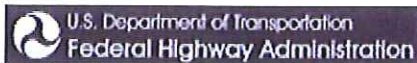
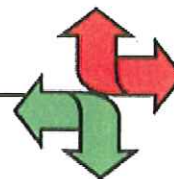


Attachment 4

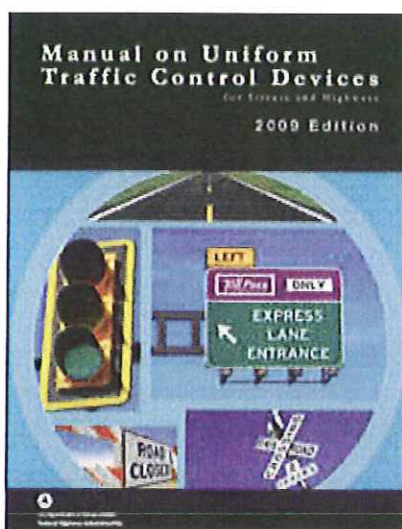
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Manual on Uniform Traffic Control Devices (MUTCD)



Knowledge

2009 Edition, dated December 2009 (PDF)



Viewing the MUTCD

If you have difficulty viewing the MUTCD sections (in PDF format), you may need to download the latest version of the [Adobe Acrobat Reader](#).

The 2009 MUTCD, 2003 MUTCD, and certain Chapters of the MUTCD Millennium Edition (those affected by Revision No. 1 changes) may be viewed in HTML format, in addition to PDF format. Earlier editions of the MUTCD are available in PDF format only on this Web site. HTML formatted chapters are accessible to individuals with disabilities, per [Section 508 of the Rehabilitation Act](#).

Printing the MUTCD

The manual is set up for double-sided, offset printing to be placed in a three-ring binder. The first 3 pages include a cover page and a spine. If you are having trouble printing the MUTCD, you may need to adjust settings in "File > Page Setup" menu, in Adobe Acrobat. A high-grade ink-jet or laser printer is recommended for a quality hard copy.

Certain chapters and sections of the MUTCD have very large file sizes due to the large page count, number of illustrations, or both, contained within (example, 2009 Edition Part 6, 184 pages with 62 illustrations). These large files can present problems when printing, depending on the printer used. This is often due to the amount of memory within the printer itself, which is often minimal, especially with the printers sold through office supply outlets. If the printer will not print the file, or prints it with errors, sending the file to the printer in smaller sections (10-20 pages at a time) often solves the problem.

If you are still experiencing difficulties after making the suggested adjustments, please submit your problem to the [Operations Feedback](#), and you will receive a reply.

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Individual Parts and Chapters

 [Cover, Table of Contents, and Introduction](#) (1.42MB)

 [Part 1 - General](#) (736KB)

Part 2 - Signs:

 [Chapter 2A - General](#) (739KB)

 [Chapter 2B - Regulatory Signs, Barricades, and Gates](#) (2.93MB)

 [Chapter 2C - Warning Signs and Object Markers](#) (1.50MB)

 [Chapter 2D - Guide Signs - Conventional Roads](#) (2.37MB)

 [Chapter 2E - Guide Signs - Freeways and Expressways](#) (3.18MB)

 [Chapter 2F - Toll Road Signs](#) (1.35MB)

 [Chapters 2G-2H - Preferential and Managed Lane Signs and General Information Signs](#) (3.38MB)

 [Chapters 2I-2N - General Service Signs, Specific Service Signs, Tourist-Oriented Directional Signs, Changeable Message Signs, Recreational and Cultural Interest Area Signs, and Emergency Management Signing](#) (2.53MB)

 [Part 3 - Markings](#) (3.32MB)

 [Part 4 - Highway Traffic Signals](#) (2.63MB)

 [Part 5 - Traffic Control Devices for Low-Volume Roads](#) (1.07MB)

 [Part 6 - Temporary Traffic Control](#) (4.72MB)

 [Part 7 - Traffic Controls for School Areas](#) (941KB)

 [Part 8 - Traffic Control for Railroad and Light Rail Transit Grade Crossings](#) (1.65MB)

 [Part 9 - Traffic Control for Bicycle Facilities](#) (1.25MB)

 [Appendices A1 and A2 - Congressional Legislation and Metric Conversions](#) (417KB)

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PART 1

GENERAL

CHAPTER 1A. GENERAL

Section 1A.01 Purpose of Traffic Control Devices

Support:

- 01 The purpose of traffic control devices, as well as the principles for their use, is to promote highway safety and efficiency by providing for the orderly movement of all road users on streets, highways, bikeways, and private roads open to public travel throughout the Nation.
- 02 Traffic control devices notify road users of regulations and provide warning and guidance needed for the uniform and efficient operation of all elements of the traffic stream in a manner intended to minimize the occurrences of crashes.

Standard:

- 03 **Traffic control devices or their supports shall not bear any advertising message or any other message that is not related to traffic control.**

Support:

- 04 Tourist-oriented directional signs and Specific Service signs are not considered advertising; rather, they are classified as motorist service signs.

Section 1A.02 Principles of Traffic Control Devices

Support:

- 01 This Manual contains the basic principles that govern the design and use of traffic control devices for all streets, highways, bikeways, and private roads open to public travel (see definition in Section 1A.13) regardless of type or class or the public agency, official, or owner having jurisdiction. This Manual's text specifies the restriction on the use of a device if it is intended for limited application or for a specific system. It is important that these principles be given primary consideration in the selection and application of each device.

Guidance:

- 02 *To be effective, a traffic control device should meet five basic requirements:*
- A. *Fulfill a need;*
 - B. *Command attention;*
 - C. *Convey a clear, simple meaning;*
 - D. *Command respect from road users; and*
 - E. *Give adequate time for proper response.*
- 03 *Design, placement, operation, maintenance, and uniformity are aspects that should be carefully considered in order to maximize the ability of a traffic control device to meet the five requirements listed in the previous paragraph. Vehicle speed should be carefully considered as an element that governs the design, operation, placement, and location of various traffic control devices.*

Support:

- 04 The definition of the word "speed" varies depending on its use. The definitions of specific speed terms are contained in Section 1A.13.

Guidance:

- 05 *The actions required of road users to obey regulatory devices should be specified by State statute, or in cases not covered by State statute, by local ordinance or resolution. Such statutes, ordinances, and resolutions should be consistent with the "Uniform Vehicle Code" (see Section 1A.11).*
- 06 *The proper use of traffic control devices should provide the reasonable and prudent road user with the information necessary to efficiently and lawfully use the streets, highways, pedestrian facilities, and bikeways.*

Support:

- 07 Uniformity of the meaning of traffic control devices is vital to their effectiveness. The meanings ascribed to devices in this Manual are in general accord with the publications mentioned in Section 1A.11.

Section 1A.03 Design of Traffic Control Devices

Guidance:

- 01 *Devices should be designed so that features such as size, shape, color, composition, lighting or retroreflection, and contrast are combined to draw attention to the devices; that size, shape, color, and simplicity of message combine to produce a clear meaning; that legibility and size combine with placement to permit adequate time for response; and that uniformity, size, legibility, and reasonableness of the message combine to command respect.*
- 02 *Aspects of a device's standard design should be modified only if there is a demonstrated need.*

39. "Guidelines for Accessible Pedestrian Signals (NCHRP Web-Only Document 117B)," 2008 Edition (TRB)
40. "Highway Capacity Manual," 2000 Edition (TRB)
41. "Recommended Procedures for the Safety Performance Evaluation of Highway Features," (NCHRP Report 350), 1993 Edition (TRB)
42. "The Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)," July 1998 Edition (The U.S. Access Board)

Section 1A.12 Color Code

Support:

- 01 The following color code establishes general meanings for 11 colors of a total of 13 colors that have been identified as being appropriate for use in conveying traffic control information. tolerance limits for each color are contained in 23 CFR Part 655, Appendix to Subpart F and are available at the Federal Highway Administration's MUTCD website at <http://mutcd.fhwa.dot.gov> or by writing to the FHWA, Office of Safety Research and Development (HRD-T-301), 6300 Georgetown Pike, McLean, VA 22101.
- 02 The two 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. The meanings described in this Section are of a general nature. More specific assignments of colors are given in the individual Parts of this Manual relating to each class of devices.

Standard:

- 03 **The general meaning of the 13 colors shall be as follows:**
 - A. **Black—regulation**
 - B. **Blue—road user services guidance, tourist information, and evacuation route**
 - C. **Brown—recreational and cultural interest area guidance**
 - D. **Coral—unassigned**
 - E. **Fluorescent Pink—incident management**
 - F. **Fluorescent Yellow-Green—pedestrian warning, bicycle warning, playground warning, school bus and school warning**
 - G. **Green—indicated movements permitted, direction guidance**
 - H. **Light Blue—unassigned**
 - I. **Orange—temporary traffic control**
 - J. **Purple—lanes restricted to use only by vehicles with registered electronic toll collection (ETC) accounts**
 - K. **Red—stop or prohibition**
 - L. **White—regulation**
 - M. **Yellow—warning**

Section 1A.13 Definitions of Headings, Words, and Phrases in this Manual

Standard:

- 01 **When used in this Manual, the text headings of Standard, Guidance, Option, and Support shall be defined as follows:**
 - A. **Standard—a statement of required, mandatory, or specifically prohibitive practice regarding a traffic control device. All Standard statements are labeled, and the text appears in bold type. The verb "shall" is typically used. The verbs "should" and "may" are not used in Standard statements. Standard statements are sometimes modified by Options. Standard statements shall not be modified or compromised based on engineering judgment or engineering study.**
 - B. **Guidance—a statement of recommended, but not mandatory, practice in typical situations, with deviations allowed if engineering judgment or engineering study indicates the deviation to be appropriate. All Guidance statements are labeled, and the text appears in unbold type. The verb "should" is typically used. The verbs "shall" and "may" are not used in Guidance statements. Guidance statements are sometimes modified by Options.**
 - C. **Option—a statement of practice that is a permissive condition and carries no requirement or recommendation. Option statements sometime contain allowable modifications to a Standard or Guidance statement. All Option statements are labeled, and the text appears in unbold type. The verb "may" is typically used. The verbs "shall" and "should" are not used in Option statements.**
 - D. **Support—an informational statement that does not convey any degree of mandate, recommendation, authorization, prohibition, or enforceable condition. Support statements are labeled, and the text appears in unbold type. The verbs "shall," "should," and "may" are not used in Support statements.**

02 Unless otherwise defined in this Section, or in other Parts of this Manual, words or phrases shall have the meaning(s) as defined in the most recent editions of the "Uniform Vehicle Code," "AASHTO Transportation Glossary (Highway Definitions)," and other publications mentioned in Section 1A.11.

03 The following words and phrases, when used in this Manual, shall have the following meanings:

1. **Accessible Pedestrian Signal**—a device that communicates information about pedestrian signal timing in non-visual format such as audible tones, speech messages, and/or vibrating surfaces.
2. **Accessible Pedestrian Signal Detector**—a device designated to assist the pedestrian who has visual or physical disabilities in activating the pedestrian phase.
3. **Active Grade Crossing Warning System**—the flashing-light signals, with or without warning gates, together with the necessary control equipment used to inform road users of the approach or presence of rail traffic at grade crossings.
4. **Actuated Operation**—a type of traffic control signal operation in which some or all signal phases are operated on the basis of actuation.
5. **Actuation**—initiation of a change in or extension of a traffic signal phase through the operation of any type of detector.
6. **Advance Preemption**—the notification of approaching rail traffic that is forwarded to the highway traffic signal controller unit or assembly by the railroad or light rail transit equipment in advance of the activation of the railroad or light rail transit warning devices.
7. **Advance Preemption Time**—the period of time that is the difference between the required maximum highway traffic signal preemption time and the activation of the railroad or light rail transit warning devices.
8. **Advisory Speed**—a recommended speed for all vehicles operating on a section of highway and based on the highway design, operating characteristics, and conditions.
9. **Alley**—a street or highway intended to provide access to the rear or side of lots or buildings in urban areas and not intended for the purpose of through vehicular traffic.
10. **Altered Speed Zone**—a speed limit, other than a statutory speed limit, that is based upon an engineering study.
11. **Approach**—all lanes of traffic moving toward an intersection or a midblock location from one direction, including any adjacent parking lane(s).
12. **Arterial Highway (Street)**—a general term denoting a highway primarily used by through traffic, usually on a continuous route or a highway designated as part of an arterial system.
13. **Attended Lane (Manual Lane)**—a toll lane adjacent to a toll booth occupied by a human toll collector who makes change, issues receipts, and perform other toll-related functions. Attended lanes at toll plazas typically require vehicles to stop to pay the toll.
14. **Automatic Lane**—see Exact Change Lane.
15. **Average Annual Daily Traffic (AADT)**—the total volume of traffic passing a point or segment of a highway facility in both directions for one year divided by the number of days in the year. Normally, periodic daily traffic volumes are adjusted for hours of the day counted, days of the week, and seasons of the year to arrive at average annual daily traffic.
16. **Average Daily Traffic (ADT)**—the average 24 hour volume, being the total volume during a stated period divided by the number of days in that period. Normally, this would be periodic daily traffic volumes over several days, not adjusted for days of the week or seasons of the year.
17. **Average Day**—a day representing traffic volumes normally and repeatedly found at a location, typically a weekday when volumes are influenced by employment or a weekend day when volumes are influenced by entertainment or recreation.
18. **Backplate**—see Signal Backplate.
19. **Barrier-Separated Lane**—a preferential lane or other special purpose lane that is separated from the adjacent general-purpose lane(s) by a physical barrier.
20. **Beacon**—a highway traffic signal with one or more signal sections that operates in a flashing mode.
21. **Bicycle**—a pedal-powered vehicle upon which the human operator sits.
22. **Bicycle Facilities**—a general term denoting improvements and provisions that accommodate or encourage bicycling, including parking and storage facilities, and shared roadways not specifically defined for bicycle use.
23. **Bicycle Lane**—a portion of a roadway that has been designated for preferential or exclusive use by bicyclists by pavement markings and, if used, signs.
24. **Bikeway**—a generic term for any road, street, path, or way that in some manner is specifically designated for bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.

145. **Physical Gore**—a longitudinal point where a physical barrier or the lack of a paved surface inhibits road users from crossing from a ramp or channelized turn lane or channelized entering lane to the adjacent through lane(s) or vice versa.
146. **Pictograph**—a pictorial representation used to identify a governmental jurisdiction, an area of jurisdiction, a governmental agency, a military base or branch of service, a governmental-approved university or college, a toll payment system, or a government-approved institution.
147. **Plaque**—a traffic control device intended to communicate specific information to road users through a word, symbol, or arrow legend that is placed immediately adjacent to a sign to supplement the message on the sign. The difference between a plaque and a sign is that a plaque cannot be used alone. The designation for a plaque includes a “P” suffix.
148. **Platoon**—a group of vehicles or pedestrians traveling together as a group, either voluntarily or involuntarily, because of traffic signal controls, geometrics, or other factors.
149. **Portable Traffic Control Signal**—a temporary traffic control signal that is designed so that it can be easily transported and reused at different locations.
150. **Post-Mounted Sign**—a sign that is placed to the side of the roadway such that no portion of the sign or its support is directly above the roadway or shoulder.
151. **Posted Speed Limit**—a speed limit determined by law or regulation and displayed on Speed Limit signs.
152. **Preemption**—the transfer of normal operation of a traffic control signal to a special control mode of operation.
153. **Preferential Lane**—a highway lane reserved for the exclusive use of one or more specific types of vehicles or vehicles with at least a specific number of occupants.
154. **Pre-Signal**—traffic control signal faces that control traffic approaching a grade crossing in conjunction with the traffic control signal faces that control traffic approaching a highway-highway intersection beyond the tracks. Supplemental near-side traffic control signal faces for the highway-highway intersection are not considered pre-signals. Pre-signals are typically used where the clear storage distance is insufficient to store one or more design vehicles.
155. **Pretimed Operation**—a type of traffic control signal operation in which none of the signal phases function on the basis of actuation.
156. **Primary Signal Face**—one of the required or recommended minimum number of signal faces for a given approach or separate turning movement, but not including near-side signal faces required as a result of the far-side signal faces exceeding the maximum distance from the stop line.
157. **Principal Legend**—place names, street names, and route numbers placed on guide signs.
158. **Priority Control**—a means by which the assignment of right-of-way is obtained or modified.
159. **Private Road Open to Public Travel**—private toll roads and roads (including any adjacent sidewalks that generally run parallel to the road) within shopping centers, airports, sports arenas, and other similar business and/or recreation facilities that are privately owned, but where the public is allowed to travel without access restrictions. Roads within private gated properties (except for gated toll roads) where access is restricted at all times, parking areas, driving aisles within parking areas, and private grade crossings shall not be included in this definition.
160. **Protected Mode**—a mode of traffic control signal operation in which left or right turns are permitted to be made when a left or right GREEN ARROW signal indication is displayed.
161. **Public Road**—any road, street, or similar facility under the jurisdiction of and maintained by a public agency and open to public travel.
162. **Pushbutton**—a button to activate a device or signal timing for pedestrians, bicyclists, or other road users.
163. **Pushbutton Information Message**—a recorded message that can be actuated by pressing a pushbutton when the walk interval is not timing and that provides the name of the street that the crosswalk associated with that particular pushbutton crosses and can also provide other information about the intersection signalization or geometry.
164. **Pushbutton Locator Tone**—a repeating sound that informs approaching pedestrians that a pushbutton exists to actuate pedestrian timing or receive additional information and that enables pedestrians who have visual disabilities to locate the pushbutton.
165. **Queue Clearance Time**—when used in Part 8, the time required for the design vehicle of maximum length stopped just inside the minimum track clearance distance to start up and move through and clear the entire minimum track clearance distance. If pre-signals are present, this time shall be long enough to allow the vehicle to move through the intersection, or to clear the tracks if there is sufficient clear storage distance. If a Four-Quadrant Gate system is present, this time shall be long enough to permit the exit gate arm to lower after the design vehicle is clear of the minimum track clearance distance.