



Strategies for Repairing Wide Cracks in Asphalt Pavements

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Association Conference**

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Outline

- Types of Cracking in Asphalt Pavements
- Wide Cracks
- Strategies for Repairing Wide Cracks
- Recommendations

Note: We may reference specific manufacturers or products. Inclusion by reference in this presentation does not constitute an endorsement of these methods or materials.

Fatigue Cracking



Longitudinal Cracking



Transverse Cracking



Block Cracking



Reflective Cracking



Edge Cracking

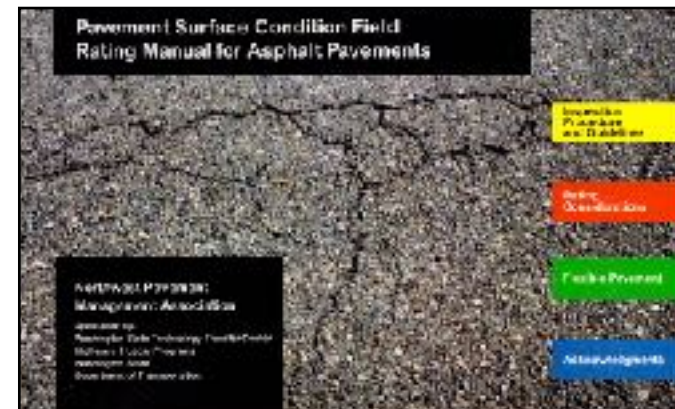
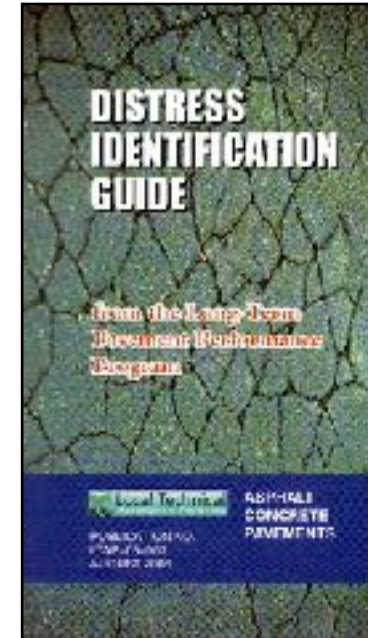


Cracking Distresses



Crack Severity

- Crack Severity is defined by the crack width
 - ASTM D6433
 - LTPP Distress Rating Manual
 - NWPMA Distress Rating Manual



Crack Width and Severity

Longitudinal Cracks

	ASTM		LTPP		NWPMA	
	Min	Max	Min	Max	Min	Max
Low	-	3/8"	-	1/4"	-	1/4"
Medium	3/8"	3"	1/4"	3/4"	1/4" No Spalls	-
High	3"	-	3/4"	-	1/4" Spalled	-

Typical Crack Treatments

	AI	Alberta MOT
Width	1/8" to 3/4"	1/4 " to 1"
Prep	Clean and Rout if < 1/2"	Clean and Rout if < 3/4"
Materials	Neat Asphalt Emulsion PMA Asphalt Emulsion PG Asphalt Asphalt Rubber	Neat Asphalt Emulsion PMA Asphalt Emulsion PG Asphalt Fiberized Asphalt Asphalt Rubber Rubberized Asphalt Silicone

Cracking Mechanisms

Narrow
Fatigue
Crack



Narrow
Top
Down
Crack



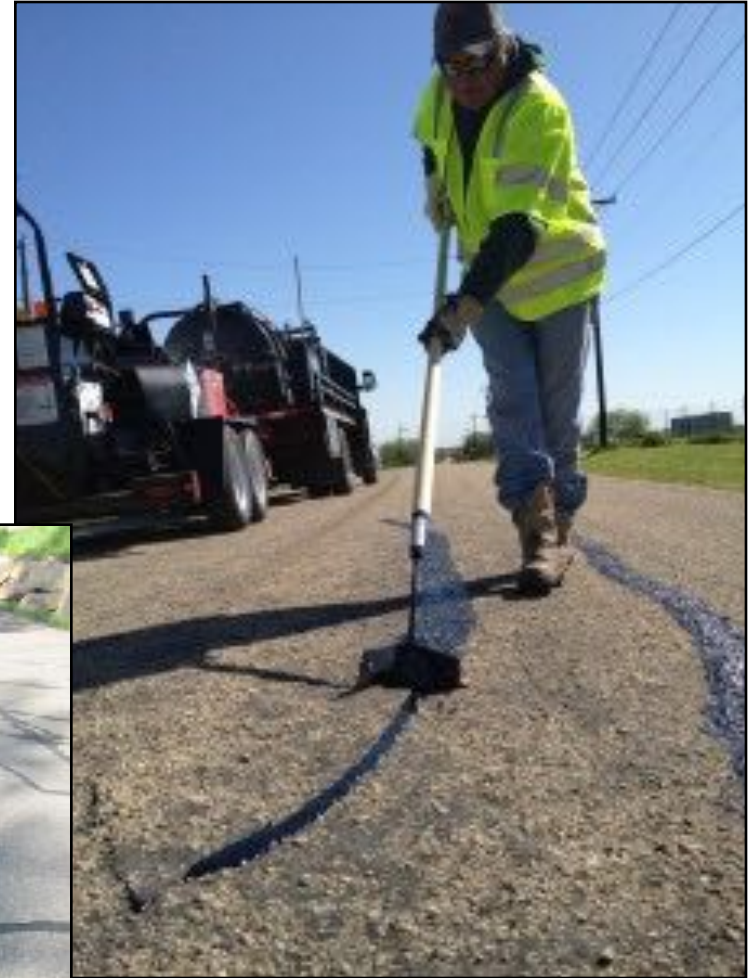
Wide
Cracks in
Successive
Overlays



Seal Cracks Early and Often



Crack Sealing



But What About Wide Cracks?



What About Wide Cracks?



Sawcut/mill and Patch



Sawcut/mill and Patch

- Patching Width?
- Maintenance
 - Two joints to maintain
- Labor Intensive
- Cost-effective?



Mastics



Reference: CRAFCO PolyPatch and Maxwell Products

PAVEMENT SERVICES, INC. 

Mastics



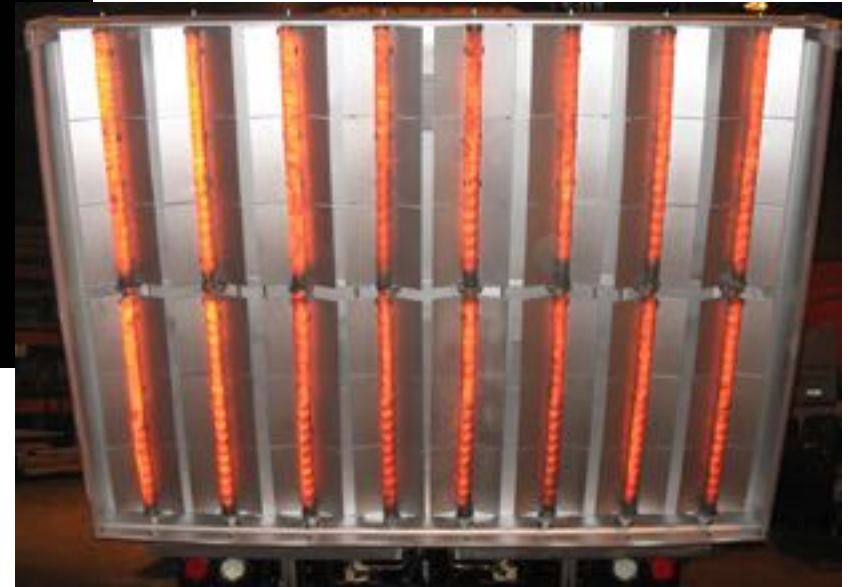
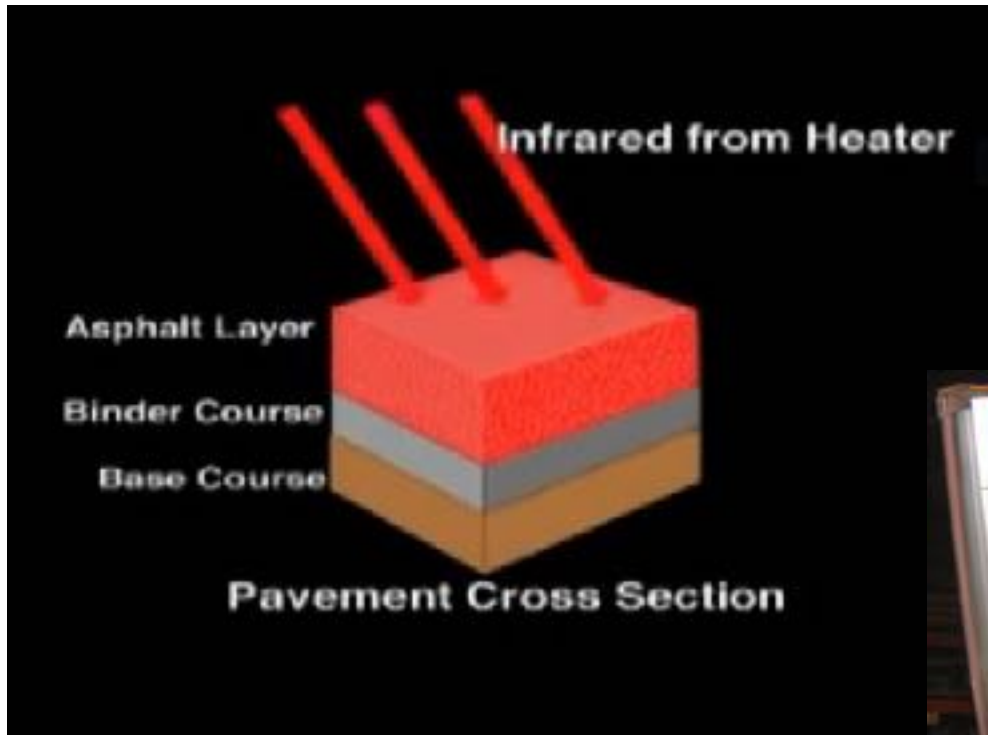
- Hot applied
- Pourable
- Self Adhesive
- Proprietary Mixtures
- Typically include some fine aggregate

Mastics



- Preparation?
- Cost?
 - Some agencies report 10-20 x increase in cost over sealants
- Life expectancy?

Infrared Repair Concept



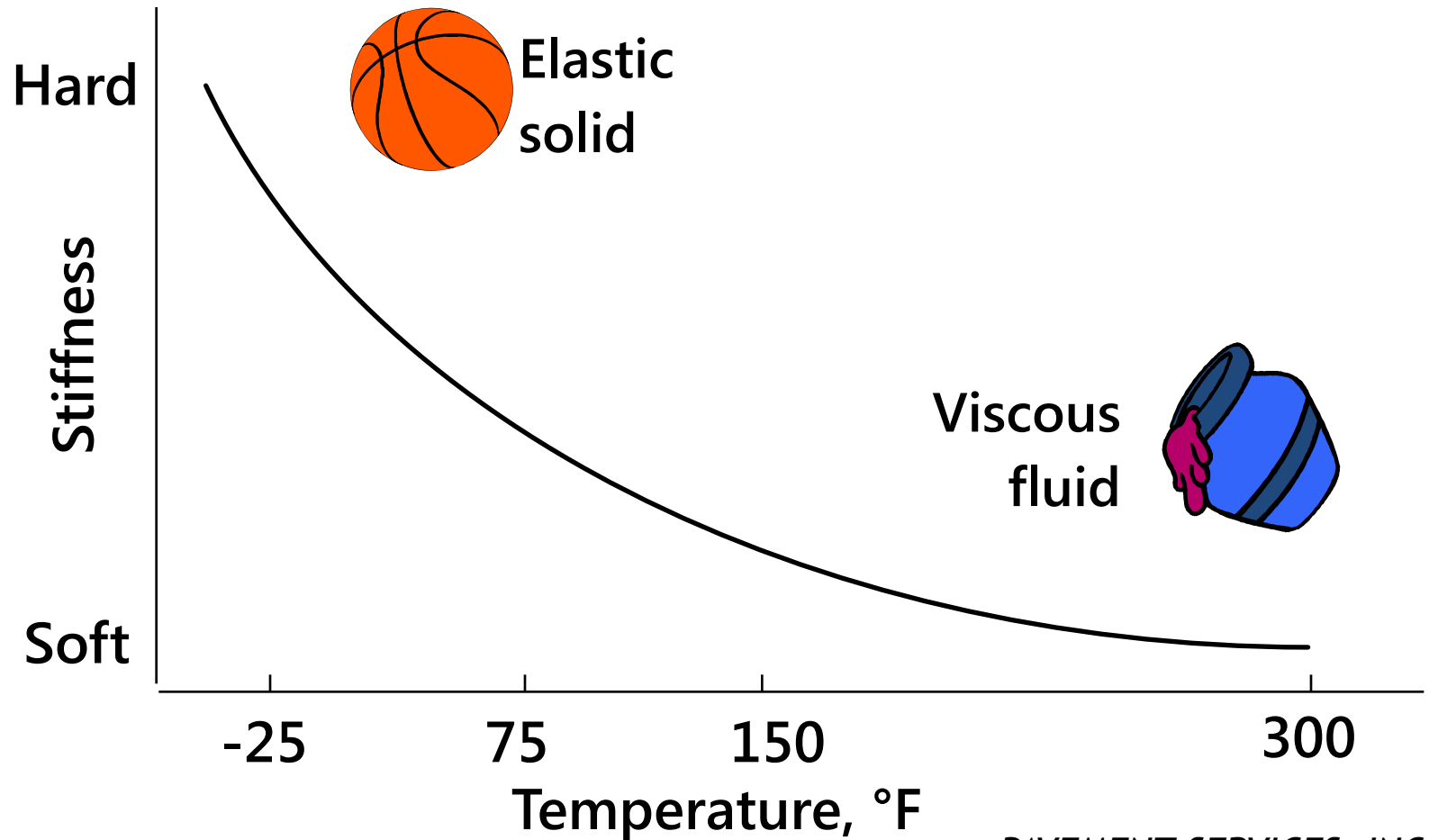
Infrared Repair Concept



Apply heat w/o
burning asphalt



Asphalt is a Viscoelastic Material



Infrared Repair Concept



Loosen Material

Add Material



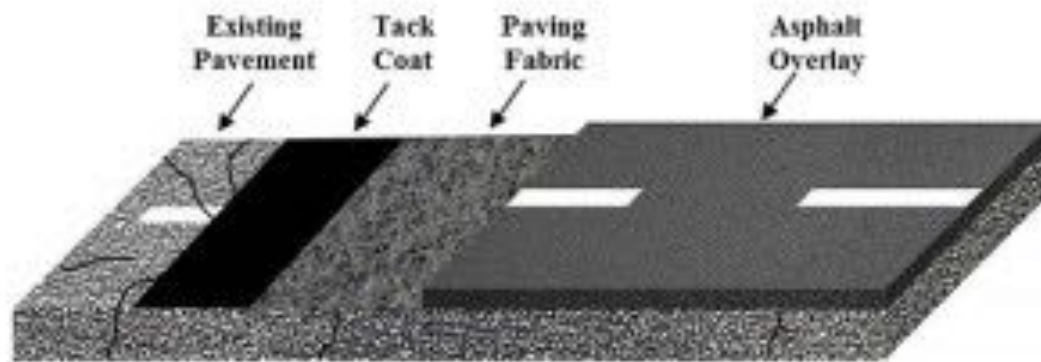
Compact

Infrared Repair Concept



- Rejuvenator oils?
- Life expectancy?
- Cost?
- Limitations?

Paving Fabric



- Delays reflective cracking 2-4 yrs
 - cracks < 1/8"
 - Marginally cost effective

CDOT Study

- 5-yr Study
- Fabric performed as well as control section for transverse cracking
- Fabric performed worse than control for fatigue and long. cracking

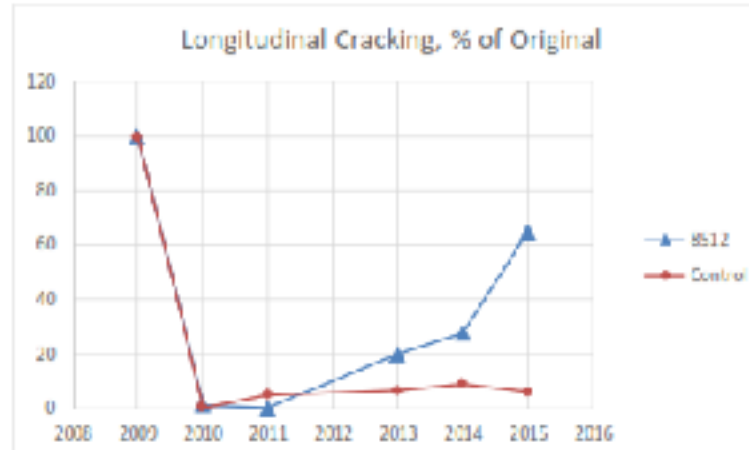


Figure 8. Longitudinal Cracking in Eastbound Driving Lane

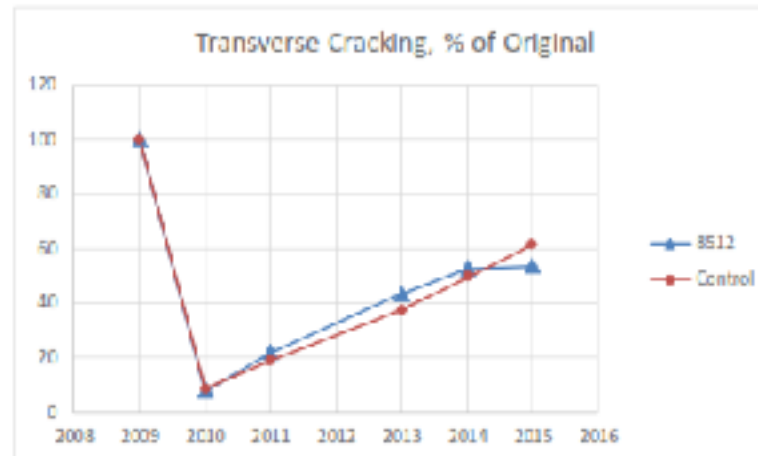
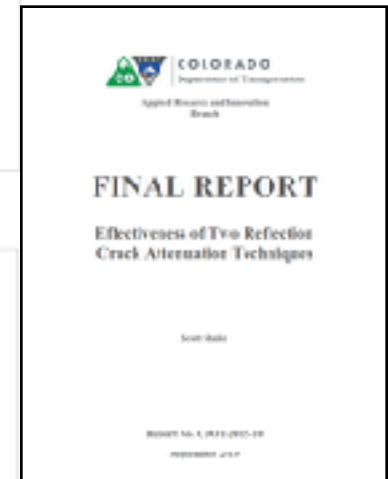


Figure 9. Transverse Cracking in Eastbound Driving Lane



Reflection Crack Interlayer (RCI)



- Asphalt-rich interlayer
- Fine-graded HMA, highly elastic PMA binder
 - 5%+ SBS Polymer load for elasticity
- High asphalt content—7%+



Reflection Crack Interlayer (RCI)



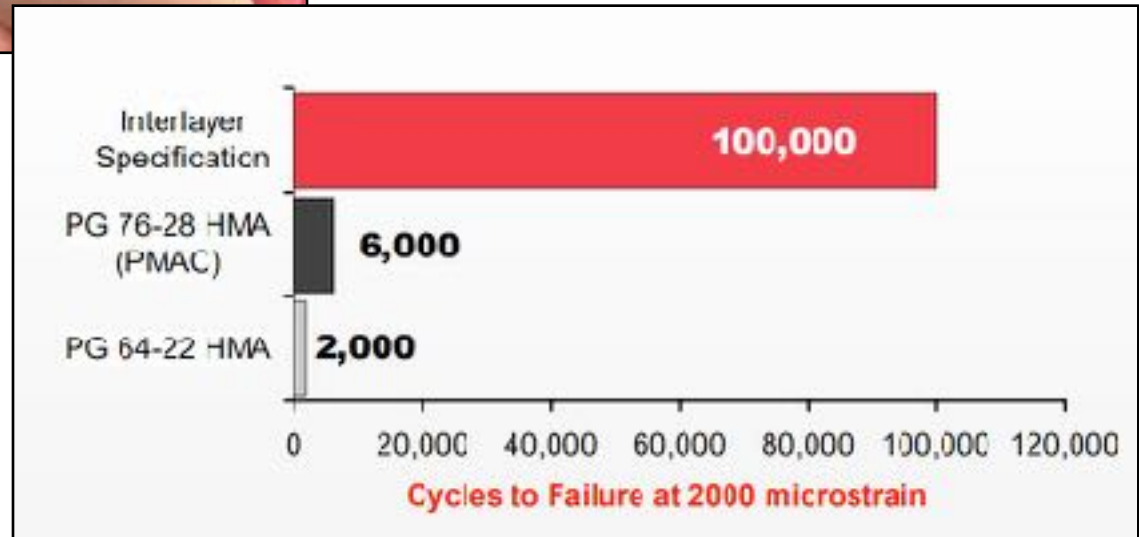
Typical interlayer mix specs

SGC design
(Superpave Gyratory Compactor)

50 gyrations

0.5 – 2.5% air voids

16% min VMA

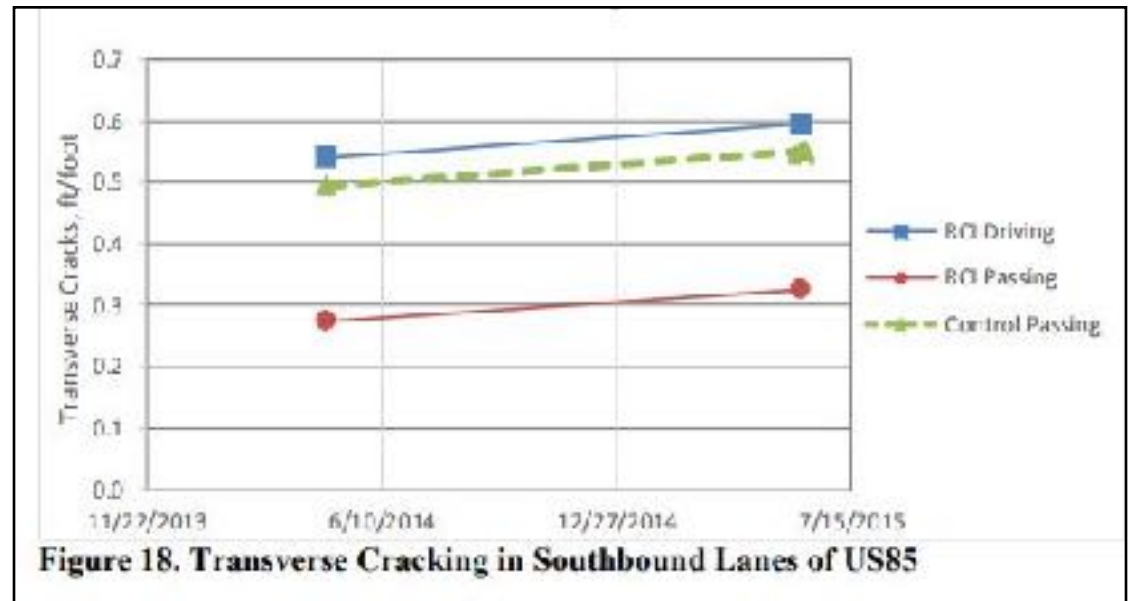
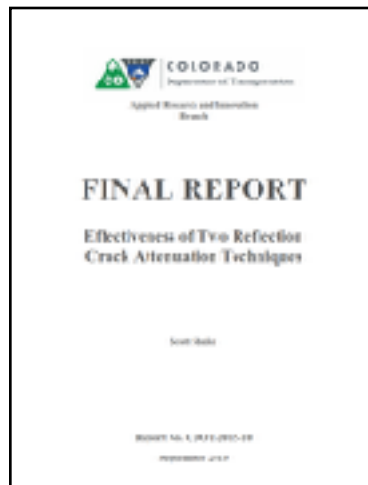


Reflection Crack Interlayer (RCI)

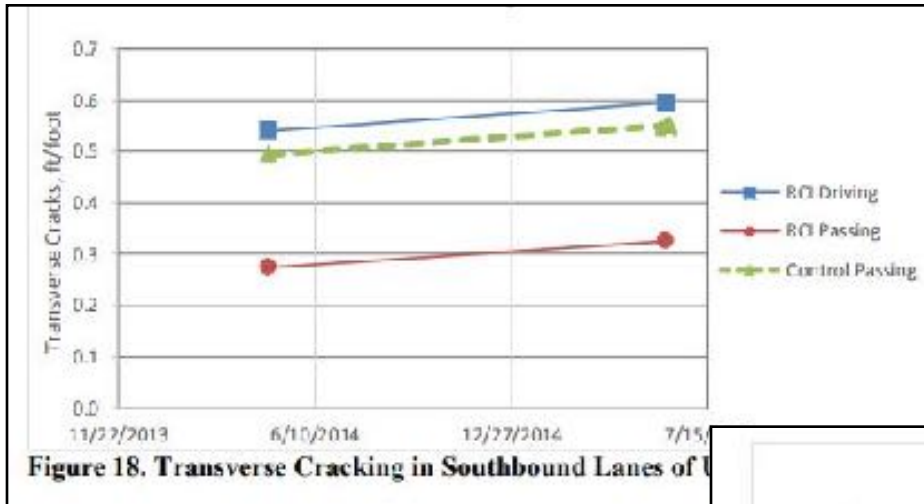
Table 1. Properties of RCI

Sieve	Passing, %
3/8-inch	100
4	94
8	75
16	53
30	33
50	12
100	5
200	2.9
Stability	18

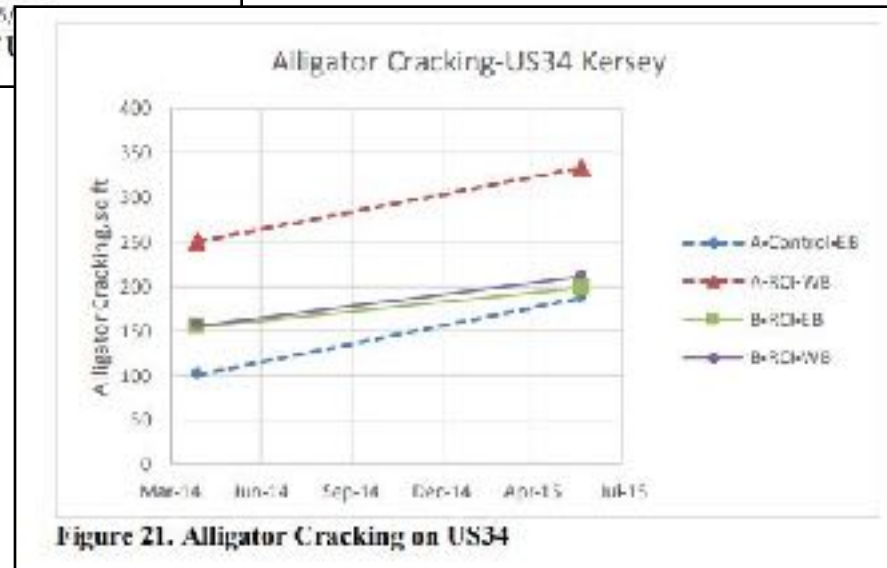
VTM, %	4.5
VMA, %	23.5
AC, %	9.5
PG Grade	70-28
Compaction, gyrations	50



Reflection Crack Interlayer (RCI)



CDOT found that control section performed as well or better than RCI for transverse and fatigue cracking.



Summary

- Wide cracks are difficult
- Emergency/short term



Summary

Strategies for Wide Crack Repair

Expected Life	Mastic	Saw cut / Patch	Infrared	RCI	Fabric	Mill / O-Lay
Short	●	●	●			
Medium	?	●	?	●	●	●
Long		●		?	?	●

Thank You!

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