



# Death in the line of duty...

## A Volunteer Fire Fighter Dies of Head Injuries After Falling Off a Responding Open-Cab Ladder Truck - Pennsylvania

### SUMMARY

On November 2, 1999, a volunteer fire fighter sustained a traumatic head injury after falling off a responding open-cab ladder truck (Photo 1). This injury led to his death the following day. The victim was part of a volunteer crew of six personnel which also included a driver, an officer, and three other fire fighters. The crew was responding to provide mutual-aid assistance to an adjoining community. As the ladder truck was leaving the station, the victim was reported to be standing behind the officer and Fire Fighter #1 (Figure 1) in the open crew compartment of the vehicle. None of the responding personnel reported wearing seat belts. Shortly after the ladder truck left the fire station and completed the second turn (Figure 2), Fire Fighter #1 realized the victim was missing and signaled to have the ladder truck stopped. The crew dismounted the ladder truck and ran back to the victim, who was lying in the roadway. They gave him emergency medical care, and he was transported to a local hospital where he died the following day. NIOSH investigators concluded that, to minimize the risk of similar occurrences, fire departments should

- *ensure that the emergency fire apparatus are equipped and functional to provide adequate safety for the riders and drivers/operators*
- *ensure that all fire fighters who ride on emergency fire apparatus are seated and secured by seat belts*

### INTRODUCTION

On November 2, 1999, a 38-year-old male volunteer fire fighter (the victim) sustained a traumatic head injury after falling off a responding piece of fire apparatus. He died the following day of his injuries. As the open-cab ladder truck was leaving the station, the victim was reported to be standing behind the officer and Fire Fighter #1 in the crew area of the vehicle. None of the responding personnel reported wearing seat belts. On November 3, 1999, the United States Fire Administration (USFA) notified the National Institute for Occupational Safety and Health (NIOSH) of this incident, and on December 2-3, 1999, a NIOSH investigation team consisting of a Safety Engineer and an Occupational Safety and Health Specialist traveled to Pennsylvania to investigate this incident. Meetings were conducted



Open-Cab Ladder Truck

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. 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:

<http://www.cdc.gov/niosh/firehome.html>

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with members of the County Police Department, the Fire Chief, and fire fighters who responded with the victim. The victim had more than 20 years of experience as a volunteer fire fighter with this department. The driver was licensed to drive this class of vehicle (i.e., fire department ladder truck) in the State of Pennsylvania. The department involved in this incident serves a population of approximately 6,000 people in an urban setting. Comprised of 38 volunteer members, the fire department operates one fire station.

#### **INVESTIGATION**

On November 2, 1999, at 1904 hours, a volunteer fire department was dispatched to assist an adjoining community at the scene of an automatic fire alarm. The apparatus involved in this incident is an open-cab ladder truck that was built in 1965. The fire department acquired the ladder truck as a new vehicle in 1965, and 26 years later, in 1991, the ladder truck was refurbished. In addition to other work performed, jump seats were added to the crew area so the riding positions on the "back step" could be eliminated. The personnel bar across the opening in the crew areas (both driver and officer side) were replaced with a hinged, positive locking gate (Photo 2). Seat belts were added to the original and the newly created riding positions as well.

Returning from a previous call, the ladder truck was parked inside the station. Subsequently, when personnel in the fire station were made aware of another call for assistance, they retrieved their turnout gear from the storage rack and boarded the truck. The victim was one of the last to board. After the crew was on board, the officer directed the driver to leave the station. Fire Fighter #1 reported kneeling on the rear facing seat and leaning over into the driver/officer compartment to hear the conversation between the driver and officer. Once the ladder truck completed the second turn after leaving the fire station, Fire Fighter #1 heard an unfamiliar sound, similar to

a muffled impact. Turning around to the rear to investigate, Fire Fighter #1 realized the victim had fallen from the ladder truck. Fire Fighter #1 immediately signaled for the ladder truck to stop. The crew dismounted the ladder truck and ran back to the victim who was lying face down with his torso and head on the roadway and his legs over the curb. He was unconscious. The victim received medical assistance on the scene and then was transported to a local hospital where he died the following day. None of the fire fighters reported wearing seat belts.

#### **CAUSE OF DEATH**

According to the medical examiner, the cause of death was blunt force trauma to the victim's head.

#### **RECOMMENDATIONS / DISCUSSION**

***Recommendation #1: Fire departments should ensure that the emergency fire apparatus are equipped and functional to provide adequate safety for the riders and drivers/operators.<sup>1,2,3</sup>***

Discussion: Each crew riding position on the emergency fire apparatus must be provided with a seat and an approved seat belt designed to accommodate a human with and without heavy clothing. When an apparatus is purchased and/or refurbished, seat belts large enough to accommodate a fire fighter in full protective clothing should be specified for all seats. The apparatus involved in this incident was built in 1965 and refurbished in 1991. During the investigation some of the seat belts on the fire apparatus of this incident were found to be wedged under seat cushions. After further examination of the seat belts, it became apparent that the seat belts were not large enough to accommodate a fire fighter in full protective clothing.

***Recommendation #2: Fire departments should ensure that all fire fighters who ride on emergency fire apparatus are seated and secured by seat belts.<sup>1,4</sup>***



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**Discussion:** Over the years, the fire service has taken measures to reduce the loss of fire fighters in the line of duty. One of these measures is prohibiting fire fighters to ride the “back-step.” However, standing in the crew area is frequently permitted as an alternative riding practice. Standing on a moving (either responding or returning) piece of fire apparatus is a dangerous practice because any loss of balance can result in the fire fighter being thrown from the apparatus. Fire fighters must be seated and use the seat belt intended for that riding position. The requirement that all drivers shall not move fire department vehicles until all persons on the vehicle are seated and secured with seat belts in approved riding positions must be clearly and effectively communicated to all members of the fire department. One way to convey this message is by developing and maintaining written risk management plans that include vehicle operations. The need to periodically inspect and maintain properly installed seat belts and other occupant restraint systems should be outlined as part of the fire department’s risk management plan as well. Fire fighters make many life-and-death decisions during a tour of duty, and one of the most important is snapping on a seat belt after climbing aboard an emergency apparatus that has been called to respond.

#### **REFERENCES**

1. National Fire Protection Association [1997]. NFPA 1500, Standard on fire department occupational safety and health programs, Chapter 4. Quincy, MA: National Fire Protection Association.
2. International Fire Service Training Association [1998]. Essentials of fire fighting. 4th ed. Stillwater, OK: Oklahoma State University, Fire Protection Publications.
3. International Fire Service Training Association [1998]. Fire department pumping apparatus. 6th ed. Stillwater, OK: Oklahoma State University, Fire Protection Publications.
4. Dunn, V [1992]. Responding and returning dangers. In: Safety and survival on the fireground. Saddle Brook, New Jersey: Fire Engineering Books & Videos, p. 37.

#### **INVESTIGATOR INFORMATION**

This investigation was conducted by Eric R. Schmidt, Safety Engineer, and Nancy T. Romano, Safety and Occupational Health Specialist, NIOSH, Division of Safety Research.



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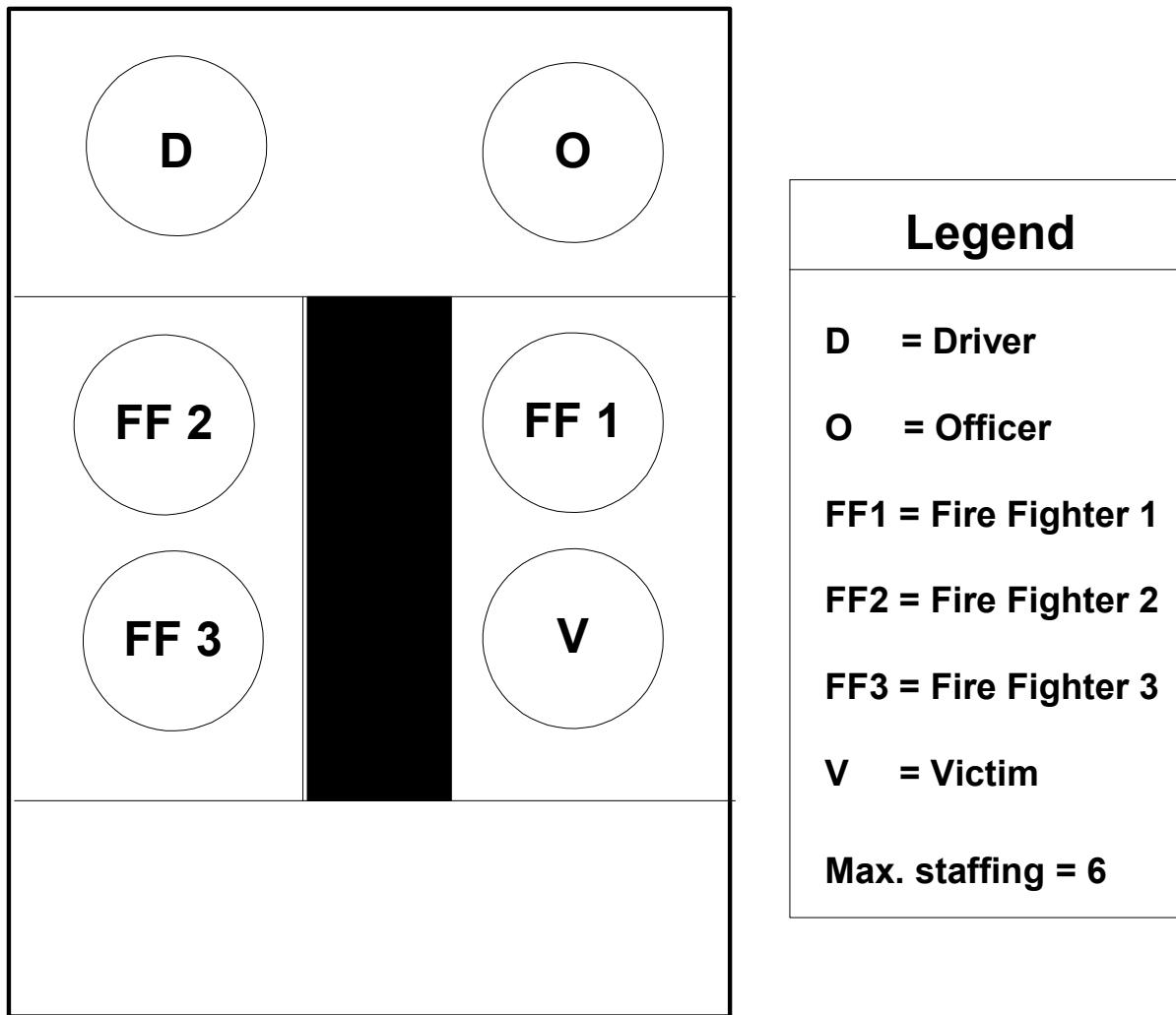
*Photo 1. Open-Cab Ladder Truck*



*Photo 2. Front, Right View of Open-Cab Ladder Truck*

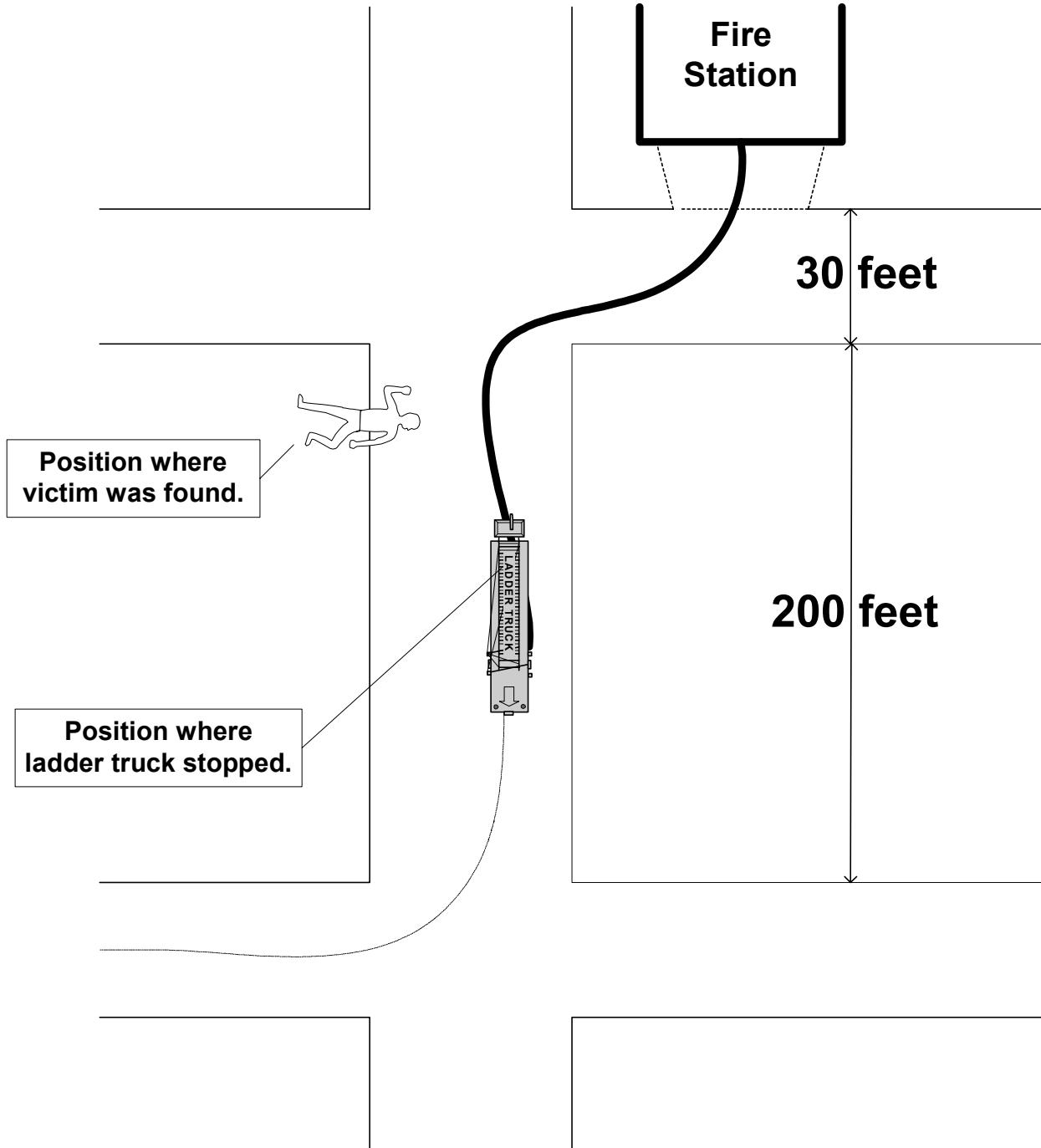
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**Figure 1.** Assigned Open-Cab Riding Positions on Ladder Truck

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*Figure 2. Incident Site*