Traffic Control Devices: Uses and Misuses

Traffic control devices are signs, signals, pavement markings and other devices placed along highways and streets to move vehicles and pedestrians safely and efficiently. They 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

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 requirements 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.

Transportation engineers attempt to provide "positive guidance" through a combination of devices to provide information to drivers when they need it.

When traffic control devices are properly selected and located... driver and pedestrian compliance can ensure safe operations.

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 and size) helps drivers to quickly understand the messages of traffic control devices. Consistency is crucial for ensuring driver respect, recognition and proper reaction.

When traffic control devices are properly selected and located for good day and night visibility, recognition and comprehension, driver and pedestrian compliance can ensure safe operation of vehicles.

Characteristics of Uniform Traffic Control Devices

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 retroreflectorized 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.

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 policymakers.

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 Millennium Edition of the MUTCD offers 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 professional engineering organizations, such as the Institute of Transportation Engineers' *Traffic Engineering Handbook* and *Traffic Control Devices Handbook*.

Problems with Traffic Control Device Placement and Installation

1. ***Use of an improper device***. Placing a yield sign where a stop sign is needed will result in an inadequate amount of time and distance for drivers to react to another vehicle or pedestrian.
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 size***. Using a small warning or information sign may result in the inability of drivers to detect and comprehend the need to make safe maneuvers.
4. ***Wrong color***. Using yellow or some other color for lane lines instead of white.
5. ***Wrong shape***. Using a diamond warning shape for a traffic regulation.

6. ***Excessive installation*** of specific devices that often results in increasing driver disregard of their important messages. One example is the blanket use of four-way stop signs in residential neighborhoods. The public generally has the mistaken belief that four-way stop signs will always promote better driver caution and achieve vehicle speed reductions. Many times, however, the placement of a four-way stop sign promotes increased speeding between intersections. Similarly, it is a common mistake to assume that signals will necessarily make a dangerous intersection safer. A more effective approach in reducing speeds in residential neighborhoods is enforcement along with reduced residential speed limits and traffic calming measures.
7. ***Failure to use traffic control devices at necessary locations***. Traffic signs that may have controlled the movement of vehicles and pedestrians for years may no longer be effective in doing so.
8. ***Failure to warn or notify drivers and pedestrians of unexpected, potentially hazardous conditions***. 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.