

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

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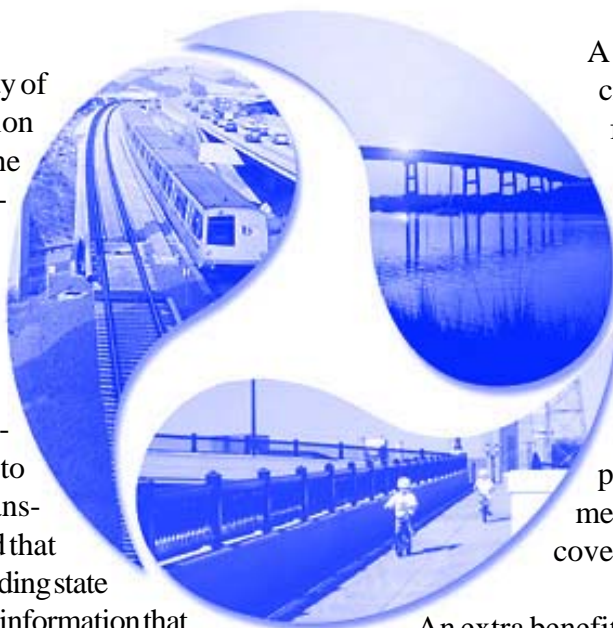
Winter 2004

## FHWA UNVEILS NEW WEB SITE TO HELP LOCAL, STATE AGENCIES MANAGE SURFACE TRANSPORTATION SECURITY

The U.S. Department of Transportation's Federal Highway Administration (FHWA) recently announced a new web site to provide state and local agencies simple access to information on improving security in the operation of the surface transportation system.

"The need to ensure the security of America's surface transportation system is a top priority for the FHWA," said FHWA Administrator Mary E. Peters. "We are working closely with the Department of Homeland Security and other federal agencies to help state and local officials develop and carry out a comprehensive set of improvements to increase the security of our transportation network." Peters said that a key element in this plan is providing state and local agencies with valuable information that can help them make wise decisions to improve the security of roadway operations in their areas.

[www.ops.fhwa.dot.gov/OpsSecurity](http://www.ops.fhwa.dot.gov/OpsSecurity) is part of the FHWA's efforts to help state and local transportation agencies develop initiatives to improve security through effective planning, operation and application of technology.



A section on the web site offers specific information on how to plan effectively for managing emergencies, how to align action plans with the nation's Homeland Security Advisory System, and how to improve military mobilization on roadways. Roads are the primary means of responding to an incident. All emergencies and incidents have a transportation component, and roads are the critical means through which response and recovery strategies can be carried out.

An extra benefit is that many of the measures that improve security also improve transportation's ability to handle natural disasters like hurricanes and earthquakes.

The new "FHWA Operations Security" web site at

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LTAP Local Technical Assistance Program

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# Guiding Motorists Through Turns and Curves

Warning signs are principally for drivers unfamiliar with the road. The *Manual of Uniform Traffic Control Devices (MUTCD)* governs which signs to use, and how to place them. For turns and curves, it describes use and placement of two W1 series. This article describes use and placement of W1 series signs: the Large Single Arrow (W1-6) and the Chevron Alignment (W1-8) signs.

## Where to Use W1-6 and W1-8 Signs

**W1-6 and W1-8** signs alert drivers, and guide them to the safe path through severe alignment changes. Road managers must install them based on engineering judgement. They should consider them for these situations:

- Where accident records show "run off the road", "hit fixed object" or other turn or curve related crashes.
- Where accident evidence exists, such as shoulder damage, scars on trees or other marks on shoulders.
- Where day or night inspection suggests drivers need warning of alignment changes.

**Large Single Arrow** signs mark sharp turns and short curves. On conventional roads, the sign size is 48 by 24 inches. The *MUTCD* allows 36 x 18 inch W1-6 signs on low-speed roadways, where the reduced legend size would be adequate.

**Chevron Alignment** signs mark curves and less than sharp turns. Chevron signs 18 by 24 inches are the standard for conventional roads. The *MUTCD* allows 12 x 18 inch W1-8 signs on low-speed roadways.



W1-6



W1-8

## Sign Placement

The *MUTCD* requires locating W1-6 and W1-8 signs on the outside of turns and curves at right angles to approaching traffic. The point of the Arrow or Chevron must indicate the direction of travel. They should be visible for at least 500 feet. The minimum lateral offset is 6 feet. Sign supports shall be breakaway or yielding. Crews may place signs on existing supports, such as utility poles.

Crews should install W1-8 signs in a series along the length of the turn or curve. They should space signs so drivers can always see two signs.

## Where Not to Use These Signs

Cities and towns should not use these warning signs when the curvature and its severity are apparent to drivers. Excessive use tends to breed disrespect for signs. Municipalities should not use Chevron Alignment signs:

- 1) On winding roads where drivers might see the last in a series of signs where the road begins to turn in reverse direction, or
- 2) Where a turn or curve within the segment has inadequate length for proper sign spacing.

### Sources:

*Street Wise*. Spring 2003, Nevada Transportation Center, Volume III, #1.

*Manual of Uniform Traffic Control Devices (MUTCD)*. Federal Highway Administration. <http://mutcd.fhwa.dot.gov/>

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# The Stop (R1-1) Sign and Supplemental Devices



**Figure 1**

Motorists must always stop at a STOP (R1-1) sign. Moreover, other motorists and pedestrians expect them to stop. Proper placement is essential to inform road users and to preserve respect for the most important traffic signs. User respect is also maintained by installing STOP signs only when necessary.

This article describes how municipalities should install STOP and supplemental signs and pavement markings. It also discusses using STOP signs to control speed.

First a note about the *Manual on Uniform Traffic Control Devices* (MUTCD). It governs traffic control devices with standard, guidance, and option statements of practice. In this article the words "shall" or "required" are used for standard statements, "should" or "recommend" for guidance, and "may" or "permitted" for options.

## Sign and Marking Installation

Figure 1 shows one of three STOP signs at a T-intersection. It illustrates a properly installed set of traffic control devices.

The STOP sign has the required white on red retroreflective sheeting and standard letters. It is 30 by 30 inches, the required size for conventional roads. It is located on the right side of the traffic lane, and as close as practical to the intersection. The lateral offset (measured from the road or shoulder edge to the near edge of the sign) is 6 feet, the required minimum.

The almost 6 foot mounting height (measured from the pavement edge to the bottom of the sign) exceeds the required 5 foot minimum for "rural districts." The MUTCD requires 7 feet "where parking or pedestrian movements occur" to reduce the risk of pedestrians hitting the sign. In this instance, the sign height and distance off the sidewalk achieves this purpose.

The 3-way (R1-3) supplemental plaque is required where STOP signs control all approaches. In Figure 1 it is in poor condition and should be replaced. It shall be 12 by 6 inches, white letters on a red background, and retroreflective. It may have a mounting height a foot less than the STOP sign.

The painted stop line is properly installed. It is the required solid white line extending across the approach lane. As recommended it is 12 to 24 inches wide with similar spacing, and is placed where the road user should stop. Being 4 feet in advance of the crosswalk, it conforms to the MassHighway standard. (Without a marked crosswalk, the stop line should be placed at the desired stopping point, and between 4 and 30 feet from the nearest edge of the intersecting travel way.)



**R1-1**

The crosswalk shown is the MUTCD standard. The crosswalk lines are the required white stripes between 6 and 24 inches wide with similar spacing. Marked crosswalks should not be less than 6' wide. (Two other layouts are permitted; see MUTCD Figure 3B-15.)

The Stop Ahead (W3-1a) sign is required where a STOP sign is not visible for a sufficient distance for motorists to respond. MUTCD Table 2C-4 provides recommended distances. For

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## STOP Signs

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the 35 mph road in Figures 1 and 2, the recommendation is 150 feet. At that distance the illustrated STOP sign is visible, but the W1-3a is still permitted. With the foliage and unexpected need to stop, the Stop Ahead sign is probably a good idea. The Stop Ahead sign, at 160 feet from the STOP sign, exceeds the recommended warning to motorists.

The W3-1a sign in Figure 2 is of the required size (30 x 30 inches), color (yellow with black and red symbols) and offset (greater than 6 feet). Here, too, the 6 foot mounting height is adequate. The *MUTCD* permits mounting on a utility pole. This illustrates that more traffic control devices than the R1-1 are usually needed. All devices must be properly installed and maintained for motorist and pedestrian safety.

### The STOP Sign as Speed Control

The *MUTCD* recommends STOP signs only when one of four conditions exists (Section 2B.05). It also states that "STOP signs should not be used for speed control." The illustrated STOP sign, however, has that purpose because after a car struck a child at this location, residents petitioned for a 20 mph speed zone. The Town Council was reluctant to set such a low speed limit; instead, it directed the STOP sign be installed.

Municipal officials often face similar decisions. They must balance residents' wishes against more effective,

but also more expensive, ways to calm traffic. In Figures 1 and 2, for example, residents were generally happy with the STOP sign. Perhaps they did not appreciate that the road might not be significantly safer with it.

The Institute of Traffic Engineers (ITE) analyzed studies of speed before and after unwarranted STOP signs. They found that motorists reduced speed only a short distance before such a STOP sign. Midblock speeds decreased slightly on average and increased in a few cases. Within several hundred feet past a STOP sign, many cars traveled as fast as if no sign existed. Moreover, as motorists accelerated from the sign, they had reduced ability to stop for an emergency.

Vehicle acceleration also increases air pollution. In addition, overuse decreases motorist respect for this important sign. While the photos were taken, 17 cars rolled through the STOP signs; one came to a complete stop. This is consistent with studies that show less than 10 percent of drivers actually stop for unwarranted STOP signs.

Other speed control measures include narrowing parts of the road or deflecting traffic with chokers or islands. Some have been successful, and many have failed. One reason for failure is residential objection. These measures slow traffic by inconveniencing motorists. Residents, who drive the roads frequently, are most inconvenienced.



**Figure 2**

### Sources

*Guidelines for Design and Application of Speed Humps -- A Recommended Practice.* 1997. Institute of Transportation Engineers.

*Manual of Uniform Traffic Control Devices, Millenium Edition with Errata 1 Changes.* 2001. Federal Highway Administration. <http://mutcd.fhwa.dot.gov/kno-millennium.htm>

*Traffic Calming: State of the Practice.* 1999. Institute of Transportation Engineers.

*Traffic Signing Handbook.* 1997

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**Visit the  
Baystate Roads  
Web Page**



**[www.ecs.umass.edu/  
baystate\\_roads](http://www.ecs.umass.edu/baystate_roads)**



## FHWA's New Website

*Continued from page 1...*

The agency developed the Operations Security web site in response to the expressed need on the part of state and local partners for technical guidance and best practices. The new site links to the information on transportation security from all of the department's administrations, from other federal agencies, and from the associations participating in the National Associations Working Group for Intelligent Transportation Systems. The web site also links to articles, research, and other information related to transportation security.

More information on traffic operations is available at:

[www.ops.fhwa.dot.gov](http://www.ops.fhwa.dot.gov).

## Homeland Security Websites/ Links

*Authorities remind us that the best way to deal with Homeland Security is to be alert and be prepared. Following are links to information that will help you be as prepared as possible for surviving terrorist acts.*

**U.S. Department of Homeland Security - [www.dhs.gov](http://www.dhs.gov)**

**Office of Homeland Security --  
[www.whitehouse.gov/homeland/](http://www.whitehouse.gov/homeland/)**

**Federal Transit Administration - Crime Prevention  
and Anti-Terrorism --  
[www.fta.dot.gov/research/safe/crimeprev/crimeprev.htm](http://www.fta.dot.gov/research/safe/crimeprev/crimeprev.htm)**

**National Homeland Security Knowledgebase --  
[www.twotigersonline.com/resources.html](http://www.twotigersonline.com/resources.html)**

## **HOT** Tip for **COLD** Weather

The Superintendent of a DPW in Massachusetts came up with an easy, cost effective way of educating residents regarding the town's snow policy. A flyer was sent home with all school children as a refresher and explanation of:



**The town's snow policy**



**Winter parking ban**



**Administrative contacts and phone numbers**



**Order of plowing: main arteries first, collectors second, residential third**



This simple reminder was an efficient way of communicating with the public and reduced the number of inquiries and complaints at the DPW that winter.

# Is It A Curve Or A Turn?



Signing for changes in horizontal alignment is a frequently noted item in the *Road Side Design Guide* published by the American Association of State Highway and Transportation Officials. A basic table that describes when signs in the W1 series are used is shown in Table 2C-5 in section 2C.06 of the *MUTCD Millenium Edition*. (shown below).

Number of Alignment Changes	Advisory Speed	
	$\leq 30$ MPH	$> 30$ MPH
1	Turn (W1-1)	Curve (W1-2)
2	Reverse Turn (W1-3)	Reverse Turn (W1-4)
3 or more	Winding Road (W1-5)	

## NOTES:

- 1 *Engineering judgment should be used to determine whether the Turn or Curve sign should be used.*
- 2 *Alignment changes are in opposite directions and are separated by a tangent distance of 180 m (600 ft) or less.*
- 3 *A Right Reverse Turn (W1-3R), Right Reverse Curve (W1-4R), or Right Winding Road (W1-5R) sign is used if the first change in alignment is to the right; a Left Reverse Turn (W1-3L), Left Reverse Curve (W1-4L), or Left Winding Road (W1-5L) sign is used if the first change in alignment is to the left.*

As the table above shows, the specific turn or curve sign that should be used is dependent on the number of alignment changes and the advisory speed determined for the turn or curve. If the proper advisory speed for an alignment change is equal to or less than 30 mph then a turn sign (W1-1) should be used. If the proper advisory speed is greater than 30 mph then the curve sign (W1-2) should be used. The same rule applies for reverse turns (W1-3) or curves (W1-4) (2 changes in horizontal alignment). If there are three or more changes in horizontal alignment, then the winding road sign (W1-5) can be used. The winding road sign can be used for whatever the proper advisory speed is. Why not just use the winding road sign for any set of curves? The *Manual* specifies that the changes in horizontal alignment must be separated by tangent (straight) sections of 600 ft or less. (see note 2 in Table 2C-5)

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*LTAP AZ Milepost*, Fall 2002, Vol. 2, No. 4

# TEN REASONS TO BECOME A BAYSTATE ROADS SCHOLAR

## **1 Knowledge -**

### **for yourself and your employees.**

We don't know everything about our business. By attending these classes, your knowledge will be taken to another level. This knowledge can help you and your employees keep their jobs.

## **2 Advice -**

Technical advice about road problems that you may face while doing your projects. We face so many issues in maintaining roads and we don't know all the answers. Sometimes, we need to ask questions.

## **3 Hands - on Training**

Working with equipment and materials that you, your employees and your hired contractors use - knowing the equipment and standards used in this field can help you save money and make your contractors and taxpayers love you.

## **4 Cost**

Cost is minimal.

## **5 Friends**

Meeting new people, meeting good people, and trading good ideas.

## **6 LTAP Needs Us**

LTAP is funded with FHWA and state money which can be reduced if unused.

## **7 Looks Good on Your Resume**

You may need one someday. Listing some training and experience will enhance your options.

## **8 Confidence**

Knowing what to tell people when they have a problem, or telling your employees how to fix a problem builds their confidence in you, and also strengthens your own confidence in yourself. Both of these help you have a better working relationship with your employees and constituents.

## **9 Not Having to Worry**

Having a well-trained work force saves time for you and your supervisors and saves money for your district, which makes you look good.

## **10 Saves Dollars for Your District**

By completing projects correctly the first time, you are saving tax dollars for the people for whom you work.

The Baystate Roads Scholar program is just one of many across the United States where road professionals are recognized for their accomplishments. These top ten reasons were presented by the Pittsburg, Oklahoma, County Commissioner, District 3, to the new commissioners listing the top ten reasons why they and their employees need to complete the Roads Scholar Program offered through T2 Center in Oklahoma. THE REASONS ARE PERTINENT IN EVERY STATE.

*Reprinted with permission from Oklahoma LTAP News, Volume 6, No. 4 October 2002*



*Congratulations to the newest Baystate Roads Scholars on your fine achievement. Keep saving those certificates and you, too, could be listed here!*



**Baystate Roads Scholars!**

**Dorothy Jay**  
Town of Ashland

**Craig Young**  
City of Brockton

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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). This newsletter is prepared in cooperation with MassHighway and the United States Department of Transportation Federal Highway Administration. FHWA is joined by Mass Highway, College of 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**

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