Work Zones: Answering Your Questions Webinar

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August 27, 2019
Purpose of Temporary Traffic Control

1. Warn motorists and pedestrians of hazards.
2. Advise proper travel path.
3. Delineate areas not to be used.
4. Separate the travel area from work area.
What is Temporary Traffic Control (TTC) in Work Zones?

- **System** to communicate with road users to safely guide them through a roadway affected by:
  - Construction and reconstruction
  - Maintenance activities
  - Utility operations
  - Disasters, special events and incidents
Ohio LTAP

Reference Manual

Ohio Manual of Uniform Traffic Control Devices

2012 Edition
January 13, 2012
Effective April 12, 2012

Ohio Department of Transportation
Office of Traffic Engineering

OMUTCD in the Complete form
Ohio Standards

• The Ohio Manual (OMUTCD) establishes the standards for design and use of traffic control devices on all public roads in Ohio.

• Per Sections 4511.09 – 4511.11 of the ORC.
Ohio Revised Code
Section 4511.11

• “(A) Local authorities in their respective jurisdictions shall place and maintain traffic control devices in accordance with the department of transportation manual and specifications for a uniform system of traffic control devices …”

(See Appendix B2 of the 2012 OMUTCD)
OMUTCD 2012

• **Standard** = “Shall” condition

• **Guidance** = “Should” condition

• **Option** = “May” condition

• **Support** = Additional information
Organization/Format – Relation To The OMUTCD

- Standards (shall) information is shown in large bold text.
- Guidance (should) information is shown in large text, but not bold.
- Option (may) and Support information are shown in a smaller size text.
Temporary Traffic Control Manual - OMUTCD, Parts 1, 5 and 6

- To purchase a copy, contact the ODOT Office of Contracts
  - Cost is $12.00 + Shipping & Tax
- 1980 West Broad St., P.O. Box 899
  Columbus, Ohio 43216-0899
- By phone at 1-800-459-3778
NOTE:
This booklet is intended to provide the principles of proper work zone traffic control, but is not a standard. Part 6 of the OMUTCD contains the standards.
Example of Information

Devices

Tables

Flagging

Mobile

Ohio LTAP
# Work Activity Matrix to Pick Typical Application

<table>
<thead>
<tr>
<th>Suggested Temporary Traffic Control For Work Activities</th>
<th>TA-1 pg. 19</th>
<th>TA-3 pg. 20</th>
<th>TA-4 pg. 21</th>
<th>TA-6 pg. 22</th>
<th>TA-8 pg. 24</th>
<th>TA-9 pg. 26</th>
<th>TA-10 pg. 27</th>
<th>TA-11 pg. 29</th>
<th>TA-17 pg. 30</th>
<th>TA-20 pg. 32</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mowing</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Pothole Patching</td>
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<td></td>
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<tr>
<td>Pavement Marking/ Striping</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Road Closings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Road Grading</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Sign Installation/ Repair</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tree Removal</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trenching</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Typical Application*
Pocket Guide (Handbook)

- To purchase a copy, contact the ODOT Office of Contracts
  - Cost is $2.50 + Shipping & Tax
- 1980 West Broad St., P.O. Box 899
  Columbus, Ohio 43216-0899
- By phone at 1-800-459-3778
Other Sources of MOT INFO

ODOT’s Office of Roadway Engineering’s Web Page

• Traffic Engineering Manual (TEM)
• Standard Construction Drawings (SCD’s)
• Plan Insert Sheets (PIS’s)
• ODOT Construction & Materials Specifications
Other Sources of MOT Info

ODOT’s Home Page

• Design Reference Resource Center (DRRC)

www.dot.state.oh.us/drrc
Question Received

Regarding when to use barrels or PCB (portable concrete barrier) when protecting a work site. This is simple for drop-offs but specifically we are looking at above ground protection for vehicles or stored materials. Are clear zone widths used to determine if barrels or PCB is used? Such as if dumped gravel or a backhoe is stored overnight behind barrels but within 4 feet of traveled way, is PCB required?
Question #1

Are clear zone widths used to determine if barrels or PCB is used?

**Answer:** All factors impacting the activity area and work zone need to be taken into consideration and engineering judgement utilized when determining the type of traffic barrier deflection to be installed.
Where to Find the Answer

ODOT’s Construction and Materials Specification Book

Available online at:
**Question 1, part 2:** Such as if dumped gravel or a backhoe is stored overnight behind barrels but within 4 feet of traveled way, is PCB required?

**Answer:** You should not install PCB for the sole purpose of protecting equipment or materials. These items must be stored in an area that meets “B or C” below:

- Look at 614.035 in CMS

614.035 Storage of Equipment, Vehicle and Material on Highway Rights of Way. **Unless otherwise permitted by the Engineer,** locate all equipment, vehicles, and material stored or parked on highway rights-of-way:

- A. At least 6 feet behind the face of Existing Barrier and not within the 75 foot long by 20 foot wide Recovery Area behind the Existing Barrier run, or;
- B. Not less than 30 feet from the nearest edge of the traveled way, or;
- C. At least 6 feet behind raised curbs.
- Additionally, at night, encompass any such equipment, vehicles or material with drums, equipped with Type A warning lights, spaced at 5 feet on center.
- For locations with traffic approaching from more than one direction or side (e.g., medians, between mainline and ramps, etc.), ensure the requirements are met for all traffic approaches.
- Existing Barrier, for purposes of 614.035 only, includes and is limited to: existing permanent guardrail, existing concrete barrier, temporary or new permanent guardrail installed in accordance with the plans, temporary portable barrier installed in accordance with the plans, or new permanent concrete barrier installed in accordance with the plans. Other types of barrier not listed, such as cable barrier, are excluded as a means of protecting drivers from stored equipment, vehicles and material on highway rights-of-way.
- Recovery Area, for purposes of 614.035, shall have slopes 3:1 or flatter and be free of workers, hazards, equipment, vehicles, drop-offs, and material storage. The Recovery Area length is to begin at the terminus of the Existing Barrier run. Any gating impact attenuator length shall not be included as part of the Recovery Area length.

* Also Typical Application #34 in the TTCM (next slide)
Figure 6H-34. Lane Closure with a Temporary Traffic Barrier (TA-34)

Note: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.
CONDITION II

DROP-OFFS BEYOND EDGE OF TRAVELED Lanes / PAVED SHOULDER
(Freeways, Expressways, other Roadways ≥ 45 mph and minimal driveways)

1. The treatments indicated below are for use in conjunction with resurfacing, planing, or excavations located beyond the edge line of the traveled lanes.
2. The treatments indicated below are applicable for pavement/shoulder drop-offs and for locations where foreslopes "A/B" are steeper than 30°.
3. Where the drop-off is located outside the clear zone, no treatment is necessary (see Table II and SCDs MT-110, 35, 45, or 82.101).
4. Where foreslopes "A/B" are 30° or flatter, no treatment is necessary.

<table>
<thead>
<tr>
<th>D</th>
<th>Method of Drop-off Protection to be used to separate the traffic from the drop-off</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Drop-off location &quot;X&quot; from traveled lane</td>
</tr>
<tr>
<td></td>
<td>≤ 3°</td>
</tr>
<tr>
<td></td>
<td>&gt; 3° - ≤ 5°</td>
</tr>
<tr>
<td></td>
<td>&gt; 5° - ≤ 12°</td>
</tr>
<tr>
<td></td>
<td>&gt; 12° - ≤ 24°</td>
</tr>
<tr>
<td></td>
<td>&gt; 24°</td>
</tr>
</tbody>
</table>

Barrels or PCB:

Question #2

2. How long of a taper do you need on a four-lane, 35 MPH undivided roadway in order to close the right lane?

• Answer is found on Page 17 of the Work Zone Pocket Guide

• **Answer:** Looking at the bottom table on this page: This would be a merging taper, which at **35 MPH** would be **245’ on a twelve-foot lane.**
## Tapers and Flagger Station Distances (in feet)

<table>
<thead>
<tr>
<th>Speed Limit (mph)</th>
<th>Two-Lane</th>
<th>Multi-Lane **</th>
<th>Flagger Station/Buffer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Max. Two-Way Taper *</td>
<td>Merging Taper 12' lane</td>
<td>Shifting Taper 12' lane</td>
</tr>
<tr>
<td>25</td>
<td>50' MIN. - 100' MAX.</td>
<td>125'</td>
<td>70'</td>
</tr>
<tr>
<td>30</td>
<td>180'</td>
<td>90'</td>
<td>50'</td>
</tr>
<tr>
<td>35</td>
<td>245'</td>
<td>130'</td>
<td>70'</td>
</tr>
<tr>
<td>40</td>
<td>320'</td>
<td>160'</td>
<td>90'</td>
</tr>
<tr>
<td>45</td>
<td>540'</td>
<td>280'</td>
<td>150'</td>
</tr>
<tr>
<td>50</td>
<td>600'</td>
<td>600'</td>
<td>170'</td>
</tr>
<tr>
<td>55</td>
<td>660'</td>
<td>660'</td>
<td>190'</td>
</tr>
<tr>
<td>60</td>
<td>720'</td>
<td>720'</td>
<td>200'</td>
</tr>
<tr>
<td>65</td>
<td>780'</td>
<td>780'</td>
<td>220'</td>
</tr>
<tr>
<td>70</td>
<td>840'</td>
<td>840'</td>
<td>240'</td>
</tr>
</tbody>
</table>

* Refers to a one-lane, two-way traffic taper (see pages 7 and 26).
** Multi-lane layouts use buffer zones instead of flagger stations.
Note: If used, a downstream taper should be 50' MIN and 100' MAX.
Question #3

3. How far apart are the cones in this same taper?

• Answer: Using the **middle table on page 17 of the work zone pocket guide**, look at the “Multi-lane” row. For the **Taper column**, the maximum spacing on the multilane roadway would be the Speed Limit in feet, which in this question the speed limit was **35 MPH**, so the maximum spacing is 35 feet apart.
### Maximum Spacing of Channelizing Devices (in feet)

<table>
<thead>
<tr>
<th>Road Type</th>
<th>Taper</th>
<th>Buffer/Work Space</th>
<th>Downstream</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two-lane</td>
<td>20’</td>
<td>2 x Speed Limit</td>
<td>20’</td>
</tr>
<tr>
<td>Multi-lane</td>
<td>Speed Limit</td>
<td>2 x Speed Limit</td>
<td>20’</td>
</tr>
</tbody>
</table>
4. Is there a way to figure out the minimum number of cones you must have for this same taper?

• **Answer:** Being that the length of the taper is 245’ and the maximum spacing is 35’ apart, divide 245 by 35 and add one since the first cone is at point zero on the edge line. \(245/35 = 7 + 1 = 8\) cones minimum for this taper.
<table>
<thead>
<tr>
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<th>Taper</th>
<th>Buffer/Work Space</th>
<th>Downstream</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two-lane</td>
<td>20’</td>
<td>2 x Speed Limit</td>
<td>20’</td>
</tr>
<tr>
<td>Multi-lane</td>
<td>Speed Limit</td>
<td>2 x Speed Limit</td>
<td>20’</td>
</tr>
</tbody>
</table>
5. How long of a **BUFFER SPACE** do you need for a flagging operation on a 55 MPH County road (two-lane road, one lane in each direction)?

- **Answer:** See the bottom table on page 17 in the work zone pocket guide. By finding “55 mph” in the left column of the table and then going straight across to the far right columns, we will see that the Buffer Space should be **495 feet**. This is also referred to as the Stopping Sight Distance for 55 MPH.
<table>
<thead>
<tr>
<th>Speed Limit (mph)</th>
<th>Two-Lane</th>
<th>Multi-Lane **</th>
<th>Flagger Station/Buffer</th>
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<tr>
<td></td>
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<td>30</td>
<td>180'</td>
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<td>245'</td>
<td>130'</td>
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<tr>
<td>40</td>
<td>320'</td>
<td>160'</td>
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</tr>
<tr>
<td>45</td>
<td>540'</td>
<td>280'</td>
<td>150'</td>
</tr>
<tr>
<td>50</td>
<td>600'</td>
<td>600'</td>
<td>170'</td>
</tr>
<tr>
<td>55</td>
<td>660'</td>
<td>660'</td>
<td>190'</td>
</tr>
<tr>
<td>60</td>
<td>720'</td>
<td>720'</td>
<td>200'</td>
</tr>
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<tr>
<td>70</td>
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<td>240'</td>
</tr>
</tbody>
</table>

* Refers to a one-lane, two-way traffic taper (see pages 7 and 26).
** Multi-lane layouts use buffer zones instead of flagger stations.
Note: If used, a downstream taper should be 50' MIN and 100' MAX.
Question #6

6. How can you enhance the safety of your signing package for a flagging operation? (the advance warning area of your flagging operation)

• Answer: We will find the answer to this question by looking at Typical application #10 on page 26 of the Work Zone Pocket Guide (or we can also look at this same Typical Application in the Temporary Traffic Control Manual on page 746.
A ROAD WORK AHEAD sign may be used in place of ROAD WORK XX MILE sign. A ONE LANE ROAD AHEAD sign may be used in place of the ONE LANE ROAD XX FT sign.

The image shows the **standard signing package** of three signs in each direction. An additional sign can be added to enhance the safety. This is the “Be Prepared to Stop” sign, placed between the one-lane road ahead sign and the flagger sign. This sign would be placed between the “One Lane Road Ahead” sign and the “Flagger Symbol” sign. You can also add a cone next to each advanced warning sign to draw attention to the sign.

You must always remember to read the “Standards, Guidance, and Options” sections listed in each Typical Application.
Question #7

7. For this same Flagging Operation, (2-lane rural road, 55 MPH), what is the proper spacing for our advance warning signs?

• Answer: The answer is found by looking at the top table on page 17 of the Work Zone Pocket Guide. We would select “Rural” as the “Road Type”, and the resulting “Distance Between Signs”, as you can see, is 500 feet.
<table>
<thead>
<tr>
<th>Road Type</th>
<th>Distance Between Signs (in feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Urban (low speed) *</td>
<td>100'</td>
</tr>
<tr>
<td>Urban (high speed) *</td>
<td>350'</td>
</tr>
<tr>
<td>Rural</td>
<td>500'</td>
</tr>
<tr>
<td>Expressway/Freeway</td>
<td>1,000'</td>
</tr>
</tbody>
</table>

* Speed Category to be determined by the highway agency.
Question #8

8. What if we are on a 35 MPH, multi-lane road, and we need to close the right lane and the work zone is less than 500’ from a big intersection and we can’t get TA-33 to fit? (because the distance required for the merging taper, buffer space, and advance warning area requires about 800 feet for this typical application at 35 mph). Is there another typical application which would be appropriate?

• Answer: Yes, Typical Application #22 from the TTCM, or the Work Zone Pocket Guide, is an appropriate substitute.
The benefit of TA-22 is that you aren’t required to install a long merging taper or a buffer space. The advanced warning area is also shorter. However, you do need a Flashing Arrow panel and 2 regulatory signs that say “Right Lane Must Turn Right”. You would then extend the work area that is shown in the picture up past your work location (500 feet away).
Questions?

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