2017
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Death in the line of duty...

National Institute for Occupational Safety and Health NIOSH

A report from the NIOSH Fire Fighter Fatality Investigation and Prevention Program October 8, 2018

Two Fire Fighters Die and One Fire Fighter Injured When Struck at a Roadway Incident – Mississippi

Executive Summary

On March 15, 2017, an 80-year-old male volunteer deputy chief and a 53-year-old female volunteer fire fighter died, and a 43-year-old male volunteer fire fighter was injured while operating at an incident scene where a dump truck was tangled in downed telephone lines. The fire fighters were struck by a hit-and-run driver. Both the deputy chief and female fire fighter were pronounced dead at the incident scene. At 1701 hours, the fire department was dispatched to a report of a dump truck pulling down power lines and the power was out in the area. The dump truck actually pulled down telephone lines when they became entangled around the bed of the dump truck. Due to the force of the telephone lines being pulled down, this caused power lines to arc which caused a power outage. At 1719 hours, the deputy chief arrived on scene in Rescue 1. The fire chief and the male fire fighter responded in the fire chief's POV. The female fire fighter arrived in her POV several minutes after Rescue 1 arrived. The city's police department also responded and was on scene. The fire fighters provided traffic control at the scene. At approximately 1805 hours, the dump truck left the scene. A power company representative and a power company crew were still on scene. At approximately 1810 hours, the city police officers cleared the scene. At approximately 1816 hours, the fire chief went to meet with the power company representative to determine if the fire department was still needed. At 1818 hours, a vehicle went through the area where the three fire fighters were standing. The area was off the roadway at the fork between a state road and county road. The vehicle struck the deputy chief first. He was thrown onto the vehicle, pushing the windshield inward and collapsing the roof of the car near the "A" Post. He was carried approximately 125 feet before he fell off the vehicle onto the roadway. The female fire fighter was struck and thrown approximately 60 feet and landed in the roadway. The other fire fighter was struck and knocked to the ground near where he was standing.

The incident scene after Medic 2 arrived on scene. The paramedic assigned to Medic 2 is assessing the deputy chief and fire fighter. He pronounced both members deceased. The time is approximately 1838 hours
(Photo courtesy of WDAM TV)

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The power company employee was facing the fire fighters and witnessed the incident. The fire chief witnessed the vehicle striking the fire fighters and watched the vehicle leave the scene. The fire chief immediately notified the county fire dispatcher of the incident and a description of vehicle, then went to check on the three fire fighters. The fire chief advised the dispatcher that two fire fighters were deceased and one fire fighter was injured. The county dispatch center dispatched law enforcement, fire, and emergency medical services to the scene. At 1838 hours, Medic 2 arrived on scene, the paramedic from Medic 2 pronounced the two fire fighters deceased. Advanced life support (ALS) care was initiated on the injured fire fighter. Medic 2 transported the injured fire fighter to the local trauma center at 1856 hours. Medic 2 arrived at the trauma center at 1916 hours. The fire fighter was treated and released the following day.

Contributing Factors

- *Alleged impaired civilian driver*
- *Lack of an incident action plan*
- *Inadequate temporary traffic control zone*
- *Lack of traffic incident management*
- *Lack of SOPs/SOGs on Traffic Incident Management*
- *Lack of training on highway/roadway traffic incident management*

Key Recommendations

- *Fire departments should develop pre-incident plans regarding deployment for highway/roadway incidents. These pre-incident plans should include establishing a temporary traffic control zone, maintaining scene safety, ensuring situational awareness, and proper traffic control for highway/roadway emergency work zones.*
- *Fire departments should ensure that all members receive training for conducting traffic incident management during emergency operations at highway/roadway incidents*
- *Fire departments should ensure that a continuous scene size-up is conducted and risks are continuously assessed and managed throughout a highway/roadway incident.*

For further information, visit the program website at www.cdc.gov/niosh/fire or call toll free 1-800-CDC-INFO (1-800-232-4636).

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Introduction

On March 15, 2017, an 80-year-old male volunteer deputy chief and a 53-year-old female volunteer fire fighter died, and a 43-year-old male volunteer fire fighter was injured while operating at an incident scene where a dump truck was tangled in downed telephone lines. On March 17, 2017, the United States Fire Administration notified the National Institute for Occupational Safety and Health (NIOSH) of this incident. On May 16 - 20, 2017, an investigator and an occupational health and safety specialist from the NIOSH Fire Fighter Fatality Investigation and Prevention Program traveled to Mississippi to investigate this incident.

The NIOSH investigators met with the county fire service coordinator, the city's fire chief, the city's police chief, county volunteer fire chiefs and fire fighters, the county sheriff and investigators, and the director of the county's dispatch center. The NIOSH investigators reviewed the fire department's standard operating procedures, training records from the department and the state of Mississippi Fire Academy, and dispatch and tactical channel radio transmissions. The NIOSH investigators visited and photographed the incident scene. During the investigation, witness statements were reviewed. Interviews were conducted with the fire fighters, fire officers, fire chiefs, and law enforcement officers, who responded to the incident.

Fire Department

The county in which this incident occurred has 13 fire departments. There are two volunteer fire departments and 11 combination fire departments, which are staffed by county fire fighters. These fire fighters are full-time and part-time employees. The 13 fire departments are staffed by approximately 220 volunteer fire fighters.

The county consists of 500 square miles with a population of 60,618. In 2016, there were 4,500 alarms for fire and EMS. Emergency medical services are provided by a private ambulance company that is contracted by the county. The medic units are operational as follows:

- 1 medic unit: 0900 – 2100 hours
- 3 medic units: 24 hours

The staffing for each unit is a paramedic and an EMT/B.

The fire department that responded to the incident serves a town with a population of 1,500 and a response area of 30 square miles. In 2016, the fire department responded to approximately 200 incidents. The incidents included:

- 3 structure fires
- 10 wildland urban interface fires
- 12 vehicle extrications
- 10 vehicle accidents with injuries.

The remainder of the incidents were responses to assist EMS and service related calls.

The fire department has approximately 30 - 35 members on the roster with 15 -18 active members. The fire department holds business meetings on the 1st Monday of each month and training is conducted on the 3rd Monday of the month, but is not mandatory. Members of the fire department attend fire school twice a year in the county, which is sponsored by the Mississippi State Fire Academy located in Jackson, MS.

The fire department operates the following apparatus and vehicles.

Designation	Year	Type of Apparatus
Engine 1	2007	Custom Pumper
Rescue 1	2008	Pick-Up
Tanker 1	2006	3500 gallon Tanker w/pump
Tanker 2	1990	2000 gallon Tanker
Engine 2	2009	1250 GPM Pumper/1000 gallon tank
Rescue 2	2016	Command/EMS vehicle

Training and Experience

The Mississippi State Fire Academy (MSFA) was established in 1974. The fire academy has 63 full-time employees and 84 adjunct instructors. The state of Mississippi has 16,300 fire fighters, of which approximately 3000 fire fighters are career. The fire academy trains approximately 15,000 students annually and offers more than 90 courses. These courses are offered on campus or off-site through the field delivery program. The Mississippi State Fire Academy offers training via fire schools as part of the off-site delivery program. These fire schools take place locally in the first and third quarter of the year.

The state of Mississippi has no requirements for becoming a volunteer fire fighter. There are 82 counties in Mississippi, of which approximately half are Mississippi certified through the volunteer fire fighter program. The volunteer fire fighter program consists of *Mississippi Certified Volunteer Fire Fighter I - Module 1*(Classroom and Practical - 80 hours); *Mississippi Certified Volunteer Fire Fighter I - Module 2* (Skills Exam – 8 hours); *Mississippi Certified Volunteer Fire Fighter II - Module*

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1(Classroom and Practical – 30 hours); and the *Mississippi Certified Volunteer Fire Fighter II - Module 2 (*Skills Exam – 8 hours*)* are offered 4 times a year at the MSFA. For career fire fighters, the Mississippi State Fire Academy offers a 7-week program on campus.

The deputy chief that was killed had 47 years' experience with the fire department. The deputy chief had served as fire chief of the department for 15 years from 1981 to 1996. The department's fire station was named for him in 2006. His training included: LP Gas Tactics; volunteer fire fighter school (10 years); Waterous fire pump maintenance; *Recognizing And Identifying Hazardous Materials;* apparatus operations; auto extrication; fireground support operations; IS-700.A: *National Incident Management System (NIMS) An Introduction*; and the Mississippi State Fire Academy's *National Traffic Incident Management Responder Training Program* course (12 hours) in October 2016. His fire training totaled over 181 credit hours and 40 EMS credit hours.

The fire fighter that was killed had approximately 2 years' experience with 3 different fire departments. Her training and certifications included CPR/AED First Responder; Mississippi State Fire Academy's *National Traffic Incident Management Responder Training Program* course (12 hours) in October 2016; Pipeline Emergency Response; IS100: *Introduction to ICS;* IS200: *Basic ICS*; IS-700.A: *National Incident Management System (NIMS), An Introduction*; and IS-800.B: *National Response Framework, An Introduction*.

The injured fire fighter had approximately 20 years' experience as a fire fighter and approximately 6 years' experience as an EMT. His training and certifications included: structural fire attack; state volunteer certification – Level 1, classroom preparation; state certified volunteer fire fighter – Level 1; and auto extrication. He had fire training totaling over 70 credit hours and 28 EMS credit hours.
The fire chief has approximately 20 years' experience as a fire fighter, and has served as fire chief for the past 6 years. His training and certifications included: volunteer fire school (5 years); pump maintenance; *Recognizing And Identifying Hazardous Materials*; structural fire attack; state volunteer certification – Level 1, classroom preparation; auto extrication; foam response; *Certified Rural Fire Apparatus – Driver/Operator*; fire fighter safety; *Mississippi Volunteer Fire Fighter 1* – Module 1; Fire Academy for Elected/Public Officials; *Mississippi Volunteer Fire Fighter 1* – Module 2; *Certified Fireground Resource Technician* – Module 1; *Certified Fireground Resource Technician* – Module 2; *Mississippi Fire Prevention and Public Fire Safety Education*; *Response to New Vehicle Fires*; *Basic Aerial Operations* – Annual Refresher; *Fire Attack for the Modern Era*; National Fallen Fire Fighters, *Everyone Goes Home*; and the Mississippi State Fire Academy's *National Traffic Incident Management Responder Training Program* course (12 hours) in October 2016. The fire chief has over 320 hours of training in firefighting and over 90 EMS credit hours.

Equipment and Personnel

The county 9-1-1 dispatch center dispatches for county fire, the county sheriff's office, four municipal police departments, and emergency medical services. The 9-1-1 center employs one director, 14 full-

time dispatchers, and 1 part-time dispatcher. The minimum staffing is 3 dispatchers. The shifts are 0530 – 1730 hours and 1730 – 0530 hours. Dispatchers rotate work schedules. The first week of the pay cycle is 2 days on 2 days off. The second week of pay cycle is 3 days on 3 days off. Dispatchers rotate through 4 stations: Sheriff, municipal police/Fire, and EMS. The training and certification programs come from the Association of Public-Safety Communications Officials (APCO).

The radio system is a 700 MHz radio system. For fireground operations, the incident commander requests a tactical channel when assuming command. Fire departments have 3 tactical channels available. The county fire service had no Mayday policy at the time of the investigation.

Incident Scene

The incident occurred at an intersection of a state highway and county road. Across the street from the intersection was a vacant lot north of a dental clinic. A dump truck had dumped a load of dirt in the vacant lot. The driver of the dump truck was putting the dump bed down as he was entering the state highway. The bed of the dump truck pulled down telephone lines. The telephone lines and the power lines were on the northeast side of the roadway. The initial assessment was the dump truck pulled down power lines, but it was later determined the lines on the ground and dump truck were telephone lines (**See Photo 1**). When the dump truck struck the telephone lines, the power lines were impacted enough to cause a power outage in the area. This generated the response from the power company, which was requested by the fire department.

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Photo 1. The incident area where the telephone lines were pulled down and a power outage occurred. (Adapted from Google Earth® satellite image.)

Timeline

The following timeline is a summary of events that occurred as the incident evolved. Not all incident events are included in this timeline. The times are approximate and were obtained by studying the dispatch records, audio recordings, witness statements, and other available information. This timeline also lists the changing indicators and conditions reported, as well as fire department response and operations. All times are approximate and rounded to the closest minute.

Dispatch Communications & Fire Department Response	Time	Fireground Communications & Fireground Operations
The county Dispatch Center received a 9-1-1 call for a dump truck entangled in power lines. Incident is dispatched to the 1st due volunteer fire department.	**1700 Hours**	

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Dispatch Communications & Fire Department Response	Time	Fireground Communications & Fireground Operations
The department's fire chief and injured fire fighter were enroute to incident scene in the fire chief's POV.	**1701 Hours**	
Rescue 1 responded to the incident.	**1702 Hours**	
Fire Chief and fire fighter arrived on scene.	**1705 Hours**	The fire chief advised the county Dispatch Center that fire department personnel would provide traffic control.
The county Dispatch Center notified the power company to respond to this incident due to a power outage. The county Dispatch Center also contacted the telephone company.	**1707 Hours**	
Rescue 1 and a city police officer arrived on scene.	**1719 Hours**	
The female fire fighter from the 1st due fire department arrived on-scene in her POV.	**1724 Hours**	
The power company arrived on-scene.	**1749 Hours**	
2nd city police officer arrived on-scene.	**1759 Hours**	
The dump truck was released and cleared the scene.	**1805 Hours**	

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Dispatch Communications & Fire Department Response	Time	Fireground Communications & Fireground Operations
Two city police officers cleared the scene.	**1810 Hours**	
	1816 Hours	The fire chief walked to the dirt driveway to meet with a power company supervisor regarding if the services of the fire department were still needed. At this time, the power company representative asked for assistance from the fire department with traffic control.
	1818 Hours	A vehicle drove through the emergency scene striking three fire fighters. The power company representative witnessed the crash.
	1819 Hours	The fire chief radioed the county Dispatch Center. He advised three fire fighters had been struck.
The county Dispatch Center dispatched Medic 3 to incident scene. Medic 2 also responded due to time and distance.	**1820 Hours**	
The county Dispatch Center dispatched city, county, and state law enforcement to the incident scene.	**1821 Hours**	

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Dispatch Communications & Fire Department Response	Time	Fireground Communications & Fireground Operations
	1823 Hours	A volunteer fire chief blocked the intersection with his POV. Civilians and fire fighters started patient care on the injured fire fighter.
City police officers arrived on scene.	**1825 Hours**	
Medic 2 arrived on scene. Medic 3 cancelled.	**1838 Hours**	Paramedic pronounced the deputy chief and female fire fighter deceased.
A homeowner called 9-1-1 to report the suspect vehicle had stopped in front of his home. The homeowner had the suspect detained in the vehicle at gunpoint.	**1839 Hours**	
Medic 2 transported the injured fire fighter to the local trauma center. The fire chief also was transported by Medic 2 for evaluation at the trauma center.	**1855 Hours**	
Medic 2 arrived at hospital with fire chief and fire fighter 2.	**1916 Hours**	
The county coroner arrived on-scene.	**1933 Hours**	
Scene is cleared	**2048 Hours**	

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Personal Protective Equipment

None of the three fire fighters were wearing turnout gear at the time of the incident. The three fire fighters were dressed in street clothes and were each wearing a high visibility traffic vest. Photo 2 shows a high visibility traffic vest similar to the ones the fire fighters were wearing.

Photo 2. A high visibility traffic vest similar to the ones the fire fighters were wearing.
(*Photo Source: World Wide Web*.)

Weather Conditions

The weather temperature at 1655 hours was 53 degrees Fahrenheit (53^{o} F). The humidity was 28% and the barometric pressure was 30.37 inches. Visibility was 10 miles and the winds were 10.4 miles per hour from the north. The skies were clear and no precipitation was reported in the previous 24 hours [Weather Underground 2017]. The weather was not a factor in this incident.

Investigation

On March 15, 2017, at approximately 1659 hours, the county 9-1-1 Center received a call reporting a dump truck entangled in power lines at the intersection of a state highway and county road. At 1700 hours, the 1st due fire chief radioed the county Dispatch Center and advised them of the incident with

the dump truck. At 1701 hours, the fire department was dispatched to a report of a dump truck pulling down power lines and the power was out in the area. The operator of the dump truck was driving on a dirt driveway and was putting the bed down when the truck pulled down telephone lines. The telephone wires were entangled around the bed of the dump truck (**See Diagram 1**). The power lines were pulled hard enough to cause a transformer to fail and cause a power outage in the area. Also, the power pole near the dump truck was leaning several feet. At 1702 hours, the fire chief and a fire fighter responded to the incident scene in the fire chief's privately owned vehicle (POV). They arrived on the scene at 1705 hours. The fire chief advised the county Dispatch Center that the fire department would provide traffic control. The department's deputy chief responded to the scene in Rescue 1 at 1702 hours. Rescue 1 arrived on the scene at the same time as a city police officer at 1719 hours. Once an initial size up was conducted, the deputy chief moved Rescue 1 to the curve in the southbound lane to provide warning lighting for northbound traffic coming around the curve on the state highway. While trying to determine if the fire department was going to clear the incident, the deputy chief drove Rescue 1 to the driveway at the entrance of the county road and state highway (**See Diagram 2**).

The female fire fighter arrived in her POV at 1724 hours. At 1749 hours, the power company arrived with a repair crew and supervisor. Another city police officer arrived on scene at 1759 hours. At approximately 1805 hours, the dump truck cleared the scene. At approximately 1810 hours, the two city police officers cleared the scene.

At approximately 1816 hours, fire chief walked across the street to talk to the power company supervisor. The fire chief was hoping to clear all fire department resources. The power company representative asked if the fire department could stay on scene and provide traffic control. At 1818 hours, a civilian operating a personally owned vehicle was driving south on the state highway. The civilian went through the intersection where the deputy chief, female fire fighter, and a male fire fighter were standing. The fire fighters were standing in a dirt area which was at the intersection between the state highway and county road (**See Diagram 3**). The vehicle struck the deputy chief first. He was thrown onto the vehicle, pushing the windshield inward and collapsing the roof of the vehicle near the "A" Post. He was carried approximately 125 feet before he fell off the vehicle onto the roadway. The female fire fighter was struck and thrown approximately 60 feet south and landed in the roadway. The other fire fighter was struck and knocked to the ground near where he was standing. ***Note:*** *The description of the vehicle striking the fire fighters was provided by the city's police department.* The power company supervisor was facing the fire fighters and witnessed the incident. The fire chief also witnessed the incident, immediately notified the county Dispatch Center of the incident and a description of the vehicle, and then went to check on the three fire fighters. The fire chief advised the fire dispatcher that two fire fighters were deceased and one fire fighter was injured. The county dispatch center dispatched law enforcement, fire, and emergency medical services to the scene at 1820 hours (**See Diagram 4**).

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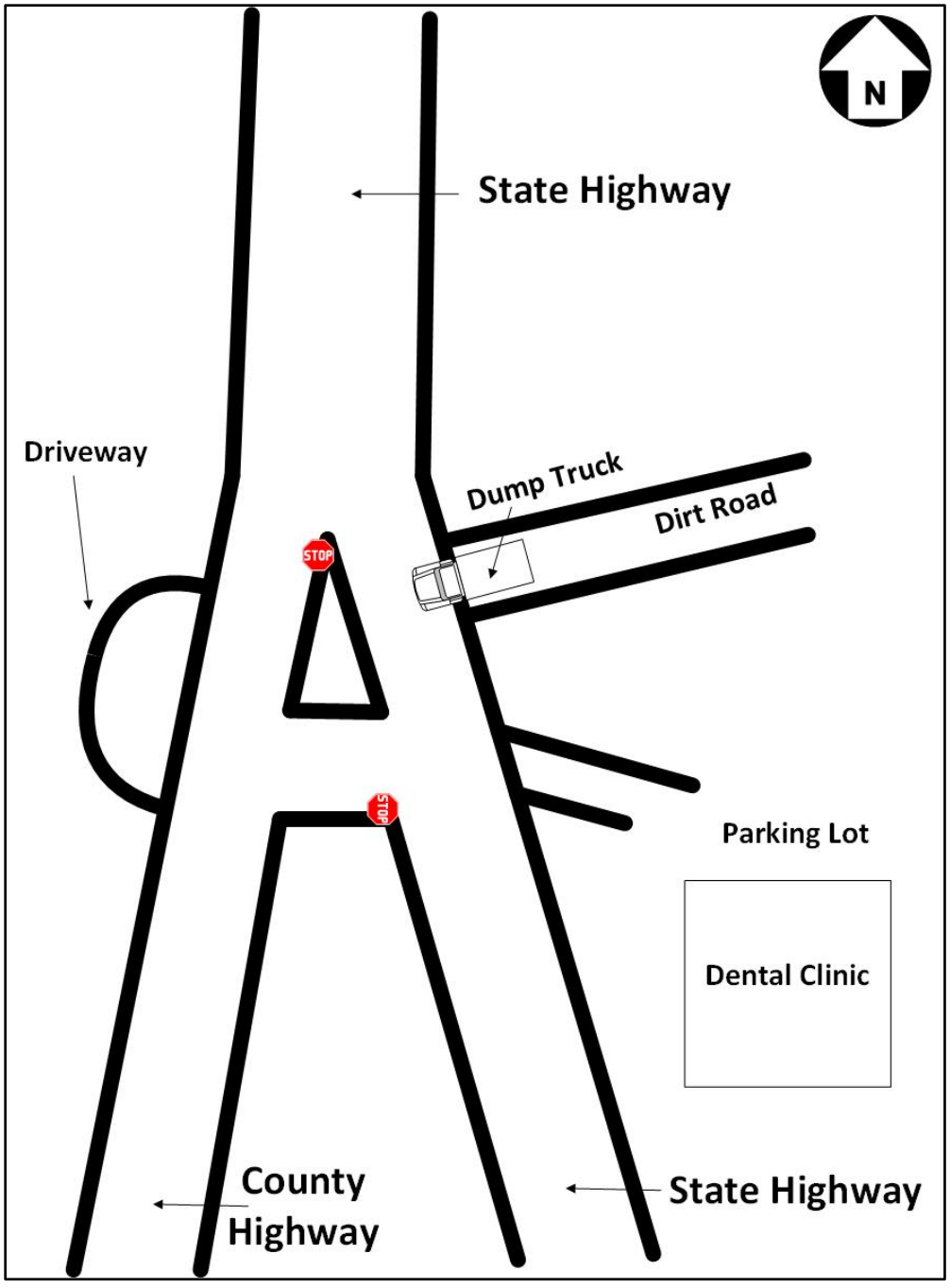

Diagram 1. The location of the dump truck that pulled down telephone lines and caused a power outage due to blown transformer.

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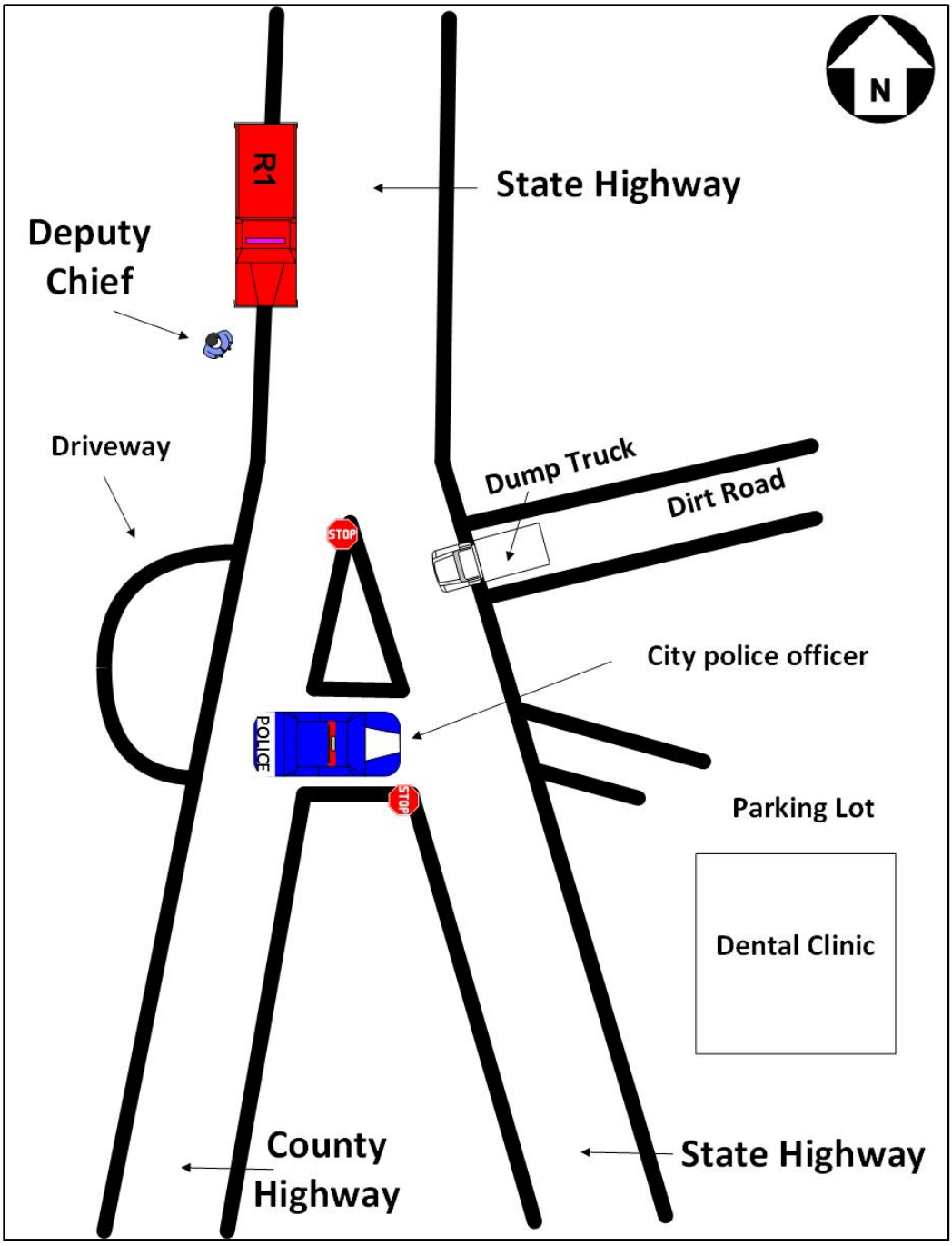

Diagram 2. The initial fire department traffic control operations.

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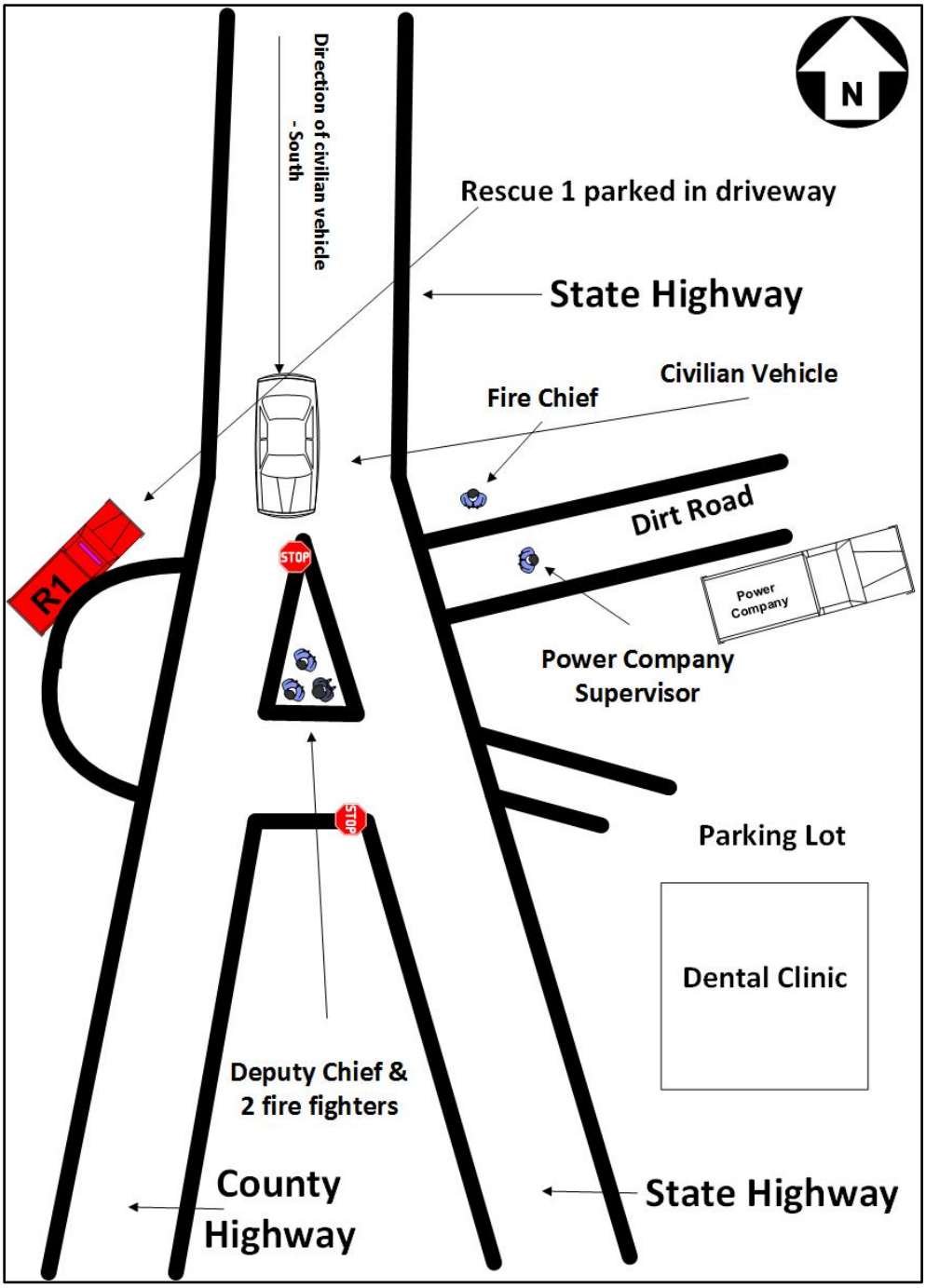

Diagram 3. The location of fire department members prior to the crash.

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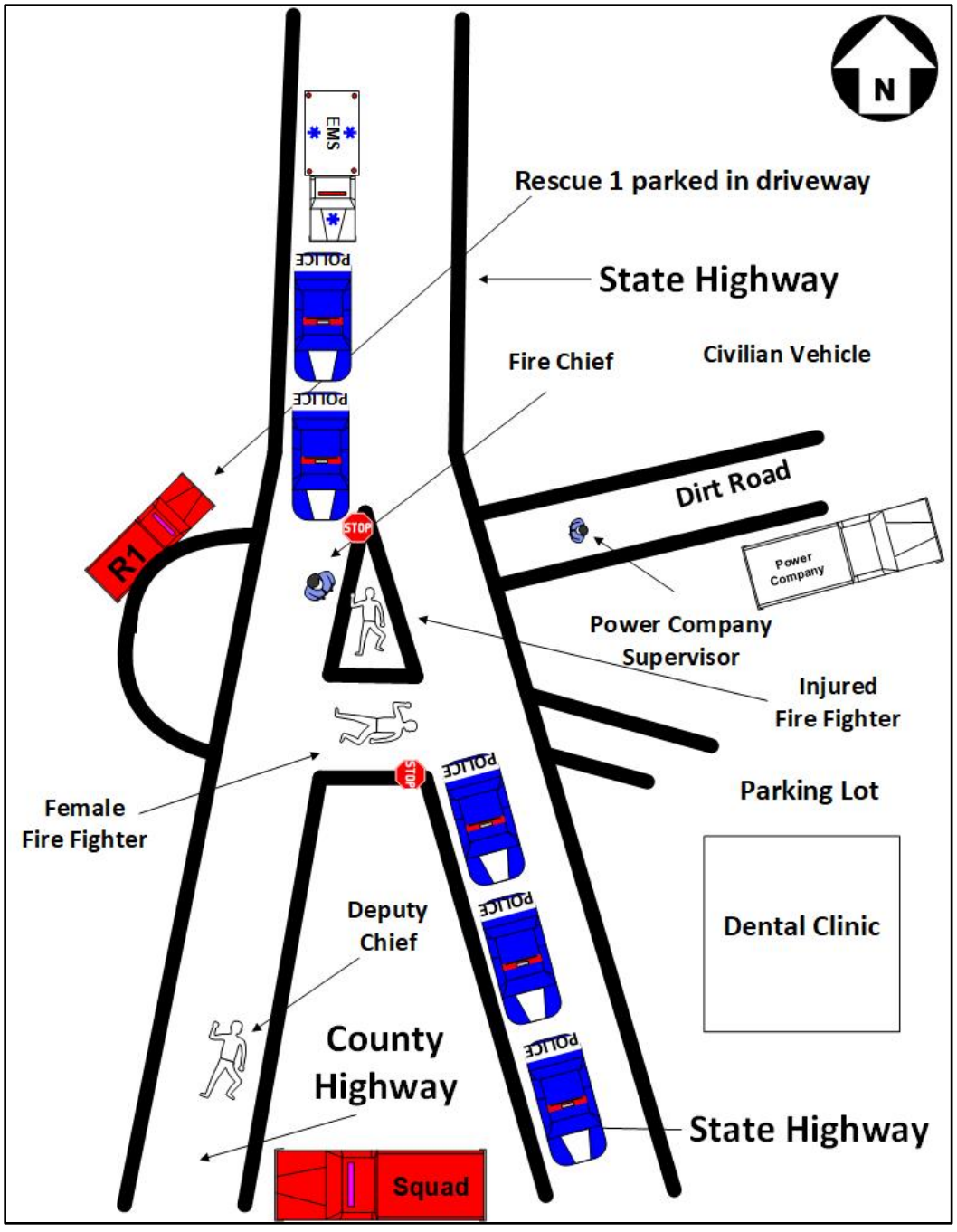

Diagram 4. The location of fire department members after they were struck. The deputy chief and female fire fighter were deceased.

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The driver of the vehicle that struck the fire fighters continued south on the county road. The driver and vehicle were located approximately 6 miles from the incident scene. Law enforcement officer arrested the driver who was charged with hit-and-run, causing death, plus additional charges of three counts of aggravated driving under the influence (DUI). The driver had a previous record and is a convicted felon, with charges from multiple counties in Mississippi.

Numerous fire service personnel responded to the incident, which quickly overwhelmed the fire dispatcher. There was no accurate count of the number of personnel on scene. At approximately 1830 hours, a volunteer fire chief from a county fire department arrived on scene and assumed Command. He got the state highway closed in both directions. Traffic was diverted to a parallel residential street which allowed traffic to bypass the incident scene. There were several civilians that stopped and assisted the injured fire fighter. At 1838 hours, Medic 2 arrived on scene. The paramedic from Medic 2 pronounced the deputy chief and female fire fighter deceased. The driver of Medic 2 with the help of advanced life support (ALS) personnel on scene initiated treatment to the injured fire fighter. Medic 2 transported the injured fire fighter and the fire chief to the local trauma center at 1855 hours. Medic 2 arrived at the trauma center at 1916 hours. At 1933 hours, the county coroner arrived on scene to pronounce the deputy chief and the female fire fighter legally deceased. He then transported the two deceased fire fighters to the county morgue.

All units were clear of the scene at 2048 hours.

Contributing Factors

Occupational injuries and fatalities are often the result of one or more contributing factors or key events in a larger sequence of events that ultimately result in the injury or fatality. NIOSH investigators identified the following items as key contributing factors in this incident that ultimately led to the fatalities:

- Alleged impaired civilian driver
- Lack of an incident action plan
- Inadequate temporary traffic control zone
- Lack of traffic incident management
- Lack of SOPs/SOGs on Traffic Incident Management
- Lack of training on highway/roadway traffic incident management.

Cause of Death

According to the death certificate, the medical examiner listed the cause of death for the both the deputy chief and the female fire fighter as blunt force trauma.

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Recommendations

Recommendation #1: Fire departments should develop pre-incident plans regarding deployment for highway/roadway incidents. These pre-incident plans should include establishing a temporary traffic control zone, maintaining scene safety, ensuring situational awareness, and proper traffic control for highway/roadway emergency work zones.

Discussion: Highway/Roadway incidents are high risk events regardless of the frequency in which they occur. When responding to an incident on any type of highway/roadway, fire fighters and other first responders must ensure for their personal safety as well as others plus the individuals they are trying to assist. Complacency, redundancy, and lack of situational awareness are issues that all responders must avoid when dealing with highway/roadway incidents. Safety of the emergency responders, care of the injured, protection of the public, protection of the environment, and clearance of the traffic lanes should all be the priority concerns of the incident commander operating at the scene of a highway/roadway incident [DCFEMS 2009].

There are various types of highways/roadways that a fire department responds to in their response area. Examples can be a city street (2 or 4 lanes), county road (2 or 4 lanes), a divided highway (4 lanes), an expressway, freeway, turnpike, or interstate which are commonly known as limited access highways. The fire department has to plan how and what resources to deploy to these various types of highways/roadways.

From a pre-incident planning process, the fire department has to consider the type of responses that may occur on these various highways/roadways such as motor vehicle crashes, vehicle fires, brush fires, hazardous materials incidents, and any other conceivable type of incident. The intent is to plan on what resources will respond in order to mitigate the problem which has occurred and how to safely protect fire fighters and the other first responders [USFA 2012].

The primary objectives for any operation at the scene of a highway incident are to:

- establish a safe operating area to prevent injuries to emergency workers;
- provide emergency care and transportation of the sick or injured;
- establish water supply, as needed;
- protect the environment;
- restore normal traffic flow, as soon as possible;
- keep as many traffic lanes open as possible if it is safe for the emergency responders, those involved in the incident, and those traveling through the incident
- preserve evidence for investigators;
- use the Incident Command System to manage the incident [NOVA Region 2012].

These objectives also are included in the National Unified Goal (NUG) for Traffic Incident Management which was developed by the National Traffic Incident Management Coalition [ERSI 2008b]. The primary objective is to protect the first responders in order to allow them to safely operate

at the incident scene. This process starts with the first arriving officer making the decision as to what lanes to close or if the highway/roadway needs to be completely closed. This is based upon the risk assessment for ensuring that first responders have a safe work area to operate including those involved in the incident and those traveling through the incident.

All responders should understand and appreciate the high risk they are exposed to when operating in or near moving vehicular traffic. At every highway/roadway-related emergency scene, personnel are exposed to passing motorists of varying driving abilities. Situational awareness can be defined as genuinely heightened consciousness or cognizance of what is currently developing or occurring around you. It is crucial that first responders maintain good situational awareness during all emergencies, especially highway/roadway incidents to better protect themselves and those around them.
Fire fighters and other first responders need to be constantly reminded to use caution while operating on highways/roadways. Company officers need to remind fire fighters to exit the apparatus safely and, above all else, to keep an eye out for any potential hazards. In some cases, additional staffing may be needed to provide sufficient supervision of tasks, scene safety, and scene management. This may include a full alarm assignment to ensure for adequate staffing including a battalion chief and a safety officer.

Approaching vehicles may be driven at speeds from a creeping pace to well beyond the posted speed limit. Some of these vehicle operators may be vision impaired, under the influence of alcohol and/or drugs, or have a medical condition that affects their judgment or abilities. In addition, motorists may be completely oblivious to first responders' presence due to distractions caused by cell phone use, loud music, conversations, inclement weather, and terrain or building obstructions. Approaching motorists will often be looking at the scene and not the roadway in front of them. Nighttime incidents requiring personnel to work in or near moving traffic are particularly hazardous. Visibility is reduced and driver reaction time to hazards in the roadway is slowed [NOVA Region 2012].

To ensure that first responders maintain situational awareness, they must understand the strategy and incident action plan, which must be communicated from the Incident Commander at the beginning of the incident and maintained throughout duration of the incident. This ensures for effective strategic, tactical, and task level management, plus all tasks being conducted are moving towards a successful outcome for the incident. At highway/roadway incidents, this is essential due to the fact that the potential for something to go wrong can occur very quickly. Each first responder is responsible for their safety plus the personnel they are working with. This protects against complacency and tunnel vision. The operations at a highway/roadway incident must be reassessed continuously, especially as incident objectives are met, as additional resources arrive, and/or resources are released from the incident [DCFEMS [2009].

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Safety Benchmarks
Emergency personnel are at great risk while operating in or around moving traffic. There are approaches that can be taken to protect yourself and all crewmembers:

- never trust the traffic;
- engage in proper blocking procedures (which means using the positioning of fire apparatus as a protection barrier for fire fighters and other first responders when working on a highway/roadway);
- wear high-visibility reflective vests including turnout gear (as necessary);
- reducing white lights and warning lights (to prevent possible motorist vision impairment) [FHWA 2009b];
- use traffic cones and flares [NOVA Region 2012].

NFPA 1500, *Standard on Fire Department Occupational Safety, Health, and Wellness Program*, Chapter 9, *Traffic Incident Management*, requires a fire department to establish, implement, and enforce standard operating procedures (SOPs) regarding emergency operations involving traffic [NFPA 2018].The first arriving officer must conduct a complete and thorough scene size-up to determine the risk to the fire fighters, EMS personnel and law enforcement officers working an incident.

For additional information, see **Appendix One – Traffic Incident Management Guide, Appendix Two – Sample Traffic Control Scenario** and **Appendix Three - Sample Highway Roadway SOP/SOG**.

At this incident, the deputy chief and two fire fighters were standing in a dirt area at the intersection of the state highway and county road. Other than wearing traffic vests, there was no scene safety perimeters established indicating an emergency incident scene. A civilian vehicle going south on the state highway struck the three fire fighters at a significant rate of speed. One option for scene safety would be to have the three fire fighters off the county roadway out of the path of traffic.

Recommendation #2: Fire departments should ensure that all members receive training for conducting emergency operations at highway/roadway incidents.

Discussion: With the development and implementation of any new policy, standard operating procedure, or regulation, one of the essential elements is to ensure that training occurs. The intent is to provide a comprehensive training program for all members. This ensures the members understand the policy, standard operating procedure, or regulation and to alleviate any confusion, misinterpretation, or misunderstanding.

The Emergency Responder Safety Institute (ERSI)/Cumberland Valley Volunteer Firemen's Association, offers a curriculum entitled "Managing Emergency Incidents on the Roadway" [ERSI

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2008a].This is an on-line eight-hour course which covers the following topics: fire fighter fatality and injury statistics related to highway/roadway incidents; case studies dealing with fire fighter fatalities, injuries, and near misses; types and use of personal protective equipment; federal regulations (e.g. Section 6I - *Control of Traffic through Traffic Incident Management Areas* of the Manual on Uniform Traffic Control Devices (MUTCD)) [FHWA 2009a]; positioning of apparatus and emergency vehicles; safety procedures for operations on highway/roadways; use of traffic signs and warning devices, use of the Incident Command System including Unified Command; pre-incident planning with law enforcement, state/local Department of Transportation, emergency medical services, tow and recovery operators, product recovery contractors; and table top exercises. This training program is available through http://www.respondersafety.com at no cost.

The ResponderSafety.com Learning Network online program has been accepted by the Federal Highway Administration (FHWA) Strategic Highway Research Program (SHRP II) after completing the following ten modules:

1. Advanced Warning
2. Blocking Procedures and Roadway Incidents
3. High Visibility Innovations
4. Manual on Uniformed Traffic Control Devices (MUTCD)
5. Move it or Work it
6. See and be seen: Emergency lighting awareness
7. Special Circumstances: Safe operations for vehicle fires
8. Special Hazards
9. Termination
10. Traffic Incident Management: Incident command and management

Proper training in traffic control can be obtained from local or state highway departments, law enforcement, and other agencies involved with controlling the roadway traffic. This training should comply with NFPA 1091, *Standard for Traffic Control Incident Management Professional Qualifications,* for personnel who operate on or about roadways mitigating an incident [NFPA 2015]. The training process will allow for members to determine the correct course of action at an incident scene including the proper staffing, appropriate agencies needed to respond, and deployment of resources to effectively control traffic until the situation has been mitigated.

According to the Manual on Uniform Traffic Control Devices (MUTCD), traffic incidents can be divided into three general classes of duration, each of which has unique traffic control characteristics and needs. These classes are listed below:

- Major - expected duration of more than 2 hours;
- Intermediate - expected duration of 30 minutes to 2 hours;
- Minor - expected duration under 30 minutes [FHWA 2009a].

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Major traffic incidents are typically traffic incidents involving hazardous materials, fatal traffic crashes involving numerous vehicles, and other natural or man-made disasters. These traffic incidents typically involve closing all or part of a roadway facility for a period exceeding 2 hours. It is important that all first responders have a good working relationship and compatible procedures when operating at highway/roadway incidents. At a minimum, at least one lane next to the incident lane must be closed (lane +1). Additional or all traffic lanes may have to be closed if the extra lane does not provide a safe barrier. Fire apparatus and other emergency vehicles must be placed between the flow of traffic and the personnel working on the incident to act as a blocking vehicle. Fire apparatus must be parked at a 30 – 45 degree angle so that the operator is protected from traffic by the tailboard. Front wheels must be turned away from the responders working highway incidents so that the apparatus will not be driven into them if struck from behind. Also, consider parking additional emergency vehicles 150 to 200 feet behind the blocking vehicles to act as an additional barrier between responders and the flow of traffic. Advanced warning devices and transition areas are a means by which fire fighters and other first responders can convey information to motorists approaching an incident scene, referred to as the "advance warning area." Warning devices in the advance warning area may vary from a single sign or high-intensity rotating, flashing, oscillating, or strobe lights on a vehicle to a series of signs in advance of the incident scene [ERSI 2008a].

NFPA 1500, Paragraph 9.4.5 states, "The following warning devices shall be used to warn oncoming traffic of the emergency operations and the hazards to member(s) operating at the incident:

- A minimum of 5 (five) 28 in. or greater (71 cm or greater) fluorescent orange traffic cones with double reflective markings that are compliant with the MUTCD.
- Retro-reflective warning signs compliant with the MUTCD [NFPA 2018; MUTCD 2012].

The importance of understanding standard operating procedures and the pre-incident planning process for highway/roadway emergency operations is essential for the safety of all first responders. All fire fighters have to understand the risks involved when conducting emergency operations on any highway/roadway. The intent is to identify and reduce the hazards encountered by fire fighters and first responders at highway/roadway incidents. The training process will allow for members to determine the correct course of action at an incident scene including the proper staffing, appropriate agencies needed to respond, and deployment of resources to effectively control traffic until the situation has been mitigated. The approximate duration of an incident, the severity and risks of the incident, the amount of resources needed to mitigate the incident, and ability to provide detours should be considered if the highway/roadway must be completely closed and allowing the hazard to be mitigated.

For additional information, see **Appendix One – Traffic Incident Management Guide, Appendix Two – Sample Traffic Control Scenario** and **Appendix Three - Sample Highway Roadway SOP/SOG**.

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At this incident, the fire chief, deputy chief, and female fire fighter had completed Mississippi State Fire Academy's *National Traffic Incident Management Responder Training Program* course in October 2016. This course was developed by the Federal Highway Administration [FHWA 2013].

Recommendation #3: Fire departments should ensure that a continuous scene size-up is conducted and risks are continuously assessed and managed throughout a highway/roadway incident.

Discussion: It's important for all emergency responders to remember that things can go very wrong very quickly at roadway emergency incidents. Fire departments need to ensure that multiple prevention strategies are in place and emergency responders must maintain an awareness of what is going on around them at all times. Fire departments should train members on how to identify and pre-plan an escape strategy should they encounter a dangerous situation such as an errant vehicle entering the emergency work zone.

Being alert to what is going on around a roadway emergency incident is extremely critical because roadway incidents are always high risk events. Complacency, redundancy, and lack of situational awareness are issues that all responders must avoid. When responding to a roadway emergency incident, fire fighters and other first responders must ensure their personal safety, as well as the safety of individuals they are trying to assist. Emergency personnel need to develop a heightened sense of awareness to detect impending dangerous situations and recognize warning signals such as screeching tires, horns, smoke or dust, and the sound of a crash or impact. Another important issue is for the incident commander to appoint a "Spotter" at every roadway incident where members are working and not continuously watching traffic. A spotter is responsible for watching traffic at all times and will warn members prior to an incident happening. This is an extra safety function for a highway/roadway incident. The spotter is equipped with an air horn bottle to warn members. Responders need to do a quick survey of the location where they are working and mentally prepare an escape strategy [IAFF 2010].

Fire fighters and other first responders should operate defensively with an awareness of the high risk associated with working near moving traffic. Fire fighters and other first responders cannot rely on approaching motorists to see them, slow down, and/or move over. Motorists may ignore traffic signs and regulations for various reasons, including poor visibility, distraction, falling sleep or fatigue, being under the influence of alcohol or drugs, and/or because of a medical condition that affects their judgment or abilities. All first responders must maintain situational awareness at all times to what is going on around them.

It is imperative that an effective incident management system is operational with an incident action plan (IAP) in place from the first arrival of resources until all units are cleared. To ensure a standard outcome of each incident, the incident commander should match the standard conditions to standard

actions. This is the core of the incident command system and is the basis for all operations. Standard conditions are identified as the incident's ***current*** critical factors:

- Identify the incident's critical factors before taking any action.
- Initial and ongoing size-up of the incident's critical factors must produce the information that becomes the basis for the current incident strategy and IAP.
- Current, accurate, and relevant information provides the foundation for effective initial and ongoing action.
- The goal of this systematic evaluation process continually produces standard, safe, well-managed incident outcomes [MABAS 2017].

Equally important to properly establishing or setting up a TTC zone and associated traffic control is safely releasing resources and demobilizing the scene. This activity includes demobilizing and releasing equipment, personnel, and response vehicles. All responders must exercise care when demobilizing, particularly if other responders remain present. In order to maintain safety, the Incident Commander must be notified of any responders departing the scene and the equipment or response vehicles that will be removed with them. Once any victims, crashed vehicles, spills, and associated debris have been removed, the Incident Commander must also monitor and control scene demobilization while recognizing the dangers of changing conditions and traffic returning to normal flow, oftentimes at high speeds. This is especially important for scene demobilization during nighttime or reduced visibility conditions. ***It is very important to demobilize the scene from the termination area backwards to the advance warning area*** [WDOT 2012].

Other important scene demobilizing considerations:

- Temporary traffic control or blocking may be required for responder departure (e.g., ambulances, towing and recovery).
- As responders depart, be aware that other responders may still be present.
- Blocking vehicles (e.g., fire apparatus, law enforcement vehicles, department of transportation vehicles) may no longer be present and the "safe" area may no longer be intact. Never turn your back to traffic and always watch for errant vehicles entering the scene.
- Frustrated motorists who have been delayed by the incident may be particularly aggressive and drive at higher speeds or weave into lanes that appear to be open.
- If possible, position a vehicle with its emergency vehicle lighting activated upstream of responders who are removing traffic control devices.

At the completion of any incident, the Incident Commander must ensure for the safety of the responders who remain on scene. When an incident scene has been fully cleared and all on-scene response is complete, the Incident Commander should ensure that the appropriate agencies (including communications/dispatch centers) have been notified that the roadway is open **(See Appendix 3)** [WDOT 2012].

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For additional information, see **Appendix One – Traffic Incident Management Guide, Appendix Two – Sample Traffic Control Scenario** and **Appendix Three - Sample Highway Roadway SOP/SOG**.

At this incident, the incident was deescalating. The fire chief was discussing with a power company supervisor, the need for fire department resources to remain on scene. The fire chief and the power company representative were standing on the northeast side of the state highway. The three fire fighters were standing in the fork of the road where the state highway and county road split. A civilian vehicle going south on the state highway approached the scene. The injured fire fighter saw the vehicle approaching on Highway 589 and then the incident occurred. It is unknown whether the other two fire fighters saw the vehicle approaching.

Recommendation #4: Fire departments should utilize the incident command system for effective command and control of highway/roadway incidents including the strategy and incident action plan.

Discussion: Emergency operations involving highway/roadway incidents can require a significant amount of resources, require the response of numerous agencies, can be of significant duration, and require effective and efficient incident management. The intent of this process is to ensure the early implementation of Command and a smooth escalation of the organization to meet the demands of any highway/roadway incident regardless of the size and complexity [NFPA 2014]. On highway/roadway incidents, experience has proven a critical necessity of integrating response agencies into one operational organization, managed and supported by one command structure.

The eight *Functions of Command* define standard activities that are performed by the incident commander to achieve the tactical priorities [Brunacini 2002]. The eight *Functions of Command* include:

- Assume and announce command and establish an effective operating position (Incident Command Post);
- Rapidly evaluate the situation (size up);
- Initiate, maintain, and control the communications process;
- Identify the overall strategy, develop an Incident Action Plan, and assign companies and personnel consistent with plans and standard operating guidelines;
- Develop an effective ICS organization;
- Provide tactical objectives;
- Review, evaluate, and revise (as needed) the strategy and Incident Action Plan;
- Provide for the continuity, transfer, and termination of command [Brunacini 2002].

The incident commander is responsible for all of these functions. As command is transferred, so is the responsibility for these functions. The first six functions must be addressed immediately from the initial assumption of command [NFPA 2014].

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The first responder (law enforcement, fire service, EMS, and/or transportation) to arrive at the scene should assume Command of the incident. The initial incident commander should remain in command until command is transferred or the incident is stabilized and terminated. The first-arriving responder on the scene must initiate whatever parts of the Incident Command System are needed to effectively manage the incident scene. The exact actions undertaken will vary depending on the type or scope of the incident:

- A single-resource incident (single-patient medical incident, traffic collision with minor injuries, disabled vehicle, property damage collision, etc.) may only require that the initial Incident Commander provide a size-up report and acknowledge its arrival on the scene.
- For incidents that require the commitment of multiple companies, the first responder or member on the scene must establish and announce Command and initiate an incident management structure appropriate for the incident [FIRESCOPE 2015].

The first-arriving responder activates the command process by giving an initial size-up report. A traditional size-up report based on standard incident command practices would include the following information:

- designation of the resource arriving on the scene;
- a brief description of the incident situation (e.g., haz mat release, multivehicle crash, guardrail damage, etc.);
- **verify the exact location of the incident including route identification, direction of travel, closest intersection, milepost or landmark, and lane(s) and/or shoulder affected;**
- obvious conditions (hazardous materials spill, multiple patients, working fire, bridge collapse, etc.);
- brief description of action taken (e.g., “Squad 65 is setting up a temporary traffic control”);
- declaration of the strategy or standardized operation (e.g., traffic stop, vehicle tow, tire change) to be used;
- any obvious safety concerns;
- assumption, identification, and location of command;
- request or release resources as required [NFSIMSC 2004].

This information should then be formed into a concise verbal report that is transmitted to the agency’s dispatch center or control center, as well as the other responders who are enroute to the scene and monitoring the radio frequency.

Much of the confusion and conflict that has occurred between emergency responders in the past has not only been caused by a lack of understanding on what various responders roles were, but also on the failure to agree on the tactical priorities of the incident. All agencies involved in the response to incidents on the roadway should work together to develop a basic agreement on the order of tactical priorities for these operations. While the tactical priorities may vary somewhat from jurisdiction to jurisdiction, the following model is a good place to start:

- Establish Command and Communications;
- Establish a Safe Work Zone;
  - ✓ Responder Safety
  - ✓ Scene Safety
  - ✓ Traffic Safety
- Incident Mitigation;
- Facilitate Investigation/Evidence Protection;
- Vehicle/Debris/Cargo Removal;
- Incident Termination [NFSIMSC 2004].

At this incident, no formal incident command was established until after the three fire fighters were struck by the civilian vehicle.

Recommendation #5: Fire departments should ensure that the incident commander develops and communicates the strategy and incident action plan (tactics) during the initial stages of the incident.

Discussion: The incident commander must determine a strategy and then develop the incident action plan (IAP) to ensure that the proper actions take control of any incident. The incident commander must follow the decision making model that includes identifying incident critical factors (through a situational evaluation or "size up"), consider the standard risk management plan, declare the strategy, and then set tactical objectives. This model will lead to the development of the IAP, which serves as the tactical road map to effectively manage the incident. The IAP defines where and when resources will be assigned throughout the incident, along with tasks and objectives [NFPA 2014].

To ensure a standard outcome of each incident, the incident commander should match the standard conditions to standard actions. This is the core of the incident command system and is the basis for all operations. Standard conditions are identified as the incident's ***current*** critical factors:

- Identify the incident's critical factors before taking any action.
- Initial and ongoing size-up of the incident's critical factors must produce the information that becomes the basis for the current incident strategy and IAP.
- Current, accurate, and relevant information provides the foundation for effective initial and ongoing action.
- The goal of this systematic evaluation process continually produces standard, safe, well-managed incident outcomes [MABAS 2017].

The IAP should match the defined strategy established by the incident commander for a particular incident. The defined strategy describes the overall approach to incident operations and drives the IAP. The IAP provides the tactical assignments required to achieve the tactical objectives. The order of occurrence is key—the strategic goals are developed first and then followed by the tactical objectives. At each incident, the incident commander should start with a standard placement-oriented operational plan that develops a strong, dependable beginning for command and control of the incident. While

developing the strategic goal for the incident is the first component, the incident commander needs to produce detailed tactical objectives that can be assigned to responding companies or resources. This is the purpose of the IAP [Brunacini 2002; NOVA Region 2013]. The initial incident commander, most often, is a company officer who arrives on-scene prior to a chief officer. The company officer should provide a detailed size-up, which is communicated to all responding resources including the dispatch center. The company officer assumes command and makes a decision regarding the strategy and IAP. The company officer may not have the ability or time to record the IAP on paper and provide documentation when transferring command. In this case, a verbal IAP is appropriate. As with this or any incident, events can occur very quickly before a detailed tactical worksheet or written IAP is developed [Brunacini 2002] (**See Diagram 5**).

The IAP can be as simple as a verbal transmission to all units assigned to an incident. The responding chief officer should be monitoring radio communications and documenting tactical objectives on a tactical worksheet if possible. When the chief officer arrives on-scene, an update from the initial incident commander can occur (face-to-face or by radio). The chief officer will then assume command at a stationary location. By following this process, the initial and subsequent incident commanders will be in a stronger position to manage an incident should an emergency event occur [NFPA 2014].

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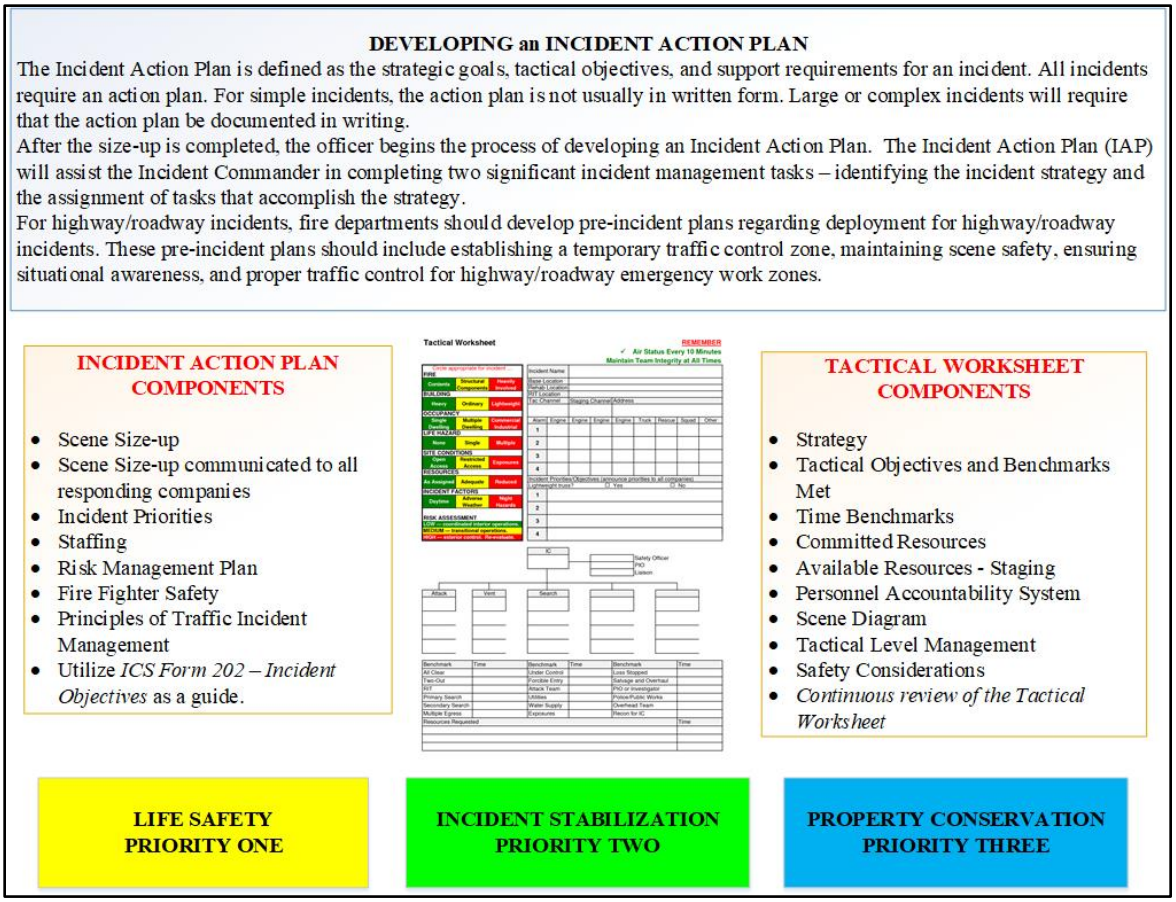

Diagram 5. A guide for developing an incident action plan at highway/roadway incidents. For these types of incidents, the incident action plan is most often communicated verbally. (*Courtesy of FireFighterCloseCalls.com.*)

NFPA 1561 defines an IAP as a verbal plan, tactical worksheet, written plan, or combinations thereof that reflects the overall incident strategy, tactics, risk management, and member safety that are developed by the incident commander. NFPA 1561, *Standard on Emergency Services Incident Management System and Command Safety* [NFPA 2014] requires the following regarding an incident action plan:

- 5.3.12.1 The incident commander shall be responsible for developing and/or approving an incident action plan (IAP).
- 5.3.12.2 This IAP shall be communicated to all staged and assigned members at an incident.
- 5.3.20 The incident commander shall be responsible for reviewing, evaluating, and revising the IAP and overall strategy of the incident.

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As an incident progresses, Command needs to continually review and update the IAP. This continuous review and evaluation should occur when benchmarks are met or conditions change and benchmarks have not been achieved.

At this incident, there was no definitive incident action plan relating to traffic incident management and control of traffic. The temporary traffic control zone requirements defined by the MUTCD are very definitive. These procedures are in place to protect not only fire fighters, law enforcement, EMS, and other responders but also for persons driving in this defined area. The incident action plan will define the approximate length of the incident, proper staffing and equipment to establish the temporary traffic control zone, proper PPE for responders, and proper demobilization procedures.

Recommendation #6: Fire departments should utilize law enforcement agencies to assist with traffic control at highway/roadway emergency work zones.

Discussion: It is important for all emergency responders to remember they must work together to make the scene safe for emergency responders, those involved in the incident, and those driving through the incident scene. There are multiple things that go wrong while emergency responders are on-scene mitigating the incident. By working together at an incident scene, all emergency responders will operate more efficiently and safer. Emergency responders from all the different response entities: fire, police, department of transportation, towing industry, and emergency management agencies, should develop a traffic incident management group. The group would be responsible for discussing traffic incident management, coordinated training, define resource availability, and concerns/responsibilities for responding to roadway incidents. This will allow emergency responders to work out issues prior to having a roadway incident plus discuss any issues with past highway/roadway incidents.

Law enforcement is tasked with multiple responsibilities once they arrive on-scene of a roadway incident including incident scene protection, initial first-aid, crash investigation, enforcement of traffic law violations, and traffic control and management. Law enforcement has limited personnel to achieve all the tasks listed above in an efficient and safe manner. Law enforcement personnel must prioritize their tasks based on safety for first responders, those involved in the incident, and those driving through the incident. One of the critical tasks that must be completed at a roadway incident is traffic control and management. Law enforcement should consider making traffic control and management of roadway incidents one of their top priorities. The other tasks should take place once the scene is secured and proper traffic control and direction is established. If law enforcement must complete another task first, law enforcement needs to coordinate with the incident commander to complete the task of traffic control and management.

Law enforcement personnel and fire service personnel should coordinate their resources to establish proper traffic control and direction at roadway incidents. Interdisciplinary training among law enforcement and fire service will assist in establishing proper traffic control and direction at all

roadway incidents. One of the most import aspects of traffic incident management is all emergency responders must have communication, coordination, and cooperation to operate more efficiently and safely on roadway incidents. Fire, EMS, and law enforcement provide assistance to those involved in the incident and the traffic that must be managed through the incident. Cooperation among these agencies will limit the amount of time at an incident thus reducing the exposure of first responders to a catastrophic event. All first responders must evaluate state laws and the authority having jurisdiction (AHJ) regulations to determine who is allowed to control and direct traffic at a roadway incident.

The Manual on Uniform Traffic Control Devices (MUTCD) provides direction for establishing a protected work area for persons working along roadways, including emergency work zone responders. Chapter 6I provides instruction on the "Control of Traffic through Traffic Incident Management Areas" which are defined as "an area of a highway where temporary traffic controls are installed, as authorized by a public authority or the official having jurisdiction of the roadway, in response to a road user incident, natural disaster, hazardous material spill, or other unplanned incident." Traffic incidents are divided into three general classes – major, intermediate, or minor according to the duration, with each having unique traffic control characteristics and needs [NIOSH 2013]. The MUTCD Chapter 6I provides the same guidance under Section 6I.02 – Major Traffic Incidents and Section 6I.03 – Intermediate Traffic Incidents, which states, *"If manual traffic control is needed, it should be provided by qualified flaggers or uniformed law enforcement officers"* [FHWA 2009a].

Law enforcement plays in critical role in providing manual traffic control. Coordination, cooperation and training among law enforcement personnel and fire service personnel will improve roadway incidents.

At this incident, fire department personnel provided traffic control until the time when they were preparing to clear the scene.

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Investigator Information

This incident was investigated by Murrey E. Loflin, Investigator and Karis Kline, Safety and Occupational Health Specialist, with the Fire Fighter Fatality Investigation and Prevention Program, Surveillance and Field Investigations Branch, Division of Safety Research, NIOSH located in Morgantown, West Virginia. An expert technical review was provided by Brad Sprague, a Sergeant with the Illinois State Police and the Deputy Chief of Operations with the Minooka, IL Fire Protection District. A technical review was also provided by the National Fire Protection Association Public Fire Protection Division.

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Additional Information

Emergency Responder Safety Institute

Manual on Uniform Traffic Control Devices (MUTCD)

National Fire Service Incident Management System, *Model Procedures Guide for Highway Incidents*, available from IFSTA/Fire Protection Publications at (800) 654-4055.

National Traffic Incident Management Coalition

United States Department of Transportation, Federal Highway Administration

United States Fire Administration, *Traffic Incident Management System*, FA-330, March 2012,

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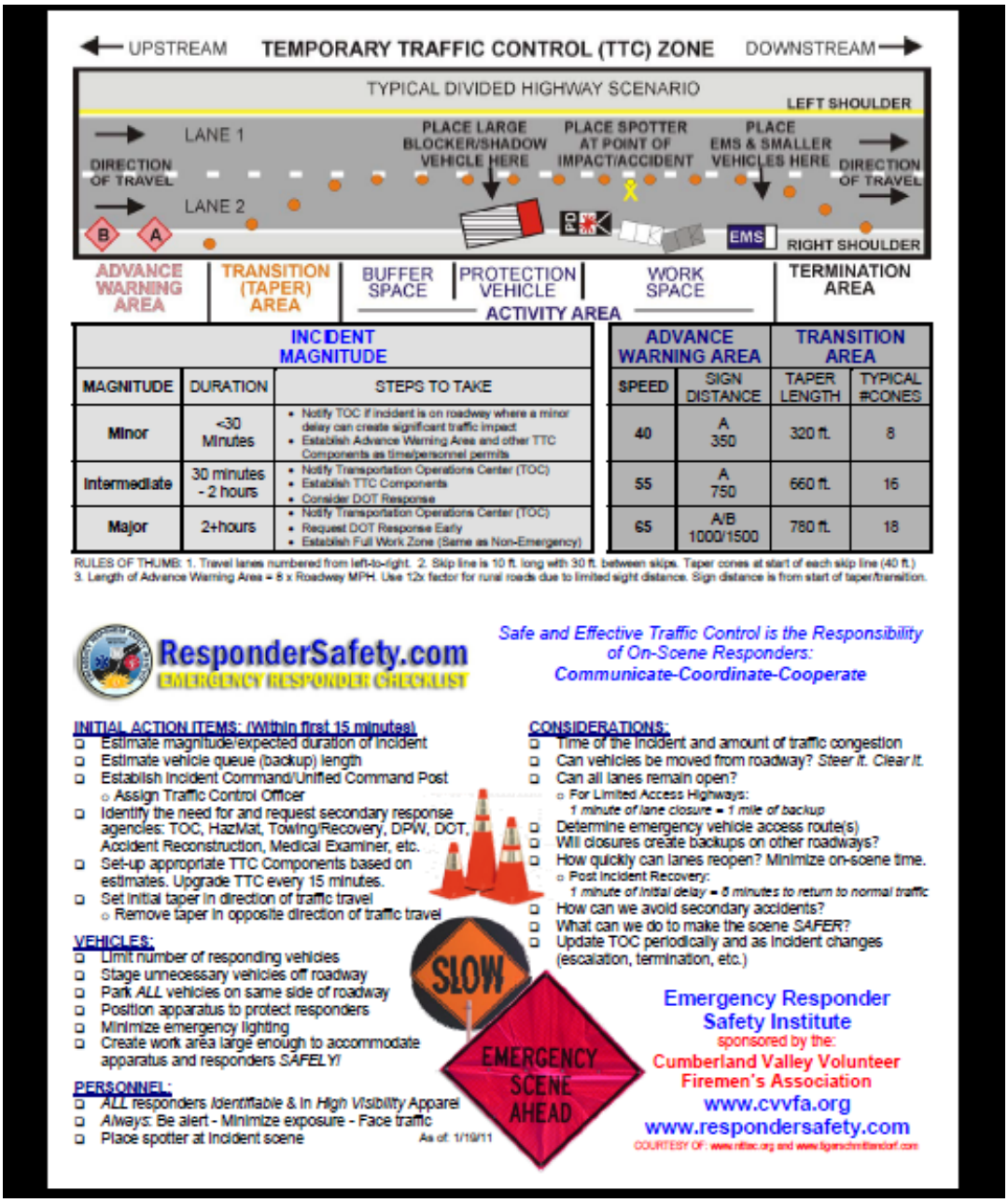
Appendix One
Traffic Incident Management Guide



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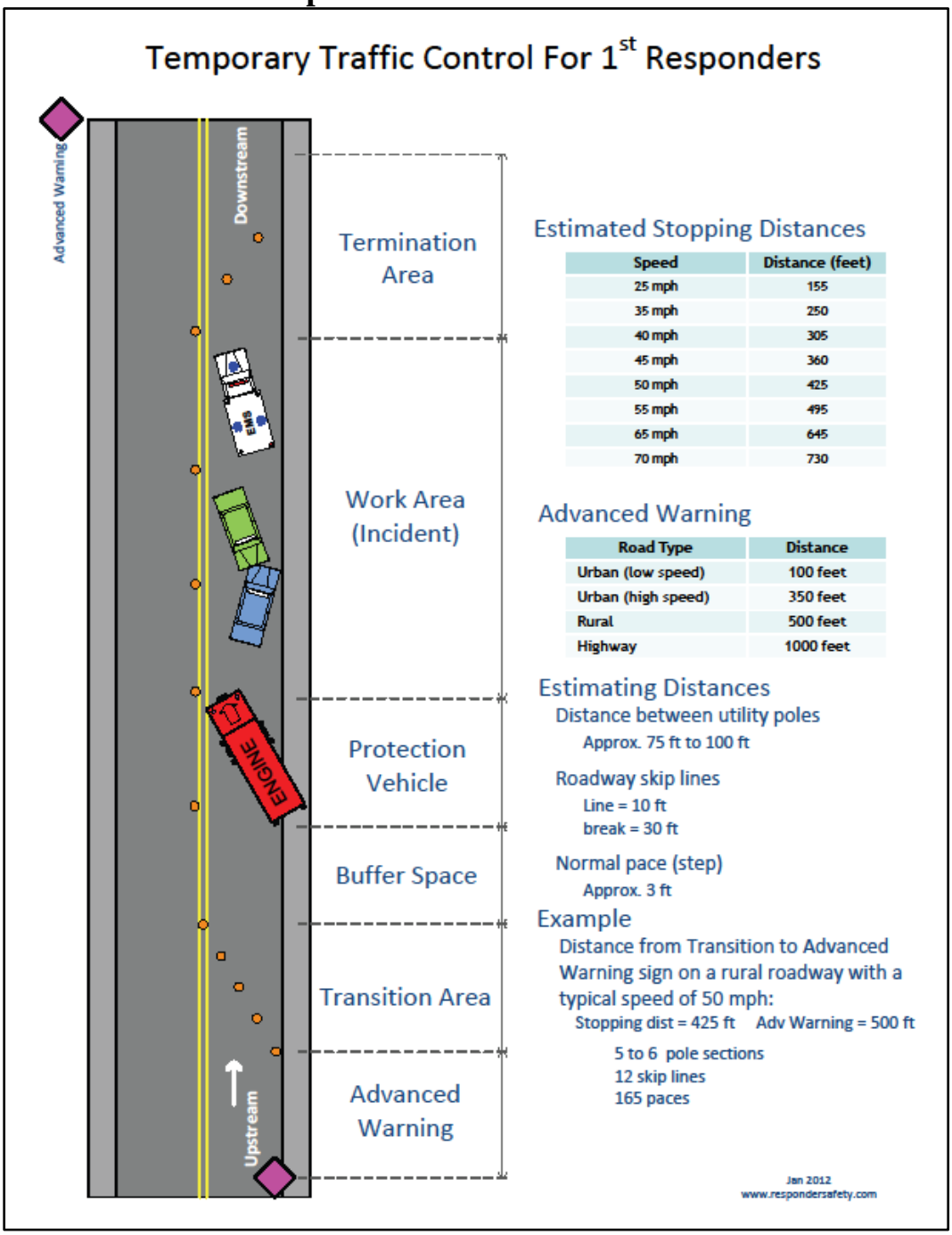
Appendix Two
Sample Traffic Control Scenario



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Appendix Three
Sample Highway/Roadway SOP/SOG

Fire Department 000.0

Operations Division
Issued 00-00-00
Revised 00-00-00

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SAFE POSITIONING WHILE OPERATING IN OR NEAR MOVING TRAFFIC

I. Overview

This guideline identifies vehicle positioning practices for Fire Department apparatus and emergency vehicles that provides maximum protection and safety for personnel operating in or near moving vehicle traffic. In addition, these procedures emphasize efforts to maintain lanes of moving traffic around the incident scene to minimize the traffic queue and the inherent probability of secondary collisions. Efforts to complete safe and efficient clearance of the incident scene in as short a timeframe as possible are recommended.

It shall be the policy of the Fire Department to initially position apparatus and other emergency vehicles at an incident on any street, road, highway or expressway in a manner that best protects the incident scene while at the same time providing for traffic movement past the incident scene as much as reasonably possible. Such positioning shall afford protection to fire department personnel, law enforcement officers, tow service operators, other emergency personnel while working in or near moving traffic.

All personnel should understand and appreciate the high risk that personnel are exposed to when operating in or near moving vehicle traffic. Responders should always operate within a protected environment at any roadway incident.

Always consider moving vehicles as a threat to your safety. At every roadway emergency scene, personnel are exposed to passing motorists of varying driving abilities. Responders must accept that motorists approaching the incident scene on the roadway may be a 'D' driver; drunk, drugged, drowsy, distracted, or just plain dumb. It is the 'D' driver that may be completely oblivious to your presence due to distractions or impairments. Distracted motorists will often be looking at the scene and not the roadway in front of them where you might be operating. Assume that all approaching traffic is a 'D' driver and is out to get you until proven otherwise.

Nighttime incidents and inclement weather conditions are particularly hazardous. Visibility is reduced and driver reaction time to hazards in the roadway is slowed. Adjust operations accordingly.

II. Terminology

1. **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.
2. **Block**- positioning a fire department apparatus on an angle to the lanes of traffic creating a physical barrier between upstream traffic and the work area. Includes 'block to the right' or' block to the left'.
3. **Buffer Zone**- the distance or space between personnel and vehicles in the protected work zone and nearby moving traffic.
4. **Downstream**- the direction that traffic is moving as it travels away from the incident scene.
5. **Flagger**- a fire department member assigned to monitor or direct 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
6. **Linear**- positioning a fire department apparatus parallel to or within a travel lane or shoulder of a roadway. Linear positioning only creates a physical barrier within that lane or shoulder of the roadway.
7. **Taper**- the action of merging lanes of moving traffic into fewer moving lanes.
8. **Temporary Traffic Control Zone-** the physical area of a roadway within which emergency personnel perform their fire, EMS and rescue tasks at a vehicle-related incident.
9. **Transition Zone**- the lanes of a roadway within which approaching motorists change their speed and position to comply with the traffic control measures established at an incident scene.

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10. **Upstream**- the direction that traffic is traveling from as the vehicles approach the incident scene.

III. 'Move It' Incidents

All emergency personnel are at great risk of injury or death while operating in or near moving traffic. There are several specific tactical procedures that should be taken to protect all responders and emergency service personnel at the incident scene including;

1. Consider that all approaching drivers are 'D' drivers
2. Establish an initial "block" with the first arriving emergency vehicle or fire apparatus while the initial size-up survey is completed
3. Always wear high visibility, florescent and reflective garments (vest or jacket) during roadway operations. When full protective NFPA compliant clothing is required by department SOG, high-visibility vests must be worn over structural turnout gear except for members combatting a fire situation or dealing directly with hazardous materials.
4. All fire department members must wear structural firefighting helmet with chinstrap donned properly.
5. Operators of emergency vehicles at the scene should complete 'light shedding'; turning off all lights such as vehicle headlights, forward-facing warning lights, or spotlights that might create vision impairment to approaching motorists at nighttime incidents.
6. Employ the 'Move It' or 'Work It' strategy. Determine if vehicles involved can be moved out of the travel lanes to an off-roadway location. Moving to an off-roadway location improves responder safety, minimizes congestion, and assists with safe, quick clearance; the "Move It" strategy
7. If vehicles can be moved out of the travel lanes of the roadway, attempt to clear the travel lanes in less than 30 minutes; Minor duration incident.

IV. 'Work It' Incidents

The following are benchmarks for Safe Positioning of **apparatus and emergency** vehicles when the crash-damaged vehicle cannot be moved out of the travel lanes of the roadway and crews must work the incident at the location found upon arrival. If incident is a 'Work It' situation, establish Command according to ICS protocols, employ upstream advance warning and temporary traffic control transition measures to warn approaching motorists, and attempt to reduce their vehicle speed. Incident duration is anticipated to exceed 30 minutes.

1. Position first-arriving apparatus to protect the scene, patients, and emergency personnel.
   a. Initial apparatus placement should create an initial incident area protected from traffic approaching in at least one direction. Intersections or where the incident may be near the middle lanes of a multi-lane roadway require two or more sides of the incident to be protected.
   b. Angle apparatus on the roadway with a "block to the left" or a "block to the right" to create a physical barrier between the crash scene and approaching traffic. Block at least one additional traffic lane more than that already obstructed by the crashed vehicle(s); obstructed Lane + 1 strategy. Shoulder of the highway can be counted as a lane.
   c. The front wheels of blocking vehicles should be turned away from the downstream work area
   d. For first arriving fire department units where a charged hoseline may

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be needed, block so that the pump panel is downstream, on the opposite side of on-coming traffic. This will protect the pump operator.

2. Ambulances should be positioned within the protected work area and have their rear patient loading area angled away from the nearest lanes of moving traffic
3. Additional responder vehicles and personnel working the incident should either support advanced warning efforts or be positioned within the protected area created by the blocking apparatus.
4. Command shall stage unneeded emergency vehicles off the roadway, place them in a Staging area on the downstream side of the incident, or return these units to service.
5. Lanes of traffic shall be identified numerically as "Lane 1", "Lane 2", etc., beginning from the left to the right when considered from the motorist's point of view driving in those lanes.
6. Traffic cones or cones with flares alongside should be deployed upstream to increase the advance warning for approaching motorists. Cones and flares identify but only suggest the transition and tapering actions that are requested of the approaching motorist.
7. Personnel shall place cones and flares as well as shall retrieve cones while facing oncoming traffic. A Buddy system is recommended for deployment and retrieval.
8. Adequate advance warning to approaching motorists should be put in place using flares or traffic cones deployed at intervals of no greater than 40' apart upstream of the blocking apparatus. The furthest traffic cone that begins the taper and closing of a travel lane should be positioned upstream along the edge or shoulder of the roadway.
9. Additional personnel may extend the advanced warning area by placing additional emergency vehicles, traffic cones, flares, deployable signs, and arrow boards to build upon initial traffic control measures as the incident duration exceeds 30 minutes. Placing flares, where safe to do so, adjacent to and in combination with traffic cones for nighttime operations greatly enhances motorist warning and scene safety.
10. Progressively open lanes of traffic as safely and efficiently as practical as the incident is dealt with. Once cleared of vehicles, patients and debris, opening of a traffic lane will reduce the queue and minimize the chances of secondary collisions.

V. Incident Command Benchmarks

The **initial-arriving company officer** and/or the **Incident Commander** must complete critical benchmarks to assure that a safe and protected work environment for emergency scene personnel is established and maintained including:

1. Assure that the first-arriving apparatus establishes an initial block to create an initial safe work area
2. Determine if incident is a 'Move It' situation where vehicles can be relocated out of the normal travel lanes thereby reducing responder exposure to moving traffic and improving incident clearance time.
3. Determine if the incident is a 'Work It' situation in which the vehicles involved must remain in their present location as fire, rescue, and medical activities take place.
4. Assure that all ambulances on-scene are placed within the downstream, protected work area of the larger apparatus.
    a. Assure that all patient loading into ambulances is done from within a protected work area.
5. The initial company officer and/or Incident Commander must operate as the Scene Safety Officer until this assignment is delegated.

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6. Command shall assure that 'light-shedding' protocols including Opticom strobe systems and high-beam headlights are turned OFF and that other emergency lighting remains ON as necessary.

VI. Emergency Crew Personnel Benchmarks

Listed below are benchmarks for safe actions of **individual personnel** when operating in or near moving vehicle traffic.

1. Always maintain an acute awareness of the high risk of working in or near moving traffic. They are out to get you!
2. Never trust the 'D' driver in the moving traffic that is approaching you.
3. Always look before you move!
4. Avoid turning your back to moving traffic.
5. Personnel arriving in crew cabs of fire apparatus should exit and enter the apparatus from the protected, downstream side, away from moving traffic.
6. Officers, apparatus operators, crew members in apparatus with individual jump seat configurations and all ambulance personnel must exit and enter their units with extreme caution remaining alert to moving traffic at all times.
7. Protective clothing, high-visibility safety garment, and helmet with chin strap in position should be donned prior to exiting the emergency vehicle.
   a. During normal daylight conditions, don helmet and high visibility garment or NFPA compliant turnout PPE and high-visibility vest when operating in or near moving traffic.
   b. During dusk to dawn operations or when ambient lighting is reduced due to inclement weather conditions, don helmet, full NFPA compliant protective clothing and high-visibility vest.
   c. All staff personnel and any other personnel arriving on an apparatus or emergency vehicle should don assigned helmet and high-visibility garment prior to exiting their vehicle.
8. Always look before opening doors and stepping out of apparatus or emergency vehicle into any moving traffic areas. When walking around fire apparatus or emergency vehicle, be alert to your proximity to moving traffic.
   a. Stop at the corner of a blocking position unit, check for moving traffic, and then proceed along the unit remaining as close to the emergency vehicle as possible.
   b. Maintain a 'reduced profile' when moving through any area where a minimum 'buffer zone' condition exists.

VII. High-Volume, Limited Access Highway Operations

High-volume, limited access divided highways include expressways, turnpikes, freeways, tollways, and other multi-lane roadways within the response area. A desire to keep the traffic moving on these high-volume thoroughfares is inherent in all operations. When in the judgement of Command (or Unified Command), it becomes essential for the safety of operating personnel and the patients involved, any or all lanes, shoulders, and entry/exit ramps of these limited access highways can be completely shut down. This, however, should rarely occur and should be for as short a period of time as practical.

Unique Safe Positioning procedures at locations such as expressway, freeway, and limited-access, high-volume multi-lane roadway incidents include;

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1. Travel lanes are typically 12 feet in width. First-arriving engine company apparatus should establish an initial Lane +1 block position.
2. A large and heavy second fire apparatus such as a ladder truck shall be automatically dispatched to all incidents on all limited-access, high-volume expressways, tollways, freeways, and highways.
3. The primary assignment of this second unit shall be to;
    a. Establish an upstream block occupying a minimum of two 12' lanes plus the paved shoulder of the highway or blockage of three 12' driving lanes of traffic upstream of the initial block provided by the first-due apparatus.
    b. The position of this apparatus shall take into consideration all conditions that might limit sight distance of the approaching traffic including ambient lighting conditions, weather-related conditions, road conditions, curves, bridges, hills and over- or underpasses.
    c. Traffic cones and/or cones illuminated by flares and the NFPA-compliant retro-reflective pink Emergency Scene Ahead deployable sign should be placed upstream of the second vehicle by its crew at the direction of the company officer.
    d. Traffic cones on limited-access, high-volume roadways can be placed at 40' intervals with the furthest cone and or flare approximately 200 feet "upstream", to allow adequate warning to drivers. When incident duration exceeds two hours, advance warning efforts should be as compliant with the Manual of Uniform Traffic Control Devices (MUTCD) requirements as possible.
    e. A flagger/spotter person should be positioned if available to monitor the response of approaching motorists as they are directed to transition to a slower speed and taper into merged lanes of traffic.
    f. Command should be notified by this flagger/spotter on the incident operating channel of any approaching traffic that is not responding to the speed changes, transition, tapering and merging directions.
    g. Flagger/spotter should have the capability of activating a pre-determined audible warning to operating personnel of a non-compliant motorist approaching.
4. Vehicles from law enforcement and transportation departments can be used to provide additional blocking of additional traffic lanes as needed as incident duration exceeds 30 minutes; MUTCD minor duration.
5. When an incident duration exceeds 30 minutes, it becomes an Intermediate duration incident as defined by the MUTCD. During this period of time, efforts should evolve around clearing the scene as expeditiously as possible. For extended duration incidents such as hazardous materials situations, Command should request appropriate traffic incident management personnel and resources. When the lane or road closure exceeds two hours in duration, MUTCD-compliant traffic control measures should be in place. This can include traffic control center protocols, transportation department arrow board trucks, road detours, changeable message

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sign notifications, media contacts, etc, as appropriate.

6. Fire Department Command officer should establish a liaison with the Police Department supervising officer as soon as possible. This Unified Command team will jointly coordinate activities and determine how to most efficiently resolve the extended duration incident and clear the obstructed travel lanes in as safe and efficient manner as practical.

7. Termination of the incident should be managed with the same aggressiveness as initial actions. Crews, apparatus, and equipment must be removed from the highway in a coordinated process to reduce exposure to moving traffic and minimize traffic congestion.

Officer's Safe Parking "Cue Card"

"Block" with first-arriving apparatus to protect the scene, patients, and emergency personnel.

- ❑ Block at least one additional lane
- ❑ Block so pump panel is "down stream"
- ❑ Block most critical or highest traffic volume direction first
- ❑ Consider requesting additional PD assistance

Crews wear proper PPE w/Helmet

- ❑ High-visibility garments at all times
- ❑ Helmet at all times
- ❑ Full PPE plus high-visibility vest between dusk and dawn or inclement weather
- ❑ NFPA Compliant turnout gear is appropriate PPE whenever the crew is directly exposed to fire, heat, flame and/or hazardous materials.

Establish more than adequate advance warning

- ❑ Traffic cones at up to 40' intervals
- ❑ Deploy minimum 5 cones upstream
- ❑ Cones only "Suggest" they don't Block!
- ❑ Expand initial safe work zone as temporary traffic control devices are available

Direct placement of ambulances

- ❑ Assure ambulances park within shadow of blocking apparatus as directed
- ❑ Lane 1 is furthest left lane, next is Lane 2, then Lane 3, etc. from approaching motorist's point of view
- ❑ Direct ambulance to "block to the right" or "block to the left" to protect loading doors
  - ➢ Place ambulance patient loading area facing away from closest lane of moving traffic
- ❑ All patient loading into ambulances is done from within a protected work zone

You are the Scene Safety Officer

❑Consider assigning FF as upstream "Spotter" as necessary for approaching traffic

Night or Reduced Light Conditions

- ❑ Turn OFF vehicle headlights
- ❑ Turn OFF Opticom
- ❑ Provide overall scene lighting
- ❑ All personnel in appropriate PPE w/helmets
- ❑ Illuminate cones with flares
- ❑ Consider additional Truck company for additional upstream "Block"

Limited access, high-volume highway incidents

- ❑ Establish initial block: minimum two lanes
- ❑ Ladder truck establishes upstream block
  - o two lanes plus paved shoulder or
  - o three driving lanes

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- Place cones and/or cones illuminated by flares upstream of larger upstream blocking vehicle with the furthest cone approximately 200 feet "upstream" of apparatus
- Establish Flagger position
  - monitor approaching traffic
  - sound emergency signal as necessary
- Use police department and/or transportation department vehicles for additional blocking , advance warning, and traffic incident management.
- Stage additional companies off highway
- Establish liaison with Police Department to form Unified Command at scene.
- Terminate incident aggressively with safe, quick clearance strategies.