Workzone Traffic Safety

- Objective: To familiarize you with the hazards, requirements, safe work practices and controls that will promote safety during construction and highway maintenance activities and exposure to traffic hazards.
- Estimated time: 40 - 45 minutes.
- Audience: Workers and supervisors on or near highways.
Introduction to Workzone Traffic Safety

Dedication

- This module dedicated to Construction and Highway Workzone Workers.
Threats to Life and Limb

- Hazardous job duty:
  - Construction and highway work is hazardous.
  - Thousands have lost their lives and limbs.
  - In a recent year, there were:
    - 771 fatalities in work zones nationwide.
    - 62 fatalities in California State Highway work zones.
Anticipate Hazards

• Working near and on the highway exposes you to many hazards.
• Learn to:
  • Anticipate
  • Recognize
  • Evaluate
  • Control workzone hazards
Highway Workzone Hazards

- Threats to Worker/Public Safety:
  - Worker being struck by motorists
  - Vehicle-to-vehicle collision
  - Changing lane collision
  - Vehicles striking fixed objects
  - Vehicles entering open trenches
  - Bicyclists and pedestrians
Introduction to Workzone Traffic Safety

Standards and Regulations

“Governing authority” on a given roadway?

- Consult Manual for Uniform Traffic Control Devices, known as the MUTCD
  - lists various traffic control devices and identification procedures for workzone safety.
OSHA Regulations

- Regulations specify that employees working in traffic:
  - Follow those guidelines and specifications in the MUTCD.
State & Local Agencies Standards/Regulations

- Often have additional specific requirements
- Contact local traffic authority for specific requirements regarding
  - written plans, devices
  - permits
  - assistance
  - additional information
Fundamentals of Workzone Safety

- Traffic control is a priority
- Control system should not create confusion
- Have a suitable project plan
- Don’t bother traffic any more than necessary
- Work during off peak hours if possible
More Fundamentals

- Beware!
- Park and work off the travel way
- Don’t expect drivers to slow down
- Don’t make drivers respond rapidly.
- Develop a plan for work/ emergency vehicles
- Reduce worker exposure time
For Drivers’ Sakes

• Guide drivers in a definite, clear manner.
• Give plenty of advanced notice
• Use Flaggers to supplement other traffic control
• Urban work zones are safer when flaggers are used.
Quality Assurance

- Inspect workzone.
- Don’t assign untrained workers responsibility for set up and maintenance.
- Allow for modification.
- Be credible, don’t advise motorists of a condition that doesn’t exist.
Traffic Control Plan

- Complete before work
- Must be flexible
- In writing
- Plan elements:
  - Hazards, Controls
  - Safe work practices
  - Notifications
  - Training
  - Handling emergencies
  - Other information.
Traffic Control Plan

Public Needs

Your plan must address issues involving:

- Workers
- Motorists
- Pedestrians
- Bicyclists and others
Safety Tip

• Keep the Traffic Control Plan Simple
  • Work area conditions present situations that are confusing for the motorists.
  • The more confusing the traffic flow, the more increased risk to the motorist and worker.
Planning for Pedestrians

- Pedestrians and cyclists need protection.
- Separate the movement of pedestrians from work activity and traffic.
Traffic Control Plan

Safety Tips: Planning for Pedestrians

• Pedestrians should:
  • Not be led into direct conflicts with vehicles, equipment, operations, or mainline traffic.
  • Be aided by signs to help direct them around the worksite/traffic.
  • Be provided with safe, convenient travel path.
Design of Work Zones

- There are five parts:
  - Advanced Warning Area
  - Transition Area
  - Buffer Zone
  - Work/Activity Area
  - Termination Area
Advance Warning Area

- The goal in the design of effective traffic control through work zones is to provide driving conditions that resemble, as closely as possible, the highway conditions under normal operation.
- The advance warning area alerts drivers.
- Main traffic control devices are diamond-shaped warning signs in the black-on-orange series specified for construction and maintenance operations.
Transition Area

- Required when lanes are to be closed, travel path shifted, or both.
- Downstream end of the advance warning area.
- Extends to beginning of activity area.
- Necessary to provide smooth, effective transition.
- Provide adequate transition taper length, sufficient pavement markings, and adequate channelization.
Buffer Zone

- An additional element of safety.
- Commences at downstream end of transition zone.
- Provides a recovery space for errant vehicles.
- Separates traffic flow from work activity.
Workzone Design

Work/Activity Area
- Where maintenance or construction takes place.
- Space for equipment and materials.
- Commences at the downstream end of buffer zone.
- Needs to be delineated to exclude vehicular and pedestrian traffic.
Termination Area

- Allows traffic to clear the activity area and return to normal traffic operations.
- Final portion of the traffic control.
- Extends from the downstream end of the activity area sign denoting the end of the work zone.
Basic Traffic Controls

- Engineering
- Administrative
- Protective Equipment
  - Engineered
  - Personal
Basic Traffic Controls

More Basic Controls

• Work Duration:
  • Permanent
  • Temporary
Basic Traffic Controls

Engineering Controls

• Should be considered first
• Eliminate or isolate hazard from worker
• Examples:
  • Lane Closures
  • Shoulder Closures
Basic Traffic Controls

Administrative Controls

• Reduce duration, frequency, and severity of exposure by:
  • Job rotation, rest breaks
  • Safe work procedures
    • Training
    • Employee conditioning
    • Acclimation period
    • Regular monitoring
    • Feedback
    • Maintenance
    • Adjustment/Modifications
Basic Traffic Controls

Permanent traffic control

• Permanent traffic control:
  • Stays in place
  • Is part of a roadway
  • Permanently directs motorists with:
    • signals
    • permanent intersection barriers
    • stop, yield, speed signs
Basic Traffic Controls

Temporary traffic control
• Directs traffic around construction zones with:
  • Cones, Candle sticks
  • Channelization devices
  • Flaggers
  • Advanced warning signs
  • Lane closures
  • Speed Limits
Highway Traffic Controls: Engineering

- Lane Closures are often necessary due to:
  - reduction in driveable width of the lane
  - work or activity
- Follow traffic control requirements
Exceptions to Lane Closures

- Allowed if:
  - limited work
  - pavement marking /relamping
  - moving shoulder operations
  - Traffic must be light
  - Sign distances great
  - Vehicles parked completely off the travel way
  - Check local traffic control authorities
Shoulder Closures

• Indicate stationary operations on shoulders.
• Set up similar to lane closures
• Cone placement begins at a “SHOULDER WORK AHEAD” sign
• A taper is required
• Barriers/control devices/signs used with shoulder closures for protection of workers
Highway Traffic Engineering Controls

Traffic Control Plan Safety Tip

• Having a clearly marked police/highway patrol vehicle with officer in the workzone gets attention and gains traffic compliance
Highway Traffic Administrative/Work Practice Controls

Administrative/Work Practice Controls

- Controls include:
  - Neat and Orderly Workzone
  - Warning systems, including signs
  - Flashing/Rotating Amber Lights
  - Parking
  - Protective Equipment and Blocking vehicles
Neat and Orderly Workzone

• Keep Clear!
  • Equipment, debris, and dirt clear of workers, traffic, pedestrians, bicyclists.
  • Signs and symbols clean and readable.
  • Place to store tools.
  • Inspect your area and equipment.
Warning Systems

- Channeling Devices
  - Plastic Drums
    - Should be at least 36 in. tall and 18 in. in diameter.
- Cones
- Tubular markers
Warning Systems (contd.)

- Channeling Devices
  - Plastic Drums
  - Cones
  - Tubular markers
Warning Systems: Barricades

- Classified as type 1, 2, or 3 based upon number of rails.
- Place barricades so that the stripes face down slanted in the direction drivers should turn or maneuver.
- Barricades should be placed completely across the road for closures.
- Concrete barricades provide the greatest level of safety.
Other Warning Devices

- Rumble strips
- Message boards
- Signs
- Flashers
Warning Systems: Speed Limits

- To minimize risk:
  - Get official approval
  - Advanced warning to motorists necessary
Warning Systems: Lookouts

- Protect workcrews by physical means whenever possible.
- Exclusive duty is to watch approaching traffic.
- Crew Warnings approved Lookout Alarm Device.
- Change lookouts frequently.
- Electrical and mechanical detections systems may be used.
- Check with local agency.
Facing Traffic: Employees on Foot

- Minimize the time backs exposed to oncoming traffic.
- Make every effort to perform work facing oncoming traffic.
- Gives better opportunity to see/hear/take evasive action/ warn fellow workers.
- Wear eye and face protection.
Warning Systems: Signs

- Posted
  - Where stationary work is in the traffic way.
  - Where work may cause potential danger to employees or motorists.
  - Contact local traffic agency for sign requirements.
  - No less than seven feet above the road elevation to be seen.
  - Remove signs promptly.
  - Use protective vehicles to set/retrieve signs.
Avoid Unnecessary Signs

- Overuse/misuse of warning signs reduces effectiveness
- Remove or cover signs when:
  - Work is not in progress and
  - Road conditions do not pose a potential danger to personnel or motorists.
Warning Systems: Flashing Arrow

Flashwing Arrow Signs:

• That point left, right, or to both sides used as “Action Messages”, not “Caution Messages”.
• Used to alert the motorist to change lanes.
Highway Traffic Administrative/Work Practice Controls

Flashing - Rotating Amber Lights

- Used on specialized vehicles that cannot be fitted with a flashing arrow sign that are operated at lower than prevailing traffic speed and on pilot cars not having a flashing arrow sign.
- Flashing and rotating amber lights should not be used
  - When traveling at prevailing speed.
  - As a supplement to a flashing arrow sign.
Parking

- Vehicles not needed for the work or protection parked to have no influence on passing traffic or the work.
- Park vehicles in a designated parking area.
- Always enter or leave the vehicle on the side away from the traffic.
- Avoid standing or working near a vehicle especially between the vehicle and traffic.
Installing and Removing Traffic Control Devices

- Can be very hazardous.
- Workers in roadway at points of high contact without full protection.
- Unexpected situation for the motorists.
- Installation and removal part of the traffic control plan.
- Perform as quickly as possible.
- Reduce exposure time.
Protective Vehicles and Equipment

Protective Equipment

• Engineered Truck-Mounted Crash Cushions
• Protective Vehicles
Protective Vehicles and Equipment

Truck-Mounted Crash Cushions

- Prevent errant vehicles from impacting hazards by:
  - Smoothly decelerating the vehicle to a stop when hit head on,
  - Or by redirecting the errant vehicle away from the hazard.
Protective Vehicles

- Advanced Warning Vehicle
- Barrier Vehicle
- Shadow Vehicle
Advanced Warning Vehicle

- Stationed upstream of moving or stationary operation
- Purpose to display sign advisory messages what to expect ahead
- Shoulder stationing should display a FAS in the caution mode or a flashing amber light
- If lane encroachment, should display a FAS with a truck mounted crash cushion.
Protective Vehicles and Equipment

Barrier Vehicle

- Parked in advance of a stationary operation
- Should be unoccupied
- The heavier the better.
- Provides protection for work crews /equipment
- Positioned to intercept errant vehicles
- Position with good brakes good spacing and angles
Protective Vehicles and Equipment

Shadow Vehicle
• Positioned a short distance from a moving operation.
• Gives physical protection
• The heavier the shadow vehicle, the better.
• Equipped with headrests, seat belt and shoulder harness, FAS or flashing amber lights.
Protective Vehicles and Equipment

Personal Protective Equipment

- Bright, highly visible clothing required.
- Day time work: a vest, shirt, or jacket, which is bright or fluorescent orange, yellow, strong yellow-green.
Protective Vehicles and Equipment

PPE

- For night time / low visibility work:
  - garments of retro-reflective material, orange, yellow, white, silver, or strong yellow-green visible at a minimum of 1,000 ft.
  - must clearly identify the wearer as a person
  - be visible through wide range of body motions.
Special Considerations

Special Considerations include:

- Flagging
- Night Work
- Uniformed Officers
- Crews Working Across from One Another
- Combined Operations
- Working Equipment Against Traffic
Special Considerations

Flagging

• Move vehicles / pedestrians safely and as quickly as possible through or around traffic control zones
• Protect workers and on-site equipment.
• Critical component of worksite safety
• Worksites with flaggers are safer
FLAGGER QUALIFICATIONS

- Flaggers are responsible for public safety.
- Must have a sense of responsibility
- Be trained in safe traffic control practices
- Be in good physical condition, including vision and hearing.
- Be mentally alert and have the ability to react quickly in an emergency.
Hand Signaling Devices

- An essential part of controlling traffic
- Stop/slow paddles and red flags are allowed to be used in many states as hand signaling devices
- Check with your local traffic authority for specific requirements
Special Considerations

Flagger Stations
- Located ahead of the work to allow sufficient stop
- Flagger should:
  - Stand either on the shoulder next to controlled traffic
  - Or in the barricaded lane
  - NEVER stand in the path of oncoming moving traffic
  - Be clearly visible and have an escape route
Effective Traffic Control

- Most effective combination of traffic control devices for work zones on multi-lane highways is cones, flashing arrows, and flaggers.
- The use of flaggers is effective means of traffic control at workzones on urban, two-lane highways.
Law Enforcement Officers

- Uniformed law enforcement:
  - Used as flaggers in urban intersections.
  - Officers and official vehicles help enforce regulated speeds.
Night Work
- White coveralls with reflective orange vests
- Reflectorized strips on hard hats and pant legs are advisable.
- Sufficient light
- Be on the lookout for fatigue
- Traffic cones illuminated or non-illuminated with high intensity reflectorized cone sleeves
- Advanced warning signs illuminated or non-illuminated signs with High Intensity reflectorized sheeting.
Crews Working Across from One Another

- Can distract motorists
- Avoid if possible
- Spaced no closer to each other than 2,000 feet unless under positive control of flaggers, stop signs or traffic signals.
Training

• All workers trained in
  • safety hazards,
  • safe work practices
  • traffic control plan
• Toolbox safety training
• Rehearse for safety
Supervisor Checklist

1. Is there a written traffic control plan?
2. Traffic control devices conform with the MUTCD?
3. Traffic flow smoothly and safely?
4. Workers safely protected?
5. Provisions for pedestrians adequate?
6. Equipment, materials, workers, and vehicles away from traffic?
7. Advance warning appropriate to the work?
8. Design and maintenance of temporary bypass or detour adequate?
9. Traffic protected from abrupt drop-off?
10. Temporary pavement markings used effectively?
11. Old pavement stripes obliterated?
12. Traffic control devices properly positioned, in sound condition, and well maintained?
13. Flaggers used as needed, using appropriate equipment, and performing well?
Supervisor Checklist (end):
  14. Permanent traffic control devices covered/turned off?
  15. Signs properly reflectorized / readable?
  16. Signs covered or removed when not used?
  17. Hazards properly shielded?
  18. Adequate signs / barricades at intersections?
  19. Provisions for movement of emergency vehicles?
  20. Test-drive through the traffic safety zone?
Summary of Key Points:

- Traffic control devices must conform to MUTCD.
- Plan, coordinate with agencies and emergency units
- Traffic and worker safety is a high priority
- Traffic movement restricted as little as practical
Summary

More Key Points

- Drivers and pedestrians should be clearly guided
- Inspect controls and working conditions
- Provide or be provided with effective training
- Adequate warning must be given to the motorists
- Workers exposed to traffic must be visible