Traffic Control Devices

The media by which traffic engineers communicate with drivers

Every traffic law, regulation, or operating instruction must be communicated through the use of devices that fall into three broad categories:

1. Traffic markings
2. Traffic signs
3. Traffic signals

The Manual on Uniform Traffic Control Devices (MUTCD) is published by the Federal Highway Administration (FHA)

In principal, traffic control devices must:

1. Fulfill a need
2. Command attention
3. Convey a clear, simple message
4. Command respect of road users
5. Give adequate time for a proper response

Contents of the MUTCD

1. Detailed standards for the physical design of the device, specifying shape, size, colors, legend types and sizes, and specific legend.
2. Detailed standards and guidelines on where devices should be located with respect to the traveled way.
3. Warrants, or conditions, that justify the use of a particular device.
Legal aspects of the MUTCD
The four different categories of MUTCD guidance and information

1. Standard:
   indicated by the use of the term “shall” or “shall not” in the statement

2. Guidance:
   indicated by the use of the word “should” or “should not” in the statement

3. Option:
   usually state using the word “may” or “may not”

4. Support:
   purely information statement provided to supply additional information to the traffic engineer. The words "shall", "should", or "may" do not appear in these statements.

Communicating with the driver
Message are conveyed through the use of:

1. Color:
   - The most easily visible characteristic of a device
   - The principal colors used in traffic control devices (in Thailand) are red, yellow, green, black, and blue

2. Shape:
   - Identify a particular type of information that the sign is conveying
   - Conveying a unique message of its own

Traffic Markings
Traffic markings fall into three broad categories:

1. Longitudinal markings
2. Transverse marking
3. Object markers and delineators
Colors and patterns

**Colors**

1. **Yellow**: marking separate traffic traveling in opposite directions
2. **White**: marking separate traffic traveling in the same directions, and are used for all traverse marking
3. **Red**: marking delineate roadways that shall not be entered or used by the viewer of the marking
4. **Blue**: marking are used to delineate parking spaces reserved for persons with disabilities
5. **Black**: marking are used in conjunction with other markings on light pavements

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**Lines types**

1. Solid line
2. Broken line
3. Dashed line
4. Dotted line

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**Solid lines**

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**Broken and dashed lines**
**Dotted line (1)**

**Dotted line (2)**

**Example of yellow marking: yellow double solid line and dotted**

**Example of yellow marking: yellow solid and dashed line**
Longitudinal marking

1. Centerlines
2. Lane markings
3. Edge markings
4. Other longitudinal markings
**Edge markings**

- Transverse marking

**Other longitudinal markings**

- Stop lines
- Crosswalk markings
- Parking space markings
- Word and symbol markings

**Stop lines**
Object markers (1)

Object markers are used to denote obstructions either in or adjacent to the travel way.

Object markers (2)

Hazard close to the edge of the road. The broken lines above the side on which you may safely pass.
**Traffic Signs**

- Traffic signs fall into one of three major categories:

1. **Regulatory signs:**
   - convey information concerning specific traffic regulations
   - relate to right-of-way, speed limits, lane usage, parking, or a variety of other functions
**o Speed limit signs:**
- Linear speed limits
- Areawide (statutory) speed limits
- Night speed limits
- Truck speed limits
- Minimum speed limits

**o Turn prohibition signs:**
- No turns

**o Lane-use signs:**
- Left lane must turn left
- Center lane do not use 7-9 AM Mon-Fri
- End reverse lane

**o Parking control signs:**
- **Parking:** A "parked" vehicle is a stationary vehicle located at the curb with the engine not running; whether or not the driver is in the vehicle is not relevant to this definition
- **Standing:** A "standing" vehicle is a stationary vehicle located at the curb with the engine running and the driver in the car
- **Stopping:** A "stopping" vehicle is one that makes a momentary stop at the curb to pick up or discharge a passenger; the vehicle moves on immediately upon completion of the pick-up or discharge, and the driver does not leave the vehicle
2. Warning signs:
   o used to inform drivers about upcoming hazards that they might not see or otherwise discern in time to safely react

o There are three conditions of warning signs:

**Condition A: High judgment required**
- Applies where the road user must use extra time to adjust speed and change lanes in heavy traffic due to a complex driving situation
- Typical applications are warning signs for merging, lane drop, and similar situations
- A PIEV time of 6.7 to 10 sec is assumed plus 4.5 sec for each required maneuver

**Condition B: Stop condition**
- Applies in cases where the driver may be required to come to a stop before the hazard location
- Typical applications are stop ahead, yield ahead, and signal ahead warning
- A PIEV time of 2.5 sec is applied

**Condition C: Deceleration to the listed advisory speed for the condition**
- Applies in cases where the road user must decelerate to a posted advisory speed to safely maneuver through the hazard
- A PIEV time of 1.6 sec is assumed with a deceleration rate of 10 ft/s²

Examples of condition A warning sign:

Examples of condition B warning sign:
Examples of condition C warning sign:

- Slippery when wet
- Slow
- Children at play
- 60
- 40

Warning signs are used to inform drivers of a variety of potentially hazardous circumstances, including:

- Changes in horizontal alignment
- Intersections
- Advance warning of control devices
- Converging traffic lanes
- Narrow roadways
- Changes in highway design
- Grades
- Roadway surface conditions
- Railroad crossings
- Entrances and crossings
- Miscellaneous

3. Guide signs:
   - Several general principals may be applied:
     - If a route services a number of destinations, the most important of these should be listed.
     - No guide sign should list more than three (four may be acceptable in some circumstances) destinations on a single sign.
     - Where roadways have both a name and a route number, both should be indicated on the sign if space permits.
     - Wherever possible, advance signing of important junctions should be given.
     - Confusion on the part of the driver must be avoided at all cost. Sign sequencing should be logical and should naturally lead the driver to the desired route selections.

Route markers

Destination signs: Conventional roads
- Route markers

- Destination signs: Conventional roads

- Destination signs: Freeways and expressways

- Service guide signs

- Mileposts
o Recreational and cultural-interest guide sign

Example of installing traffic signs and marking (1)

Example of installing traffic signs and marking (2)

o Traffic signs in Thailand (1)
Traffic signs in Thailand (2)

Traffic signs in Thailand (3)

Traffic signs in Thailand (4)

Traffic signs in Thailand (5)
Traffic Signals

The MUTCD defines nine types of traffic signals:

- Traffic control signals
- Pedestrian signals
- Emergency vehicle traffic control signals
- Traffic control signals for one-lane, two-way facilities
- Traffic control signals for freeway entrance ramps
- Traffic control signals for moveable bridges
- Lane-use control signals
- Flashing beacons
- In-roadway lights

The benefits of traffic control signals:

- Increase capacity of critical intersection movements
- Reduce the frequency and severe accidents
- Provide nearly continuous movement of through traffic
- Provide interruptions in heavy traffic streams to permit crossing vehicular and pedestrian traffic

Signal indications:

- Green ball
- Yellow ball
- Red ball
- Flashing ball
- Arrow indications

Signal indications: The examples
o Signal faces and visibility requirements:

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<tr>
<th>85th Percentile Speed (mi/h)</th>
<th>Minimum Sight Distance (ft)</th>
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The symbols used for pedestrian signals:

- Walking man (steady)
- Upraised hand (flashing)
- Upraised hand (steady)

Pedestrian signals: The examples (1)

Pedestrian signals: The examples (2)
- Beacons
- In-roadway lights
- Lane-use control signals
- Ramp control signals (or ramp meters)

Special Types of Control

- School zones
- Railroad crossings
- Construction and maintenance zones
- Pedestrian and bicycle controls