

Cold-In-Place Recycling (CIR) in Nevada

National Pavement Preservation Conference
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Nashville, TN

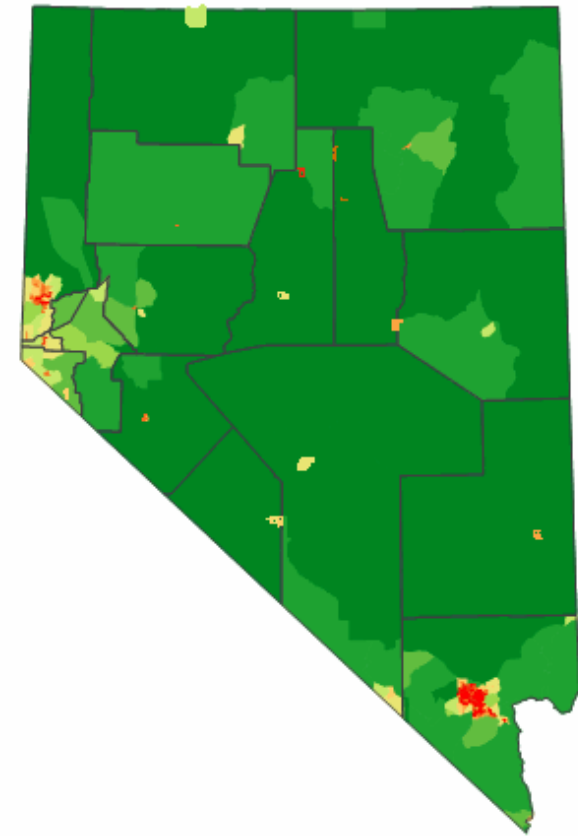
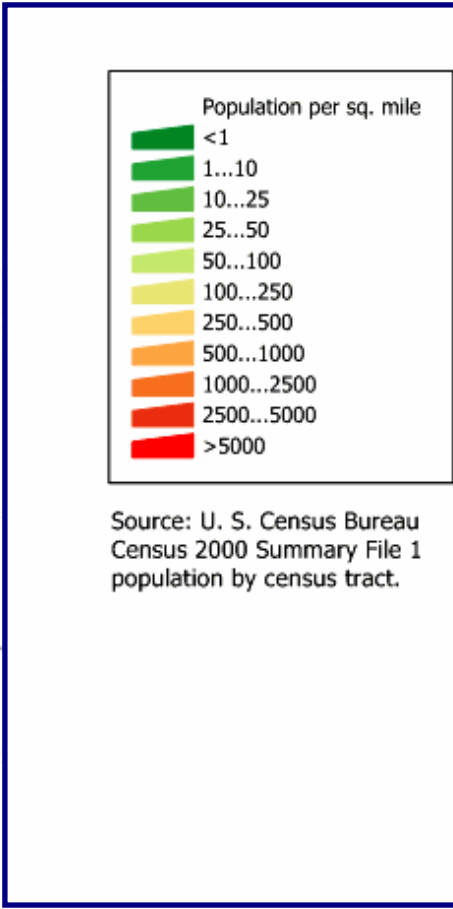
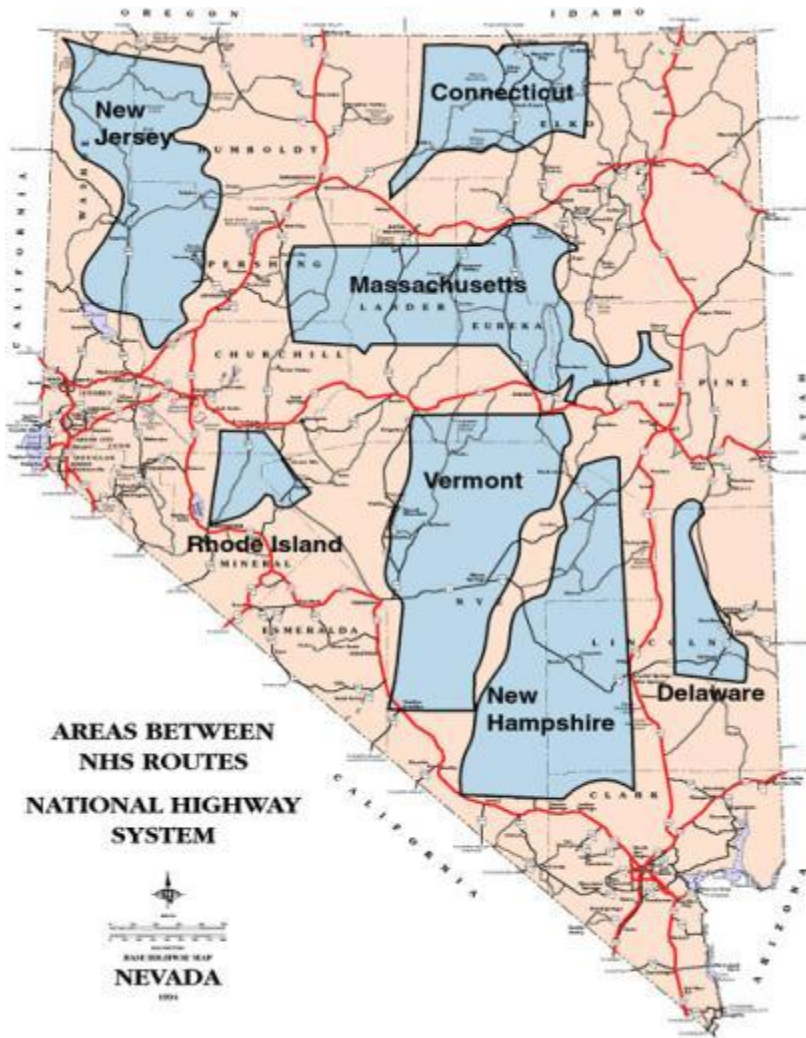
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Outline

- *Overview of the Pavement Preservation Program at NDOT*
- What is the definition of CIR (NV Specs)?
- Why should an agency use CIR?
- How do you select a project for CIR?
- How do you construct a successful project?
- What is the short-term & long-term performance of CIR?
- What are the costs?
- Conclusions and Recommendations





Centerline miles of rural highway = 4,782
Centerline miles of urban highway = 618



Overview of the Pavement Preservation Program at NDOT

- Nevada was the fastest growing state in the country for the past two decades. As such there is a high demand for capacity improvements!
- Nevada is the hardest hit state by the recession.
- Despite a significant cost increase in highway construction, the level of funding for pavement preservation has not increased since 1990.



Overview of the Pavement Preservation Program at NDOT

- NDOT has some of the smoothest roads in the country based on the FHWA's Highway Performance Monitoring System (HPMS).
- 19th Annual Highway Report

Performance by Category in 2008	Rank
Rural Interstate Condition	1
Rural Other Princ. Art. Condition	20
Urban Interstate Condition	20



Roadway Categories

Category	ADT & Truck Traffic	% of System	Projected Deterioration Rate (Years)
1	Controlled Access	19	8
2	ESAL > 540 OR ADT > 10,000	20	10
3	540 ≥ ESAL > 405 OR 1,600 < ADT ≤ 10,000 & NHS	21	12
4	405 ≥ ESAL > 270 OR 400 < ADT ≤ 1,600	15	15
5	ADT ≤ 400	25	20



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Definition of CIR (Nevada Specifications)

- Utilizing a CIR train to:
 - Mill the existing plantmix to a depth of to 3”
 - Crush the millings to < 1.5
 - Mix the millings with and emulsion (CMS-2S or Engineered Emulsion)
 - Lime slurry mandatory w/ CMS-2S
 - Use the paver to place the millings



Definition of CIR (Nevada Specifications)

- Compact the material after the emulsion breaks (1 to 2 hours)
- Seal and sand blotter the mat and open to traffic (prefer traffic to help compaction on low volume roads)
- AADT < 5000, No overlay, Double chip seal wearing surface



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The Message

- ***We must utilize the existing pavement structural section to meet the engineering and economical challenges of pavement rehabilitation:***
 - Limited funding for pavement preservation
 - In the past decade the cost of plantmix has tripled (-)
 - Lack of quality aggregates
 - Stringent environmental regulations



The Message

CIR is a cost effective preservation treatment that Nevada had been using for 30 years.



Facts About CIR

Cold-In-Place Recycling Projects 1982-2012

- Total Cold-in-Place Recycling with PBS
950.197 cl. miles
- Total Cold-in-Place Recycling Seals Only
344.854 cl. miles
- Total Cold-in-Place 1295.051 cl. miles
(24% of total system)



Facts About CIR

- NDOT successfully CIR over 3421 lane miles of roadway ranging from
 - IR080 – 3700 daily ESALs
 - SR892 – 4 daily ESALs



CIR Train US095A



CIR Train SR659 (McCarran Blvd.)

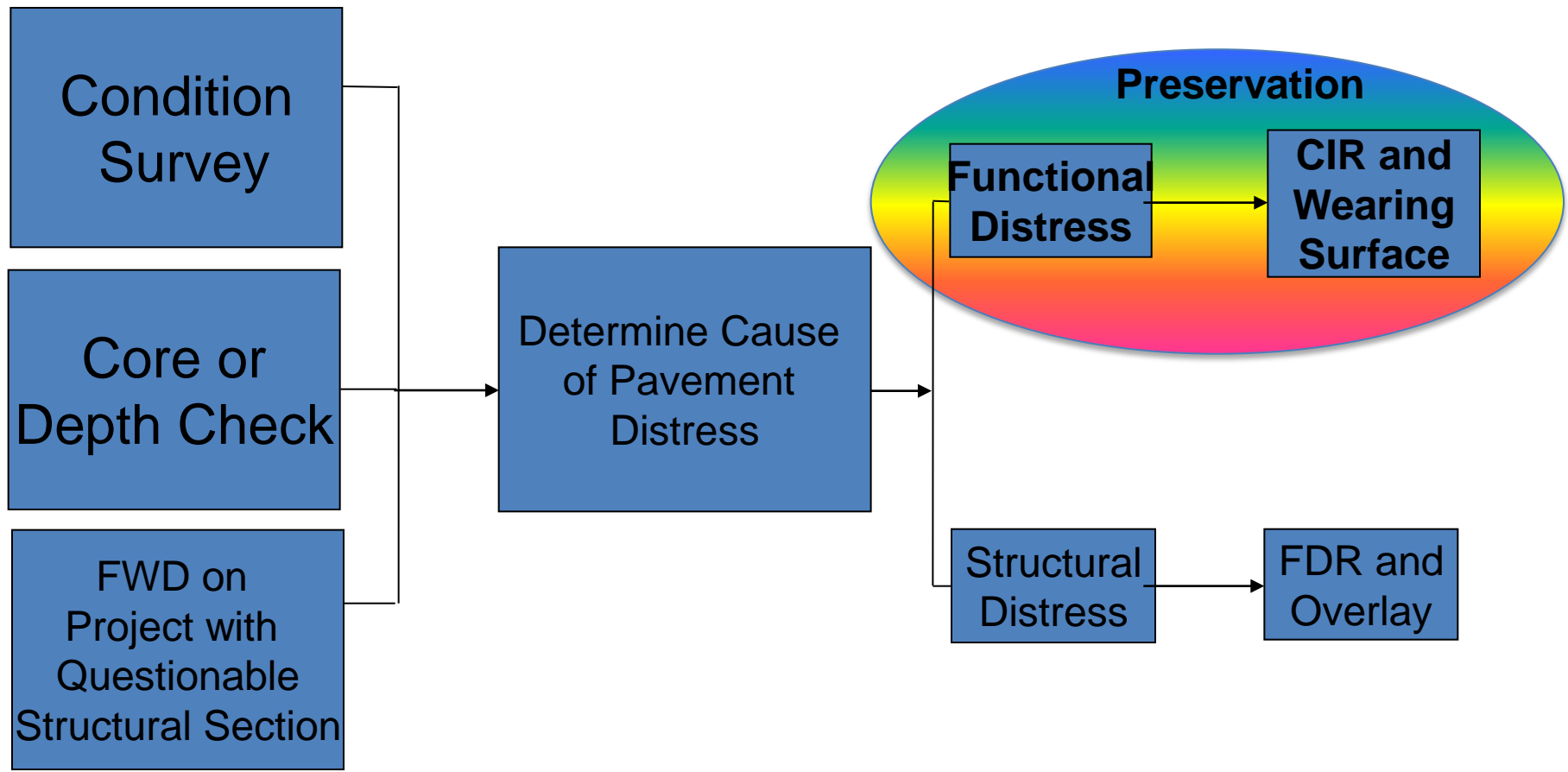


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How Do You Select a CIR?



Project Selection Criteria

- CIR
 - ≥ 3 " of plantmix on 80% of the cores
 - $< 15\%$ of the pavement is experiencing load related distress



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How do you Construct a Successful Project?



- Develop a check list of critical items
- The CIR Contractor is responsible for correcting any damage, raveling, or areas of non-uniform mixture at their own expense
- Use experienced individuals



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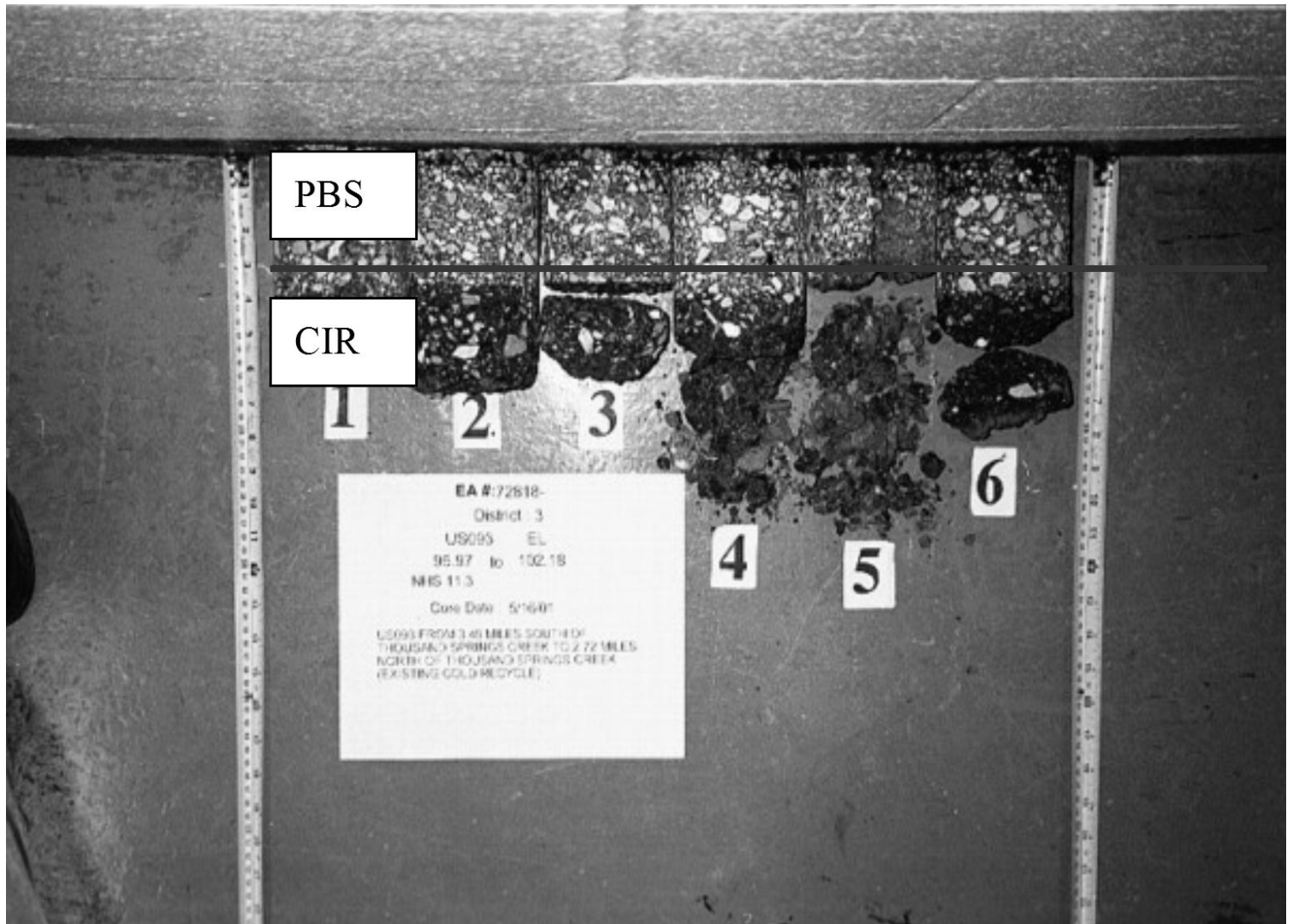


Short-Term Performance of CIR

- Short term performance (less than 10 years)
 - With lime slurry we've had excellent performance
 - With using engineered emulsion we've had mixed performance



CIR Cores



Long-Term Performance of CIR



- Long term performance (10-20 years)
 - With lime slurry we've had excellent performance
 - Minor stripping in harsh climates when lime slurry is NOT used



Long-Term Performance of CIR



- Long term performance (10-20 years)
 - Have re-recycled 73 cl. miles
 - Average age at time of 2nd treatment is 16 years
 - Minor stripping in harsh climates when lime slurry is NOT used



A wide-angle photograph of a two-lane asphalt road with double yellow lines, stretching into the distance. The road is flanked by green grass and some trees on the left, and a gravel shoulder with a white line on the right. In the background, there are large, rugged mountains with patches of green and brown. The sky is blue with some light clouds.

***Long-Term Performance of CIR
(SR208 – 2nd CIR -4yr. old)***

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Cost Comparison Among Various Treatment Alternatives (per centerline mile)

Treatment	Cost (K)
2" Mill	\$90
3" CIR	\$100
2" Overlay	\$136
2" Overlay w/ 3/4" O.G	\$200
2" Overlay w/ single (3/8") Chip	\$160
3" CIR w/ double Chip	\$150



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Recommendations

- All agencies should consider utilizing CIR in their Pavement Preservation Program
- Start slowly and keep pushing the envelope



Recommendations

- Get the contractors involved at an early stage
- Require the contractors to accept responsibility for their work
- Continue improving the process



CIR
Allows You to Do More
With Less



QUESTIONS?

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