Congressional Research Service

Ensuring That Traffic Signs Are Visible at Night: Federal Regulations

David Randall Peterman
Analyst in Transportation Policy

April 16, 2013

Congressional Research Service
7-5700
www.crs.gov
R43042

CRS Report for Congress
Prepared for Members and Committees of Congress

Summary

Traffic signs provide information to help motorists travel safely. If a sign is useful during daytime, it has equal or greater value to motorists at night, when less of the road environment can be seen. Federal regulations have long required that traffic signs be visible at night, either through the use of retroreflective materials (materials that reflect light, such as from headlights, back in the direction from which it came) or through permanent lighting illuminating the sign. These regulations are part of the Manual of Uniform Traffic Control Devices (MUTCD), a compilation of federal regulations governing traffic control devices. Due to the costs and practical limitations on supplying electricity for lighting, agencies typically rely on retroreflective materials to make most traffic signs visible at night.

Retroreflective materials lose their reflective properties over time due to weathering and other factors. This reduces the visibility of the signs at night. To promote safety, the MUTCD also requires agencies to monitor their traffic control devices and make sure they comply with the federal requirements. Thus, agencies have been required to make sure that their traffic signs are visible at night, and to replace those which are no longer visible. However, for many years there was no objective standard establishing what level of retroreflectivity was needed for a traffic sign to be visible at night.

In 1992, Congress directed the federal Department of Transportation (DOT) to develop a standard for the minimum level of retroreflectivity that traffic signs (and pavement markings) must maintain. The Federal Highway Administration (FHWA) within DOT had already been doing research on the reflective properties of sign materials. Between 1993 and 2004 FHWA did further research and consulted with state and local transportation agencies regarding the implementation of the congressional directive. Between 2004 and 2007, FHWA completed a rulemaking to add a minimum standard for the retroreflectivity of traffic signs to the MUTCD. The new standard had three elements: it set a minimum measurable value for the retroreflectivity of traffic signs to ensure their visibility at night; it required state and local agencies to adopt a method by which to maintain the nighttime visibility of their traffic signs by 2012; and it required agencies to ensure that their signs were in compliance with the standard by 2018.

In 2009, the street sign lettering standard in the MUTCD was revised. This standard did not have a compliance deadline. In 2010, several press reports conflated the new nighttime visibility standard with the new street sign lettering standard. These articles made it appear that the federal government was requiring communities to replace traffic signs just to change their lettering style. Communities also complained about the cost of the new nighttime visibility maintenance standard (though the requirement that they replace traffic signs that were no longer visible at night was not new). Thus the nighttime visibility maintenance standard came to the attention of Congress.

In 2012, FHWA amended the compliance dates for the retroreflectivity standard (and several other MUTCD standards) to alleviate possible financial burdens the deadlines might have created for state and local highway agencies.

Contents

Tables

Contacts

Introduction

Since 2007, the Federal Highway Administration (FHWA) has amended certain national standards for traffic signs. Among the new standards were a measurable standard for the minimum level of nighttime visibility of traffic signs and a change in the lettering of street signs. These new standards were the subject of some confusion and controversy. Some state and local agencies complained that the new standards would be relatively costly to comply with during a period when state and local finances are strained. Some agencies also confused the new nighttime visibility maintenance standard, which originally included deadlines by which agencies had to comply with the new standard, with the new sign-lettering standard, which did not have compliance deadlines. In response to the criticism, FHWA eliminated some of the nighttime visibility maintenance standard compliance deadlines. This report provides background for the nighttime visibility maintenance standard and addresses some of the issues that have been raised about this standard.

There Are Two New Traffic Sign Standards

In 2007, FHWA updated the Manual of Uniform Traffic Control Devices standard governing the maintenance of the nighttime visibility (retroreflectivity) of traffic signs (§2A.08).[1] Retroreflectivity refers to the reflection of light back from an object. With respect to traffic signs, this involves reflecting the light from car headlights so that the sign is visible to drivers at night. The 2007 amendment set a minimum level of retroreflectivity for signs and required state agencies to adopt a method to ensure that signs met that minimum. Because of its safety significance, this standard was given a deadline for compliance.

Separately, in the 2009 edition of the MUTCD, FHWA updated the standard concerning the sign lettering style for names of places, streets, and highways (§2D.05). Formerly, names on signs could either be in all capital letters or have only the first letter capitalized. The new standard eliminated the option of using only uppercase letters. This standard did not have a deadline for compliance.

The Mixed-Case Street Sign Lettering Standard

The lettering standard applies only to signs with names of places, streets, and highways. This change was made because drivers often have only a brief time to read these signs, and studies indicate that mixed-case lettering is easier to read. State and local transportation agencies are required to implement the new lettering style only as they install new signs or replace existing signs. Some press reports have given the impression that the federal government is requiring communities to immediately begin replacing all street signs just to comply with the new lettering style standard, but this is incorrect.

[1] FHWA maintains the MUTCD, a compilation of standards for signs, signals, and design elements of traffic control devices, in order to ensure a level of uniformity among traffic control devices across the nation. States may adopt the national MUTCD as the state MUTCD, adopt the national MUTCD with a state supplement, or adopt a state MUTCD. The supplement or state MUTCD must substantially conform to the national MUTCD; this allows for local exceptions that do not create a safety concern.

The Retroreflectivity Maintenance Standard

Origin

Earlier versions of the MUTCD had declared that "All traffic signs ... should have adequate retroreflectivity." However, there was no measurable standard for what constituted "adequate retroreflectivity." In 1985, the Center for Auto Safety petitioned FHWA to add a minimum nighttime visibility standard to the MUTCD.[2]

In 1992, Congress directed DOT to develop a minimum standard, with this provision in the FY1993 Department of Transportation (DOT) appropriations bill:

> SEC. 406. The Secretary of Transportation shall revise the Manual of Uniform Traffic Control Devices to include—
>
> > (a) a standard for a minimum level of retroreflectivity that must be maintained for pavement markings and signs, which shall apply to all roads open to public travel ...[3]

Purpose

The reflective properties of sign materials decrease over time, due to exposure to sunlight and other factors. As the reflective materials degrade, a sign becomes harder to see at night.

For many reasons, including the limited visibility available to drivers after sunset, driving at night is much more dangerous than driving during the daytime. Nighttime crash rates are estimated to be three times higher than daytime rates, and the fatality rate for nighttime driving is also higher than for daytime driving.[4]

At night, when visual cues available to drivers are much more limited, the assistance provided by traffic signs becomes more important. As an earlier version of the MUTCD put it, if a sign is necessary in the daytime, it has equal or greater value to motorists at night.

Nighttime driving becomes more challenging as drivers age, because over time the lens of the eye typically become less transparent. This and other changes result in reduced sensitivity to light and reduced clarity of vision for older persons. With the aging of the U.S. population, the number of older drivers is increasing significantly. Thus, ensuring that traffic signs are easily visible to older drivers at night is becoming a more significant safety issue. But ensuring that traffic signs are easily visible at night benefits not only older drivers, but all drivers.

---

[2] 50 *Federal Register* 16515, April 26, 1985.

[3] P.L. 102-388, Department of Transportation and Related Agencies Appropriations Act, 1993, §406 (106 STAT. 1564). DOT is implementing the congressional directive in two parts: the traffic sign standard was finalized in 2007, and the rulemaking to implement the pavement marking standard began in 2010.

[4] FHWA, *Maintaining Traffic Sign Retroreflectivity: Impacts on State and Local Agencies*, April 2007, p. 2.

Development of the Retroreflectivity Maintenance Standard

The process of developing the new standard included FHWA-sponsored research and the development of a proposed standard based on that research by a task force appointed by the American Association of State Highway and Transportation Officials (AASHTO), which represents state and local transportation agencies. FHWA held workshops for representatives of state and local transportation agencies to examine the proposed new standard in the 1990s.

AASHTO requested in 1998 that FHWA let it study the potential impact of the proposed new standard on state and local transportation agencies before issuing the standard. AASHTO adopted a policy resolution in 2000 requesting that agencies be given six years to implement methods to assess the nighttime visibility of signs.

FHWA made further efforts to publicize the proposed standard, and then revised the proposal through the formal federal rulemaking process from 2004 through 2007, with repeated opportunities for public comment. The new standard took effect on January 22, 2008.

The new standard involved two elements. First, it established measurable standards for the minimum acceptable retroreflectivity of signs. Since it is not considered feasible for agencies to regularly measure the retroreflectivity of every sign, the second element of the new standard was a requirement that agencies adopt a method by which to maintain the retroreflectivity of their street signs. To provide flexibility to agencies, the standard listed several methods that can satisfy this requirement, including

- visual nighttime inspection from a moving vehicle by a trained sign inspector;
- measurement of sign retroreflectivity using a retroreflectometer;
- replacement of signs based on their expected life above the minimum standard for retroreflectivity;
- replacement of all signs in an area, or of a given type, at specified intervals, based on the expected life above the minimum standard for retroreflectivity of the shortest-life material used on the signs in that area or of that type;
- replacement based on the performance of sample signs that are monitored for loss of retroreflectivity; or
- other methods that are developed based on engineering studies.

According to the standard, an agency using a retroreflectivity assessment or management method will be in compliance even if at times individual signs did not meet the minimum retroreflectivity levels.

Finally, this standard required that communities comply with the new standard by certain deadlines. There were three deadlines:

- January 22, 2012 (four years after adoption of the new standard)—the deadline for communities to adopt one of the methods to systematically maintain the retroreflectivity of their street signs.
- January 22, 2015 (seven years after adoption)—the deadline for communities to bring all of their regulatory, warning, and post-mounted guide signs (except street name signs and overhead guide signs) into compliance with the new standard.

- January 22, 2018 (10 years after adoption)—the deadline for communities to bring all street name signs and overhead guide signs into compliance.

The Controversy Surrounding the Standard

Generally, highway safety groups supported the standard, while state and local transportation agencies opposed the establishment of numerical minimum levels of retroreflectivity due to concerns about potential tort liability from failure to maintain a specific minimum level of retroreflectivity. They preferred that the standard be limited to establishing a management process that agencies would follow to maintain adequate nighttime visibility of signs.

FHWA's final retroreflectivity standard tried to satisfy both the congressional directive to set a minimum retroreflectivity standard, by including a table of minimum numerical standards in the MUTCD, and the preferences of the state and local transportation agencies, by saying that not every sign needed to meet the minimum standard so long as agencies had a management process in place to maintain the nighttime visibility of their signs. Regarding tort liability, FHWA noted that having formally implemented a method for maintaining retroreflectivity would appear to put an agency in a better position to defend lawsuits in which inadequate sign retroreflectivity is an issue. Also, the final standard provided that agencies that have adopted an assessment or management method will be in compliance with the standard even if some signs do not meet the minimum retroreflectivity standard.[5]

There appear to be two reasons for the standard's sudden notoriety beginning in the fall of 2010. One was concern on the part of agencies about the cost of compliance. The other was that several press reports conflated the requirement for replacing signs that were no longer clearly visible at night with the entirely unrelated new standard requiring mixed-case lettering on street signs, which was added in the 2009 update of the MUTCD.

Compliance with the Retroreflectivity Maintenance Standard

Generally, federal and state laws require that each state adopt a manual of traffic control devices that meets or exceeds the standards in the federal MUTCD. The reason for these requirements is the belief that uniformity in traffic control devices promotes public safety.

Most MUTCD standards, such as the lettering standard, do not have compliance deadlines. The case of the retroreflectivity maintenance standard is unusual in this respect. It was given a compliance deadline because its safety impact was considered to be significant.

There are two potential enforcement mechanisms for standards in the MUTCD. First, states and local governments that are not in compliance with standards are potentially subject to having a portion of their federal transportation funding withheld. However, there is no formal enforcement mechanism to ensure compliance. In fact, one report noted that "It is not uncommon for MUTCD principles to be violated (knowingly or unknowingly) in actual practice."[6]

[5] FHWA, Final Rule, 72 *Federal Register* no. 245, December 21, 2007, p. 72578.

[6] FHWA, *Minimum Retroreflectivity Levels for Overhead Guide Signs and Street-Name Signs*, FHWA-RD-03-082, December 2003, p. 28.

The more significant potential enforcement mechanism for MUTCD standards is the tort liability that communities may face in the event of a lawsuit involving, in this case, a nighttime car crash in which the visibility of a street sign may be a factor.

Compliance Costs

A study sponsored by DOT estimated the total additional cost to state and local governments of complying with the new standard to be $37.5 million over a 10-year period. Of this, $27.5 million would be borne by local governments, which are responsible for most traffic signs, and $11.8 million by state governments.[7] The total cost was estimated to represent a 0.5% increase in annual sign maintenance costs for states; data to estimate the incremental impact on local government budgets were not available. The maximum cost in any one year was estimated at $4.5 million. Up to 100% of the cost of replacing traffic signs is eligible for federal funding.

Most larger communities already have sign maintenance and replacement programs; for these communities, the study estimated that the impact of the retroreflectivity maintenance standard is likely to be modest. The impact may be greater in smaller communities that may never have instituted sign maintenance and replacement programs.

Press reports indicate that a number of state and local highway agencies stated they estimated that their costs to comply with the new standard were much higher than the estimate in the DOT study. The methodologies by which these estimates were generated were not reported.

In the controversy over the new standard, the charge was made that the new standard required agencies to replace "perfectly good" traffic signs.[8] In part this may have resulted from the confusion of the two different traffic sign standards. If a traffic sign meets the MUTCD standard for retroreflectivity, it does not have to be replaced. If it does not meet the minimum retroreflectivity standard, then it may create a safety hazard after dark, although it may appear to be perfectly good during daylight hours.

Several comments submitted during the rulemaking process described the rule as an unfunded mandate, as it would impose additional costs on state and local governments for developing sign inventories, training personnel to examine signs, and replacing signs without providing additional resources for this purpose. DOT has observed that the MUTCD already required agencies to maintain the nighttime visibility of traffic signs. The minimum retroreflectivity standard's primary impact was to establish a quantifiable level for what constitutes adequate nighttime visibility.

Up to 100% of the cost of installing and replacing traffic signs can be covered by federal-aid highway funding under several programs.[9] The annual level of federal-aid highway funding

---

[7] FHWA, *Maintaining Traffic Sign Retroreflectivity: Impacts on State and Local Agencies*, FHWA-HRT-07-042, April 2007, p. 25.

[8] This theme was even repeated by DOT Secretary Ray LaHood: "It's just common sense; proposed rule eases traffic sign burden on local governments," *the Fast Lane: The Official Blog of the U.S. Secretary of Transportation*, August 30, 2011, http://fastlane.dot.gov/2011/08/its-common-sense-proposed-rule-eases-traffic-sign-burden-on-local-governments.html.

[9] 72 *Federal Register* 72581; FHWA, *Sign Retroreflectivity Update and Funding Assistance*, http://safety.fhwa.dot.gov/roadway_dept/night_visib/policy_guide/signret_funasst.cfm.

provided through the annual DOT appropriations act rose from $33.9 billion in FY2004[10] (when the rule was formally proposed) to $41.5 billion in FY2012,[11] in addition to $27.5 billion provided to states and localities for highway infrastructure investment in the American Recovery and Reinvestment Act of 2009.[12]

Changes to the Compliance Deadlines

DOT amended the compliance deadlines for the retroreflectivity maintenance standard (and numerous other MUTCD standards with compliance deadlines) in a May 2012 *Federal Register* notice.[13]

DOT extended the deadline for highway agencies to implement an assessment or management method for ensuring that their signs comply with the retroreflectivity standard to May 2014, and limited the scope of that required assessment to regulatory and warning signs, rather than all street signs. DOT also eliminated the compliance deadlines for replacement of signs that are identified as not meeting the minimum retroreflectivity level standards. Communities are still required to replace any signs that do not meet the standards.

DOT said it changed the deadlines to reduce the costs and impacts of the compliance deadlines on state and local highway agencies. It noted that the original deadlines had been based on standard useful-life cycles for signs, but that varying environmental conditions meant that the actual useful life of signs varied in different areas of the country.

Table 1. Changes to the Retroreflectivity Maintenance Rule

Original Requirements	Changes
Agencies must implement a sign retroreflectivity assessment or management method by January 22, 2012	Deadline extended to two years after effective date of revised Final Rule [May 2014]
Retroreflectivity assessment or management method must be implemented for all traffic signs	Only regulatory and warning signs (e.g., stop signs) must be assessed/managed by the new deadline; other signs must also be assessed, but no deadline.
Noncompliant regulatory, warning, and post-mounted guide signs must be replaced by January 22, 2015	No deadline, though noncompliant signs must be replaced
Noncompliant street name signs and overhead guide signs must be replaced by January 22, 2018	No deadline, though noncompliant signs must be replaced

Source: Federal Highway Administration, "National Standards for Traffic Control Devices; MUTCD; Revision," 77 *Federal Register* 28460, May 14, 2012.

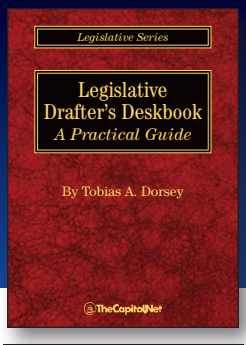
[10] Consolidated Appropriations Act, 2004 (P.L. 108-199), Division F, Title I, 118 STAT. 285.

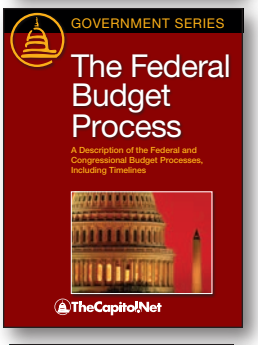
[11] Consolidated and Further Continuing Appropriations Act, 2012 (P.L. 112-55), Division C, Title I, 125 STAT. 650.

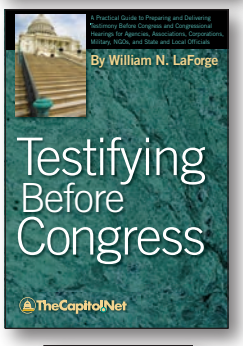
[12] P.L. 111-5, Division A, Title XII, 123 STAT. 206.

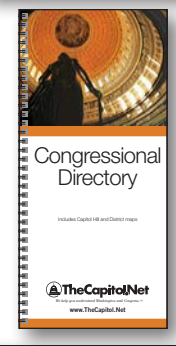
[13] FHWA, 76 *Federal Register* no. 169, August 31, 2011, p. 54156.

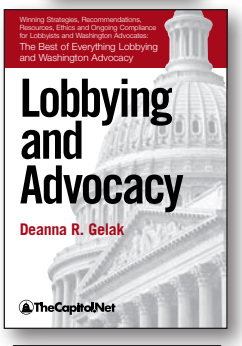
Learn how Capitol Hill really works

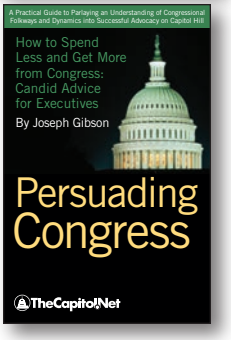












All of our programs and any combination of their topics can be tailored for on-site training for your organization.

For more than 30 years, TheCapitol.Net and its predecessor, Congressional Quarterly Executive Conferences, have been training professionals from government, military, business, and NGOs on the dynamics and operations of the legislative and executive branches and how to work with them.

Our training and publications include congressional operations, legislative and budget process, communication and advocacy, media and public relations, research, testifying before Congress, legislative drafting, critical thinking and writing, and more.

- **Diverse Client Base**—We have tailored hundreds of custom on-site training programs for Congress, numerous agencies in all federal departments, the military, law firms, lobbying firms, unions, think tanks and NGOs, foreign delegations, associations and corporations, delivering exceptional insight into how Washington works.™
- **Experienced Program Design and Delivery**—We have designed and delivered hundreds of custom programs covering congressional/legislative operations, budget process, media training, writing skills, legislative drafting, advocacy, research, testifying before Congress, grassroots, and more.
- **Professional Materials**—We provide training materials and publications that show how Washington works. Our publications are designed both as course materials and as invaluable reference tools.
- **Large Team of Experienced Faculty**—More than 150 faculty members provide independent subject matter expertise. Each program is designed using the best faculty member for each session.
- **Non-Partisan**—TheCapitol.Net is non-partisan.
- **GSA Schedule**—TheCapitol.Net is on the GSA Schedule, 874-4, for custom on-site training: GSA Contract GS02F0192X.

GSA Contract GS02F0192X Advantage!®

We help your staff, members, and executives better understand Washington and Congress.™

Please see our Capability Statement on our web site at **TCNCS.com**.

Custom training programs are designed to meet your educational and training goals, each led by independent subject-matter experts best qualified to help you reach your educational objectives and align with your audience.

As part of your custom program, we can also provide classroom space, breaks and meals, receptions, tours, and online registration and individual attendee billing services.

For more information about custom on-site training for your organization, please see our web site: **TCNCustom.com** or call us: 703-739-3790, ext 115.

TheCapitol.Net
PO Box 25706, Alexandria, VA 22313-5706
www.TheCapitol.Net 703-739-3790

Author Contact Information

David Randall Peterman
Analyst in Transportation Policy
dpeterman@crs.loc.gov, 7-3267