Continuing Education Training

-Work Zone Protection

Facilitator Guide

-2nd Quarter 2018
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Introduction

The Work Zone Protection continuing education course is a facilitator led process. The facilitator may choose to augment the material with videos, handouts or other media to enhance the learning experience. The facilitator may want to incorporate visual aids such as road signs, cones or other channelizing devices, Stop/Slow signs etc. to enhance the presentation.

Using this material combined with practical experience, good presentation skills, and knowledge of adult learning techniques, the facilitator has a greater opportunity to deliver the information effectively. It is not the intent of this booklet to function as a “script” for the presenter or for the presenter to read every word in the slide notes when presenting the information. The intent of this booklet is to provide the presenter with pertinent information, which they can, in-turn relay (in summary) to the attendees.

Microsoft® PowerPoint® combined with good instructional skills and instructor/student dialogue help with information retention and understanding. PowerPoint® presents the information to the attendee and the facilitator summarizes the content of the slides. It is critical to engage and involve the attendee in the process. Ask open-ended questions that will elicit conversation and discussion, but be cautious to maintain control of the discussion.

Conversation and scenarios are good, but can cause the discussion to run long. If it seems like the group is losing focus during the course, the facilitator can direct the group back on track by using comments like “This is a great discussion, but let’s get back to the subject at hand”. Another facilitator tool is the “Parking Lot” which is simply a newsprint chart or dry erase board or note pad where the facilitator records unanswered questions/concerns during the meeting and that may require more research. It is vital to capture any ongoing discussions or questions on the “Parking Lot” and follow up when the information is known.

This refresher is to be delivered in the second quarter of 2018. Delivery time is approximately 1 to 1.5 hours in one setting or divided-up into three, twenty to thirty minute settings. It is critical that the facilitator makes him or herself familiar with the material prior to delivery.

At the end of this document is a two-page handout the presenter may use as stand-alone or to augment this module.

The following is a link to National Work Zone Safety web site. Use at your discretion.

https://www.workzonesafety.org/work_zone_topics/work-zone-safety/

The following is a link to site that shows flagger-training requirements by state. Use at your discretion.

https://www.workzonesafety.org/flagger-information/flagger_training/

Copy and paste the link(s) into your web browser to access the web page(s).
Disclaimer

The material in this document is provided for informational purposes only and not as a comprehensive or exhaustive resource on the topic. This material is a compilation of a multitude of materials derived from sources believed to be accurate; however, The Electrical Transmission & Distribution Partnership and/or it’s associate members assumes no responsibility for the accuracy or currency of this information and encourages you to consult experts in this area for more information. In no event does the content of this document supersede any applicable local, state, or federal statutes or regulations.
Begin session one

Slide 1-1

Introduce the module. Explain the intent of this presentation is to provide a continuing education training topic related to certain aspects from the either the ET&D 10-Hour OSHA training class, the OSHA Partnership Best Practices, and/or incident trending analysis.

Slide 1-2

Objectives

Upon completion of this continuing education module you should be able to:

☑ Describe the hazards of working in proximity to traffic
☑ Define a work zone
☑ Discuss the importance of traffic control
☑ Explain requirements for certain traffic control devices
☑ Explain requirements for flagger operations

Thank the attendees for their attention and explain the objectives of this course and the duration. Explain that this is second quarter 2018 topic.
The most dangerous work environment in the United States is the public highway system. Hazards caused by distractions such as cell phones and work performed in traffic areas makes it necessary to put in place the proper measures to control the risks.

Explain work zone safety is critical for protection of both workers and the public. Because the public highway system can be a very hazardous place to work, it is essential that our workers have a basic understanding of the hazards involved and understand certain measures used to help minimize the risks.

Explain that according to the Federal Highway Administration, in 2015 there were an estimated 96,626 crashes in work zones, which was an increase of 7.8% over 2014. This continues a rise in work zone crashes since a low of 67,887 in 2013 (a 42% increase since 2013).
The Federal Highway Administration defines a work zone as:

- An area of a traffic-way with highway construction, maintenance, or utility-work activities
- A work zone is typically marked by signs, channeling devices, barriers, pavement markings, and/or work vehicles

Explain it may be surprising to hear there are currently no nationally recognized definitions of work zones, and almost every state has their own definition. Work planners such as managers, supervisors, foremen, and leads, should be aware of the safety impact of work zones to understand the full impact of working on or near a roadway. The Federal Highway Administration (FHWA) is currently involved in an effort to develop a standardized definition of work zone. Ultimately, this effort will allow researchers the opportunity to assess the current state of work-zone safety and to recommend possible countermeasures to eliminate or mitigate safety problems.

If we bring a lion into a neighborhood, it is our responsibility to ensure our lion does not eat the residents!

- When we set up work zones in public areas we may be bringing lions into the neighborhood

Explain we must control the hazards. If our work exposes the public to hazards, it is incumbent upon us to protect them.
Traffic Control Plan

Part of job planning
Should be prepared by persons which are:

✓ Knowledgeable about the principles of temporary traffic control
✓ Understand the work activities to be performed

Explain Traffic Control Plans (TCP's) play a vital role in providing continuity of safe and efficient traffic flow to the extent interruptions in normal flow are necessary for temporary traffic control operations or other events. Important auxiliary provisions that cannot conveniently be specified on project plans can easily be incorporated into Special Provisions within the TCP. A traffic control plan, in detail appropriate to the complexity of the work project or incident, should be prepared and understood by all responsible parties before the site is occupied. Any changes in the plan should be approved by a competent person trained in safe traffic control practices.

Factors

These factors can effect worker safety

✓ Changing conditions
✓ Moving equipment
✓ Vehicles in the activity area
✓ Workers on foot
✓ Workers not visible
✓ Distracted/impaired drivers
✓ Short duration projects
✓ Barriers possibly not feasible

Explain because of the type, location, and duration of work, and roadway/traffic characteristics, work zones can be very diverse. Applicable standards and procedures may vary depending on several factors.

End session one
Session one key points

Slide 1-9

The presenter should have touched on the following items when Explaining session one:

1. Hazards caused by distractions (and other issues) make it necessary to put in place the proper measures to control the risks encountered in work zones.
   a. True
   b. False

2. Every week there are ______ work zone crashes that resulted in at least one fatality.
   a. 5
   b. 12
   c. 50

3. The public highway system can be one of the most dangerous work environments in the United States.
   a. True
   b. False
Begin session two

Slide 2-1

Explain the following section will discuss traffic control. The information in this section is based on the Manual for Uniform Traffic Control Devices known as the MUTCD. The Manual is a document issued by the Federal Highway Administration (FHWA) of the United States Department of Transportation (USDOT) to specify the standards by which traffic signs, road surface markings, and signals are designed, installed, and used. The MUTCD is generally considered the minimum requirement for traffic control and devices.
The Purpose

Warn
Inform
Guide
Regulate

Explain that the four main purposes of traffic control is to warn the traveling public of a potential work zone ahead, to inform what type of work zone they may encounter, to guide them safely through the work zone, and lastly to regulate the traffic so worker and public exposure is mitigated.

Effectiveness

There are many factors that may hinder effectiveness
- Hills
- Curves
- Intersections
- Shade
- Color Contrast
- Driveways

Explain that there are numerous factors that may influence the effectiveness of traffic control. Hills, curves, intersections, shade, color contrast, and driveways just to name a few. Add to that distractions caused by driver behavior, other operations in the area, and possible bad weather and there is a recipe for disaster.
Slide 2-4

**Send A Clear Message**
- Use signage that is in good condition
- Use the correct sign for the application

Explain that damaged, soiled, or illegible signs will not provide the necessary protection. Also, use the correct sign for the application. The sign shown in the picture indicates that there may be a flagger ahead. However, there was no flagger or need to stop. A “Utility Work Ahead” sign would be more appropriate. Signs used in temporary traffic control zones are moved frequently, loaded and unloaded from trucks, and in general receive much harsher treatment than permanent signs. For this reason, particular attention must be given to maintaining signs properly for cleanliness, visibility, and correct positioning.

Slide 2-5

### Warning Sign Placement

<table>
<thead>
<tr>
<th>Road Type</th>
<th>Distance Between Signs</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 Speeds</td>
<td>350’</td>
</tr>
<tr>
<td>Rural</td>
<td>500’</td>
</tr>
<tr>
<td>Expressway-Freeway</td>
<td>1000’</td>
</tr>
</tbody>
</table>

Explain that this chart is from the MUTCD. On urban streets, the effective placement of the first warning sign in feet should range from 4 to 8 times the speed limit in mph, with the high end of the range being used when speeds are relatively high. When a single advance warning sign is used, the advance warning area can be as short as 100 feet. When two or more advance warning signs are used on higher-speed streets, the advance warning area should extend a greater distance. The distances contained in Table 6C-1 are approximate and should be applied with engineering judgment. These distances should be adjusted for field conditions, if necessary, by increasing or decreasing the recommended distances.
Typical Placement

Distance “A” is based on speed & work location

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Warning Sign Placement

Sign “C” is first sign the approaching motorist will encounter

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Explain that depending on traffic speed and other work zone requirements the spacing between signs and the work zone may vary. The table shown on the previous slide is from the MUTCD.

Explain that this slide shows the order of the signs from a driver’s point of view. The driver will encounter sign “C” first as he or she approaches the work zone.
**Portable Changeable Message Signs**

- Visible up to ½ mile away
- Visible from all lanes
- Read entire message twice at the posted speed
- Adjust under low-light conditions

Explain that Portable Changeable Message Signs (PCMS) are traffic control devices with the flexibility to display a variety of messages to fit the needs of road and street authorities. Each message consists of one or more displays. Portable Changeable Message signs are used most frequently on high density, urban freeways, but have applications on all types of highways where highway alignment, traffic routing problems or other pertinent conditions require advance warning and information. The signs should be visible from 1/2 mile under ideal day and night conditions. Each sign message should be legible from all lanes, from the sign up to a minimum of 650 feet. In the field, the PCMS should be sited and aligned to optimize driver performance. The message panel should have adjustable flash rates, so that the entire message can be read at least twice at the posted speed, the off-peak 85th percentile speed prior to work starting, or the anticipated operating speed. Under low light level conditions, the sign shall automatically adjust its light source so as to meet the legibility requirements and not impair the drivers, vision.
Cones

Not less that 18" in height
Must be at least 28" to 36" for freeway
When retro-reflective material is used:
  ✓ Must have a white band 3" from top & 6" wide
  ✓ Then a 4" band 2" below the 6" band

Explain that this requirement is also from the MUTCD. 36” is recommended.

Advance Warning Signs

Short Duration

48” For High Speed
36” For moderate traffic loads and speeds
24” For rural low speed

Explain that where any part of the roadway is obstructed or closed, advance-warning signs are required to alert traffic well in advance of these obstructions or restrictions. These signs may be used singly or in combination. Because of their importance, they shall have a standard size of 48 inches square and shall be the standard diamond shape for warning signs. Signs larger than 48 inches square may be used for additional emphasis of the temporary traffic control zone. Where speeds and volumes are moderately low, a minimum size of 36 inches square may be used for advance warning signs, if they have a minimum letter size of 5 inches. On secondary roads or city streets where speeds are very low, signs smaller than the standard size, but not less than 24 inches square, may be used for warning signs having short word messages or clearly understood symbols. Where distances are not shown on warning signs as part of the message, a separate panel with the distance legend may be mounted immediately below the sign on the same support.
**Advance Warning Signs**

- Should be mounted on the right side of the road
- Should be placed on both sides of divided highways

*Signs shown are for illustration purposes only and not intended to indicate what sign to use.*

Explain that on divided highways, the MUTCD requires that warning signs be placed so that both travel lanes see the signs.

**Merging Taper Formula**

\[
\begin{align*}
L &= \frac{W(S)^2}{60} \\
L &= W(S) & \text{45 MPH or Greater}
\end{align*}
\]

L = Taper in length of feet  
W = Width of offset in feet  
S = Speed*

*Note: May not be posted speed!

Explain that when redirection of the driver’s path is required, traffic is channelized from the normal path to a new path. The traffic control should try to inhibit the driver’s speed as little as possible. In addition, traffic movement should be inhibited as little as possible. Frequent and abrupt changed in geometries should be avoided. Roadway occupancy and work completion should be minimized to reduce exposure.
Explain that if our work zone activity affects pedestrian walkways, then we must provide them safe access through the work zone or route them to a safe area. A wide range of pedestrians might be affected by traffic temporary work zones, including the young, elderly, and people with disabilities such as hearing, visual, or mobility. These pedestrians need a clearly delineated and usable travel path.

The following three items should be considered when planning for pedestrians in work zones:

• Pedestrians should not be led into conflicts with vehicles, equipment, and operations.
• Pedestrians should not be led into conflicts with vehicles moving through or around the worksite.
• Pedestrians should be provided with a convenient and accessible path that replicates as nearly as practical the most desirable characteristics of the existing sidewalk(s) or footpath(s).
Explain that retro-reflective clothing will shine light back toward the source. States have different requirements as to the color of vest and hard hats required.

**End session two**
Session two key points

Slide 2-15

The presenter should have touched on the following items when explaining session two:

1. There are many factors that can hinder the effectiveness of traffic control
   a. True
   b. False

2. Traffic control devices must be set-up according to the posted speed limit.
   a. True
   b. False. Traffic control is set-up according to the 85th percentile.

3. For high-speed roadways, warning signs must be a minimum size of _______ inches.
   a. 24
   b. 36
   c. 48

4. Road cones must be no shorter than _______ inches.
   a. 16
   b. 18
   c. 24
Begin session three

Slide 3-1

Explain that the following section will discuss certain flagging requirements listed in the MUTCD.

Slide 3-2

Explain that each flagger should be trained in the techniques necessary to recognize the hazards associated with performing flagger operations. Flaggers should only use “Stop/Slow” paddles to flag traffic and flags should only be used in emergency situations. Because flaggers are responsible for public safety and make the greatest number of contacts with the public of all highway workers, they should be trained in safe traffic control practices and public contact techniques.
Flaggers should be able to demonstrate the following abilities:

- Ability to receive and communicate specific instructions clearly, firmly, and courteously
- Ability to move and maneuver quickly in order to avoid danger from errant vehicles
- Ability to control signaling devices (such as paddles and flags) in order to provide clear and positive guidance to drivers approaching a TTC zone in frequently changing situations
- Ability to understand and apply safe traffic control practices, sometimes in stressful or emergency situations
- Ability to recognize dangerous traffic situations and warn workers in sufficient time to avoid injury

Slide 3-3

Flagger Operations

- Wear reflective vest
- Use Stop/Slow paddles
- Be physically fit
- Be courteous and conscientious
- Provided drinking water

Explain that flaggers should always wear retro reflective vest. For daytime and nighttime activity, flaggers shall wear high-visibility safety apparel that meets the Performance Class 2 or 3 requirements of the ANSI/ISEA 107–2004 publication entitled "American National Standard for High-Visibility Apparel and Headwear" and labeled as meeting the ANSI 107-2004 standard performance for Class 2 or 3 risk exposures. The apparel background (outer) material color shall be fluorescent orange-red, fluorescent yellow-green, or a combination of the two as defined in the ANSI standard. The retroreflective material shall be orange, yellow, white, silver, yellow-green, or a fluorescent version of these colors, and shall be visible at a minimum distance of 1,000 feet. The retroreflective safety apparel shall be designed to identify the wearer as a person. For nighttime activity, high-visibility safety apparel that meets the Performance Class 3 requirements of the ANSI/ISEA 107–2004 publication entitled "American National Standard for High-Visibility Apparel and Headwear" and labeled as meeting the ANSI 107-2004 standard performance for Class 3 risk exposure should be considered for flagger wear.

Flaggers must be physically fit to perform the necessary duties and flaggers must be courteous and conscientious. Also, explain that flag persons must be provided with clean drinking water at their flagging station (water cooler) when the flag person is to be at the flagger station for a period exceeding 30-minutes.
Requirements

Signaling directions by flag persons

- Must conform to the MUTCD of state requirements
- Flags are used to direct traffic only during an emergency

Explain that signaling directions by flag persons must conform to the directions described in Chapter 6E, “Flagger Control”, of the Manual on Uniform Traffic Control Devices (MUTCD) or state requirements. One must ensure that flags are used to direct traffic only during an emergency. Also, explain that flag persons must use a legible, 18-inch STOP/SLOW paddle mounted on a 7-ft PVC pole for hand signaling. Red lights may be used in periods of darkness and a flagger’s station must be illuminated to the point that the flag person is visible to oncoming traffic when the flagger is working in darkness. Ensure that flagger stations are set up far enough ahead of the workspace so that approaching traffic has sufficient distance to stop before entering the work zone. Always position flag persons on the shoulder of the road and adjacent to the traffic being controlled or place them in a barricaded area.
Instruct flaggers to stand in an open area, not under trees, in curves, over the crest of the hill or directly behind parked vehicles to enhance their visibility to oncoming motorists. Ensure that flag persons do not leave their flagging stations unless relieved by another trained flag person or in the event of an emergency. Also, explain that flag persons with a horn, whistle, or other sounding device are stationed far enough ahead of the workforce to warn workers of approaching dangers, such as out-of-control vehicles. Importantly, give the flag person a break. Relieve them occasionally.

End session three
Key points session three

Slide 3-6

Key Points-Session three

1. Except in an emergency, only trained workers may perform flagging operations.
   a. True
   b. False
2. Flags may only be used to direct traffic in an emergency situation.
   a. True
   b. False
3. Flaggers should stand alone and not allow people or other workers to gather around their flagger station.
   a. True
   b. False
4. Flaggers must be trained in techniques necessary to recognize hazards associated with performing flagger operations.
   a. True
   b. False

The presenter should have touched on the following items when explaining session two:

1. Except in an emergency, only trained workers may perform flagging operations.
   a. True
   b. False
2. Flags may only be used to direct traffic in an emergency situation
   a. True
   b. False
3. Flaggers should stand-alone and not allow people or other workers to gather around their flagger station.
   a. True
   b. False
4. Flaggers must be trained in techniques necessary to recognize hazards associated with performing flagger operations
   a. True
   b. False

The last slide asks for questions. Answer any questions and thank the attendees. This slide has animation.
Work Zone Safety Handout

Work zone fatalities have increased. In 2015, 70 work zone crashes occurred each day resulting in at least one injury.

Put This in Perspective

- 12 crashes per week that cause at least one work zone fatality per week
- One work zone injury every 5.4 minutes

Streets and highway are full of busy people driving vehicles. Many of those people may be too busy to notice you and/or your co-workers. To compound this problem, work zones, even small ones can be distracting and confusing to drivers.

Transportation incidents and workers struck by vehicles and/or mobile equipment account for the highest number of all work related fatalities. Any time work operations require that workers are in proximity to traffic, or, operations affect or impede the flow of traffic, the answer may be temporary traffic control. When work is performed on or near these streets, our workers are exposed to potential hazards. Consequently, we MUST protect ourselves from these hazards.

Proper traffic control at work zones will help keep traffic flowing smoothly and in turn, help protect both drivers and workers.

Here are some “keys” to working safely around and in proximity to traffic.

- Companies must know the requirements for temporary traffic control for their state and/or location.
- Supervisors must ensure that temporary traffic control is used any time work interferes with and/or impedes traffic flow.
- Workers must be trained in the hazards associated with working in proximity to traffic.
Avoid the issue! Do not get into the traffic area any sooner than necessary, and get out as soon as possible. Less time equals less chance of having an incident!

Wear high visibility retro-reflective clothing such as traffic vests working on or near streets and highways. In addition, hard hats help you to be seen.

Traffic control and traffic warning devices must be set-up in advance of the work area.

Drivers are busy and quick to forget. Do not get too far from the signs.

Warning signs must be upright, installed on approved holders, and legible from at least 200’ away.

Temporary traffic control devices should impede traffic flow as little as possible.

Flag persons must be trained in proper flagging techniques prior to directing traffic.

Maintain the devices. If signs are blown around or cones are knocked over, fix them.

Flag persons must wear high visibility clothing; stand away from vehicles and other equipment and stand-alone. Flag persons should not allow co-workers or others to gather around their flag station as this may distract drivers and make the flag person harder to see.

Flag stations must be illuminated when flagging at night.

When placing cones at the work site, face oncoming traffic. Do not walk with oncoming traffic approaching from your back. Once cones are in place, work within them.

Stay alert! Avoid stepping in front of oncoming traffic. Work well inside the coned area and wear highly visible clothing at all times.

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1 Federal Highway Administration