Making Rural Roads Safe, Understanding Retroreflectivity for Signs and Pavement Markings

Rural Road Safety Webinar Series
Thursday, September 30

NACo is pleased to present this webinar in cooperation with the Federal Highway Administration and the National Association of County Engineers.
NACo Staff Contacts:

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202-661-8807
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cwasser@naco.org
Tips for viewing this webinar:

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• The chat box is on the right side of the webinar window. The box will collapse so that you can better view the presentation. To unhide the box, click the arrows on the top of the panel.
This webinar will be recorded and made available online to NACo members to view later or review.

Within the next few days you will receive an email notice with the link to the recording with your webinar evaluation survey.

Thank you in advance for completing the webinar evaluation survey. Your feedback is important to us.
Question and Answer Session Instructions

Type your question into the chat window, and the moderator will read the question on your behalf.
Rural Road Safety
Webinar Series

There are nearly four million miles of public roads in the U.S. Approximately 75 percent of those roads are rural and experience the highest rates of accidental fatalities — over six times that of urban interstates. The Rural Road Safety Webinar Series share approaches that can reduce costs to counties and save the lives of residents.

■ Webinar 1: Saving Lives in Your County — A systematic process for developing a road safety
January 28, 2010 • AVAILABLE ONLINE
Participants will be able to identify key programs and approaches to assist them in reducing the number of crashes and fatalities on rural and isolated roads. Participants will also learn about the various support services available to counties, specifically the Center for Excellence in Road Safety and NACo Rural Road Safety Peer Exchange Program, to assist them in this effort.
Access recorded webinars: www.naco.org/webinars

■ Webinar 2: Why Should a County Conduct a Road Safety Audit?
March 25, 2010 • 2:00-3:15 p.m. EST
This webinar will expand upon the basics of a County Action Plan and Strategic Highways Plans and examine road safety audits (RSA) and the legal issues surrounding the development of an RSA.
To register: www2.gotomeeting.com/register/224239098

■ Webinar 3: The Nine Road Safety Countermeasures — Cost-Effective Can Save Lives in Your County
June 24, 2010 • 2:00-3:15 p.m. EST
This webinar will focus on the implementation of proven safety countermeasures. Participants will be introduced to the countermeasure implementation process, the benefits of the nine countermeasures, and how they can save lives and county resources.
To register: www2.gotomeeting.com/register/869987003

Please contact Cindy Wasser at 202/942-4274 or cwasser@naco.org with questions.

www.naco.org/webinars
Peer Exchange Program kicked off at:

Developing County Solutions to Improve Rural Road Safety
NACE 2009 Annual Meeting - Management & Technical Conference
April 23
Peoria, IL

Workshop Objectives: Develop a system for sharing rural road safety best practices among counties
The FHWA, Office of Safety Nine Proven Safety Countermeasures Program

2:00  Welcome/Review Objectives/Introduce Speakers
Moderator – James Davenport, Program Manager, NACo

2:05  Signs & Pavement Marking Retroreflectivity Notice of Rule Making –
Greg Schertz, P.E.
FHWA-Federal Lands Highway

2:25  Case study – Local Example of Implementing Standards for Retroreflectivity
to Improve Visibility of Signs and Road Markings.
Jim Ellison, P.E
James W. Ellison Inc.

2:45  Q&A

3:15  Conclusion
Moderator
Greg Schertz
FHWA, Western Resource Center
555 Zang Street, Room 400
Lakewood, CO 80228
Greg.Schertz@fhwa.dot.gov
(303) 969-5772
James W. Ellison, P.E.
Consulting Traffic Engineer
1600-B Dash Point Rd SW, #33
Federal Way, WA 98023
jameswellison@comcast.net
(253) 666-2377
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Type your question into the chat window, and the moderator will read the question on your behalf.
Thank you for participating in NACo’s webinar.
For more information about NACo membership, contact

Andrew Goldschmidt at agoldschmidt@naco.org or
Ilene Manster at imanster@naco.org
Thank you for participating in NACo’s webinar.

To learn about future webinars, please visit on www.naco.org/webinars

For more information on NACo’s Rural Road Safety Resource Center please visit http://www.naco.org/programs/csd/Pages/RuralRoadResourceCenter.aspx
Sign and Pavement Marking
Retroreflectivity Requirements

Greg Schertz - FHWA
Signs Provide Critical Information to Drivers, But Retroreflectivity Degrades Over Time

When Do We Replace Signs?
Manual On Uniform Traffic Control Devices (MUTCD)

National standard for all traffic control devices installed on any street, highway, or bicycle trail open to public travel.
Modified MUTCD

- 2003 MUTCD Revision #2
- Effective Jan 22, 2008
- Remained in 2009 MUTCD
New MUTCD Standard

“Standard: Public agencies or officials having jurisdiction shall use an assessment or management method that is designed to maintain sign retroreflectivity at or above the minimum levels in Table 2A-3”
New MUTCD Language
Section 2A.08 Maintaining Minimum Retroreflectivity

“Support:
Compliance… is achieved by having a method in place and using the method to maintain the minimum levels established in Table 2A-3.
Compliance Periods

• Establish and implement method(s)
  – January, 2012

• Replace identified regulatory, warning, ground-mounted guide signs (except street-name)
  – January, 2015

• Replace identified street name & overhead guide signs
  – January, 2018
Allowed Methods

**Assessment Methods** *(to determine which signs don’t meet minimums)*

1. Visual Nighttime Inspection
   a. Calibration signs
   b. Comparison panels
   c. Consistent parameters
2. Measured Sign Retro

**Management Methods** *(after your signs meet minimums)*

3. Expected Sign Life
4. Blanket Replacement
5. Control Signs
## Sign Methods Summary Table

<table>
<thead>
<tr>
<th>Equipment Needs</th>
<th>Inspector Requirements</th>
<th>Time Demands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retroratetivity</td>
<td>Inventory Vehicle</td>
<td>Trained</td>
</tr>
<tr>
<td>Any</td>
<td>Any</td>
<td>(1)</td>
</tr>
<tr>
<td>NA</td>
<td>Constant</td>
<td>PU or SUV</td>
</tr>
<tr>
<td>Measured</td>
<td>Measured</td>
<td>Measured</td>
</tr>
<tr>
<td>Expected Sign Life</td>
<td>Expected Sign Life</td>
<td>Expected Sign Life</td>
</tr>
<tr>
<td>Management Methods</td>
<td>Management Methods</td>
<td>Management Methods</td>
</tr>
</tbody>
</table>
| Control Signs | Control Signs | Control Signs | (1) | (2) | ✓ | ✓ |}

(1) Not required in MUTCD, but might be beneficial
(2) Need training on operation of retroratetimeter
✓ Means "required"
### Summary of Sign Retroreflectivity Maintenance Methods

A method must be implemented and in use by January 2012.

<table>
<thead>
<tr>
<th>ASSESSMENT METHODS</th>
<th>EQUIPMENT NEEDS</th>
<th>INSPECTOR REQMTS</th>
<th>TIME DEMANDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calibration Signs</td>
<td>Retr. Reflomter</td>
<td>(1)</td>
<td>≥ 60</td>
</tr>
<tr>
<td>Comparison Panels</td>
<td>Inspection Veh.</td>
<td>Trained</td>
<td>At Night</td>
</tr>
<tr>
<td>Select Any 1 of These 3 Visual Procs</td>
<td>Must Know Sheet Type</td>
<td>Age</td>
<td>Must Stop At Signs</td>
</tr>
<tr>
<td>Consistent Parameters</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measured Retro</td>
<td>PU or SUV</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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<tr>
<td>Select Any 1 of These 3 Visual Procedures</td>
<td>Retroreflectometer</td>
<td>Trained</td>
<td>At Night</td>
</tr>
<tr>
<td>Calibration Signs</td>
<td>Inspection Vehicle</td>
<td>Any</td>
<td>Must Stop At Signs</td>
</tr>
<tr>
<td>Comparison Panels</td>
<td>Any</td>
<td>(1)</td>
<td>Only Marginal Signs</td>
</tr>
<tr>
<td>Consistent Parameters</td>
<td>PU or SUV</td>
<td>(1)</td>
<td></td>
</tr>
</tbody>
</table>

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<tr>
<td></td>
<td>Retroflectometer</td>
<td>Inspection Vehicle</td>
<td>Must Know</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sheet Type</td>
<td>Inventory</td>
</tr>
<tr>
<td>Calibration Signs</td>
<td>Any</td>
<td>(1)</td>
<td>✓</td>
</tr>
<tr>
<td>Select Any 1 of These 3 Visual Procedures</td>
<td>Any</td>
<td>(1)</td>
<td>✓</td>
</tr>
<tr>
<td>Consistent Parameters</td>
<td>PU or SUV</td>
<td>(1)</td>
<td>✓</td>
</tr>
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<td>Select Any 1 of These 3 Visual Procedures</td>
<td>Retroreflector</td>
<td>Trained</td>
<td>At Night</td>
</tr>
<tr>
<td>Calibration Signs</td>
<td>Inspection Vehicle</td>
<td>(1)</td>
<td>Age</td>
</tr>
<tr>
<td>Comparison Panels</td>
<td>Must Know Sheet Type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistent Parameters</td>
<td>Inventory</td>
<td>Any</td>
<td></td>
</tr>
</tbody>
</table>

(1) Not required in MUTCD, but might be beneficial
(2) Need training on operation of retroreflector

☑️ Means “required”
### Sign Methods Summary Table

<table>
<thead>
<tr>
<th>Equipment Needs (Equipment)</th>
<th>Inspector Requirements (Inspect)</th>
<th>Time Demands (Time)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retro-Reflectometer</td>
<td>(1)</td>
<td>✓ Any</td>
</tr>
<tr>
<td>Maintenance</td>
<td></td>
<td>✓ Any</td>
</tr>
<tr>
<td>Analysis</td>
<td></td>
<td>✓ Any</td>
</tr>
<tr>
<td>PU or SUV</td>
<td>(1)</td>
<td>✓ 60+</td>
</tr>
<tr>
<td>Expected Retrospection</td>
<td>✓</td>
<td>✓ (2) Any</td>
</tr>
<tr>
<td>Blocked Replacement</td>
<td>✓</td>
<td>✓ Every Sign</td>
</tr>
<tr>
<td>Control Signs</td>
<td>✓</td>
<td>✓ (1)</td>
</tr>
<tr>
<td>To Check Control Signs</td>
<td>✓</td>
<td>✓ Only Control Signs</td>
</tr>
</tbody>
</table>

- ✓ required
- (1) Not required in MUTCD, but might be beneficial
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- ✓ Means “required”
<table>
<thead>
<tr>
<th>MANAGEMENT METHODS</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Expected Sign Life</td>
<td>Retroreflector</td>
<td>Trained</td>
<td>Must Stop At Signs</td>
</tr>
<tr>
<td>Control Signs</td>
<td>Inspection Vehicle</td>
<td>Age</td>
<td>At Night</td>
</tr>
<tr>
<td>Blanket Replacement</td>
<td>Must Know Sheet Type</td>
<td>Inventory</td>
<td></td>
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<td>Retrol.</td>
<td>Inspection Vehicle</td>
<td>Must Know Sheet Type</td>
</tr>
<tr>
<td>Blanket Replacement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Signs</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **CONTROL SIGN**
  - To Check Control Signs

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</thead>
<tbody>
<tr>
<td></td>
<td>Retro-reflectometer</td>
<td>Inspection Vehicle</td>
<td>Must Know Sheet Type</td>
</tr>
<tr>
<td>Expected Sign Life</td>
<td>![Diagram](186x95 to 576x564)</td>
<td>✔️</td>
<td>(1)</td>
</tr>
<tr>
<td>Blanket Replacement</td>
<td>![Diagram](186x95 to 576x564)</td>
<td>✔️</td>
<td>(1)</td>
</tr>
<tr>
<td>Control Signs</td>
<td>![Diagram](186x95 to 576x564)</td>
<td>✔️</td>
<td>(1)</td>
</tr>
</tbody>
</table>

1. Not required in MUTCD, but might be beneficial
2. Need training on operation of retroreflectometer
✔️ Means “required”
Exempt Signs

- Parking/Standing/Stopping
- Walking/Hitchhiking
- Adopt-A-Highway
- Blue or Brown Backgrounds
- Exclusive Use of Bikes or Peds

Note: Must still meet other requirements in MUTCD (inspections, retroreflective, etc)
More Information
www.fhwa.dot.gov/retro

4-page “Maintaining Traffic Sign Retroreflectivity”
FHWA-SA-07-020

report.center@fhwa.dot.gov

Sign Retroreflectivity Guidebook (toolkit CD included)
FHWA - CFL / TD-09-005
Sign Retro Summary

• Approaching deadlines
  – Jan. 2015: Replace reg, warn, grd-mt guide

• Delaying decisions will increase funding challenges

greg.schertz@dot.gov
Notice of Proposed Amendment (NPA)

- Federal Register – April 22, 2010
- 2009 MUTCD Proposed Revision 1
- “Maintaining Minimum Retroreflectivity of Longitudinal Pavement Markings”
- Request for public comment within 120 days (August 20, 2010)
Proposed Pavement Marking Retro Rule

• Very similar to sign retro requirements
  – Focuses on “methods”
  – Must tie to minimum values

• Applies to required or recommended longitudinal lines in MUTCD
  – Center lines
  – Edge lines
  – Lane lines
Proposed Pavement Marking Retro Rule

• Does not apply:
  – When you have:
    • Continuous roadway lighting, or
    • RRPMs in good condition, or
    • Posted speed less than or equal to 30mph
  – Optional* lines in MUTCD
  – Transverse markings, symbols, etc.
Pavement Marking Retro Rule
Schedule

• Comment period over
• Assembling and studying comments
• Intent to publish Final Rule in 2011
• However, we don’t know what decisions will need to be made or what they will be
Thank You For Your Participation

Greg Schertz – FHWA
greg.schertz@dot.gov
## New MUTCD Table with Specifications for New Sheeting

<table>
<thead>
<tr>
<th>Sign Color</th>
<th>Sheet Type (ASTM D4956-04)</th>
<th>Beaded Sheeting</th>
<th>Prismatic Sheeting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>I</td>
<td>III, IV, VI, VII, VIII, IX, X</td>
</tr>
<tr>
<td></td>
<td></td>
<td>II</td>
<td>III, IV, VI, VII, VIII, IX, X</td>
</tr>
<tr>
<td></td>
<td></td>
<td>III</td>
<td>III, IV, VI, VII, VIII, IX, X</td>
</tr>
<tr>
<td>White on Green</td>
<td>W*</td>
<td>G ≥ 7 (9)</td>
<td>W ≥ 250 (250 – 700); G ≥ 25 (38 – 75)</td>
</tr>
<tr>
<td></td>
<td>G ≥ 15 (30)</td>
<td>W ≥ 120 (140 – 700); G ≥ 15 (30 – 75)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>G ≥ 25 (45)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black on Yellow or Black on Orange</td>
<td>Y*; O*</td>
<td>Y ≥ 50 (100 – 525); O ≥ 50 (60 – 265)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Y ≥ 75 (100 – 525); O ≥ 75 (60 – 265)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White on Red</td>
<td>W ≥ 35 (70 – 700); R ≥ 7 (14 – 105)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black on White</td>
<td>W ≥ 50 (70 – 700)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Required or Recommended Centerline Markings

- Urban arterials/collectors
  - 20 ft or more in traveled way width, and
  - ADT $\geq$ 4,000
- Two-way streets/highways
  - three or more lanes for moving motor vehicle traffic
- Rural arterials and collectors
  - $\geq$ 18 ft in traveled way width, and
  - ADT $\geq$ 3,000
- Other traveled ways where an engineering study indicated a need for a centerline
Required or Recommended Edge Lines

- Freeways and expressways
- Rural arterials and collectors
  - $\geq 20$ ft traveled way width, and
  - ADT $\geq 3,000$
- Other paved streets and highways where an engineering study indicated a need for edge line markings
# Proposed Minimum Retro Levels

(\text{mcd/m}^2/\text{lux})

<table>
<thead>
<tr>
<th>Posted Speed (mph)</th>
<th>≤ 30</th>
<th>35 - 50</th>
<th>≥ 55</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-lane roadways with only centerline</td>
<td>n/a</td>
<td>100</td>
<td>250</td>
</tr>
<tr>
<td>All other roadways</td>
<td>n/a</td>
<td>50</td>
<td>100</td>
</tr>
</tbody>
</table>

Exceptions:
- When at least 3 RRPMs are visible from any position along a line at night
- When continuous roadway lighting assures that markings are visible
Considerations for Complying with the Requirements for Traffic Sign Retroreflectivity

James W. Ellison, P.E.
County Traffic Engineer
Pierce County, WA
The Complexity of Sign Retroreflectivity

- Driver
- Vehicle
- Road
- Environment
- Sign
- Sign location
- Ra measurement
Maintaining Traffic Signs

Visual Assessment → Sign Inspection

Sign Retroreflectivity → Sign Maintenance
Sign Inspection is Sign Maintenance
The Value (and Need) for Sign Inspection

• Benefits of Inspecting Signs
  – Is the sign still there?
  – Is it lying on the ground?
  – Has it been defaced?
  – Can you see it?
  – How well can you answer inquiries from the attorneys or the insurance company or the newspaper?
  – Proactively fixing sign concerns (versus reacting on someone else’s notification) costs less
The Value (and Need) for Sign Inspection

Is the sign adequately delivering the intended message to the road user?

Does it command respect?
Sign Inspection is Sign Maintenance
Can we decide to replace signs based on daytime inspections?
Older Signs Pulled From Field and Set Up in Sign Shop Yard
Visual Assessment of Signs at Night

• Issues to consider
  – Overtime? Shift differential? One person or two?
  – On-board tools and equipment?
  – Do you fix sign problems you encounter? Or call another crew? Or defer the work?
  – Agency policy recommended
What do the numbers look like?

*Pictures do not represent retroreflectivity well*
Use of a Sign Retroreflectometer

• Borrow for a day or two and take some sample measurements to get a feel for what the numbers look like (and how some of your signs compare)

• LTAPs: Consider purchasing one that can be made available to your constituency

• Or Purchase
  – In-field control sample readings
  – Test new sheeting
  – Quality control & inspection for contractor-installed signs
Retroreflectivity measurements
Decide on Sheeting Types

• Engineering grade (EG) (ASTM Type I)

  Phase Out Type I for:
  – Yellow (Warning) Signs
  – Orange (Temp Traffic Control)
  – Green (Guide & Street Name Signs)
Decide on Sheeting Types
Yellow, Orange, Green
(Red series, White also)

Consider:

– Sheeting cost as part of overall cost of installed sign
– Anticipated sign life
– Current budget

Type III & IV? (ground)
Type IX? (overhead)
Blanket Replacement (by area or by roadway)?
The Value of Serial Number Tagging
Signs left by vandals... where do they belong?
Date stamping within serial number

<table>
<thead>
<tr>
<th>RT#</th>
<th>POS#</th>
<th>STRUCT</th>
<th>ON STREET</th>
<th>DIST</th>
<th>DR</th>
<th>REF ST</th>
<th>BN</th>
<th>O</th>
<th>SIZE</th>
<th>CODE</th>
<th>VAR</th>
<th>LEGEND</th>
<th>SER #</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP106</td>
<td>702</td>
<td>71350</td>
<td>PARK AV S</td>
<td>93 N</td>
<td>133 ST S</td>
<td>N</td>
<td>R</td>
<td>24x10</td>
<td>S-2</td>
<td>WHEN CHILD PRE</td>
<td>99100237</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SP106</td>
<td>4525</td>
<td>71459</td>
<td>YAKIMA AV S</td>
<td>175 N</td>
<td>139 ST S</td>
<td>N</td>
<td>R</td>
<td>24x30</td>
<td>R-2</td>
<td>SPEED LIMIT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SP106</td>
<td>300</td>
<td>71342</td>
<td>PARK AV S</td>
<td>100 N</td>
<td>132 ST S</td>
<td>S</td>
<td>R</td>
<td>12x18</td>
<td>R-7</td>
<td>NO PARKING ANYT</td>
<td>99100077</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SP106</td>
<td>4925</td>
<td>71470</td>
<td>010 AV S</td>
<td>320 N</td>
<td>138 ST S</td>
<td>N</td>
<td>R</td>
<td>30x30</td>
<td>W-15</td>
<td>PLAYGROUND</td>
<td>99060723</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SP106</td>
<td>5000</td>
<td>71472</td>
<td>010 AV S</td>
<td>45 N</td>
<td>136 ST S</td>
<td>N</td>
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Agency Signs by Age
(Possible Use for Expected Sign Life & Control Signs methods)
The Value of a Sign Inventory

- For maintenance purposes FIRST
- Maintenance personnel buy-in
- Foundation for programming sign replacement & preparing budgets & setting priorities
- Asset management
The Value of Documenting All Sign Maintenance Activities

• Scheduling & monitoring work

• Risk management & tort liability

• Tracking of maintenance (preferably by function)

• Asset management
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<th>White Average</th>
<th>Red Average</th>
<th>RATIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>95020557</td>
<td>1</td>
<td>March 6, 2007</td>
<td>310</td>
<td>41</td>
<td>7.6</td>
</tr>
</tbody>
</table>

For Serial # 95020557:
- White Average: 310
- Red Average: 41
- RATIO: 7.6
Which Method? You Choose

• Flexibility in the MUTCD – different methods available

• Tie-in to Table 2A.3 values

• Gauge by most effective use of in-agency resources & expertise

• Training a key
“Compliance...is achieved by having a method in place and using the method to maintain the minimum levels established in Table 2A-3.... even if there are some individual signs that do not meet the minimum retroreflectivity levels at a particular point in time.”
Sign Retroreflectivity Toolkit

• Primarily for agencies with no traffic engineer on staff
• Provides step-by-step instruction to select the best method for you
• Includes CD with additional help
  – Helps develop sign replacement budget
  – Provides sample forms

FHWA-CFL / TD-09-005
report.center@dot.gov or your LTAP center
Comments on Proposed Requirements for Maintained Minimum Retroreflectivity Levels of Pavement Markings

James W. Ellison, P.E.
Consulting Traffic Engineer
Federal Way, WA
Applies to these longitudinal markings

- Required or recommended center lines
- Required or recommended lane lines
- Required or recommended edge lines
- Any optional edge line markings used to qualify for lower minimum retro levels in Table
Pavement Marking Management Systems

Key Elements

• Inventory
• Documentation of work
• Regular, periodic inspections
Methods for maintaining pavement marking retroreflectivity

• Calibrated Visual Nighttime Inspection
• Consistent Parameters Visual Nighttime Inspection
• Service Life Based on Monitored Markings
• Measured Retroreflectivity
• Blanket Replacement
• Other methods
Pavement Marking Management Systems

Prioritization approach

• Maintain highest needs first/earlier
• Set frequency of striping (annually or ?)
• Durable material vs. paint?
Compliance Support Statement

Agencies would be in compliance if they:

• Have a method in place & are using it
• Maintain minimum levels in Table
• “Even if there are markings that do not meet the minimum retroreflectivity levels at a particular location or at a particular point in time”
Resources

• Your local LTAP Center
  – Some might have retroreflectometers for loan

• Methods for Maintaining Traffic Sign Retroreflectivity, 2007
  – FHWA-HRT-08-026

• FHWA  fhwa.dot.gov/retro

• ATSSA  www.retroreflectivity.net

• James W. Ellison, P.E.  Jim@jameswellison.com
## Summary of Sign Retroreflectivity Maintenance Methods

A method must be implemented and in use by January 2012.

<table>
<thead>
<tr>
<th>ASSESSMENT METHODS</th>
<th>EQUIPMENT NEEDS</th>
<th>INSPECTOR REQMTS</th>
<th>TIME DEMANDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select Any 1 of These 3 Visual Procedures</td>
<td>Any</td>
<td>(1)</td>
<td>Any</td>
</tr>
<tr>
<td>Calibration Signs</td>
<td>Any</td>
<td>(1)</td>
<td>Any</td>
</tr>
<tr>
<td>Consistent Parameters</td>
<td>PU or SUV</td>
<td>(1)</td>
<td>60+</td>
</tr>
<tr>
<td>Measured Retro</td>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
</tbody>
</table>

### MANAGEMENT METHODS

<table>
<thead>
<tr>
<th>Blanket Replacement</th>
<th>To Check Control Signs</th>
<th>(1)</th>
<th>(2)</th>
<th>Only Control Signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Signs</td>
<td>CONTROL SIGN</td>
<td>(1)</td>
<td>(2)</td>
<td>Only Control Signs</td>
</tr>
</tbody>
</table>

(1) Not required in MUTCD, but might be beneficial
(2) Need training on operation of retroreflectometer

Means “required”