



Oregon Department of Transportation

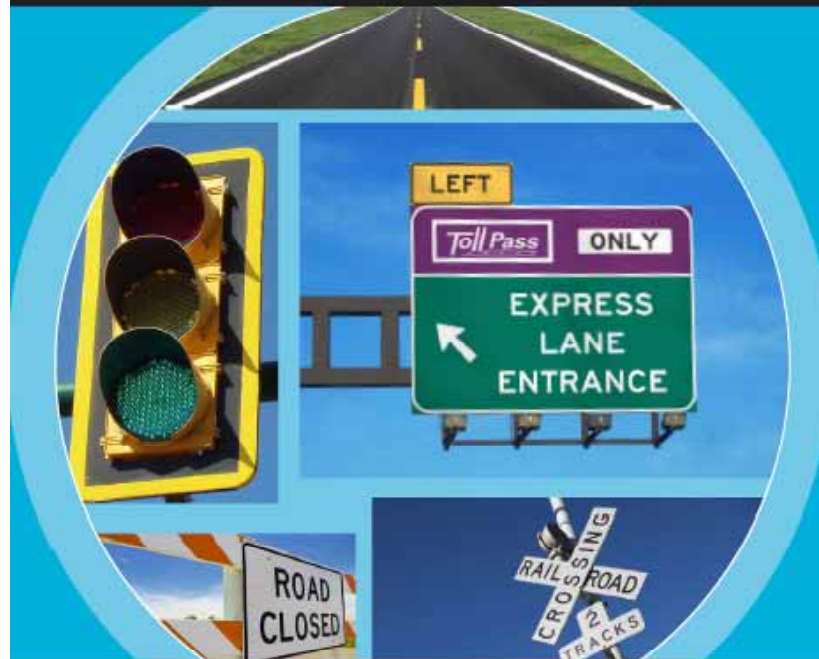


# ***Compliance Issues Associated with 2009 MUTCD***

**Manual on Uniform  
Traffic Control Devices**

for Streets and Highways

2009 Edition



U.S. Department of Transportation  
Federal Highway Administration



## ***Adoption Schedule***

- Issued by FHWA in December 2009
- States have two years to adopt it (or their own version) and be in substantial conformance.
- Oregon is finalizing its supplements.
- Rulemaking will begin in February.



## ***How are changes in MUTCD implemented***

- Some things are required to be changed at the end of their service life.
- Other items have specific dates associated with them.
- In the 2000 and 2003 versions of the MUTCD, several compliance periods were defined by the date of adoption of the Manual. Now they have a specific date associated with them.



## ***Minimum Retroreflectivity Levels for Signs***

- Implementation and continued of an assessment or management method that is designed to maintain traffic signs at or above minimum levels – January 22, 2012
- Replacement of regulatory, warning and post-mounted guide signs (except street name signs) that don't meet minimum levels – January 22, 2015
- Replacement of street name signs and overhead guide signs that don't meet minimum levels – January 22, 2018



## ***Assessment or Management Methods***

- Visual Nighttime Inspection
- Measured Sign Retroreflectivity
- Expected Sign Life
- Blanket Replacement
- Control Signs
- Other Methods – Based on Engineering Studies
- ODOT is using Visual Nighttime Inspection



**Table 2A-3. Minimum Maintained Retroreflectivity Levels<sup>1</sup>**

Sign Color	Sheeting Type (ASTM D4956-04)				Additional Criteria
	Beaded Sheeting		Prismatic Sheeting		
	I	II	III	III, IV, VI, VII, VIII, IX, X	
White on Green	W <sup>*</sup> ; G ≥ 7	W <sup>*</sup> ; G ≥ 15	W <sup>*</sup> ; G ≥ 25	W ≥ 250; G ≥ 25	Overhead
	W <sup>*</sup> ; G ≥ 7	W ≥ 120; G ≥ 15			Post-mounted
Black on Yellow or Black on Orange	Y <sup>*</sup> ; O <sup>*</sup>	Y ≥ 50; O ≥ 50			2
	Y <sup>*</sup> ; O <sup>*</sup>	Y ≥ 75; O ≥ 75			3
White on Red	W ≥ 35; R ≥ 7				4
Black on White	W ≥ 50				—
<sup>1</sup> The minimum maintained retroreflectivity levels shown in this table are in units of cd/m <sup>2</sup> measured at an observation angle of 0.2° and an entrance angle of -4.0°.					
<sup>2</sup> For text and fine symbol signs measuring at least 48 inches and for all sizes of bold symbol signs					
<sup>3</sup> For text and fine symbol signs measuring less than 48 inches					
<sup>4</sup> Minimum sign contrast ratio > 2:1 (white retroreflectivity ÷ red retroreflectivity)					
<sup>*</sup> This sheeting type shall not be used for this color for this application.					
Bold Symbol Signs					
<ul style="list-style-type: none"> <li>• W1-1,2 – Turn and Curve</li> <li>• W1-3,4 – Reverse Turn and Curve</li> <li>• W1-5 – Winding Road</li> <li>• W1-6,7 – Large Arrow</li> <li>• W1-8 – Chevron</li> <li>• W1-10 – Intersection In Curve</li> <li>• W1-11 – Hairpin Curve</li> <li>• W1-15 – 270 Degree Loop</li> <li>• W2-1 – Cross Road</li> <li>• W2-2,3 – Side Road</li> <li>• W2-4,5 – T and Y Intersection</li> <li>• W2-6 – Circular Intersection</li> <li>• W2-7,8 – Double Side Roads</li> </ul>	<ul style="list-style-type: none"> <li>• W3-1 – Stop Ahead</li> <li>• W3-2 – Yield Ahead</li> <li>• W3-3 – Signal Ahead</li> <li>• W4-1 – Merge</li> <li>• W4-2 – Lane Ends</li> <li>• W4-3 – Added Lane</li> <li>• W4-5 – Entering Roadway Merge</li> <li>• W4-6 – Entering Roadway Added Lane</li> <li>• W6-1,2 – Divided Highway begins and ends</li> <li>• W6-3 – Two-Way Traffic</li> <li>• W10-1,2,3,4,11,12 – Grade Crossing Advance Warning</li> </ul>	<ul style="list-style-type: none"> <li>• W11-2 – Pedestrian Crossing</li> <li>• W11-3,4,16-22 – Large Animals</li> <li>• W11-5 – Farm Equipment</li> <li>• W11-6 – Snowmobile Crossing</li> <li>• W11-7 – Equestrian Crossing</li> <li>• W11-8 – Fire Station</li> <li>• W11-10 – Truck Crossing</li> <li>• W12-1 – Double Arrow</li> <li>• W16-5P,6P,7P – Pointing Arrow Plaques</li> <li>• W20-7 – Hagger</li> <li>• W21-1 – Worker</li> </ul>			
Fine Symbol Signs (symbol signs not listed as bold symbol signs)					
Special Cases					
<ul style="list-style-type: none"> <li>• W3-1 – Stop Ahead: Red retroreflectivity ≥ 7</li> <li>• W3-2 – Yield Ahead: Red retroreflectivity ≥ 7; White retroreflectivity ≥ 35</li> <li>• W3-3 – Signal Ahead: Red retroreflectivity ≥ 7; Green retroreflectivity ≥ 7</li> <li>• W3-5 – Speed Reduction: White retroreflectivity ≥ 50</li> <li>• For non-diamond shaped signs, such as W14-3 (No Passing Zone), W4-4P (Cross Traffic Does Not Stop), or W13 (P,2,3,6,7 (Speed Advisory Plaques), use the largest sign dimension to determine the proper minimum retroreflectivity level.</li> </ul>					



## ***Lateral Offset of Signs***

- Crashworthiness of sign supports on roads with posted speed of 50 mph or higher – January 17, 2012 (2000 edition)
- ODOT has standard drawings for application.



## ***Size of Regulatory Signs***

- Increased sign sizes and other 2003 MUTCD revisions to Table 2B-1 – December 22, 2013
- Minimum size for STOP signs is 30" x 30".



## ***Yield Sign Applications***

- Changes in YIELD sign application criteria from the 1988 MUTCD to the 2003 MUTCD – January 17, 2011
- This is the criteria for installing YIELD signs.



## ***STOP or YIELD Sign Placement***

- Signs mounted on the back of STOP or YIELD signs shall not obscure the shape of the STOP or YIELD sign except for DO NOT ENTER signs – December 22, 2013







## ***Size of Warning Signs***

New sizes for

- W1 Series - arrow signs
- W12-2a – low clearance signs
- W7 – runaway truck
- W10-1 – advance grade crossing
- All changed in the 2003 MUTCD – December 22, 2013
- Minimum size for curve signs is now 30" x 30"



# *Horizontal Alignment Warning Signs*

- Revised requirements regarding the use of horizontal alignment signs – December 31, 2019

Table 2C-5. Horizontal Alignment Sign Selection

Type of Horizontal Alignment Sign	Difference Between Speed Limit and Advisory Speed				
	5 mph	10 mph	15 mph	20 mph	25 mph or more
Turn (W1-1), Curve (W1-2), Reverse Turn (W1-3), Reverse Curve (W1-4), Winding Road (W1-5), and Combination Horizontal Alignment/Intersection (W10-1) (see Section 2C.07 to determine which sign to use)	Recommended	Required	Required	Required	Required
Advisory Speed Plaque (W13-1P)	Recommended	Required	Required	Required	Required
Chevrons (W1-8) and/or One Direction Large Arrow (W1-6)	Optional	Recommended	Required	Required	Required
Exit Speed (W13-2) and Ramp Speed (W13-3) on exit ramp	Optional	Optional	Recommended	Required	Required

Note: Required means that the sign and/or plaque shall be used, recommended means that the sign and/or plaque should be used, and optional means that the sign and/or plaque may be used.

See Section 2C.06 for roadways with less than 1,000 ADT.



## ***New criteria for the determination of advisory speeds***

### **Engineering Practices to Determine Advisory Speeds**

- A. An accelerometer that provides a direct determination of side friction factors**
- B. A design speed equation**
- C. A traditional ball-bank indicator using the following criteria:**
  - 16 degrees of ball-bank for speeds of 20 mph or less**
  - 14 degrees of ball-bank for speeds of 25 to 30 mph**
  - 12 degrees of ball-bank for speeds of 35 mph and higher**



## ***Changed or Eliminated Symbols***

- Truck Rollover
- NARROW BRIDGE
- PAVEMENT ENDS
- December 22, 2013










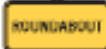

## ***Reduced Speed Limit Ahead Signs***

- Removal of R2-5 Series, Reduced Speed Limit Ahead
- Use W3-5 or W3-5A signs instead, December 22, 2018





## *New Design for Warning Signs*

- Lane Ends
  - 2000 MUTCD  
  - Current 
- Circular Intersection
  - 2000 MUTCD 
  - Current  W2-6
    -  W16-17P (optional) OR  W16-12P (optional)
- December 22, 2013



## ***Non-Vehicular Warning Signs***

- Elimination of crosswalk lines from crossing signs and use of diagonal pointing arrow supplemental plaque if at crossing – January 17, 2011





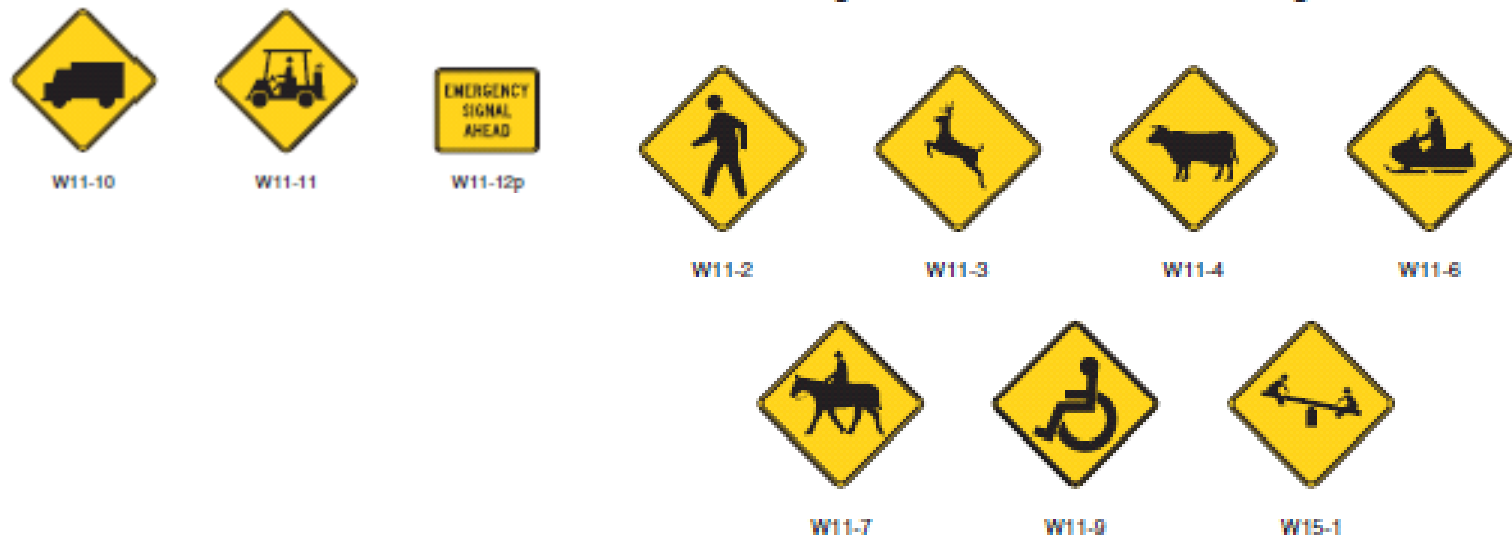
# ***Vehicular Traffic Warning Signs***

- New Symbol Signs – December 22, 2013

*Figure 2C-9. Vehicular Traffic Signs*



*Figure 2C-10. Nonvehicular Traffic Signs*





## ***Street Name Signs***

- 6" letter height for lettering on post-mounted Street Names signs (except on multi-lane streets with speed limits over 40 mph) - January 9, 2012
- 8" letter height on post mounted Street Name signs greater than 40 mph and 12" letter height on overhead signs – December 12, 2018



# Street Name Signs

*Guidance:*

- 04 *Lettering on post-mounted Street Name signs should be composed of initial upper-case letters at least 6 inches in height and lower-case letters at least 4.5 inches in height.*
- 05 *On multi-lane streets with speed limits greater than 40 mph, the lettering on post-mounted Street Name signs should be composed of initial upper-case letters at least 8 inches in height and lower-case letters at least 6 inches in height.*

**Table 2D-2. Recommended Minimum Letter Heights on Street Name Signs**

Type of Mounting	Type of Street or Highway	Speed Limit	Recommended Minimum Letter Height	
			Initial Upper-Case	Lower-Case
Overhead	All types	All speed limits	12 inches	9 inches
Post-mounted	Multi-lane	More than 40 mph	8 inches	6 inches
Post-mounted	Multi-lane	40 mph or less	6 inches	4.5 inches
Post-mounted	2-lane	All speed limits	6 inches*	4.5 inches*

\* On local two-lane streets with speed limits of 25 mph or less, 4-inch initial upper-case letters with 3-inch lower-case letters may be used.



## ***Advance Street Name Signs***

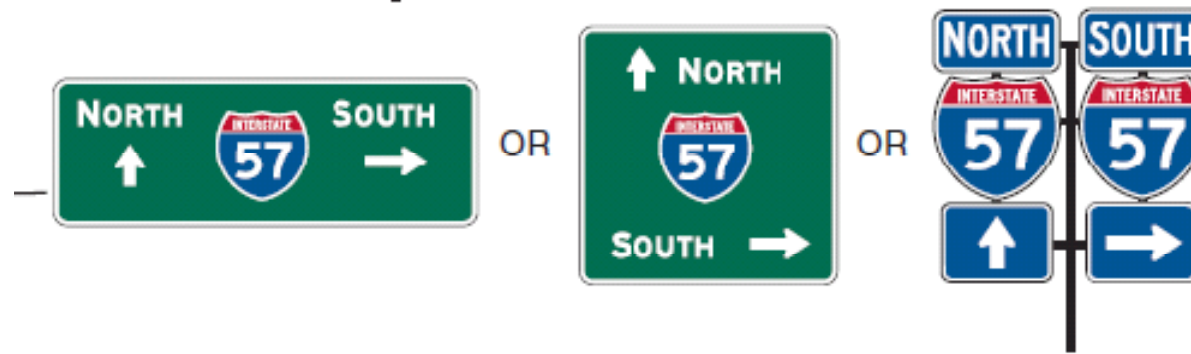
Meet the requirements of 2D.44 -  
December 22, 2018

- Can't be used instead of Street Name signs
- White legend on a green background
- The name of the intersecting street goes on the top other messages (1/4 MILE, NEXT SIGNAL) go on the bottom
- No pictographs



## ***Signing on Conventional Roads on Approaches to Interchanges***

- Multi-Lane approaches to interchanges to have guide signs to identify which direction of turn is to be made for access to each direction of the freeway or expressway – December 31, 2019





## ***Evacuation Route Signs***

- New design and size of EM-1 sign – December 22, 2018



EM-1



EM-1a

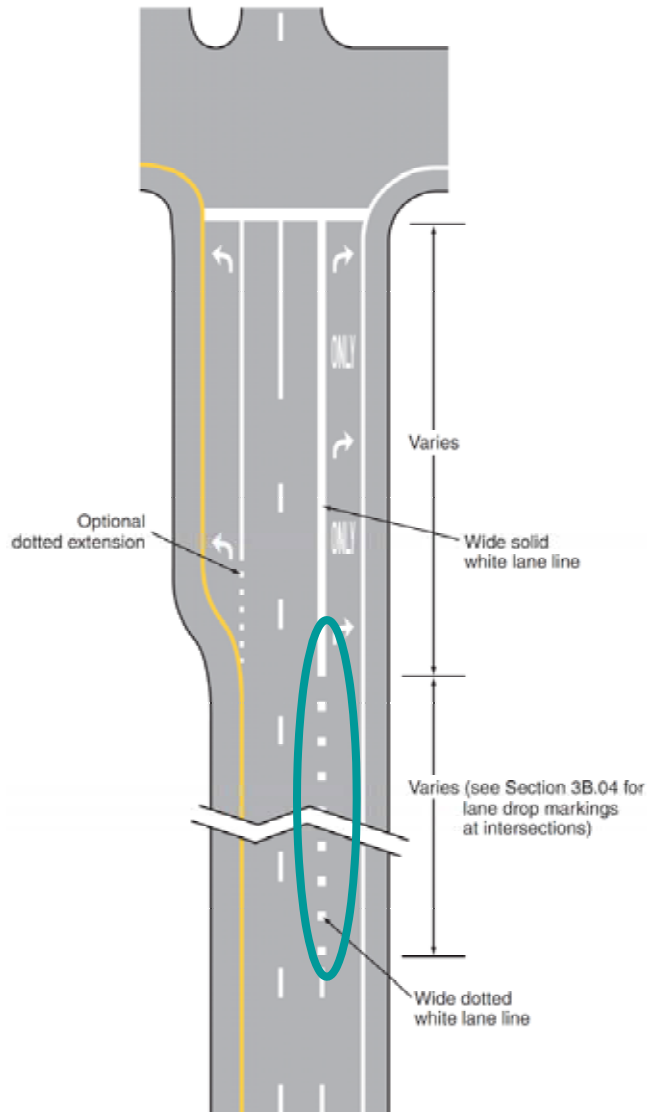


## ***White Longitudinal Pavement Markings***

- New requirement for dotted lane lines for dropped lanes and for acceleration, deceleration, and auxiliary lanes – December 16, 2016 or resurfacing whichever is first

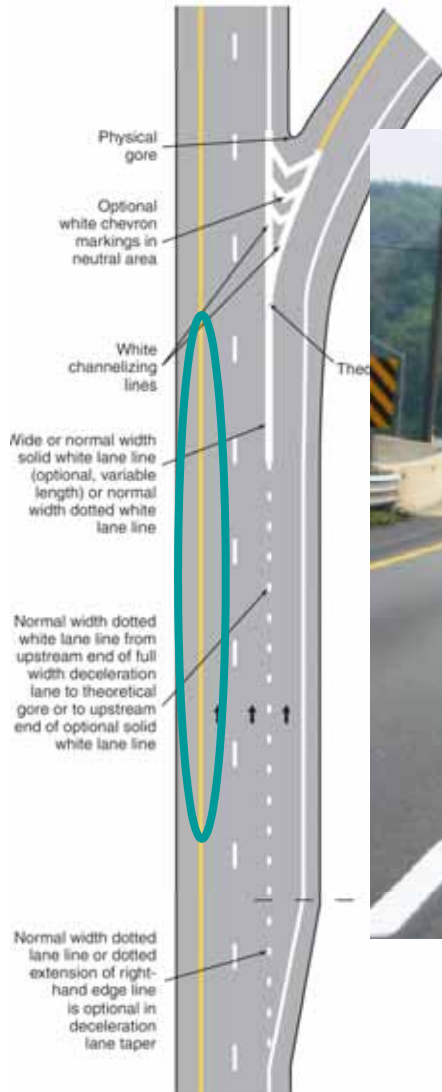


# *Lane drops on conventional roads*





# Deceleration Lanes





## ***Yellow Change and Red Clearance Intervals***

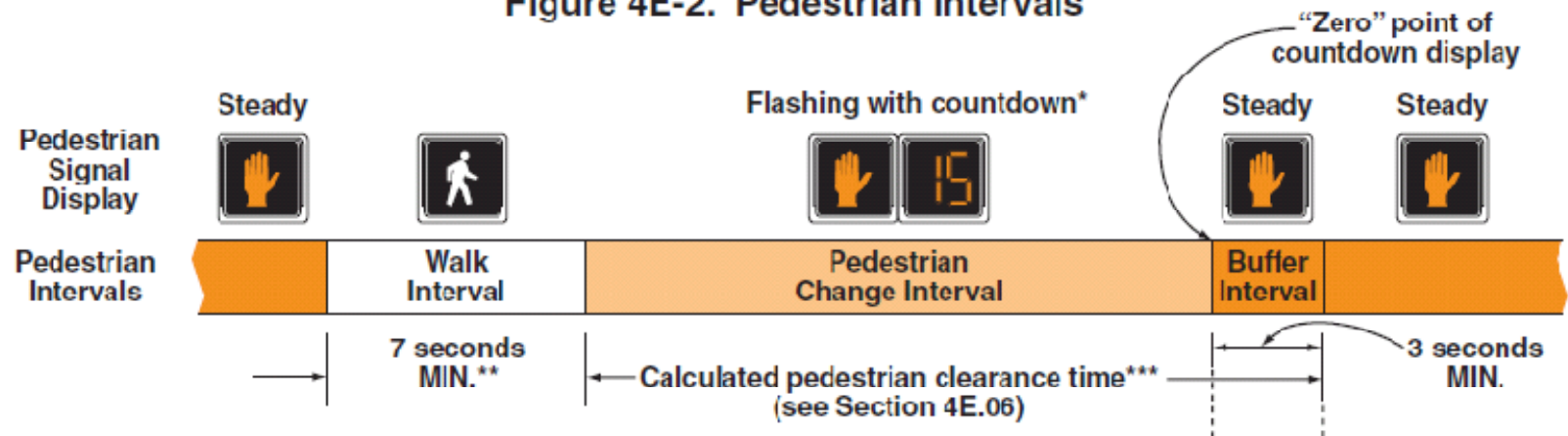
- Durations of yellow change intervals and red clearance intervals shall be determined using engineering practices – December 31, 2014 or when timing adjustments are made
- ITE and NCHRP are currently doing research to update timing practices



## *Countdown Pedestrian Heads*

- Pedestrian countdown hardware requirements – December 22, 2013

Figure 4E-2. Pedestrian Intervals





## ***Countdown pedestrian displays***

- **Required** for all ped signals **except** where ped change interval is  $\leq 7$  sec.
- 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





## ***Worker Safety Considerations***

- All workers within the right-of-way shall wear high visibility apparel – December 31, 2011
  - Applies to all roads, not just those on the Federal-aid system
  - Option for law enforcement and first responders to use new ANSI “public safety vests”
  - Firefighters and law enforcement are exempted from the requirement under certain conditions, but not when directing traffic



Oregon Department of Transportation



## *High-visibility safety apparel*





## ***School Advance Crossing Assembly***

- Use of AHEAD (W16-9) plaque or distance plaque (W16-2P or W16-2aP) – January 17, 2011

School Advance  
Crossing Assembly



S1-1



W16-9P

OR



W16-2aP

OR



W16-2P



## *Grade Crossing Signs*

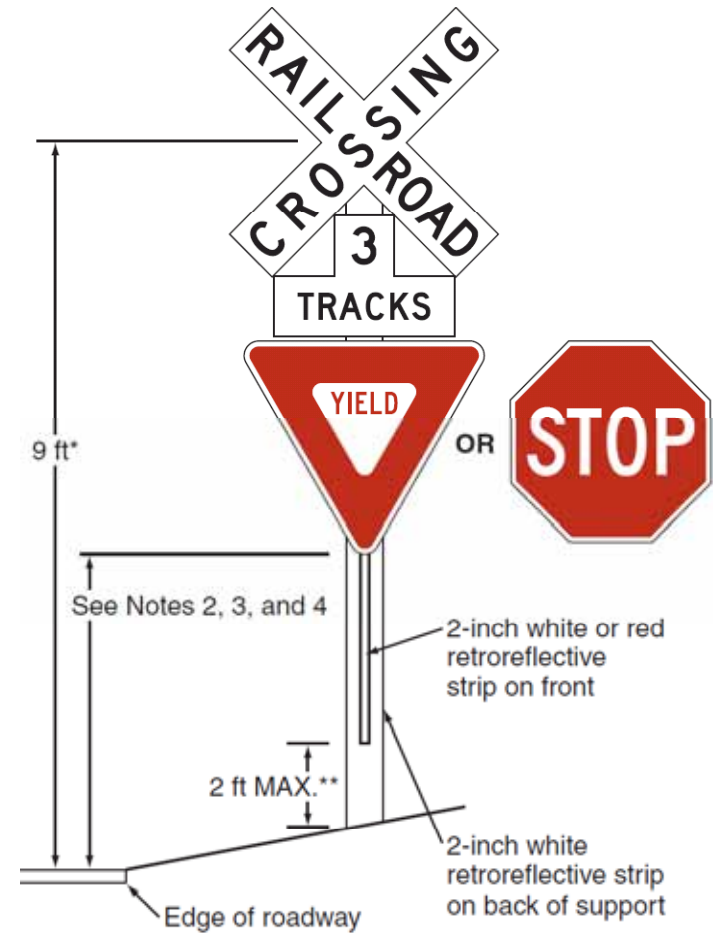
- Retroreflective strip on crossbuck support – January 17, 2011



Retroreflective  
Strip



***YIELD or STOP signs required at passive highway-rail grade crossings (Dec. 31, 2019 compliance date)***





## ***Grade Crossings Within or In Close Proximity to Circular Intersections***

- Requirement in the 2009 MUTCD for study of grade crossings near roundabouts – December 31, 2014
- If queues impact crossing, provisions shall be made to clear highway traffic from the crossing before train arrivals



## ***Other Issues***



## ***Some Changes w/out Compliance Date***

- Size of sign lettering should be based on 1 inch of letter height per 30 feet of legibility – changed from 40 feet
- Mixed case letters required for names of places, streets and guide signs





***New plaque that may be used with  
STOP sign in special conditions***



**EXCEPT  
RIGHT  
TURN**



## ***Pavement Marking Retroreflectivity***

- FHWA has proposed rules on pavement marking retroreflectivity



**Table 3A-1. Minimum Maintained Retroreflectivity Levels<sup>1</sup> for Longitudinal Pavement Markings**

	Posted Speed (mph)		
	≤30	35-50	≥55
<u>Two-lane roads with center line markings only<sup>2</sup></u>	<u>n/a</u>	<u>100</u>	<u>250</u>
<u>All other roads<sup>2</sup></u>	<u>n/a</u>	<u>50</u>	<u>100</u>

1. Measured at standard 30-m geometry in units of mcd/m<sup>2</sup>/lux

2. Exceptions:

A. When RRPMs supplement or substitute for a longitudinal line (see Section 3B.13 and 3B.14), minimum pavement marking retroreflectivity levels are not applicable as long as the RRPMs are maintained so that at least 3 are visible from any position along that line during nighttime conditions.

B. When continuous roadway lighting assures that the markings are visible, minimum pavement marking retroreflectivity levels are not applicable.



## ***Implementation Time Lines***

- 4 years from date of Final Rule for implementation and continued use of a maintenance method that is designed to maintain pavement marking retroreflectivity at or above the established minimum levels; and
- 6 years from date of Final Rule for replacement of pavement markings that are identified using the maintenance method as failing to meet the established minimum levels.



## ***FHWA Request for Comments***

FHWA is seeking comments of the compliance dates for:

- Maintaining Minimum Sign Retroreflectivity
- Horizontal Alignment Warning Signs (Curve, Chevrons and Arrows)
- One-Way Signs
- Yellow Change and Red Clearance Intervals
- Pedestrian Intervals



## ***Questions FHWA is asking***

1. What, if any, difficulties does your organization anticipate in meeting the seven MUTCD compliance dates discussed above for upgrading existing non-compliant devices in the field?
2. Are there one or more of these seven compliance dates that are more problematic than the others for your organization? If so, which ones, and why?
3. If some or all of these seven compliance dates were extended, how long do you estimate it would take to complete the necessary traffic control device upgrades?
4. What safety or other impacts would result from extending some or all of these seven compliance dates?



## ***Questions (Cont.)***

5. Are there other MUTCD compliance dates not described in this notice that are problematic for your organization? If yes, which ones, and why?
6. What considerations should be applied to establish new compliance dates in the MUTCD?
7. What other comments or input do you wish to provide to FHWA regarding MUTCD compliance dates for upgrading existing traffic control devices?

Comments are due January 14, 2011. Go to [regulations.gov](http://regulations.gov).



***Questions?***