

## Retroreflectivity: How Oregon Signs Measure Up

### New FHWA Standards Proposed

In July 2004 the Federal Highway Administration (FHWA) published notice of a proposed rulemaking in the Federal Register on maintaining the retroreflectivity of traffic signs. The public has until February 1, 2005 to review and comment on proposed changes to the Manual on Uniform Traffic Control Devices (MUTCD), which will incorporate new methods for maintaining traffic sign retroreflectivity.

The proposed rule speaks to minimum retroreflectivity levels, sign assessment methods, sign management methods, exclusions from the new standards, and a phase-in compliance period.

The proposal outlines two methods for maintaining sign retroreflectivity – assessment and management. Assessment methods evaluate individual signs by periodic inspection or measurement. One approach is to conduct visual nighttime inspections of signs while approaching them in a vehicle. Management methods rely on tracking and predicting the retroreflectivity life of signs using data bases, date labeling, control signs, and blanket replacement programs.

Currently ODOT uses maintenance personnel to conduct nighttime inspections of highway signs to plan for replacement.

### Oregon Research on Retroreflectivity

Even though ODOT inspects and manages the inventory of signs, how likely is it that highway signs in Oregon will meet the new standards? ODOT Research drew on the findings of a recent study to help address this question.



*Retroreflectivity can affect the readability of signs at night, as shown in comparing the bottom photo with the top. (Source: FHWA)*

In 1998-99 ODOT Research conducted a study in the mid-Willamette Valley to examine how the age of signs and other factors affected sign retroreflectivity. The study collected retroreflectivity readings from 137 signs, including the background colors of white, yellow, green and red.

### How Mid-Willamette Valley Signs Measure Up

Table 1 shows the average retroreflectivity levels of 137 signs on state highways in Marion, Polk and Yamhill Counties. These signs ranged in age from one to thirteen years. The proposed FHWA standards are included for comparison. As the table shows, the average retroreflectivity levels for all colors of sheeting in the ODOT study were well above the proposed minimum standards. In addition, only one sign in the ODOT study had a retroreflectivity level below the proposed standard.

**Table 1: Comparison of Proposed FHWA Standards with Field Measurements**

Sheeting Color	Proposed FHWA Standard <sup>a</sup>	Average Field Measurement <sup>a</sup>	Field Measurement Range	No. of Signs Below Proposed Standard	No. of Signs Measured
White	50	261	189-305	0	34
Yellow	50 <sup>b</sup> -75 <sup>c</sup>	198	5-248	1	34
Green	15	56	34-80	0	40
Red	7	37	20-60	0	29

<sup>a</sup> The coefficient of retroreflectivity ( $R_A$ ) is described as Specific Intensity per unit Area (SIA)

<sup>b</sup> This minimum applies to text signs of 48 inches or more and all bold symbol signs

<sup>c</sup> This minimum applies to text signs of less than 48 inches and all fine symbol signs

### **Other Research Findings**

The ODOT study conducted in 1998-99 found no consistent relationship between the age of signs and their retroreflectivity. Similarly, the physical orientation of road signs (north, south, east or west) appeared to have little or no effect on their levels of retroreflectivity.

The study also looked at the variability of retroreflectivity readings over the surface of a sign. Analysis of the data showed that the age of the signs appeared to have no effect on this variability. However, the physical orientation of the signs did seem to have a bearing on their uniformity.

The variability in retroreflectivity was found to be somewhat greater among west-facing signs with white and yellow background sheeting and among south-facing signs with green and red sheeting.

The physical orientation of road signs toward the prevailing weather patterns may affect their service life. In relatively mild environments like the mid-Willamette Valley, the orientation may not be a major factor in planning for sign replacement, but in harsher environments such as Central and Eastern Oregon it may be a useful method for sign replacement.

To view the *Federal Register* notice, visit <http://mutcd.fhwa.dot.gov/texts/2003-15149FR.htm>

Parties wishing to submit comments on the proposed changes to the MUTCD may do so online at <http://dmses.dot.gov/submit>

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*To request a copy of the report "Factors Affecting Sign Retroreflectivity" contact the ODOT Research Unit by phone, or view the report on the Research Unit web page listed below*



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