

Best Practices in Solutions for Lane Departure Avoidance

NCHRP Project 20-68A
Domestic Scan Program
Scan 09-03

Best Practices in Solutions for Lane Departure Avoidance

Sponsored by AASHTO, NCHRP and TRB
Administered by Arora & Associates, P.C.
Consulting Engineers, Lawrenceville, NJ

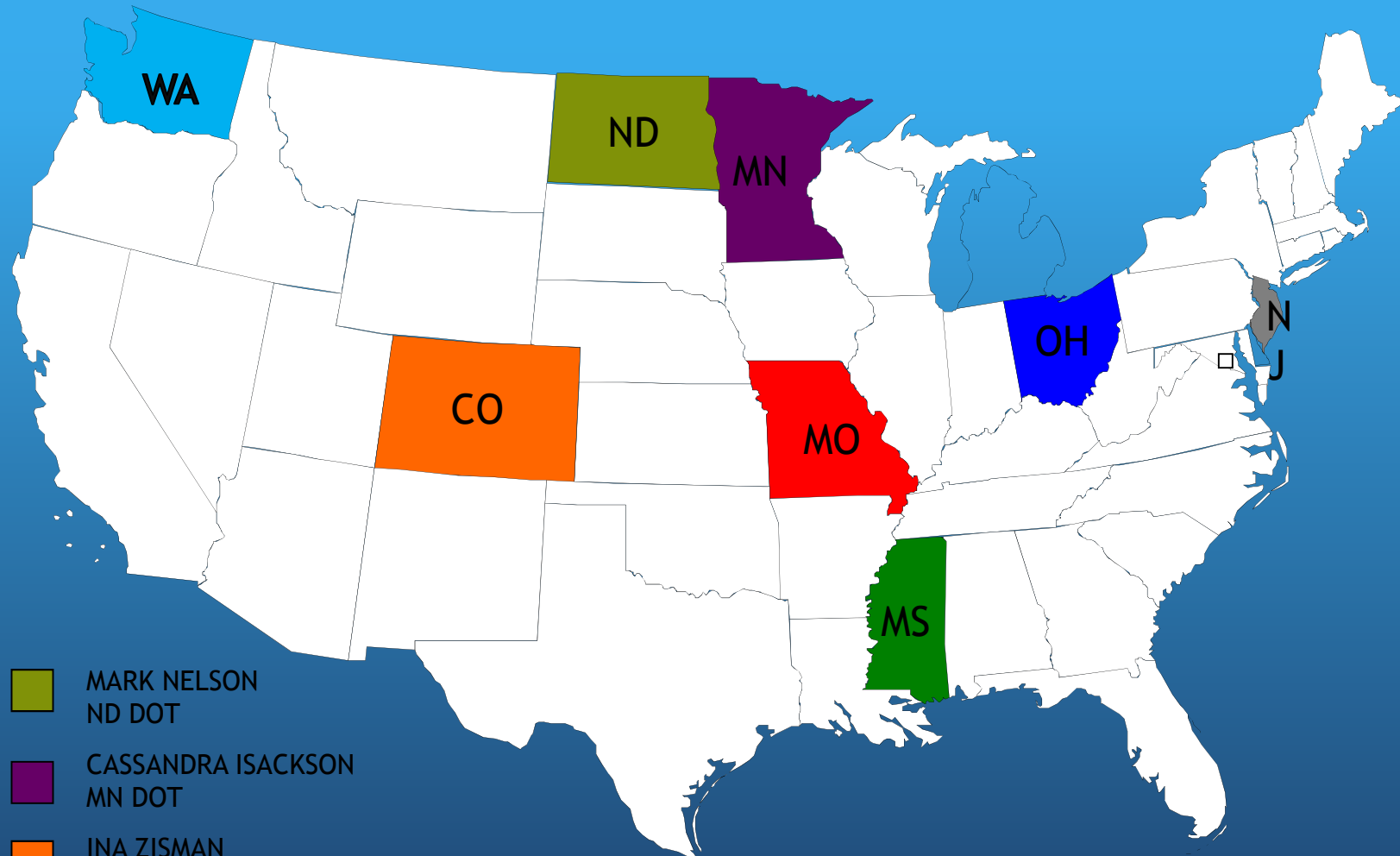
Impetus for Scan

- NCHRP Report 500, Volume 6: “A Guide for Addressing Run-Off-Road Collisions”
- AASHTO’s “Driving Down Lane-Departure Crashes”

Focus of Scan

- While many states have implemented countermeasures, their nature and effectiveness have not been widely disseminated
- To identify and share these successful strategies in preventing lane departure crashes, and
- To ultimately save lives

Scan Team Members



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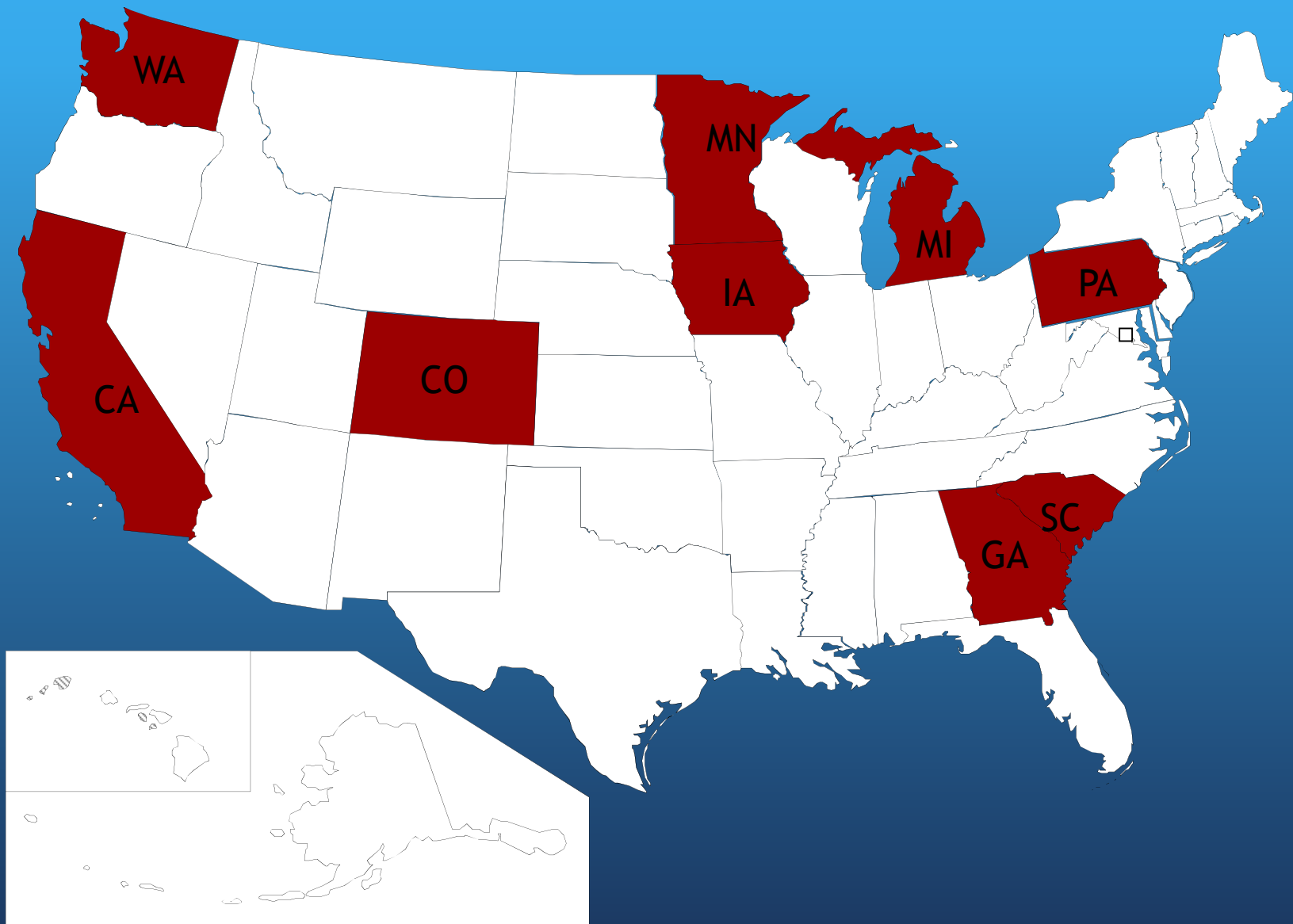


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Participating States



Preliminary Findings - Successful Lane Departure Strategies

- Lane Departure Countermeasures
- Accurate and Timely Crash Data and Data Analysis
- Performance Reviews
- Funding Issues and Resources
- Institutionalized Culture of Safety
- Partnerships

Use of both “Proactive” and “Reactive” Strategies are important

Lane Departure Countermeasures

- Rumble Strips and Stripes (Shoulder, Edgeline, Centerline)
- Safety Edge and Pavement Drop-offs
- Paved Shoulder Widening
- Pavement Markings (Edge Lines and In-Lane Markings)
- Additional Horizontal Curve Signing (Chevrons, Advisory Speed Limits)
- Dynamic Signing (Speed Feedback and LED Signing)
- Median Cable Systems

Successful Countermeasures

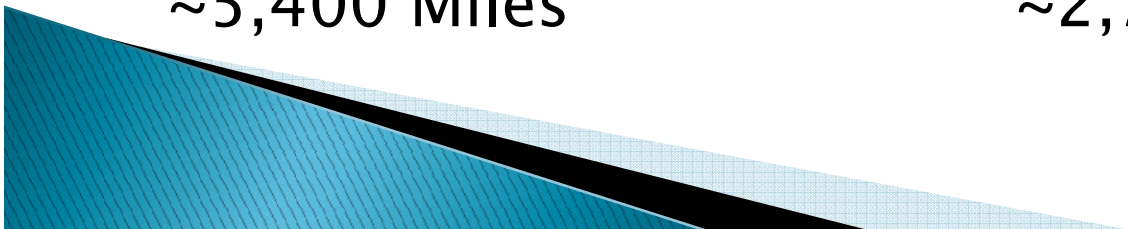
Michigan's Non-Freeway Rumble Strip Program



Centerline Rumble Strips:
~5,400 Miles

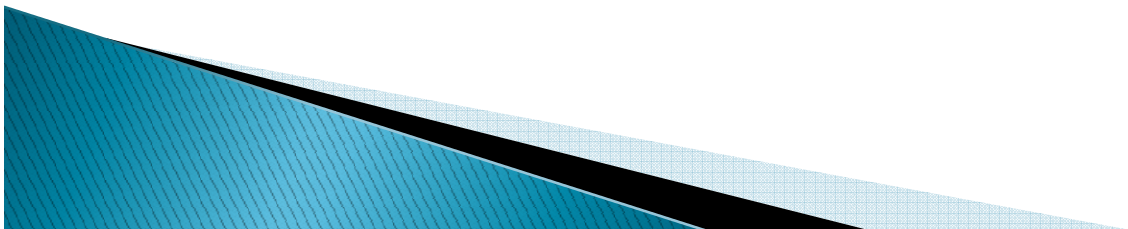


Shoulder Rumble Strips:
~2,700 Miles



Successful Countermeasures

Iowa's Safety Edge



Successful Countermeasures

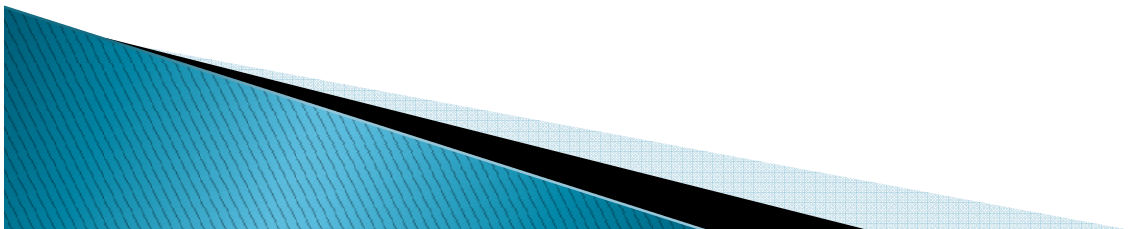
Advanced
Markings,
Signage, and
Delineations



Retro-reflective Pavement
Markings



Curve Delineation



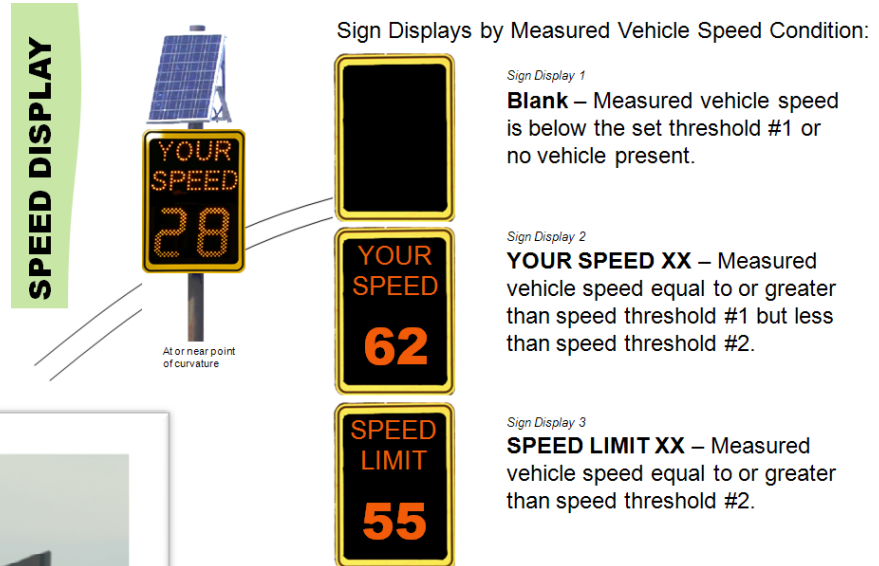
Successful Countermeasures



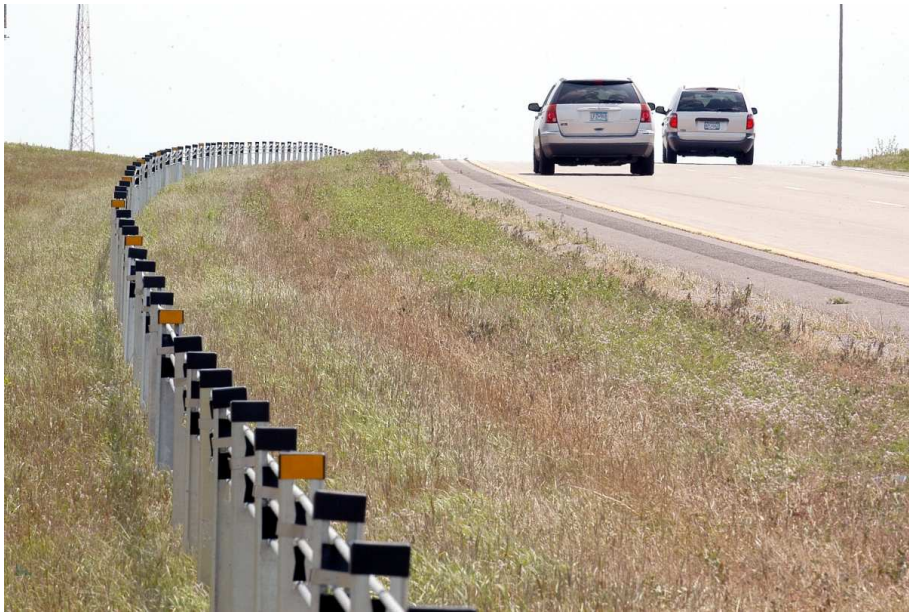
Colorado's Dynamic
Curve Warning Signs

Successful Countermeasures

Dynamic Signing for Horizontal Curves



Successful Countermeasures



Minnesota Cable Median Barrier

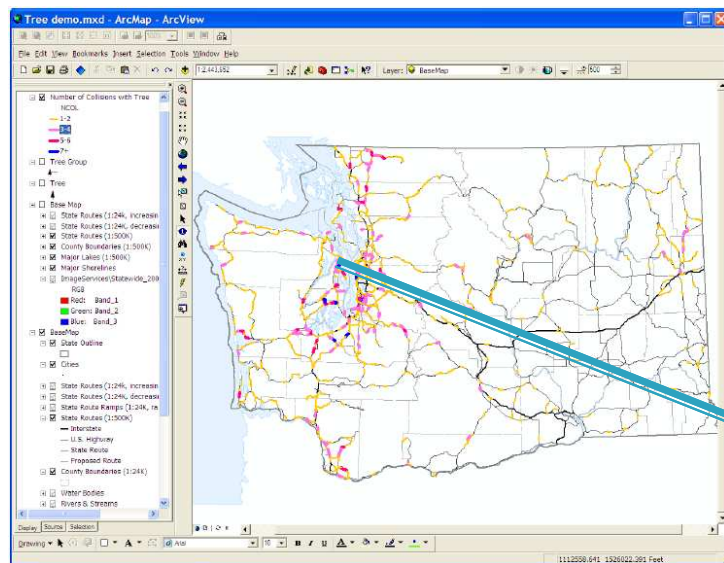
- 260 miles installed to date
- 90–100% Reduction in target K&A's
- Additional 90 miles planned

Crash Data and Data Analysis

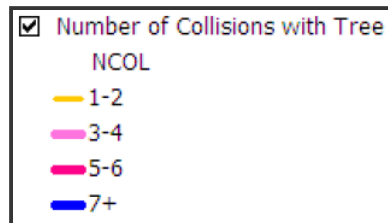
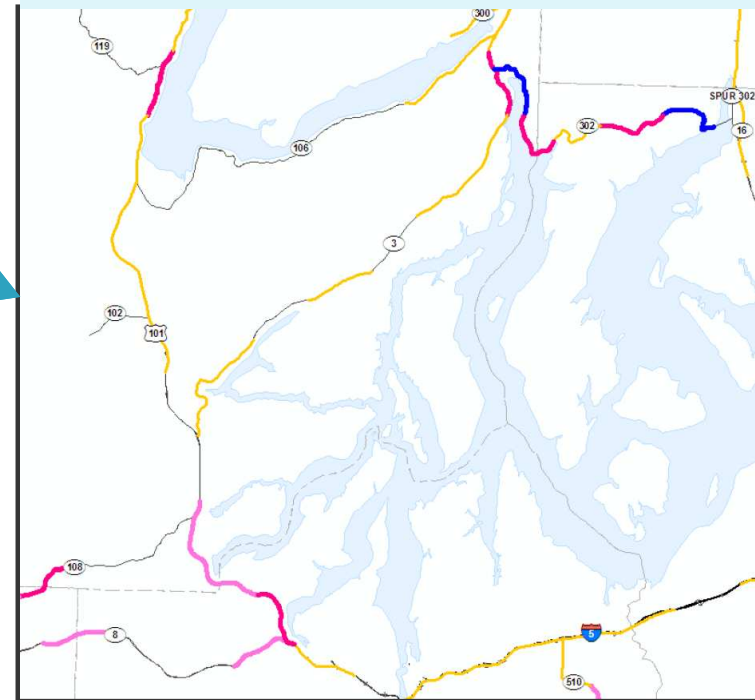
- Agencies adept at processing crash data are better able to allocate resources
- Issues with:
 - Ownership
 - Data Quality
 - Use of automated inputs
 - Accuracy of the accident report
 - Precise accident location
- Ease of data queries and timeliness of reports

Crash Data and Data Analysis

Washington quality data allows for better selection of safety projects



Example: Run-off-Road Collisions - Striking Tree(s)

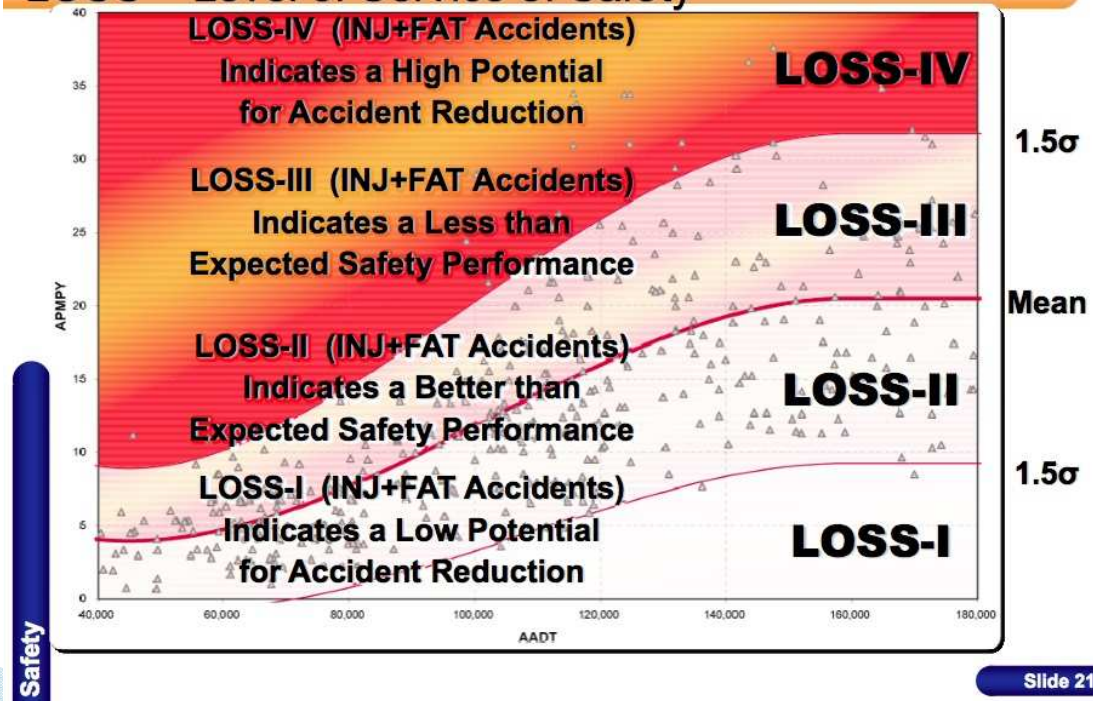


Crash Data and Data Analysis

Colorado defines a
Safety Level of Service

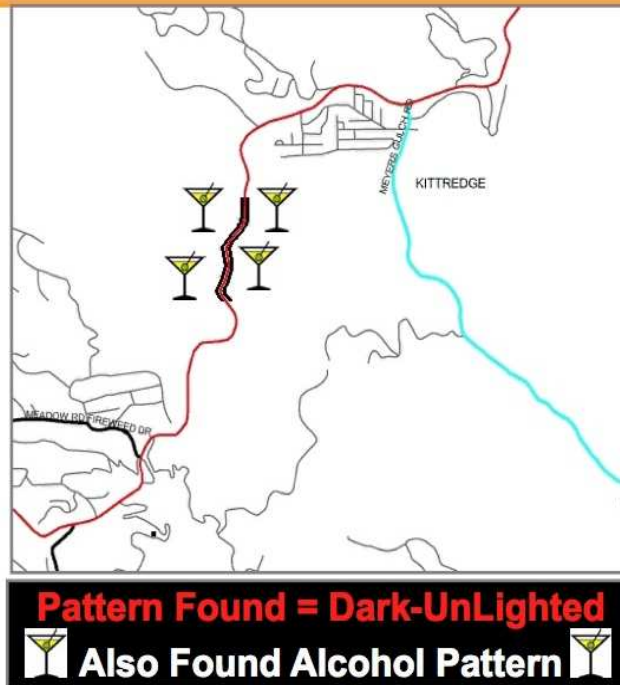
Safety Performance Tools

LOSS – Level of Service of Safety



Crash Data and Data Analysis

Pattern Recognition and Diagnostic Tools

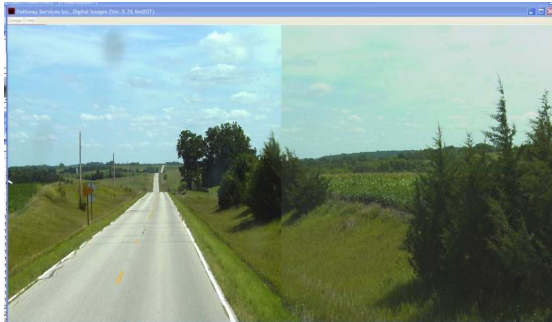
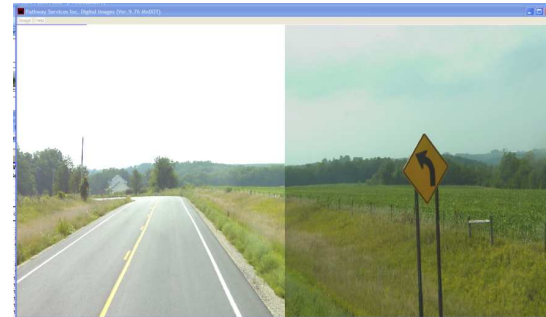


Colorado uses a Pattern Recognition algorithm for ALL projects

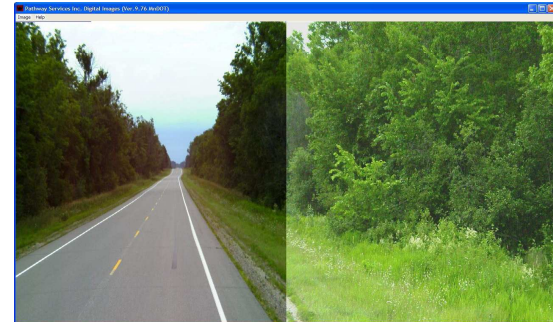
Crash Data and Data Analysis

Minnesota's Edge Risk Assessment

1 – Good Shoulder,
Good Clear
Zone

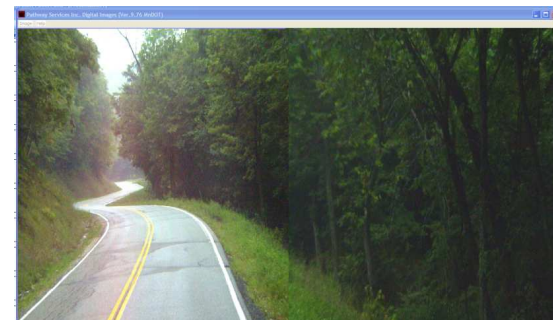


2 – No Shoulder, Good Clear Zone



2 – Good Shoulder, No Clear Zone

3 – No Shoulder,
No Clear Zone



Crash Data and Data Analysis



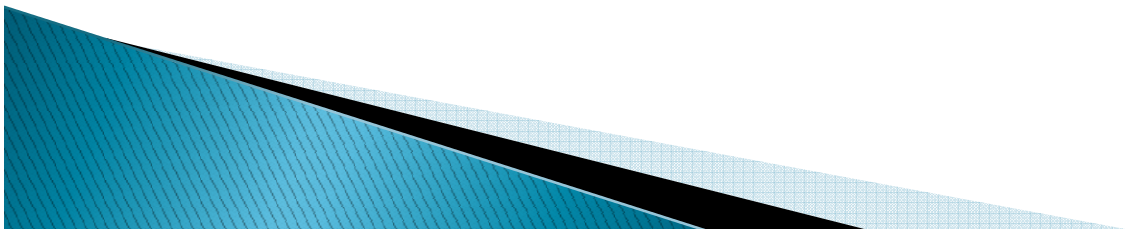
- Mendocino County's Traffic Safety Review Program
 - Excellent low cost program for rural counties
 - Identify and treat collision generators systemically
 - Address problems unique to local or low volume roads
 - Stretch resources
 - Create a road safety program

Innovative Funding

- Everything is always underfunded, but
- Successful states seem to be able to find funding for safety
 - SAFETEA-LU Section 156 and 164 are available
 - State Set-asides can generate funds
 - Don't overlook Fee Revenue/fines as a source

Funding Issues – Local Agencies

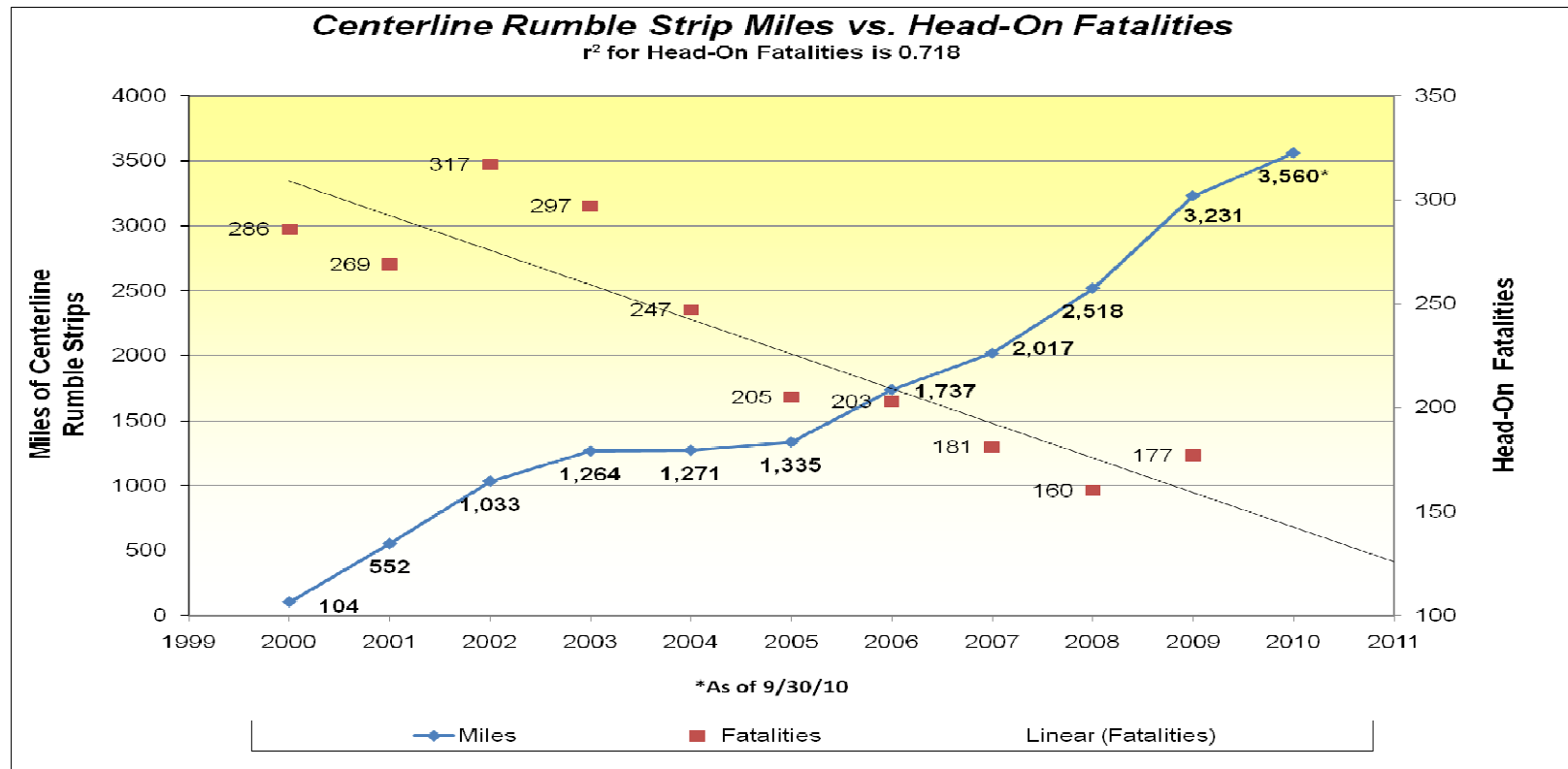
- Wright County's Experience
 - Limited Resources
 - Limited tax base
 - Limited political clout



Performance Reviews

- Appropriate follow-up project tracking is important for future success
 - Post project tracking gives good indication of what has been done
 - Also show progress of mitigation strategies
 - Informs of what work is remaining
 - Can be used to inform Management, or Public of progress

Performance Reviews

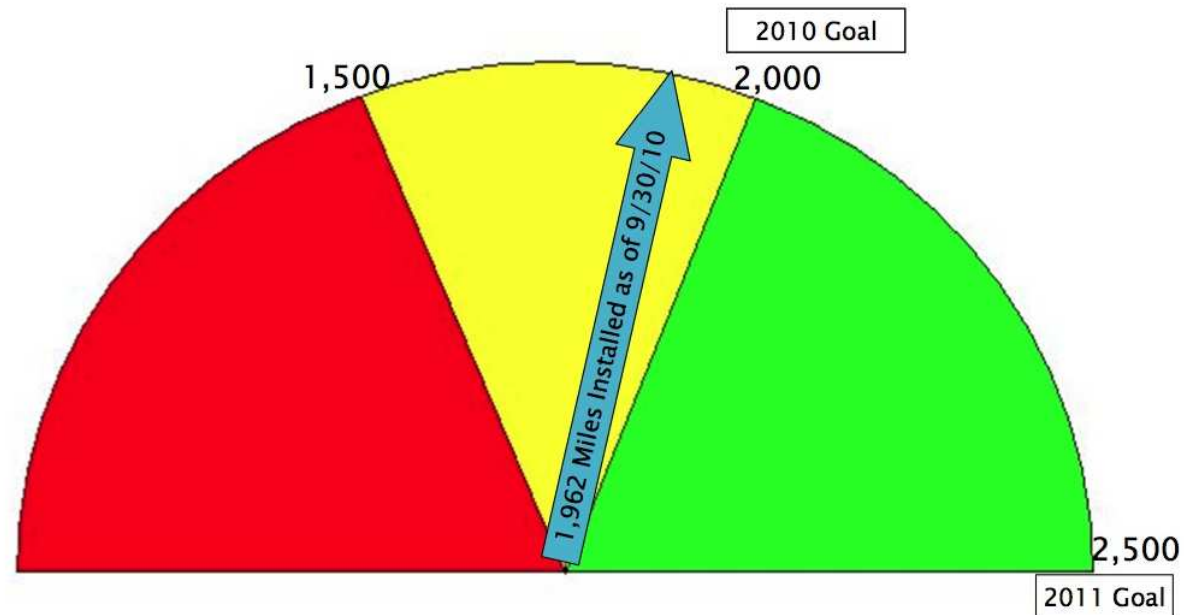


Pennsylvania's Trend Line Graphs

Performance Reviews

Pennsylvania's Pinwheel Plots show remaining work

Miles of Edgeline Rumble Strips Installed



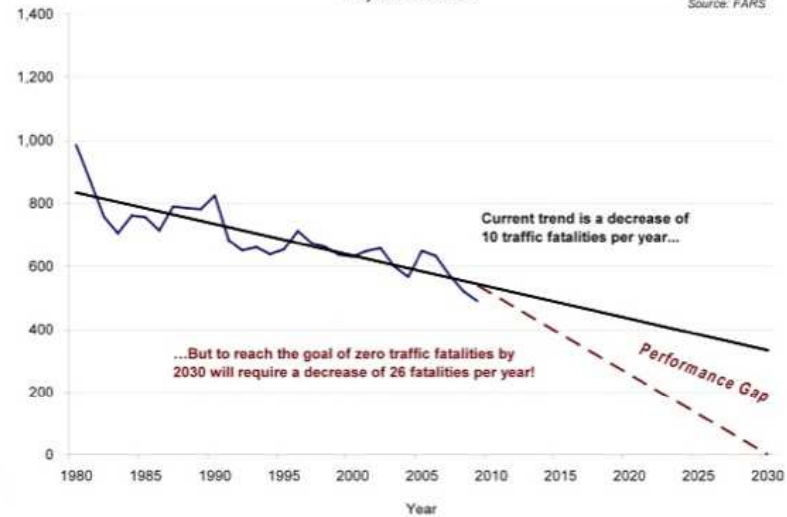
Safety Culture

- Institutionalized “Culture of Safety” successfully drives some agencies
 - Safety Advocate
 - Someone’s personal mission
 - Formalizing Safety into Departmental Policies
 - SOP, Standard Plans, Design Manuals, etc.
 - Department-wide Safety Focus
 - Top management driven

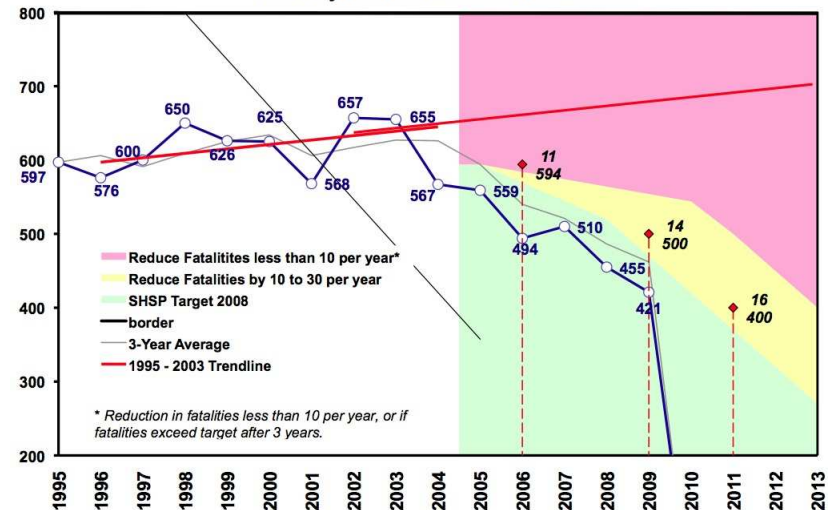
Safety Culture



Washington Traffic Fatalities, 1980-2009
Projected to 2030



Roadway Fatalities All State & Local Roads



Partnerships

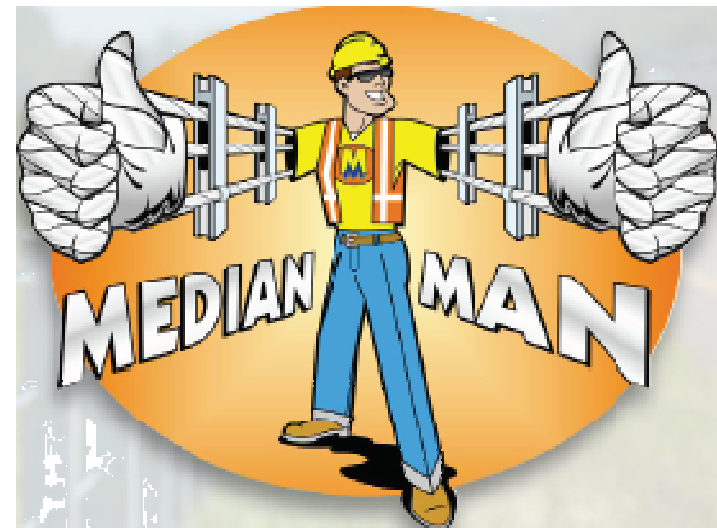
- Successful agencies team with other interested and affected agencies to increase the synergy of the effectiveness of Safety Programs
- Makes better use of the 4E's of Highway Safety
 - Engineering
 - Enforcement
 - Education
 - Emergency Response

Partnerships – Other Agencies



Partnerships – Education

- Education Regarding Cable Barrier in Michigan
 - Public Service Announcements
 - Informational Flyers
 - Project-Specific Training
 - Presentations
 - Website



Partnerships – Enforcement

- Driver Behavior
 - Seat Belt Enforcement Campaigns
 - Conduct DWI Saturations
 - GDL Enforcement Campaigns
 - Speed Enforcement Campaigns



Implementation of Findings

- Participate in conferences of national transportation organizations
 - AASHTO, ITE, NACE, TRB
- Provide Web Seminars utilizing agencies which are advanced in selected topic areas
 - Safety Edge, Low-Cost Program, Accident Data Collection, etc., as deemed necessary.
- Final Scan Report due by Summer 2011

Best Practices in Solutions for Lane Departure Avoidance

Thanks to these participating agencies:

- Colorado State DOT
- Georgia State DOT
- Iowa State DOT
- Mendocino County, California, Dept. of Transportation
- Michigan State DOT
- Minnesota State DOT
- Pennsylvania State DOT
- South Carolina State DOT
- Washington State DOT
- Wright County, Minnesota, Highway Department