



A Volunteer Fire Fighter/Driver Was Killed and Another Volunteer Fire Fighter was Injured While Responding to a Motor Vehicle Incident with Injuries—California

SUMMARY

On February 11, 2000, a 25-year-old male volunteer fire fighter/driver was injured and subsequently died as the result of injuries he received when the engine he was driving crashed into a tree. A 35-year-old female volunteer fire fighter who was a passenger in the engine was also injured.

At 1530 hours, the volunteer component of this combination fire department was notified by Central Dispatch of a motor-vehicle incident involving injuries. Rescue 2 (two fire fighters/paramedics) and Engine 1 (a driver/operator [the victim] and a fire fighter [the injured]) responded to the scene. The Assistant Chief responded in his privately owned vehicle (POV). En route to the scene of the motor-vehicle incident, the driver of the engine pulled/swerved to the right side of the road to avoid colliding with an oncoming vehicle. The engine traveled onto the soft shoulder and continued for approximately 230 feet. To avoid striking a utility pole, the driver steered the engine sharply back onto the road. He

overcompensated, and the engine traveled across both lanes, left the road, and struck a large tree. The passenger was ejected from the cab of the engine and landed approximately 30 feet away. At 1537 hours, Central Dispatch requested all volunteers to respond to the scene to assist in the extrication of the victim. The victim was trapped in the engine and was removed approximately 1½ hours later. The victim and the passenger were taken by ambulance to an area hospital. The passenger was hospitalized for 5 days, and the victim died 3 days after the incident.

The NIOSH investigators concluded that, to minimize the risk of similar occurrences, fire departments should

- ***ensure all drivers of fire apparatus are licensed for the vehicles they are expected to operate***
- ***ensure all drivers of fire department vehicles are responsible for the safe and prudent operation of the vehicle under all conditions***



Engine Involved in this Incident

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**



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- ***ensure all drivers of fire department vehicles receive driver training at least twice a year***
- ***establish, implement, and enforce standard operating procedures (SOPs) on emergency vehicle operation***
- ***develop and document an inspection, maintenance, and repair schedule for fire apparatus.***

INTRODUCTION

On February 11, 2000, a 25-year-old male volunteer fire fighter/driver (victim) died and a 35-year-old female volunteer fire fighter was injured when the engine in which they were responding to a motor-vehicle incident crashed into a tree. The injured fire fighter was hospitalized for 5 days. The victim died after complications from surgery.

On February 22, 2000, the U.S. Fire Administration notified the National Institute for Occupational Safety and Health (NIOSH) of this incident. On March 31-April 2, 2000, two Safety and Occupational Health Specialists from the NIOSH Fire Fighter Fatality Investigation and Prevention Program investigated the incident. Interviews were conducted with the combination department, including the Chief of the volunteer department, the Chief of the career department, an officer from the State Highway Patrol, the volunteer Assistant Chief, the volunteer fire fighters of this department, the Assistant Chief of the mutual aid department which responded to this incident, and a civilian witness. Copies of the State Highway Patrol report were obtained, along with a Tribal Police report (this incident occurred on a Federal Indian reservation and the Tribal Police have jurisdiction on the reservation), photographs of the engine at the incident scene, the dispatch

log for the department, and the dispatch log for the mutual aid fire department which responded. At the time of the investigation, the department did not have any written standard operating procedures or maintenance records for review. The incident site and engine were visited and photographed.

The volunteer component of this combination fire department handles all fires that are not wildland related, which the career portion of the department handles. This department has two stations and of the 32 fire fighters in the combination department, 12 are volunteers. The engine involved in this incident was a 1984 Ford F-800, cab-over. The engine had a 1,000-gallon water tank equipped with baffles, and was full at the time of the incident. The gross vehicle weight of the engine was 31,000 lbs including the 8,350 lbs of water. At the time of the investigation, no vehicle maintenance records were available. The engine was equipped with seat belts (lap and shoulder) on both the driver's and passenger's side; however, they were not used by the victim or passenger.

On the day of the incident the weather consisted of a light rain, which caused the road surface to be wet. The asphalt road on which the engine was traveling consisted of two lanes marked with a dashed center yellow line. There were no drivable shoulders; however, the shoulders on both sides of the road were soft, covered with grass, and basically level. The road measures 22 feet from edge to edge. The posted speed limit on this section of road was 35 mph. The victim did not have a current driver's license, nor did he have the state-required commercial driver's license, which he needed to operate the engine. At the time of the incident, the victim's driver's license was suspended due to a lapse in insurance coverage.



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The State requires all career fire fighters to complete training equivalent to National Fire Protection Association (NFPA) Level I. Additionally, the State requires all driver/operators of emergency vehicles to have a class “B” commercial driver’s license with a fire fighter endorsement. Volunteer fire fighters are provided training at an area academy which trains fire fighters on basic fire fighting operations, including, but not limited to, self-contained breathing apparatus (SCBA), fire hose and nozzles, forcible entry, rescue, ventilation and fire control. The department requires all new drivers to demonstrate their driving abilities to an officer of the department. The victim, who was Level I certified, had 2 years of fire fighting and driver/operator experience. However, the victim did not have a valid driver’s license or the class “B” endorsement.

INVESTIGATION

On February 11, 2000, at approximately 1530 hours, Central Dispatch notified the volunteer component of the combination fire department of a motor-vehicle incident involving injuries. The department responded with Rescue 2 (two fire fighters/paramedics) and Engine 1 (a driver/operator [the victim] and a fire fighter [the injured fire fighter]). The Assistant Chief responded to the scene in his privately-owned vehicle (POV).

Rescue 2 left the station first, followed approximately 3 minutes later by Engine 1. Engine 1 pulled out of the station with lights and sirens activated. Approximately 3 miles from the station, Engine 1 rounded a bend and entered a straight stretch of road. The victim and injured fire fighter saw an approaching vehicle some distance ahead, and the vehicle was straddling the center line. The victim told the passenger to sound the air horn to alert the oncoming vehicle. After sounding the air horn, the oncoming vehicle remained in the center

of the road. When the vehicle and the engine were approximately 50 feet apart, the victim pulled the engine to the right, partway onto the soft shoulder. The injured fire fighter recalled the engine fishtailing as it traveled on the soft shoulder toward a utility pole. The distance from the location where the engine’s right tires left the roadway to the utility pole is approximately 230 feet. To avoid striking the pole, the victim steered the engine sharply to the left; however, the top-mounted lights on the engine grazed the pole. In pulling the engine back onto the road, the victim overcompensated. The engine crossed the road diagonally and struck a large tree. The distance from the utility pole to the tree was approximately 80 feet (see Photo 1). The posted speed limit on this section of road is 35 mph. The injured fire fighter estimates that the engine was traveling approximately 35 mph. *Note: The State Highway Patrol estimated the engine traveling between 35 and 50 mph. This estimate was taken from several witness statements.*

Since the driver’s side of the engine was heading directly toward the tree, the victim lunged toward the passenger side to try to avoid direct impact. The engine struck the tree, which pushed the cab inward approximately 3 feet (see Photo 2). The victim was in the middle of the bench seat with the gear shift between his legs, and he was leaning at the waist toward the passenger side. He was pinned by the gear shift and the dashboard, and he was bleeding profusely and calling for help. The passenger was thrown through the windshield and landed approximately 30 feet from the engine in the yard of a residence. The resident called Central Dispatch at 1536 hours to report the incident. A civilian following approximately ¼ mile behind the engine stopped to provide assistance to the victim and injured fire fighter. The civilian immediately ran to the victim inside the crushed cab. When a second civilian arrived on the scene,



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he found a fire extinguisher and extinguished a small fire under the engine.

Rescue Unit 1 and the Assistant Chief arrived simultaneously at the scene of the initial call (approximately 2 miles away from the incident involving Engine 1). While they were attending to the injuries of a civilian, Central Dispatch, at 1537 hours, requested that all volunteers respond to the motor-vehicle incident involving the fire truck. The rescue unit had to delay responding to the incident involving Engine 1 until the State Police arrived to take over the initial incident scene. The Assistant Chief responded, and upon arrival, sized up the scene. A backup department responded at 1620 hours with an engine, an ambulance, and extrication tools. After fire fighters attempted unsuccessfully to extricate the victim, Central Dispatch called for a tow truck to pull the engine away from the tree. Once it was pulled away from the tree, the victim was extricated from the engine, approximately 1½ hours after the incident occurred. The victim and the injured fire fighter were taken by the same ambulance to the hospital. Both the victim and the injured fire fighter were conscious and coherent during the 1-hour ambulance ride to the hospital. One of the victim's legs was broken, and both of the passenger's ankles were broken. The victim was taken into surgery and died 3 days later. The passenger required surgery and was hospitalized for 5 days and then released.

CAUSE OF DEATH

The death certificate lists the immediate cause of death as adult respiratory distress syndrome [lung failure]/ischemia and encephalopathy due to motor vehicle crash.

The injured fire fighter received a fracture of the lateral malleolus of the right ankle, a bimalleolar fracture to the left ankle and lacerations.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Fire departments should ensure all drivers of fire apparatus are licensed for the vehicles they are expected to operate.¹

Fire departments should ensure fire fighters required to operate a fire department's vehicles possess a valid driver's license for the appropriate class of vehicle operated (a class B license [commercial driver's license] with a "fire fighter" endorsement is required by the State for any vehicle over 28,000 lbs).

Recommendation #2: Fire departments should ensure all drivers of fire department vehicles are responsible for the safe and prudent operation of the vehicle under all conditions.^{2,3}

Fire departments should ensure driver/operators of fire service vehicles are responsible for the safe and prudent operation of the vehicles under all conditions. The State allows emergency vehicles responding to an incident to exceed the maximum speed limit if the driver does not endanger life or property; however, drivers of fire apparatus should reduce their speed when traveling on hazardous routes or during less than favorable conditions (e.g, insufficient shoulder, wet roads). Drivers should always maintain a safe speed to avoid losing control of the vehicle. Additionally, if a vehicle leaves the right side of the road and conditions permit, drivers should take their foot off the throttle and slow to a speed that allows the vehicle to come back onto the roadway safely. "Fighting" to get the vehicle on the road at high speed may lead to a collision or rollover.

Recommendation #3: Fire department should ensure all drivers of fire department vehicles receive driver training at least twice a year.^{4,5}



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Driver training should be provided to all driver/operators as often as necessary to meet the requirements of NFPA 1451, but not less than twice a year. This training should cover defensive driving techniques during emergency and nonemergency conditions. Additionally, drivers should receive a minimum of 100 hours of driver training which includes a minimum of 5 hours of defensive driving instruction, an annual recertification by a department-certified driver trainer and a refresher course every 3 years by an outside agency. This training should be given by a certified instructor outside the department. Each candidate for a driving/operator must demonstrate driving skills to an officer of the department.

Recommendation #4: Fire departments should establish, implement, and enforce standard operating procedures (SOPs) on emergency vehicle operation.^{2, 6}

Fire departments should establish and implement SOPs for emergency vehicle operation. It is important that all occupants are seated and wearing their seat belts before the vehicle is moved. Additionally, SOPs on the use of seat belts should be implemented and should apply to all persons riding in all emergency vehicles. At the time of this investigation, the department did not have any written policy on the use of seat belts.

Recommendation #5: Fire departments should develop and document an inspection, maintenance, and repair schedule for fire apparatus.⁷

The apparatus driver/operator or persons responsible for the maintenance and readiness of the apparatus should establish a system of record keeping for reference and review for preventive maintenance. Fire department vehicles need to be

inspected at least weekly, within 24 hours after any use or repair, and prior to being placed in service or used for emergency purposes, to identify and correct unsafe conditions. This inspection should include tires, brakes, warning lights, wipers, and mirrors. The apparatus should be started and the operation of pumps and other equipment should be verified. Fluid levels should also be checked. The department in this incident performed monthly apparatus inspections, however, did not retain any type of documentation to reflect the results. Maintenance of the apparatus was not revealed as a contributing factor to the incident. This recommendation is provided for the purpose of bringing focus to the importance of maintenance being regularly scheduled and documented. The proper care, inspection, and maintenance of fire apparatus are crucial to fire fighter safety.

REFERENCES

1. California State Vehicle Code. Section 15250.5(a).
2. National Fire Protection Association [1997]. NFPA 1500, Standard on fire department occupational safety and health program. Quincy, MA: National Fire Protection Association.
3. Wilbur, M [2000]. Preventing apparatus rollover fatalities and injuries. Firehouse, September 2000.
4. National Fire Protection Association [1997]. NFPA 1451, Standard for a fire service vehicle operations training program. Quincy, MA: National Fire Protection Association.
5. Wilbur, M [1999]. The next millennium: 2025 and beyond. Firehouse, August 1999.
6. Cook, JL, Jr. [1998]. Standard operating



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procedures and guidelines. Saddle Brook, NJ: Penn Well.

7. National Fire Protection Association [1998]. NFPA Fire department occupational health and safety standards handbook. Quincy, MA: National Fire Protection Association.

INVESTIGATOR INFORMATION

This incident was investigated by Kimberly Cortez and Nancy Romano, Occupational Health and Safety Specialists, Surveillance and Field Investigations Branch, Division of Safety Research, NIOSH.

*A Volunteer Fire Fighter/Driver Was Killed and Another Volunteer Fire Fighter was Injured
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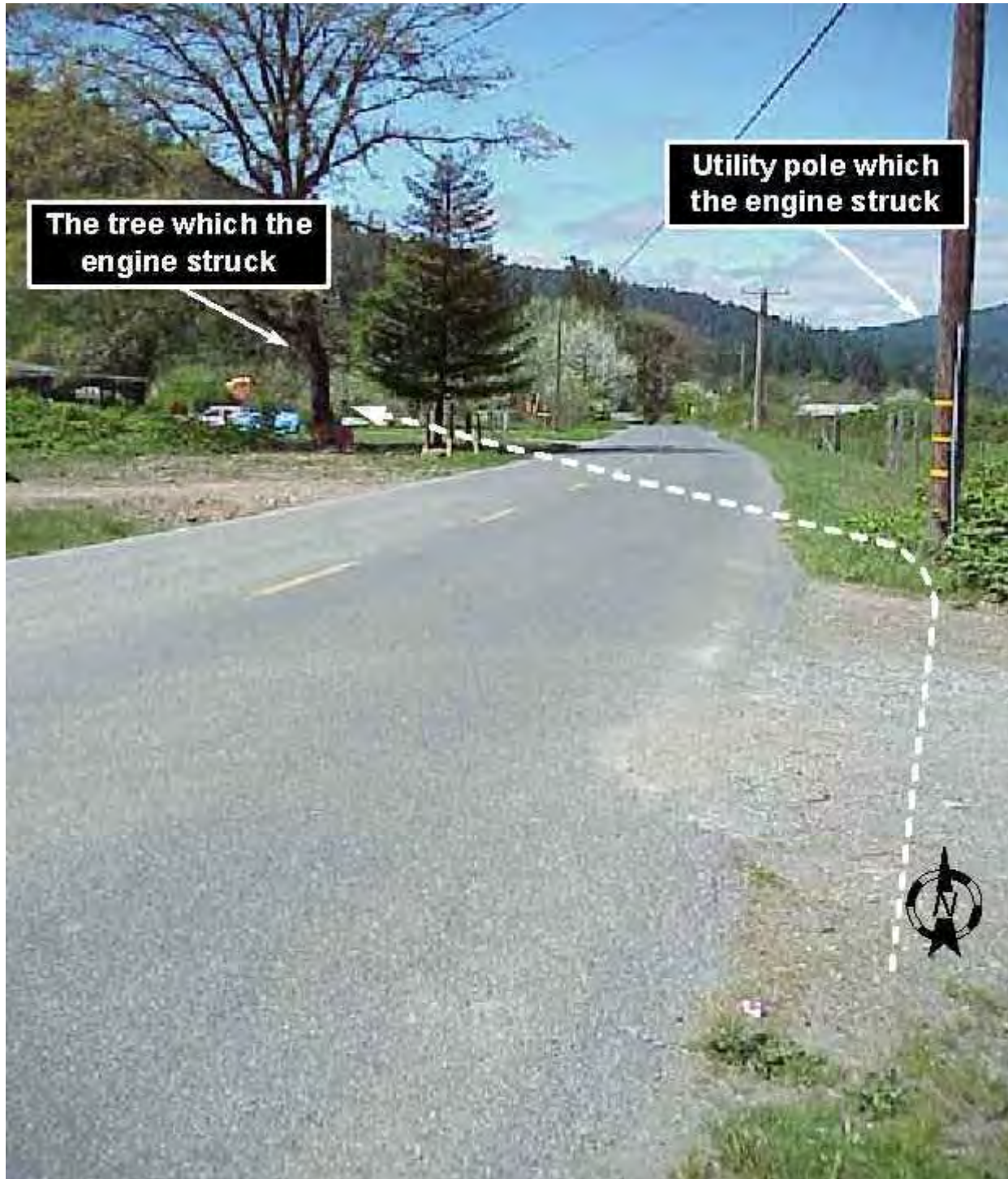


Photo 1. The Road Which the Engine Was Traveling. Note: The dashed arrow indicates the approximate path the engine traveled.

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Photo 2. The Engine Involved in This Incident

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Photo 3. *The Road Which the Engine Was Traveling.* Note: This photo depicts the opposite direction of travel with the engine coming toward the police vehicle. The arrow indicates the approximate location which the engine left the roadway.