



Sign Management Current Practices

August 2012

Did You Know?

The Federal Highway Administration’s (FHWA) 2009 *Manual on Uniform Traffic Control Devices (MUTCD)* set forth federal requirements that military installations must meet several key traffic control sign compliance requirements between January 2012 and December 2019 for signs on any road open to public travel. The FHWA published final rules, which took effect on June 14, 2012, to revise the sign replacement compliance dates due to a decision that these dates caused burdensome regulations for cash-strapped local governments and communities. Most compliance dates have been eliminated; however, the requirements still apply. When a sign has reached the end of its useful service life it is to be replaced in accordance with these new requirements, or as part of other systematic upgrades. Some signs, however, may require higher priority for replacement if they are already beyond their useful service life, and are a critical sign. A brief overview of the *MUTCD* requirements and any applicable dates are as follows:

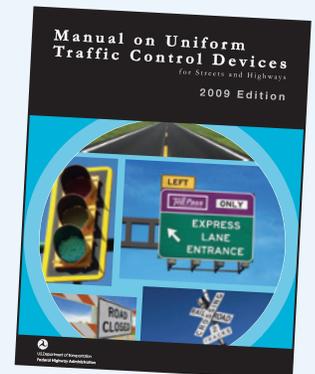
- ✓ Conform to new requirements relating to sign size, type, and placement.
- ✓ Implement and continue to use a sign assessment or management method for the purpose of conforming to FHWA’s requirement that agencies implement a program by June 13, 2014 (formerly January 2012) for the maintenance of minimum levels of retroreflectivity.
- ✓ Ensure compliance with new minimum retroreflectivity requirements, dependent on sign type.

The *MUTCD*’s intent is to promote traffic control device uniformity and consistency. This is of particular importance on military installations where roadways are traveled by both government personnel and civilians from all over the country.

DoD Installations Must Conform to the MUTCD!

Multi-Service Regulation (AR 55-80, OPNAVINST 11210.2, AFMAN 32-1017, MCO 11210.2D and DLAR 4500.19), DoD Transportation Engineering Program.

“Installation commanders will develop and maintain their roadways to nationally accepted standards that provide a safe driving environment for all drivers and passengers.”



“All installation traffic signals, signs, and pavement markings will be in substantial conformance to FHWA’s *MUTCD* (<http://mutcd.fhwa.dot.gov>).”

“Variances in the design and application of installation traffic control devices from the standards contained in *MUTCD* must be approved by SDDCTEA and FHWA.”

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Most of SDDCTEA's previous publications relating to sign management (such as Pamphlet 55-14 and a Traffic Engineering Bulletin dated January 2010) were geared toward meeting the previous deadlines. These are still good reference documents since they describe sign management and replacement methods.

Therefore, based on the provision in the *MUTCD* for a sign assessment and management method, and based on these findings, SDDCTEA recommends that sign assessments be conducted on all bases.

As part of a sign assessment, SDDCTEA recommends a team inventory all signs on base: identify if the signs are the right signs at the right locations; obtain attributes of the sign, such as message, size, post type, height, offset, retroreflective sheeting type, retroreflectivity, and overall condition; as well as take a photo of the sign. Then, identify anything deficient or incorrect about the use of the existing sign to be fixed when the sign is replaced.

This data can be entered into a Sign Management System (SMS). An SMS is a geographic information system (GIS) based application used to inventory and capture sign data. The SMS maintains the signing inventory by identifying the properties of the signs. Over time, the agency would know when the sign should be replaced based on an expected life of the sign. It would also keep track on sign location and type, which is beneficial when a sign is reported missing.

Although the deadlines for sign replacement have been eliminated, sign management remains an important topic. There is a specific provision in the *MUTCD* to implement and use an assessment or management method to maintain regulatory and warning sign retroreflectivity levels at or above the established minimums.

Recent work by SDDCTEA found that of 14,000 signs inventoried as part of several sign management studies, 59 percent were found to be in poor condition due to poor retroreflectivity or due to the signs being obsolete or inappropriate for conditions. These signs need to be replaced immediately.

Benefits of a Sign Management System

While maintaining sign retroreflectivity is a key goal of an SMS, the use of an SMS is not limited to retroreflectivity. An SMS offers the opportunity to verify that all signs on base are correct, and verifies that there are no other signing-related deficiencies, to include:

- ✓ Sign size
- ✓ Sign mounting height
- ✓ Guide sign text 4 lines or less
- ✓ Street name sign minimum font size
- ✓ Non-breakaway posts where no curb protection exists
- ✓ Signs where vegetation may become an obstruction
- ✓ Curves lacking necessary signing
- ✓ Obstructions where no object markers are present
- ✓ Pedestrian crossing signs or crosswalks that may not be necessary
- ✓ Questionable intersection traffic control (STOP or YIELD)
- ✓ Missing or inappropriate STOP sign plaques (ALL WAY plaques)

By addressing the identified signing deficiencies (or lack of signing) future crashes may be prevented. Should a

What's Wrong With This Photo?

See page 7 for the answers.



crash be eliminated by addressing a signing deficiency, the associated cost savings could be quite significant. FHWA assigns monetary values to quantify crash costs: \$5,800,000 per fatality; \$80,000 per moderate injury; \$4,000 per PDO (property damage only).

Often, an installation (particularly a larger installation) may not have enough money to replace all deficient signs at once. An SMS can help identify a replacement strategy that divides the signs into different priorities, then assigns target replacement years. An example of priorities is shown on the GIS image in Exhibit 1.

Check out FHWA's FAQ page on the June 2012 Final Ruling:

http://safety.fhwa.dot.gov/roadway_dept/night_visib/policy_guide/faq.cfm#top

Benefit - Cost of Sign Replacement

The cost of replacing a sign depends not only on the sign size but also on what needs to be replaced along with the sign. Rule-of-thumb costs (2012) include:

- ✓ \$70/Sq Ft for a post-mounted sign (includes sign, post, installation, and removal of existing sign/post)
- ✓ \$21/Sq Ft for a new sign installed on existing post

These costs are relatively low, especially when compared to larger-scale improvements. Should a crash be prevented by addressing a signing deficiency, the associated cost savings could be quite significant.

Assuming a new 16 square foot sign with post is replaced, this corresponds to benefit-to-cost ratios of:

- ✓ 5,600 if a fatal crash is prevented
- ✓ 78 if a moderate injury crash is prevented
- ✓ 3.8 if a property damage crash is prevented.

Type I and Type II Sheeting Considerations

Type I and Type II Engineering Grade sign sheeting may technically still be used for most signs. When new, these sheeting types meet minimum retroreflective requirements.

However, SDDCTEA recommends that Type I and II no longer be used for new signs. When agencies review their signing practices and their choice of sign materials, the annualized costs of the signs using factors such as expected sign life should be considered. Even though a particular type of sheeting might initially meet the minimum retroreflectivity levels when it is new, it might quickly degrade to below the minimum retroreflectivity levels, thus losing its effectiveness at night and requiring replacement. The use of higher performance sheeting (Type III minimum), even though at a higher initial cost would provide a better life-cycle cost.

For more information on these sheeting types, refer to SDDCTEA Pamphlet 55-14, or contact SDDCTEA (see page 7).

Exhibit 2 on page 4 shows typical annualized costs for different sheeting types.

Exhibit 1: Sign Replacement By Priority Example

- PriorityLevels
- No Priority Level
- Priority 1 Any Signs to be Removed
- Priority 2 Vegetation Obstructing Sign
- Priority 3 Street Name signs with text smaller than 6 inches in nonhousing area
- Priority 4 STOP signs less than 30 inches
- Priority 5 STOP signs less than 36 inches located at multilane approach intersection
- Priority 7 Speed Limit or any of the 3 Keep Right signs smaller than 24 by 30
- Priority 9 Do Not Enter smaller than 30 by 30
- Priority 11 YIELD Sign smaller than 36 by 36 on single lane road
- Priority 12 YIELD Sign smaller than 48 by 48



Sign Replacement Methods

There are five methods to maintain adequate sign retroreflectivity. The first two methods are assessment methods where signs are evaluated individually, and the last three methods are management methods where signs are evaluated on a macroscopic basis. These methods are not fool-proof, but all meet the requirement to implement a program to maintain sign retroreflectivity. These have been published previously by SDDCTEA in the January 2010 bulletin on Sign Retroreflectivity, as well as in SDDCTEA Pamphlet 55-14. For more information, refer to either of these publications, or contact SDDCTEA (see page 7).

These methods are as follows:

- ✓ **Visual Nighttime Inspection.** At least every 2 years, all signs should be inspected at night by a trained sign inspector, driving at normal speeds and using low-beams. Signs appearing to be defective should be replaced.
- ✓ **Measured Sign Retroreflectivity.** Periodically measure the retroreflectivity of sign backgrounds and retroreflective legends. Signs with substandard retroreflectivity values should be replaced.
- ✓ **Expected Sign Life.** Replace individual signs based on the age of the sign and the expected sign life. To track the installation date, maintain a sign inventory or identify the year of installation on the back of the signs.

- ✓ **Blanket Sign Replacement.** Replace all signs on the installation or areas or zones within the installation at the same time using the previous replacement date and the expected sign life.
- ✓ **Control Signs.** Replace signs based on measured retroreflectivity of signs that represent the general population of signs purchased in the same basic timeframe. The control signs are usually installed in the field or in another location such as in a maintenance yard.

Other Compliance Dates

As new editions of the *MUTCD* are released, there are occasional changes that affect the design or use of signs. When changes are made, signs are to be upgraded by a certain date. One example of this is the old style Reduced Speed Ahead regulatory sign as shown in the 2000 *MUTCD*, and shown below on the left. Per the 2003 *MUTCD*, this sign is to be replaced with the Reduced Speed Limit warning sign, as shown below on the right. Exhibit 3, shown on the following page, illustrates the revised compliance date table, amended per the final ruling effective June 2012.



Exhibit 2: Typical Annualized Sign Sheeting Costs

Sheeting Type	Typical Sheeting Cost (Per Sq Ft)	Sign Cost (Per Sq Ft)	Sign Life (Years)	Cost Per Year (Per Sq Ft)
I - Engineering Grade	\$0.85	\$19.15	7	\$2.74
II - Super Engineering Grade	\$1.45	\$19.75	7	\$2.82
III - High Intensity	\$1.70	\$20.00	12	\$1.67
VIII - High Intensity Prismatic	\$4.00	\$22.30	12	\$1.86
Other Prismatics	\$5.45	\$23.75	12	\$1.98

**Exhibit 3: FHWA Target Compliance Dates
(2009 MUTCD Table I-2, as revised by FHWA final rule, effective June 2012)**

MUTCD Section No.	Section Title	Special Provision	Compliance Date
2A.08	Maintaining Minimum Retroreflectivity	Implementation and continued use of an assessment or management method that is designed to maintain regulatory and warning traffic sign retroreflectivity at or above the established minimum levels	7/13/2014
2A.19	Lateral Offset	Crashworthiness of sign supports on roads with posted speed limit of 50 mph or higher	01/17/2013 (date established in the 2000 MUTCD)
2B.40	ONE WAY signs (R6-1, R6-2)	New requirements in the 2009 MUTCD for the number and locations of ONE WAY signs	12/31/2019
2C.06 thru 2C.14	Horizontal Alignment Warning Signs	Revised requirements in the 2009 MUTCD regarding the use of various horizontal alignment signs	12/31/2019
2E.31, 33, and 36	Plaques for Left-Hand Exits	New requirements in the 2009 MUTCD to use E1-5aP and E1-5bP plaques for left-hand exits	12/31/2014
4D.26	Yellow Change and Red Clearance Intervals	New requirement in the 2009 MUTCD that durations of yellow change and red clearance intervals shall be determined using engineering practices	7/13/2017, or when timing adjustments are made to the individual intersection and/or corridor, whichever occurs first
4E.06	Pedestrian Intervals and Signal Phases	New requirement in the 2009 MUTCD that the pedestrian change interval shall not extend into the red clearance interval and shall be followed by a buffer interval of at least 3 seconds	
6D.03	Worker Safety Considerations	New requirement in the 2009 MUTCD that all workers within the right-of-way shall wear high-visibility apparel	12/31/2011
6E.02	High-Visibility Safety Apparel	New requirement in the 2009 MUTCD that all flaggers within the right-of-way shall wear high-visibility apparel	12/31/2011
7D.04	Uniform of Adult Crossing Guards	New requirement in the 2009 MUTCD for high-visibility apparel for adult crossing guards	12/31/2011
8B.03, 8B.04	Grade Crossing (Crossbuck) Sign and Supports	Retroreflective strip on Crossbuck sign and support	12/31/2019
8B.04	Crossbuck Assemblies with YIELD or STOP Signs at Passive Grade Crossings	New requirement in the 2009 MUTCD for the use of STOP or YIELD signs with Crossbuck signs at passive grade crossings	12/31/2019

What Are the Appropriate Colors for Guide Signs on Installations?

The *MUTCD* states that the appropriate color for guide signs is a white message and border on a green background. Military bases very commonly use colors other than this, mainly white letters on a brown background. This sparks the question: Does the use of brown guide signs violate the *MUTCD*?

SDDCTEA's view is that a majority of the destination signs found on military base main cantonment areas are, by definition, considered community wayfinding guide signs per the 2009 *MUTCD* section 2D.50. Per the *MUTCD*, the installation should establish a wayfinding guide sign system that is conducive to a cohesive and continuous system of signs. These guide signs are a type of destination guide sign for conventional roads with a common color and/or identification enhancement marker for destinations within an overall wayfinding guide sign plan for the installation. A brown background with white lettering satisfying the retroreflective requirement is an example of one of the acceptable color combinations.

There are some scenarios where the white legend on green background is more applicable. Examples include installations with higher speed corridors connecting several cantonment, industrial, or flightline areas or remote road networks supporting range areas. On these higher speed corridors, green background with white lettering is appropriate.

In all cases, remember these tips regarding the use of guide signs:

- ✓ Guide signs are normally rectangular, with the sign width as the longer dimension.
- ✓ All guide signs should have white letters, arrows, and borders.
- ✓ Limit the number of destination lines to three to four lines so as to make the message simple and easy for a motorist to understand in the time available for the motorist to read it.
- ✓ Do not use a traditional ladder-type sign, due to too many destinations for a motorist to read in a short amount of time.
- ✓ Consider providing printed maps to visitors, so as to not provide guide signing to every attraction on base.
- ✓ For speeds of 25 mph or less, use a letter size of 4 inches in height and arrows 6x6 inches.
- ✓ For speeds of 30 mph or higher, generally use a letter size of 6 inches in height and arrows 9x9 inches, unless it is a multilane roadway with speeds greater than 40 mph.
- ✓ Clearview fonts for the lettering on guide signs. For more information, see SDDCTEA Pamphlet 55-14 or contact SDDCTEA.

Exhibit 4 shows common guide sign options.

Exhibit 4: Guide Sign Examples



Historic Street Name Signs

Per the FHWA, a new provision has been adopted that exempts historic street name signs on lower speed roadways in locally-identified historic districts from complying with the provisions for retroreflectivity, letter height and case, color, and placement. Formal guidance is available in 36CFR 60.4, which provides criteria on how to evaluate a district to be identified as historic, and how to evaluate whether street name signs can be considered historic. There is no formal definition of what speed is considered to be low speed, but per a May 2012 memo from FHWA 25 miles per hour is a reasonable maximum speed limit for locally identified historic districts.

If historic street name signs are kept, make sure they provide at least some degree of utility as navigational devices for road users.

Answers from Page 2

The primary sign is missing from this sign assembly. Often, when a sign is missing, there is no record of what sign should be there. If the installation has an SMS in place, they could open the record to see what sign to order. SDDCTEA is available to assist installations in performing sign assessments and creating SMSs. This would provide an opportunity to verify that the signs are correct for their applications.



Contact Us

We can help your installation “get a handle” on your traffic sign problems!

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Reference List

- ✓ Federal Highway Administration, Manual on Uniform Traffic Control Devices (*MUTCD*), 2009
http://mutcd.fhwa.dot.gov/pdfs/2009/pdf_index.htm
- ✓ Traffic Engineering for Better Signs and Markings, SDDCTEA Pamphlet 55-14, 2011
- ✓ Better Military Traffic Engineering, SDDCTEA Pamphlet 55-17, 2011

Continuing Education	Phone	Web Site
Pennsylvania State University; The Pennsylvania Transportation Institute	(814) 865-4700	www.pti.psu.edu
University of Maryland; MD Transportation Technology Transfer Center	(301) 403-4623	www.encc.umd.edu/ttcc
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