

Colorado LTAP

March 2008

Serving local transportation agencies throughout Colorado

Spring Issue



Sign Retroreflectivity Requirements Added to the MUTCD

Maintaining Traffic Sign Retroreflectivity

Approximately half of the fatal crashes on the nation's highways occur at night, despite the fact that travel at night is significantly less than during the daytime. The Federal Highway Administration (FHWA) is interested in finding ways to remedy the nighttime safety problem. Their Road Departure Program's first objective is keeping vehicles on the road. This requires effective delineation of the roadway in both day and night conditions.

Nighttime visibility of signs and pavement markings is essential for roadway safety. Night visibility can be provided in many ways, but primarily through headlight illumination of traffic control devices (TCD), illumination of the TCD or the legend itself, or by overhead fixed lighting. The objective is to provide adequate levels of luminance to assure that traffic control devices are noticeable and legible to drivers.

When a driver sees a traffic sign at night, he is viewing the sign's luminance, or brightness. The effectiveness of headlight illumination is measured in terms of retroreflectivity. The driver does not "see" retroreflectivity.

Retroreflectivity is a scientific term for the ability of a material to reflect light directly back towards its source. All surfaces reflect light, but in most cases the light is scattered in all directions. Mirrors for example provide a surface that reflects light in a specular fashion, or at an equal and opposite angle from the light source. Retroreflectivity is achieved by including micro-sized glass beads (enclosed or encapsulated) or by using micro-prisms (cube corner reflectors) into the sign sheeting material. A sign can reflect only the light that reaches it. Variations in sign sheeting technology result in differing levels of retroreflectivity. The higher the retroreflectivity measure the greater amount of the

light can be returned toward the source. This property in traffic sign materials is important for providing increased nighttime visibility.

Sign sheeting with high retroreflectivity values may be desirable due to wearing and aging of materials, changing conditions of headlights, ambient atmospheric conditions, and other physical factors that influence night visibility.



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Colorado LTAP

STAFF

Yunping Xi

University Administrator

Renée Koller

Director

Lindsay Nathaniel

Training Coordinator

Nattapong, Haideh & Marty Butcher

Library-Office Assistants

Jeremy Goldsmith

Webmaster

The Colorado Local Technical Assistance Program is sponsored by the Federal Highway Administration, the Colorado Department of Transportation, and the University of Colorado at Boulder.

The Colorado LTAP Newsletter is published quarterly. Articles, pictures and comments are welcome.

For more information, contact:

Colorado LTAP
University of Colorado
at Boulder
3100 Marine St., A-213
UCB 561
Boulder, CO 80309-0561

Office: (303) 735-3530
Toll Free: (888) 848-LTAP

Fax: (303) 735-2968

Email:
cltap@colorado.edu

Website:
<http://ltap.colorado.edu>

Director's Corner

2008 will be Great!

That's my motto for the coming year.

We had quite a few bumps in the road to climb over in 2007 both personal and professional - but it has only made us stronger. We are excited for what we have in store for you in 2008 - including hosting the National LTAP Conference in Breckenridge in July!

We have just completed our 10th year of Colorado LTAP's association between the University of Colorado at Boulder and CDOT. The University of Colorado has also been awarded the next five-year contract. Colorado LTAP staff will continue to improve the available resources for local agencies - and we always welcome suggestions!

In 2007, we provided 78 training courses to 1,964 participants, resulting in over 13,460 training hours. There were 6900 recipients of our quarterly Newsletter. All of our focus areas of Safety, Workforce Development, Infrastructure Management, and Value Delivery were covered through training and articles. We successfully completed two heavy equipment training programs thanks to partnerships with Arapahoe County and La Plata County. There were 53 *Roads Scholar*

participants and 3 *Supervisory Skills* participants who completed the training program requirements and received their plaques in 2007. We partnered with the Colorado Contractor's Association to certify 35 participants in the Traffic Control Supervisory Certification course; and we certified 95 participants in our 5 free Flagger Certification workshops. There were 279 library materials checked out and 3,337 free materials distributed throughout 2007. There were 77 new publications, 12 bulk materials, 28 new CDs, 6 new DVDs, 6 new videos, and 32 different types of bulk free materials added to our library loan program. There were 8 agencies that requested traffic count services; and 6 agencies that loaned our retroreflectometer. Colorado LTAP had a booth at 5 trade shows and conferences; held 4 Advisory Committee meetings with representatives from local agencies across the state; and hosted the LTAP Region 8 meeting in 2007.

We are looking forward to working with all of our local partners and agencies for another successful year in 2008!

Renée Koller

In preparation for FLOOD season...

"There is a tide in the affairs of men, which, taken at the flood, leads on to fortune. We must take the current when it serves, or lose our ventures."

- William Shakespeare

Quotes of the Day

"We must build dikes of courage to hold back the flood of fear."

- Martin Luther King, Jr.

"No loss by flood and lightning, no destruction of cities and temples by the hostile forces of nature, has deprived man of so many noble lives and impulses as those which his intolerance has destroyed"

- Helen Keller

"No individual raindrop ever considers itself responsible for the flood."

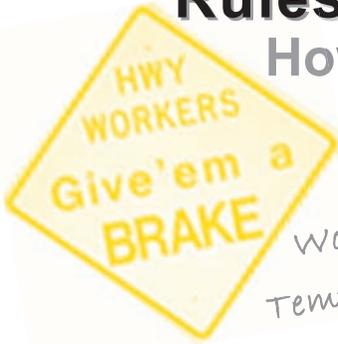
- Unknown

"Nobody's strong enough to stand up under a flood of weak material."

- Alan Ladd

Rules, Rules and More Rules

How to keep them all straight?



Worker Visibility Rule
 Work Zone Safety and Mobility Rule
 Temporary Traffic Control Devices Rule

By Renée Koller and Lindsay Nathaniel

Work Zone Safety and Mobility Rule

The *Rule on Work Zone Safety and Mobility* was published in the Federal Register (69 FR 54562) on September 9, 2004. All state and local governments that receive Federal-aid funding were required to comply with the provisions of the rule by **October 12, 2007**. The rule updates and broadens the former regulation "Traffic Safety in Highway and Street Work Zones" in 23 CFR 630 Subpart J to address more of the current issues affecting work zone safety and mobility.

While the original rule addressed procedures and plans to provide for road user and highway worker safety, it did not address the broader impacts of work zones. Current issues and trends such as - increasing traffic volumes and congestion; highways approaching middle age requiring more construction and repair; pressure on contractors to compress schedules, finish projects early, and perform work at night; travelers frustrated with the delays, unexpected road conditions, and work zone inconsistencies; all made a strong case for updating the rule to address these issues and better provide for work zone safety and mobility. Changes to the regulation encourage broader consideration across project development, and the implementation of strategies that help manage the impacts of work zones during project delivery.

Rule Overview

Within the *Work Zone Safety and Mobility Rule* are three primary components: 1) Implementation of an overall, state-level work zone safety and mobility **policy**; 2) Development and implementation of standard **processes and procedures** to support policy

implementation, including procedures for work zone impacts assessment, analyzing work zone data, training, and process reviews; and 3) Development and implementation of procedures to assess and manage work zone impacts on individual projects. This includes requirements for identifying **significant projects** and developing and implementing **transportation management plans (TMPs)**. A *significant project* is defined in the rule as one that, alone or in combination with other concurrent projects nearby, is anticipated to cause sustained work zone impacts that are greater than what is considered tolerable.

The updated Rule expands the concept of "work zone traffic control" to "work zone transportation management." The updated Rule provides for the systematic consideration of work zone impacts of road projects, and the development of appropriate TMPs that help manage those impacts during implementation. The former Rule focused on the development of Traffic Control Plans (TCPs) for road projects and providing for the safety of motorists and workers. The updated Rule emphasizes the importance of safety but also adds a focus on providing for mobility. The updated Rule requires TMPs to be developed and implemented for all projects. TMP strategies for a work zone include temporary traffic control measures and devices, public information and outreach, and operational strategies (e.g., travel demand management, signal retiming, traffic incident management, etc.). The strategies included in a TMP will vary based upon the expected work zone impacts of the road project.

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Colorado LTAP Advisory Committee Members

◆
Marlene Crosby
 Gunnison County

◆
John Baker
 Town of Snowmass

◆
Adam Lancaster
 City of Cañon City

◆
Richard McKee
 City of Longmont

◆
Tammie Crawford
 Routt County

◆
Doyle Villers
 LaPlata County

◆
Kevin Scott
 Phillips County

◆
Beth Moore
 CDOT

◆
Craig Larson
 FHWA

◆
Yunping Xi
 University of Colorado
 at Boulder

◆
Renée Koller
 Colorado LTAP



MUTCD RETRO- REFLECTIVITY REVISION

Revision 2 of the 2003 MUTCD was published in the Federal Register on December 21, 2007, making the sign retroreflectivity requirements a federal regulation effective on **January 22, 2008**.

The second revision of the 2003 MUTCD introduces new language establishing minimum retroreflectivity levels that must be maintained for traffic signs.

Agencies have until January 2012 to establish and implement a sign assessment or management method to maintain minimum levels of sign retroreflectivity.

The compliance date for *regulatory, warning, and ground-mounted guide signs* is **January 2015**.

The compliance date for *overhead guide signs and street name signs* is **January 2018**.

The new MUTCD language is shown on page 7 and 8 of this document.

Sign Retroreflectivity Requirements Added to the MUTCD

continued from page 1...

For headlamps, the old sealed beam headlamp provides a brighter sign. However, modern cutoff headlamps direct less light toward the sign and the sign looks dimmer if all other factors are equal. The larger the vehicle size, the less bright a sign appears. This is because of the larger observation angle to the sign caused by the greater distance between the driver eyes and the headlamps. There is additional need for use of higher retroreflective materials to meet the needs of older drivers. Research has shown that a 59-year old driver needs 8 times more light than a 20-year old to see the same object while driving!

Traffic signs provide important information to drivers at all times, both day and night. To be effective, their visibility must be maintained. Since the first edition of the Manual on Uniform Traffic Control Devices (MUTCD) in 1935 the manual has required signs to be visible at night by using reflective elements in the sign face. In 1993, Congress directed the US DOT to “revise the MUTCD to include 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.” Initial minimum retroreflectivity levels were developed in 1993 and documented in “Minimum Retroreflectivity Requirements for Traffic Signs”, Technical Report, FHWA-RD-93-077. Since the 1993 directive, FHWA has worked diligently to develop a rational set of minimum requirements for sign retroreflectivity, assessment and management methods, and technologies for the evaluation of traffic signs. The proposed minimum retroreflectivity levels were updated to account for changes in vehicle headlight attributes (i.e. brighter, but with a different illumination pattern), the vehicle fleet mix (i.e. the large number of SUVs has increased the average headlight and driver eye heights), an



increasingly older driver population, the changes to sign legibility requirements in the 2000 MUTCD, the need for overhead guide and street name signs, and the emergence of new sign materials since the 1993 research. These research efforts were completed in 2003, and have become the basis for the minimum maintained traffic sign retroreflectivity rulemaking. The 2003 MUTCD addresses sign visibility in several places, including Sections 1A.03, 1A.04, 1A.05, 2A.06, 2A.08, and 2A.22. These sections address factors such as uniformity, design, placement, operation, and maintenance. Previously, the MUTCD did not specify minimum retroreflectivity levels.

Announcement of Final Rule

Revision 2 of the 2003 MUTCD was published in the Federal Register on December 21, 2007, making the sign retroreflectivity requirements a federal regulation effective on January 22, 2008.

Revision 2 of the 2003 MUTCD was published in the Federal Register on December 21, 2007, making the sign retroreflectivity requirements a federal regulation effective on January 22, 2008. The final rule provides additional requirements, guidance, clarification, and flexibility in maintaining traffic sign retroreflectivity that is already required by the MUTCD. The minimum retroreflectivity levels and maintenance methods consider changes in

the composition of the vehicle population, vehicle headlamp design, and the demographics of drivers. The FHWA expects that the minimum maintained retroreflectivity levels and maintenance methods will help to promote safety and mobility on the nation’s streets and highways.

The new standard in Section 2A.09 *Maintaining Minimum Retroreflectivity* requires that agencies maintain traffic signs to a minimum level of retroreflectivity outlined in Table 2A-3 of the MUTCD (included on page 8). The

FHWA believes that this proposed change will promote safety while providing sufficient flexibility for agencies to choose a maintenance method that best matches their specific conditions.

Including Table 2A-3 in the MUTCD does not imply that an agency must measure the retroreflectivity of every sign. Rather, the new MUTCD language describes five methods that agencies can use to maintain traffic sign retroreflectivity at or above the minimum levels.

Agencies can choose from these methods or combine them. Agencies are allowed to develop other appropriate methods based on engineering studies. However, agencies should adopt a consistent method that produces results that correspond to the values in Table 2A-3.

The new MUTCD language recognizes that there may be some individual signs that do not meet the minimum retroreflectivity levels at a particular point in time. As long as the agency with jurisdiction is maintaining signs in accordance with Section 2A.09 of the MUTCD, the agency will be considered to be in compliance. This document describes methods that can be used to maintain sign retroreflectivity at or above the MUTCD's minimum maintained retroreflectivity levels.

Retroreflectivity Maintenance

The MUTCD describes two basic types of methods that agencies can use to maintain sign retroreflectivity at or above the MUTCD minimum maintained retroreflectivity levels — *assessment methods* and *management methods*. The FHWA has identified and listed assessment and management methods for maintaining sign retroreflectivity in accordance with Section 2A.09. These methods are described here; a full report on these methods can be found at www.fhwa.dot.gov/retro.

ASSESSMENT METHODS

Assessment methods require evaluation of individual signs within an agency's jurisdiction. There are two basic

assessment methods — *visual assessment* and *measured sign retroreflectivity*.

1. Visual Assessment

Nighttime Inspection

In the visual nighttime inspection method, on-the-fly assessments of retroreflectivity are made by an inspector during nighttime conditions. The following recommendations provide general guidance for the inspections:

- Develop guidelines and procedures for inspectors to use in conducting the nighttime inspections and train inspectors in the use of these procedures.
- Conduct inspections at normal speed from the travel lane(s).
- Conduct inspections using low-beam headlights while minimizing interior vehicle lighting.
- Evaluate signs at typical viewing distances so that adequate time is available for an appropriate driving response.

One or more of the following procedures should be used to support visual inspections.

Calibration Signs Procedure

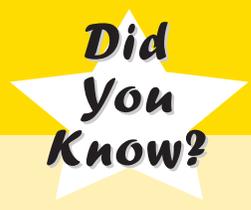
In this procedure, an inspector views a "calibration sign" prior to conducting the nighttime inspection described above.

Calibration signs have known retroreflectivity levels at or above minimum levels. These signs are set up where the inspector can view the calibration signs in a manner similar to nighttime field inspections. The inspector uses the visual appearance of the

calibration sign to establish the evaluation threshold for that night's inspection activities. The following factors provide additional information on the use of this procedure:

- Calibration signs are needed for each color of sign in Table 2A-3.
- Calibration signs are viewed at typical viewing distances using the inspection vehicle.
- Calibration signs need to be properly stored between inspections so that their retroreflectivity does not deteriorate over time.

Table 2A-3 in the MUTCD does not imply that an agency must measure the retroreflectivity of every sign. As long as the agency is maintaining signs in accordance with Section 2A.09, the agency will be considered to be in compliance.



- * For the last 25 years, 50% or more of the fatal crashes have occurred at night despite the lower volumes of traffic at night.
- * Overall annual fatalities on US highways have declined from about 50,331 in 1978 to 42,643 in 2003.
- * Crashes during dawn and dusk are relatively a small portion of the fatal crashes.
- * Despite a long-term downward trend, the night crash rate is still about three times higher than that during the day!

LTAP RETRO-REFLECTIVITY TRAINING

FHWA will be teaching LTAPs a train-the trainer course in July. Colorado LTAP will be offering several full-day retroreflectivity classes this Fall. The course will cover new rules and regulations, how it affects local agencies, what agencies can do, assessment methods, and management methods. The course will also provide a toolkit for locals on step-by-step what they need to do, and sample letters to use when asking for funding.

FREQUENTLY ASKED QUESTIONS

Can I use any type of sign sheeting as long as its retroreflectivity meets the minimum specified levels?

The new Table 2A-3 indicates that any type of sheeting including the Type I (Engineering Grade), Type II (Super Engineering Grade), or Type III beaded (High Intensity Beaded) sheeting and the Type III, IV, VI, VII, VIII, IX, or X prismatic sheeting may be used on any sign with the following exceptions: *Types I, II, and III beaded sheeting cannot be used for the white legends on overhead guide signs; Type I beaded sheeting cannot be used for the white legends on ground-mounted guide signs; and Type I beaded sheeting cannot be used for the yellow or orange backgrounds on warning and temporary traffic control signs.*

Can I still use Type I Engineering Grade (EG) sign sheeting?

Type I Engineering Grade sign sheeting may still be used for white, green, and red backgrounds. Type I EG sign sheeting also may still be used for the white legend on a sign with a red background. Thus, STOP signs and black-on-white regulatory signs may still be made from Type I EG sign sheeting. However, 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 next time its retroreflectivity is assessed. The use of higher performance sheeting, even though it has a higher initial cost, might provide a better life-cycle cost for the agency.

☐ Calibration sign retroreflectivity should be verified periodically.

Comparison Panels Procedure

Comparison panels are used to assess signs that have marginal retroreflectivity. The comparison panels are fabricated at retroreflectivity levels at or above the minimum levels. When the visual inspection identifies the retroreflectivity of a sign as marginal, a comparison panel is attached to the sign and the sign/panel combination is viewed and compared by the inspector.

Consistent Parameters Procedure

Nighttime inspections are conducted under similar factors that were used in the research to develop the minimum retroreflectivity levels. These factors include:

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

2. Measured Sign Retroreflectivity

In this method the retroreflectivity of a sign is measured and directly compared to the minimum level appropriate for that sign. ASTM E1709, Standard Test Method for Measurement of Retroreflective Signs Using a Portable Retroreflectometer, provides a standard method for measuring sign retroreflectivity.

MANAGEMENT METHODS

Management methods provide an agency with the ability to maintain sign retroreflectivity without having to assess individual signs. There are three basic management methods—sign replacement based on expected sign life, blanket replacement of large numbers of signs at appropriate intervals, and use of control signs.

1. Expected Sign Life

In this method, individual signs are replaced before they reach the end of their

expected service life, which is the time anticipated for the retroreflective material to degrade to the appropriate minimum level. Expected service life can be based on sign sheeting warranties, weathering deck results, measurements of field signs, or other criteria.

This method requires a system for tracking sign age. A common approach for identifying the age of individual signs uses a label on the sign to mark the year of fabrication or installation. Sign management systems can also be used to track the age of individual signs.

An agency can choose to use either an assessment method or a management method, or a combination of the two. Agencies may develop other methods as long as they are documented in an engineering study and correspond to the values in Table 2A-3.

2. Blanket Replacement

With this method, an agency replaces all signs in an area, or of a given type, at specified time intervals based on the relevant expected sign life. This method typically requires that all of the designated signs within a replacement area, or of the particular sign type, be replaced even if a sign was recently installed.

3. Control Signs

In this method, a control sample of signs is used to represent all of an agency's signs. The retroreflectivity of the control signs is monitored and sign replacement is based on the performance of the control signs.

- ☐ Agencies should develop a sampling plan to determine the appropriate number and type of control signs needed to represent the agency's signs.
- ☐ Control signs may be actual signs in the field or signs in a maintenance yard (for convenience).
- ☐ The retroreflectivity of the control signs should be monitored using an assessment method.

A complete list of “what has changed” in Revision 2 of the MUTCD in regards to retroreflectivity is accessible at:

http://safety.fhwa.dot.gov/roadway_dept/retro/index.htm.



Sources:

FHWA-SA-07-020 and http://safety.fhwa.dot.gov/roadway_dept/retro

New MUTCD Section 2A.09 Maintaining Minimum Retroreflectivity

Support:

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

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.

Support:

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

Guidance:

Except for those signs specifically identified in the Option portion of this Section, one or more of the following assessment or management methods should be used to maintain sign retroreflectivity:

1. Visual Nighttime Inspection – The retroreflectivity of an existing sign is assessed by a trained sign inspector conducting a visual inspection from a moving vehicle during nighttime conditions. Signs that are visually identified by the inspector to have retroreflectivity below the minimum levels should be replaced.

2. Measured Sign Retroreflectivity – Retroreflectivity is measured using a retroreflectometer. Signs with retroreflectivity below the minimum levels should be replaced.

3. Expected Sign Life – When signs are installed, the installation date is labeled or recorded so that the age of a sign is known. The age of the sign is compared to the expected sign life. The expected

sign life is based on the experience of sign retroreflectivity degradation in a geographic area compared to the minimum levels. Signs older than the expected life should be replaced.

4. Blanket Replacement – All signs in an area/corridor, or of a given type, should be replaced at specified intervals. This eliminates the need to assess retroreflectivity or track the life of individual signs. The replacement interval is based on the expected sign life, compared to the minimum levels, for the shortest-life material used on the affected signs.

5. Control Signs – Replacement of signs in the field is based on the performance of a sample of control signs. The control signs might be a small sample located in a maintenance yard or a sample of signs in the field. The control signs are monitored to determine the end of retroreflective life for the associated signs. All field signs represented by the control sample should be replaced before the retroreflectivity levels of the control sample reach the minimum levels.

6. Other Methods – Other methods developed based on engineering studies can be used.

Support:

Additional information about these methods is contained in the 2007 Edition of FHWA's "Maintaining Traffic Sign Retroreflectivity" (see Section 1A.11).

Option:

Highway agencies may **exclude** the following signs from the retroreflectivity maintenance guidelines described in this Section:

1. Parking, Standing, and Stopping signs (R7 and R8 series)
2. Walking/Hitchhiking/Crossing signs (R9 series, R10-1 through R10-4b)
3. Adopt-A-Highway signs
4. All signs with blue or brown backgrounds
5. Bikeway signs that are intended for exclusive use by bicyclists or pedestrians.

FREQUENTLY ASKED QUESTIONS

Can fluorescent colors be used?

Fluorescent versions of sign colors may be used provided that they meet the minimum retroreflectivity levels specified for the basic color. Fluorescent yellow and fluorescent yellow-green signs would need to meet the minimum retroreflectivity levels for yellow signs, and fluorescent orange signs would need to meet the minimum retroreflectivity levels for orange signs.

Why are signs with blue or brown backgrounds excluded from these retro requirements?

At the time that the changes associated with Revision 2 were being developed, the research for signs with blue or brown backgrounds had not yet been completed. However, a research report (FHWA-HRT-08-029) that provides minimum recommended retroreflectivity levels for brown and blue signs was completed in 2007 and will be available soon.

Won't these efforts be costly to highway agencies?

Because of the 7- to 10-year compliance period that has been adopted for replacing signs that have insufficient retroreflectivity, highway departments will be able to implement improved sign inspection and management procedures and subsequently replace the signs in a time frame that is consistent with the typical sign replacement cycle. As a result, the cost impacts might be little more than the additional cost of using higher performance sign materials. Cost increases from upgrading materials and/or processes might be offset by the long-term savings that result from the longer life of the higher performance sheeting products.

A 1998 FHWA report estimated that agencies would be faced with the need to replace 5- 8% of their signs to meet the minimum requirements (FHWA-RD-97-053). The costs for any particular agency would vary by existing condition of their signs and nature of their current sign management practices. An April 2007 update (FHWA-HRT-07-042) of this 1998 report is available at: <http://www.fhrc.gov/safety/pubs/07042/07042.pdf>

New MUTCD TABLE 2A-3. Minimum Maintained Retroreflectivity Levels¹

SIGN COLOR	SHEETING TYPE (ASTM D4956-04)				ADDITIONAL CRITERIA
	Beaded Sheeting			Prismatic Sheeting	
	I	II	III	III, IV, VI, VII, VIII, IX, X	
White on Green	W*; G ≥ 7	W*; G ≥ 15	W*; G ≥ 25	W ≥ 250; G ≥ 25	Overhead
	W*; G ≥ 7	W ≥ 120; G ≥ 15			Ground-mounted
Black on Yellow or Black on Orange	Y*; O*	Y ≥ 50; O ≥ 50			②
	Y*; O*	Y ≥ 75; O ≥ 75			③
White on Red	W ≥ 35; R ≥ 7				④
Black on White	W ≥ 50				—

① The minimum maintained retroreflectivity levels shown in this table are in units of cd/lx/m² measured at an observation angle of 0.2° and an entrance angle of -4.0°.

② For text and fine symbol signs measuring at least 1200 mm (48 in) and for all sizes of bold symbol signs

③ For text and fine symbol signs measuring less than 1200 mm (48 in)

④ Minimum Sign Contrast Ratio ≥ 3:1 (white retroreflectivity ÷ red retroreflectivity)

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

BOLD SYMBOL SIGNS

- | | | |
|---|--|---|
| <ul style="list-style-type: none"> • W1-1, -2 – Turn and Curve • W1-3, -4 – Reverse Turn and Curve • W1-5 – Winding Road • W1-6, -7 – Large Arrow • W1-8 – Chevron • W1-10 – Intersection in Curve • W1-15 – 270 Degree Loop • W2-1 – Cross Road • W2-2, -3 – Side Road • W2-4, -5 – T and Y Intersection • W2-6 – Circular Intersection | <ul style="list-style-type: none"> • W3-1 – Stop Ahead • W3-2 – Yield Ahead • W3-3 – Signal Ahead • W4-1 – Merge • W4-2 – Lane Ends • W4-3 – Added Lane • W4-6 – Entering Roadway Added Lane • W6-1, -2 – Divided Highway Begins and Ends • W6-3 – Two-Way Traffic • W10-1, -2, -3, -4, -11, -12 – Highway-Railroad Advance Warning • W11-2 – Pedestrian Crossing | <ul style="list-style-type: none"> • W11-3 – Deer Crossing • W11-4 – Cattle Crossing • W11-5 – Farm Equipment • W11-6 – Snowmobile Crossing • W11-7 – Equestrian Crossing • W11-8 – Fire Station • W11-10 – Truck Crossing • W12-1 – Double Arrow • W16-5p, -6p, -7p – Pointing Arrow Plaques • W20-7a – Flagger • W21-1a – Worker |
|---|--|---|

FINE SYMBOL SIGNS – Symbol Signs Not Listed As Bold Symbol Signs

SPECIAL CASES

- W3-1 – Stop Ahead: Red retroreflectivity ≥ 7
- W3-2 – Yield Ahead: Red retroreflectivity ≥ 7; White retroreflectivity ≥ 35
- W3-3 – Signal Ahead: Red retroreflectivity ≥ 7; Green retroreflectivity ≥ 7
- W3-5 – Speed Reduction: White retroreflectivity ≥ 30
- For non-diamond shaped signs such as W14-3 (No Passing Zone), W4-4p (Cross Traffic Does Not Stop), or W13-1, -2, -3, -5 (Speed Advisory Plaques), use largest sign dimension to determine proper minimum retroreflectivity level.

New MUTCD Minimum Retroreflectivity COMPLIANCE PERIODS

* **4-years** for implementation and continued use of an assessment or management method that is designed to maintain traffic sign retroreflectivity at or above the established minimum levels;

* **7-years** for replacement of regulatory, warning, and ground-mounted guide (except street name) signs that are identified using the assessment or management methods as failing to meet the established minimum levels; and

* **10-years** for replacement of street name signs and overhead guide signs that are identified using the assessment or management method as failing to meet the established minimum levels.



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Title

DVD 9THSWT *9 Traits of Highly Successful Work Teams*

Unless you've acquired solid team-leadership skills, odds are high you'll be underemployed (perhaps even out of work) by the end of the decade. In this program you'll learn the skills you need to create teams that are efficient and effective. Here are practical tools to help you and your teammates work together in better harmony, enjoy your jobs more and make greater contributions to your organization. Learn together as renowned team authority Loren Ankario walks you through nine critical traits of highly successful teams- essential traits a team must have to function at its peak. Program Highlights: Why "purpose" is the backbone of any true team; How to craft a team mission statement that's more than a motto; The #1 reason why teams succeed - or fail; 3 proven strategies for galvanizing diverse individuals into a unified team; The 5 styles of conflict resolutions - when, why, and how to use each; Recognizing the 4 most dangerous symptoms of team fragmentation and how to correct them; and Simple techniques to keep teams fresh and more immune to burnout.

DVD HDWDP *How To Deal With Difficult People*

This program takes a long, hard and lighthearted look at what you can do to deal with the people who seem to delight in making your life miserable. Learn to co-exist with all kinds of difficult people - from know-it-talls to bullies, backstabbers and more — and free yourself from their grip. Learn how to handle difficult people once and for all. Program Highlights: The best comeback to a biting or sarcastic remark; What to do when someone starts yelling or threatens you; The one mistake people make that's guaranteed to escalate conflict; What to do when your "difficult person" is your boss; When to call in a third party to resolve a stalemate; and How to know when YOU are the difficult one.

CD ADAA *ADA & Accessibility Let's Get Practical*

This CD version of APWA's definitive book on requirements for meeting requirements of the Americans with Disabilities Act is best read using the latest version of Adobe Reader software. Free software for PC can be downloaded at www.adobe.com. Mac users can download from the Adobe web site at: www.adobe.com. For optimum functionality and display, use the "bookmark" function to move through the document with the Page Display option under VIEW set for "Two-Up." If you have Internet access while using this CD, websites within the text are functional. Move your cursor over the link to jump to the appropriate website. The contents of this CD are exclusively copyrighted by the American Public Works Association; making copies is strictly prohibited.

CD GSWBBT *Guidelines for the Selection of W-Beam Barrier Terminals*

This CD provides information for designers and construction/maintenance personnel responsible for selecting and properly installing the most appropriate terminal design at any site. Shows the actual crash performance of each terminal type, and provides guidance on proper site grading and presents real-world examples of both appropriate and inappropriate installations.

CD PPT2 *Pavement Preservation Toolbox, 2nd Edition, 2007*

Techniques and strategies in pavement preventative maintenance.

APWA's "Quick Course to Construction Inspection" Five-Part Series

CD CIPAP *Quick Course To Construction Inspection "Paperwork and Processes"*

From APWA's new "Quick Course to Construction Inspection", this five-part series is led by top experts in the construction inspection field and is intended as an overview for those preferring distance learning. Part ONE of this five-part series covers the following topics: *Paperwork and Processes*. New construction in developing areas requires public works construction projects. Public works projects also involve maintenance and repair to existing structures. Public works construction must have quality and safety controls.

CD QCCIIT *Quick Course To Construction Inspection "In The Trenches"*

From APWA's new "Quick Course to Construction Inspection", this five-part series is led by top experts in the construction inspection field and is intended as an overview for those preferring distance learning. Part TWO of this five-part series covers the following topics: *Excavation and Confined Space Safety & Underground Pipeline Construction Inspection*. As a public works construction inspector, it is important to understand the potential dangers inherent with entering excavations, trenches, and confined spaces. Learn what steps the public works construction inspector can take to minimize the dangers - such as cave-ins - that are associated with underground utility construction. Improperly installed underground pipelines pose potential threats to the community's health and safety and serious consequences to the public agency. Learn the appropriate testing methods for different materials, accept/reject criteria, and key evaluation points that a public works construction inspector needs to look for on the job.

CD QCCILT *Quick Course To Construction Inspection "Laying The Groundwork"*

From APWA's new "Quick Course to Construction Inspection", this five-part series is led by top experts in the construction inspection field and is intended as an overview for those preferring distance learning. Part THREE of this five-part series covers the following topics: *Earthwork Construction Inspection & Street and Surface Improvements*. A public works construction project is only as good as the foundation it was built on! Learn about the general characteristics of soil, how to recognize different soil types, what soil makes the best foundation for a particular project, and when to report soil conditions that are incompatible with design criteria. Hot mix asphalt concrete (HMAC) paving projects represent a major investment in resources. The public works construction inspector needs to understand the basics of the HMAC paving process. Learn about support conditions, ambient conditions, thickness, reinforcement and load transfer devices and other critical components of a successful project.

CD QCCIFAF *Quick Course To Construction Inspection "Framework and Foundation"*

From APWA's new "Quick Course to Construction Inspection", this five-part series is led by top experts in the construction inspection field and is intended as an overview for those preferring distance learning. Part FOUR of this five-part series covers the following topics: *General Concrete Construction Inspection & General Structural Steel Inspection*. Concrete construction involves many different phases of work from formwork to placement and curing—but most importantly, proper design of the concrete mix. Learn about the standards and inspection points for a concrete construction project, such as concrete ingredients, mixture requirements, testing procedures, and accept/reject criteria. In Structural Steel Inspection all structural steel materials must be the right type and undergo the correct installation operations according to the plans and specifications. This module will provide a brief overview of fabrication and erection procedures and the inspector's general duties.

CD QCCISSFS *Quick Course To Construction Inspection "Signals, Scenery, & Final Steps"*

From APWA's new "Quick Course to Construction Inspection", this five-part series is led by top experts in the construction inspection field and is intended as an overview for those preferring distance learning. Part FIVE of this five-part series covers the following topics: *Street Lighting and Traffic Signal Inspection, Landscape and Irrigation Construction Inspection, and Project Close-out Procedures*. • Street Lighting and Traffic Signal Inspection - Traffic signals and signage, street lights, and pavement marking may be installed as part of new roadway construction or to improve existing streets or highways. Gain a basic working knowledge of how these individual systems are designed, constructed, and operated in order to ensure that they are installed as specified. • Landscape and Irrigation Construction Inspection - Regardless of the climate, no landscaped area will thrive and survive without proper irrigation, so it is essential that the installation does not deviate from the project specifications. Learn the basic construction, installation, and inspection techniques for a public works landscape and irrigation installation. • Project Close-out Procedures - The final inspection and close-out of a public works construction project is necessary to ensure that the end result is a safe, well-constructed, quality product. Learn about the final inspection process, how to develop a punch list, and what documentation the public works construction inspector will be required to submit.

Rules, Rules and More Rules How to keep them all straight?

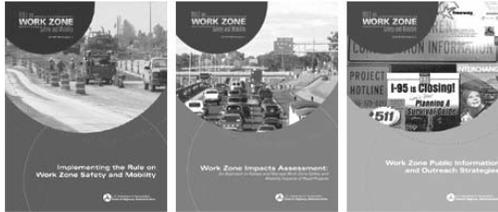
continued from page 3...

Work Zone Safety & Mobility Implementation Guidance Tools

While local public agencies that receive Federal-aid highway funding need to implement the policies and procedures required by the Rule, it does not prescribe any specific approach. If a local agency uses its own policies and procedures, it is recommended that the State and local agency work together to ensure they do not conflict. To assist agencies with developing their own procedures, FHWA has developed a number of implementation guidance tools to help agencies implement the provisions of this Rule – 1)

Implementing the Rule on Work Zone Safety and Mobility is a document that provides a general overview of the Rule, as well as guidance, examples, best practices, tools, and resources to help implement the Rule's provisions - many types of funding are available for implementing elements of the Rule, and a list of funding sources can be found in Section 7.5.2 of this document; 2) *Work Zone Impacts Assessment: An Approach to Assess and Manage Work Zone Safety and Mobility Impacts of Road Projects* is a document that provides guidance on developing procedures to assess and manage work zone impacts of road projects, as well as examples and practices of how agencies are currently assessing and managing work zone impacts; 3)

Developing and Implementing Transportation Management Plans for Work Zones is a document that provides information about developing and implementing Transportation Management Plans (TMP), including information on how and where a TMP fits into project-level processes and procedures, a list of components that can be considered for inclusion in a TMP, descriptions of work zone management strategies, and examples and practices of how agencies are currently using TMPs; and 4) *Work Zone Public Information and Outreach Strategies* is a document that provides tips, examples, and practices on designing a public information and outreach campaign for work zones and offers a variety of strategies that can be used in a campaign.



There is also a CD available, *Work Zone Safety and Mobility Rule Implementation Guides and Other Resources* (Publication Number: FHWA-HOP-07-116) that contains all four of these Rule implementation guides; other Rule-related resources such as checklists, templates, a set of frequently asked questions; information on the Work Zone Peer-to-Peer Program and other resources. The resources on the CD are intended to aid agencies as they fully implement the Rule in the coming years. The CD is available at no cost. To request copies of this CD, please send an email with the name of the publication you are requesting (*CD on Work Zone Safety and Mobility Rule Implementation Guides and Other Resources*, Publication Number: FHWA-HOP-07-116), the number of copies needed, and shipping information to workzonepubs@fhwa.dot.gov. These guidance tools and other informational materials pertaining to the rule are posted at: http://ops.fhwa.dot.gov/wz/resources/final_rule.htm.

The provisions of the Rule apply to all highway construction projects financed in whole or in part with Federal-aid highway funds. While the Rule uses the term "State", the Rule applies to all agencies, whether State or local, that receive Federal-aid highway funds. In the development of the implementation guidance materials, FHWA uses the term "agency" throughout, and in each of the implementation guides it is clearly stated that "agency" refers to State Departments of Transportation and local transportation (or public) agencies. All agencies are encouraged to apply the good practices that the Rule promotes to *all* their road projects.

The full text of this Rule can be found at: http://www.ops.fhwa.dot.gov/wz/docs/wz_final_rule.pdf.

...continued on page 12

National Work Zone Awareness Week

April 7 - 11, 2008

Scheduled in April each year, *National Work Zone Awareness Week* is a national campaign that helps increase public awareness of work zone safety. Local community activities help educate the nation on work-zone related injuries and fatalities and the hazards and dangers that can be encountered and avoided when driving through a road construction zone. The theme for this year's NWZAW is

"We Remember"

Slow for the Cone Zone
http://www.atssa.com/cs/root/news_pr/nwzaw_2008

National Public Works Week

May 18 - 24, 2008

NPWW is a celebration of men and women in North America who provide and maintain the infrastructure and services collectively known as public works. Instituted as a public education campaign by the APWA in 1960, NPWW calls attention to the importance of public works. The week has been celebrated in many different ways from parades to open houses to media events. To learn more about activities to promote this event, to learn how other agencies are celebrating, or to download an *How To Guide* visit online.

"The Future Is Now"
<http://www.apwa.net/About/npww/>

Temporary Traffic Control Devices Rule

The *Final Rule on Temporary Traffic Control Devices* was published in the Federal Register (72 FR 68480) on December 5, 2007 with an **effective date of December 4, 2008**. This rule supplements existing regulations that govern work zone safety and mobility in highway and street work zones to include conditions for the appropriate use of, and expenditure of funds for, uniformed law enforcement officers, positive protective measures between workers and motorized traffic, and installation and maintenance of temporary traffic control devices during construction, utility, and maintenance operations. This rulemaking is in response to section 1110 of SAFETEA-LU.

The *Temporary Traffic Control Devices Rule* is an entirely new regulation in 23 CFR 630 Subpart K that applies to all State and local agencies that receive Federal-aid highway funding. Specifically, the provisions of the Rule apply to all Federal-aid highway projects, including highway construction, maintenance, and utility projects that are funded in whole or in part with Federal-aid funds. This Rule supplements the Work Zone Safety & Mobility Rule by establishing minimum requirements and providing guidance for specific components of work zone safety. These added considerations are intended to be integrated into the agency processes, procedures, and/or guidance for the systematic consideration and management of work zone impacts that have been established in accordance with the Work Zone Safety & Mobility Rule (section 630.1006). This action has no impact on the deadline to comply with the Work Zone Safety & Mobility Rule (10/12/07). The compliance date established for the Temporary Traffic Control Devices Rule (12/04/08) is only for incorporating the new considerations introduced by this Rule.

Key components of the new Temporary Traffic Control Devices Rule include the following: **Policy** – Policy and related processes, procedures, and guidance established under the WZ Safety & Mobility Rule **shall** include consideration and management of road user and worker safety by addressing: 1) Use of positive protection devices to prevent intrusions; 2) Exposure control measures to avoid or minimize exposure; 3) Other traffic control measures to minimize crashes; and 4) Safe entry/exit of work vehicles onto/from the travel lanes.

Positive Protection Devices – use **shall** be based on an engineering study. An engineering study **may** be used to develop positive protection guidelines for the agency, or to determine the measures to be applied on an individual project. Use of positive protection **shall** be considered in work zone situations that place workers at increased risk from motorized traffic and where positive protection devices offer the highest potential for increased safety for workers and road users. Items 1-5 of Section 630.1108(a) were designed to be examples of conditions that may warrant the use of positive protection and thus trigger application of the agency's policies related to the use of positive protection. The Rule does not specifically address

the use of positive protection devices for separating opposing traffic. Its focus is primarily on the use of positive protection devices between the work space and motorized traffic, as directed by Section 1110 of SAFETEA-LU. Such considerations should be included as part of the engineering study to determine the need for longitudinal traffic barrier.

Exposure Control Measures – **should** be considered to avoid or minimize exposure for workers and road users.

Other Traffic Control Measures – **should** be considered to reduce work zone crashes, and risks and consequences of intrusions into the work space.

Uniformed Law Enforcement – **shall** develop a policy addressing the use of uniformed law enforcement on Federal-aid highway projects. If your agency does not currently use law enforcement officers on projects, this rule does not require the use of law enforcement officers on projects. It *does* require the agency to develop a policy addressing the use of uniformed law enforcement on Federal-aid highway projects. In developing this policy, the agency should consider situations where the use of uniformed law enforcement officers could improve the safety of the road user and workers. Several examples of conditions are provided in Section 630.1108(d). Law enforcement officers must be properly trained before they can be used on projects.

Work Vehicles and Equipment – Safe means for work vehicles and equipment to enter and exit traffic lanes and for delivery of construction materials to the work space **should** be addressed at the project level.

Payment for Traffic Control Features and Operations – Appropriate pay item provisions for work zone traffic control features are necessary to address the safety impacts of a project. Some agencies, however, provide little or no specific payment for work zone safety features, and in extreme cases, provide only minimal information as to what features are required. Payment for traffic control features and operations **shall not** be incidental to the contract, or included in payment for other items of work not related to traffic control and safety. Separate pay items **shall** be provided for major categories of traffic control devices, safety features, and work zone safety activities.

Quality Guidelines – shall be implemented to help maintain the quality and adequacy of the temporary traffic control devices for the duration of the project.

The full text of this Rule can be found at: <http://ops.fhwa.dot.gov/wz/resources/policy.htm>. Additional guidance is being developed under the umbrella of the Work Zone Safety Grants. Refer back to that regulation and policy website for future updates.

Final Rule on Worker Visibility

The Federal Highway Administration (FHWA) has updated the rule pertaining to the use of high visibility personal protective equipment for workers who are working within the rights-of-way of Federal-aid roadways. This new rule will go into effect on **November 24, 2008**. This new rule applies to all State and local agencies that receive Federal-aid highway funding. Is your agency ready?

The new rule states "All workers within the right-of-way of a Federal-aid highway who are exposed either to traffic (vehicles using the highway for purposes of travel) or to construction equipment within the work area shall wear high-visibility safety apparel". What does that mean, though? Most workers currently wear safety vests - so they are following the rule?

"Workers" is defined as people on foot whose duties place them within the right-of-way of a Federal-aid highway, such as: road construction, maintenance crews, survey crews, utility crews, responders, and law enforcement personnel when directing traffic, investigating crashes, and handling lane closures, obstructed roadways, and disasters in the right-of-way.

The rule goes beyond just requiring that workers wear high-visibility apparel. Workers must be wearing the right *class* of clothing. There are three levels of conspicuity. These are Class 1, Class 2, and Class 3. These levels start at the minimum level of visibility and move to the highest need for visibility at Class 3. The Manual on Uniform Traffic Control Devices (MUTCD) Section 6E.02 High-Visibility Safety Apparel states that workers shall wear a *minimum* of a Class 2 apparel that meets the American National Standard Institute 107-1999 during work. This section recommends that workers wear Class 3 at night. The MUTCD states that the outer or background color of the material "shall be either fluorescent orange-red or fluorescent yellow-green as defined in the standard. The retroreflective material shall be either orange, yellow, white, silver, yellow-green, or a fluorescent version of these colors, and shall be visible at a minimum distance of 300 m (1,000 ft)." The person must be able to be easily identified as a person.

Class 1 apparel is suited for workers who are exposed to slow moving vehicles traveling at speeds of less than 25 miles per hour. People who should wear these vests can pay full attention to the traffic around them; they are not distracted by the job they are performing. Workers who would qualify for Class 1 apparel are people directing

traffic in parking lots at events, supermarket workers gathering shopping carts, and people working in a warehouse who encounter equipment traffic there.

The next level of conspicuity is Class 2. This is the minimum standard for roadway workers according to the MUTCD. These workers need a higher level of visibility because their attention is partially divided from the traffic, there are poor weather conditions, or the amount of equipment in the background makes it hard for motorists to spot them as workers. Workers who are encountering traffic over 25 miles per hour should wear Class II apparel. Some types of jobs that would qualify for this level of apparel are airport runway personnel, accident investigators, and utility workers.

Class 3 is the highest level of visibility. Workers encountering traffic exceeding 50 miles per hour should wear this class. Other qualifications are the need to have the worker visible throughout all motions, all attention paid to job at hand and not to traffic, and the worker must look like a person and not an inanimate object. Road crews, emergency responders, and police officers are examples of workers who would qualify for this type of apparel.

Wherever you purchase your personal protective equipment, it is important to ensure that the materials really are the class that the company says they are. There are third party tests that companies can have done to prove that their materials are up to par. Companies should have these records on file and can provide them upon request. Be wary of companies that offer products way below the cost of all other companies. These companies may not be providing clothing at the class level they are stating.

The full text of this Rule can be found at <http://ops.fhwa.dot.gov/wz/resources/policy.htm>.

Sources:

The Rule on Work Zone Safety and Mobility Website, p://www.ops.fhwa.dot.gov/wz/docs/wz_final_rule.pdf.
Federal Register, Vol. 71, No. 226, November 24, 2006, <http://mutcd.fhwa.dot.gov/res-notices.htm>
MUTCD, <http://mutcd.fhwa.dot.gov>.
Safety and Supply Co., www.safetyandsupply.com

Special thanks to Jason Leniski, Managing Partner of Vinatronics High Visibility Apparel for his "Vinatronics Technical Briefs" on the high visibility requirements and apparel photos.



CLASS I



CLASS II



CLASS III





COLORADO LTAP RETRO- REFLECTOMETER LOAN PROGRAM

FHWA has released regulations regarding minimum levels of sign retroreflectivity. Agencies will now be responsible for maintaining their signs to a minimum level of service. A retro-reflectometer can play a key role to ensure quality and accuracy when implementing an effective sign management program. To help local agencies who are unable to afford or don't warrant enough need to purchase their own meter, Colorado LTAP has purchased a retroreflectometer and implemented a loan program.

Colorado LTAP has purchased a sign sheeting DELTA RetroSign® GR3 Retroreflectometer with GPS capability. The 9-foot extension pole kit is also included.

For more information or to sign up, please call Colorado LTAP at 303-735-3530.

Manual on Uniform Traffic Control Devices Out for Review

By Gene Putman, P.E., P.T.O.E., City of Thornton
Member National Committee on Uniform Traffic Control Devices

On January 2, 2008 the Federal Highway Administration has published in the Federal Register a notice of proposed amendments to the Manual on Uniform Traffic Control Devices. This is the next version after the 2003 MUTCD. The Federal Highway Administration will receive written comments on the proposed new MUTCD until July 31, 2008.

You can see the proposed revised MUTCD by going to FHWA's MUTCD website and download an electronic version to review. It is accessible at <http://mutcd.fhwa.dot.gov>.

In the box labeled "What's New" the proposed amendments are available by clicking on the "Proposed MUTCD text, figures, and tables" link. You can view a clear text set of just the new version, and a text changed set that shows the deletions in red with a strike thru, and green text that is the new wording. The changed set is the most useful to see what the changes are to the current 2003 version of the MUTCD. The proposed MUTCD text, figures, and tables are separate and also available for public review and comment. A link to slide presentations illustrating the proposed amendments are available for easier understanding.

The National Committee on Uniform Traffic Control Devices and its Technical Committees are currently doing a review of the entire proposed new MUTCD. Several of the proposed changes have been recommended by the National Committee over the last eight years, some of their recommendations have not been

included in the proposed MUTCD, and some changes are totally new. All users of the MUTCD need to review the proposed changes.

One of the major changes in the proposed MUTCD increases the area over which the MUTCD is to be enforced.

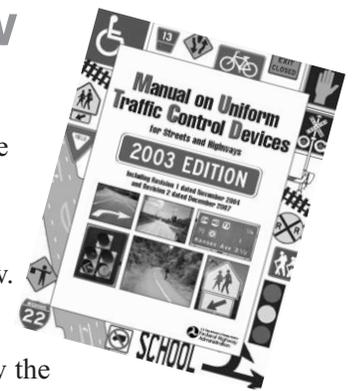
That one change will require the MUTCD to be used on public streets and highways as well as require compliance by all private property that is open to the public, such as apartment complexes, shopping malls, store parking lots, and any other facilities open to the public. It would not be enforced on gated areas -

apartments, companies, and other areas not open to the public without restrictions.

The National Committee on Uniform Traffic Control Devices is soliciting any and all comments the public would like to provide. You may submit comments online through the Federal eRulemaking portal at: www.regulations.gov. All comments should include the FHWA Docket No. FHWA-2007-28977.

Or mail to:

Hari Kalla
MUTCD Team Leader
Office of Transportation Operations
Federal Highway Administration
Mail Stop: E84-402
1200 New Jersey Avenue, S.E.
Washington, DC 20590



**FHWA
will receive written
comments on the
proposed
amendments to the
MUTCD until
July 31, 2008.**



<http://ltap.colorado.edu>

Visit Colorado LTAP online today
for online training, class registration,
free lending library, and more.

Upcoming Events

Upcoming Training

NOTE: Please contact the Colorado LTAP office for an updated schedule, or check online at <http://ltap.colorado.edu>.

Road Scholar Core Classes

Safety on the Job
October 2008

Drainage
November 2008

Road Scholar Electives

Chip Seal Applications
March 31, 2008 - Golden
April 1, 2008 - Pueblo
April 3, 2008 - Grand Junction

Erosion Control Supervisor Certification
April 3, 2008 - Pueblo
April 7, 2008 - Fort Collins

Basics of a Good Gravel Road
April 21, 2008 - Durango
April 24, 2008 - Glenwood Springs
April 29, 2008 - Fort Morgan
May 1, 2008 - Pueblo

Motor Grader Training, Hayden
April 28, 2008 - Classroom
April 29-30, 2008 - 1st In-field
May 1-2, 2008 - 2nd In-field

Chainsaw Safety Applications
July 17, 2008 - Frisco

Remember!

You can register *online* at:
<http://ltap.colorado.edu>

Supervisory Skills Classes

ETHICS for New Supervisors
April 28, 2008 - Grand Junction

Written Communications
April 29, 2008 - Grand Junction

Workshops

Flagger Certification
April 7, 2008 - Lamar
April 8, 2008 - Trinidad
April 9, 2008 - Durango
April 10, 2008 - Montrose

Conferences

APWA/CARMA Street Conference
April 16-18, 2008
Doubletree Hotel, Grand Junction
For registration and information, visit
<http://ltap.colorado.edu/>

APWA Management Conference
May 1-2, 2008
Belmar Conference Center, Lakewood
For information visit: <http://colorado.apwa.net/events.asp?mode=detail&ID=4253>

2008 National LTAP Conference
July 14-17, 2008
Beaver Run Resort, Breckenridge
For registration and information, visit
<http://ltap.colorado.edu/>



RECENT COLORADO ROADS SCHOLAR GRADUATES

Bob Sickler - *City of Thornton*

Harold Stromberger - *City of Windsor*

Bob Reeder - *Montrose County*

Art Romero - *Arapahoe County*

Jeff McWilliams - *Arapahoe County*

David Rightsell - *Arapahoe County*

Joe Montoya - *Otero County*

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Mark DeMaio - *Arapahoe County*

Chad Mills - *City of Golden*

Scott Ota - *City of Golden*

Web Based Training Opportunities



April 3
April 17
May 15
May 29
June 12

June 26

Work Zones – Safety First
Innovative Funding
Developing Tomorrow's PW Leaders
Green Buildings – LEED the Way
Developing a Successful Fleet Replacement Program
Municipal Stormwater Self-Audit

For more information visit: <http://apwa.net/Events/>

FREE MATERIALS

The following is a list of **FREE materials** available to Colorado local government agencies in the transportation field. Quantities are limited and available on a first-come, first-serve basis.

Contact the Colorado LTAP office to put in a request for these free publications.

**Check out our website for additional free materials not listed here.

<http://ltap.colorado.edu>



F5 CI *Cave In! Trenching & Shoring Safety*

Working in trenches can be dangerous! When excavation sites are unsafe, workers risk injury or death. Protect yourself with this handbook by learning more about trench soil, trench protective systems, atmospheric hazards and safety practices for excavation work.

F5 LFL *Lockout For Life!*

You probably know a lot about lockout and tagout of energy sources. But do you know the whole story? This handbook goes beyond teaching you how to put a personal lock on an energy source or valve handle. You'll be taken beyond warning tags. In fact, you'll learn some things you might find disturbing. This handbook recounts a series of true stories- each a close call or a loss of life. Read them carefully to learn how these accidents could be avoided.

F5 LT *Lockout Tagout: An Open and Shut Case*

When it comes to your safety, lockout/tagout is no big mystery. This handbook includes nine basic steps that keep you safe in your work. In fact, it's so simple, it's an open and shut case. OSHA created the lockout/tagout standard to protect you from the unexpected start-up of machines or release of stored energy during service or maintenance. To protect yourself from injury, you need to know: What lockout/tagout is; When to perform lockout/tagout; OSHA's six steps for controlling sources of hazardous energy; and OSHA's three steps for safely restoring energy once your work is done. It also explains the specific steps you must follow.

F50 DDACC *Defensive Driving: A Crash Course*

Each year, thousands of people are injured or die in job-related motor vehicle accidents. In fact, motor vehicle accidents are the number-one cause of employee injuries and deaths. Most of these accidents could have been avoided simply by driving defensively. This handbook will take you on a crash course in defensive driving by explaining how to apply these techniques whenever you're behind the wheel-even when you are not on the job.

F50 SWD *Safe Winter Driving*

You take a risk every time you get behind the wheel. When you drive in the winter, your risk is ten times greater. So what can you do when your livelihood depends on driving on the road in the winter? What you can do is remember one final fact: You can minimize your risk by recognizing winter hazards and knowing how to prepare yourself and your vehicle for winter. This handbook provides a review of safe winter driving techniques that could save your life.

Colorado LTAP

University of Colorado at Boulder
3100 Marine St, A-213
UCB 561
Boulder, CO 80309-0561

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