The Toll on Workers >>

- Annual average approximately 942 fatalities
- More than half occur during daytime hours
- Twice as high during the week than weekend
- Mostly occur during the summertime
- Over half involve single motor vehicles
- 10% underreporting of national work zone fatalities

(Ullman & Scribe)

CAIT
Risk Factors of Work Zone Crashes >>

- Traffic volume on the roadway
- Travel speed Lateral distance from travel lanes
- Work duration – time to complete the work
- Sight distance and work area visibility
- Others
Passing Motorists Need >>

- Early recognition
- Clear recognition of potential hazard
- Driver expectancy maintained through the work zone

![Image of construction zone with signs]

Passing Motorists Need >>

**Early Recognition**

- Evasive action taken to avoid a traffic crash if motorist recognizes work zone
- Temporary traffic control provides information about potential hazard
- Information is provided through signs, cones, drums, barriers, etc.
Passing Motorists Need >>

**Early Recognition**

- Uniformity of treatment
- Making work zones conspicuous to the passing motorist—orange color
- Treatments must consider driver expectancy

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Passing Motorists Need >>

- Clear recognition of potential hazard
- Driver expectancy maintained through the work zone

“Positive guidance information increases the driver’s probability of selecting the speed and path most appropriate to the operating conditions of the highway”

*Source: A Users’ Guide to Positive Guidance - FHWA*
Public Works
Work Zones
And the MUTCD

The MUTCD is the minimum National Standard for all traffic control devices installed on all streets, highways, or bicycle trails open to the public. This applies to construction, maintenance, utilities, and incident management. This includes private as well as public roads, toll roads, and roads within parking lots.
MUTCD >>

- The MUTCD and any revisions are automatically adopted by the State of New Jersey under N.J.S.A. 39:4-183.27
- Goal is SAFETY, with minimum disruption to road users
- Safe and efficient travel of road users including motorists and motorized vehicles, bicycles, and pedestrians

Principles of Traffic Control Devices
*MUTCD Section 1A.02*

A. Fulfill a need
B. Command Attention
C. Convey a clear, simple meaning
D. Command respect from road users; and
E. Give adequate time for proper response
Public Works Roadway Work Zones Are Different Than Normal Work Zones

- Shorter duration
- May require more time to set-up and remove traffic control than to complete work (increases workers’ exposure to traffic)
- May be unplanned
- May require less traffic control
- Smaller work crew
- Same work crew attends multiple work sites
MUTCD >>

Short Term & Short Duration Need

- Standardized plans
- Workers realize need for traffic control
- Different traffic control devices than long term work

MUTCD >>

The MUTCD Recognizes

- Short time spent in public works and utility work zone
- Practical limitations of site specific infrastructure
- Normal roadway construction work zone may not be applicable
Simplified control procedures may be warranted for short-duration work. A reduction in the number of devices may be offset by the use of other more dominant devices such as high-intensity rotating, flashing, oscillating, or strobe lights on work vehicles.”

- Short duration is less than 1 hour in daylight
- Reduction of devices, not elimination

Warning Lights on Vehicles

- Warning lights should be visible to drivers from all angles (360 degrees)
- Larger vehicles should be equipped with a minimum of three warning lights
- Warning lights should be amber in color
Warning Lights on Vehicles >>

Warning lights should be TURNED ON!

Some of the Basics
Don’t Stand in the Middle of the Road

- Assume cars will not stop
- Face on coming traffic
- Stand and walk behind guide rail when practical and safe
- Don’t just wander around
- Don’t stand in front of shadow vehicles

Some of the Basics >>

- Drive safely
- Pull completely off the road
  - Park behind guiderail if possible
  - Tall dry grass can catch fire
  - Ground may be soft
- Be mindful of private property
High Visibility Apparel >>

Wearing of high visibility apparel is **Required** by the MUTCD

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High Visibility Apparel >>

- The ANSI/ISEA 107-2004 (or 2010) standard applies to:
  - “Flaggers”
  - All workers within the right-of-way
  - Uniformed law enforcement officers, fire, EMS
High Visibility Apparel >>

Class 2 “vest” is the Minimum

High Visibility Apparel >>

Class 3 (sleeves w/ reflective stripes)

Class 3 should be worn at night and roads 55 mph or faster
High Visibility Apparel >>

Not acceptable while working in roadway/R.O.W. (acceptable beyond R.O.W.)

Some of the Basics >>

Set-up of Traffic Control Devices

- Identify traffic control plan ahead of time
- Plan and discuss traffic control off roadway
- Park work vehicles and equipment to maximize safety
- Place traffic control devices as per selected plan starting at beginning of work zone
Some of the Basics >>

**Set-up and Removal of Devices**

- Spend least amount of time necessary to set-up and remove devices safely
- Perform work as expeditiously as possible to reduce exposure
- Decreasing exposure time increases safety
- Use devices that are easily transported

Some of the Basics >>

**Removal of Traffic Control Devices**

- Remove immediately following completion of work, including signs
- Only leave in place what is needed
- Know where everything goes in work vehicle so no time is wasted
Traffic Control Devices

Traffic control devices shall be defined as all signs, signals, markings, and other devices used to regulate, warn, or guide road users, placed on, over, or adjacent to a street, highway, private roads open to public travel (see definition in Section 1A.13), pedestrian facility, or bikeway by authority of a public body or official having jurisdiction.

All traffic control devices used for construction, maintenance, utility, or incident management operations on a street, highway, or private road open to public travel (see definition in Section 1A.13) shall comply with the applicable provisions of this Manual.
TTC Zone Devices >>

- All TTC devices and their supports must be crashworthy meeting NCHRP Report 350 “Recommended Procedures for the Safety Performance of Highway Features”

- Newer designed devices (January 1, 2011) must meet AASHTO Manual for Assessing Safety Hardware (MASH)

TTC Warning Signs >>

- TTC warning signs shall be black legend on an orange background

- Size may vary due to speed (*MUTCD Table 6F-1*)

- Minimum sizes only for roads less than 35 mph

- Larger sized signs may be used
TTC Warning Signs

- Both the panel and stand/post must be crash worthy
- Signs for night use must be retroreflective meeting minimum values or lighted *(not lit by street light)*
- Sign legend shall be as contained in “Standard Highway Signs and Markings”
TTC Warning Signs

Section 6F.63

- Devices must be crash-worthy
  
  *Just because you can buy it doesn’t mean it’s crash worthy*

- Must be retroreflective
  For night work

- Replace when damaged, faded or poor retroreflectivity
**Channelizing Devices >>**

**Maximum spacing (feet) =**

- ~20 ft for taper on 2 lane road (typ. local road)
- 1 x Speed for taper on multi lane road
- 2 x Speed for tangent

**Traffic Cones MUTCD Section 6F.64**

- Daytime low speed 18” minimum height (*no white stripe*)
- Freeways/high speed = 28” min. height
- Nighttime requires retroreflective stripes
Channelizing Devices >>

Traffic Cones

- Cone must be predominately Orange

Drums

- Top stripe must be orange (don’t use drums with top white stripe)
- Tops shall be closed to not allow debris inside
- Never place sand bags on top as ballast
Channelizing Devices

**Barricades**

*MUTCD Section 6F.68*

- Stripes slope downward at 45° in the direction traffic is to pass

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**Changeable Message Board** *(VMS/DMS)*

*MUTCD Section 6F.60*

- Only display traffic related messages
- Simple, clear messages up to 2 phases of 3 lines
- MUTCD has proper abbreviations to use and when to use boards
- No animations
Changeable Message Board (VMS/DMS)

*MUTCD Section 6F.60*

The message should be as brief as possible and should contain three thoughts

1. *The problem or situation that the road user will encounter ahead*
2. *The location of or distance to the problem or situation*
3. *The recommended driver action*

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Pedestrian & Bicycle Considerations
Pedestrian & Bicycle Injuries >>

- 10% of work zone injuries/deaths on NJ roads are pedestrians and cyclist (very high)

Pedestrian & Bicycle Considerations >>

Pedestrians are reluctant to:

- Retrace their steps to a prior intersection
- Add distance to a destination
- Add out of the way travel to a destination
Pedestrian & Bicycle Considerations

\(*MUTCD\) Section 6D.01

- Sometimes road work and the associated Temporary Traffic Control (TTC) with affect existing pedestrian or bicycle facilities.

- Advance notification of sidewalk closure shall be provided.

- Provide clearly delineated, usable, and detectable path.

Pedestrian Considerations

\(*MUTCD 6D.01\)

- MUTCD Standards emphasize needs of all pedestrians, able and disabled (civil rights).

- Americans with Disabilities Act of 1990 (ADA) Title II Paragraph 35.130.
Accessible Pedestrian Considerations

Free of protrusions and hazards

3’ min

Photo: Matt Carter

Photos: Matt Carter
Flagger Control

Flagger Method
*MUTCD Section 6C.11*

- Flaggers placed at both ends of closure, one is designated as coordinator
- Must be able to communicate with each other
- A single Flagger can be used for small closure
Flagger Control >>

Qualifications of Flagger
*MUTCD Section 6E.01*

Flagger Abilities

A. Receive and communicate instructions
B. Move and maneuver quickly
C. Control signaling devices
D. Understand and apply safe traffic control
E. Recognize dangerous traffic situations and warn workers

Flagger Station
*Section 6E.08 page 71*

• Flagger stations shall be located such that road users will have sufficient distance to stop
• Location shall have advance warning sign, except for emergency
• Flagger Station is not a congregation area for others
Flagger Control >>

Hand Signaling Devices

- Stop/Slow paddle should be primary and preferred hand signaling device

MUTCD = 18” minimum sign on a rigid pole

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Flagger Control >>

One-lane, Two-way Taper Length

Min length = 50 feet
Max length = 100 feet
Flagger Control >>

Automated Flagger Assistance Device

*MUTCD Section 6E.04*

- Allows Flaggers to positioned out of the lane of traffic
- Appropriate for short-term and intermediate work
- They are not a replacement for temporary signals
Mobile Operations on 2 Lane Roads >>
• Stops less than 15 minutes
• Must use a Shadow Vehicle (TMA recommended)
• Shadow vehicle shall have flashing lights
• Arrow board recommended (use caution mode setting, not arrow)

Working on the Center Line >>
The lanes on either side of the center work space should have a minimum width of 10 feet as measured from the near edge of the channelizing devices to the edge of the pavement or the outside edge of the paved shoulder.
**MUTCD Options:**
A lane width of 9 feet may be used for short-term stationary work on low-volume, low-speed roadways when motor vehicle traffic does not include longer and wider heavy commercial vehicles.

A work vehicle displaying high-intensity rotating, flashing, oscillating, or strobe lights may be used instead of the channelizing devices forming the tapers or the high-level warning devices.

**Questions?**
Work Zone Safety For Public Works Personnel

Ted Green, P.E.
NJ LTAP