Rural Signing and Marking Resources

Webinar Logistics

• Duration is 11:00 AM - 12:30 PM Mountain
• CEUs are being offered for this webinar
• Webinar is being recorded
• Please ensure that if you are on the phone, that you turn your computer speakers down all the way
• Your phone will be muted for you while presenters are speaking
• For audio challenges, please call in to the webinar
• To maximize the presentation on your screen click the four arrows in the top right of the presentation
• At the end of each section there will be time for Q&A
Robert Hull, P.E.
Cambridge Systematics, Inc.
Goals of this Webinar

Once you have completed this webinar, you will be able to:

• Explain the potential benefits of implementing signing and marking improvements,
• Define the potential available resources for signing and marking improvements, and
• Characterize successful signing and marking improvement implementations.
Learning Outcomes

To achieve the webinar goal, you will learn:

• To identify the critical safety issues in signing and marking,

• To identify signing and marking maintenance benefits, and

• To identify the critical liability issues with signing maintenance.
Rural Signs and Marking Issues

• Section 1: Signing and Marking Opportunities
  – Safety Emphasis Areas and Locations
  – Vulnerable Road User Groups

• Section 3: Maintenance of Signs and Markings
  – Signing and Marking Inventories
  – Good Practices for Signing and Marking Maintenance

• Section 3: Signing and Marking Challenges
  – Liability, Litigation, and Risk Management
  – Funding Limitations
  – Unique Signage and Marking Issues on Tribal Lands
Section 1: Signing and Marking Opportunities
What’s wrong with this picture?

Source: Cambridge Systematics
Safety Emphasis Area Locations

• Locations where signing and marking are a proven low cost safety improvement include:
  – Curves
  – Intersections
  – Rail grade crossings
Safety Emphasis Area Locations - Curves

- 40% of all rural fatal crashes between 2010-2013 occurred on curves
- Low cost signing and marking countermeasure examples:
  - Road edge line markings
  - Post-mounted delineators and chevrons
  - Maintaining retroreflectivity
  - Curve warning signs

Source: NHTSA’s FARS database, accessed October 2015.
Safety Emphasis Area Locations - Curves

- Road edge line markings at night

Source: Creative Commons
Safety Emphasis Area Locations - Curves

• Chevrons installed along curve

Source: Cambridge Systematics
Safety Emphasis Area Locations-Intersections

- From 2010 - 2013 nationally there were 10,234 rural intersection related fatal crashes.
- Low cost signing and marking countermeasure examples:
  - Proper signage retroreflectivity
  - Intersection advanced warning signs
  - Stop ahead signs and markings
  - Dotted edge lines through intersection

Source: NHTSA’s FARS database, accessed October 2015.
Safety Emphasis Area Locations - Intersections

• Maintaining retroreflectivity

Source: FHWA
Safety Emphasis Area Locations - Intersections

• Intersection warning and stop ahead signs

Source: Creative Commons
Safety Emphasis Area Locations- Rail Grade Crossings

• More than 55% of all rail grade crossing fatalities happen on rural roads.

• Alerting and stopping vehicles is vital
  – Correct/ conforming warning signs and sign location
  – Use of conforming regulatory signs, barricades and gates

• Using retroreflective channelizing devices may reduce gate violations

Source: NHTSA’s FARS database, accessed October 2015.
Safety Emphasis Area Locations- Rail Grade Crossings

- Advance warning signs

Figure 8B-4. Warning Signs and Plaques for Grade Crossings

Source: MUTCD 2009 Edition
Safety Emphasis Area Locations- Rail Grade Crossings

• Retroreflective channelizing device at grade crossing.

Source: Cloverleaf Corporation
Combining Safety Countermeasures

• Signing and marking improvements are cost effective ways to enhance other safety countermeasures.

• Consider adding signing and marking improvements to
  – High Friction Surface Treatments (HFST)
  – ITS installations
  – Roadway repaving
  – Rumble stripes
Combining Safety Countermeasures

• High Friction Surface Treatment
  – Surface treatment with high skid resistance
  – Counteracts aggregate polishing
  – May be applied to roadway instead of replacing

Open-grade surface course on the left and HSFT on the right. Source: FHWA HFST Brochure
Combining Safety Countermeasures

- Intelligent Transportation Systems
  - Approaching vehicle warning at stop controlled intersections
  - Changeable message signs

Source: Traffictechnologytoday.com (left) FHWA (center) Texas A&M Traffic Institute (right)
Combining Safety Countermeasures

• Dynamic use of signs
  – Mainline Dynamic Warning Signs
  – Vehicle Activated Traffic Calming Signs (VATCS)

Static curve warning signs (left) Activated dynamic and statics warning signs (right).
Source: MoDOT
Combining Safety Countermeasures

- Rumble Strips/ Rumble Stripes

A worker measures rumble strips (left) A worker measures rumble stripes (right). Source: FHWA
Vulnerable Road User Groups

• Pedestrian Signing
  – Improve visibility of crosswalks
    • Mid-crossing signs,
    • Rectangular Rapid Flash Beacons (RRFB)
    • Pedestrian Hybrid Beacon

Source: FHWA MUTCD 2009 (left), Creative commons (center, right)
Vulnerable Road User Groups

- Pedestrian Markings

Source: FHWA Report FHWA-HRT-10-068
Vulnerable Road User Groups

- Bicyclist Signing
  - Dedicated bike lanes
  - Signs and markings for bike/trail crossings
  - Share the road signs

Source: FHWA MUTCD 2009
Vulnerable Road User Groups

• Bicyclist Markings
  – Bike lanes
  – Watch for bicycles

Source: Creative Commons
Vulnerable Road User Groups

- Motorcyclists
  - Work zones
  - Specify adverse conditions
  - Special considerations to high frequency rider

Source: FHWA MUTCD 2009
Vulnerable Road User Groups

• Older Drivers
  – Sign sizing and spacing
  – Additional signing and marking, particularly for left turns
  – Additional advance warning signs for intersections, work zones, and obscured vision
  – FHWA Travel Better Travel Longer Pocket Guide to Improve Traffic Control and Mobility for Our Older Population.
    • http://mutcd.fhwa.dot.gov/pdfs/PocketGuide0404.pdf
Directing Your Questions via the Chat Pod

1. Chat pod is on left side of screen between attendees pod & closed caption pod

2. Type your question or comment here

3. Answers will appear here unless addressed verbally
Section 2: Signing and Marking Maintenance
When Does A Sign Need to Be Replaced?

Source: Creative Commons
Maintenance/ Replacement of Outdated Signs and Markings

• Sign inventories
  – Serves many purposes
    • Sign life
    • Manage and prioritize where new signs should be located
    • Minimizing tort liability
    • Budgeting
    • Efficiency
  – Inventory systems can be simple or advanced
    • Manual cards
    • Computer/ GIS
Signing and Marking Inventory

Resources

• FHWA’s “Tapping Into the Power of a Traffic Sign Inventory”

• Several software options

• Inventories and systems employed should only be as complicated as an agency can handle.
# Data Elements for Sign Inventory

<table>
<thead>
<tr>
<th>Example Data Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sign Identification Number</td>
<td>Unique number identifying the sign</td>
</tr>
<tr>
<td>Sign Code</td>
<td>Usually MUTCD designation</td>
</tr>
<tr>
<td>Sign Position</td>
<td>Location of sign relative to road (left, right, overhead)</td>
</tr>
<tr>
<td>Offset</td>
<td>Distance from edge of pavement</td>
</tr>
<tr>
<td>Height</td>
<td>Height of sign above road level</td>
</tr>
<tr>
<td>Sign Size</td>
<td>Width and Height of Sign</td>
</tr>
<tr>
<td>Sheeting Type</td>
<td>Grade of retroreflective material</td>
</tr>
<tr>
<td>Installation Date</td>
<td>Date when sign installed</td>
</tr>
<tr>
<td>Post/ Support Type</td>
<td>Type of Sign Support (e.g. wood, tube)</td>
</tr>
</tbody>
</table>
## Inspection Elements for Sign Inventory

<table>
<thead>
<tr>
<th>Example Inspection Items</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sign Condition</td>
<td>Quality of sign based on visual inspection</td>
</tr>
<tr>
<td>Retroreflectivity</td>
<td>Measured value or visual assessment condition</td>
</tr>
<tr>
<td>Maintenance Activity</td>
<td>Type of maintenance last performed</td>
</tr>
<tr>
<td>Inspection/ Maintenance Date</td>
<td>Date when sign was last inspected or maintained</td>
</tr>
<tr>
<td>Inspector</td>
<td>Name or initials of person who inspected or maintained sign</td>
</tr>
<tr>
<td>Comments</td>
<td>Supplementary notes about the sign</td>
</tr>
</tbody>
</table>
Sign and Marking Inventory and Maintenance – Good Practices

• Observe sign and marking conditions while performing regular agency road maintenance

• Provide a method of feedback for citizens / officials

• Include a system of reporting from law enforcement
Maintenance/ Replacement of Outdated Signs and Markings

• Repair and Replacement
  – Vandalism
  – Hit by vehicle
  – Relocated/ adjusted by private individuals
  – Damaged by weather
  – Reached end of useful life (retroreflectivity)
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Section 3: Signing and Marking Challenges
Liability and Litigation

• Fear of litigation is not an excuse for inaction or a defense against litigation.

• Check for LTAP resources regarding sign maintenance and liability
  - A Highway Department’s Legal Liabilities-Understanding the Basics, Cornell Local Roads Program, New York LTAP Center
  - Nebraska LTAP Legal Issues Video Library, http://ne-ltap.unl.edu/legal-issues

• Contact local or county counsel for support.
Liability and Litigation

- Additional resources
  - NCHRP Project 20-06- Legal Problems Arising out of Highway Problems
Limited Funding

• Budget restrictions are not an excuse to not maintain signs.

• New signs may be funded by state safety funds (SHSP, HSIP).

• Systematic upgrade of signs, not individual sign maintenance.
Signing and Marking Resources For Tribal Agencies

- Local Tribal Technical Assistance Programs (TTAP’s)
- Road Safety Fundamentals Guidebook
- National LTAP & TTAP Association Training and Resources
  - http://nltapa.org/workgroups/training-resources
Compliance with MUTCD

• Inspecting/upgrading traffic control devices as consistent with the most current MUTCD within timeframes mandated by FHWA

• Risk management tool for litigation

• Improved safety for road users

Source: Creative Commons
Consistent use of Signs and Markings

• Reduces risk of liability
• Sign maintenance and usage policy may provide guidance on
  – maintenance
  – compliance
  – operating procedures
• Reduces need for engineering opinion or case study
Case Study- Mendocino County

• Located 100 miles north of San Francisco
• Approximately 87,000 county residents
• 1,000 centerline miles of road maintained
Case Study- Mendocino County -
Background

• Began Road System Traffic Safety Review System in 1990’s.

• Each year, one third of all county roads are reviewed for safety.

• Process identifies potential signing and marking deficiencies.
Case Study- Mendocino County - Outcomes

• In a six year comparison total crashes were reduced by over 40%.

• In the same period, roads that were not reviewed had a 27% increase in total crashes.

• Reported benefit to cost ratio is 159:1 to 299:1.
Resources for Rural Road Owners

- FHWA MUTCD Website (Low volume roads section)
- FHWA Rural Safety Fact Sheets
- Low Cost Local Road Safety Solutions- ATSSA, NACE
  • [http://www.atssa.com/galleries/default-file/Low%20Cost%20Local%20Roadsrev10-09-08-reduced.pdf](http://www.atssa.com/galleries/default-file/Low%20Cost%20Local%20Roadsrev10-09-08-reduced.pdf)
- Local Road Safety- A Manual for California’s Local Road Owners
- Handbook of Traffic Engineering Practices for Small Cities-KDOT, KSU
Resources for Rural Road Owners

- Iowa Traffic Control Devices and Markings- A Manual for Cities and Counties
  - http://www.ctre.iastate.edu/pubs/itcd/
- Intermunicipal Cooperation to Improve Rural Sign Safety
- Handbook for Designing Roadways for the Aging Population
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• To identify the critical safety issues in signing and marking,

• To identify signing and marking maintenance benefits, and

• To identify the critical liability issues with signing maintenance.
Let us be your trusted “safety sidekick” to make road travel safer!
Upcoming 2016 Webinars


• An Overview of the Factors that Increase Organization Safety Culture
  March 22nd
  9:00-10:30 AM
  Mountain

Archived Webinars

Training Videos

http://ruralsafetycenter.org/resources/multimedia/

- What is the National Center for Rural Road Safety? Released: Jan. 2015
National Working Summit on Transportation in Rural America

http://ruralsafetycenter.org/news-events/moving-rural-america-summit/

Save the Date:
September 7-9, 2016
Denver, CO
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Contact Information

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rhull@camsys.com

Or contact the National Center for Rural Road Safety Help Desk at:

(844) 330-2200 or info@ruralsafetycenter.org

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