Traffic Signs and Markings

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Traffic Signs

Definition:
A traffic sign is defined as a device mounted on a fixed or portable support whereby a specific message is conveyed by means of words or symbols.

See the FHWA and the MUTCD website at http://mutcd.fhwa.dot.gov
Traffic Signs

The sign is placed or erected for the purpose of:

regulating, 
warning, or 
guiding 

vehicular, pedestrian, or bicycle traffic.

See the FHWA and the MUTCD website at http://mutcd.fhwa.dot.gov
Traffic Signs

- **Purpose:**
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 and highways throughout the Nation.
Purpose (continued):
Traffic control devices or their supports shall not bear any advertising message or any other message that is not related to traffic control.
Function of signs:

Signs shall be defined by their function as follows:

A. **Regulatory** signs give notice of traffic laws or regulations.

B. **Warning** signs give notice of a situation that might not be readily apparent.

C. **Guide** signs show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, or cultural information.
Traffic Signs

- **Sign Limitations:**
  - Easily damaged due to impact or vandalism
  - Visual quality degrade over time due to dirt and normal reflectivity deterioration
  - Require continuous maintenance
Traffic Signs

- **Principles of traffic signs and markings:**

  Traffic signs and markings are most effective when they satisfy five basic requirements:
  - Fulfill a need;
  - Command attention;
  - Convey a clear, simple meaning;
  - Command respect from road users; and
  - Give adequate time for proper response.
Traffic Signs

- Changeable Message Signs
  
  Changeable message signs are traffic control devices designed to display variable messages. Changeable message signs should not be used to display information other than regulatory, warning, and guidance information related to traffic control.

https://www.google.ps/search?q=changeable+message+signs&tbm=isch&tbo=u&source=univ&sa=X&ei=5imQUp2RHZD30gWdkICoBw&ved=0CDAQsAQ&biw=1010&bih=398

http://www.youtube.com/watch?v=LeqjFHbZ0J4
Traffic Signs

- Changeable Message Signs
  
  Changeable message signs, with more sophisticated technologies, are gaining widespread use to inform road users of variable situations, particularly along congested traffic corridors.
Traffic Signs

LINCOLN TUNNEL
2+ PEOPLE / CAR
START FRI 6AM
Traffic Signs

NEW CHANGEABLE MESSAGE ROADBOARD

WITH 288 LETTERS & NUMBERS
STALLED VEHICLE
AT HWY 280
IN ALL LANTES
Traffic Signs
ACCIDENT AHEAD
30 MIN DELAY
USE NEXT OFFRAMP
Traffic Signs

- Changeable Message Signs: (continued)

  In order to ensure that the above principles are fulfilled the following aspects should be considered:
  
  - design;
  - placement and operation;
  - maintenance; and
  - uniformity.
Traffic Signs

1. **Design**
   Shape, color, Size, composition, lighting or retro-reflection should command attention and convey a simple meaning.

   *The sign should have:*

   A. High visibility by day and night; and
   
   B. High legibility (adequately sized letters or symbols, and a short legend for quick comprehension by a road user approaching a sign).
Shapes

Particular shapes, as shown in the Table below, shall be used exclusively for specific signs or series of signs.

**Use of Sign Shapes**

<table>
<thead>
<tr>
<th>Shape</th>
<th>Signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Octagon</td>
<td>* Stop</td>
</tr>
<tr>
<td>Equilateral Triangle (1 point down)</td>
<td>* Yield</td>
</tr>
<tr>
<td>Circle</td>
<td>Highway-Rail Grade Crossing (Advance Warning)</td>
</tr>
<tr>
<td></td>
<td>Emergency Evacuation Route Marker</td>
</tr>
</tbody>
</table>
# Traffic Signs

<table>
<thead>
<tr>
<th>Shape</th>
<th>Signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pennant Shape / Isosceles Triangle (longer axis horizontal)</td>
<td>* No Passing</td>
</tr>
<tr>
<td>Pentagon (pointed up)</td>
<td>* School Crossing Series</td>
</tr>
<tr>
<td></td>
<td>* County Route Sign</td>
</tr>
<tr>
<td>Crossbuck (two rectangles in an “X” configuration)</td>
<td>* Highway-Rail Grade Crossing</td>
</tr>
<tr>
<td>Diamond</td>
<td>Warning Series</td>
</tr>
<tr>
<td>Rectangle</td>
<td>Regulatory Series</td>
</tr>
<tr>
<td></td>
<td>** Guide Series</td>
</tr>
<tr>
<td></td>
<td>** Guide Series</td>
</tr>
<tr>
<td>Trapezoid</td>
<td>* Recreational Series</td>
</tr>
</tbody>
</table>

* Indicates exclusive use
** Guide series includes general service, specific service, and recreation signs
## Traffic Signs

- **Color code**

  The general meanings of colors used in signs are as follows:

<table>
<thead>
<tr>
<th>Color</th>
<th>General Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Yellow</strong></td>
<td>Warning</td>
</tr>
<tr>
<td><strong>Red</strong></td>
<td>Stop or prohibition</td>
</tr>
<tr>
<td><strong>Blue</strong></td>
<td>Road user services guidance, tourist information, and evacuation route</td>
</tr>
<tr>
<td><strong>Green</strong></td>
<td>Indicated movements permitted, direction guidance</td>
</tr>
<tr>
<td><strong>Brown</strong></td>
<td>Recreational and cultural interest area guidance</td>
</tr>
<tr>
<td><strong>Orange</strong></td>
<td>Temporary traffic control</td>
</tr>
<tr>
<td><strong>Black</strong></td>
<td>Regulations</td>
</tr>
<tr>
<td><strong>White</strong></td>
<td>Regulation</td>
</tr>
<tr>
<td><strong>Fluorescent Yellow - Green</strong></td>
<td>Pedestrian warning, bicycle warning, school bus and school warning</td>
</tr>
</tbody>
</table>
Traffic Signs

Size:

- Normal sizes of signs are used in urban areas.
- Larger signs are used in rural areas.
- Larger signs are also used for added emphasis.
- Or to ensure that they attract motorists attention.

See the MUTCD for standard sizes of signs.
Traffic Signs

- **Size:**

  See the MUTCD for standard sizes of signs.
  - Normal sizes
  - Larger signs
Traffic Signs

- **Message:**
  A. word messages
  brief, 3 words maximum on regulatory or warning signs

B. .
Traffic Signs

Stop sign
Stop sign ahead
Yield sign
Traffic light ahead sign

Crossroad ahead sign
Right side road ahead sign
Do not pass sign
Pass with care sign
Regulatory Signs
Traffic Signs

- **Message:**

B. **symbolic**

for faster recognition by drivers

- pictograms; arrows, curve warning, deer crossing

- symbols, should be learned by the code; red circle with a slash, and **DO NOT ENTER SIGN.**
Traffic Signs

- **Lettering**
  Uppercase letters on all regulatory and warning signs
Traffic Signs

Illumination and reflectorization

- Illumination
  - External light,
  - light within or behind the sign,
  - luminous tubing shaped to the letter or symbol

- Reflectorization
  - Reflective sheet background
  - Reflective letters, symbol or border
Traffic Signs

- **Sign location**
  - See page 16-4 for details
  - On the right hand side of the roadway
  - Facing approaching traffic
  - Supplementary signs in other locations may be used
  - Guide signs are often mounted overhead (on wide and high speed streets)
  - Visible only to the traffic for which they are intended.

- **Longitudinal placement**
- **Lateral placement**
Traffic Signs

- **Longitudinal placement**
  Must be coordinated with roadside features (guardrails and other signs)

**Regulatory signs:**
normally placed at or near the location where the regulation:
- exists (stop, yield)
- begins (wrong way, do not pass)
- additional signs where a regulation continues over an extended section of the highway (speed limit)
Traffic Signs

Warning signs:
- in advance of the hazard
- as a function of approaching traffic speed

Guide signs:
- In advance of an intersection or junction
- At the point where they apply (street names, kilometer posts)
Traffic Signs

- Lateral placement
  Within the driver's cone of vision
Traffic Signs

- **Sign support**

  New changes for safety at impact
  Large ground-mounted signs are now acceptable only if:
  - They are placed beyond the clear zone of behind protective barriers
  - Most supports for small signs (5m²) are now designed to break away or yield and bend over
Traffic Signs

- **Sign application**
  See details in page 16-5
2. **Placement and operation**

- Properly seen;
- Give adequate time for proper response;
- Vertical and lateral locations;
- Fulfill a need;
- Command respect;
- Unnecessary traffic control devices should be removed.
3. **Maintenance**

- Physical maintenance of traffic control devices should be performed to ensure legibility and visibility.
- Devices should be removed if no longer appropriate.
4. **Uniformity**

Treating similar situations in a similar way and using consistent fashion for similar signs.

Uniformity in design shall include shape, color, dimensions, legends, borders, and illumination or retroreflectivity.
4. **Uniformity (continued)**

Uniformity of devices simplifies the task of the road user because it aids in recognition and understanding, thereby reducing perception/reaction time.

In this section the need and use of traffic signs and markings will be addressed.

- Standard Symbols
- Effectiveness of signs
- Observation angle
PAVEMENT MARKINGS
PAVEMENT MARKINGS
PAVEMENT MARKINGS

• **Definition:**
  Traffic markings are all lines, patterns, symbols, words, colors, or other devices, except signs and power-operated traffic control devices, set into the surface of, applied upon, or attached to the pavement or curbing and placed for the purpose of regulating, warning, or guiding traffic.
Marking functions:
Markings may:
  supplement other traffic control devices
or
they may be used alone
to convey information that would be
difficult to convey using other devices.
Marking functions: (continued)

They are specifically used to:

A. Display regulations (no passing zones, curb parking restrictions)
B. Supplement other devices (STOP lines, symbol arrows)
C. Guide traffic (lane lines, rout number)
D. Warn traffic (SIGNAL AHEAD, rail-highway crossing legend)
Marking Limitations

Markings have several important limitations.

- May be hidden by:
  - other vehicles directly over the markings or
  - by snow, or
  - by dirt.
Marking Limitations (continued)

- May be worn by sand or gravel.
- May not be visible when wet.
- They wear due to traffic and the environment and must be maintained or replaced.
- Removal of markings from the pavement is a difficult task.
Marking Design:

Materials

- All markings that apply at night must be reflectorized.
- Paint, thermoplastic and cold plastic are used for markings
- Materials must provide the color and reflectivity throughout their useful life.
Marking Design: (continued)

- Reflectivity in painted markings is achieved by mixing small glass heads with the paint.
- Raised pavement markers, 10-25 mm high, may be used.
- Jiggle bars (raised bars) are usually 75 mm high.
- Marking material used near pedestrian or bicycle activity should not present hazards of tripping or slipping to pedestrians or two-wheel vehicles users.
PAVEMENT MARKINGS

- **Color**
  - White
  - Yellow
  - Red and
  - Blue

- **Longitudinal Markings (parallel to the roadway)**
  - Broken lines   permissive
  - Dotted lines   path guidance
  - Solid lines    restrictive
  - Double lines   maximum restriction
  - Width of line  indicates degree of emphasis
PAVEMENT MARKINGS

- **Transverse Markings** (Table 16-2)
  - Stop bars: 300 – 600 mm in width, 1.2 m before crosswalk lines
  - Crosswalk lines: min. width 1.8 m
  - Railroad crossing markings: X & RR and a pair of transverse lines
  - Diagonal lines: in traffic islands

- **Parking space markings**
  - 100-150 mm wide
  - blue and white for disabled places
Word markings

Only used in support of standard signs
Limited to as few words as possible, never > 3 words
White in color and elongated
2.4 m high and 1.8 m at low speed roads

Should be read as below

<table>
<thead>
<tr>
<th>AHED</th>
<th>STOP</th>
<th>not</th>
<th>STOP</th>
<th>AHED</th>
</tr>
</thead>
<tbody>
<tr>
<td>XING</td>
<td>PED</td>
<td></td>
<td>PED</td>
<td>XING</td>
</tr>
</tbody>
</table>
PAVEMENT MARKINGS

- Marking applications

See page 16-14

Before any new highway, paved detour, or temporary route is opened to traffic, all necessary markings should be in place.
Under most highway conditions, markings provide important information while allowing minimal diversion of attention from the roadway.
PAVEMENT MARKINGS

- ADVANTAGES

Pavement markings can enhance roadway delineation with the addition of:
  - audible and tactile features such as:
    - bars, differential surface profiles, raised pavement markers, or
  - other devices intended to alert the road user that delineation on the roadway is being traversed.
PAVEMENT MARKINGS

- Examples of Pavement Markings

- Through Lane-Use Arrow

- 2.4 m (8 ft)

- 2.9 m (9.0 ft)
Figure 3B-20. Typical Lane-Use, Lane-Reduction, and Wrong-Way Arrows for Pavement Markings

a. Through Lane-Use Arrow

\[2.9 \text{ m (9.0 ft)}\]

b. Turn Lane-Use Arrow

\[2.4 \text{ m (8.0 ft)}\]
PAVEMENT MARKINGS

Posted or Statutory Speed Limit 70 km/h (45 mph) or greater

1.8 m (6 ft)

900 mm (3 ft)

200 mm (8 in)

6.1 m (20 ft)

Direction of travel
PAVEMENT MARKINGS

Figure 3B-1. Typical Two-Lane, Two-Way Marking Applications

Legend

- Direction of travel

Typical two-lane, two-way marking with passing permitted in both directions

b - Typical two-lane, two-way marking with no-passing zones
b - Typical pavement markings with optional double-turn lane lines, lane-use turn arrows, crosswalk lines, and stop lines
PAVEMENT MARKINGS

- Signs and markings must draw the driver’s attention.
- Driver’s attention is directly proportional to:
  - The density of traffic
  - Vehicle speed
  - Complexity of maneuvering areas
  - Operating environment (urban & rural)