



# Traffic Control Devices: Uses and Misuses

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## Overview

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Traffic control devices are signs, signals, pavement markings and other devices placed along highways and streets to move vehicles and pedestrians safely and efficiently. These devices are placed in key locations to guide traffic movement, control vehicle speeds and warn of potentially hazardous conditions. They also provide important information to drivers about detours and traffic delays.

## Functions of Traffic Control Devices

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The main purpose of a traffic control device is to provide information to drivers so they can operate their vehicles safely along a highway or street. The five basic criteria of a traffic control device are to:

- ◆ Fulfill a need;
- ◆ Command attention;
- ◆ Convey a clear, simple meaning;
- ◆ Command respect from road users, and
- ◆ Give adequate time for response.

Signs, signals, pavement markings, cones, barricades and warning lights are designed with dedicated colors, shapes and sizes based on the different functions they provide. They regulate, guide and warn vehicle and pedestrian traffic about road conditions. Uniformity of design (color, shape, size and location) helps drivers to quickly understand the messages of traffic control devices. Consistency is important for driver respect, recognition and proper reaction to the devices.

## Characteristics of Uniform Traffic Control Devices

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**Color.** Certain colors are used to trigger instant recognition and reaction; for example, STOP signs are always red. Similarly, signals at intersections must have the same sequence of red/yellow/green to communicate stop/warning/go to drivers and pedestrians.

**Nighttime visibility.** Traffic control devices are made visible under nighttime operating conditions by either being separately lighted or retro-reflectorized so that the light coming from vehicle headlamps is bounced off signs and other devices back to the eyes of drivers.

**Daytime visibility.** Traffic control devices are designed with highly visible colors or a sharp contrast of messages against a background. Sometimes traffic control devices are lighted even for daytime viewing to draw the attention of drivers to their messages.

**Shape and size.** Signs have standard shapes and sizes to trigger instant recognition and reaction. For example, STOP signs have an octagonal shape of a particular size that no other sign is permitted to have. There are similar specifications for the shapes and sizes of many other traffic control devices for both permanent and temporary conditions.

**Location.** Traffic control devices must be placed in locations that provide enough time for all drivers to make the appropriate safe maneuvers, such as entering or departing a road or stopping and turning to avoid conflicts with other vehicles and pedestrians.



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**Messages.** Traffic control devices are designed with carefully chosen symbol or word messages of specific sizes and content. Locations and functions are then selected in relation to the amount of time that drivers need to detect, read and understand messages to make appropriate vehicle maneuvers.

### How to Select the Correct Traffic Control Device

Traffic control devices work in concert with the basic “rules of the road” contained in traffic laws and ordinances, including each states’ uniform code that regulates vehicle movements. One example is the “right-of-way” principle that determines which driver has priority when approaching or entering an intersection.

Traffic control devices have undergone a long evolution of design and installation criteria. Current designs and the standards for using them are the result of several decades of scientific investigation and the combined experience of many professional engineers, human behavior and vision researchers and safety policy-makers.

One of the major resources for determining the design and use of traffic control devices is the *Manual on Uniform Traffic Control Devices* (MUTCD). The 2003 Edition of the MUTCD is the national standard applicable to all public roads. The MUTCD provides standards, guidance and application information for signs, markings, traffic signals and other traffic control devices. This document can be found on the Web site: <http://mutcd.fhwa.dot.gov/>.

Additional basic design guides have been produced by the Institute of Transportation Engineers’ such as the *Traffic Engineering Handbook* and *Traffic Control Devices Handbook*. These documents can be ordered through the ITE Bookstore at <http://www.ite.org>.

### Common Problems with Traffic Control Device Placement and Installation



Due to resource constraints, many jurisdictions do not have traffic engineers or traffic engineering technicians on staff. These jurisdictions may rely on personnel that may have an engineering background; however, they may not be specifically trained in traffic engineering. Knowledge of the standards, guidance and applications included in the MUTCD is an essential element in the design, construction, operation and maintenance of roadway segments and intersections. A few of the common problems with traffic control device placement and installation are provided below.

1. **Use of an improper device.** Placing an unwarranted traffic signal where a less restrictive control would be more appropriate may result in unnecessary delays, excessive violations, increased crashes and diversion to less desirable routes such as residential streets.
2. **Improper placement.** A traffic control device at the wrong location may result in the device being seen too late by drivers to safely react (e.g., placing a properly designed sign too far around the bend of a sharp curve).
3. **Wrong color, shape, or size.** Using a color, shape, or size for a sign or other traffic control device that is in conflict with the MUTCD can result in the inability of drivers

to detect and comprehend the need to make safe maneuvers and can cause inattention or visibility problems (i.e., “I didn’t see the STOP sign.”)

4. **Land use, traffic and other changes can cause existing traffic control devices to become obsolete.** As an example, traffic signs that may have controlled the movement of vehicles and pedestrians for years may no longer be effective in doing so.
5. **Lack of signs or other devices to warn drivers and pedestrians of unexpected, potentially hazardous conditions.** For example, neglecting to provide advance warning of an upcoming signal or STOP sign over the top of a steep hill can result in inappropriate braking and steering maneuvers that may result in collisions.
6. **Poor Maintenance.** Signs and pavement markings need to be maintained on a regular basis. Faded signs and pavement markings make them harder for road users to detect and may lead to potentially dangerous situations. For example, faded STOP signs may lead to drivers entering an intersection without stopping.