Federal Highway
Administration

Safe and Effective Use of Law Enforcement Personnel in Work Zones

Participant Workbook

Welcome!!

Safe and Effective Use of Law Enforcement Personnel in Work Zones

U.S. Department of Transportation
Federal Highway Administration

0-1

Instructor

0-2

Did you know?

We have more than 42,000 traffic fatalities every year nationwide

More than 1,200 of those occur in work zones

More police officers are killed by traffic than by bullets

4 times more officers were killed when struck by vehicles than in accidental shootings over the last 10 years

Source: www.nhtsa.dot.gov, www.fbi.gov

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Introductions

- *Name*
- *Agency*
- *City and State*
- *Experiences and anecdotes with work zones*

0-4

About the Instructor

0-5

Logistics

- Ending time
- Restrooms
- Emergency exits
- Breaks
- No smoking
- Cell phones/radios **SILENT**

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How Dangerous can WZ be for Law Enforcement Officers?

- Tractor-semi-trailer collided with the **police vehicle**, killing an officer and injuring others

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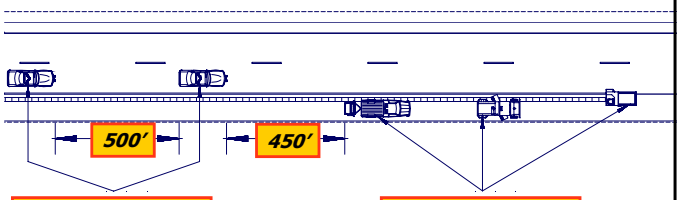

Highway patrol vehicles blocking the right lane, with emergency lights operational

Construction vehicles involved in a moving milling operation

Common Pitfalls When Using Law Enforcement Officers in WZ

1. **Lack of communication** between work zone (WZ) participants
2. **Lack of planning and coordination** of traffic control responsibilities
3. **Inadequate training** of law enforcement personnel (LEO) in traffic control procedures within highway work zones

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Inadequate Training

- May result in officers positioning their **vehicles in unsafe locations**
- May lead to crashes and injuries

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US Government Survey of 46 States

66%

Use police officers for work zone projects

20%

Provide only general traffic management training

0-15

Why Are Work Zones a Concern?

- Speeding
- Hazards present
- Exposed workers
- Situations not familiar to drivers
- Others?

It is dangerous work!

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So, Why Are We Here?

- To provide you with **working knowledge** of traffic control work zones
- To define your **roles and responsibilities** when working in work zone

These are our course objectives

0-17

This Training Course

- Provides the basic knowledge that can save lives, **including your own**, when working in a work zone.

This knowledge will help you avoid work zone crashes and improve safety!

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On completion, participants will be able to:

1. Understand standards and guidelines related to temporary traffic control in work zones
2. Understand the role of law enforcement officers in work zones
3. Recognize the component parts of a typical work zone
4. Recognize proper practices and procedures related to the use of law enforcement officers in work zones

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Course Modules

1. Roles and Responsibilities	30 min.
2. Understanding Work Zones	60 min.
3. Recommended Practices	30 min.
4. Application Workshop	30 min.
5. Closing	10 min.

4 HOURS

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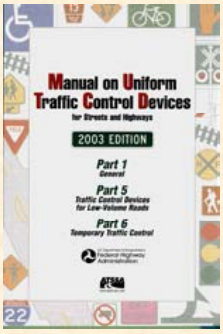
Course Materials



- Course notebook
- Name tag
- Pencil
- MUTCD can be found on FHWA's website: http://mutcd.fhwa.dot.gov

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Safety is an Integral Part of WZs

- Workers
- Motorists
- Pedestrians
- Bicyclists
- LEOs if present

Module Recap

- *Why are we here?*
- *How dangerous are WZs for Law Enforcement Officers?*
- *How big is this problem?*

0-23

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Roles and Responsibilities

0-24

Module Objectives

- *Recognize the roles of LEOs and others in work zones*
- *List LEO responsibilities and expectations in work zones*
- *Discuss communication channels among all involved and the importance of good communication*

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Decision-Makers

- Set a procedure for how LEOs may be used
- Implement policies
- Be active and engaged – even if contractor is mainly responsible for hiring LEOs
- One state: Regional WZ enforcement coordinators

0-26

Discussion

- Does your state have a defined process for using officers in work zones?
- How is coordination achieved?
- How would you evaluate your current practice?
- Is the process working as well as it could be?

0-27

Typical WZ Stakeholders

1. Highway Agency
2. Contractor
3. Contractor's Point of Contact
4. Traffic control technicians

LEO?

LEO?

0-28

1. Highway Agency

- May be:
  - State DOT
  - Other local agency
- Responsible for the **overall project,** including enforcement of the TCP
- The "final authority"
- May contract-out these responsibilities

DOT

Approves a Traffic Control Plan (TCP) for the project

0-29

1. Highway Agency (cont.)

- May allocate enforcement resources
- May provide inspection services and liaison with LEOs
- Builds the TCP which includes:
  - Pattern of TCPs
  - Tasks to be performed
  - Project phasing

0-30

1. Highway Agency (cont.)

- May include location/placement of police officers based upon:
  - WZ type
  - Location
  - Duration
  - Time of day

0-31

2. Contractors

- Build and maintain project
- May provide inspection services and liaison to LEO
- **Ensures the traffic control is correct on a daily basis**
- May be responsible for hiring and paying LEOs
- Assumes officers are trained!!

Implements the Traffic Control Plan based on the MUTCD and local standards

0-32

Contractors….

- **<u>Do not</u> have the authority to place officers *contrary* to established procedures and/or endanger the police officer**

Request a briefing from the contractor or DOT representative!

0-33

Contractors….

- Should provide a **daily work zone briefing** to police officers prior to the beginning of each shift or special enforcement activity.

The officer you are relieving is another good source of work zone information, but not your only one!

0-34

3. Contractor's Point of Contact (POC)

- Represents the Contractor in the field
- In charge of project
- "Work Zone Supervisor?
  - Certification?
- DOT Inspector may be your POC – be sure of your communication channels
- **Responsible for inspection and documentation**

*Know your **primary contact** in the field!*

0-35

4. Traffic Control Technicians

- Report to the WZ Supervisor
- Workers
- Are a good technical source on TCP issues
- **Should have some WZ training**
- Understand and support role of law enforcement

0-36

5. Law Enforcement Officers

- Should:
  - **Be trained** in basic work zone operations and safety
  - **Obtain names & numbers** of contractor personnel and POC
  - Attempt to make **daily contact** with Contractor or DOT personnel.
  - Attend the project's **pre-construction conference**

0-37

The "Pre-construction Conference"

- A meeting where **everyone** involved with the project discusses:
  - Roles and responsibilities
  - Construction details
- Procedures/schedules are discussed
- Decisions are made
- Questions are answered

LEOs should attend and take information back to others!

0-38

5. Law Enforcement Officers

- **Your activities will affect everyone's safety!**

Your badge does not protect you from traffic impacts!

Anyone *working in close proximity to traffic is in* ***danger!***
Watch your back!!

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Main Types of Police Services in WZ

a) **Presence**
b) **Enforcement**
c) **Traffic Control**
d) **Emergency assistance**

0-40

Services: a) Presence

- **Deterrent to speeding** and aggressive driving
- Gains the attention of drivers

Most common LEO activity in WZ!

0-41

Presence Issues

- Jurisdictional boundaries may cause issues
- Work zone impact area may cross boundaries
- Longer queuing and higher traffic impacts
- Multi-agency traffic teams are an option
- Use of State Police is another option for presence officers to reduce jurisdictional issues

Have a process or policy!

0-42

Services: b) Enforcement

- Active enforcement of traffic laws in the WZ
- May not be as common as presence
- Combine with presence

WZ should be enforced as strictly as school zones!

Presence officers shouldn't do enforcement! Use local officers.

0-43

Services: c) Traffic Control

- **Operations that require traffic control such as intersections**
- May be used in detour/diversion situations
- Or to direct traffic & keep it moving

This may be in line with normal duty for a police officer

0-44

Services: d) Emergency Assistance

- Not within the scope of this class
- Emergency traffic control is a type of temporary traffic control
- Discussed in section 6i of MUTCD

0-45

What to do When Working in a Work Zone

1. Stay in communication
2. Be visible
3. Be alert
4. Drive-through
5. Investigate crashes?
6. Arrive early/leave late
7. Monitor TCP compliance?

Let's discuss in more detail!

0-46

1. Stay in Communication

- **Report** to the POC at beginning of shift
- **Contact Project Engineer** for clarification and directions
- Remain in **radio contact** with the local dispatch

0-47

What to discuss with the Point of Contact (POC)

- Project **objective and schedule**
- Your location
- **Contact information**
- Identify enforcement areas?
- Express **concerns** about your safety, if any
- **Be friendly!**

0-48

2. Be Visible

- Patrol car emergency lights on
  - No headlights
- If outside the patrol vehicle and within the work zone, **MUST** wear issued **retroreflective safety vest**

Your visibility is critical!

0-49

Where is the safest place to be for PRESENCE?

- Identify the **safest and most efficient location**, that is in compliance with procedures
- Will discuss in next module

0-50

3. Be alert

- **Stay alert at all times!**

0-51

4. Drive-Through

- Both directions
- To become familiar with the work zone and its activities
- To determine safe places to investigate crashes and for enforcement
- To identify hazardous conditions

5. Investigate Crashes?

- Investigate minor property damages crashes that occur within the WZ if the time required to complete the investigation is minimal

Crashes involving injury shall be investigated by the appropriate personnel, ***not the WZ "presence" officer***

Determine local property damage (PDO) policies ahead of time!

About Investigating Crashes..

- Limit investigation of minor property-damage crashes to assurance of non-injury.

Crashes involving injury should be ***investigated*** *by the appropriate personnel, not the WZ "presence" officer. Enforcement agency policy will guide initial involvement.*

Determine local property damage only (PDO) policies ahead of time!

6. Arrive early/leave late

- **For best worker protection, be present** when the traffic control devices are being installed or removed

15-Minute Rule!

0-55

As a courtesy: The 15 Minute Rule .....

- *Arrive **15 minutes before** traffic control devices are being placed, moved or taken down*
- *Stay **15 minutes after** these changes have taken place, to ensure the new traffic control change is working properly*

15-Minute Rule!

Discuss with POC

0-56

7. Inspect TCP Compliance?

- **Inspect TCP compliance?????????**
  - Check TCP against field inspection
  - Detect safety violations
  - Notify supervisor of problems

Officers are not responsible for TCP inspection, but can be extremely valuable in identifying potential problems.

NJ State Police has a program….

0-57

NJ Safety Intervention Results: July 1, 1995 - November 30, 2000

5248 Total Interventions

11,544 Employees Removed From Risk

3387 OSHA Violations Corrected

4008 DOT Violations Corrected

247 Different Contractors Impacted

0-58

DISCUSSION

- *How do you feel about requiring training for officers before they work in or around traffic work zones?*

0-59

Module Recap

- *What are the traditional roles of LEOs in work zones?*
- *Who else is involved with work zones?*
- *What specific activities are typical of LEOs in work zones?*
- *What is the "15-Minute Rule"?*
- *Do you know your POC?*
- *Do policies related to emergency response exist?*

0-60

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Understanding Work Zones

0-61

Module Objectives

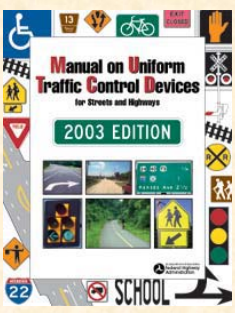
- Discuss sources of WZ standards & guidelines
- Define the component parts of a TTC zone
  - WZ terminology
- Discuss patrol vehicle positioning

0-62

Where Can Federal WZ Standards be Found?

- Manual on Uniform Traffic Control Devices **(MUTCD)**

Uniformity!



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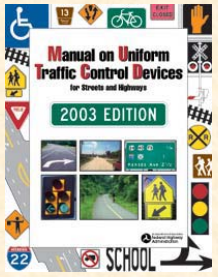
Manual on Uniform Traffic Control Devices

- **MINIMUM** standards
  - States and local agencies can have more restrictive standards
- Applies to **ALL** streets and highways open to the public travel



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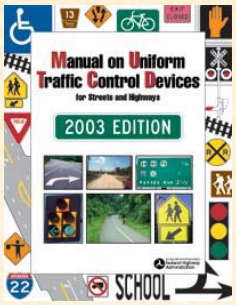
The MUTCD

- **Does not** address use of law enforcement officers in WZ
- **Does not** show location of police vehicles



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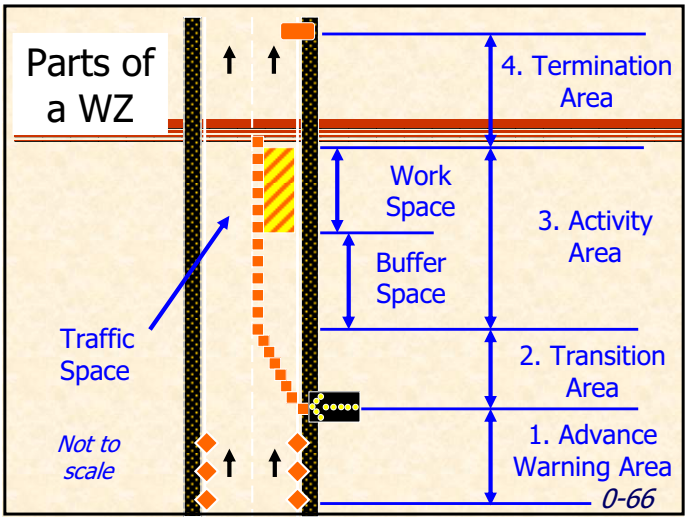
Parts of a WZ



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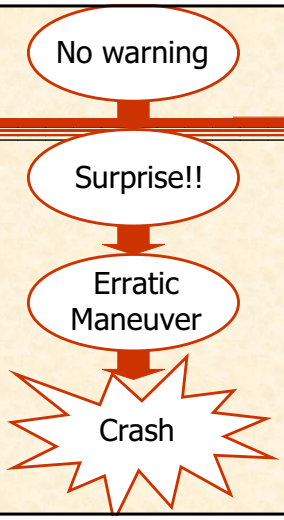


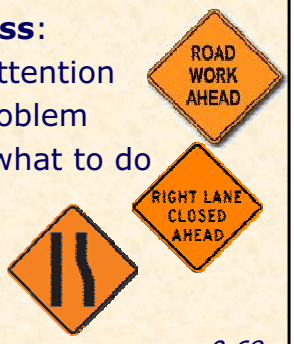
1. Advance Warning Area

- **Uses advance warning signs to warn drivers**
- Where drivers make their **decisions!**

0-67

Advance Warning Signs

- Usually, **3-step process**:
  - 1st sign: Gets their attention
  - 2nd sign: Tells the problem
  - 3rd sign: Tells them what to do
- **Diamond shape**
- **Orange in WZ**
- **48" x 48"**



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MUTCD Suggested Advance Warning Sign Spacing

Road Type	A	B	C
Urban (low speed*)	100'	100'	100'
Urban (high speed*)	350'	350'	350'
Rural	500'	500'	500'
Freeways and Expressways	1,000'	1,500'	2,640'

** Speed determined by local agency*

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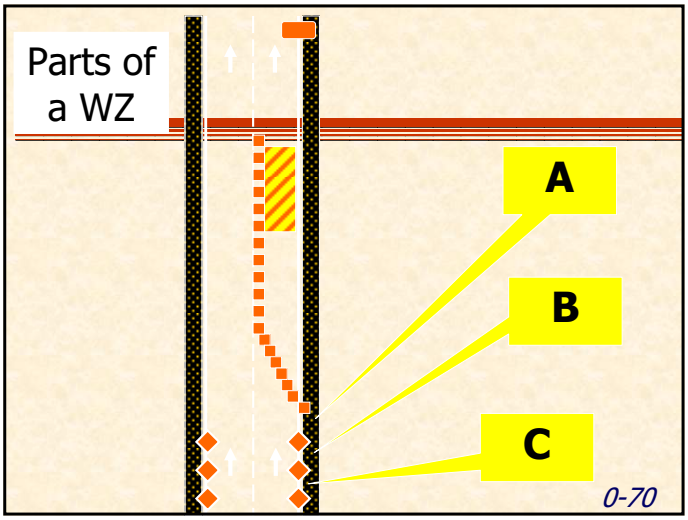
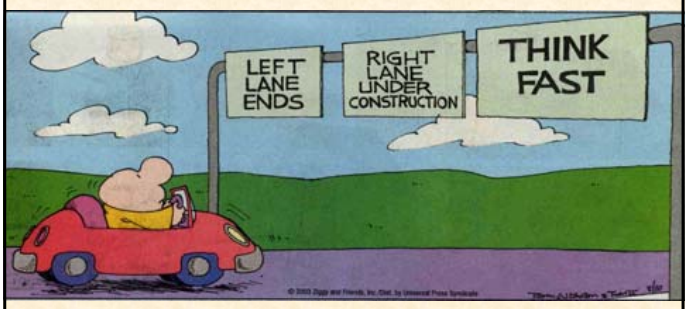


Sign spacing is critical!



To give TIME to analyze and decide on maneuver

0-71

Portable Changeable Message Signs (PCMS)

- Sometimes used **before the advance warning area**
- **Supplemental** devices
- **Optional** devices

0-72

2. Transition

- Typically uses ***channelizing devices*** to form a ***taper***

A taper is a gradual transition

Channelizing devices

0-73

Channelizing Devices

- Cones
  - Two white bands for night use!
  - Short duration only
- Drums
- Others

0-74

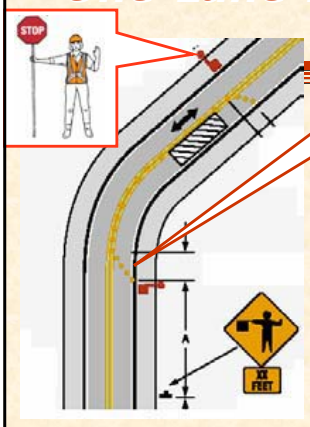
Minimum length of **MERGING taper** (L) in feet necessary to close a 12-ft lane

Most lanes are 12′

SPEED	L
25	125
30	180
35	245
40	320
45	540
50	600
55	660
60	720
65	780
70	840
75	900

0-75

One-Lane Two-Way Taper



50-100′ MAX

- On two-lane roads
- Flaggers required
  - *"Flagging taper"*

Special case!!

0-76

Speeds are Critical in Work Zones!

- The faster the speed:
  - The less **time** motorists will have to make their maneuvers
  - The more severe the crash

This is called "Perception-Reaction Time"

0-77

Perception-Reaction Time (PRT)

- The amount of TIME drivers need to **perceive, analyze, react and complete their maneuvers**

PRT= 2.5 sec. under "normal" conditions

PRT= 5+ sec. for work zones!!!

0-78

Converting mph to fps

- Multiply the speed in miles per hours by **1.47** to obtain the number of feet a vehicle travels in one second

Example:
60 mph = (60)(1.47) = 88 fps

At 60 mph you travel 88 feet in ONE second!

0-79

ESTIMATING: Converting mph to fps

- Approximate by using 1.5
  - The number plus its half

TIP

Example:
60 mph = 60 + 30 = 90 fps

0-80

Traveling Speed (mph)	Feet Traveled in One Second
25	37
35	51
45	66
55	81
60	88
65	96
75	110
80	118

Feet Traveled in One Second

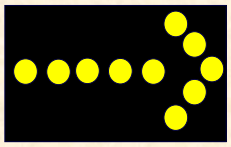
0-81

Distance Traveled During the PRT

Speed (mph)	Feet traveled in 2.5 sec.	Feet traveled in 5.0 sec.
25	**92**	**183**
35	**129**	**257**
45	**165**	**331**
55	**202**	**404**
60	**220**	**440**
65	**239**	**478**
75	**276**	**551**
80	**294**	**588**

Arrow Panels

- **Supplemental** device
- Used in addition to signs



Arrows are used **ONLY** when a lane is closed and merging is required

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The "CAUTION" Mode

- Displayed for shoulder operations
- **No arrows if all lanes are open**

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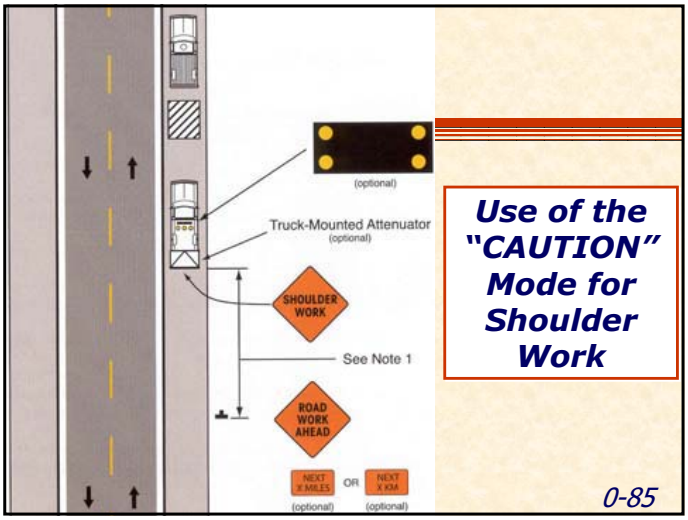

Use of the "CAUTION" Mode for Shoulder Work

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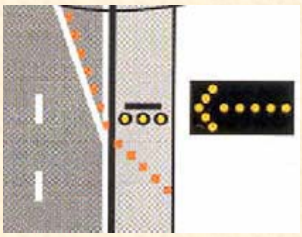
Preferred Arrow Panel Location

- For a stationary lane, panel should be located ***on the shoulder at the beginning of the taper***



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3. Activity Area

- **3 Sub-areas**
  - Buffer space
  - Work space
  - Traffic space

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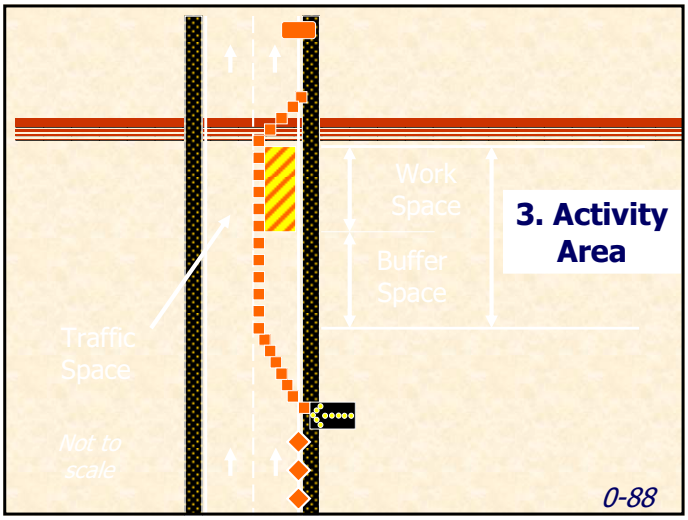


Buffer Space

- Recovery area for errant vehicles
- Protects workers
- **ALWAYS** empty
  - No vehicles or equipment allowed
- **Highly** recommended

DO NOT PARK IN BUFFER SPACE!

A "FORGIVING DESIGN"

0-89

Do not park in buffer space!

- Your vehicle is not equipped with an impact attenuator!
- Not a "forgiving design"

0-90

Stopping Sight Distance as a Function of Speed

Speed (mph)	Buffer (ft.)	Speed (mph)	Buffer (ft.)
20	115	50	425
25	155	55	495
30	200	60	570
35	250	65	645
40	305	70	730
45	360	75	820

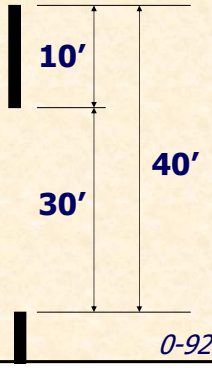
(Use for Longitudinal Buffer Spaces) 1

Determining distances in the field

- Use odometer for longer distances
  - 1/10 mile = 525′
- Use skip pattern for short ones

"10-30 SKIPS"

  - 10 skips = 400′



0-92

Traffic Space

- The space open for public to pass **safely**

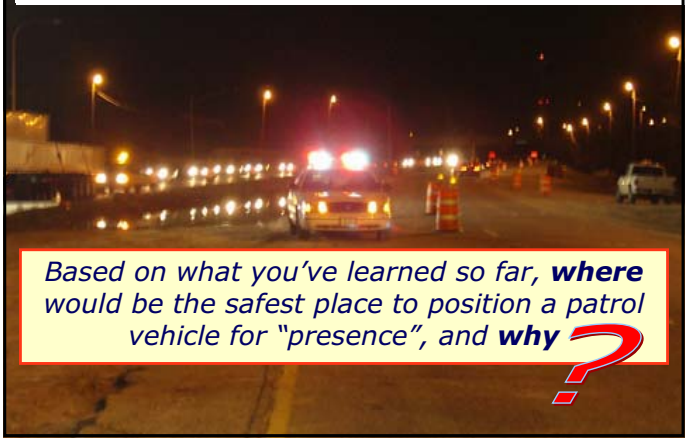
0-93

4. Termination Area

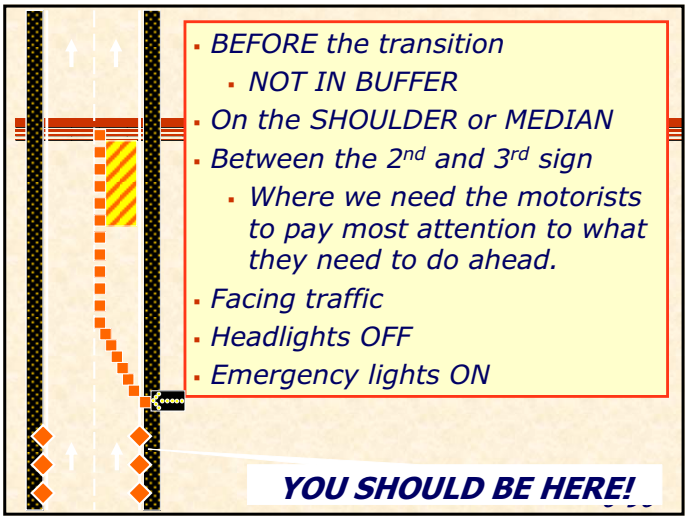
- May (optionally) include
  - **Termination taper**
    - **100' min.**
  - **END ROAD WORK** sign

0-94

Positioning your patrol car



*Based on what you've learned so far, **where** would be the safest place to position a patrol vehicle for "presence", and **why***



- *BEFORE the transition*
  - *NOT IN BUFFER*
- *On the SHOULDER or MEDIAN*
- *Between the 2nd and 3rd sign*
  - *Where we need the motorists to pay most attention to what they need to do ahead.*
- *Facing traffic*
- *Headlights OFF*
- *Emergency lights ON*

YOU SHOULD BE HERE!

Why Face Traffic??

- Larger field of view
  - More alert!
- Engine protects you
  - Not the gas tank!
- Air bags protect you
- Allows your position to be dynamic

Case by case!

0-97

Your Position is Dynamic!

- May need to to **move your vehicle** often
- **Minimizes crashes at the end of the queue**

0-98

Use of Emergency Lights

- Use **emergency lights only**
- **Headlights off** during nighttime WZ
  - May be helpful during the day

0-99

If Traffic Backs Up....

- Queuing beyond the advance warning signs may cause **rear end crashes**
- **Move** your vehicle back (toward traffic) to stay ahead of the traffic queue

Stay far enough ahead of stopped traffic to give fast-moving cars plenty of time to stop (approx. ¼ mile.)

0-100

Moving Operations

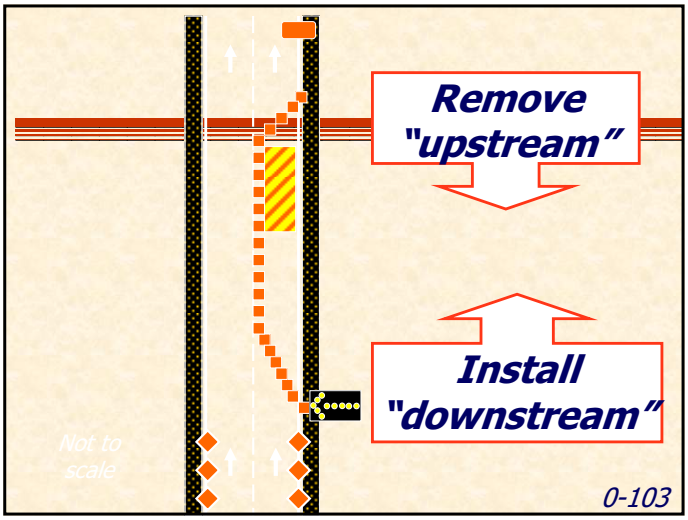
- **The work zone** moves **continuously**
  - Example: Striping
- May use **truck-mounted attenuators** (TMA) to protect workers
  - Unlike patrol vehicles, designed for impacts

0-101

Installation and Removal of Stationary Lane Closures

- Devices are installed "**with the flow of traffic**"
- Removed "**against the flow of traffic**"
- Except for detours
  - Reverse the above instructions

0-102



Officer's Visibility

SAFE?

VISIBLE?

0-104

High-Visibility Safety Apparel

- **Wear** if outside the patrol vehicle
- Retroreflective trim provides **human form outline**
  - ANSI Class 2 or 3
- Specially designed to provide **access to holsters**

0-105

Module Recap

- *Where do we find WZ standards & guidelines?*
- *What are the component parts of a TTC zone?*
- *What is a buffer space?*
- *Where is the patrol vehicle positioned?*
- *How are devices installed and removed?*

0-106

3 Recommended Practices

0-107

Module Objectives

- *Summarize safe operating practices for LEOs working in WZ*

0-108

About Recommended Practices

- Not requirements, but **recommendations**
- Few specific standards/guidelines exist
  - None in the MUTCD
- **Every case is different!**
- Use your **judgment!**

0-109

Recommended Practices

1. **BEFORE** the WZ starts
2. On **ARRIVAL** at the WZ
3. While at the WZ
   - **A. Stationary** operations
   - **B. Moving** operations

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1. BEFORE the WZ Starts

- Attend the **pre-construction conference, if possible**
- **Familiarize** yourself with the project
- Identify your **point of contact**
  - WZ Supervisor
  - Project Engineer
  - Who is responsible for the project?

0-111

2. On ARRIVAL at the WZ

- **Be early!**
  - **15-minute rule**
- Contact your **point of contact**
  - Identify your role and safest location
- Gather **information** about the project
  - Drive through the WZ
  - Note signs in the advance warning area
  - Identify possible relocating procedures

0-112

3. WHILE in the WZ

- Be **alert**!
- Be **visible**!
- Be **in contact**!
- If applicable, **face traffic**!
- **Pay attention** to queues that may form and **relocate** as necessary
- **Contact your POC** if adjustments are needed

0-113

3A. Stationary Operations

- On the **shoulder**
- **Not in buffer** space
- **Relocate as needed** based on traffic condition
  - **¼ mile** behind the end of the queue

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3B. Moving Operations

- The work zone moves continuously!
  - **So should you!**

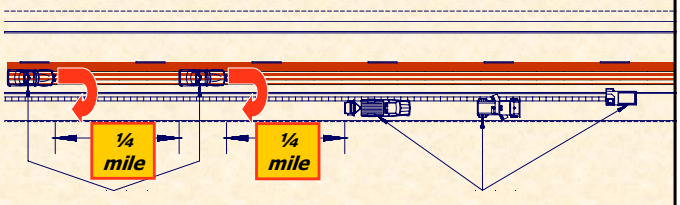
EXAMPLES are paving, striping, rumble strips, milling operations, etc.

0-115

3B. Moving Operations

- Your position will change
- May have to move in reverse on the shoulder
  - This may not be feasible if moving "fast"
- REMEMBER:
  - Your role is **PRESENCE**
  - **You are not a crash attenuator!**

0-116



On the shoulder, facing traffic!

0-117

DO	WHY?
Attend the pre-construction conference and ask questions	To familiarize yourself with the project
Discuss the TCP	To understand the project
Communicate with the WZ supervisor	To express concerns; to establish a point of contact
15-minute rule	Common courtesy
Position your vehicle in the safest, most efficient location	To avoid parking in the taper or buffer areas
Face forward	To have a larger field of view; better protection; dynamic

DO	WHY?
Be alert at all times	To see what's coming; to move as needed
Move vehicle position as traffic conditions change	To be at the most effective location
Wear retroreflective apparel if outside the vehicle	To be visible!
Protect yourself!	To protect your life!

0-119

Module Recap

- What are some of the recommended practices when working in a work zone?
  - Before?
  - During?

0-120

4

Application Workshop

0-121

Module Objectives

- Apply the concepts learned to a **freeway lane closure**
  - Case 1. Without a back up
  - Case 2. With a back up
- Discuss possible solutions, variations and adjustments

0-122

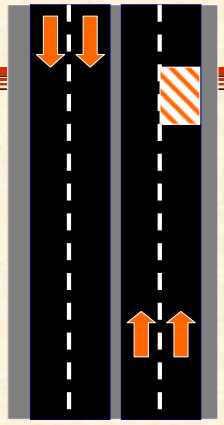
Case 1: Light Traffic

Given:

- *Four-lane freeway in a rural area, light traffic*
- *Speed = 55 mph*
- *Lane width = 12 ft.*
- *Duration: 6 daylight hours*

Indicate:

- *Signs (& spacing) needed*
- *Length of taper & buffer necessary to close the area shown*
- *Position of patrol vehicle for presence and enforcement*



0-123

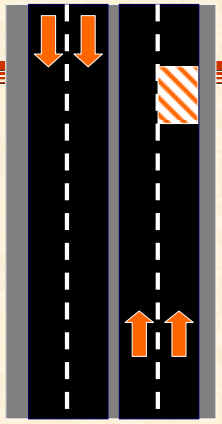
Case 2: Heavy Traffic

Given:

- *Same conditions as in Case 1, except….*
- *Heavy traffic slowly creates a 2-mile backup from the beginning of taper*

Discuss:

- *Possible adjustments*
- *Position of patrol vehicle*
- *Safest place to pull-over violators*



0-124

Case 3

- Single LEO on scene. Work zone is 10 miles long on a north-south rural, multi-lane freeway – 3 lanes each direction with 10-foot shoulders.
- A serious injury crash occurs 500 yards from an off-ramp in the NB lanes in the middle of the project, blocking all three lanes in that direction.
- There is a concrete median barrier. The next nearest interchange is 5 miles on either side of this one.
- The LEO is patrolling three miles up stream from the crash.
- Contractor personnel are present in the vicinity of the crash. The nearest town is seven miles south of the project.

0-125

Case 4

- A temporary work zone, 45 MPH, four-lane city arterial.
- The work area is in the eastbound outside lane (closed).
- The taper is comprised of 12 cones spaced 10 feet apart, and a flagger has been positioned at the beginning of the lane taper to direct eastbound traffic
- Fifty feet ahead of the flagger is a sign reading "Be Prepared to Stop". One-hundred-fifty feet in front of the BPTS sign is a sign reading "Road Work Ahead".
- The LEO has just driven through the work area in advance of positioning himself/herself for patrol.

0-126

Module Recap

- Patrol vehicle position is
  - **Important**
  - **Critical**
  - **Dynamic**
    - May vary depending on traffic conditions and other factors

0-127

5 Closing

0-128

Module Objectives

- Review course objectives
- Discuss your expectations
- Complete course evaluations
- Adjourn

0-129

Course Objectives

- To provide you with **working knowledge** of traffic control work zones
- To define your **roles and responsibilities** when working in work zones

0-130

You should be able to:

1. Understand standards and guidelines related to temporary traffic control in work zones
2. Understand the role of law enforcement officers in work zones

0-131

You should be able to:

3. Recognize the component parts of a typical work zone
4. Recognize proper practices and procedures related to work zones and the role of law enforcement officers

0-132

Your Expectations

- Did we meet your **expectations**?
- Did you get information you can use?
- How do you feel about work zones and workers now?

0-133

Course Evaluations

- How can we improve the course?
- Your honest input will help us!
- **Negative and/or positive**

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THANK YOU!!

Safe and Effective Use of Law Enforcement Personnel in Work Zones

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