

# **Cold In-Place Recycling Review 2004 and 2009 Update**

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FHWA**

**2010 Mid-Atlantic Regional  
In-place Recycling Conference**

## What I am Covering

- Survey to the STATES using Subcommittee on Materials User/List – 2004
- Survey to our FHWA Divisions about CIR used – 2009
- Survey to our FHWA Division about the past two conferences -2010

# What were the Goals?

- Gather “Best Practices” – learn what is happening
- Determine methods used to overcome barriers
- Learn about advances in equipment, materials, & specifications
- Learn about economics and performance benefits
- Engineering process – design, selection, construction process

## **Members of Review Team**

Jason Harrington - Pavement Technology

Mike Arasteh - East Resource Center

Butch Waidelich - NH Division

Tom Deddens - Asset Management

Funding support from RMRC



## Initial Questionnaire

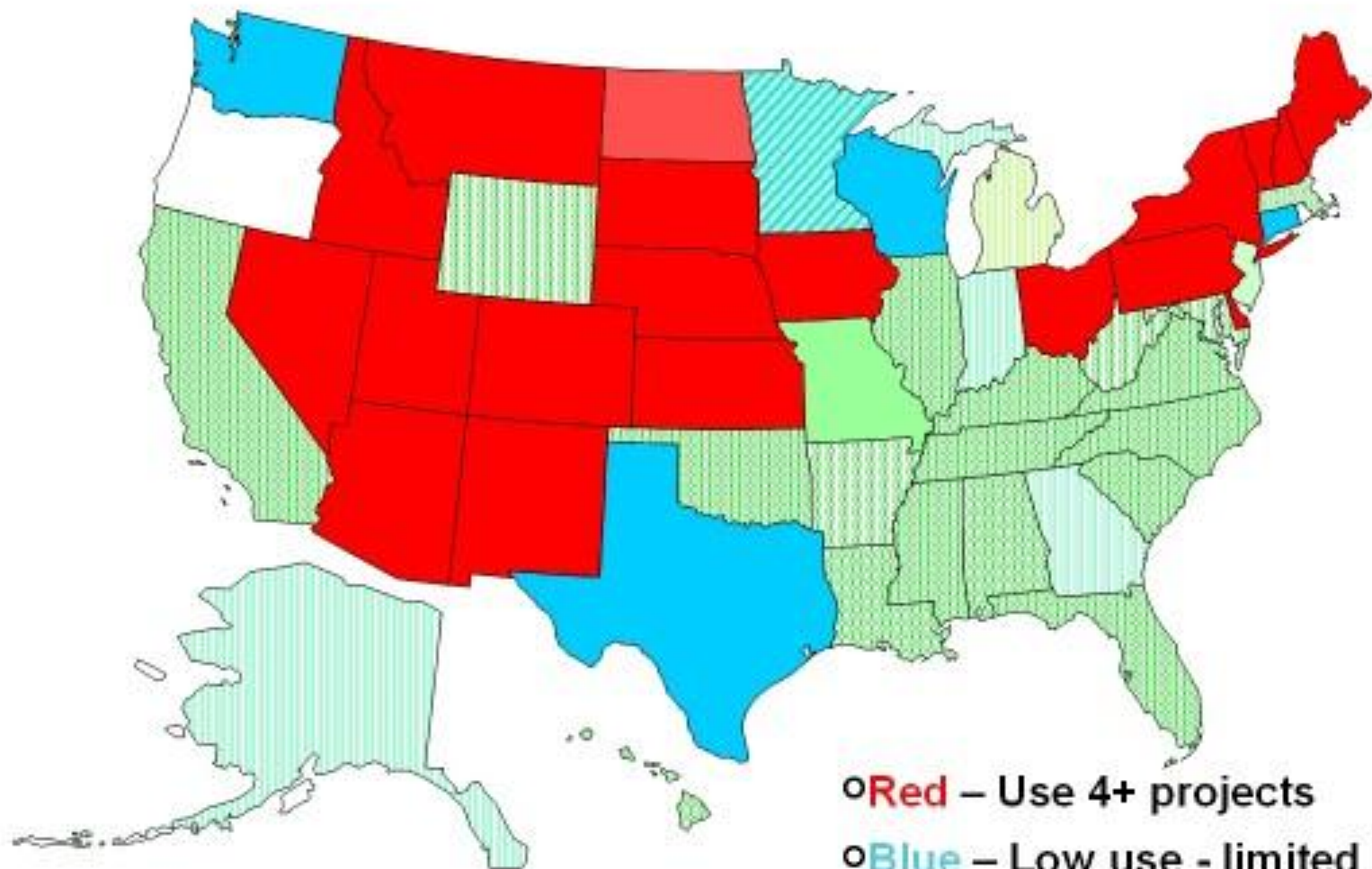
- Is CIR used as a means of rehabilitating pavements
- What is the estimated annual tonnage processed?
- Is the Use of CIR limited by roadway traffic level?
- What types of recycling agents are permitted ? If any?
- Is a design processed used to determine the required thickness of pavement ?
- Are specifications used for the control of the construction?

## Extent of Use in 2004?

41 out of 52 state DOT's replied to the initial questionnaire (79% response rate)

- 21 states use CIR on their roads
- 20 states reported no use of CIR

# 2004 States Use of CIR



- o **Red** – Use 4+ projects
- o **Blue** – Low use - limited
- o **Green** – No Use
- o **White** – no response



## Of the 21 that said yes –

- 9 use it frequently or starting to increase their CIR projects
  - 6 states (KS, NV, NM, NY, NE, SD) have a well developed program
  - 3 states (IA, MT, and ME) note increasing use
- 4 have specs but use it on one or fewer projects a year
- 3 use it on only county/local roads
- 6 states really are not using it on STATE projects



## Three states selected for further investigation via an on-site review

- New York
- Nevada
- Kansas

## **Items we were interested in discussing**

- **Project Selection**
- **Program Implementation**
- **Pavement Management System**
- **Performance Monitoring**
- **Materials**
- **Quality Control / Quality Assurance**
- **Research and Development**

# State Experience / Anticipated Savings

## New York DOT

Successfully used for 300 projects during the last 15 years.

Typically average 2 million metric tons per year

## Nevada DOT

Successfully used for 20 years.

Began w/ 6 projects between '85 and '92

Successfully treated 770 centerline miles (11 %) over the last 9 years

Figure savings of \$600 million during this period

Typically realize \$40 million annually

## Kansas DOT

KDOT has used CIR successfully since 1977, Since October of 1992 to date over 6000 lane miles have been cold in-place recycled thus exhibiting a high degree of confidence in performance of the process.





Add Stone

NY DOT



End Results



Add Stone on top



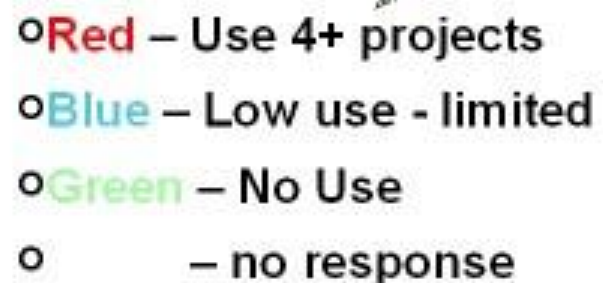
CIR Equipment

## 2009 Survey of Division

### 40 FHWA Divisions reported back

- Does the State use CIR? (not county)
- Past year level of use
  - Low 1 – 3 projects
  - High 4 – 10 projects
  - Very high 10+
- This year level of use
- Future Extent level of use







## What I Learned:

22 yes 18 no as reported

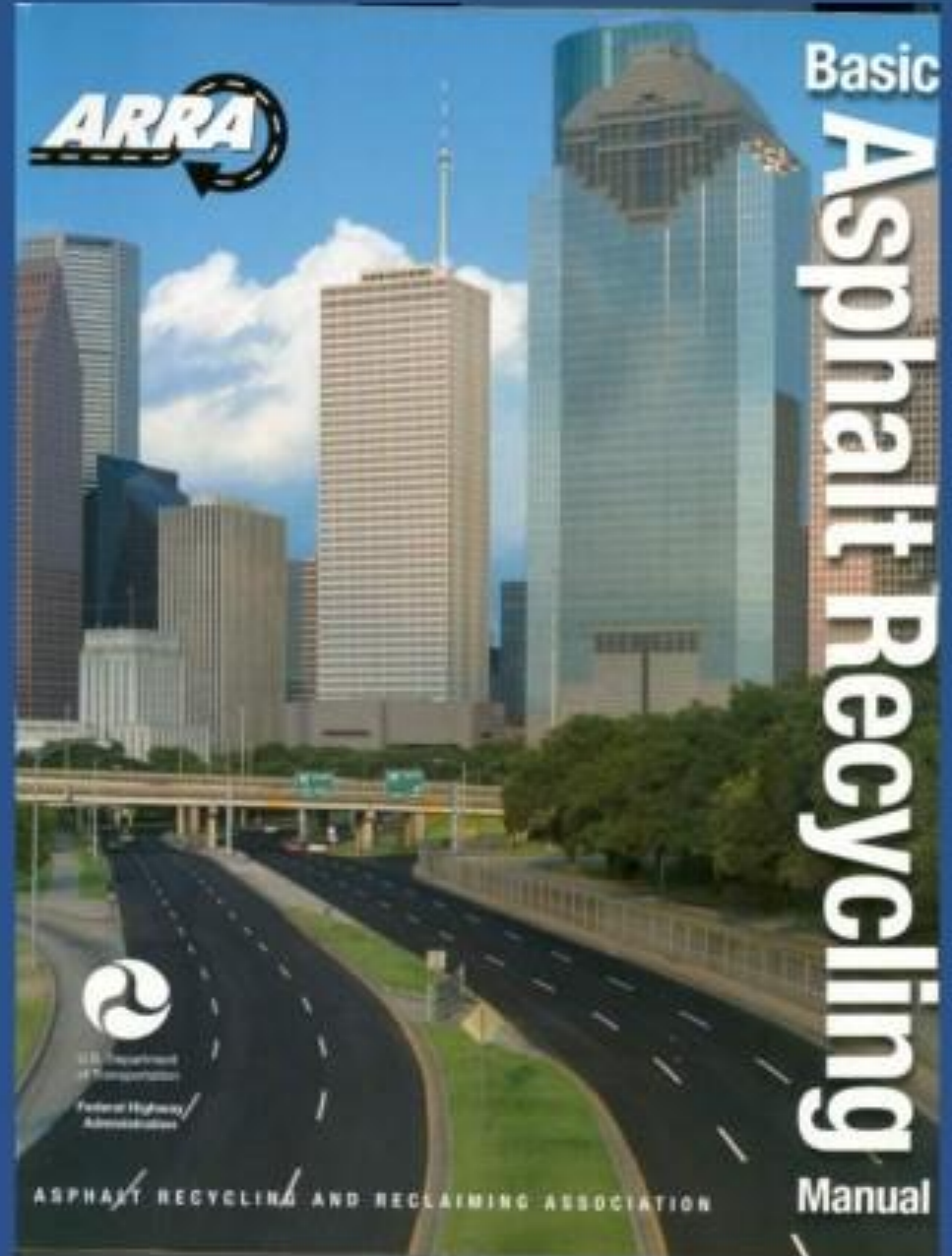
Using what I know – 28 YES , 22 NO and 2 Unknown

Changes from 2004

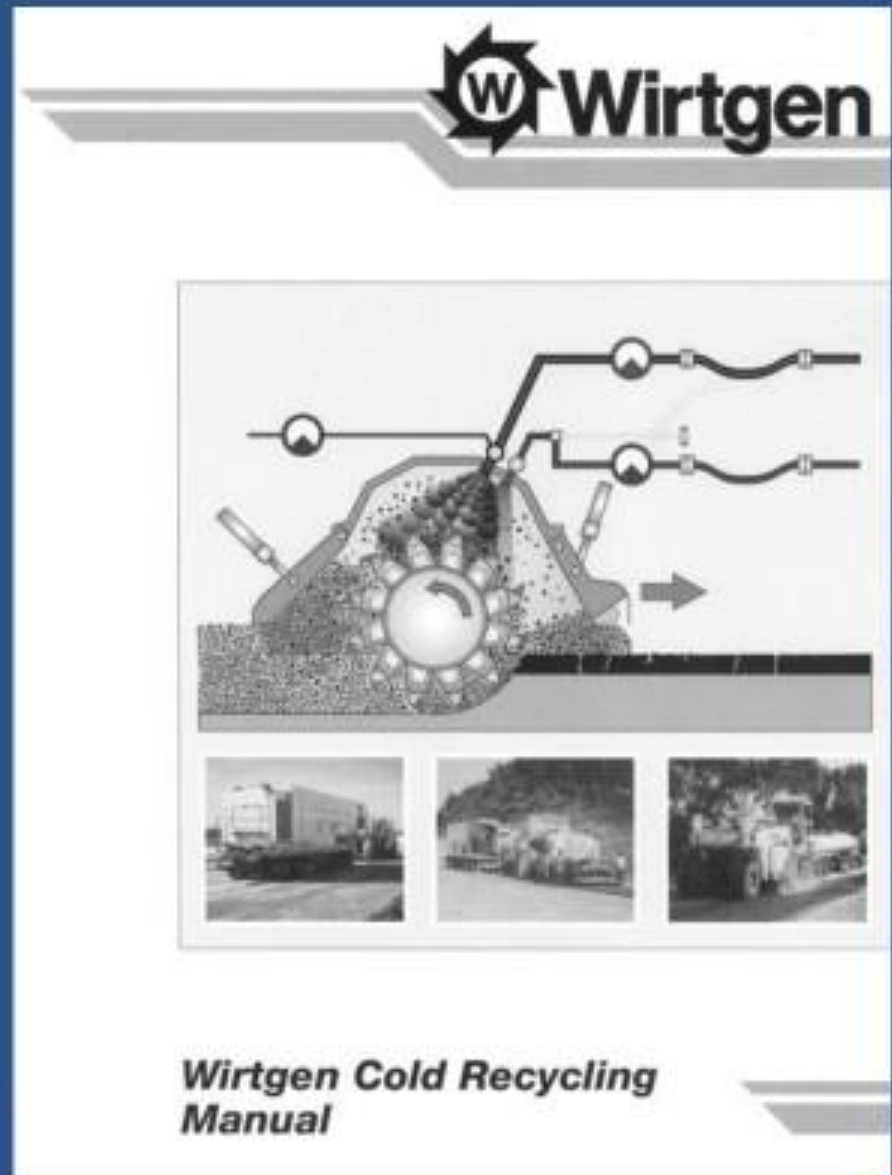
- CA from NO to 3-4 projects and evaluation of performance
- IL from NO to very high use.. ( State or County?)
- MI from unknown to YES and low – future forecast –less
- MN from unknown to Yes and low – future forecast – increase
- MO from NO to Yes and high level and increasing!!!!!!!!!!!!
- OK from NO to "YES" and low – performance concerns, 1 maybe yr
- WY from NO to YES and low and staying same
- VT - Yes and increasing in future!!! Lots
- VA NO to still NO – but recently developed a special provision to perform CIR. VDOT is investigating several projects to use CIR on in the coming years.
- PA high use

Questions for SD, ND, OR, KY, KS. UT, MT, WY, CT

## Partners in CIR: Asphalt Recycling & Reclaiming Association



## Industry Is Active in Technology Transfer







## Recycled Materials Resource Center – Another Partner

- Determination of N-design for CIR Mixture Design Using the Super Gyratory Compactor (SGC)
- Laboratory Foamed Asphalt Producing Plant
- Determination of Structural Layer Coefficient for Roadway Recycling Using Foamed Asphalt
- CIR Design Guide for Emulsion using SGC
- SD School of Mines and Tech – FDR Guidelines
- [www.recycledmaterials.org/](http://www.recycledmaterials.org/)



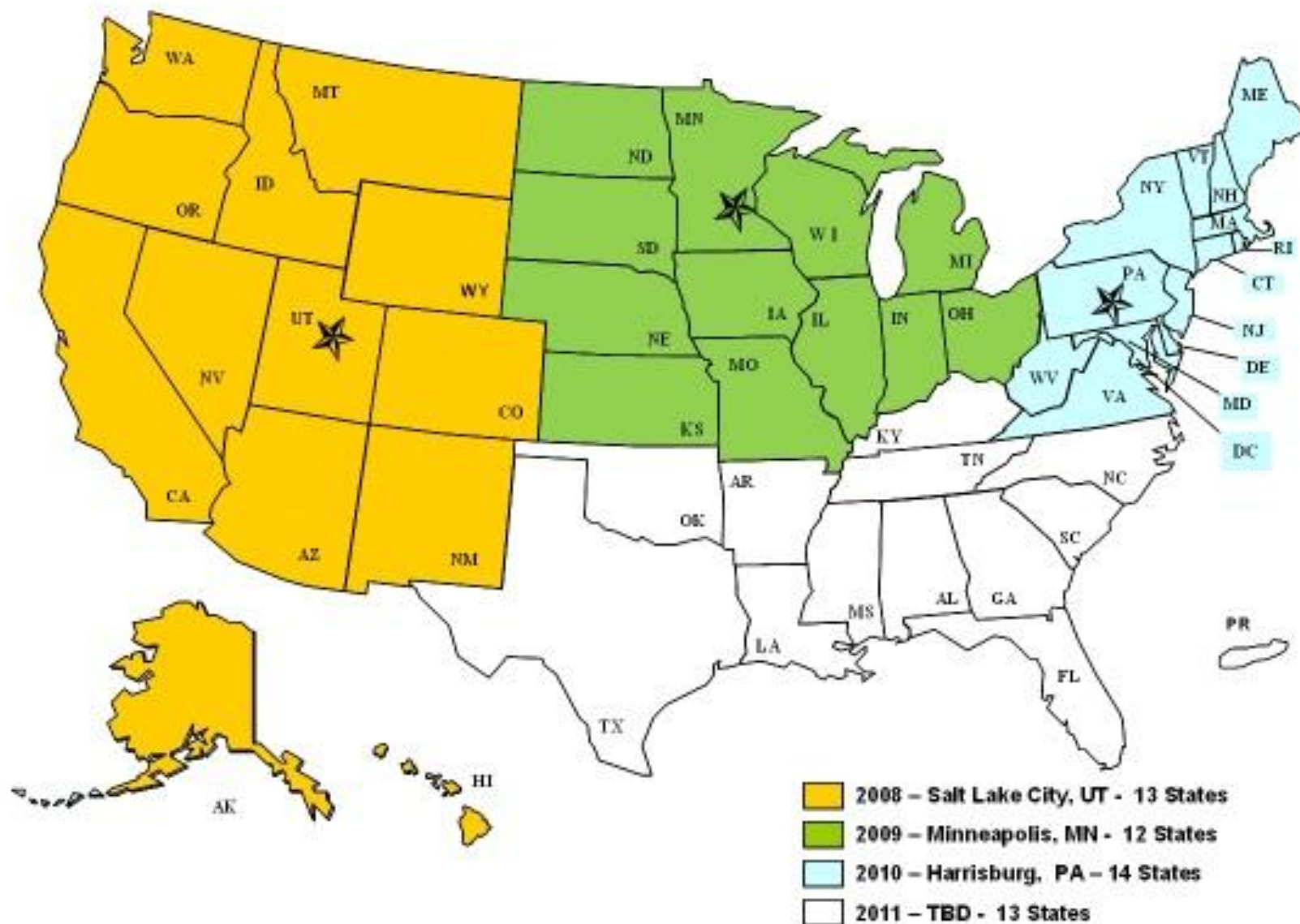
# 2008 & 2009 Conference Impacts to States



- ▣ Did the conference make a difference?
- ▣ Bid more/less/same in-place recycling contracts
- ▣ Factor for changes in program?
- ▣ Does your Pavement Management System have FDR, CIR, HIR?
- ▣ Does your State use FDR? CIR? HIR?

# FHWA / ARRA In-Place Recycling Conferences

## State DOT Attendance





# Western States Responses

## 2008

- ▣ 7 out of 13 responses
- ▣ **Q1 -Made a difference?**
  - ▣ Looking for more CIR projects – improved scoping
  - ▣ Did first CIR project in 2009
  - ▣ Two had no change, one still using only FDR, other State is bigger user (1 million sq yd/year)
  - ▣ Another is moving slowing towards CIR, now only FDR – a little
  - ▣ One is evaluating new CIR specs – issue with cure/performance.
  - ▣ CA says it was strong emphasis for changes

# Western States Responses 2008

## Q2 - Bid more projects?

- ▣ Four States increased bidding
  - ▣ One was first job - 8 bidders!!
- ▣ One had less bids - issue with specs/performance - reworking specs
- ▣ Two were at the same level

## Q3 any reasons for changes?

- ▣ FDR is being used for 3R reconstruction to save \$\$
- ▣ \$\$\$\$ most common answer

# Western States Responses 2008

- ▣ Q4 - In the PMS as a selection?
- ▣ Three NO
- ▣ One not on network level but on Regional Level
- ▣ Two Yes
- ▣ Two say No - but PMS system is getting overhauled - CIR and HIR being added



# Western States Responses 2008

Q5 - Does your State use HIR, CIR, FDR?

HIR	CIR	FDR
√	√√√	√√√
√√√	√√√	√√√
	√ (first one)	
		√
√√√	√√√	√√√
		√√√
√√√	√√√	√√√

# Mid-West States Responses

## 2009

- ▣ 9 out of 12 responses
- ▣ **Q1 -Made a difference?**
  - 5 -Yes and
    - ▣ one said: better understanding of in-place asphalt recycling & willingness to try it
    - ▣ other has 1<sup>st</sup> CIR project underway, and locals seen using more.
  - Three no change - two uses it, one does not
  - One unknown - one did not attend

# Mid-West States Responses 2009

## Q2 - Bid more projects?

- ▣ Two States increased bidding
  - ▣ One was first job
- ▣ Five were same - none of no change
- ▣ One Decreased - due to large amount of HIR projects done in 2007-08. And due to bad experience with CIR in 2009 on low volume routes which were improperly scoped.

## Q3 any reasons for changes?

- ▣ stretch available funding
- ▣ local use increased slightly due to ARRA funding



# Mid-West States Responses

## 2009

- ▣ Q4 - In the PMS as a selection?
- ▣ Four No
- ▣ Four Yes
  - FDR/CIR or HIR/CIR or CIR
  - One all three.
- Our current specs do need to be updated
- CIR and FDR no longer considered experimental following the completion of a research study; special provisions for FDR, CIR, and HIR issued effective Jan 1, 2011
- HIR, CIR and FDR are strategies listed in NDOR's Pavement Maintenance Manual.

# Mid-West States Responses 2009

Q5 - Does your State use HIR, CIR, FDR?

HIR	CIR	FDR
Not now	Not now	Test section
√√√	√√√	√√√
	√ (first one)	
	√√√	√√√
√√√	√√√	
	√√√	
	√√√	
√√√	√√√	√√√

# Thank You for the Lend of Your Ears!!

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