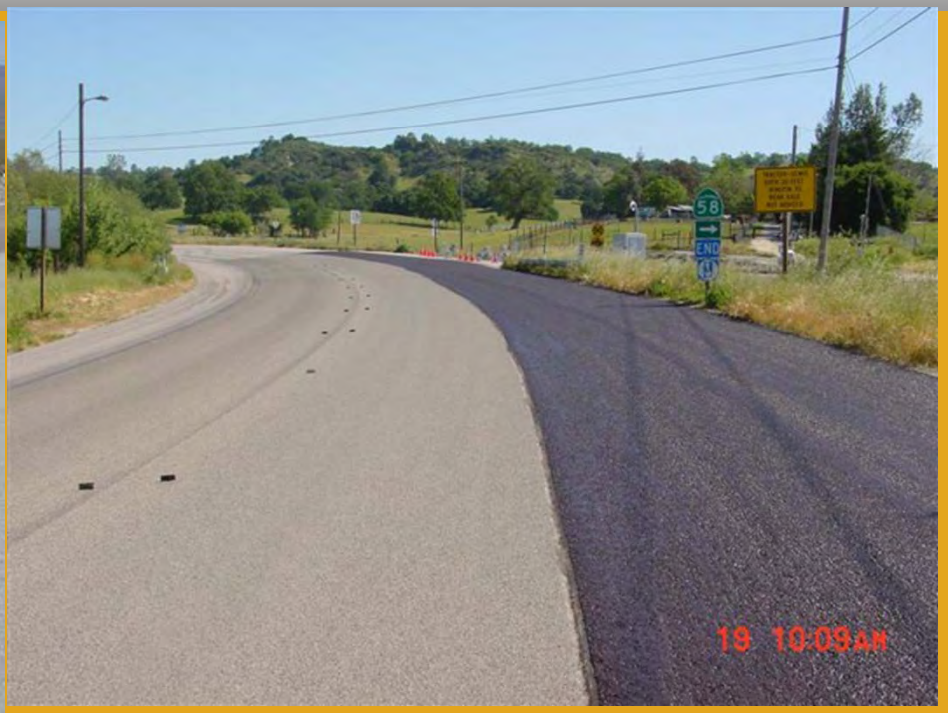
Polymer Modified Rejuvenating Emulsions

Western Emulsions



2015 NWPMA Conference
October 20-23rd

Preserving Roads With Scrub / Cape Seals

Bob McCrea, P.E.

Western Emulsions is committed to Sustainable Solutions for Pavement Preservation and Recycling

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PMRE CR Scrub / Cape Seal

- Terminology
- Mechanics
- PMRE Cape System /Compared to other alternatives
- A Few examples
- Life Cycle Cost Analysis

Western Emulsions is committed to "Sustainable Solutions for Pavement Preservation and Recycling."

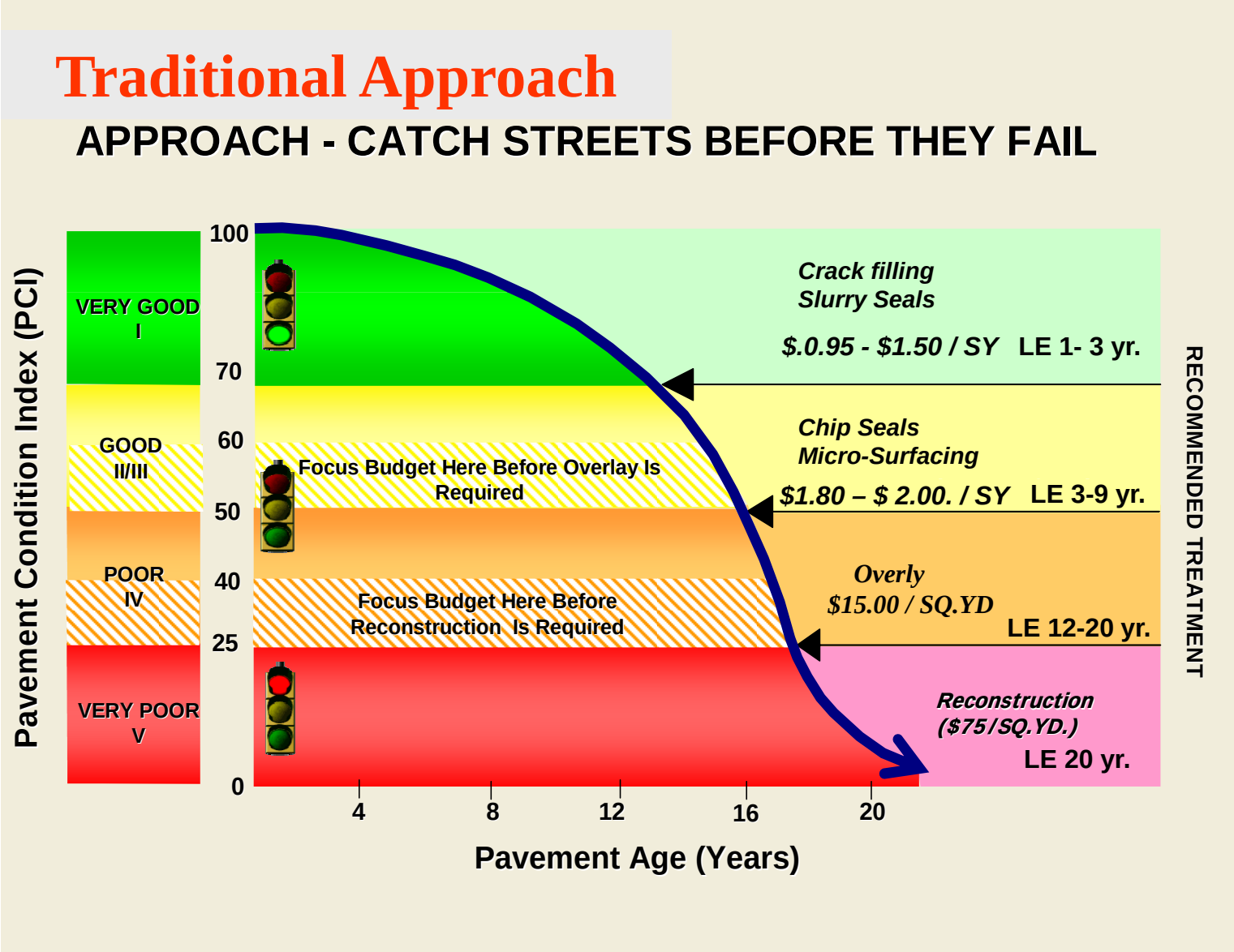
Terminology

- **Scrub Seals**

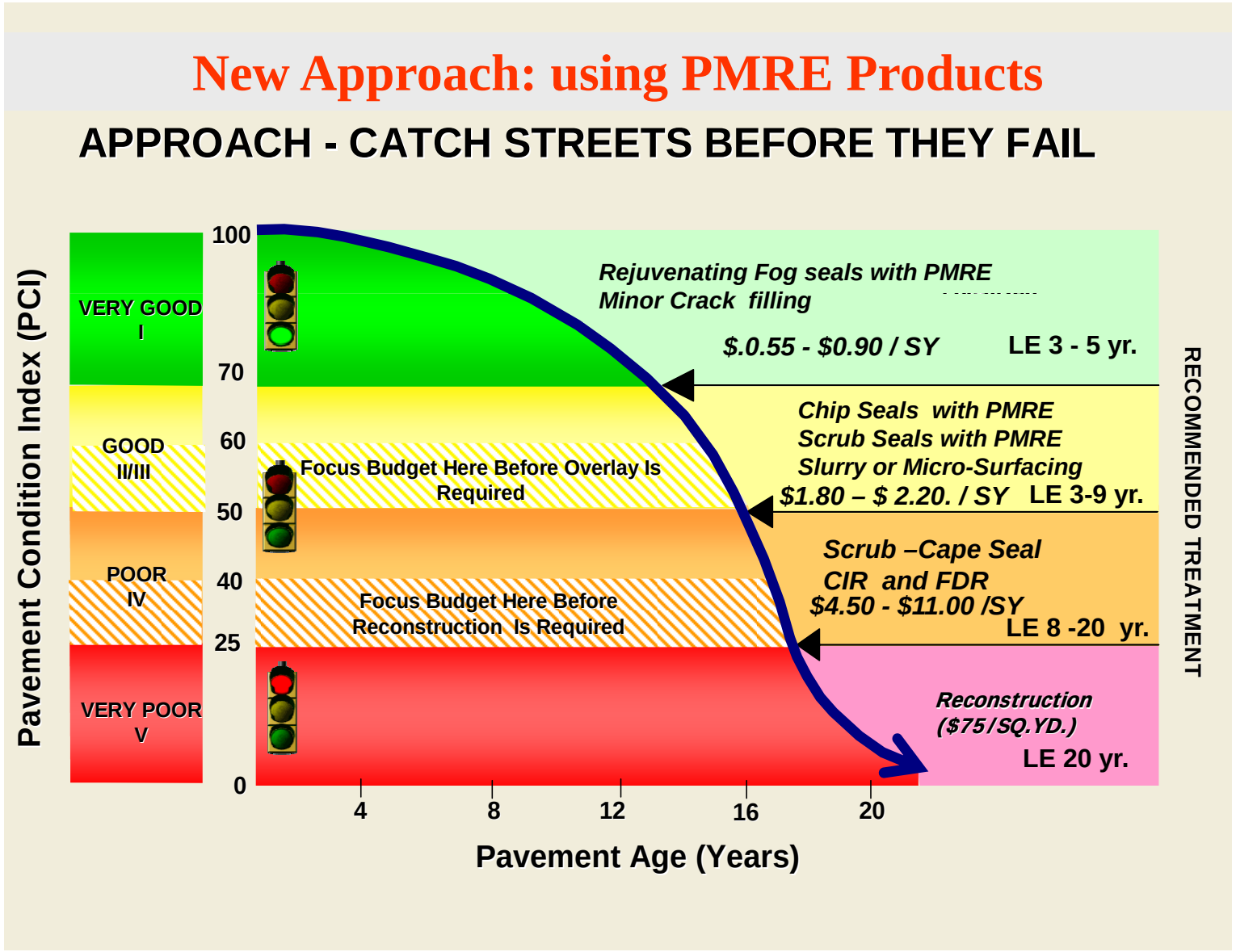
- **Chip Seals**

- **Interlayer for: Slurry, Micro, Chip, or AC**

The Concept of Pavement Preservation



The Concept of Pavement Preservation



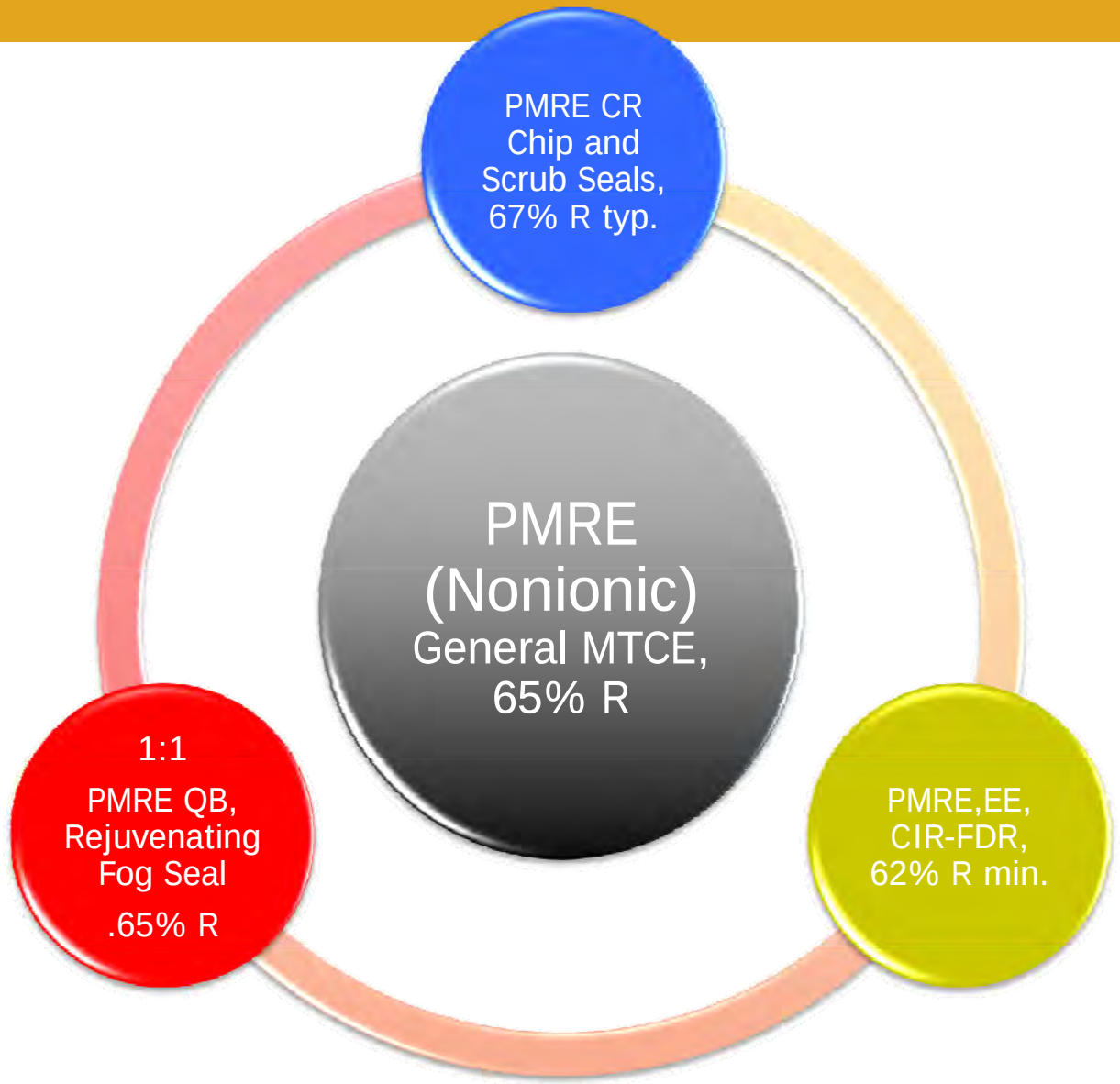
What is a PMRE

PMRE is a Polymer Asphalt Surface Sealer used as a binder for aggregate chips while also sealing cracks in distressed pavements.

It contains.

- **Asphalt**
- **Solvent-free rejuvenating agent (15%)**
- **High-quality emulsifier**
  - **(The emulsifier is changed to facilitate the end use)**
- **Tough Polychloroprene Polymer (3.5%) PA-AS-1**

The PMRE Family and Evolution



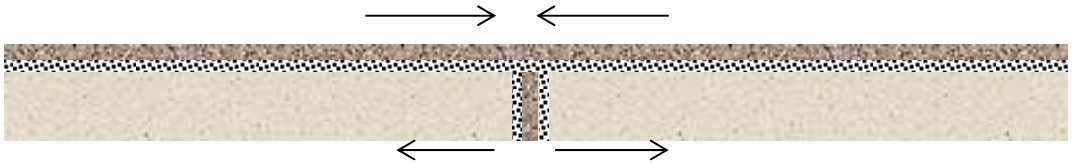
Product Advantages: Compared to standard Emulsions

- No Crack Filling is Required
- Can be applied at both low and high Temperature.
  - (40º F - 125º F)
- High Flexibility (3.5 % Polymer)
- Will work with dirty chips

How does PASS Work

Mechanics

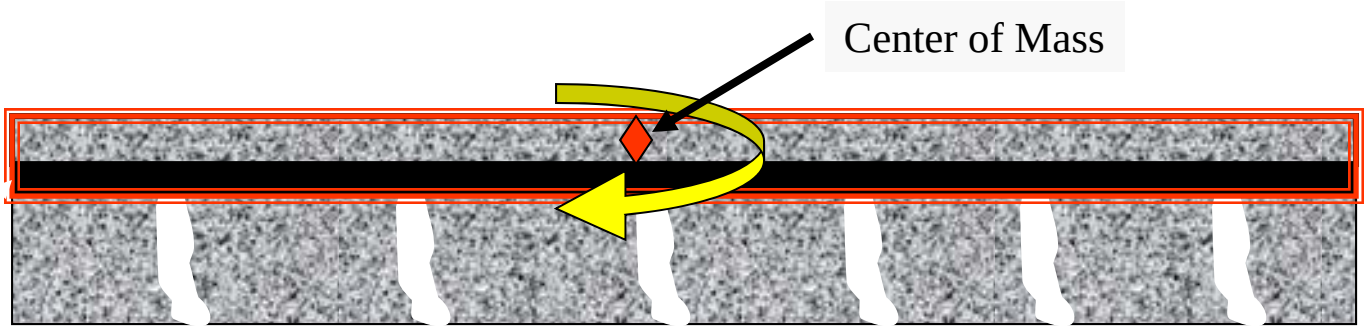
Zero Flexural Strength



The rejuvenator penetrates, rejuvenates and anneals to develop a permanent bond on the surface and on the walls of the crack..

The end result is the reconstruction of a structural beam able to withstand flexural loading.

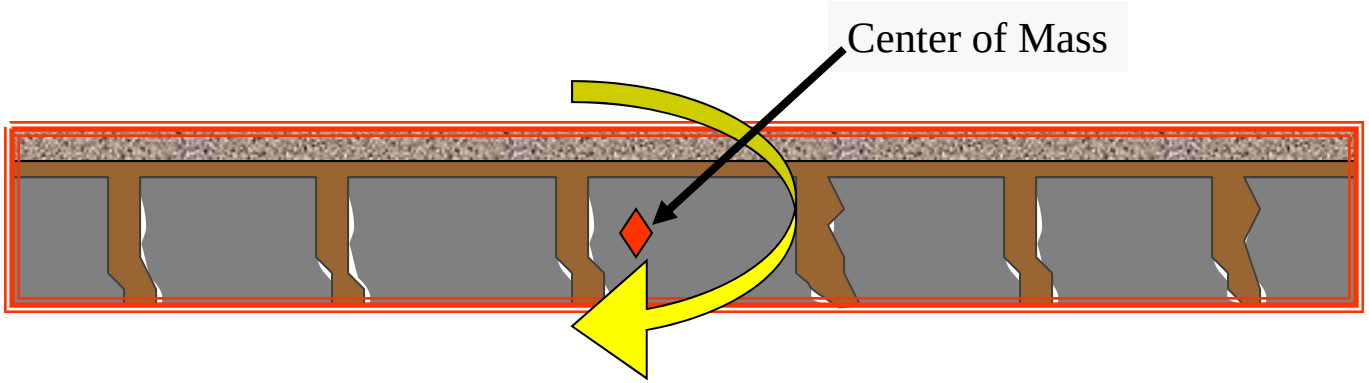
Comparing Treatment Alternatives



Bridging Systems

Hot Applied Chip and Fabric

System boundary in red

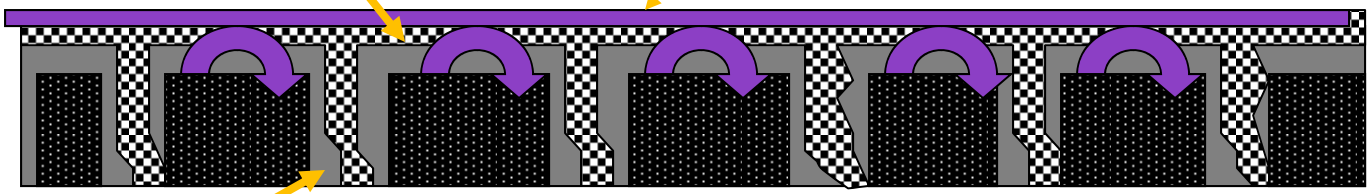


PMRE System

Polymer Mechanics

Chip and Asphalt

Polymer works independently to force the rejuvenator into the pavement



Rejuvenator

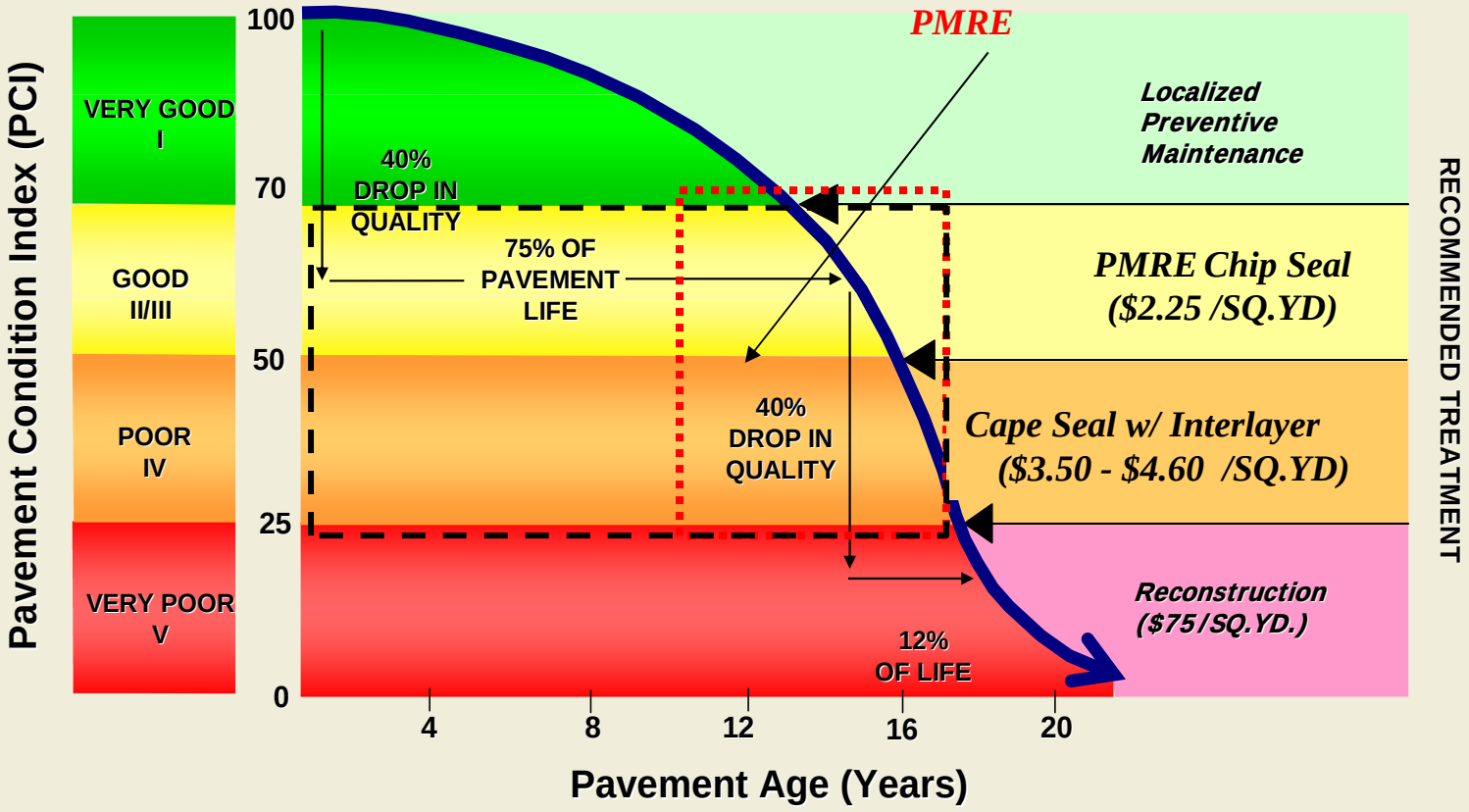
Rejuvenator in simple terms works independently to work on aged asphalt. If the rejuvenator breaks down the polymer two things happen:

- **The polymer steels the rejuvenator and therefore no replacement of maltene's to aged and distressed asphalt.**
- **Become sticky and gooey.**

PMRE Chip Seals, Scrub Seals / Cape Seals

The Concept of Pavement Preservation Using PASS®

PAY NOW….OR PAY MUCH MORE LATER



Scrub / Cape Seals

Prospective Scrub Seal Candidates

- **Alligator Cracks**

- **Block Cracking**

- **Raveling**

- **Open Graded**

Prospective Chip Seal Candidates

- **Some minor distress**
- **Aged AC or heavy oxidation**
- **Climatic conditions**
  - ❖ **In some geographical locations it is difficult to meet temperature requirements for standard emulsions.**

NOTE: PMRE Scrub Seals and Chip Seals Limitations

Structural failures need to be identified and repaired prior to application.

Execution:

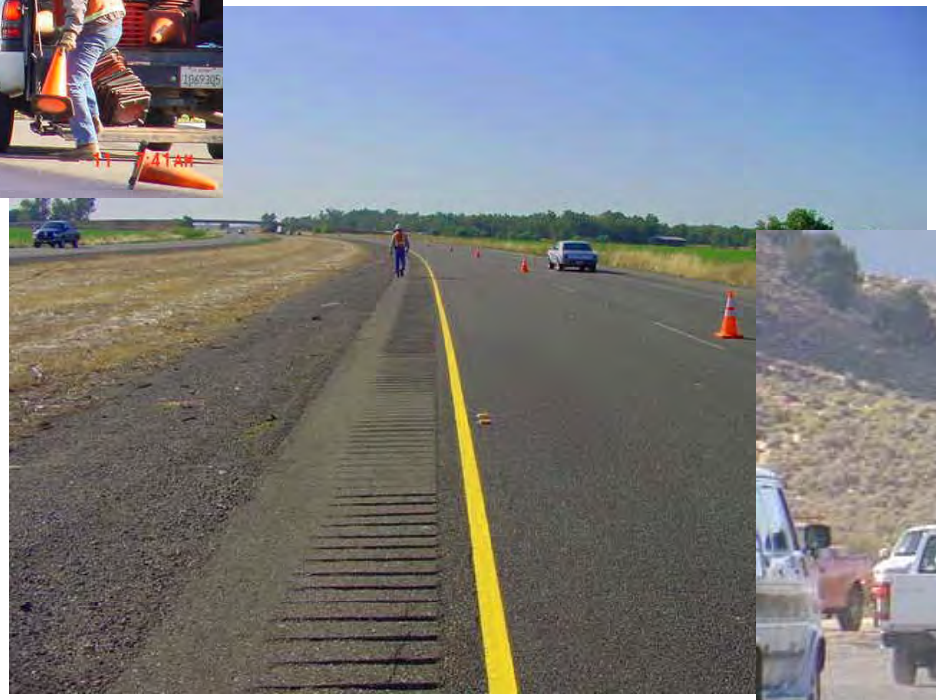
Application Steps

for

PASS® CR Scrub Seals / Cape Seal

Western Emulsions

Set up Traffic Control



Sweep and Clean the Pavement Surface

Apply Fog Seal to all new patches < 3months old prior to sealing

New Patch without Seal

2nd application @ .30 gal / sy = total of .60 gals / sy

1st application @ .30 gal / sy

Apply and Scrub the Emulsion

- The size of the emulsion wave is a function of the number and severity of cracks.
- Application rates for PMRE Scrub or Chip Seals are generally 10% lower than standard Emulsions.
- Scrub Seals generally require a higher application to afford the opportunity for the broom to build a wave of emulsion which is used to fill the voids of the distress.
- For roadways that are not distressed the broom is eliminated.

Broom dynamics

Apply the chips

Maximum chip retention is accomplished when the mean diameter chip is embedded 50-70%.

Another way to determined if chip embedment is going to be accomplished is to look for a small wave being pushed by the chips as they are applied.

Roll to set the chips

- Use Pneumatic tire rollers.
- Offset the rollers.
- Start at centerline and work toward shoulder.
- Roll 3 times.

Sweep up excess Chips

Consider:

- ❑ **Re-claiming chips**
- ❑ **Broom efficiency**
- ❑ **Environmental requirements**

Pick-Up Broom

Kick Broom

Open to Traffic

Some agencies prefer to fog seal chip seals or scrub seals after completion.

Benefits:

- ❑ **Better chip retention**
- ❑ **Provides good background for delineation**

“Re-Cap” of the Scrub Seal

Western Emulsions

Apply the Micro-Surface or Slurry Seal over scrub seal

Examples

Note:

In California there are 1,360 miles of roads treated using the PMRE Scrub / Cape Seals annually.

Ca. State Rt. 395; 3/8” scrub seal used as interlayer for AC overlay. This was a 5 year warranty project constructed in 2003. Total length of project = 8.5 miles

Scrub Seal placed and being swept

- Emulsion rate was .33 gal. / SY
- Chip size 3/8”
- Chip application rate 23 lbs./SY

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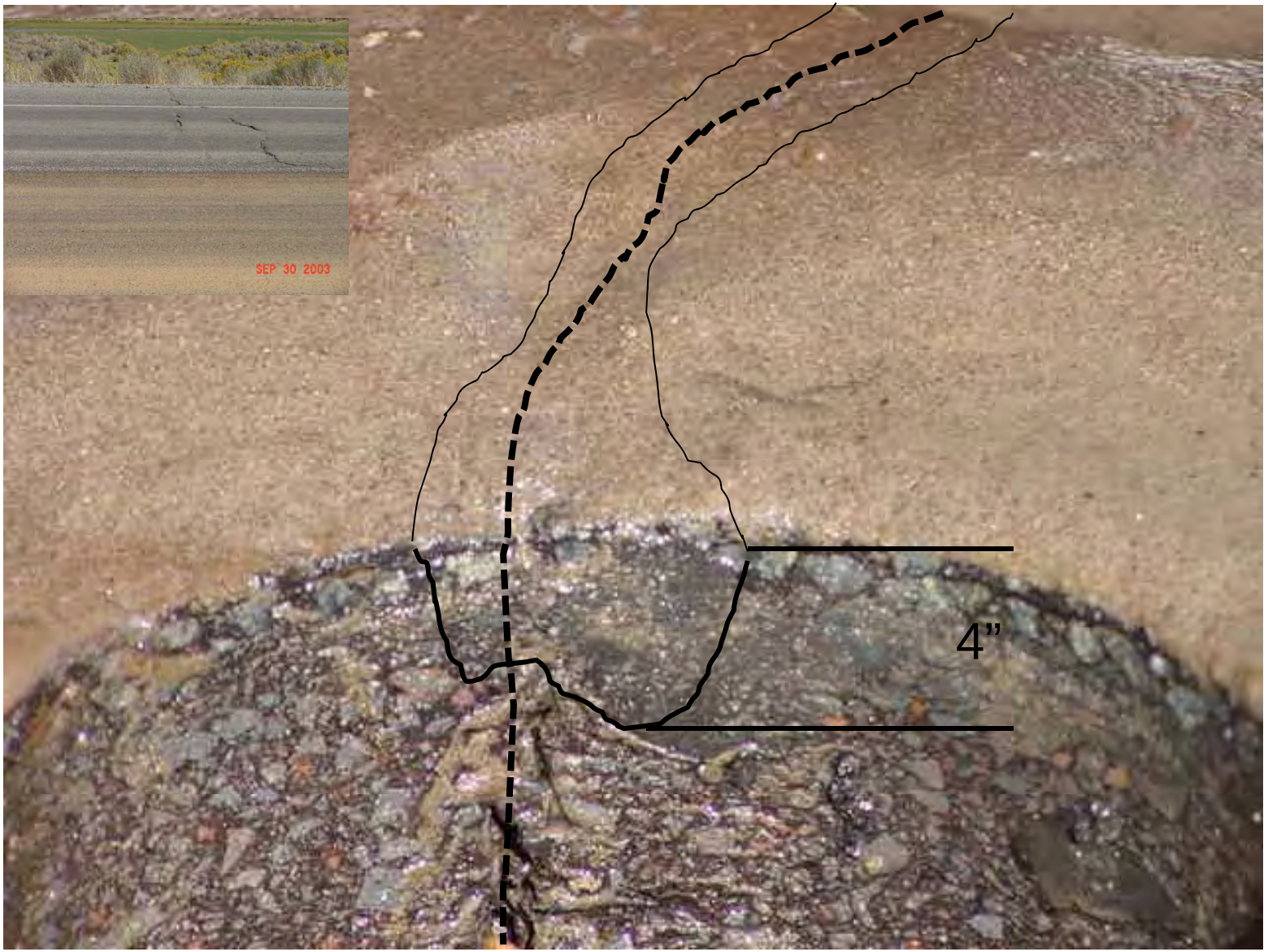
Project included low temperature application

21 core samples taken prior to overlay being placed



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A.C. Leveling Coarse Applied

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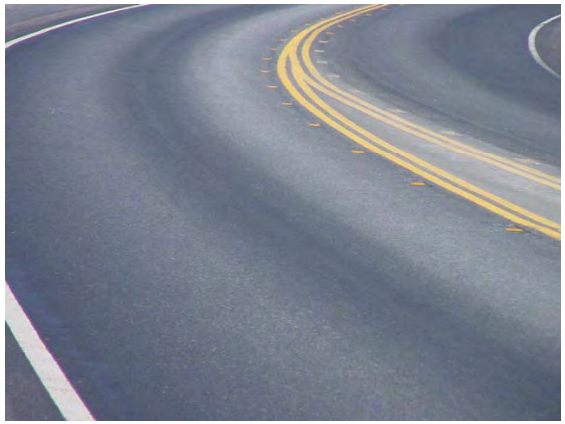
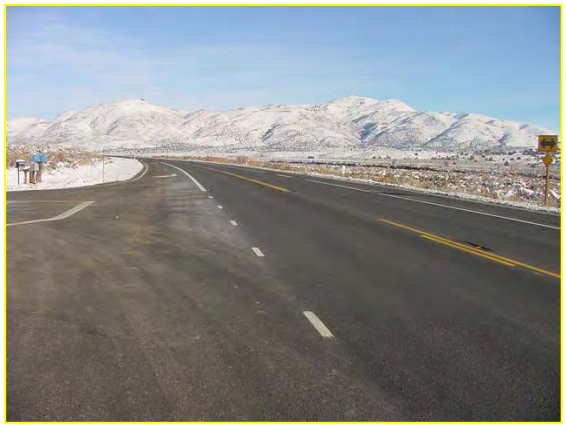
2 ½” A.C. Terminal Blend w/Rubber over PMRE Scrub Seal Interlayer

Follow-Up Feb. 2009





<u>Total warranty work done over 5 years</u>

- ❑ 153 linier feet of crack fill
- ❑ 40% was in shoulder area in through cut areas.

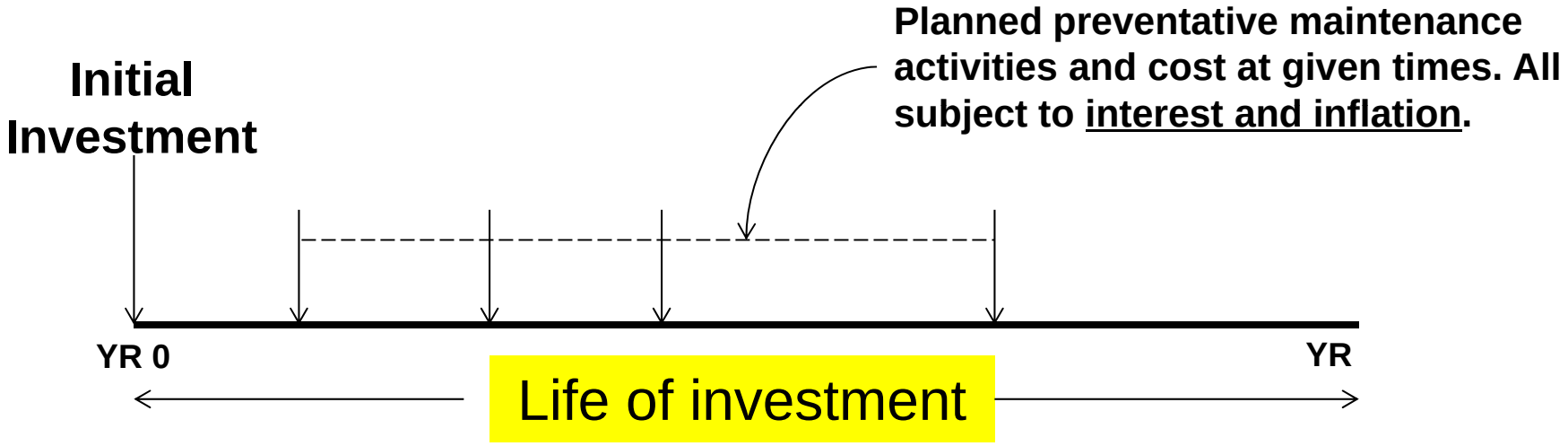
Cape Seals using a PMRE Scrub Seals as interlayer

City of Greenfield Ca.: El Camino Real, PCI 26

City of Greenfield Ca.: Scrub Seal with Micro being applied

City of Greenfield Ca. ,El Camino Real 2008

Using Life Cycle Cost to evaluate and compare different Strategies



Given all cost over the life of the asset alternatives can be compared in todays cost. NPV = $ / SY

http://www.westernemulsions.com/savings-and-roi.php