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**National Committee on  
Uniform Traffic Control Devices**

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RWSTC Agenda item IV.C.  
June 2012  
RWSTC Agenda item III.3  
January 2013

**National Committee on Uniform Traffic Control Devices  
RWSTC RECOMMENDATION FOLLOWING SPONSOR COMMENTS**

**TECHNICAL COMMITTEE: NCUTCD Regulatory/Warning Signs Technical  
Committee**

**DATE OF ACTION: (Task Force) 5-6-12, revised 5-24-12, 5-26-12, revised 12-9-12,  
revised 12-21-12 following sponsor comments, revised 1-10-13 following sponsor  
comments**

**TASK FORCE: Tom Heydel (chair), Paul Carlson, Jason Kennedy**

**RWSTC APPROVAL DATE: 1-10-13**

**TRANSMITTAL TO SPONSORS DATE: Fall 2012**

**COUNCIL APPROVAL DATE: 1-11-13**

**TOPIC: Visual Assessment Method – Maintaining Minimum Retroreflectivity,  
Section 2A.08**

**AFFECTED PORTIONS OF MUTCD: Section 2A.08**

**DISCUSSION:**

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32 Section 2A.08 paragraph 04 lists Visual Nighttime Inspection as one of the 5 methods  
33 that can be used to maintain sign retroreflectivity. The 6<sup>th</sup> method is “other methods”.  
34 However, there are actually 3 visual assessment procedures (methods); and these are not  
35 mentioned in the MUTCD, but are mentioned in various FHWA documents and other  
36 research documents. Many agencies are reading the MUTCD not realizing that there are  
37 three specific techniques (called procedures) that make up the visual inspection method.  
38 Even though paragraph (05) of this section does refer the reader to the 2007 Edition of  
39 FHWA’s “Maintaining Traffic Sign Retroreflectivity” (FHWA –SA-07-020) which lists  
40 these 3 procedures (methods); that is often overlooked and additional language is needed  
41 in the MUTCD to name these 3 procedures with a description. There is a guidebook  
42 called “sign retroreflectivity from Sept 2009 by USDOT and FHWA. (FHWA CFL TD  
43 09-005). This document also lists the 3 procedures.

44

45 Additional language is needed in the MUTCD to name these 3 procedures with a  
46 description. **The procedures are presently in the resources, but NCHRP Synthesis 431**  
47 **(May 2012) stated that the current MUTCD is confusing in terms of the visual assessment**  
48 **method because it does not match the resources.**

49

50 The visual assessment method has three procedures under this method. The procedures  
51 describe what activities are at night.

52

53 Other documents: 2007 “Methods for Maintaining Traffic Sign Retroreflectivity”,  
54 (FHWA –HRT-08-026).

55

56 Also, 2 of the 5 methods are assessment methods and 3 are management methods, and  
57 that should be described as well in the MUTCD.

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59 **RECOMMENDATION:** Include the 3 procedures under the visual assessment method  
60 in section 2A.08. Add paragraph showing which methods are management methods and  
61 which are assessment methods.

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63 **RECOMMENDED WORDING:**

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65 **Note:** Proposed changes to the MUTCD are shown in underline red and removed  
text are shown in ~~strikethrough red~~.

66

67 **Section 2A.08 Maintaining Minimum Retroreflectivity**

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69 Support:  
01 Retroreflectivity is one of several factors associated with maintaining nighttime sign  
visibility (see Section 2A.22).

70

71 **Standard:**  
02 **Public agencies or officials having jurisdiction shall use an assessment or**  
72 **management method that is designed to maintain sign retroreflectivity at or**  
73 **above the minimum levels in Table 2A-3.**

**Table 2A-3. Minimum Maintained Retroreflectivity Levels<sup>1</sup>**

Sign Color	Sheeting Type (ASTM D4956-04)				Appl. Code
	Beaded Sheeting			Prismatic Sheeting	
	I	II	III	III, IV, VI, VII, VIII, IX, X	
White on Green	$W_{\geq 7}^*$ ; $G \geq 7$	$W^*$ ; $G \geq 15$	$W^*$ ; $G \geq 25$	$W \geq 250$ ; $G \geq 25$	C
	$W_{\geq 7}^*$ ; $G \geq 7$	$W \geq 120$ ; $G \geq 15$			Pos
Black on Yellow or Black on Orange	$Y^*$ ; $O^*$	$Y \geq 50$ ; $O \geq 50$			
	$Y^*$ ; $O^*$	$Y \geq 75$ ; $O \geq 75$			
White on Red	$W \geq 35$ ; $R \geq 7$				
Black on White	$W \geq 50$				

Notes:

<sup>1</sup> The minimum maintained retroreflectivity levels shown in this table are in units of cd/lx/m<sup>2</sup> measured at an observation angle of 0.2° and an entrance angle of -4.0°.

<sup>2</sup> For text and fine symbol signs measuring at least 48 inches and for all sizes of bold symbol signs.

<sup>3</sup> For text and fine symbol signs measuring less than 48 inches.

<sup>4</sup> Minimum sign contrast ratio  $\geq 3:1$  (white retroreflectivity  $\div$  red retroreflectivity)

\* This sheeting type shall not be used for this color for this application.

**Bold Symbol Signs**

<ul style="list-style-type: none"> <li>W1-1, -2 – Turn and Curve</li> <li>W1-3, -4 – Reverse Turn and Curve</li> <li>W1-5 – Winding Road</li> <li>W1-6, -7 – Large Arrow</li> <li>W1-8 – Chevron</li> <li>W1-10 – Intersection in Curve</li> <li>W1-11 – Hairpin Curve</li> <li>W1-15 – 270 Degree Loop</li> <li>W2-1 – Cross Road</li> <li>W2-2, -3 – Side</li> </ul>	<ul style="list-style-type: none"> <li>W3-1 – Stop Ahead</li> <li>W3-2 – Yield Ahead</li> <li>W3-3 – Signal Ahead</li> <li>W4-1 – Merge</li> <li>W4-2 – Lane Ends</li> <li>W4-3 – Added Lane</li> <li>W4-5 – Entering Roadway Merge</li> <li>W4-6 – Entering Roadway Added Lane</li> <li>W6-1, -2 – Divided Highway Begins and Ends</li> <li>W6-3 – Two-Way Traffic</li> <li>W10-1, -2, -3, -4, -11, -12 – Grade Crossing Advance Warning</li> </ul>	<ul style="list-style-type: none"> <li>W11-2 – Pedestrian Crossing</li> <li>W11-3, -4, -16-22 – Lane Reduction</li> <li>W11-5 – Farm Equipment</li> <li>W11-6 – Snowmobile Crossing</li> <li>W11-7 – Equestrian Crossing</li> <li>W11-8 – Fire Station</li> <li>W11-10 – Truck Crossing</li> <li>W12-1 – Double Arrow</li> <li>W16-5P, -6P, -7P – Point-to-Point</li> </ul> <p>Plaques</p> <ul style="list-style-type: none"> <li>W20-7 – Flagger</li> <li>W21-1 – Worker</li> </ul>
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Table 2A-3. Minimum Maintained Retroreflectivity Levels <sup>1</sup>				
Sign Color	Sheeting Type (ASTM D4956-04)			
	Beaded Sheeting			Prismatic Sheeting
	I	II	III	III, IV, VI, VII, VIII, IX, X
Road				
<ul style="list-style-type: none"> <li>• W2-4, -5 – T and Y Intersection</li> <li>• W2-6 – Circular Intersection</li> <li>• W2-7, -8 – Double Side Roads</li> </ul>				
Fine Symbol Signs (symbol signs not listed as bold symbol signs)				
Special Cases				
<ul style="list-style-type: none"> <li>• W3-1 – Stop Ahead: Red retroreflectivity <math>\geq 7</math></li> <li>• W3-2 – Yield Ahead: Red retroreflectivity <math>\geq 7</math>; White retroreflectivity <math>\geq 35</math></li> <li>• W3-3 – Signal Ahead: Red retroreflectivity <math>\geq 7</math>; Green retroreflectivity <math>\geq 7</math></li> <li>• W3-5 – Speed Reduction: White retroreflectivity <math>\geq 50</math></li> <li>• For non-diamond shaped signs such as W14-3 (No Passing Zone), W4-4P (Cross Traffic Stop), or W13-1P, -2, -3, -6, -7 (Speed Advisory Signs), use largest sign dimension to determine proper minimum retroreflectivity level.</li> </ul>				

74 Support:  
75 03 Compliance with the Standard in Paragraph 2 is achieved by having a method in place  
76 and using the method to maintain the minimum levels established in Table 2A-3.  
77 Provided that an assessment or management method is being used, an agency or official  
78 having jurisdiction would be in compliance with the Standard in Paragraph 2 even if there  
79 are some individual signs that do not meet the minimum retroreflectivity levels at a  
80 particular point in time.

81 *Guidance:*  
82 04 *Except for those signs specifically identified in Paragraph 6, one or more of the*  
83 *following assessment or management methods should be used to maintain sign*  
84 *retroreflectivity at or above the minimum levels in Table 2A-3. Signs that are below the*  
85 *minimum levels should be replaced:*

86 Assessment Methods

87 A. Visual **Nighttime-Inspection**—The retroreflectivity of an existing sign is assessed  
88 by a trained sign inspector conducting a visual nighttime inspection from a moving  
89 vehicle during nighttime conditions. Signs that are visually identified by the inspector  
90 to have retroreflectivity below the minimum levels should be replaced.—The visual  
91 inspection method is made up of three specific procedures that can be used by  
92 themselves or combined with other methods.

93 1. Calibration Signs Procedure - In this procedure, an inspector views a  
94 "calibration sign" prior to conducting a nighttime inspection. Calibration signs

95 have retroreflectivity levels at or above minimum levels. These signs are set  
96 up where the inspector can view the calibration signs in a manner similar to  
97 nighttime field inspections. The inspector uses the visual appearance of the  
98 calibration sign to establish the evaluation threshold for that night's  
99 inspection activities.

100 2. Comparison Panels Procedure- Comparison panels are used to supplement a  
101 nighttime inspection of sign retroreflectivity. When signs are identified as  
102 having questionable retroreflectivity. Comparison panels are used to  
103 determine whether those identified signs have retroreflectivity levels at or  
104 above the minimum levels. To use this procedure, a comparison panel is  
105 attached to the sign and the sign/panel combination is viewed and compared  
106 by the inspector.

107 3. Consistent Parameters Procedure - Nighttime inspections are conducted using  
108 the following conditions:

- 109 ○ Using a sport utility vehicle or pick-up truck to conduct
- 110 the inspection.
- 111 ○ Using a model year 2000 or newer vehicle for the
- 112 inspection.
- 113 ○ Using an inspector who is at least 60 years old.

114 B. Measured Sign Retroreflectivity—Sign retroreflectivity is measured using a  
115 handheld or mobile retroreflectometer. Signs with retroreflectivity below the  
116 minimum levels should be replaced.

#### 117 Management methods

- 118
- 119 A. Expected Sign Life—When signs are installed, the installation date is labeled or  
120 recorded so that the age of a sign is known. The age of the sign is compared to  
121 the expected sign life. The expected sign life is based on the experience of sign  
122 retroreflectivity degradation in a geographic area compared to the minimum  
123 levels. Signs older than the expected life should be replaced.
  - 124 B. Blanket Replacement—All signs in an area/corridor, or of a given type, should be  
125 replaced at specified intervals. This eliminates the need to assess retroreflectivity  
126 or track the life of individual signs. The replacement interval is based on the  
127 expected sign life, compared to the minimum levels, for the shortest-life material  
128 used on the affected signs.
  - 129 C. Control Signs—Replacement of signs in the field is based on the performance of a  
130 sample of control signs. The control signs might be a small sample located in a  
131 maintenance yard or a sample of signs in the field. The control signs are  
132 monitored to determine the end of retroreflective life for the associated signs. All  
133 field signs represented by the control sample should be replaced before the  
134 retroreflectivity levels of the control sample reach the minimum levels.

#### 135 Other methods:

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- 137
  - 138 D. Other management and/or assessment methods developed based on engineering  
139 studies, can be used.

140 Support:

141 05 Additional information about these methods and procedures is contained in the Sign  
142 Retroreflectivity Guidebook, FHWA September 2009 by USDOT and FHWA. (FHWA CFL TD

143 [09-005](#). The 2007 Edition of FHWA's "Maintaining Traffic Sign Retroreflectivity" (see  
144 [Section 1A.11](#)) [also provides information on sign retroreflectivity](#).

145 Option:  
146 06 Highway agencies may exclude the following signs from the retroreflectivity  
147 maintenance guidelines described in this Section:

- 148 A. Parking, Standing, and Stopping signs (R7 and R8 series)
- 149 B. Walking/Hitchhiking/Crossing signs (R9 series, R10-1 through R10-4b)
- 150 C. Acknowledgment signs
- 151 D. All signs with blue or brown backgrounds
- 152 E. Bikeway signs that are intended for exclusive use by bicyclists or pedestrians

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154 RWSTC 6-20-12 Vote: For: 18  
155 Opposed: 3  
156 Abstentions: 0  
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158 RWSTC 1-10-13 Vote: For: 25  
159 Opposed: 2  
160 Abstentions: 1  
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162 COUNCIL 1-11-13 Vote: For: 37  
163 Opposed: 1  
164 Abstentions: 0  
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166 c: NCUTCD/January 2013/Heydel/RW # 3 visual assessment method , Section 2A.08 5-6-12,  
167 revised 5-24-12, revised 5-26-12, 6-20-12 READY FOR SPONSORS, revised following sponsor  
168 comments 12-9-12, revised 12-21-12, revised 1-9-13, revised 1-10-13 following sponsor comments,  
169 approved by Council 1-11-13  
170