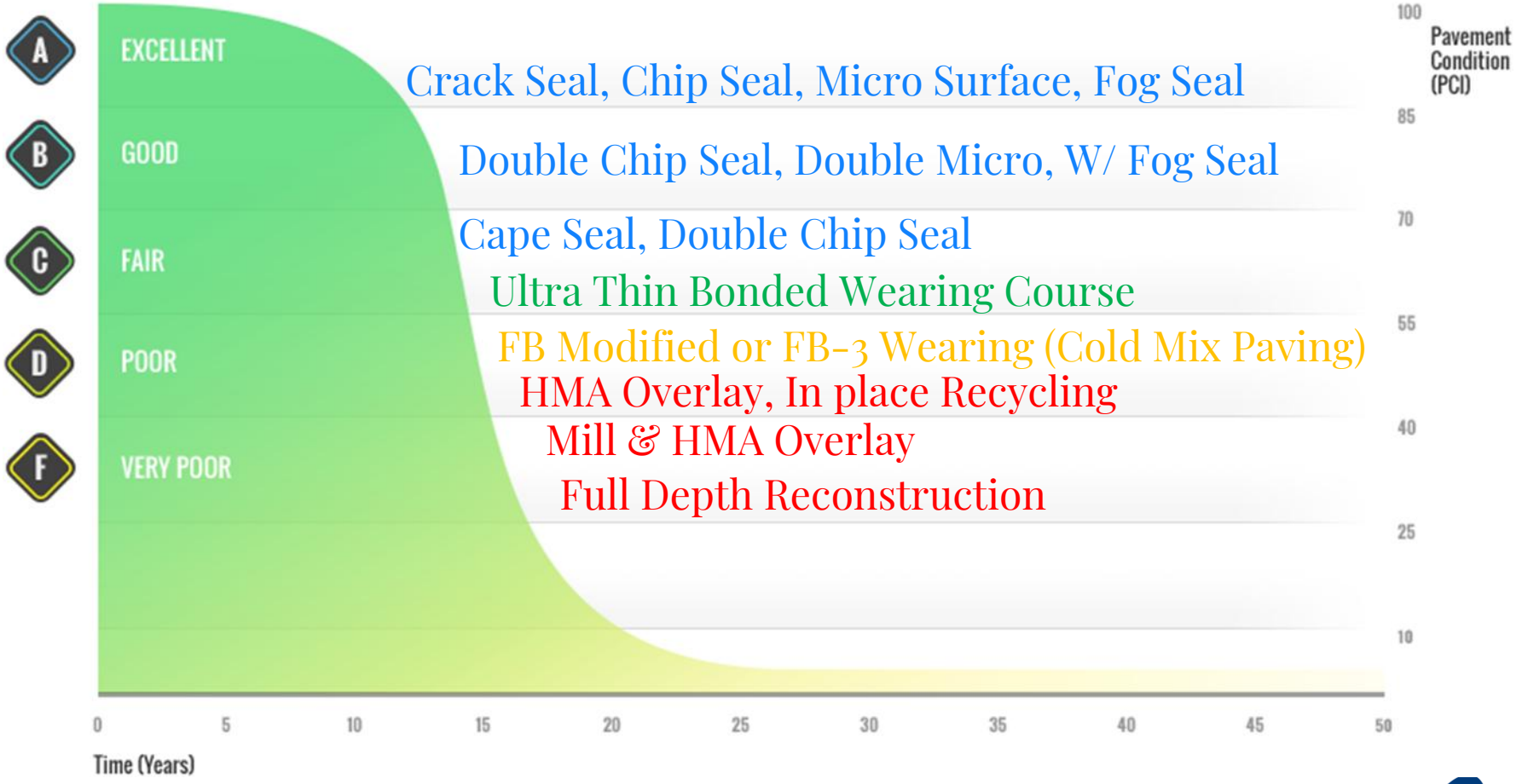
- By performing regular preservation techniques, roads stay in good condition, keeping them above the complaint line.
- This helps reduce reactive maintenance, decrease user costs, and ultimately leads to happier motorists, businesses, and taxpayers.



The How

A investment in preservation pays off.

Every $2 here…
or **$4-8 here**
saves **$12-18 here**



We covered the why, now let’s cover our specialty

Chip Seals

Chip Seal Introduction

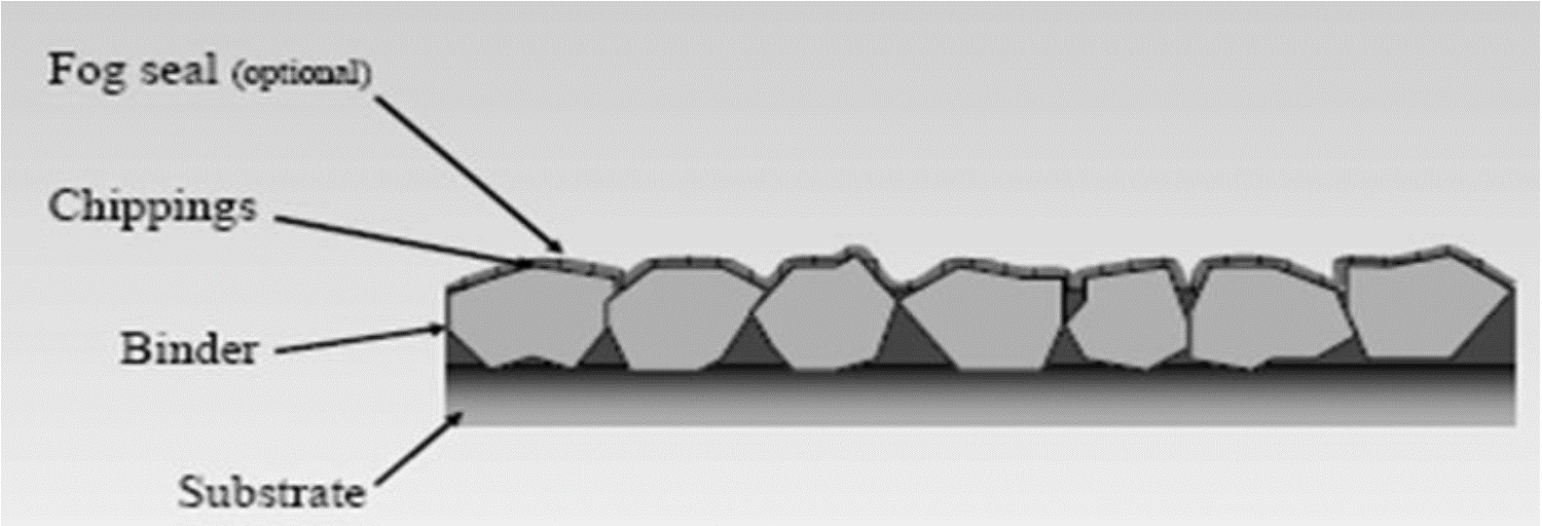
- AKA: Seal Coat and Tar & Chip
- Seals and waterproofs low to moderate severity cracks, raveling, and low severity bleeding
- Improves skid resistance and macrotexture
- Protect the pavement from oxidation, aging, and traffic wear

Chip Seal Introduction

- Seal minor cracks (less than ¼”)
- Extends the average service life of the existing pavement for 2 to 8 years
- Correct deficiencies such as:
  - ✓ Raveling
  - ✓ Flushing
  - ✓ Aged or oxidized pavements

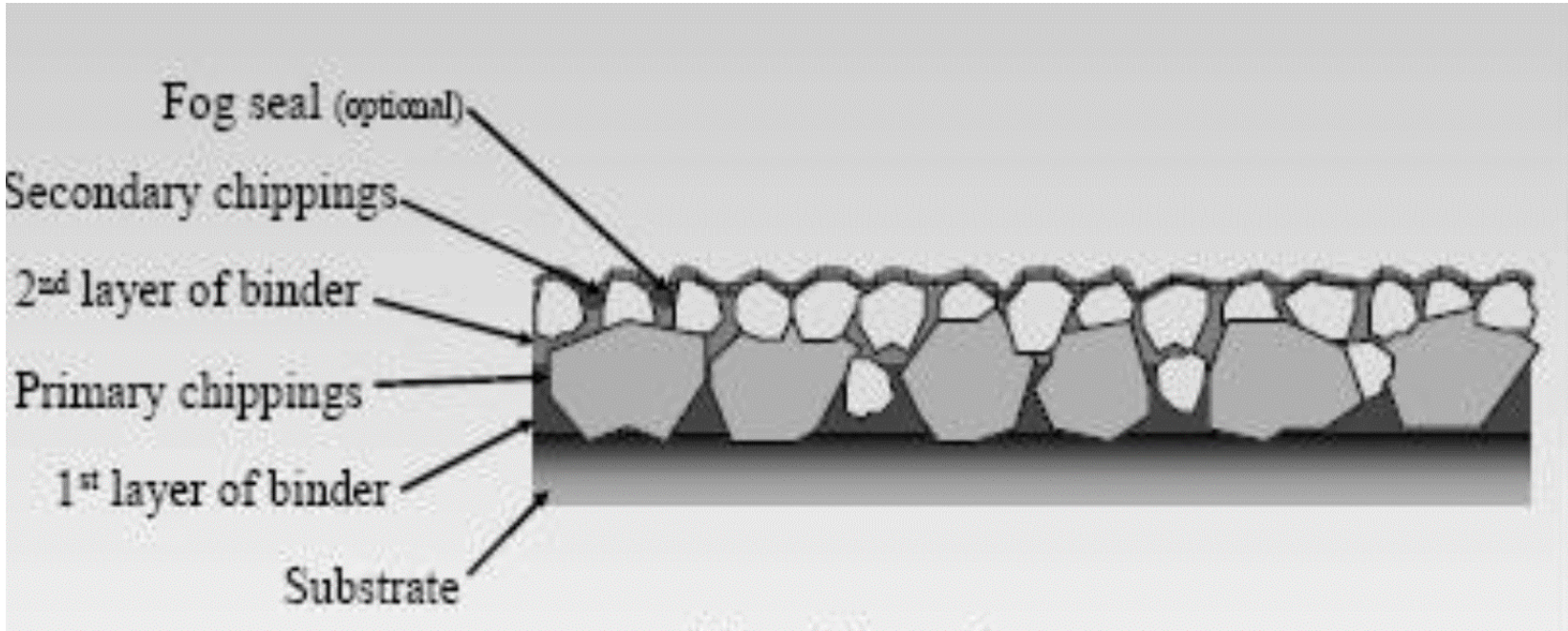
Chip Seal Introduction

Chip Seal is at the heart of Pavement Preservation and consists of a layer(s) of asphalt emulsion with a layer(s) of aggregate



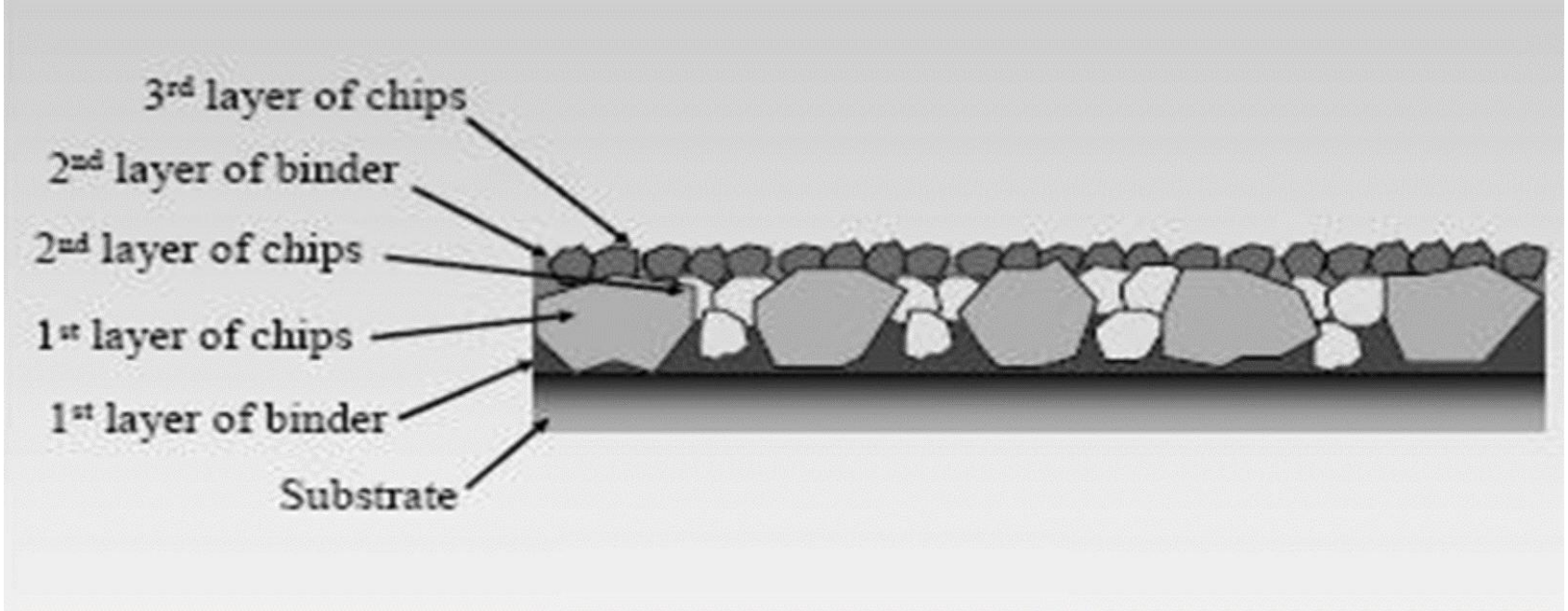
Chip Seal Introduction

Double Chip Seal



Chip Seal Introduction

Triple Chip Seal



Chip Seal Variances

Double Seal Benefits vs. Single Seal

- Extra sealing properties
- Covers imperfections
- More durable

Triple Seal Benefits vs. Single & Double Seal

- Extra sealing properties
- Covers imperfections
- More durable, with some structure added

Surface Treatments differ from chip seals in the sizes of aggregate used and the size on each pass. A surface treatment will ALWAYS include 2 passes

Chip Seal Limitations

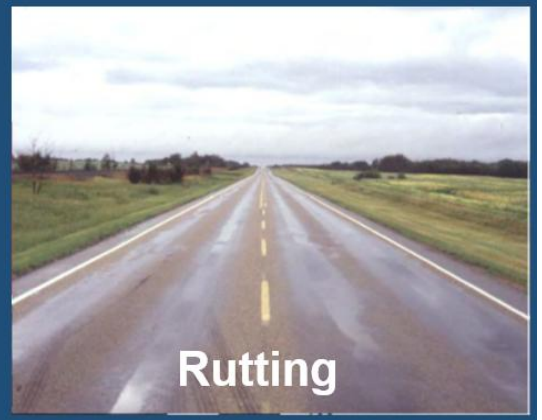
Chip Seals DO NOT:

- Strengthen the existing pavement
- Increase load-bearing capacity
- Smooth rough pavement
- Bridge cracks wider than ¼”
- Address ruts greater than ½” in depth
- Eliminate the need for maintenance or reconstruction

Chip Seal Site Selection

Chip Seal Site Selection

POOR CANDIDATES



Chip Seal Site Selection

- Ideal substrate has 1/8” cracks or less
- Hot mix, previously chip sealed, and gravel roads are good candidates
- Dirt roads require priming or specific emulsions (i.e. MC70 or E-1Prime)
- No structural or deformation failures (base damage or rutting)
- No moderate to high cracking
- No base failures, adequate structure required

Chip Seal Emulsion Selection

- Rapid setting for typical surfaces
- Medium setting for dirtier surfaces
- High float for dirt or dirt like surfaces and extremely dirty aggregates
- Polymer (CRS-2P) emulsions for better traffic resistance

Chip Seal Emulsion Selection

- Both Anionic and Cationic Emulsions are accepted, but most PA manufacturers have cationic readily available.
- Dictated by stone sources in area

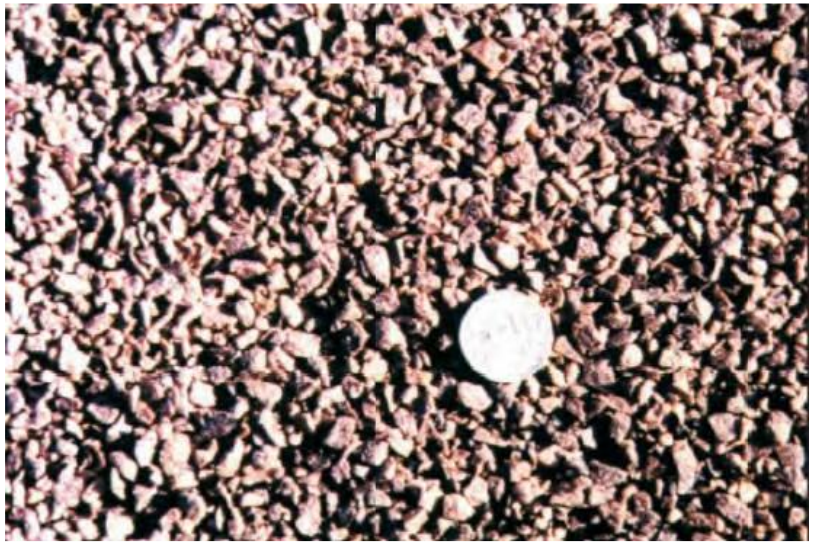
Class Of Material	Emulsified Asphalt Type	Application Temperature ºF	
		Minimum	Maximum
RS-2	Anionic Rapid Set	140	175
CRS-2	Cationic Rapid Set	140	175
HFRS-2P	High Float Polymer Modified	140	175
RS-2P	Anionic Rapid Set Polymer Modified	140	175
CRS-2P	Cationic Rapid Set Polymer Modified	140	175
HFRS-2	High Float	140	175

Chip Seal Aggregate Selection

Cleanliness

- Dusty Aggregate will prevent bonding with binder
- Should have 1% or less passing the #200 sieve
- Wash aggregate or change emulsion type TBD through proper mix design and compatibility testing

Prior to Sweeping



Dirty Aggregate Led to Massive Stone Loss, Emulsion Coated the Fines Instead of Aggregate

Chip Seal Site Prep

- Clean site of vegetation, debris, carcasses, oil stains, and dirt
- Ensure there is an absence of hydraulic fluids on surface prior and during construction (can breakdown and eat away at the emulsion)
- Seal all cracks over 1/4” wide, ideally 30 days or more in advance
- Broomed clean day of prior to chip seal if possible

Best Practices

- **Application rate.**
- **Emulsion temperature, surface temperature.**
- **Sealing cracks**
- **Bar height.**
- **Stone application, embedment**
- **Identifying your surface**
    - Porous
    - Smooth
- **Test Strip**


QUESTIONS?

RUSSELL STANDARD

Unmatched all the way around.