Traffic Signs and Pavement Markings

Traffic Engineering Workshop

Receptions Conference Center
Fairfield, Ohio

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Presented by:

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- ODOT is required to adopt a manual and specifications for a uniform system of traffic control devices (Ohio Revised Code Section 4511.09)

- ODOT is required to follow the OMUTCD (ORC Section 4511.10)

- Local jurisdictions are required to follow the OMUTCD (ORC Section 4511.11)
The 2012 Edition of the OMUTCD was published on January 13, 2012 and became effective on April 12, 2012.

Most of the text in the OMUTCD is identical to the Federal MUTCD.

Some text has been modified to meet State laws or to more closely reflect conditions and policies in Ohio.
SDMM

Sign Designs and Markings Manual

Published by Ohio Department of Transportation

- Referenced in the OMUTCD (Page iii)
- Contains detailed drawings for traffic control signs
- Provides information regarding designable guide signs
- Provides information pertaining to the pavement marking alphabet and symbols
OMUTCD and SDMM

These are the principal sources for signing and marking information for all jurisdictions in Ohio
Other ODOT Manuals and Specifications

- Traffic Engineering Manual (TEM)
- Construction & Material Specifications (C&MS)
- Standard Construction Drawings (SCDs)
This manual contains standards and policies regarding the use of traffic control devices for use in ODOT work (TEM Page iii).

- Expands and builds upon information contained in theOMUTCD

- Local jurisdictions are not required to follow the TEM, but can use it as a reference
C&MS

Construction and Material Specifications

Published by Ohio Department of Transportation

- Provides instructions to contractors working on ODOT projects
- Provides specifications for materials used on ODOT projects
- Local jurisdictions are not required to follow the C&MS, but can use it as a reference
Standard Construction Drawings

Published by Ohio Department of Transportation

- Detailed construction drawings for traffic control devices
- Provides instructions to contractors working on ODOT projects
- Local jurisdictions are not required to follow the Standard Construction Drawings, but can use them as a reference
On-Line Manuals and Specifications

ODOT Manuals and Specifications are available on-line by going to the Ohio Department of Transportation web page, at:

www.dot.state.oh.us

and clicking on:

Design Reference Resource Center (blue box)
Local authorities in their respective jurisdictions are required to place and maintain traffic control devices in accordance with the OMUTCD.

Traffic control devices include highway signs, signals and pavement markings, which are intended to regulate, warn and guide traffic.

All traffic control devices erected on any street, highway, alley, bikeway, or private road open to public travel shall conform to the OMUTCD.
Private Roads

Private roads open to public travel includes roads within shopping centers, airports, sports arenas, theme parks, and similar business or recreation facilities that are privately owned, but the public is allowed to travel without access restrictions. However, parking lots and their driving aisles are not included.
Purpose of Traffic Control Devices

The purpose of traffic control devices is to promote highway safety and efficiency by providing for the orderly movement of all road users on streets, highways, bikeways, and private roads open to public travel throughout the Nation. Nationwide uniformity is the objective.
Principles of Traffic Control Devices

To be effective, a traffic control device should meet five basic requirements:
A. Fulfill a need;
B. Convey a clear, simple meaning;
C. Give adequate time for proper response;
D. Command attention; and
E. Command respect from the road users.

Some of the ways signs command attention and respect from the road users:
1. The proper sign is used for the application
2. The sign is of the appropriate size for the application
3. The sign is properly placed
   a. mounting height
   b. lateral offset
   c. longitudinal placement
4. The sign is properly maintained
5. The sign has adequate levels of retroreflectivity
As per Section 202-2 of the TEM, Children at Play and signs with similar messages are not used by ODOT. These signs have not been shown to have a discernable benefit to traffic safety. No factual evidence has been presented to document the success of this type of signing. This type of signing is not recommended for use on any roadway at any time.
Hidden Drive Sign

As per Section 202-3 of the TEM, ODOT discontinued the use of this type of sign in 1970 when traffic observations and experience disclosed that drivers on the through roadway were ignoring the message. The signs had little or no effect in alerting drivers or in reducing speed. These signs can create a false sense of security for the driveway user, and are not recommended for use.
Uniformity of Traffic Control Devices

The use of uniform traffic control devices does not, in itself, constitute uniformity. A standard device used where it is not appropriate is as objectionable as a nonstandard device; in fact, this might be worse, because such misuse might result in disrespect at those locations where the device is needed and appropriate.
OMUTCD Terminology

Standard – “shall” – required or prohibited

Guidance – “should” – recommended

Option – “may” – optional, permissive

Support – information
The OMUTCD contains numerous figures intended to illustrate items described in the text. It should be recognized that the importance of the values shown will vary, depending upon whether they are based on a standard, guidance, or option in the text. Refer to the text for an explanation of the values shown in the figures.

For example, a portion of Figure 2A-2 is shown below:

- **A - Roadside Sign in Rural Area**
  - "Should" Section 2A.19 Paragraph 03
  - "Shall" Section 2A.18 Paragraph 04

- **C - Roadside Sign in Business, Commercial, or Residential Area**
  - "May" Section 2A.19 Paragraph 10

*Where parking or pedestrian movements are likely to occur*
The sign lettering for names of places, streets, and highways shall be composed of a combination of lower-case letters with initial upper-case letters. There is no longer an option to use all upper-case letters for these signs.

For other signs, the sign lettering shall be in upper-case (capital) letters.
Larger size signs are used for higher classes of roads. A comparison of speed limit sign sizes as specified in OMUTCD Table 2B-1, are shown below. Note that some sign sizes have increased with the 2012 OMUTCD.

**Sign Sizes**

1. **SPEED LIMIT 50**
   - 18 x 24 MINIMUM
   - 24 x 30 SINGLE LANE CONVENTIONAL ROAD

2. **SPEED LIMIT 50**
   - 30 x 36 MULTI-LANE CONVENTIONAL ROAD

3. **SPEED LIMIT 50**
   - 36 x 48 EXPRESSWAY

4. **SPEED LIMIT 50**
   - 48 x 60 FREeway
Special Signs

Special word message signs can be developed for special situations. Special symbols are not allowed.
Standardization of Location

Locate signs where they are clearly visible, not blocked by obstructions or other signs. Signs need to be properly maintained.
Standardization of Location

Street name signs may be mounted with STOP signs.
Standardization of Location

STOP or YIELD signs should not be placed farther than 50 feet from the edge of the pavement of the intersected roadway.

F - WIDE THROAT INTERSECTION
In urban areas where crosswalks exist, signs should not be placed within 4 feet in advance of the crosswalk.
Mounting Heights

Minimum mounting height is 5 foot in rural areas, and 7 foot in urban areas. A secondary sign mounted below another sign may be 1 foot less than the 5 and 7 foot mounting heights, except when mounted above a sidewalk.
The mounting height of chevron alignment signs and object markers is 4 feet.
Mounting Heights

There is no specified maximum mounting height.

The large arrow sign shown here is mounted at a height of over fifteen feet . . .
Mounting Heights

... to be visible above the hill prior to the sudden right turn.
Lateral Offset

The minimum lateral offset should be 12 feet from the edge of the traveled way, or 6 feet from the edge of a paved shoulder wider than 6 feet.
Lateral Offset

Where space is limited, a lateral offset of 2 feet may be used. A lateral offset of 1 foot from the face of the curb may be used in business, commercial or residential areas where sidewalk width is limited or where existing poles are close to the curb.
The OMUTCD describes the application of traffic control devices, but is not a legal requirement for their installation. The OMUTCD provides the following support:

Standardization of position cannot always be attained in practice.

This statement recognizes the fact that extenuating circumstances may exist in some cases that would prevent the placement of signs in the preferred locations. The decision to use a particular device at a particular location should be made on the basis of either an engineering study or the application of engineering judgment. Thus, while the OMUTCD provides Standards, Guidance, and Options for design and application of traffic control devices, the OMUTCD should not be considered a substitute for engineering judgment.
Regulatory Sign Sizes

A portion of OMUTCD Table 2B-1 is shown below. See footnote 5 regarding the use of Stop signs.

<table>
<thead>
<tr>
<th>Sign or Plaque</th>
<th>Sign Designation</th>
<th>Section</th>
<th>Conventional Road</th>
<th>Expressway</th>
<th>Freeway</th>
<th>Minimum³</th>
<th>Oversized⁴</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Single Lane</td>
<td>Multi-Lane²</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STOP</td>
<td>R1-1</td>
<td>2B.05</td>
<td>30 x 30</td>
<td>36 x 36</td>
<td>36 x 36</td>
<td>30 x 30</td>
<td>48 x 48</td>
</tr>
<tr>
<td>YIELD</td>
<td>R1-2</td>
<td>2B.08</td>
<td>36 x 36 x 36</td>
<td>48 x 48 x 48</td>
<td>48 x 48</td>
<td>30 x 60</td>
<td>30 x 30</td>
</tr>
<tr>
<td>TO ONCOMING TRAFFIC</td>
<td>R1-2aP</td>
<td>2B.10</td>
<td>24 x 18</td>
<td>36 x 36</td>
<td>48 x 36</td>
<td>24 x 18</td>
<td>—</td>
</tr>
<tr>
<td>(plaque)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALL WAY (plaque)</td>
<td>R1-3P</td>
<td>2B.05</td>
<td>18 x 6</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>30 x 12</td>
</tr>
<tr>
<td>Yield Here to Peds</td>
<td>R1-5</td>
<td>2B.11</td>
<td>—</td>
<td>36 x 36</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Yield Here to Pedestrians</td>
<td>R1-5a</td>
<td>2B.11</td>
<td>—</td>
<td>36 x 36</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>In-Street Ped Crossing</td>
<td>R1-6</td>
<td>2B.12</td>
<td>12 x 36</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Overhead Ped Crossing</td>
<td>R1-9</td>
<td>2B.12</td>
<td>90 x 24</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>SPEED LIMIT</td>
<td>R2-1</td>
<td>2B.13</td>
<td>24 x 30</td>
<td>30 x 36</td>
<td>36 x 48</td>
<td>48 x 60</td>
<td>18 x 24</td>
</tr>
</tbody>
</table>
Regulatory Sign Sizes

Special provision for sizes of STOP signs (OMUTCD Table 2B-1, footnote 5 and Section 2B.03, paragraph 07):

Where a single lane side road intersects a multi-lane street or highway that has a speed limit of 40 mph or lower, the minimum size of the STOP sign facing the side road approach shall be 30 x 30 inches (as shown in Table 2B-1).

Where a single lane side road intersects a multi-lane street or highway that has a speed limit of 45 mph or higher, the minimum size of the STOP sign facing the side road approach shall be 36 x 36 inches.

This is the only place in the OMUTCD where a sign size is dependent not just upon the route type it will be viewed from, but also the intersecting route type.
Regulatory Sign Sizes

Where a single lane side road intersects a multi-lane street or highway that has a speed limit of 40 mph or lower, the minimum size of the STOP sign facing the side road approach shall be 30 x 30 inches (as shown in Table 2B-1).

(OMUTCD Section 2B.03)
Regulatory Sign Sizes

Where a single lane side road intersects a multi-lane street or highway that has a speed limit of 45 mph or higher, the minimum size of the STOP sign facing the side road approach shall be 36 x 36 inches.

A failure to comply with footnote 5 in Table 2B-1 could result in the installation of a substandard sized STOP sign in some situations.
Target Compliance Dates

The MUTCD published by FHWA states that, unless a particular device is no longer serviceable, non-compliant devices on existing highways and bikeways shall be brought into compliance as part of the systematic upgrading of substandard traffic control devices.

The Federal Highway Administration has the authority to establish other target compliance dates for implementation of particular changes. These compliance dates are shown in OMUTCD Table I-3.

As of the printing of the 2012 edition of the OMUTCD, the FHWA compliance dates were under review. FHWA issued a Final Rule on this subject on May 14, 2012. The final rule eliminated the compliance dates for 46 of the 58 items, extended and/or revised the compliance dates for four items, and retained the compliance dates for eight items. Of these twelve, seven are signing related.
Number 1

OMUTCD Section 2A.19

Title: Lateral Offset

Specific Provision: Crashworthiness of sign supports on roads with posted speed limit of 50 mph or higher

Compliance Date: January 17, 2013
Target Compliance Dates

Number 2

OMUTCD Section 2B.40

Title: ONE WAY Signs (R6-1, R6-2)

Specific Provision: New requirements in the 2009 MUTCD for the number and locations of ONE WAY signs

Compliance Date: December 31, 2019
Number 3

OMUTCD Sections 2E.31, 2E.33, and 2E.36

Title: Plaques for Left-Hand Exits

Specific Provision: Use of E1-5aP and E1-5bP plaques for left-hand exits

Compliance Date: December 31, 2014
Target Compliance Dates

Numbers 4 & 5

OMUTCD Sections 8B.03, 8B.04

Title: Grade Crossing (Crossbuck) Signs and Supports & Crossbuck Assemblies with YIELD or STOP Signs at Passive Grade Crossings

Specific Provision: Retroreflective strip on Crossbuck sign and support & use of STOP or YIELD signs with Crossbuck signs at passive grade crossings

Compliance Date: December 31, 2019
Target Compliance Dates

Number 6

OMUTCD Section 2A.08

Title: Maintaining Minimum Retroreflectivity

Specific Provision: Implementation and continued use of an assessment or management method that is designed to maintain regulatory and warning sign retroreflectivity at or above the established minimum levels

Compliance Date: June 13, 2014
Target Compliance Dates

Number 7

OMUTCD Sections 2C.06 through 2C.14

Title: Horizontal Alignment Warning Signs

Specific Provision: Revised requirements in the 2009 MUTCD regarding the use of various horizontal alignment signs

Compliance Date: December 31, 2019
Maintaining Minimum Retroreflectivity

Regulatory, warning, and guide signs and object markers shall be retroreflective to show the same shape and similar color by both day and night (unless illumination is provided).
Maintaining Minimum Retroreflectivity

The minimum required sign retroreflectivity levels were added to the OMUTCD with an effective date of January 15, 2010. These provisions are contained in Section 2A.08 of the 2012 OMUTCD.

Public agencies or officials having jurisdiction shall use an assessment or management method that is designed to maintain sign retroreflectivity at or above the minimum levels in OMUTCD Table 2A-3.

Compliance with this requirement is achieved by having a method in place and using the method to maintain the minimum levels established in OMUTCD Table 2A-3.
# Maintaining Minimum Retroreflectivity

## Table 2A-3. Minimum Maintained Retroreflectivity Levels

<table>
<thead>
<tr>
<th>Sign Color</th>
<th>Sheet Type (ASTM D4956-04)</th>
<th>Additional Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Beaded Sheet</td>
<td>Prismatic Sheet</td>
</tr>
<tr>
<td></td>
<td>I</td>
<td>II</td>
</tr>
<tr>
<td>White on Green</td>
<td>W*; G ≥ 7</td>
<td>W*; G ≥ 15</td>
</tr>
<tr>
<td></td>
<td>W*; G ≥ 7</td>
<td></td>
</tr>
<tr>
<td>Black on Yellow or Black on Orange</td>
<td>Y*; O*</td>
<td>Y ≥ 50; O ≥ 50</td>
</tr>
<tr>
<td>White on Red</td>
<td>W ≥ 35; R ≥ 7</td>
<td></td>
</tr>
<tr>
<td>Black on White</td>
<td>W ≥ 50</td>
<td></td>
</tr>
</tbody>
</table>

1. The minimum maintained retroreflectivity levels shown in this table are in units of cd/lx/m² measured at an observation angle of 0.2° and an entrance angle of -4.0°.
2. For text and fine symbol signs measuring at least 48 inches and for all sizes of bold symbol signs.
3. For text and fine symbol signs measuring less than 48 inches.

* This sheering type shall not be used for this color for this application.
Maintaining Minimum Retroreflectivity

Original target compliance dates established in OMUTCD Table I-3:

January 22, 2012 – Implementation and continued use of an assessment or management method that is designed to maintain traffic sign retroreflectivity at or above the established minimum levels.

January 22, 2015 – Replacement of regulatory signs, warning signs, and ground-mounted guide signs (except street name signs) that are identified using the assessment or management method as failing to meet the established minimum levels.

January 22, 2018 – Replacement of street name signs and overhead guide signs that are identified using the assessment or management method as failing to meet the established minimum levels.

The first target compliance date above has been revised. The other two have been eliminated.
Maintaining Minimum Retroreflectivity

The target compliance date established in OMUTCD Table I-3 was revised by FHWA as recorded in the Federal Register, Vol. 77, No. 93, dated Monday, May 14, 2012. The January 22, 2012 compliance date has been changed to June 13, 2014, and the wording modified to read:

Implementation and continued use of an assessment or management method designed to maintain traffic regulatory and warning sign retroreflectivity at or above the established minimum levels.

The 2015 and 2018 compliance dates have been eliminated. However, from the FHWA Final Rule:

“Even without a specific date, agencies will still need to replace any sign they identify as not meeting the established minimum retroreflectivity levels. Their schedules replacing the signs, however, would be based on resources and relative priorities, rather than specific compliance dates . . .”
Maintaining Minimum Retroreflectivity

In a nutshell, each agency needs to:

- Select and implement an assessment or management method by the compliance date (June 13, 2014)

- Determine which sheeting type your agency will use

- Evaluate current signs
  - Upgrade to current standards
  - Eliminate unnecessary signs

- Achieve sign replacements in a reasonable time frame as funding permits.
Horizontal Alignment Warning Signs

A Curve sign is used in advance of curves that have an advisory speed of 35 mph or greater.

A Turn sign is used in advance of curves that have an advisory speed of 30 mph or less.
Horizontal Alignment Warning Signs

Where there are two changes in roadway alignment in opposite directions that are separated by a tangent distance of less than 600 feet, the Reverse Turn sign should be used instead of multiple Turn signs and the Reverse Curve sign should be used instead of multiple curve signs. The Reverse Curve sign is used when the advisory speed is 35 mph or greater. The Reverse Turn sign is used when the advisory speed is 30 mph or less.
Horizontal Alignment Warning Signs

A Winding Road sign may be used instead of multiple Turn or Curve signs where there are three or more changes in roadway alignment each separated by a tangent distance of less than 600 feet.
## Warning Sign Placement

### Table 2C-4. Guidelines for Advance Placement of Warning Signs

<table>
<thead>
<tr>
<th>Posted or 85th-Percentile Speed</th>
<th>Condition A: Speed reduction and lane changing in heavy traffic</th>
<th>Condition B: Deceleration to the listed advisory speed (mph) for the condition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0³</td>
<td>10⁴</td>
</tr>
<tr>
<td>20 mph</td>
<td>225 ft</td>
<td>100 ft³</td>
</tr>
<tr>
<td>25 mph</td>
<td>325 ft</td>
<td>100 ft³</td>
</tr>
<tr>
<td>30 mph</td>
<td>450 ft</td>
<td>100 ft³</td>
</tr>
<tr>
<td>35 mph</td>
<td>565 ft</td>
<td>100 ft³</td>
</tr>
<tr>
<td>40 mph</td>
<td>670 ft</td>
<td>125 ft</td>
</tr>
<tr>
<td>45 mph</td>
<td>775 ft</td>
<td>175 ft</td>
</tr>
<tr>
<td>50 mph</td>
<td>885 ft</td>
<td>250 ft</td>
</tr>
<tr>
<td>55 mph</td>
<td>990 ft</td>
<td>325 ft</td>
</tr>
<tr>
<td>60 mph</td>
<td>1,100 ft</td>
<td>400 ft</td>
</tr>
<tr>
<td>65 mph</td>
<td>1,200 ft</td>
<td>475 ft</td>
</tr>
<tr>
<td>70 mph</td>
<td>1,250 ft</td>
<td>550 ft</td>
</tr>
<tr>
<td>75 mph</td>
<td>1,350 ft</td>
<td>650 ft</td>
</tr>
</tbody>
</table>
Horizontal Alignment Warning Signs

The One-Direction Large Arrow sign and Chevron Alignment signs are used on the outside of a turn or curve to provide additional guidance.
Horizontal Alignment Warning Signs

A chevron alignment sign spacing table is now included in the OMUTCD. The spacings are based on research at the Texas Transportation Institute.

![Chevron Alignment Sign]

**Table 2C-6. Typical Spacing of Chevron Alignment Signs on Horizontal Curves**

<table>
<thead>
<tr>
<th>Advisory Speed</th>
<th>Curve Radius</th>
<th>Sign Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 mph or less</td>
<td>Less than 200 feet</td>
<td>40 feet</td>
</tr>
<tr>
<td>20 to 30 mph</td>
<td>200 to 400 feet</td>
<td>80 feet</td>
</tr>
<tr>
<td>35 to 45 mph</td>
<td>401 to 700 feet</td>
<td>120 feet</td>
</tr>
<tr>
<td>50 to 60 mph</td>
<td>701 to 1,250 feet</td>
<td>160 feet</td>
</tr>
<tr>
<td>More than 60 mph</td>
<td>More than 1,250 feet</td>
<td>200 feet</td>
</tr>
</tbody>
</table>

Note: The relationship between the curve radius and the advisory speed shown in this table should not be used to determine the advisory speed.
Horizontal Alignment Warning Signs

In advance of horizontal curves on roadways with more than 1,000 annual average daily traffic (AADT) that are functionally classified as arterials or collectors, horizontal alignment warning signs and Advisory Speed plaques shall be used in accordance with Table 2C-5 based on the speed differential between the roadway’s posted or statutory speed limit or 85\textsuperscript{th}-percentile speed, or the prevailing speed on the approach to the curve, and the horizontal curve’s advisory speed.

FHWA has established a target compliance date of December 31, 2019 to complete this work.
Horizontal Alignment Warning Signs

Horizontal Alignment Signs are used in accordance with OMUTCD Table 2C-5 (for roadways with over 1,000 AADT).

### Table 2C-5. Horizontal Alignment Sign Selection

<table>
<thead>
<tr>
<th>Type of Horizontal Alignment Sign</th>
<th>Difference Between Approach Speed * and Advisory Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5 mph</td>
</tr>
<tr>
<td>Turn (W1-1), Curve (W1-2), Reverse Turn (W1-3), Reverse Curve (W1-4), Winding Road (W1-5), and Combination Horizontal Alignment/Intersection (W1-10 series) (see Section 2C.07 to determine which sign to use)</td>
<td>Recommended</td>
</tr>
<tr>
<td>Advisory Speed Plaque (W13-1P)</td>
<td>Recommended</td>
</tr>
<tr>
<td>Chevrons (W1-8) and/or One Direction Large Arrow (W1-6)</td>
<td>Optional</td>
</tr>
<tr>
<td>Exit Speed (W13-2) and Ramp Speed (W13-3) on exit ramp</td>
<td>Optional</td>
</tr>
</tbody>
</table>

*Approach speed means the speed (posted or statutory speed limit, 85th-percentile speed, or prevailing speed) on the approach to the curve (in accordance with FHWA June 2, 2010 letter).
The advisory speed shall be determined by an engineering study that follows established engineering practices. Do not guess!

For horizontal curves, the following methods can be used:
- Ball bank indicator
- An accelerometer
- A design speed equation
Horizontal Alignment Warning Signs

In a nutshell, each agency needs to:

- Identify curves/turns needing signing
- Determine appropriate advisory speed
- Determine which signs are needed as per OMUTCD Table 2C-5
- Install signs by the compliance date of December 31, 2019
Horizontal Alignment Warning Signs

Combination Horizontal Alignment/Advisory Speed Signs may be used to supplement the advance Horizontal Alignment warning and Advisory Speed plaque. This sign shall not be used alone or as a substitute for a Horizontal Alignment warning and Advisory Speed plaque.
Combination Horizontal Alignment/Advisory Speed signs are installed at the beginning of the turn or curve, as shown.
These installations are not interchangeable.
Horizontal Alignment Warning Signs

Combination Horizontal Alignment/Intersection Signs may be used where an intersection occurs within or immediately adjacent to a turn or curve. No more than one crossroad or two side roads should be shown.
Horizontal Alignment Signs

This new sign was added to the Sign Design and Markings Manual on January 16, 2015. It is intended to be used where a sharp turn immediately follows a more gradual curve in the opposite direction.
Horizontal Alignment Signs

State Route 534 in Ashtabula County is popular with motorcyclists, but was experiencing a crash problem at a particular location.
Horizontal Alignment Signs

SR-534
Horizontal Alignment Signs

SR-534
Horizontal Alignment Signs

SR-534
Horizontal Alignment Signs

SR-534 with new reverse curve/turn waning signs installed.
Advance Traffic Control Signs

The symbol signs shown are the standard designs. Word message alternatives are no longer allowed.
Reduced Speed Limit Ahead Sign

The black on yellow warning sign shown below has replaced the black on white regulatory signs.
Street Name Signs

Lettering on post-mounted Street Name signs should be composed of initial upper-case letters of at least 6 inches in height and lower-case letters at least 4.5 inches in height.

For local roads with speed limits of 25 mph or less, the lettering on post-mounted Street Name signs may be composed of initial upper-case letters at least 4 inches in height and lower-case letters at least 3 inches in height.

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.

If overhead Street Name signs are used, the lettering should be composed of initial upper-case letters at least 12 inches in height and lower-case letters at least 9 inches in height.
Street Name Signs

Lettering on street name signs must be in upper and lower case letters. There is no longer an option to use all capital letters.

No target compliance date has been established for the use of upper/lower-case letters. Existing signs of all upper-case letters can remain in place until they have reached the end of their effective performance lives.
Street Name Signs

Target Compliance Dates established in the OMUTCD (eliminated by Federal Register, May 14, 2012):

January 9, 2012 – 6-inch letter height for lettering on ground-mounted street name signs (except on multi-lane streets with speed limits greater than 40 mph).

December 22, 2018 – 8-inch letter height on ground-mounted signs on multi-lane streets with speed limits greater than 40 mph and 12-inch letter height on overhead-mounted signs.

No compliance date has been established for the use of upper/lower-case legends.
Street Name Signs

An alternative color combination other than the normal white on green may be used for Street Name signs where the highway agency determines this is necessary to assist road users in determining jurisdictional authority for roads. The alternative color combinations are white on blue, white on brown, and black on white.
Street Name Signs

Other color combinations are not allowed.
Advance Street Name plaques also use upper and lower case letters.
Fluorescent Yellow Green Sheeting

Fluorescent yellow-green sheeting is required to be used for the background of School warning signs, including the “SCHOOL” portion of the School Speed Limit sign and including any supplemental plaques used in association with these warning signs.
Fluorescent Yellow-Green Sheeting

Note that fluorescent yellow-green sheeting can also be used for pedestrian, bicycle and playground signs, but in not required. Any other use is not allowed.
School Area Signs

The END SCHOOL ZONE sign has been replaced with the END SCHOOL SPEED LIMIT sign.

The SCHOOL BUS STOP AHEAD word message sign has been replaced with the symbol sign.
Pavement Marking Materials
ODOT currently uses the following pavement marking material types:

1.) Water-based traffic paint
2.) Low temperature water-based traffic paint
3.) Polyester
4.) Thermoplastic
5.) Epoxy
6.) Spray thermoplastic
7.) Preformed tape (auxiliary markings)
8.) Heat-fused preformed thermoplastic (auxiliary markings)
Factors to consider when selecting pavement marking materials to use:

1. Cost
2. Pavement type (asphalt, concrete)
3. Terrain (horizontal curves)
4. Traffic mix (car, truck, buggy)
5. Pavement condition (remaining surface life)
6. ADT (average daily traffic)
7. Renewal frequency (exposure of workers to traffic)
8. Compatibility (reapplication over existing material)
Pavement Marking Materials

Traffic Engineering Manual – Table will be updated to remove references to alkyd paint.

Table 397-1. Material Selection for Pavement Marking and Expected Marking Life** in Years

| Remaining Pavement Surface Life * | Asphalt | | | Concrete | | |
|----------------------------------|---------|---------|------------|---------|---------|
| | ADT < 5,000 | ADT > 5,000 | | ADT < 5,000 | ADT > 5,000 |
| Type Years | Type Years | | Type Years | Type Years |
| 0 - 2 years | Water-Based Paint | Polyester | 1 | Polyester | 2 | Water-Based Paint | 1 |
| | Spray Thermo | Water-Based Paint | 2 | | Spray Thermo | 2 | Water-Based Paint | 2 |
| 3 - 4 years | Polyester | 3 | Polyester | 2 | Spray Thermo | 2 | Epoxy | 4 |
| | Spray Thermo | Water-Based Paint | 2 | | Water-Based Paint | 1 | Spray Thermo | 2 |
| | Water-Based Paint | 1 | | | | Water-Based Paint | 1 |
| > 4 years | Thermo Polyester | Epoxy | 4 | Epoxy | 4 | | |
| | Polyester | Thermo | 4 | Spray Thermo | 2 | | |
| | | Water-Based Paint | 4 | Water-Based Paint | 1 | | |
| New Surface | Alkyd Paint | 1 | Alkyd Paint | 1 | Alkyd Paint | 1 | Alkyd Paint | 1 |
| i) <40˚F | | | | | | | |
| ii) 40 to 50˚F | Water-Based Paint | 1 | Water-Based Paint | 1 | Water-Based Paint | 1 | Water-Based Paint | 1 |
| iii) > 50˚F | Thermo | 4 | Thermo | 4 | Epoxy | 4 | Epoxy | 4 |
# Long Line Marking Materials

<table>
<thead>
<tr>
<th>Material</th>
<th>Cost*</th>
<th>Life Expec (years)**</th>
<th>Dry Time (min)</th>
<th>Application Temp</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water-based paint</td>
<td>$350</td>
<td>1-2</td>
<td>2</td>
<td>50°F</td>
<td></td>
</tr>
<tr>
<td>Low temp water-based paint</td>
<td>n/a</td>
<td>1-2</td>
<td>2</td>
<td>35°F</td>
<td>^1</td>
</tr>
<tr>
<td>Polyester</td>
<td>$560</td>
<td>2-3</td>
<td>45</td>
<td>50°F</td>
<td>^2</td>
</tr>
<tr>
<td>Thermoplastic</td>
<td>$2,200</td>
<td>4-5</td>
<td>45</td>
<td>50°F/70°F</td>
<td>^3</td>
</tr>
<tr>
<td>Epoxy</td>
<td>$2,200</td>
<td>4-5</td>
<td>15-45</td>
<td>50°F</td>
<td></td>
</tr>
<tr>
<td>Spray thermoplastic</td>
<td>$860</td>
<td>2-4</td>
<td>1</td>
<td>50°F</td>
<td>^3</td>
</tr>
</tbody>
</table>

* Cost is approximate price paid by ODOT for one mile of 4 inch wide edge line applied (provided for cost comparison purposes; based on 2014 costs)

** Life expectancy will vary depending on traffic volume, traffic mix (car, truck, buggy), terrain (horizontal curves), pavement condition (crack sealing), and snow removal activities. Actual life may be more or less than shown

n/a = information not available

1 Used primarily for early and late season construction projects

2 Not used on new asphalt pavement until open to traffic for at least 2 weeks

3 Application temperature is 50°F for pavements less than 6 months old, and 70°F for pavements older than one year. Thermoplastic is not used on concrete pavement (although some agencies use on concrete with primer)
LTAP Workshops

• *Traffic Sign Retroreflectivity Inspection*
  
  Half-day course (3 contact hours), based on the Federal Highway Administration’s “Inspector Training for Sign Retroreflectivity”
  
  The last class for this year is being offered June 25, 2015, at the ODOT District 8 office in Lebanon, Ohio

• *Traffic Signs and Pavement Markings*
  
  Full-day course (5 contact hours)
  
  Will be offered again in 2016

• Check the LTAP website for additional information.
Questions?