



Volunteer Fire Fighter Killed While Walking Across an Interstate Highway Responding to a Motor Vehicle Incident - Texas

SUMMARY

On March 18, 2003, a 20-year old male volunteer fire fighter (the victim) was killed when he walked in front of a tractor trailer truck on an interstate highway at about 3 am. The victim had responded to a minor motor-vehicle incident located on the shoulder of the outer eastbound lanes. He drove his privately owned vehicle (POV) from his home, passed the fire station and traveled westbound on the highway. As he neared the incident scene from across the highway, he parked on the inside westbound shoulder and median directly behind a POV of the first fire fighter on scene. He exited his vehicle, walked across the grass median and eastbound shoulder into the passing lane where he was struck by a tractor-trailer truck. He landed on the grass median and was pronounced dead at the scene.

NIOSH Investigators concluded that, to minimize the risk of similar occurrences, fire departments should:

- *develop, implement, and enforce standard operating procedures/guidelines (SOPs/SOGs) regarding emergency operations for roadway incidents, including procedures for parking on the same side of the roadway as the incident*
- *ensure that personnel receive training in the proper procedures and the hazards associated with emergency operations for highway incidents*
- *ensure that fire fighters establish a protected work area on roadways before safely turning their attention to the emergency*
- *establish pre-incident plans regarding traffic control for emergency service incidents and pre-incident agreements with law enforcement and other agencies such as highway departments*
- *ensure fire fighters wear suitable high-visibility apparel such as a yellow-green or orange reflecting flagger vest when operating at the emergency scene*



Interstate highway eastbound lanes

The **Fire Fighter Fatality Investigation and Prevention Program** is conducted by the National Institute for Occupational Safety and Health (NIOSH). The purpose of the program is to determine factors that cause or contribute to fire fighter deaths suffered in the line of duty. Identification of causal and contributing factors enable researchers and safety specialists to develop strategies for preventing future similar incidents. The program does not seek to determine fault or place blame on fire departments or individual fire fighters. To request additional copies of this report (specify the case number shown in the shield above), other fatality investigation reports, or further information, visit the Program Website at

www.cdc.gov/niosh/firehome.html

or call toll free **1-800-35-NIOSH**



Fatality Assessment and Control Evaluation Investigative Report #F2003-13

Volunteer Fire Fighter Killed Walking Across an Interstate Highway Responding to a Motor Vehicle Incident - Texas

- *consider limiting or restricting the response of their members in privately owned vehicles (POVs) to interstate highway incidents.*

INTRODUCTION

On March 18, 2003, a 20-year old male volunteer fire fighter (the victim) died after he walked into the path of a tractor-trailer truck. On March 18, 2003, the U.S. Fire Administration (USFA) notified the National Institute for Occupational Safety and Health (NIOSH) of the death. On April 15, 2003, two Occupational Safety and Health Specialists from the NIOSH Fire Fighter Fatality Investigation and Prevention Program, Division of Safety Research, investigated the incident. The NIOSH team met with the Chief of the department and those directly involved with the incident— fire fighters, emergency medical technicians, the highway patrol, the dispatcher, and the Justice of the Peace. The team visited the incident scene and reviewed the department's standard operating procedures (SOPs), witness statements, the State fire marshal's report, traffic report, and autopsy report.

Fire Department

The volunteer fire department has 20 active fire fighters and serves a population of approximately 2,500 in an area of about 8.5 square miles. The fire department had standard operating procedures (SOPs) for POVs responding to a structure fire, however, there were none in place for responding to traffic incidents on the roadway. Since the incident occurred, the department has revised its standard operating procedures.

Training and Experience

The 20-year-old victim had been a volunteer fire fighter for 4 years, having served the fire service in some capacity since becoming a junior fire fighter at 16-years old. He had recently been promoted to Lieutenant. He had attended several weekend training sessions, however, training records were not

available from the department. He did not hold any certifications from the Texas Commission on Fire Protection or the National Fire Protection Association (NFPA). There are no minimum State requirements for certification of volunteer fire fighters.

Equipment and Personnel

The victim responded in his POV, wearing street clothes (blue jeans, a red shirt with fire department insignia, boots and a baseball cap). The first fire fighter who responded to the scene in his POV was also wearing street clothes.

The driver of the tractor trailer was a 56-year old male who holds a valid, current commercial driver's license. He was driving a 1998 white box semi-trailer with five axles, 18 wheels and a Gross Vehicle Weight rating (GVWR) of 80,000 pounds.

Weather and Road Conditions

The incident occurred at approximately 0259 hours with light fog in the area. According to the National Weather Service, the temperature was approximately 61 degrees and dry. The incident occurred on a four-lane interstate highway with no roadway lighting (Photo 1 and Diagram). The highway is level and straight with narrow asphalt shoulders on the inside and the outside of the pair of lanes. The posted speed limit is 65 miles per hour.

INVESTIGATION

On March 18, 2003, at approximately 0237 hours, the volunteer fire department was dispatched to a minor motor-vehicle incident involving a tractor trailer in the outside eastbound lane of the interstate highway. Between the hours of 0237 and 0255 hours, the first fire fighter arrived and parked his POV across the highway from the scene of the incident. *Note: Approximately ¼ mile away on the westbound side of the highway, there is an exit ramp to an overpass that leads to an entrance ramp to the eastbound lanes.* He parked on the



Volunteer Fire Fighter Killed Walking Across an Interstate Highway Responding to a Motor Vehicle Incident - Texas

inside shoulder and median of the westbound passing lane. He turned off his headlights, and put on his four way emergency flashers. There were no emergency warnings lights on his POV. He exited his vehicle and walked across the grass median and the eastbound passing lane to the outside shoulder where the original motor vehicle incident had occurred. *Note: He was not wearing any reflective gear.* Upon arrival he sized-up the incident, advised dispatch that there was one minor injury, and asked the sheriff who was already on scene to establish traffic control. He stated that he did not assume incident command because the emergency call was within jurisdiction of another volunteer fire department that had not yet arrived on scene. There was no traffic control set up where the incident occurred.

While the first fire fighter was sizing up the original motor-vehicle incident, the victim was en route in his POV from his home. He bypassed the fire station. Like the first fire fighter, he traveled westbound on the highway towards the incident. The victim stopped across the highway from the incident and parked his POV on the inside shoulder and median directly behind the first fire fighter's POV. According to the State fire marshal's report, the victim exited his vehicle, walked across the median into the eastbound passing lane, and into the path of a tractor trailer truck. Another witness saw the silhouette of the victim walking across the median and saw him momentarily look into the headlights of an oncoming truck.

In his statement, the driver of the tractor-trailer truck recalled that he was alerted by other drivers on the CB radio of a minor motor vehicle incident down the interstate on the eastbound shoulder. He slowed to approximately 50 miles per hour as he approached the incident. He observed emergency lights on vehicles on the outside shoulder and other vehicles without emergency lights on the inside westbound

shoulder, and he moved his truck into the inside lane. As he was passing the original motor vehicle incident, he looked to his right rear view mirror to make certain that he cleared the incident in preparation to move from the inside lane to the outside lane. As he directed his attention back to the front, he saw the victim step directly in front of his truck from the median.

According to the State fire marshal's report, the victim was struck by the tractor trailer on the right side of the front bumper of the passenger side. He was thrown onto the grass median approximately 170 feet east from the point of impact (Photo 1). The tractor trailer truck stopped approximately 598 feet down the highway from where the victim was struck. There were no skid marks from the tractor trailer on the highway from before or after the victim was struck. After the incident occurred, a reflectorized vest was found hanging from the rear-view mirror in the victim's POV.

CAUSE OF DEATH

According to the autopsy report, the cause of death was "severe craniocerebral injuries."

RECOMMENDATIONS AND DISCUSSION

Recommendation #1: Fire departments should develop, implement, and enforce standard operating procedures/guidelines (SOPs/SOGs) regarding emergency operations for roadway incidents including procedures for parking on the same side of the roadway as the incident¹⁻⁹

Discussion: Emergency responders themselves are falling victim to "secondary incidents" that occur as they attend to the original incident to which they are dispatched. Fire fighters operating at the scene of a motor vehicle incident on a highway are in danger of being struck by oncoming motor vehicles. Approximately ¼ mile from where the victim and the fire fighter parked their POVs on the westbound



Volunteer Fire Fighter Killed Walking Across an Interstate Highway Responding to a Motor Vehicle Incident - Texas

side of the highway, there is an exit ramp to an overpass that leads to an entrance ramp to the eastbound lanes. Parking on the same side of the road where the original incident occurred would have eliminated the need to cross the roadway. In this case, the fire department had SOPs for POVs responding to a fire scene, however, there were no procedures for responding in and around roadways. SOP's should include, but not be limited to, parking on the same side of the roadway as the incident, apparatus/ POV positioning, lane closures, methods to establish a secure work area, clearing traffic lanes, releasing the incident scene back to normal operation, and wearing appropriate protective clothing at all times, including the use of high visibility reflective apparel when operating in or near moving traffic. As recommended in *Protecting Emergency Responders on Highways*, "standard operating procedures (SOPs) should guide vehicle positioning upon arrival as an integral part of traffic control. Procedures should be scalable to incidents of varying size, magnitude and location so as to be easily adapted to any sort of incident." An example of a SOP for fire departments operating at high volume, limited access highways^a, such as the incident scene, is available at www.respondersafety.com.

Recommendation #2: Fire departments should ensure that personnel receive training in the proper procedures and the hazards associated with emergency operations for highway incidents. ^{1,4,7,10}

Discussion: Fire fighters who respond to highway incidents have numerous responsibilities, ranging from traffic control to assisting injured or stranded

motorists. Responders must be trained to safely conduct multiple tasks near moving traffic. Because of the variability of each incident, all emergency responders should have ongoing, appropriate, task-specific training.

Recommendation #3: Fire departments should ensure that fire fighters establish a protected work area on roadways before safely turning their attention to the emergency. ^{7,9}

Discussion: As stated in the *Pumping Apparatus Driver/Operator Handbook*, "some of the most dangerous scenarios faced by fire fighters are operations on highways, interstates, turnpikes, and other busy roadways. Fire apparatus should be placed between the flow of traffic and the fire fighters working on the incident to act as a shield. The apparatus should be parked on an angle so that the operator is protected by the tailboard. Front wheels should be turned away from the fire fighters working highway incidents so that the apparatus will not be driven into them if struck from behind. Also consider parking additional apparatus 150 to 200 feet behind the shielding apparatus to act as an additional barrier between fire fighters and the flow of traffic." The positioning of apparatus (as a shield) is referred to as a "block" that creates a protected area known as the "shadow." For limited-access, high-volume highway incidents, the first arriving apparatus (preferably a ladder truck or other large apparatus establishes the "block" by positioning the apparatus) upstream as the traffic approaches the scene from the incident, providing a "shadow" where emergency personnel can safely work. Emergency personnel should never leave the "shadow" for any reason.

^a According to NFPA 502 Standard for Bridges, Roads and Tunnels, High volume limited access highways are highways where preference is given to through-traffic by providing access connections that use only selected public roads and by prohibiting crossings at grade and at direct private driveways. High-volume limited access highways include expressways, toll ways and multi-lane roadways within the fire department response area



Volunteer Fire Fighter Killed Walking Across an Interstate Highway Responding to a Motor Vehicle Incident - Texas

Recommendation #4: Fire departments should establish pre-incident plans regarding traffic control for emergency service incidents and pre-incident agreements with law enforcement and other agencies such as highway departments.^{1,2,6,11,12}

Discussion: Upon arrival on the scene, the first fire fighter requested that the deputy sheriff already on scene establish traffic control. When the victim arrived on scene, traffic control was still not established to warn oncoming traffic that there was a vehicle incident ahead and that emergency responders were on scene. According to NFPA 502, fire protection requirements for limited access highways include recommendations that “a designated authority shall carry out a complete and coordinated program of fire protection that shall include written preplanned emergency response procedures and standard operating procedures.” NFPA 1620 provides guidance to assist departments in establishing pre-incident plans. Pre-incident planning that includes agreements formed by a coalition of all involved parties such as mutual aid fire departments, EMS companies, police, and highway departments may save valuable time, present a coordinated response, and provide a safer emergency work zone.

Recommendation #5: Fire departments should ensure fire fighters wear suitable high-visibility apparel such as a yellow-green or orange reflecting flagger vest when operating at the emergency scene.^{5,7,9,11,13}

Discussion: The victim was wearing blue jeans, a red shirt and a baseball cap. The fire fighter and the victim in this case were not wearing reflective apparel, however, a reflectorized vest was found in the victim’s POV. NFPA 1500, Standard for Fire Department Occupational Safety and Health Programs, Chapter 7.1.2 states that “Protective clothing and protective

equipment shall be used whenever the member is exposed or potentially exposed to the hazards for which it is provided.” The need to wear personal protective clothing such as a reflective, brightly colored vest arises from the fact that personnel need to be highly visible while working at the scene of a motor vehicle incident or while directing or blocking traffic near an incident scene. Fire fighters could wear either the strong yellow-green or orange to provide a suitable contrast with the background. Additionally, a voluntary consensus standard, ANSI/ISEA 107-1999, American National Standard for High-Visibility Safety Apparel, provides guidance for use of high-visibility safety apparel to protect workers exposed to hazards of low visibility, including emergency response personnel. It recommends that Class 3 high visibility garments be worn by personnel in high risk work activities that take place in or near traffic at speeds over 50 miles per hour and participating in tasks that may distract motorists or divert the attention of the emergency worker from watching for traffic. These garments will assist approaching motorists to identify workers from a distance of approximately 1,280 feet.

Recommendation #6: Fire Departments should consider limiting or restricting the response of their members in privately owned vehicles (POVs) to interstate highway incidents.¹⁻⁷

Discussion: The fire fighter and victim responded to the original minor-motor vehicle incident scene in their POVs. NFPA 1500, Chapter 6.2.3 states that “the fire department shall enact specific rules and regulations pertaining to the use of private vehicles for emergency response.” NFPA 1500, Chapter 6.2.3 states that “the rules and regulations shall be at least equal to the provisions regulating the operation of fire department vehicles. Fire fighters responding to limited-access highway incidents in their POVs may be ill equipped to protect themselves or the civilians they are serving from



Fatality Assessment and Control Evaluation Investigative Report #F2003-13

Volunteer Fire Fighter Killed Walking Across an Interstate Highway Responding to a Motor Vehicle Incident - Texas

oncoming traffic. High volume limited-access highway pose additional hazards such as higher speed limits, larger vehicles, and a higher number of vehicles. Responding in a POV may not afford fire fighters the means to carry all of the necessary equipment, high visibility vests, flags, and traffic cones to operate in or near moving traffic. Fire department or agency emergency vehicles can carry all of the required equipment and provide the means to block the scene, providing a safe work zone. A decision tree (Figure) can be used in the development of department SOPs when addressing whether to allow members to respond in POVs to limited access, high volume, high-speed highway incidents.

REFERENCES

1. Kipp J, Loflin, M [1996] Emergency incident risk management: a safety & health perspective. New York, NY: Van Nostrand Reinhold, Chapters 4, 12, 13.
2. Dunn V [1992]. Safety and survival on the fire ground. Saddle Brook, NJ: Fire Engineering Books & Videos.
3. Moore R [2003]. Standard operating procedures (SOPs) decision tree, January 17, 2003, from Ron Moore, Fire Training Manager, Plano (TX) Fire Rescue. Contact information: 214-728-6776 or Rmoore@Firehouse.com.
4. NFPA [2002]. NFPA 1500: Fire department occupational safety and health program. Quincy, MA: National Fire Protection Association.
5. Phoenix Fire Department [1995]. M.P. 205.07A 04/95-R: standard operating procedures for safe parking while operating in or near vehicle traffic. Phoenix, AZ: Phoenix Fire Department.
6. NFPA [1998]. NFPA 502: standard for road tunnels, bridges, and other limited access highways. Quincy, MA: National Fire Protection Association.
7. NIOSH [2001]. NIOSH Hazard ID: Traffic Hazards to Fire Fighters While Working Along Roadways. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 2001-143.
8. University of Extrication "Safe Parking" SOP: safe positioning while operating in or near moving traffic. Responder Safety website: www.respondersafety.com/sops.html. Accessed 12/11/2003.
9. Cumberland Valley Volunteer Firemen's Association. [1999]. A White Paper: protecting emergency responders on the highways. Emmitsburg, MD: U.S. Fire Administration.
10. International Fire Service Training Association [2001]. Pumping apparatus driver/operator handbook. 1st ed. Stillwater, OK: Oklahoma State University, Fire Protection Publications.
11. FHA [1999] Meeting the Customer's Needs for Mobility and Safety During Construction and Maintenance Operations. Federal Highway Administration. February 26, 2004 www.fhwa.dot.gov/reports/best_practices.pdf.
12. NFPA [1998]. NFPA 1620, standard on recommended practice for pre-incident planning. Quincy, MA: National Fire Protection Association.



Volunteer Fire Fighter Killed Walking Across an Interstate Highway Responding to a Motor Vehicle Incident - Texas

13. ANSI/ISEA [1999] American National Standards for high visibility safety apparel. New York, NY: American National Standards Institute, ANSI/ISEA 107-1999
- INVESTIGATOR INFORMATION**
This incident was investigated by Carolyn Guglielmo and Linda Frederick, Safety and Occupational Health Specialists, Division of Safety Research, Surveillance and Field Investigations Branch, NIOSH.



Volunteer Fire Fighter Killed Walking Across an Interstate Highway Responding to a Motor Vehicle Incident - Texas



Photo 1. Interstate eastbound lanes where victim was struck



Volunteer Fire Fighter Killed Walking Across an Interstate Highway Responding to a Motor Vehicle Incident - Texas

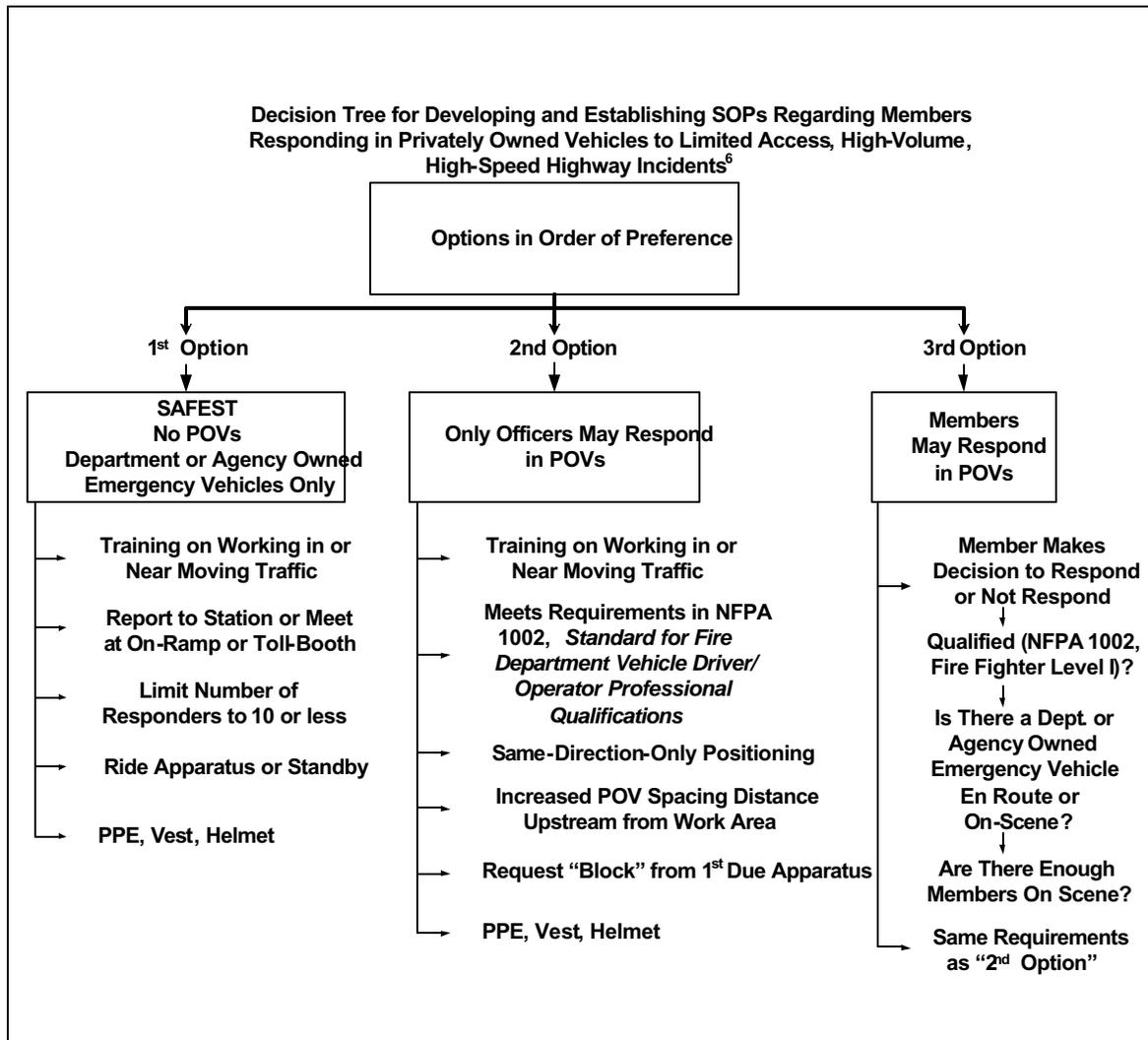


Figure. Decision tree



Volunteer Fire Fighter Killed Walking Across an Interstate Highway Responding to a Motor Vehicle Incident - Texas

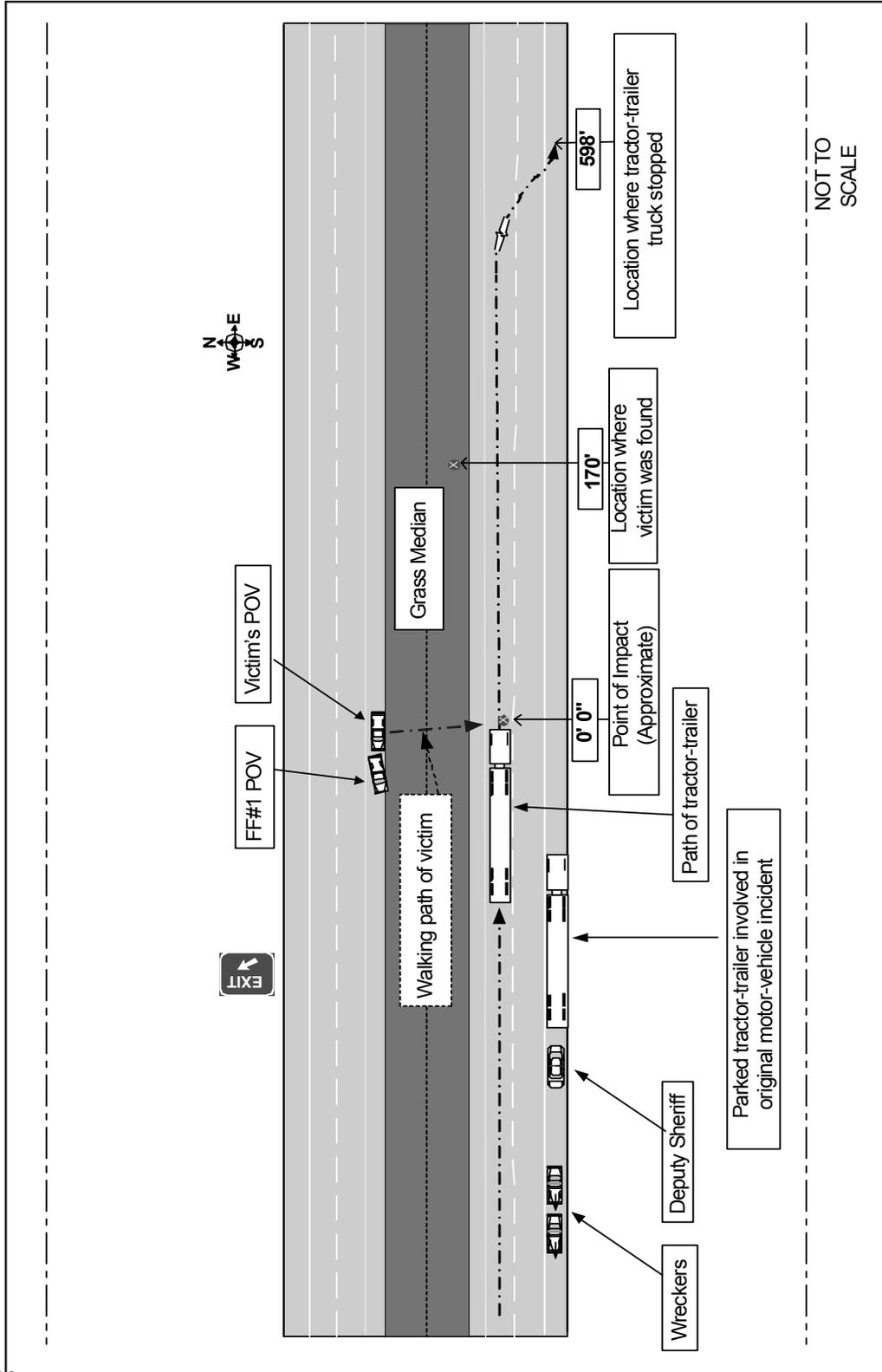


Diagram. Aerial view of incident scene

U. S. Department of Health and Human Services

Public Health Service

Centers for Disease Control and Prevention

National Institute for Occupational Safety and Health

4676 Columbia Parkway, MSC-13

Cincinnati, OH 45226-1998

OFFICIAL BUSINESS

Penalty for private use \$300



Delivering on the Nation's promise:

Safety and health at work for all people

through research and prevention