

M A S S I N T E R C H A N G E

Volume 15, Number 3

Summer 2001

A Manual for the Millennium

by Jonathan Upchurch

The new 2000 edition of the *Manual on Uniform Traffic Control Devices* was adopted by FHWA in December, 2000. It is the first new edition since 1988.

OVERVIEW

The 1988 edition was completely rewritten and re-formatted to create the "Millennium Manual". Every paragraph is now clearly identified as either: Standard, Guidance, Option, or Support. Standards are those provisions that are requirements -- items that use the word "Shall". Guidance

refers to recommended practice--items that use the word "Should". Options are practices or applications that "May" be done. Support is additional information that clarifies the use of devices. Each paragraph is now clearly labeled as Standard, Guidance, Option or Support. In addition Standards are printed in bold type. Language is now tight and precise; vague wording that could lead to differences in interpretation has been eliminated.

HIGHLIGHTS

While the 1988 edition had very few

defined terms, the Millennium Manual has many. There are 71 definitions for Part 4 -- "Highway Traffic Signals" alone. FHWA intends to update the Manual (issue changes) on an annual basis. This is a good reason to purchase a loose-leaf version.

The old Part 5 -- "Islands" is no longer in the Manual. A new Part 5 -- "Traffic Control Devices for Low Volume Roads" has been added. The definition of low volume road is one outside a built-up area with less than 400 AADT.

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LTAP Local Technical Assistance Program

(413) 545-2604 http://www.ecs.umass.edu/baystate_roads

New Publications



BRI-63 Inspection of Timber Bridges Using Stress Wave Timing Nondestructive Evaluation Tools---Forest Products Laboratory---April 1999

BRI-64 Guide for Minimizing the Effect of Preservative-Treated Wood on Sensitive Environments---Nat'l Wood in Trans. Info. Ctr.---February 2001

BRI-65 Field Performance of Timber Bridges---Nat'l Wood in Trans. Info. Ctr.---December 2000

BRI-66 Standard Plans for Timber Bridge Superstructures---Nat'l Wood in Trans. Info. Ctr.---February 2001

SAF-99 Methods & Procedures to Reduce Motorists Delays in European Work Zones---FHWA---October 2000

SAF-100 American National Standard for High-Visibility Safety Apparel---ISEA--June 1999

SOI-49 Using Stable Isotopes of Carbon & Nitrogen as In-Situ Tracers for Monitoring the Natural Attenuation of Explosives---US Army Corps of Engineers---December 1999

TRA-72 Traffic Calming Guidelines--MHD---November 2000

EASTERN WINTER ROAD MAINTENANCE SYMPOSIUM & EQUIPMENT EXPO Centrum Center, Worcester, MA September 5-6, 2001

**FHWA, MassHighway and
Baystate Roads invite everyone
to this free annual event.**
**NO REGISTRATION FEE
FOR ATTENDEES!!!!!!**

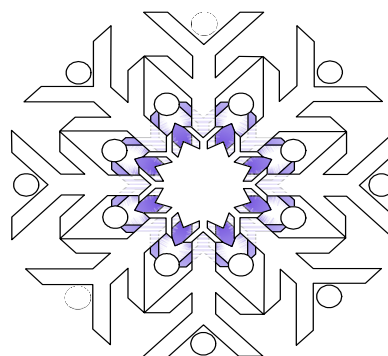
**Exhibit Area - September 5
2:00 - 6:00 p.m.**

**Demos and Information Exchange
Winter Fest - September 5
6:30 - 9:00 p.m.**

Reception & complimentary banquet
featuring regional delicacies, enter-
tainment & networking opportunity
for all attendees/vendors

**Symposium - September 6
7:00 a.m. - 3:00 p.m.**

Experts provide the latest information
for 3 tracks: managers/operators/
general



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Part 6 has a new title --"Temporary Traffic Control" to reflect coverage of roadway incidents and special events, in addition to work zones. Although Part 6 was updated in 1993, it has also been re-written and re-formatted as well.

Part 10 is new and deals with light-rail transit.

January 17, 2003 is the "Adoption Date" for the new edition. The Code of Federal Regulations requires each state to either: adopt the national MUTCD; or adopt its own state manual that is "in substantial conformance with" the national MUTCD. Massachusetts has adopted the new millennium edition as of February 21, 2001.

In general, traffic control devices in the field must comply by January 17, 2003. Because Guidance and Options are not required, it is only the Standards for which this compliance date must be met. So, any change in a Standard in the national Manual (something in the 2000 edition that was not in the 1988 edition) must be implemented in the field by January 2003. The exceptions to this rule are certain items for which FHWA has specified later compliance dates. These later dates apply to items for which a 2003 compliance date would impose a substantial financial burden on an agency. A list of these items is included on FHWA's website.

SOME SPECIFIC CHANGES

* Unless specifically stated otherwise, all signs shall be retroreflective or illuminated.

* A new SPEED HUMP warning sign has been adopted.

* A symbolic PAVEMENT ENDS sign has been deleted; a word message sign must now be used.

* Symbol signs have been approved as an alternative to the NO RIGHT (LEFT) TURN ON RED signs.

* A symbol sign for use in advance of roundabouts or rotaries has been adopted.

* Centerline markings shall be placed on urban arterials or collectors equal to or greater than 20 feet in width and with greater than 6,000 ADT. Edgelines shall be placed on freeways and expressways. Edgelines shall also be placed on paved rural arterials equal to or greater than 20 feet in width and with greater than 6,000 ADT. These changes are also far-reaching and have January 2003 compliance dates.

* Warning signs used in advance of a pedestrian crossing and at a pedestrian crossing have been modified. This is, perhaps, one of the more far-reaching changes affecting local agencies. All new installations must comply by 2003. Existing installations must comply by 2011. Similar changes have been made to the School Advance sign and the School Crossing sign.

*The 11 previous traffic signal warrants have been consolidated into 8 warrants.

The back side of the blades on the railroad crossbuck must be reflectorized and the front and back of the support for the crossbuck must be reflectorized.

HOW TO OBTAIN A COPY

The Federal Government is not printing paper copies of the Manual. Three organizations--Institute of Transportation Engineers, American Association of State Highway and Transportation Officials, and American Traffic Safety Services Association -- have teamed to print and sell the document. Prices vary by membership affiliation, copies purchased, etc. Check these websites for more information:

www.ite.org

www.aashto.org

www.atssa.com

An excellent electronic version is available on FHWA's website at:
<http://mutcd.fhwa.dot.gov>

ADDITIONAL SOURCES OF INFORMATION

The FHWA's website is excellent and includes Frequently Asked Questions, discussion groups, a side-by-side comparison of 1988 and 2000 editions, and a variety of other useful information.

The Texas Transportation Institute's website has five illustrated presentations that were given at TRB's Annual Meeting last January. This series provides more details than can be fit into this article. Go to:

<http://transops.tamu.edu>.

Then click on "News" and you will be led to MUTCD presentations.

Jonathan Upchurch is a professor of civil engineering at UMass/Amherst and has been associated with the National Committee on Uniform Traffic Control Devices since 1979 currently serving as its Vice-Chair. See page 8 for the MUTCD workshop calendar presented by Baystate Roads Program.

Minimum Retroreflectivity for Signs and Markings

The Federal Highway Administration will likely set guidelines for retroreflectivity of in-service signs and pavement markings in the next two years. (Retroreflectivity is that reflectivity built into signs & markings that send light from headlights directly back to a vehicle's driver.

Whether states in turn will ask municipalities to apply guidelines to signs and markings on local roads may be moot. Other factors, such as liability concerns, could compel municipalities to replace their deteriorated signs and markings that measure below the minimum levels.

Sign Management

In their article, *Bringing the Night-time Road to Life*, Patrick Hasson, safety engineer, FHWA Midwestern Resource Center, along with Ernie Huckaby and Rudy Umbs, note that FHWA has estimated the cost of replacing signs (not pavement markings) that will not meet proposed minimums at \$32 million for all state agencies and \$144 million for all local agencies across the United States.

FHWA estimated that, based on the average condition of road signs in 1994, 5 % of signs under state jurisdiction and about 8 % of signs under local control would not meet proposed minimum levels of retroreflectivity and would need replacement. The greater use of Type 1 (engineering grade) sheeting among local agencies may account for the greater percentage of signs under their jurisdiction that would not meet proposed minimums. Type 1 offers less

retroreflectivity and shorter service than higher grades of sheeting. However, the estimates were for replacing all below-minimum signs at once. In practice, sign replacement probably would not be accelerated much above current levels, as agencies worked the guidelines into their sign management programs.

The authors note that a sign management program that includes measurements of retroreflectivity would lead to planned spending on signs that, in the long run, might reduce overall spending rates for maintenance and replacement of traffic signs.

While a municipality ideally would incorporate periodic measurements of retroreflectivity into its sign management program, even the least expensive devices for measuring retroreflectivity cost more than many municipalities may be willing to pay. Furthermore, measurements may not

be crucial if a municipality adheres strictly to an inventory management system (SIMS). Signs and markings could be scheduled for replacement at conservative intervals in which experience and research suggest their retroreflectivity will not have deteriorated below minimum levels, LTAP Transportation Safety Engineer Mark Hood noted. (*Baystate Roads* offers free SIMS software/manuals.)

Background

The retroreflectivity of materials used in traffic signs and in markings such as raised pavement markers, striping, and post-mounted delineators diminishes over time from exposure to the elements as well as the ability of a sign or marking to convey its information or guidance to a driver. In a 1993 law, Congress directed FHWA to establish minimum levels of retroreflectivity at which signs and markings must be maintained. FHWA's *Manual On Uniform Traffic Control Devices* has required

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The 6th Annual Eastern Winter Road Maintenance Symposium and Equipment Expo

**Centrum Center, Worcester, MA
September 5-6, 2001**

Schedule

Wednesday, September 5, 2001

Early Bird Exhibit Preview-

Exhibit Area Open 2:00p.m.-6:00 p.m.

for review to maximize the availability of information exchange between attendees and exhibitors.

WinterFest- 6:30p.m.-9:00p.m.

Vendor Sponsored Networking Banquet (Grand Ballroom)

Thursday, September 6, 2001

Symposium Hours:

Registration 7:00 a.m. (Complimentary Coffee Service Begins)

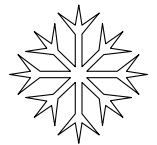
Opening Remarks 8:00 a.m.-8:30 a.m.

Exhibit Area Open 8:30 a.m.-3:00 p.m. (Centrum)

Breakout Sessions 9:00 a.m.-4:30 p.m. (Salons A,B,C)

Registration

Forms will be mailed to the entire Baystate Roads database and are due by August 16, 2001. Watch for yours in the mail.



Attendance History

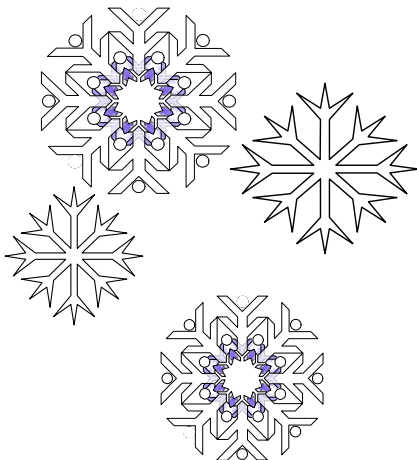
1996-D.C. Armory--81 exhibits--19 pieces of equipment on display--700 attendees

1997-Hagerstown, MD--88 exhibits--35 pieces of equipment--1250 attendees

1998-State College, PA--158 exhibits--35 pieces of equipment--1750 attendees

1999-Albany, NY--158 exhibits--45 pieces of equipment--1350 attendees

2000-Roanoke, VA--115 exhibits--54 pieces of equipment--1563 attendees



since 1954 that signs and pavement markings be reflectorized or illuminated, but it contains no minimum retroreflectivity requirements for in-service signs and markings. States use a specification for purchasing the retroflective sheeting that is applied to traffic signs--American Society of Testing and Materials D4956-89--but the specification does not establish the level to which retroflective sheeting may deteriorate in the field before it is considered ineffective.

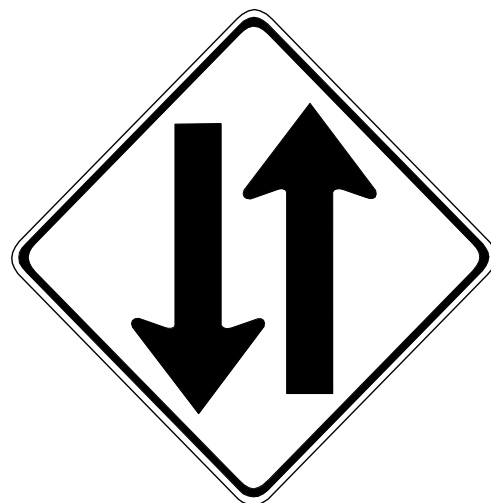
FHWA may issue guidelines for signs and pavement markings in 2002. The process for issuing guidelines is lengthy, involving review and input by the public, and will include a recommendation from an American Association of State Highway and Transportation Officials (AASHTO) task force that is examining research on minimum levels of retroreflectivity. The guidelines also will address how the standards will be implemented.

Many state and local officials have provided input to research and implementation related to retroreflectivity over the years, through organizations such as AASHTO, the National Association of County Engineers, National Cooperative Highway Research Program, National Committee on Uniform Traffic Control Devices, Institute of Transportation Engineers, state departments of transportation, and the American Public Works Association to ensure that the results of research and field evaluation are implemented reasonably through the rulemaking process.

While there are many commercially available, hand-held devices for measuring retroreflectivity, FHWA has been developing mobile units that can measure retroreflectivity of signs and pave-

ment markings at highway speed. The agency demonstrated a van with a unit capable of measuring the retroflective qualities of pavement markings a few years ago. Industry now is manufacturing these units and providing support for their operation and maintenance.

Reprinted with permission from the Fall 2000 issue of the Pennsylvania LTAP Center newsletter Moving Forward.



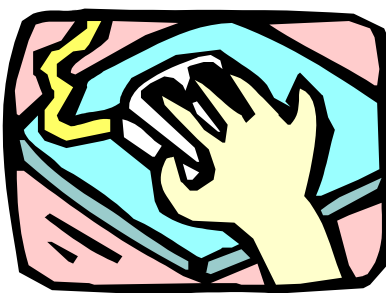
MUTCD Millennium Colors

The three colors for which general meanings have not yet been assigned are being reserved for future applications that will be determined only by FHWA after consultation with the States, the engineering community, and the general public. These meanings are of a general nature, but more specific assignments of colors are given in the individual parts of the *MUTCD Manual* relating to each class of devices.

The general meaning of the 12 colors shall be as follows:

A. Yellow	warning
B. Red	stop or prohibition
C. Blue	road user services guidance, tourist information, and evacuation route
D. Green	indicated movements permitted, direction guidance
E. Brown	recreational and cultural interest area guidance
F. Orange	temporary traffic control
G. Black	regulation
H. White	regulation
I. Fluorescent Yellow-Green	pedestrian warning, bicycle warning, school bus and school warning
J. Purple	unassigned
K. Light Blue	unassigned
L. Coral	unassigned

Check Out TRIS Online



For those of you who prefer to browse for transportation information while seated comfortably in front of your computer, here is a valuable resource for you. TRIS Online (<http://tris.amti.com/>) is a public-domain, Web-based version of the Transportation Research Information Service (TRIS). It is designed to enhance transportation research, safety, and operations by sharing knowledge and information.

TRIS is the world's largest and most comprehensive bibliographic database of published and ongoing research of all modes and disciplines in the field of transportation. For the last 30 years, TRIS has been developed by the Transportation Research Board (TRB) with support from state and federal agencies.

TRIS Online is a result of a memorandum of understanding (MOU) between the U.S. Department of Transportation's Bureau of Transportation Statistics (BTS) and TRB that was signed at the TRB's 1999 annual meeting. The MOU provided for the development, testing, and implementation of the fully searchable, web-based version of the TRIS database. One year later, the TRIS Online was ready for public use and is currently accessible from the National Transportation Library's (NTL) Web site: <http://ntl.bts.gov/tris/>.

TRIS Online contains more than 400,000 bibliographic records of federal, state, local, and association research that has been published in books, journals, technical reports, and other media from the 1960s to date (with some coverage from prior years). TRIS Online contains all the records found in TRIS except for the international records from the International Road Research Documentation (IRRD) system. However, TRIS Online provides links to the IRRD database as an option with each search.

Users can look for monographic, journal, technical report, and conference literature in TRIS Online through comprehensive search capabilities. The site's database can be searched by either a basic word search or an intelligent word search by author, title, and subject. Search results can be narrowed down by restricting the query to specific areas, such as the article title, contributor or date of publication.

After the user submits the search criteria, the search results are listed by publication date and description. The site provides two ways for the user to view the material from their search. The "More" link can be selected to view additional information about the specific pub-

lication.

Or additional information about multiple publications can be viewed by checking boxes next to the description, which allows the user to quickly view a large amount of material rather than going back and forth between screens.

The user is provided with detailed information about each document, including a title, author, publication date, number of pages, publisher, and volume number. Users also can read an abstract, if available, for an overview of the material. TRIS Online allows users to access electronic copies of full-text reports or link them directly to the publishers or suppliers that produce the documents.

TRB will continue to produce TRIS Online and BTS will publish the database and make it available on the Internet as a component of the NTL. It is anticipated that within three years, more than 70 percent of government reports listed in TRIS Online will be available electronically for downloading, printing, or through e-mail requests.

Reprinted with permission from Public Roads, May/June 2000. Article was written by Diane Enriquez, Webmaster for the Federal Highway Administration's Turner-Fairbank Highway Research Center in McLean, VA.

Baystate Roads Program

Announces a Workshop on the

MUTCD Millennium Edition

September 12, 2001

Holiday Inn, Taunton

October 3, 2001

Hotel Northampton, Northampton

October 31, 2001

Holiday Inn, Worcester

Dr. Jonathan Upchurch will explain the changes and new regulations (*see related article on Page 1*). Watch for the registration flyer.

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The Baystate Roads Program, which publishes *Mass Interchange* each quarter, is a Technology Transfer (T2) Center created under the Federal Highway Administration's (FHWA) Local Technical Assistance Program (LTAP). FHWA is joined by the Massachusetts Highway Department, the Department of Civil and Environmental Engineering at the University of Massachusetts/Amherst, and local public works departments in an effort to share and apply the best in transportation technologies.

In addition to publishing *Mass Interchange*, the Baystate Roads Program facilitates information exchange by conducting workshops, providing reports and publications and videotapes on request, and offering one-to-one technical assistance on specific roadway issues. Because the program relies on input from many sources, inquiries, articles, and ideas are encouraged.

LTAP Local Technical Assistance Program

To contact the Baystate Roads Program call (413) 545-2604 or FAX 413-545-6471.

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