

# "Watch out behind you!"

## Responder Safety on the Roadway

"Watch out behind you!"



Responder Safety on the Roadway

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### Midwest City Fire Department, OK

- Incident Overview
  - August 5, 1999 – Raining with wet roadways
  - Initial alarm of a one vehicle crash into the median barrier of Interstate 40 Westbound at Hudiburg Drive.
  - Midwest City FD Ladder 2, Squad 2, and one privately owned ambulance dispatched at 1920 hrs.

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### Original Incident

- Ladder 2 and Squad 2 arrive at 1923 hrs.
- Squad 2 positioned behind initial crash (Car #1)
- Ladder 2 establishes a blocking position approximately 150 yards behind the Squad.
- Highway Patrol and City Police units still responding to the scene.

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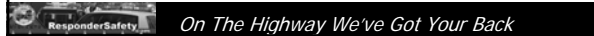
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## Responder Safety on the Roadway

### Original Incident

- Squad 2 reports no injuries and cancels the ambulance.
- Ladder 2 personnel remain in the truck while in blocking position.



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### Secondary Crashes

- At 1926 hrs Ladder 2 reports being struck from behind (Car #2)
- Ladder 2 personnel and one Squad 2 firefighter begin checking on injuries in the vehicle



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### Secondary Crashes

- At 1927 hrs Ladder 2 reports being struck again (Car #3) with 2 firefighters down.
- 2 firefighters and the occupant of the 1<sup>st</sup> vehicle to strike Ladder 2 were thrown approximately 47 feet



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## Responder Safety on the Roadway

### Secondary Crashes

- Ladder 2 is struck a third time (Car #4) within the next two minutes
- At 1932 hours the Assistant Chief and Squad 1 arrive on scene.



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### Aftermath of the Crashes

- 1 firefighter fatality
- 1 firefighter injured
- 2 civilians injured
- Four crashes in 9 min.



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### Additional Factors

- Highway Patrol delayed response due to high volume of weather related crashes
- High speeds and standing water on highway lead to crashes
- Secondary crashes eliminated the benefit of the blocking apparatus



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# “Watch out behind you!”

## Responder Safety on the Roadway

### Overview

- Responding to Highway Incidents is inherently dangerous
- All the tools available must be used to ensure the safety of responders and to avoid tragedy



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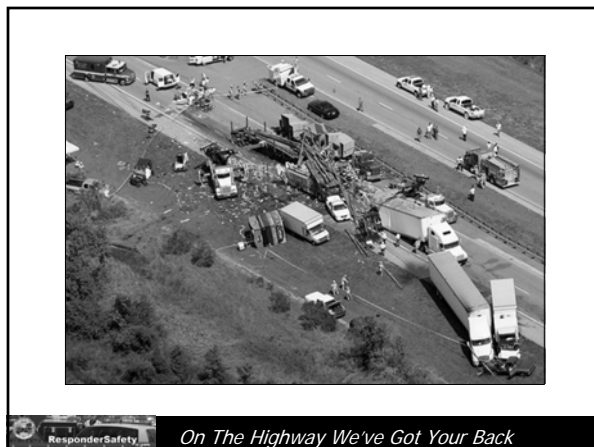
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# “Watch out behind you!” Responder Safety on the Roadway



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## Responder Safety

- Traffic speeds and congestion are continually increasing
- Responders are being struck by, and seriously injured or killed, by traffic at an alarming, and increasing rate
- There are many things that can be done to prevent these injuries and deaths



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## What is the Impact on Traffic?

Seattle Traffic Cam Video



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# "Watch out behind you!"

## Responder Safety on the Roadway

### Training

- Establish Policies and Procedures
- Initial Training
- Review Policies and Procedures
- Annual Refresher
- Table-top Exercises or Online Simulations



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### Policies and Procedures

- Follow Department guidelines to establish Policies and Procedures
- Components of a Policy
  - Terminology
  - Incident Command
  - Safety
  - Apparatus Placement
  - Operations – High Volume and Limited Access roadways



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### Policies and Procedures

- Terminology
  - Establish terminology and agreed definitions to reduce confusion
- Incident Command
  - Identify Incident Command roles required for this type of incident
    - Example – A Traffic Control Sector in Operations or the Position of Spotter in Safety



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# "Watch out behind you!"

## Responder Safety on the Roadway

### Policies and Procedures

- Safety
  - Include minimum safety requirements or benchmarks for the incident
  - Establish minimum PPE requirements
  - Identify equipment required to safely respond to roadway incidents



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### Policies and Procedures

- Apparatus Placement
  - Establish apparatus response guidelines
  - Identify apparatus appropriate for blocking
- Operations
  - Identify the issues with the roadways in the jurisdiction
  - Pre-plan for traffic control and diversion in problem areas



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### Policies and Procedures

- Review Process
  - Conduct periodic review based on training and response debriefings to assess the effectiveness of Departmental Policies and Procedures
  - Make appropriate changes based upon the above review
  - Update training to account for any changes made to Departmental Policies and Procedures



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# “Watch out behind you!”

## Responder Safety on the Roadway

### Multi-Agency Response

Establish Partnerships:

- Agencies and Services
- Capabilities
- Resources
- Common Practices



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### Multi-Agency Response

- The Three C's
  - Communication
    - Prior to, during, and following the incident
  - Cooperation
    - Cooperation vs. Competition
  - Collaboration/Coordination
    - Collaboration before the incident
    - Coordination during the incident

Every agency has a role to play in safety and incident stabilization

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### National Initiatives and Standards

The CVVFA Emergency Responder Safety Institute



The resource for responder safety training and information

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# “Watch out behind you!”

## Responder Safety on the Roadway

### National Initiatives and Standards

#### National Unified Goal for Traffic Incident Management – NUG

##### Key Strategies:

1. Standardized (but not mandated) Responder Safety Operational Procedures
2. Accredited Traffic Safety Control Training for Responders
3. Responder Safety Policies and Legislation
4. Motorist Training and Awareness Programs



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### National Unified Goal

- Standardized Responder Safety Operational Procedures
  - Traffic control at traffic incident scenes
  - High-visibility reflective apparel
  - Incident command system
  - On-scene traffic safety management
  - The use of adjunct warning lights and audible devices



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### National Unified Goal

- Accredited Traffic Safety and Traffic Control Training for Responders
  - Multidisciplinary training for traffic incident responders
  - Specialized Training
    - Traffic safety
    - Traffic control



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# “Watch out behind you!”

## Responder Safety on the Roadway

### National Unified Goal

- Responder Safety Policies and Legislation
  - Slow down and Move over Laws
  - Policies requiring pre-planning for traffic control and traffic diversion
  - Policies supporting multi-agency and multi-jurisdictional training



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### National Unified Goal

- Driver Training and Awareness Programs
  - Establishing partnerships to increase driver awareness and preparedness for encountering traffic incidents
    - AAA
    - AARP
    - Driver's Education Teachers



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### National Initiatives and Standards

#### Manual on Uniform Traffic Control Devices – MUTCD

- Defines the standards used by road managers nationwide to install and maintain traffic control devices on all streets and highways.
- For roadway incidents the pertinent section is Part 6I - Temporary Traffic Control



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# “Watch out behind you!”

## Responder Safety on the Roadway

### National Initiatives and Standards

- NFPA 1500, 2007 Edition - Section 8.7
  - Traffic Incidents
    - Requires
      - Establishing and Implementing Policies and Procedures
      - Blocking apparatus to protect responders
      - Use of Temporary Traffic Control Devices
      - Use of high visibility garments
      - Training



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### National Initiatives and Standards

- Federal Highway Administration – 23 CFR Part 634
  - To decrease the likelihood of worker fatalities and injuries
  - “Sec. 634.3 Rule.  
All workers within the right-of-way of a Federal-aid highway who are exposed either to traffic (vehicles using the highway for purposes of travel) or to construction equipment within the work area shall wear high-visibility safety apparel.”
  - Effective November 24, 2008

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### National Initiatives and Standards

- Move Over and Slow Down Initiatives
  - Many states have passed “Move Over and Slow Down” laws
  - Exact requirements vary but the principle is the same move away from emergency responders and travel at a safe speed
  - Penalties also vary but most are substantial civil fines up to criminal penalties

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# “Watch out behind you!”

## Responder Safety on the Roadway

### Definitions

**Roadway** – Any place on which a vehicle-related incident could occur (Including but not limited to highways, secondary roads, dirt roads, driveways, and parking lots)



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### Definitions

**Highway** – A limited access, divided roadway with high speed traffic



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### Definitions

**Advance Warning** – notification procedures that advise approaching motorists to transition from normal driving status to that required by the temporary emergency traffic control measures ahead of them



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# “Watch out behind you!”

## Responder Safety on the Roadway

### Definitions

**Block** — positioning of emergency vehicles on an angle to the lanes of traffic creating a physical barrier between traffic and the work area. Includes: upstream, downstream, block to the left, and block to the right



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### Definitions

**Shadow** — the protected work area at a vehicle-related roadway incident that is shielded by the block from emergency vehicles. Also known as Safe Zone or Work Zone



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### Definitions

**Taper** — the action of merging several lanes of moving traffic into fewer moving lanes



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# “Watch out behind you!”

## Responder Safety on the Roadway

### Definitions

Temporary Traffic Control (TTC) – Equipment and apparatus placed on the roadway to temporarily alter the flow of traffic to make a scene safe. This may include but is not limited to: signs, cones, flares, and attenuator vehicles



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### Definitions

Traffic Incident Management (TIM) – The systematic, planned and coordinated use of human, institutional, mechanical, and technical resources to reduce the duration and impact of incidents, and improve the safety of motorists, crash victims, and incident responders



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### Definitions

- Downstream – beyond the incident in the direction traffic normally flows



- Upstream – prior to the incident in the direction traffic normally flows

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# "Watch out behind you!"

## Responder Safety on the Roadway

### Definitions

- **Minor Incident** – any incident that will be cleared in 30 minutes or less
- **Intermediate Incident** – any incident that will be cleared in between 30 minutes up to 2 hours
- **Major Incident** – any incident that will be cleared in 2 hours or more



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### Personal Protective Equipment (PPE)

#### Personal Protective Equipment

- Wear appropriate PPE including ANSI high visibility vests as required by department policy.
- Recommended minimum:
  - Structural Firefighting Helmet
  - ANSI high visibility vest
  - Turnout gear if possible



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### Personal Protective Equipment (PPE)

#### ANSI high visibility vests

- ANSI 107-2004 vs. ANSI 207-2006
  - 107 breaks vests into three classes:
    - Class 3 – Offers the greatest visibility to the wearer in complex backgrounds and through a full range of body movements
    - Class 2 – Provides superior visibility to the wearer by additional coverage to the torso, and is more conspicuous than Class 1
    - Class 1 – Provides the minimum amount of required material to differentiate the wearer from the work environment



Class 3



Class 2



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# “Watch out behind you!”

## Responder Safety on the Roadway

### Personal Protective Equipment (PPE)

#### ANSI high visibility vests

- 207 was created for Public Safety Responders for several issues
  - Most emergency scenes would require responders to be in Class 3 vests, essentially requiring sleeves and long vests
  - This is not compatible with structural fire fighting gear and gun or equipment belts



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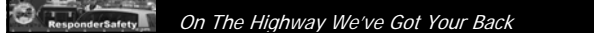
### ANSI/ISEA Compliant Vests



ANSI/ISEA 207-2006 American National Standard for High-Visibility Public Safety Vests



ANSI/ISEA 107-2004 American National Standard for High-Visibility Safety Apparel and Headwear



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### Public Safety Vests

- Provide access to equipment while worn
- Can be easily worn over firefighting PPE
- Optional breakaway safety feature



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## 4/5 Point Breakaway Feature



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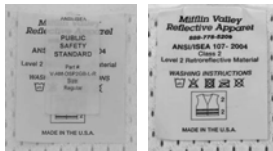
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## Labeling



Label from new Public Safety Vest  
Meets requirements of both  
ANSI/ISEA 207-2006 and 107-2004



Label from older Class 3 vest  
Met requirements of  
ANSI/ISEA 107-1999 would be  
a Class 2 vest under the 2004  
standard

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## Personal Protective Equipment (PPE)

### ANSI high visibility vests

- High Visibility = Fluorescent + Retroreflective
- Existing or in-service vests that meet ANSI 107-2004 are perfectly acceptable
- New vests that meet ANSI 207-2006 are an option

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# “Watch out behind you!”

## Responder Safety on the Roadway

### Personal Protective Equipment (PPE)

Helmets – Should be worn due to the possibility of traumatic injury while operating along a roadway



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### Apparatus Marking

- Apparatus marking and lighting are important factors in responder safety
- Applicable Standards
  - NFPA 1901
  - Federal and state requirements



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### Apparatus Marking

- Apparatus should be marked so that it is easily recognized as an emergency vehicle
  - Chevrons or a “Vertical Panel” on rear of vehicle
  - Effective emergency lighting



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# "Watch out behind you!"

## Responder Safety on the Roadway

### Apparatus Marking

- Proposed change to NFPA 1901
  - Requiring that 50% of the rear surface of the apparatus must be marked with high visibility chevrons
- Ambulance marking
  - Ensure that State and Federal standards allow for all markings



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### Apparatus Marking

- Vertical Panel
  - MUTCD Section 6F.61 defines chevrons as retro-reflective stripes that slope downward at a 45 degree angle in the direction that traffic is to pass
  - This cues traffic visually to go around the vehicle



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### Apparatus Marking

Halfway, MD

Amber traffic advisory light

Chevrons on compartment interior



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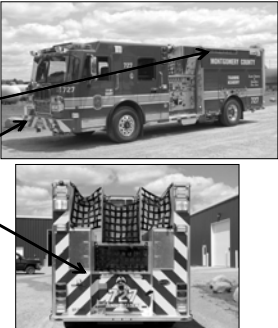
## Responder Safety on the Roadway

### Apparatus Marking

Montgomery County, MD

Amber traffic advisory lights on each side of apparatus for use during blocking

Chevrons on front and rear of apparatus



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### Temporary Traffic Control (TTC)



Temporary traffic control devices

- Traffic cones
- Warning signs
- Flares
- Paddles
- Flags
- Flashlights
- Arrow and Variable Message Signs

Example of cones and signs as traffic control at a roadway incident.

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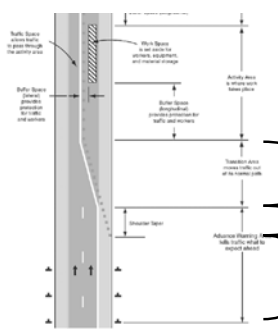
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### Temporary Traffic Control (TTC)



Cones used to indicate transition and work areas

Cones used to indicate taper

Signs at spaced to provide advanced warning to traffic

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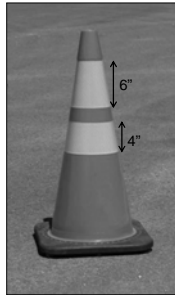
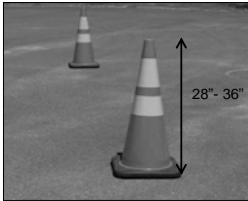
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# “Watch out behind you!”

## Responder Safety on the Roadway

### Temporary Traffic Control (TTC)

#### Cones



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### Temporary Traffic Control (TTC)

- Cone deployment
  - Use hand signals while placing cones to direct the flow of traffic



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### Temporary Traffic Control (TTC)

- Cone deployment
  - At a minimum apparatus should be able to deploy a 200' taper with five cones placed at 50' spacing between cones
  - A “safety cone” should be placed approximately 10' behind the apparatus, located so that it provides a safe work zone next to the vehicle

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# “Watch out behind you!”

## Responder Safety on the Roadway

### Cone Deployment



One lane taper with safety cone

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### Temporary Traffic Control (TTC)

- Flares
  - Used to initiate Temporary Traffic Control at incidents until more permanent devices can be placed (MUTCD 61.02 and 61.03)
  - Used to illuminate cones during nighttime incidents



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### Temporary Traffic Control (TTC)



- Warning signs used in the TTC
  - Fluorescent pink background
  - Black letters and border
- Signs should be positioned to provide maximum advanced warning to oncoming traffic

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# “Watch out behind you!”

## Responder Safety on the Roadway

### Temporary Traffic Control (TTC)

#### Advanced Warning Sign Placement



- For low-speed streets advance warning signage should be a minimum of 200 feet from the first apparatus
- Distances should be increased to approximately 4 to 8 times the speed limit on higher speed urban streets

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### Temporary Traffic Control (TTC)

- Paddles
- Flags
- Flashlights



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### Temporary Traffic Control (TTC)

- Arrow and Variable Message Signs



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# "Watch out behind you!"

## Responder Safety on the Roadway

### Safety

Firefighters responding to calls, need to operate "as if someone is trying to run them over."

James Joyce, Commissioner  
Chicago Fire Department  
January 2001



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### Video



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### Safety Considerations

- Disembark on the side of the apparatus opposite traffic if possible



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# “Watch out behind you!”

## Responder Safety on the Roadway

### Safety Considerations

- Like atomic exposure Time, Distance, and Shielding will protect responders
  - Time – The more efficiently an incident can be safely resolved the less exposure responders will have to the hazards of traffic
  - Distance – The farther away from moving traffic responders can operate the safer they will be
  - Shielding – Blocking is essential to protect responders from vehicles that do not or cannot conform to the altered flow of traffic due to the incident



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### Safety Considerations

- Driver/Operator issues
  - The Driver may have to disembark to the traffic side, use caution and possibly a spotter
  - In Block Left position the operator will be between traffic and the apparatus, consider Block Right or an additional blocking apparatus if hose line is needed



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### Safety Considerations

Warning lights activated

Operator facing traffic and wearing PPE

“Safety cone” deployed



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# “Watch out behind you!” Responder Safety on the Roadway

## Safety Benchmarks

1. Windshield Size-up



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## Safety Benchmarks

2. Never trust approaching traffic.



3. Avoid turning your back to approaching traffic.

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## Safety Benchmarks

4. Establish an initial block with the first arriving emergency vehicle or fire apparatus.



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# “Watch out behind you!”

## Responder Safety on the Roadway

### Safety Benchmarks

5. Wear appropriate PPE including ANSI high visibility reflective vests as required by department policy.



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### Safety Benchmarks

6. At nighttime incidents turn off all sources of vision impairment to approaching vehicles including vehicle headlights and spotlights.



Photo By: Sarah Britain

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### Safety Benchmarks

7. Use fire apparatus and police vehicles to initially redirect the flow of moving traffic.



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# “Watch out behind you!”

## Responder Safety on the Roadway

### Safety Benchmarks

8. Establish advance warning and adequate transition area traffic control measures upstream of incident to reduce travel speeds of approaching motorists.



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### Safety Benchmarks

8. Establish advance warning and adequate transition area traffic control measures upstream of incident to reduce travel speeds of approaching motorists.



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### Safety Benchmarks

9. Use signs and traffic cones and/or cones illuminated by flares where appropriate for sustained highway incident traffic control and direction.



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# “Watch out behind you!”

## Responder Safety on the Roadway

### Safety Benchmarks

10. Assign personnel to monitor approaching traffic and activate an emergency signal if the actions of a motorist do not conform to established traffic control measures in place at the highway scene.



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### Incident Command

- Command
  - For large scale operations on a roadway a unified command with Fire, Police, and DPW is recommended
- Operations
  - Traffic Control Group for temporary traffic control

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### Incident Command

- Safety Officer
  - Spotter/Flagger is an Assistant Safety Officer
- Staging
  - Staging off the roadway to prevent unnecessary exposure to traffic hazards

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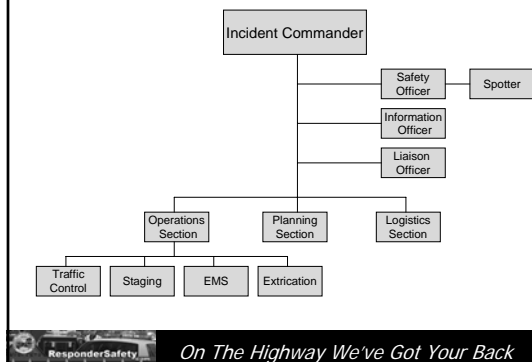
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# “Watch out behind you!”

## Responder Safety on the Roadway

### Sample Command Structure



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### Video

“The Hats of Highway Safety”

ResponderSafety On The Highway We've Got Your Back

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### Evaluate the Scene



ResponderSafety On The Highway We've Got Your Back

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# “Watch out behind you!” Responder Safety on the Roadway



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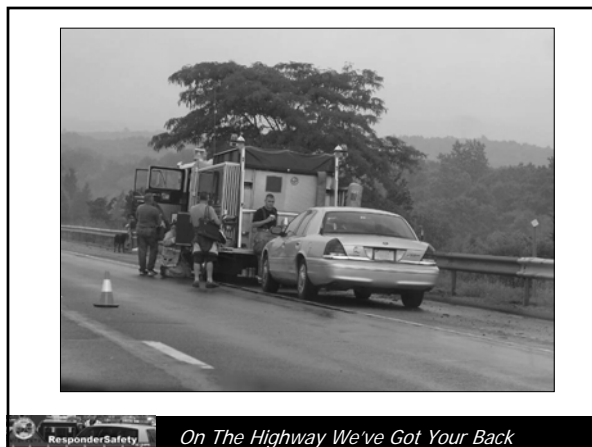
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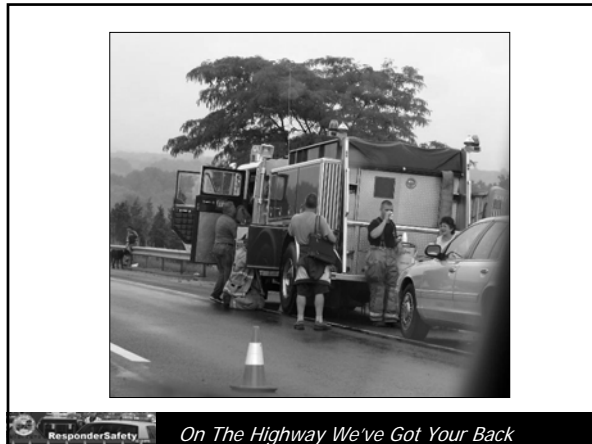
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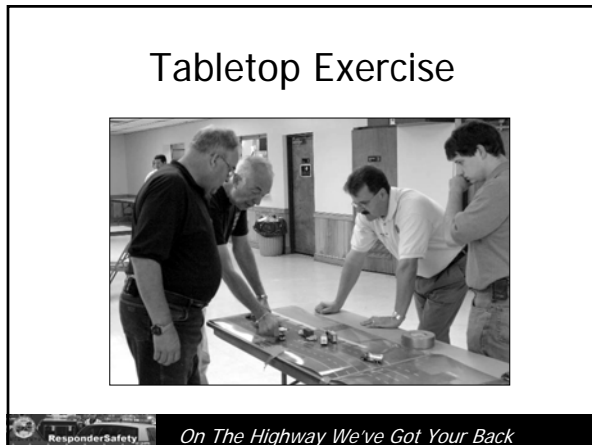
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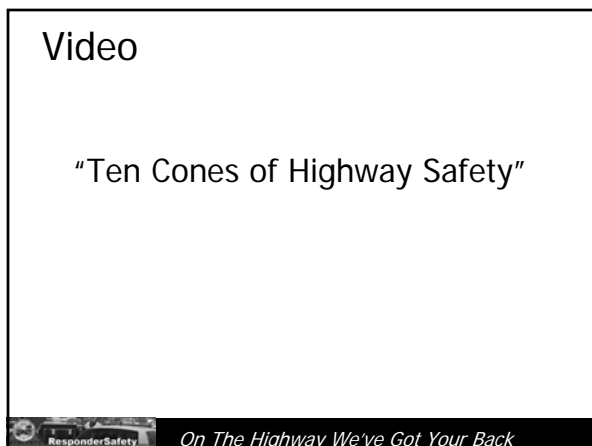
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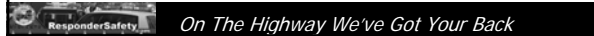
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# “Watch out behind you!”

## Responder Safety on the Roadway

This program was developed by the CVVFA  
Emergency Responder Safety Institute with  
the support of the following organizations

The United States Fire Administration  
The U.S. Department of Justice  
The Pennsylvania Turnpike Commission  
VFIS  
Fire Protection Publications/Oklahoma State University  
GDOT H.E.R.O.S.



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