

## CHAPTER 6C. PEDESTRIAN AND WORKER SAFETY

### Section 6C.01 Pedestrian and Worker Safety – General

#### Standard:

- 01 The various TTC provisions for pedestrian and worker safety set forth in Part 6 shall be applied by knowledgeable **qualified** (for example, trained and/or certified) persons after appropriate evaluation and engineering judgment.

### Section 6C.02 Pedestrian Considerations

#### Support:

- 01 A wide range of pedestrians might be affected by TTC zones, including the young, elderly, and people with disabilities such as hearing, vision, or mobility. Pedestrians need a clearly delineated and usable travel path. Considerations for pedestrians with disabilities are addressed in Section 6C.03.

#### Guidance:

- 02 *Prior to closing a sidewalk or other pedestrian facility, the maintaining agency should advise users of the future closure.*

#### Standard:

- 03 **If the TTC zone affects the movement of pedestrians, adequate pedestrian access and walkways shall be provided.**

#### Option:

- 04 If establishing or maintaining an alternate pedestrian route is not feasible during the project, an alternate means of providing for pedestrians may be used, such as adding free bus service around the project or assigning someone the responsibility to assist pedestrians with disabilities through the project limits.
- 05 If an existing pedestrian route is impacted by a short duration or a short-term stationary work zone that is attended with project personnel, establishing an alternate pedestrian route may not be necessary if the work can be stopped and pedestrians can navigate the work zone. Pedestrians may be delayed for a short period of time for project personnel to move equipment and material to facilitate passage. Work zone personnel may also provide assistance to pedestrians as necessary.

#### Support:

- 06 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.

#### Guidance:

- 07 *The following three items should be considered when planning for pedestrians in TTC zones:*
- A. Pedestrians should not be led into conflicts with vehicles, equipment, and operations.*
  - B. Pedestrians should not be led into conflicts with vehicles moving through or around the worksite.*
  - C. 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).*
- 08 *A pedestrian route should not be severed and/or moved for non-construction activities such as parking for vehicles and equipment.*
- 09 *TTC zones should be designed to minimize conflicts between vehicular and pedestrian movements. Consideration should be made to separate pedestrian movements from both worksite activity and vehicular traffic. Unless an acceptable route that does not involve crossing the roadway can be provided, pedestrians should be appropriately directed with advance signing that encourages them to cross to the opposite side of the roadway. In urban and suburban areas with high vehicular traffic volumes, these signs should be placed at intersections (rather than midblock locations) so that pedestrians are not confronted with midblock worksites that will induce them to attempt skirting the worksite or making a midblock crossing.*

#### Support:

- 10 Figures 6P-28 and 6P-29 show typical TTC device usage and techniques for pedestrian movement through work zones.

#### Guidance:

- 11 *To accommodate the needs of pedestrians, including those with disabilities, the following considerations should be*

addressed when temporary pedestrian pathways in TTC zones are designed or modified:

- A. Provisions for continuity of accessible paths for pedestrians should be incorporated into the TTC plan.
- B. Access to transit stops should be maintained.
- C. A smooth, continuous hard surface should be provided throughout the entire length of the temporary pedestrian facility. There should be no curbs or abrupt changes in grade or terrain that could cause tripping or be a barrier to pedestrians with disabilities. The geometry and alignment of the facility should meet the applicable requirements of the “U.S. Department of Justice 2010 ADA Standards for Accessible Design, September 15, 2010, 28 CFR 35 and 36, Americans with Disabilities Act of 1990.”
- D. The width of the existing pedestrian facility should be provided for the temporary facility if practical. Traffic control devices and other construction materials and features should not intrude into the usable width of the sidewalk, temporary pathway, or other pedestrian facility. When it is not possible to maintain a minimum width of 60 inches throughout the entire length of the pedestrian pathway, a 60 x 60-inch passing space should be provided at least every 200 feet to allow individuals in wheelchairs to pass.
- E. Blocked routes, alternate crossings, and sign and signal information should be communicated to pedestrians with vision disabilities by providing devices such as audible information devices or barriers and channelizing devices that are detectable to the pedestrians traveling with the aid of a long cane or who have vision disabilities.
- F. When channelization is used to delineate a pedestrian pathway, a continuous detectable edging should be provided throughout the length of the facility such that pedestrians using a long cane can follow it. These detectable edgings should comply with the provisions of Section 6M.04.
- G. Signs and other devices mounted lower than 7 feet above the temporary pedestrian pathway should not project more than 4 inches into accessible pedestrian facilities.

Support:

- 12 Where pedestrians in TTC zones are routed on temporary pedestrian pathways, providing information in non-visual formats (such as accessible pedestrian signals with audible tones and/or speech messages, and vibrotactile surfaces) aids pedestrians with vision disabilities so they can navigate the temporary pathway. Section 6C.03 contains additional information on accessibility considerations in TTC zones. Section 4K.01 contains information on accessible pedestrian signals.

Option:

- 13 Whenever it is feasible, the worksite may be closed off from pedestrian intrusion if doing so is determined to be preferable to channelizing pedestrians along the site with TTC devices.

Guidance:

- 14 Fencing should not create sight distance restrictions for road users. Fences should not be constructed of materials that would be hazardous if impacted by vehicles. Wooden railing, fencing, and similar systems placed immediately adjacent to motor vehicle traffic should not be used as substitutes for crashworthy temporary traffic barriers.
- 15 Ballast for TTC devices should be kept to the minimum amount needed and should be mounted low to prevent penetration of the vehicle windshield.
- 16 Movement by work vehicles and equipment across designated pedestrian paths should be minimized and, when necessary, should be controlled by flaggers or other TTC. Staging or stopping of work vehicles or equipment along the side of pedestrian paths should be avoided, since it encourages movement of workers, equipment, and materials across the pedestrian path.
- 17 Access to the work space by workers and equipment across pedestrian walkways should be minimized because the access often creates unacceptable changes in grade, and rough or muddy terrain, and pedestrians will tend to avoid these areas by attempting non-intersection crossings where no curb ramps are available.

Option:

- 18 A canopied walkway may be used to protect pedestrians from falling debris, and to provide a covered passage for pedestrians.

Guidance:

- 19 Covered walkways should be sturdily constructed and adequately lighted for nighttime use.
- 20 When pedestrian and vehicle paths are rerouted to a closer proximity to each other, consideration should be given to separating them by a temporary traffic barrier.
- 21 If a temporary traffic barrier is used to shield pedestrians, it should be designed to accommodate site conditions.

Support:

- 22 Depending on the possible vehicular speed and angle of impact, temporary traffic barriers might deflect upon impact by an errant vehicle. Guidance for locating and designing temporary traffic barriers can be found in Chapter 9 of the “Roadside Design Guide,” 4<sup>th</sup> Edition, 2011, AASHTO.

**Standard:**

- 23 **Normal vertical curbing shall not be used as a substitute for temporary traffic barriers when temporary traffic barriers are needed.**

Option:

- 24 Temporary traffic barriers or longitudinal channelizing devices may be used to discourage pedestrians from unauthorized movements into the work space. They may also be used to inhibit conflicts with vehicular traffic by minimizing the possibility of midblock crossings.

Support:

- 25 A major concern for pedestrians is building construction encroaching onto the contiguous sidewalks, which forces pedestrians off the curb into direct conflict with moving vehicles.

Guidance:

- 26 *If a significant potential exists for vehicle incursions into the pedestrian path, pedestrians should be rerouted or temporary traffic barriers should be installed.*

Support:

- 27 TTC devices, temporary traffic barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.

Guidance:

- 28 *Tape, rope, or plastic chain strung between devices should not be used as a control for pedestrian movements because they are not detectable and are therefore not accessible to and usable by individuals with disabilities.*

- 29 *In general, pedestrian routes should be preserved in urban and commercial suburban areas. Alternative routing should be discouraged.*

- 30 *The highway agency in charge of the TTC zone should regularly inspect the activity area so that effective pedestrian TTC is maintained.*

Support:

- 31 Other laws and requirements are unique to California and need to be followed when providing pedestrian access through or around TTC zones.

- 32 Additional information on this topic can be found in publication titled “Pedestrian Considerations for California Temporary Traffic Control Zones on Caltrans’ following web link:

<https://dot.ca.gov/-/media/dot-media/programs/safety-programs/documents/ped-bike/pedbrochure-a11y.pdf>

- 33 See Memorandum for more details on Caltrans’ following web link:

<https://dot.ca.gov/-/media/dot-media/programs/safety-programs/documents/ca-mutcd/rev8/temp-ped-access-route-07142017-a11y.pdf>

### **Section 6C.03 Accessibility Considerations**

Support:

- 01 Additional information on the design and construction of accessible temporary facilities is found in the “Guidelines for Accessible Pedestrian Signals (NCHRP Web-Only Document 117B),” 2008 Edition (TRB) and the U.S. Department of Justice 2010 ADA Standards for Accessible Design, September 15, 2010, 28 CFR 35 and 36, Americans with Disabilities Act of 1990.

- 02 Where pedestrians are detoured to a temporary traffic control signal, an accessible pedestrian signal (see Chapter 4K) provides information in non-visual formats (such as audible tones and/or speech messages, and vibrating surfaces) so that a pedestrian with vision disabilities can know when to cross the street along the alternate route.

Guidance:

- 03 *Adequate provisions should be made for pedestrians with disabilities. The extent of needs for such provisions should be determined through engineering judgment or by the individual responsible for each TTC zone situation.*

**Standard:**

- 04 **When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian**

**facility. A barrier that is detectable by a person with a vision disability traveling with the aid of a long cane shall be placed across the full width of the closed pedestrian facility.**

Support:

- 05 Maintaining a detectable, channelized pedestrian route is much more useful to pedestrians with vision disabilities than closing a walkway and providing audible directions to an alternate route involving additional crossings and a return to the original route. Braille is not useful in conveying such information because it is difficult to find. Audible instructions might be provided, but the extra distance and additional street crossings might add complexity to a trip.

Guidance:

- 06 *Because printed signs and surface delineation are not usable by pedestrians with vision disabilities, blocked routes, alternate crossings, and sign and signal information should be communicated to pedestrians with vision disabilities by providing audible information devices, tactile and/or vibrating surface devices, and barriers and channelizing devices that are detectable to pedestrians traveling with the aid of a long cane or who have vision disabilities.*

Support:

- 07 The most desirable way to provide information to pedestrians with vision disabilities that is equivalent to visual signing 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. Audible information devices might not be needed if detectable channelizing devices make an alternate route of travel evident to pedestrians with vision disabilities.

Guidance:

- 08 *If a pushbutton is used to provide equivalent TTC information to pedestrians with vision disabilities, the pushbutton should be equipped with a locator tone to notify pedestrians with vision disabilities that a special accommodation is available, and to help them locate the pushbutton.*

#### **Section 6C.04 Worker Safety Considerations**

Support:

- 01 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 road users. This creates an even higher degree of vulnerability for workers on or near the roadway.

- 02 Maintaining TTC zones with road user flow inhibited as little as possible, and using TTC devices that get the road users' 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 operators of these vehicles with a greater separation clearance and improved sight lines to minimize exposure to the hazards of moving vehicles and equipment.

Guidance:

- 03 *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 ways that minimize 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 Management—reducing the speed of vehicular traffic, mainly through regulatory speed zoning, funneling, lane reduction, and/or the use of speed safety cameras, uniformed law enforcement officers or flaggers should be considered. The use of regulatory speed zone signing tends to be more effective when law enforcement is present. Refer to Section 6B.01.*
  - D. Activity Area—operations entering and departing the work space, and within the work space, should be planned to minimize backing maneuvers by construction vehicles and equipment to minimize the risk of run-over and back-over crashes.*
  - 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.”*

Option:

- 04 The following are additional elements of TTC management that may be considered to improve worker safety:
- A. Shadow Vehicle—in the case of mobile and constantly moving operations, such as pothole patching and striping operations, a shadow vehicle, equipped with appropriate lights and warning signs, may be used to protect the workers from impacts by errant vehicles. The shadow vehicle may be equipped with a rear-mounted impact attenuator.
  - B. Road Closure—if alternate routes are available to handle road users, the road may be closed temporarily to facilitate project completion and thus further reduce worker vulnerability.
  - C. Law Enforcement Use—in highly vulnerable work situations, particularly those of relatively short- duration, law enforcement units may be stationed to heighten the awareness of passing vehicular traffic and to improve safety through the TTC zone.
  - D. Lighting—for nighttime work, the TTC zone and approaches may be lighted.

Guidance:

*Care should be taken to ensure that the lighting used for nighttime work does not cause blinding. Refer to CVC 21466.5 for light impairing driver's vision.*

Option:

- E. Special Devices—these include rumble strips, changeable message signs, hazard identification beacons, flags, and warning lights. Intrusion warning devices may be used to alert workers to the approach of errant vehicles.

Support:

- 05 Judicious use of the special devices described in Item E in Paragraph 4 of this Section might be helpful for certain difficult TTC situations, but misuse or overuse of special devices or techniques might lessen their effectiveness.

## **Section 6C.05 High-Visibility Safety Apparel**

**Standard:**

- 01 **For daytime and nighttime activity, all workers, including emergency responders, within the right-of-way who are within the TTC zone shall wear high-visibility safety apparel that meets the Performance Class 2 or 3 requirements of the ANSI/ISEA 107–2015 publication entitled “American National Standard for High-Visibility Safety Apparel and Headwear,” or equivalent revisions, except as provided in Paragraph 4 of this Section. A person designated by the employer to be responsible for worker safety shall make the selection of the appropriate class of garment.**

Support

- 01a Refer to Construction Safety Order in the California Code of Regulations (Title 8, Division 1, Chapter 4, Subchapter 4, Article 11, Section 1598 and 1599). See Section 1A.05 for information regarding this publication.

**Standard**

- 02 **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.**

- 03 **When uniformed law enforcement personnel are used to direct traffic, to investigate crashes, or to handle lane closures, obstructed roadways, and disasters, high-visibility safety apparel as described in this Section shall be worn by the law enforcement personnel.**

Option:

- 04 Emergency and incident responders and law enforcement personnel within the TTC zone may wear high-visibility safety apparel that meets the performance requirements of the ANSI/ISEA 207-2006 publication entitled “American National Standard for High-Visibility Public Safety Vests,” or equivalent revisions, and labeled as ANSI 207-2006, in lieu of ANSI/ISEA 107-2015 apparel.

**Standard:**

- 05 **Except as provided in Paragraph 6 of this Section, firefighters or other emergency responders working within**



**the right-of-way shall wear high-visibility safety apparel as described in this Section.**

Option:

- 06 Firefighters or other emergency responders working within the right-of-way and engaged in emergency operations that directly expose them to flame, fire, heat, and/or hazardous materials may wear retroreflective turn-out gear that is specified and regulated by other organizations, such as the National Fire Protection Association.

Guidance:

- 07 *For flagger wear during nighttime activity, high-visibility safety apparel that meets the Performance Class 3 requirements of the ANSI/ISEA 107–2015 publication entitled “American National Standard for High-Visibility Apparel and Headwear,” or equivalent revision, and labeled as meeting the ANSI 107-2015 standard performance for Class 3 risk exposure should be worn.*

## **Section 6C.101(CA) Bicycle Considerations**

Support:

- 01 There are several considerations in planning for bicyclists in TTC zones on highways and streets:
- A. A travel route that replicates the most desirable characteristics of a wide paved shoulder or bikeway through or around the TTC zone is desirable for bicyclists.
  - B. If the TTC zone interrupts the continuity of an existing bikeway system, signs directing bicyclists through or around the zone and back to the bikeway is desirable.
  - C. Unless a separate bike path through or around the TTC zone is provided, adequate roadway lane width to allow bicyclists and motor vehicles to travel side by side through or around the TTC zone is desirable.

Guidance:

- D. *When the roadway width is inadequate for allowing bicyclists and motor vehicles to travel side by side, warning signs should be used to advise motorists of the presence of bicyclists in the travel way lanes. See Section 6N.04 for more details.*

**Standard:**

- E. Bicyclists shall not be led into direct conflicts with mainline traffic, work site vehicles, or equipment moving through or around the TTC zone. Except when flagging operation.**

Support:

- 02 Figures 6P-15, 6P-19A(CA), 6P-30, 6P-32, 6P-36A(CA), 6P-47, 6P-48, 6P-49, 6P-50, 6P-51, 6P-51A(CA) and 6P-101(CA) show typical TTC device usage and techniques for bicycle movement through TTC zones.