MUTCD Part 4
Highway Traffic Signals

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KEEP AUSTIN WEIRD
Support Local Businesses
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2009 MUTCD
Revisions to Part 4 –
Highway Traffic Signals
Signal warrants – revisions to Warrant 4 (Pedestrian Volume)

More comparable to vehicular volume warrants

Figure 4C-5. Warrant 4, Pedestrian Four-Hour Volume

*Note: 107 pph applies as the lower threshold volume.
New Warrant 9 for intersections near grade crossings

Figure 4C-10. Warrant 9, Intersection Near a Grade Crossing
(Two or More Approach Lanes at the Track Crossing)

2009 MUTCD (Final Rule)
Signals based only on Warrant 4 (Ped Volume) or Warrant 5 (School Crossing) should also control the minor street or driveway

No “half-signals”
Vehicular signal visibility – 12-inch indications required for all new traffic control signal faces

Six options for using new 8-inch indications in special circumstances (incl. ≤30 mph if <120 ft from stop line)
Recommended number, location, and design of signal faces for approaches with speeds ≥ 45 mph

- Primary faces overhead, far side, with backplates

1 or more supplemental faces

If a protected-permissive left-turn mode is used (see Section 4D.20) with a shared signal face, the left-most through lane face will be the “shared” signal face, will contain appropriate left-turn arrow indications in addition to circular R-Y-G, and will be located over the projection of the lane line between the left-turn and through lanes.
Recommended number, location, and design of signal faces for approaches with speeds ≥ 45 mph
Recommended minimum number of through signal faces on approaches with speeds ≥ 45 mph

Table 4D-1. Recommended Minimum Number of Primary Signal Faces for Through Traffic on Approaches with Posted, Statutory, or 85th-Percentile Speed of 45 mph or Higher

<table>
<thead>
<tr>
<th>Number of Through Lanes on Approach</th>
<th>Total Number of Primary Through Signal Faces for Approach*</th>
<th>Minimum Number of Overhead-Mounted Primary Through Signal Faces for Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>2**</td>
</tr>
<tr>
<td>4 or more</td>
<td>4 or more</td>
<td>3**</td>
</tr>
</tbody>
</table>

NOTES:  
* A minimum of two through signal faces is always required (See Section 4D.11). These recommended numbers of signal faces may be exceeded. Also, see cone of vision requirements otherwise indicated in Section 4D.13.  
** If practical, all of the recommended number of primary through signal faces should be located overhead.
Same provisions should also be considered for speeds of less than 45 mph
Optional yellow retroreflective borders around backplates
Circular green indications for permissive LTs should **not** be located over or in front of the LT lane.
Protected-only mode shall not be used without exclusive turn lane

...unless turn phase always begins and ends simultaneously with the adjacent through movement (“split-phased”)

NOT to be used with shared lane unless split-phased
Optional U-turn arrow indications

Revisions Incorporated into the 2009 MUTCD

2009 MUTCD (Final Rule)
Permissive turns – optional use of flashing yellow arrow
Flashing yellow arrow
Provisions that allowed “Dallas” displays have been eliminated
Section 4D.20 –

If a separate left-turn signal face is being operated in a protected/permissive left-turn mode, a CIRCULAR GREEN signal indication shall not be used in that face.
Separate Turn Signal Face—a signal face that exclusively controls a turn movement and that displays signal indications that are applicable only to the turn movement.

Shared Turn Signal Face—a signal face, for controlling both a turn movement and the adjacent through movement, that always displays the same color of circular signal indication that the adjacent through signal face or faces display.
Flashing red arrow for permissive turns – optional use in special cases

Note: A flashing red arrow controlling a turn movement may be used only when an engineering study determines that each and every vehicle must successively come to a full stop before making a permissive turn.

*Shall not be displayed when operated in the permissive only mode.
Protected-only mode left-turn faces must use red arrow, not circular red

Does not apply to right-turn signals
Protected-only mode left-turn faces must use red arrow, not circular red.

Sign not required – but if used, shall be a LEFT ON GREEN ARROW ONLY sign.

Does not apply to right-turn signals.
Yellow change intervals and red clearance intervals

- Durations shall be determined using engineering practices
  - Compliance date December 31, 2014 or when timing adjustments are made (whichever occurs first)
- Use of red clearance – changed from option to guidance, when indicated by application of engineering practices
Back-up power should be provided for signals with RR preemption.
Overhead lane control signs should be used for certain signalized approaches

Per Section 2B.19 – lane drops, multiple-lane turns, shared through-turn lanes, other unexpected lane-use
Pedestrian Signals

2009 MUTCD (Final Rule)
If signal timing provides only enough time for pedestrians to cross to the median -- ped signals, pushbuttons (if actuated), and signs are required in the median.
New meaning of **flashing upraised hand** when pedestrian countdown signals are present was **NOT ADOPTED**

**Ped** may enter the intersection on the flashing upraised hand when a countdown pedestrian signal indication is present if they are able to travel to the far side of the traveled way by the time conflicting traffic receives a green signal.

*2009 MUTCD (Final Rule)*
Ped change interval (FDW) shall end at least 3 seconds ("buffer") before release of conflicting traffic

Buffer shall not begin later than the start of the red clearance interval, if used

Compliance date 12/31/2014 or when timing adjustments are made (whichever occurs first)
Slower walking speed for calculating pedestrian clearance time (guidance)

4.0 feet per second

Ped. Clearance Time based on 3.5 feet/sec

Exception allows 4.0 ft/sec if extended button press or passive ped detection allows slower peds to request additional crossing time

Sum of Walk time + Ped. Clearance Time based on 3.0 feet per second for distance from ped detector to far side
Countdown pedestrian displays

- **Required** for all ped signals where ped change interval is 7 sec. or more

- No specific compliance date for retrofitting existing ped signals (can remain w/o countdown until ped heads replaced)

- May be used even if ped change interval is 7 sec. or less

2009 MUTCD (Final Rule)
New guidance and figures for locations of pedestrian pushbuttons for a variety of conditions (APS compatible)
Positioning of pedestrian pushbuttons and legends on pushbutton signs shall clearly indicate which crosswalk signal is activated by which pushbutton.
Accessible pedestrian signals (APS) and accessible detectors – combined and reorganized into five new sections

- 4E.09 – General
- 4E.10 – Location
- 4E.11 – Walk indications
- 4E.12 – Tactile arrows and locator tones
- 4E.13 – Extended press button features
APS pushbutton locations

- APS pushbutton locations similar to 2003 edition now apply to non-APS pushbutton also (Section 4E.08)
- As close as possible to the crosswalk line furthest from center of intersection, and as close as possible to the curb ramp
- If 2 buttons on same corner, separate them by at least 10 ft. (unless physical constraints make impractical)
APS WALK indications

- Shall provide both in both audible & vibrotactile form
- Shall be same duration as WALK interval
- Audible:
  Percussive tone (8 to 10 ticks/sec), except if 2 buttons on same corner < 10 ft apart or on same pole – shall use speech WALK message rather than audible tone
  - “(Street Name). Walk sign is on to cross (Street Name).”
- Vibrotactile – vibrating tactile arrow
Tactile arrows and locator tones

• Tactile arrow shall be located on each pushbutton and shall be aligned parallel to the direction of travel on the associated crosswalk

• Locator tone shall be incorporated into each APS pushbutton and shall operate during intervals other than the WALK interval
APS features via extended pushbutton press

- Special features may be actuated by button press of 1 second or more:
  - Longer crossing time
  - Speech information message
  - Audible beaconing
Speech information messages

- Actuated only during intervals other than WALK
- Required if two APS pushbuttons on same corner < 10 ft apart or on same pole (optional otherwise)
- Message format:
  "Wait. Wait to cross (Street Name 1) at (Street Name 2)"

Unusual geometry, phasing may also be described
Questions?
Two new devices in 2009 Federal MUTCD that may not be included in the next Texas MUTCD
Chapter 4F – new pedestrian hybrid beacon: may not be included in Texas MUTCD

Figure 4F-3. Sequence for a Pedestrian Hybrid Beacon

1. Dark Until Activated
2. Flashing Yellow Upon Activation
3. Steady Yellow
4. Steady Red During Pedestrian Walk Interval
5. Alternating Flashing Red During Pedestrian Clearance Interval
6. Dark Again Until Activated

Legend:
- SY: Steady yellow
- FY: Flashing yellow
- SR: Steady red
- FR: Flashing red

Should not be installed at or within 100 feet of an intersection

2009 MUTCD (Final Rule)
Section 4G.04 – new emergency-vehicle hybrid beacon: may not be included in Texas MUTCD

Figure 4G-1. Sequence for an Emergency-Vehicle Hybrid Beacon

1. Dark Until Activated
2. Flashing Yellow Upon Activation
3. Steady Yellow
4. Alternating Flashing Red During Egress of the Emergency Vehicle(s)
5. Dark Again Until Activated

Legend:
- SY = Steady yellow
- FY = Flashing yellow
- FR = Flashing red

Note: An optional steady red clearance interval may be used after Interval 3 and before Interval 1.
Sec. 544.007. TRAFFIC-CONTROL SIGNALS IN GENERAL

(i) An operator of a vehicle facing a traffic-control signal that does not display an indication in any of the signal heads shall stop as provided by Section 544.010 as if the intersection had a stop sign.
Questions?
Sec. 541.304. TRAFFIC CONTROL

(3) "Traffic-control signal" means a manual, electric, or mechanical device that alternately directs traffic to stop and to proceed.