Work Zone Flagging Operations

Bob Karrick
Key Message: Summarize who and what AWP is and all about.

Est. Presentation Time: <1 minute(s)

Explanation of Cues/Builds: None

Suggested Comments: Largest traffic management service company in the Eastern U.S.

• Over 1,200 employees
• Protecting a diverse range of clients including construction contractors, engineering firms, state transportation agencies, and major public utilities.
• We are dedicated to keeping roads safe for workers and the motoring public.

Suggested Questions: None

Additional Information: Reinforce that SAFETY is AWP’s first priority.

Possible Problems: None
Slides with ATSSA Content

♦ This presentation has been developed and adapted from the ATSSA “Safe Installation and Removal of Temporary Traffic Control Devices” presentation with permission from ATSSA.

♦ Slides containing copyrighted material is denoted by the ATSSA logo, as shown below.

Key Message: None
Est. Presentation Time: #-# minute(s)
Explanation of Cues/Builds: None
Suggested Comments: None
Suggested Questions: None
Additional Information: None
Possible Problems: None
Module Objectives

- Discuss flagger equipment
- Discuss proper flagger location
- Discuss flagger techniques and signals

Key Message: State the module objectives
Est. Presentation Time: Less than 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: None
Suggested Questions: None
Additional Information: None
Possible Problems: None
Key Message: Discuss a common flagger operation on a 2-lane road.
Est. Presentation Time: 2 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: The “special case” is a common situation where flaggers are used. We need two flaggers controlling the right of way to the one remaining open lane. Notice the location of the flaggers: on the shoulder.
Suggested Questions: Remember the “special case”? No arrow boards and a 50-100’ taper.
Additional Information: Refer to MUTCD TA-10. Discuss as needed based on the audience.
Possible Problems: None.
Flagger Equipment

- STOP/SLOW paddle
- Red flag
- High-visibility safety apparel
  - Will discuss later
- Hardhat, recommended
- Air horn
- Personal comfort items

Key Message: Discuss flagger equipment
Est. Presentation Time: 2 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: This is some of the equipment you will need:
  - STOP/SLOW paddle: Discussed next
  - Red flag: For emergencies only. Red not orange
  - High-visibility apparel: ANSI 107 Class 2 required. Class 3 recommended for nighttime flagger. This will be discussed later.
  - Hardhat is recommended but may be required by the state or by OSHA.
  - Air horn is recommended to warn fellow workers or impending danger
  - Personal comfort items, like water, snack bar, etc,
Suggested Questions: Let’s say you are going to be a flagger today. What equipment do you need?
Additional Information: Refer to MUTCD TA-10. Discuss as needed based on the audience.
Possible Problems: This is a list for discussion. The specific requirements of the paddle are presented in the next slide.
Advance Warning Signs

♦ Except in emergency situations, flagger stations shall be preceded by an advance warning sign or signs.

Key Message: Discuss advance warning signs
Est. Presentation Time: 2 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: Except in emergency situations, flagger stations shall be preceded by an advance warning sign or signs.
Also, except in emergency situations, flagger stations shall be illuminated at night.
Suggested Questions: As a minimum, which sign shall be present when you are working as a flagger?
Additional Information: Refer to MUTCD Page 575, paragraph 04.
Possible Problems: Size may vary by State.
**Preferred Flagger Location**

- **NEVER** in the path of moving vehicles
- On the shoulder
- At the beginning (in advance) of the taper (on lane closures)

**Key Message:** Discuss preferred flagger location  
**Est. Presentation Time:** 2 minute(s)  
**Explanation of Cues/Builds:** None  
**Suggested Comments:** The preferred flagger location is on the shoulder, at the beginning of the taper (on lane closures). **NEVER** in the path of moving vehicles.  
**Suggested Questions:** Where should you stand? On the shoulder and never in the path of moving vehicles. Assume drivers can’t see you. Where should you be?  
**Additional Information:** Refer to MUTCD TA-10. Discuss as needed based on the audience.  
**Possible Problems:** None
Photo source: John McEahern, Arvada, CO
Key Message: Discuss flagger devices

Est. Presentation Time: Less than 1 minute(s)

Explanation of Cues/Builds: None

Suggested Comments: Hand-signaling devices, such as STOP/SLOW paddles, lights, and red flags, are used to control road users through TTC zones. The STOP/SLOW paddle should be the primary and preferred hand-signaling device because the STOP/SLOW paddle gives road users more positive guidance than red flags. Use of flags should be limited to emergency situations.

Suggested Questions: What’s an emergency situation? Anything that was not scheduled, such as a water main break.

Additional Information: Refer to MUTCD Section 6E.03.

Possible Problems: None
Key Message: Discuss STOP/SLOW paddle requirements
Est. Presentation Time: 2 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: The STOP/SLOW paddle shall have an octagonal shape on a rigid handle. STOP/SLOW paddles shall be at least 18 in. wide with letters at least 6 in. high and should be fabricated from light semi-rigid material. The background of the STOP face shall be red with white letters and border. The background of the SLOW face shall be orange with black letters and border. When used at night, the STOP/SLOW paddle shall be retroreflectorized.
Suggested Questions: What’s “octagonal”? Eight sides.
Additional Information: Refer to MUTCD Section 6E.03.
Possible Problems: Several states required 24” x 24” in. paddles. Tailor to your state. MUTCD does not mention the height of the paddle. This is given as guidance, or recommended practice.


**Flags**

- Limited to emergency situations
- Min. of 24 inches square
- Red or fluorescent orange/red
- Staff approximately 36 inches in length
- Should be weighted
- Retroreflectorized for night use

---

**Key Message:** Discuss flag requirements  
**Est. Presentation Time:** 2 minute(s)  
**Explanation of Cues/Builds:** None

**Suggested Comments:** Flags, when used, shall be a minimum of 24 in. square, made of a good grade of red material, and securely fastened to a staff that is approximately 36 in. in length. The free edge of a flag should be weighted so the flag will hang vertically, even in heavy winds. When used at nighttime, flags shall be retroreflectorized red.

**Suggested Questions:** Why red and not orange? Red means STOP! What’s an emergency situation? Anything that was not scheduled, such as a water main break. Paddles generate more respect than flags.

**Additional Information:** Refer to MUTCD Section 6E.03.

**Possible Problems:** None
Key Message: Discuss flagger techniques
Est. Presentation Time: 2 minute(s)
Explanation of Cues/Builds: Text boxes appear upon click
Suggested Comments: Flaggers may only perform these three functions: STOP, RELEASE and SLOW traffic. Flaggers do not “direct” traffic like a police officer would at an intersection, for example. They stop, release and slow traffic only! Flagging stations SHALL be illuminated at night!
Additional Information: Refer to MUTCD Section 6E.04.
Possible Problems: Emphasize that flaggers cannot control traffic at an intersection.
Key Message: Discuss flagger techniques
Est. Presentation Time: 2 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: To stop road users, the flagger shall face road users and aim the STOP paddle face toward road users in a stationary position with the arm extended horizontally away from the body. The free arm shall be held with the palm of the hand above shoulder level toward approaching traffic.
Suggested Questions: How do flaggers STOP traffic?
Additional Information: Refer to MUTCD Section 6E.04.
Possible Problems: Emphasize flags may be used for emergencies only.
Key Message: Discuss flagger techniques

Est. Presentation Time: 2 minute(s)

Explanation of Cues/Builds: None

Suggested Comments: To direct stopped road users to proceed, the flagger shall face road users with the SLOW paddle face aimed toward road users in a stationary position with the arm extended horizontally away from the body. The flagger shall motion with the free hand for road users to proceed. Be assertive!

Suggested Questions: How do flaggers RELEASE traffic?

Additional Information: Refer to MUTCD Section 6E.04.

Possible Problems: Emphasize flags may be used for emergencies only.
**Key Message:** Discuss flagger techniques  
**Est. Presentation Time:** 2 minute(s)  
**Explanation of Cues/Builds:** None  
**Suggested Comments:** To alert or slow traffic, the flagger shall face road users with the SLOW paddle face aimed toward road users in a stationary position with the arm extended horizontally away from the body. Use your free hand to slow traffic down!  
**Suggested Questions:** How do flaggers SLOW traffic?  
**Additional Information:** Refer to MUTCD Section 6E.04.  
**Possible Problems:** Emphasize flags may be used for emergencies only.
Module Recap

- List flagger equipment
- Are signs required?
- What’s the preferred flagger location?
- When can flags be used?
- What color are they? Why?
- Where should flaggers stand?

Key Message: Recap module
Est. Presentation Time: 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: None
Suggested Questions: None
Additional Information: None
Possible Problems: Avoid telling the audience the answers to these questions. Their purpose is to gauge understanding. You may add other questions.
Module Objectives

- Discuss worker safety considerations
  - Discuss high-visibility safety apparel requirements

Key Message: State the module objectives
Est. Presentation Time: Less than 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: None
Suggested Questions: None
Additional Information: None
Possible Problems: None
Who Can Make Adjustments to the TTCP?

♦ Individuals with such authority
  ♦ Project superintendent
  ♦ Sometimes a supervisor
  ♦ Seldom a technician!

Changing an approved TCP without the proper authority may result in litigation in case of a crash!

Key Message: Discuss who can make adjustments to the TCP
Est. Presentation Time: 1 minute(s)
Explanation of Cues/Builds: Text box appears upon click
Suggested Comments: Changing an approved TCP without the proper authority may result in litigation in case of a crash!
Suggested Questions: Who can make adjustments and changes? Rarely a technician, sometimes a supervisor. Changes may have to be authorized.
Additional Information: None
Possible Problems: Requirements may vary by state
What to look for?

1. Factors affecting visibility/location
2. Factors affecting stopping distance
3. Nighttime operations
4. Urban areas
5. Intersections
6. Utility work
7. Bicycle and pedestrian considerations
8. Motorcycle considerations
9. Worker considerations

Key Message: Discuss other considerations that may require adjustments
Est. Presentation Time: 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: These are other considerations that may require adjustments. Let’s look at each one in more detail.
Suggested Questions: None
Additional Information: None
Possible Problems: This is a title slide. There are slides for each of these following. Avoid discussing them here.
### 1. Factors Affecting Visibility/Location

- Hills
- Curves
- Intersections
- Shade
- Color contrast
- Driveways
- Trees
- Other signs
- Buildings
- Bad weather
- Darkness

**Key Message:** Discuss factors that may affect visibility that may require adjustments

**Est. Presentation Time:** 1 minute(s)

**Explanation of Cues/Builds:** None

**Suggested Comments:** These are factors that may affect visibility. We need to be aware of these since they may prompt adjustments.

**Suggested Questions:** None

**Additional Information:** Give examples as needed.

**Possible Problems:** No need to give examples or read each of these. Choose one or two and give examples.
Weather Can be a Factor

Key Message: Provide an example of the previous point.
Est. Presentation Time: Less than 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: Weather can be a factor, like fog in the morning
Suggested Questions: Is this the proper location for this arrow board?
Additional Information: Photo source unknown.
Possible Problems: None
Rain Can be a Factor

Key Message: Provide an example of the previous point.

Est. Presentation Time: Less than 1 minute(s)

Explanation of Cues/Builds: None

Suggested Comments: Rain can be a factor, creating slippery pavements.

Suggested Questions: None

Additional Information: Give examples as needed.

Possible Problems: None
Hills Can be a Factor

Key Message: Provide an example of the previous point.
Est. Presentation Time: Less than 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: Hills can be a factor, restricting sight distance.
Suggested Questions: None
Additional Information: Photo source unknown.
Possible Problems: None
Key Message: Provide an example of the previous point.
Est. Presentation Time: Less than 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: Vegetation can be a factor, restricting sight distance.
Suggested Questions: None
Additional Information: Photo by J. Morales, taken in Kapaa, Kauai, Hawaii.
Possible Problems: None
Curves Can be a Factor

**Key Message:** Provide an example of the previous point.

**Est. Presentation Time:** Less than 1 minute(s)

**Explanation of Cues/Builds:** None

**Suggested Comments:** Curves can be a factor, restricting sight distance.

**Suggested Questions:** Where’s the flagger’s escape route?

**Additional Information:** Photo source unknown

**Possible Problems:** None
2. Factors Affecting Stopping Distance

- Traffic speed
- Vehicle weight
- Road and weather conditions
- Visibility

Key Message: Discuss factors affecting stopping distance that may require adjustments.
Est. Presentation Time: 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: These are factors affecting stopping distance. We need to be aware of these since they may prompt adjustments.
Suggested Questions: How does vehicle weight be a factor? Trucks take longer to stop!
Additional Information: Give examples as needed.
Possible Problems: None
Hills Will Add to Stopping Distances

Key Message: Provide an example of the previous point.
Est. Presentation Time: Less than 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: Hills can be a factor, adding stopping distance.
Suggested Questions: Where’s the flagger’s escape route?
Additional Information: Photo source unknown
Possible Problems: None
3. Nighttime Operations

- Driver vision is limited
- Signs and devices shall be retroreflective
- More impaired users
- Worker visibility is key

Key Message: Discuss night operations and how they may require adjustments.
Est. Presentation Time: 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: At night, driver vision is limited. Signs and devices shall be retroreflective. Worker visibility is key so wearing the proper apparel is critical.
Suggested Questions: How many of you work at night? What issues do you need to consider?
Additional Information: The MUTCD “typical” do not consider night work.
Possible Problems: None
4. Urban Areas

- Business access
- Pedestrians and bicyclists
- Heavier traffic
- Tighter spaces
- Street parking

**Key Message:** Discuss urban areas and how they may require adjustments.

**Est. Presentation Time:** 1 minute(s)

**Explanation of Cues/Builds:** None

**Suggested Comments:** Urban areas are unique, and they are all different. They require special considerations. Some are listed here.

**Suggested Questions:** Who remembers the definition of an urban area?

**Additional Information:** Photo source unknown, NYC.

**Possible Problems:** None
Pedestrian Friendly?

Key Message: Discuss urban areas and how they may require adjustments.
Est. Presentation Time: 2 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: This sidewalk should be closed and pedestrians detoured to the other side. Plus it is not ADA-compliant. Enough width (48”) shall be provided for ADA compliance.
Suggested Questions: What would you do if you walk up to this sign? Walk on the roadway, with your back to traffic? Turn around? It must be recognized that pedestrians are reluctant to retrace their steps to a prior intersection for a crossing or to add distance or out-of-the-way travel to a destination.
Additional Information: Photo taken in Fort Lauderdale, FL, by Juan Morales.
Possible Problems: None
5. Intersections

- Advance warning signs?
- Impact on signals?
- Pedestrians?

Every intersection is different!

Key Message: Discuss intersections and how they may require adjustments.
Est. Presentation Time: 1 minute(s)
Explanation of Cues/Builds: Text box appears upon click
Suggested Comments: Intersections are unique, and they are all different. They require special considerations. Some are listed here.
Suggested Questions: Can flaggers be used to control traffic at an intersection? No!
Additional Information: None
Possible Problems: None
Intersection Options

- Keep work space small
- Flaggers
  - STOP and RELEASE only!
  - Work in stages
- Reduce traffic volumes
- Closures
- Diversions/detours

Key Message: Discuss intersection options
Est. Presentation Time: 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: Self explanatory
Suggested Questions: Can flaggers be used to control traffic at an intersection? No!
Additional Information: Photo is from Virginia.
Possible Problems: May have to define a “diversion”. Discuss this in general terms. Keep moving.
Key Message: Discuss intersection options
Est. Presentation Time: 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: Working within an intersection can be difficult, due to multiple approaches and reduced visibility. Drivers are used to look up when approaching a signalized intersection
Suggested Questions: Can you think these workers are safe? Any other options?
Additional Information: Photo is from NYC, by J Morales
Possible Problems: Keep brief.
6. Utility Work

- Short daytime operations
- Intersection work
- Work beyond the shoulder

**Key Message:** Discuss utility operations and how they may require adjustments.

**Est. Presentation Time:** 2 minute(s)

**Explanation of Cues/Builds:** None

**Suggested Comments:** Utility operations are unique since most of them are short duration. The same standards and guidelines apply!

**Suggested Questions:** What are utility operations?

**Additional Information:** Utility: a public service, as a telephone or electric-light system, a streetcar or railroad line, or the like. A business enterprise, as a public-service corporation, performing an essential public service and regulated by the federal, state, or local government.

**Possible Problems:** None
Utility Work

♦ Small crew size
♦ Few vehicles
♦ Little traffic control training

Same standards apply!

Key Message: Discuss utility operations and how they may require adjustments.
Est. Presentation Time: 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: Utility operations usually work with small crew sizes and few vehicles. They usually have little or no traffic control training.
Suggested Questions: Does the MUTCD apply to utility operations? YES!
Additional Information: None
Possible Problems: None
Key Message: Discuss utility operations and how they may require adjustments.
Est. Presentation Time: 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: This photo shows a typical utility operation on a public street.
Suggested Questions: Do the same standards apply?
Additional Information: Photo taken near Fort Lauderdale, FL. By J. Morales
Possible Problems: NOTE: Florida allows work over an open lane if some conditions are met. Some states may not allow this and would require the lane underneath to be closed.
Key Message: Discuss pedestrians considerations.

Est. Presentation Time: 1 minute(s)

Explanation of Cues/Builds: None

Suggested Comments: Pedestrian may be problematic since they have much more mobility than motor vehicles. Three main considerations in planning for pedestrian safety: (next slides)

Suggested Questions: None

Additional Information: A wide range of pedestrians might be affected by TTC 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. Considerations for pedestrians with disabilities are addressed in Section 6D.02. The most desirable way to provide information to pedestrians with visual disabilities that is equivalent to visual signage for notification of sidewalk closures is a speech message provided by an audible information device. Devices that provide speech messages in response to passive pedestrian actuation are the most desirable. Other devices that continuously emit a message, or that emit a message in response to use of a pushbutton, are also acceptable. Signage information can also be transmitted to personal receivers, but currently such receivers are not likely to be carried or used by pedestrians with visual disabilities in TTC zones. Audible information devices might not be needed if detectable channelizing devices make an alternate route of travel evident to pedestrians with visual disabilities.

Possible Problems: None
Bicycle Considerations

- Also users
- Bike lanes may be affected
- Maintain access
- Affected:
  - By lane constriction
  - Uneven lanes
  - Shoulder drop-offs

Key Message: Discuss bicycle considerations
Est. Presentation Time: 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: Self explanatory
Suggested Questions: None
Additional Information: Picture donated by Ed Kant.
Possible Problems: None
Pedestrian Considerations

- Avoid pedestrian detours
- If pedestrian routes are closed, alternate pedestrian routes shall be provided
- Facilities shall be detectable & accessible

Key Message: Discuss pedestrians considerations.
Est. Presentation Time: 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: Pedestrian may be problematic since they have much more mobility than motor vehicles. Three main considerations in planning for pedestrian safety: (next slides)
Suggested Questions: None
Additional Information: A wide range of pedestrians might be affected by TTC 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. Considerations for pedestrians with disabilities are addressed in Section 6D.02. The most desirable way to provide information to pedestrians with visual disabilities that is equivalent to visual signage for notification of sidewalk closures is a speech message provided by an audible information device. Devices that provide speech messages in response to passive pedestrian actuation are the most desirable. Other devices that continuously emit a message, or that emit a message in response to use of a pushbutton, are also acceptable. Signage information can also be transmitted to personal receivers, but currently such receivers are not likely to be carried or used by pedestrians with visual disabilities in TTC zones. Audible information devices might not be needed if detectable channelizing devices make an alternate route of travel evident to pedestrians with visual disabilities.
Possible Problems: None
Pedestrian Considerations

- Three main considerations in planning for pedestrian safety:

Key Message: Discuss pedestrians considerations.
Est. Presentation Time: 1 minute(s)
Explanation of Cues/Buils: None
Suggested Comments: Pedestrian may be problematic since they have much more mobility than motor vehicles. Three main considerations in planning for pedestrian safety: (next slides)
Suggested Questions: None
Additional Information: A wide range of pedestrians might be affected by TTC 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. Considerations for pedestrians with disabilities are addressed in Section 6D.02. The most desirable way to provide information to pedestrians with visual disabilities that is equivalent to visual signage for notification of sidewalk closures is a speech message provided by an audible information device. Devices that provide speech messages in response to passive pedestrian actuation are the most desirable. Other devices that continuously emit a message, or that emit a message in response to use of a pushbutton, are also acceptable. Signage information can also be transmitted to personal receivers, but currently such receivers are not likely to be carried or used by pedestrians with visual disabilities in TTC zones. Audible information devices might not be needed if detectable channelizing devices make an alternate route of travel evident to pedestrians with visual disabilities.
Possible Problems: None
Pedestrians Should Not Be Led Into Conflicts With:

A. Work site vehicles, equipment or operations
B. Traffic moving through or around work site

Key Message: Discuss pedestrians considerations.
Est. Presentation Time: 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: The following three items should be considered when planning for pedestrians in TTC zones: A. Pedestrians should not be led into conflicts with work site vehicles, equipment, and operations. B. Pedestrians should not be led into conflicts with vehicles moving through or around the work site. Whenever it is feasible, closing off the work site from pedestrian intrusion may be preferable to channelizing pedestrian traffic along the site with TTC devices.
Suggested Questions: None
Additional Information: C. Pedestrians should be provided with a reasonably safe, convenient, and accessible path that replicates as nearly as practical the most desirable characteristics of the existing sidewalk(s) or footpath(s). Where pedestrians who have visual disabilities encounter work sites that require them to cross the roadway to find an accessible route, instructions should be provided using an audible information device. Accessible pedestrian signals (see Section 4E.06) with accessible pedestrian detectors (see Section 4E.09) might be needed to enable pedestrians with visual disabilities to cross wide or heavily traveled roadways.
Possible Problems: None
Pedestrians Should

C. Be provided with a safe, convenient travel path that replicates as nearly as possible their normal pathways

*If this is not possible, detour or divert pedestrians!*

**Key Message:** Discuss pedestrians considerations.

**Est. Presentation Time:** 1 minute(s)

**Explanation of Cues/Builds:** Text box appears upon click

**Suggested Comments:** C. Pedestrians should be provided with a reasonably safe, convenient, and accessible path that replicates as nearly as practical the most desirable characteristics of the existing sidewalk(s) or footpath(s). Where pedestrians who have visual disabilities encounter work sites that require them to cross the roadway to find an accessible route, instructions should be provided using an audible information device. Accessible pedestrian signals (see Section 4E.06) with accessible pedestrian detectors (see Section 4E.09) might be needed to enable pedestrians with visual disabilities to cross wide or heavily traveled roadways.

**Suggested Questions:** None

**Additional Information:** When pedestrian movement through or around a work site is necessary, a separate usable footpath should be provided. If the previous pedestrian facility was accessible to pedestrians with disabilities, the footpath provided during temporary traffic control should also be accessible. There should not be any abrupt changes in grade or terrain that could cause a tripping hazard or could be a barrier to wheelchair use. Barriers and channelizing devices should be detectable to pedestrians who have visual disabilities (see Section 6F.68). Photo from FHWA.

**Possible Problems:** None
**Key Message:** Discuss sidewalk diversions.
**Est. Presentation Time:** 1 minute(s)
**Explanation of Cues/Builds:** None
**Suggested Comments:** This shows a pedestrian diversion, where the pedestrians remain on the same route but are diverted around an obstruction.
**Suggested Questions:** What is a “diversion”? A diversion is a temporary rerouting of road users onto a temporary highway or alignment placed around the work area.
**Additional Information:** Provisions for effective continuity of accessible circulation paths for pedestrians should be incorporated into the TTC process. Where existing pedestrian routes are blocked or detoured, information should be provided about alternative routes that are usable by pedestrians with disabilities, particularly those who have visual disabilities. Access to temporary bus stops, reasonably safe travel across intersections with accessible pedestrian signals (see Section 4E.06), and other routing issues should be considered where temporary pedestrian routes are channelized. Barriers and channelizing devices that are detectable by people with visual disabilities should be provided.
**Possible Problems:** 09 MUTCD shows 36 inches. ADA requires 48 inches. This has been recognized as an error by FHWA. Also, if pedestrian ramps are needed, they shall have a 2% (1:50) slope.
Key Message: Discuss sidewalk diversions.
Est. Presentation Time: 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: This shows a pedestrian diversion, where the pedestrians remain on the same route but are diverted around an obstruction.
Suggested Questions: What is a “diversion”? A diversion is a temporary rerouting of road users onto a temporary highway or alignment placed around the work area.
Additional Information: Provisions for effective continuity of accessible circulation paths for pedestrians should be incorporated into the TTC process. Where existing pedestrian routes are blocked or detoured, information should be provided about alternative routes that are usable by pedestrians with disabilities, particularly those who have visual disabilities. Access to temporary bus stops, reasonably safe travel across intersections with accessible pedestrian signals (see Section 4E.06), and other routing issues should be considered where temporary pedestrian routes are channelized. Barriers and channelizing devices that are detectable by people with visual disabilities should be provided.
Possible Problems: None
Key Message: Discuss the use of cones and visually impaired persons

Est. Presentation Time: 1-2 minute(s)

Explanation of Cues/Builds: None

Suggested Comments: Cones should not be used for pedestrian channelization or as pedestrian barriers in TTC zones on or along sidewalks unless they are continuous between individual devices and detectable to users of long canes. Yellow caution tape is not acceptable.

Suggested Questions: Can a blind person walk in between cones and unknowingly enter a work zone? Yes! We need detectable perimeters or cones that are very close together.

Additional Information: Photo source unknown

Possible Problems: Avoid getting into an ADA discussion here. Not within the scope of this course.
Not Detectable:

- Individual channelizing devices
- Tape
- Rope or plastic chain used to connect individual devices
- Discontinuous barriers and devices
- Pavement markings

**Key Message:** Discuss items that are NOT detectable.

**Est. Presentation Time:** 1-2 minute(s)

**Explanation of Cues/Builds:** None

**Suggested Comments:** Individual channelizing devices, tape or rope used to connect individual devices, other discontinuous barriers and devices, and pavement markings are not detectable by persons with visual disabilities and are incapable of providing detectable path guidance on temporary or realigned sidewalks or other pedestrian facilities.

**Suggested Questions:** Why not?

**Additional Information:** None

**Possible Problems:** Avoid getting into an ADA discussion here. Not within the scope of this course.
Tape or rope are not detectable!

Key Message: Illustrate previous point
Est. Presentation Time: 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: (Illustrate previous point, self explanatory)
Suggested Questions: Do you see the problem?
Additional Information: Photo is from FHWA
Possible Problems: None
Key Message: Provide an example of the previous point.
Est. Presentation Time: Less than 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: Safe travel path? Yes. Notice the continuous baseboard.
Suggested Questions: Safe travel path? YES.
Additional Information: Photo source unknown, NYC.
Possible Problems: None
Key Message: Provide an example of the previous point.
Est. Presentation Time: Less than 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: Safe travel path? Yes. Notice the continuous baseboard.
Suggested Questions: Safe travel path? YES.
Additional Information: Photo source unknown, Washington, DC
Possible Problems: None
Key Message: Provide an example of the previous point.
Est. Presentation Time: Less than 1 minute(s)
Explanation of Cues/BUILDs: None
Suggested Comments: Safe travel path? Yes. Notice the continuous baseboard.
Suggested Questions: Safe travel path? YES.
Additional Information: Photo source unknown, NYC.
Possible Problems: None
Bad!

Key Message: Provide an example of the previous point.
Est. Presentation Time: Less than 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: Safe travel path? No. Caution tape is not “detectable” and therefore cannot be used to delineate pedestrians.
Additional Information: Photo source: FHWA
Possible Problems: None
Key Message: Provide an example of the previous point.
Est. Presentation Time: Less than 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: Safe travel path? Yes!
Suggested Questions: Is this ADA compliant? Yes, it is detectable!
Additional Information: Photo source unknown
Possible Problems: None
Key Message: Provide an example of the previous point.
Est. Presentation Time: Less than 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: What about this one?
Suggested Questions: What would a visually impaired person do? Keep going!
Additional Information: Photo source unknown
Possible Problems: None
Key Message: Discuss motorcycles and how they may require adjustments.
Est. Presentation Time: 2 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: Motorcycles are unique users and some feel deserve special considerations. Their crashes tend to be serious and are increasing.
Suggested Questions: Any one here rides a motorcycle? What are your concerns with work zones?
Additional Information: None
Possible Problems: Some feel motorcycles are regular motor vehicles and do not need special considerations. The MUTCD part 6 does not mention motorcycles.
Key Message: Discuss motorcycles countermeasures.
Est. Presentation Time: 2 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: Self explanatory. There are no specific requirements in this regard.
Suggested Questions: What about steel plates? May be slippery or create a bump.
Additional Information: None
Possible Problems: Discuss this in general terms. This is not in the MUTCD
Key Message: Provide an example of the previous point.
Est. Presentation Time: Less than 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: This is an example of a drop-off condition, which may require protection devices (when the adjacent lane is open)
Suggested Questions: None
Additional Information: Photo is from Manassas, VA, by J. Morales
Possible Problems: Drop-off requirements vary by State, but are usually based on the Roadside Design Guide.
Drop-off Protection
Requirements vary by State

♦ Protection devices usually depend on:
  ♦ Depth of drop-off
  ♦ Proximity to travel lane

Key Message: Provide an example of the previous point.
Est. Presentation Time: Less than 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: This is an example of a drop-off condition, which may require protection devices (when the adjacent lane is open)
Suggested Questions: None
Additional Information: Photo and figure from NY Times.
Possible Problems: Drop-off requirements vary by State, but are usually based on the Roadside Design Guide.
Steel Plate Markings

Key Message: Provide an example of the previous point.
Est. Presentation Time: Less than 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: Some states, like Virginia, require markings on steel plates for better visibility by motorcyclists.
Suggested Questions: None
Additional Information: Photo is from Virginia.
Possible Problems: None
Potential Motorcycle Hazards

- Water ponding
- Rolling devices
- Bumps
- Loose gravel

Key Message: Discuss motorcycles countermeasures.
Est. Presentation Time: 2 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: Self explanatory. There are no specific requirements in this regard.
Suggested Questions: None
Additional Information: None
Possible Problems: Discuss this in general terms.
9. Worker Safety Considerations

- Exposed to dangerous situations
- Vulnerable
- They rely on TTC for their safety!

Key Message: Discuss considerations for worker safety
Est. Presentation Time: 2 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: Equally as important as the safety of road users traveling through the TTC zone is the safety of workers. TTC zones present temporary and constantly changing conditions that are unexpected by the road user. This creates an even higher degree of vulnerability for workers on or near the roadway.
Suggested Questions: How do we enhance worker safety?
Additional Information: Maintaining TTC zones with road user flow inhibited as little as possible, and using TTC devices that get the road user's attention and provide positive direction are of particular importance. Likewise, equipment and vehicles moving within the activity area create a risk to workers on foot. When possible, the separation of moving equipment and construction vehicles from workers on foot provides the operator of these vehicles with a greater separation clearance and improved sight lines to minimize exposure to the hazards of moving vehicles and equipment.
Possible Problems: None
Key Elements to Improve Worker Safety

A. Training
B. Temporary Traffic Barriers
C. Speed Reduction
D. Activity Area (Internal TCP)
E. Worker safety planning
   ♦ OSHA general duty clause

Key Message: Discuss considerations for worker safety
Est. Presentation Time: 2 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: The following are the key elements of worker safety and TTC management that should be considered to improve worker safety:
A. Training—all workers should be trained on how to work next to motor vehicle traffic in a way that minimizes their vulnerability. Workers having specific TTC responsibilities should be trained in TTC techniques, device usage, and placement.
B. Temporary Traffic Barriers—temporary traffic barriers should be placed along the work space depending on factors such as lateral clearance of workers from adjacent traffic, speed of traffic, duration and type of operations, time of day, and volume of traffic.
C. Speed Reduction—reducing the speed of vehicular traffic, mainly through regulatory speed zoning, funneling, lane reduction, or the use of uniformed law enforcement officers or flaggers, should be considered.
D. Activity Area—planning the internal work activity area to minimize backing-up maneuvers of construction vehicles should be considered to minimize the exposure to risk.
E. Worker Safety Planning—a trained person designated by the employer should conduct a basic hazard assessment for the worksite and job classifications required in the activity area. This safety professional should determine whether engineering, administrative, or personal protection measures should be implemented. This plan should be in accordance with the Occupational Safety and Health Act of 1970, as amended, “General Duty Clause” Section 5(a)(1) - Public Law 91-596, 84 Stat. 1590, December 29, 1970, as amended, and with the requirement to assess worker risk exposures for each job site and job classification, as per 29 CFR 1926.20 (b)(2) of "Occupational Safety and Health Administration Regulations, General Safety and Health Provisions" (see Section 1A.11).

**Suggested Questions:** How do we enhance worker safety?

**Additional Information:** Refer to MUTCD Section 6D.03.

**Possible Problems:** None
Key Message: Discuss high-visibility safety apparel

Est. Presentation Time: 1 minute(s)

Explanation of Cues/Builds: None

Suggested Comments: At night, driver vision is limited. Signs and devices shall be retroreflective. Worker visibility is key so wearing the proper apparel is critical. ANSI (next slide) Class 2 apparel is REQUIRED for all workers.

Suggested Questions: What are the requirements for high-visibility safety apparel? Who is a “worker”?

Additional Information: Refer to MUTCD Section 6E.02. For daytime and nighttime activity, flaggers shall wear safety apparel meeting the requirements of “American National Standard for High-Visibility Apparel” (see Section 1A.11) and labeled as meeting the ANSI 107-1999 standard performance for Class 2 risk exposure. The apparel background (outer) material color shall be either fluorescent orange-red or fluorescent yellow-green as defined in the standard. The retroreflective material shall be either orange, yellow, white, silver, yellow-green, or a fluorescent version of these colors, and shall be visible at a minimum distance of 1,000 ft.. The retroreflective safety apparel shall be designed to clearly identify the wearer as a person. For nighttime activity, safety apparel meeting the requirements of ISEA “American National Standard for High-Visibility Apparel” (see Section 1A.11) and labeled as meeting the ANSI 107-1999 standard performance for Class 3 risk exposure should be considered for flagger wear (instead of the Class 2 safety apparel in the Standard above). The Federal Highways regulation 23CFR634: Worker Visibility is applicable to any worker within the right-of-way of a Federal-aid highway. The definition of a Federal-aid highway is dependent on the functional classification of the roadway as determined by the
State DOT and owner agency and is a direct reference the eligibility for the use of Federal-aid dollars. Any roadway functionally classified higher than a **local street** (within an urbanized area) or **rural minor collector** (outside of any defined urbanized area) is considered a **Federal-aid highway**.

**Possible Problems:** Avoid referring to the apparel as “vests” since the apparel may involve retroreflective pants. Colors may vary by state. Class 3 may be required by the state for nighttime activities.
Who is a “worker”?  

♦ A person who is on foot and whose duties place them within the right-of-way no matter what their actual job is, including incident responders, volunteer workers & trash pickers

♦ Police officers are exempt as long as they are not directing traffic or acting as an incident responder

Key Message: Discuss high-visibility safety apparel
Est. Presentation Time: 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: A worker is defined as a person who is on foot and whose duties place them within the right-of-way no matter what their actual job is (there is an exception is for police officers as long as they are not Directing Traffic or acting as an incident responder). The definition includes incident responders and volunteer workers such as trash pickers (i.e. maintenance) as well.
Suggested Questions: Who is a “worker”?
Additional Information: The Federal Highways regulation 23CFR634 : Worker Visibility is applicable to any worker within the right-of-way of a Federal-aid highway. A worker is defined as a person who is on foot and whose duties place them within the right-of-way no matter what their actual job is (there is an exception is for police officers as long as they are not Directing Traffic or acting as an incident responder). The definition includes incident responders and volunteer workers such as trash pickers (i.e. maintenance) as well. The definition of a Federal-aid highway is dependent on the functional classification of the roadway as determined by the State DOT and owner agency and is a direct reference the eligibility for the use of Federal–aid dollars. Any roadway functionally classified higher than a local street (within an urbanized area) or rural minor collector (outside of any defined urbanized area) is considered a Federal-aid highway.
Possible Problems: None
High-Visibility Safety Apparel


Key Message: Discuss ANSI 107
Est. Presentation Time: 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: ANSI 107 is the standard for high-visibility safety apparel. ANSI stands for American National Standard Institute. They developed a standard for high-visibility safety apparel that has been included in the MUTCD. The standard includes 3 classes (or types) of apparel (next slide), based on how much retroreflective material they have.
Suggested Questions: What is ANSI?
Additional Information: The American National Standards Institute (ANSI) approved the American National Standard for High-Visibility Safety Apparel (ANSI/ISEA 107-2004). This standard provides consistent, authoritative guidelines for the selection and use of high-visibility apparel in the United States. ANSI/ISEA 107-2004 is a voluntary standard that offers performance specifications for reflective materials, including minimum amounts, placement, background material, test methods and care labeling. In simplest terms, the ANSI/ISEA 107-2004 standard provides for a high degree of reflective material incorporated into garments...thus improving visibility...and safety.
ANSI/ISEA 107-2004 specifies three classes of garments based on work environment.
Possible Problems: Although this requirements is included in the flagger section of the MUTCD, it has been expanded to include all workers within the right-of-way.
ANSI 107-2004

- Specifies minimum amounts of retroreflective materials, colors and placement of materials
- Three types of apparel:
  - Class 1
  - Class 2
  - Class 3

Key Message: Discuss ANSI 107
Est. Presentation Time: 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: The standard includes 3 classes (or types) of apparel (next slide), based on how much retroreflective material they have.
Suggested Questions: None
Additional Information: ANSI/ISEA 107-2004 specifies three classes of garments based on work environment.
Possible Problems: Although this requirements is included in the flagger section of the MUTCD, it has been expanded to include all workers within the right-of-way, effective 11/24/08.
Key Message: Discuss Class 1 apparel
Est. Presentation Time: 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: Class 1 is unacceptable for highway work. Do not wear. Throw them away
Suggested Questions: How can you tell a class 1? Usually there’s no retroreflective material on the side.
Additional Information: These garments are intended for workers who have ample separation from vehicular traffic that does not exceed 25 mph. Class 1 garments are often safety vests they are recommended for parking service attendants, workers in warehouses with equipment traffic, shopping cart retrievers, sidewalk maintenance workers and delivery vehicle drivers.
Possible Problems: Although this requirements is included in the flagger section of the MUTCD, it has been expanded to include all workers within the right-of-way, effective 11/24/08.
**Class 2 Apparel**

- **Required for:**
  - All workers within the right-of-way
  - Daytime flaggers
  - Officers directing traffic
- **Various colors allowed**
  - May vary by State

---

**Key Message:** Discuss Class 2 apparel

**Est. Presentation Time:** 1 minute(s)

**Explanation of Cues/Builds:** None

**Suggested Comments:** Class 2 apparel is required for ALL workers within the right-of-way.

**Suggested Questions:** How can you tell a class 2? 360 visibility.

**Additional Information:** Class 2 garments are for users who need greater visibility in poor weather conditions and whose activities occur near roadways where traffic speeds exceed 25 mph. This class of garment is suitable for railway workers, school crossing guards, parking and toll gate personnel, airport ground crews and law enforcement personnel directing traffic.

**Possible Problems:** Although this requirements is included in the flagger section of the MUTCD, it has been expanded to include all workers within the right-of-way, effective 11/24/08

---

**Check your local standards!**
Class 3 Apparel

- Identifies the wearer as a person
  - Retroreflective sleeves
  - and/or
  - Retroreflective trousers

- Recommended for nighttime flaggers

---

**Key Message:** Discuss Class 3 apparel

**Est. Presentation Time:** 2 minute(s)

**Explanation of Cues/Builds:** None

**Suggested Comments:** Class 3 apparel is recommended for nighttime workers, including flaggers.

**Suggested Questions:** How can you tell a class 3? It has sleeves. (See below)

**Additional Information:** Class 3 garments provide the highest level of visibility to workers in high-risk environments that involve high task loads, a wide range of weather conditions and traffic exceeding 50 mph. Class 3 garments provide coverage to the arms and/or legs as well as the torso, and can include pants, jackets, coveralls or rain wear. The MUTCD recommends this apparel for nighttime workers. ANSI released a revised version of ANSI 107 in 2004 (after the 2003 MUTCD). Under the revised standard, class 3 apparel requires sleeves. The 1999 version did not, so often, workers with a small built had to wear retroreflective pants to be class 3 compliant.

**Possible Problems:** Class 3 may be required by the state. Although this requirements is included in the flagger section of the MUTCD, it has been expanded to include all workers within the right-of-way, effective 11/24/08. Some state standards may still refer to the 1999 standard.
Key Message: Discuss Class 3 apparel  
Est. Presentation Time: 2 minute(s)  
Explanation of Cues/Builds: None  
Suggested Comments: Class 3 apparel is recommended for nighttime workers, including flaggers.  
Suggested Questions: How can you tell a class 3? It has sleeves. (See below)  
Additional Information: Class 3 garments provide the highest level of visibility to workers in high-risk environments that involve high task loads, a wide range of weather conditions and traffic exceeding 50 mph. Class 3 garments provide coverage to the arms and/or legs as well as the torso, and can include pants, jackets, coveralls or rain wear. The MUTCD recommends this apparel for nighttime workers. ANSI released a revised version of ANSI 107 in 2004 (after the 2003 MUTCD). Under the revised standard, class 3 apparel requires sleeves. The 1999 version did not, so often, workers with a small built had to wear retroreflective pants to be class 3 compliant.  
Possible Problems: Class 3 may be required by the state. Although this requirements is included in the flagger section of the MUTCD, it has been expanded to include all workers within the right-of-way, effective 11/24/08. Some state standards may still refer to the 1999 standard.
Module Recap

♦ Can a TCT make adjustments to an approved plan? When? By whom?
♦ Name 3 worker safety considerations
♦ Name some potential motorcycle hazards
♦ What type of apparel is required for daytime work?

Key Message: Recap module
Est. Presentation Time: 1 minute(s)
Explanation of Cues/Builds: None
Suggested Comments: None
Suggested Questions: None
Additional Information: None
Possible Problems: Avoid telling the audience the answers to these questions. Their purpose is to gauge understanding. You may add other questions.
We’ve come a long way!!

...but we have a long way to go!

**Key Message:** Discuss the “bottom line”

**Est. Presentation Time:** Less than 1 minute(s)

**Explanation of Cues/Builds:** None

**Suggested Comments:** We’ve come a long way, and traffic safety has been improved considerably from these days, but we still have along way to go. We can do better! You can help us!

**Suggested Questions:** What’s wrong with this picture?

**Additional Information:** Picture taken on I-95 North, circa early 70s, in Richmond, VA, presumably by Vic Liebe.

**Possible Problems:** None
The Bottom Line: ASK YOURSELF

♦ Are your TTC areas as safe as they can be for
  ♦ Workers,
  ♦ Motorists,
  ♦ Bicyclists, and
  ♦ Pedestrians?

**IF NOT, YOU CAN MAKE A DIFFERENCE!!!**

Key Message: Discuss the “bottom line”
Est. Presentation Time: Less than 1 minute(s)
Explanation of Cues/Builds: Text box appears upon click
Suggested Comments: Ask your self this question. If the answer is no, you can help us!
Suggested Questions: None
Additional Information: None
Possible Problems: None
THANK YOU and WORK SAFE

Bob Karrick
513-321-9889
bkarrick@awptraffic.com
www.awptrafficsafety.com