Welcome!

Urban Work Zone Design Training Course

ATSSA
SAFER ROADS SAVE LIVES
Instructor

Instructor’s Name Here
About This Course

- This material is based upon work supported by the Federal Highway Administration (FHWA) under grant agreement NO. DTFH61-06-G-00004
Developed and Presented by

American Traffic Safety Services Association

SAFER ROADS SAVE LIVES
Course Objectives

- Review of temporary traffic control standards and guidelines
- Discuss issues and considerations related to the application (design) of those standards and guidelines in urban areas
## Course Schedule

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<th>DAY 1</th>
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**3. Component Parts**
Exam

- 25 True/False questions @ 4 points each = 100 pts
- Open book, open notes
- One hour time limit
- Passing score: 80%
## Urban Work Zone Design

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Module Objectives

- Define Temporary Traffic Control (TTC)
- Quantify the traffic safety problem
- Define “urban” areas
- Describe some of the problems associated with work zones in urban areas
What is Temporary Traffic Control?

- A *SYSTEM* to *communicate* with road users to safely guide them through a roadway affected by:
  - Construction and reconstruction
  - Maintenance
  - Utility operations
  - Special events
  - Incidents

*Same standards apply to all!!*
Why is Temporary Traffic Control Important?
How Do We Make Urban Work Zones Safer?

- Improving communication with ALL road users:
  - Eliminates uncertainty
  - Gives more time to make decisions

- Using standard devices and procedures
Traffic Safety, Is There a Problem?

- 43,000+ traffic fatalities per year
- 1,000+ in work zones
- 15% of work zone fatalities are workers!
Work Zone Fatalities: 1998 - 2006

- 1998: 772
- 1999: 872
- 2000: 1026
- 2001: 989
- 2002: 1186
- 2003: 1095
- 2004: 1063
- 2005: 1058
- 2006: 1010
Safety is Important For:

- Motorists
- Motorcyclists
- Bicyclists
- Pedestrians
- Workers
What is “Urban”?

1. of, pertaining to, or designating a city or town
2. living in a city
3. characteristic of or accustomed to cities

Source: dictionary.com
What is an “Urban Area”?

“An area normally characterized by:
- Relatively low speeds
- Wider range of traffic volumes
- Narrower lanes
- Frequent intersections & driveways
- Significant pedestrian traffic
- More businesses & houses”

Source: 2003 MUTCD
Rural vs. Urban Statistics

Data source: National Transportation Statistics 2003 Bureau of Transportation Statistics
Why Crashes in Urban Work Zones?

- Users confront unknown conditions
- “Normal” conditions changed
- Hazards present
- Minimal standards for urban WZ exist
Problems with Urban Work Zones

- Restricted spaces
- **Heavy traffic**
- Signals
- Restricted sight distance
- Parking
Problems with Urban Work Zones

- Conflicts with pedestrians
- Conflicts with “other” vehicles
  - Delivery trucks,
  - Utility vehicles
  - Bicycles, buses
# Urban Work Zone Design

## Agenda

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ATSSA

SAFER ROADS SAVE LIVES
The MUTCD

- **MINIMUM** standards and guidelines
  - States and local agencies can go beyond them
  - Applies to **ALL** streets & highways open to the public
Does the MUTCD Apply to Urban Areas?

Section 6A.01: “The criteria of Part 6 apply to both rural and urban areas”.

YES!
What does the MUTCD say about Urban Work Zones?

“The test concerning adequate taper lengths involves observation of driver performance after TTC plans are put into effect.”
Questions to Ponder...

- What adjustments should be made?
- How do we adjust to field conditions?
- Are these adjustments within the MUTCD standards & guidelines?
- Does the MUTCD address urban work zones adequately?
- How can we protect against lawsuits?
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0-27
Module Objectives

- Define temporary traffic control zone (TTCZ)
- Describe its four component parts
- Describe the requirements of each
- Discuss possible adjustments applicable to urban areas
Longitudinal Buffer Space

- Recovery area for errant vehicles
- Protects BOTH workers & motorists
- COMPLETELY empty
  - No vehicles, equipment or materials
- Provide a buffer space unless you have a documented reason not to

Based on stopping sight distances
Buffer Spaces in Urban Areas

- They may not fit
- This is the reason buffer spaces are not required in the MUTCD
- **FLEXIBILITY!**
- Provide as much as you can!
- If you cannot provide the numbers on the table, document the reason!
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What are Traffic Control Devices?

- “Things” used to implement a TTC plan in the field
- **Objects** motorists see and respond to when they drive through a TTCZ
- Shall be approved in the MUTCD and NCHRP 350-compliant
Warning or Regulatory?
Urban Area Challenges
Types of Crash Cushions

- Redirective
  - **Redirect** the errant vehicle

- Non-redirective
  - **Decelerate** the vehicle to a stop
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Module Objectives

- Define lane closures and street closures
- Discuss tapers
- Discuss the various types of tapers
- Discuss their lengths and how to determine them
- Review device spacing
What is a Taper?

- A series of channelizing devices (and sometimes pavement markings) placed on an angle to move traffic out of its normal path

“A gradual increase or decrease”
“A gradual transition”
Combo table for your reference (includes BUFFER length!)

<table>
<thead>
<tr>
<th>MPH</th>
<th>9’</th>
<th>10’</th>
<th>11’</th>
<th>12’</th>
<th>Buffer</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>95</td>
<td>105</td>
<td>115</td>
<td>125</td>
<td>155</td>
</tr>
<tr>
<td>30</td>
<td>135</td>
<td>150</td>
<td>165</td>
<td>180</td>
<td>200</td>
</tr>
<tr>
<td>35</td>
<td>185</td>
<td>205</td>
<td>225</td>
<td>245</td>
<td>250</td>
</tr>
<tr>
<td>40</td>
<td>240</td>
<td>270</td>
<td>295</td>
<td>320</td>
<td>305</td>
</tr>
<tr>
<td>45</td>
<td>405</td>
<td>450</td>
<td>495</td>
<td>540</td>
<td>360</td>
</tr>
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</table>
Proper Taper?

S = 45 mph
W = 12 ft
L = 540’
Buffer = 360’
13 devices!
WORKSHOP

- Refer to the scenario provided
Signalized intersection

NORTH AVENUE

10th Street
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Module Objectives

- Discuss “other” considerations that may improve safety
- Discuss potential adjustments to a traffic control plan
- Discuss high-visibility safety apparel requirements
Other Considerations

- "Non-typical" urban conditions may require adjustments to the TTC zone
When Are Adjustments Needed?

- Unexpected field conditions
- Overlooked situations
- Changed conditions
- Special conditions
- Long queues
- Special users
Other Considerations to Discuss:

1. Factors affecting visibility/location
2. Factors affecting stopping distance
3. Night operations
4. Intersections
5. Utility work
6. Pedestrian/bicycle considerations
7. Motorcyclist considerations
8. Worker considerations
## Recommended Min. Illuminance Levels & Categories for NWZ

<table>
<thead>
<tr>
<th>LEV.</th>
<th>Min. Illuminance Level, lx (fc)</th>
<th>Area of Illumination</th>
<th>Examples of Activities</th>
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<tbody>
<tr>
<td>I</td>
<td>54 (5)</td>
<td>Throughout spaces</td>
<td>Excavation, sweeping &amp; cleanup, movement area in work zone, movement between two tasks</td>
</tr>
<tr>
<td>II</td>
<td>108 (10)</td>
<td>Of tasks and around equipment</td>
<td>Paving, milling, concrete work, around paver or miller</td>
</tr>
<tr>
<td>III</td>
<td>216 (20)</td>
<td>Illuminance on task</td>
<td>Crack filling, pot filling, tasks requiring extreme accuracy and attention</td>
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6. Pedestrian and Bicycle Considerations

- MUTCD Section 6G.05: “Bicyclists and pedestrians should not be exposed to unprotected excavations, open utility access, overhanging equipment, or other such conditions.”
Assuring Worker Safety

- Proper training
- High-visibility apparel
- Positive protection
- Use of police
- Proper lighting
- Special devices
- Public information
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**Module Objectives**

- Review course objectives
- Review the “Parking Lot”
- Complete course evaluation form
- Take exam
- Adjourn!