



Civilian Jumps From Fourth-Story Window of Burning Apartment Building and Strikes Career Fire Fighter - Michigan

SUMMARY

On January 10, 2002, a 39-year-old male career fire fighter (the victim) was injured from being struck by a civilian who jumped from a fourth-story window of an apartment building. The victim and two other fire fighters were raising a 35-foot extension ladder to a fourth-story window of the involved structure to rescue two trapped civilians when the incident occurred. The victim was bracing the base of the ladder when the first civilian jumped and landed at their feet. The second civilian jumped immediately thereafter, striking a van and the victim simultaneously. The victim was knocked to the ground but was able to continue rescuing trapped occupants and finished his shift. The victim experienced severe head, neck, and back pain from this incident and was admitted on January 26, 2002, to a hospital, where he lapsed into a coma until his death on February 7, 2002.

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

- *ensure that adequate numbers of staff are available to immediately respond to emergency incidents*
- *develop, implement, and enforce standard operating procedures (SOPs) to address the treatment of injuries on-site which include guidelines for evaluating injuries that are not obviously life-threatening*

Additionally, municipalities and building owners should consider

- *requiring older structures to meet new building codes and standards to improve safety of occupants and fire fighters.*

INTRODUCTION

On January 10, 2002, a 39-year-old male career fire fighter (the victim) was injured from being struck by a civilian who jumped from a fourth-story window of an apartment building. The victim was admitted to a hospital on January 26, 2002, where he lapsed into a coma until his death on February 7, 2002. On February 11, 2002, the U.S. Fire Administration notified the National Institute for Occupational Safety and Health (NIOSH) of this incident. On April 29, 2002, a Safety and Occupational Health Specialist from the NIOSH Fire Fighter Fatality Investigation and Prevention Program investigated this incident. Meetings were conducted with representatives from the Fire Commissioner's office, the Chief of Operations, a Battalion Chief and fire fighters who were at the scene, and representatives from the local International Association of Fire Fighters (IAFF). Interviews were conducted with a Battalion Chief and fire fighters who were involved in the incident. The investigator reviewed the victim's training records, standard operating procedures (SOPs), coroner's report, medical examiner's report contracted by the fire department, autopsy reports, photographs of the incident scene, fire department

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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witness statements and a transcription of the dispatch tapes. The incident site was also visited.

The career fire department involved in this incident consists of 1,326 uniformed fire fighters. The department serves a population of approximately 900,000 in a geographical area of about 139 square miles. The State of Michigan requires that all fire fighters receive Fire Fighter I and Fire Fighter II training. The victim was National Fire Protection Association (NFPA) Level I- and Level II-certified, and he had received water tower training and Department of Transportation hazardous materials training. He had over 13 years of fire-fighting experience.

Equipment

First alarm, 0227 hours

- Battalion Chief 05 — 1 Chief
- Engine 21 — Officer, Driver/Operator, 2 Fire Fighters
- Engine 39 — Officer, Driver/Operator, 2 Fire Fighters
- Engine 40 — Officer, Driver/Operator, 1 Fire Fighter
- Engine 42 — Officer, Driver/Operator, 2 Fire Fighters
- Ladder 17 — Officer, Driver, 2 Fire Fighters
- Ladder 28 — Officer, Driver, 1 Fire Fighter
- Squad 05 — Officer, Driver, 2 Fire Fighters
- Medic 01 — 2 Technicians

Second alarm, 0231 hours

- Senior Chief — 1 Chief
- Battalion Chief 07 — 1 Chief
- Engine 34 — Officer, Driver/Operator, 2 Fire Fighters
- Engine 35 — Officer, Driver/Operator, 2 Fire Fighters
- Ladder 21 — Officer, Driver/Operator, 1 Fire Fighter (the victim)
- Ladder 22 — Officer, Driver, 2 Fire Fighters
- Squad 02 — Officer, Driver, 2 Fire Fighters

- Squad 04 — Officer, Driver, 2 Fire Fighters
- Medic 02 — 2 Technicians
- Medic 07 — 2 Technicians
- Medic 10 — 2 Technicians

Additional units were dispatched on the third alarm; however, only those units on the scene leading up to the incident are discussed in this report.

Structure

The structure involved in this incident was a four-story, 50-unit apartment building of brick and frame construction with a full basement. The building was approximately 60 years old and did not have a sprinkler system. The fire department's arson section declared the fire to be arson. Its origin was a flammable liquid accelerant on the front central stairway between the first and fourth floors.

INVESTIGATION

At approximately 0226 hours, Central Dispatch received a report of an apartment building on fire with persons trapped inside. The companies responding to the first alarm were staged at the front of the building advancing attack lines and conducting rescue operations. Ladder 21, which included the victim, arrived on the scene at approximately 0232 hours as the third ladder truck to respond. The crew immediately noticed occupants who were trapped in the structure hanging out the windows preparing to jump from the third and fourth floors.

Following the department SOPs, Ladder 21 proceeded down an alley and took a position for truck operations at the rear of the structure. Ladder 21 encountered additional civilians preparing to jump from the third and fourth floors. Two civilians were hanging out of a window on the fourth floor with fire at their backs. The hydraulic aerial ladder was unable to be put into service because of overhead electrical lines running parallel to the rear of the structure (Diagram #1). The two civilians were screaming for rescue with fire emitting from the top of the window behind them.



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Civilians on the ground were yelling for the trapped civilians on the fourth floor to jump. The situation required an immediate response. The three-man crew of Ladder 21 knew they would be physically unable to raise the 50-foot extension ladder; therefore, they pulled the 35-foot extension ladder when they exited the truck.

The fire fighters were attempting to position the aluminum ladder at the base of a fourth-floor window to rescue an adult male and female who were trapped on the floor with fire at their backs. The three fire fighters struggled with the fully extended 35-foot ladder which was approximately 3 feet from the bottom of the window sill. As they were leaning the ladder to the building, the woman jumped from the window. She struck the top of the ladder and landed at the feet of the fire fighters. The male jumped immediately after, striking a van and the victim simultaneously (Diagram #2). The victim, who was bracing the base of the ladder, was knocked to the ground by the force of the jumper. He eventually made it to his feet and continued to rescue additional civilians with the 35-foot extension ladder. When additional fire fighters arrived on the scene, they were able to place the 50-foot extension ladder into service to rescue other civilians from the fourth floor. The victim put on his air pack and continued interior rescue operations and clean-up until returning at approximately 0415 hours to quarters, where he spent the remainder of his shift.

The victim complained of severe head, neck, and back pain throughout the night. The victim's injuries were entered into the department's journal, and it was suggested to the victim that he be transported to the hospital by an ambulance. The victim declined to be transported by an ambulance because he would need transportation to his home if he was not admitted. He decided to wait until his shift ended to visit a medical facility near his residence. The victim later was treated and released from this facility.

Note: This facility was not typically used by the department.

Over the next several weeks while on medical leave, the victim continued to have severe headaches, forcing him to seek medical treatment on January 22, 2002; however, he was not admitted to the hospital at this time. On January 26, 2002, he collapsed and was admitted to a hospital where he remained in a coma until his death on February 7, 2002.

CAUSE OF DEATH

The county medical examiner listed the cause of death as natural due to a ruptured berry aneurysm. *Note: A berry aneurysm is due to a small developmental weakness in the wall of a brain artery, leading to a round (berry-like) outpouching or swelling of the artery. These aneurysms can rupture, causing severe symptoms or death.*

It should be noted that the department requested another physician to review the cause of death. This independent review concluded that the fire fighter's death was work-related. The report described the cause of death as "...job related, caused by stress and exertion in the performance of his duties. The timeliness of the events on January 10, 2002, and subsequent developments are unquestionably the direct result of the victim's blood pressure which brought on leakage from a pre-existing aneurysm, (sentinel bleed) and ultimately the rupture of the aneurysm, profuse subarachnoid hemorrhage, brain swelling, coma, and death."

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Fire departments should ensure that adequate numbers of staff are available to immediately respond to emergency incidents.¹

Discussion: As stated in NFPA 1710 (5.2.1.1) "On-duty fire suppression personnel shall be comprised



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of the numbers necessary for fire-fighting performance relative to the expected fire-fighting conditions. These numbers shall be determined through task analyses that take the following factors into consideration:

- (1) Life hazard to the populace protected
- (2) Provisions of safe and effective fire-fighting performance conditions for the fire fighters
- (3) Potential property loss
- (4) Nature, configuration, hazards, and internal protection of the properties involved
- (5) Types of fireground tactics and evolutions employed as standard procedure, type of apparatus used, and results expected to be obtained at the fire scene.”

NFPA 1710 recommends that a minimum acceptable fire company staffing level should be four members responding on or arriving with each engine and each ladder company responding to any type of fire. It also recommends that for companies responding in jurisdictions with high-hazard occupancies, which is consistent with this incident (neighborhoods with structures in close proximity to one another), to be staffed with a minimum of five or six members responding or arriving with each engine and each ladder company.

Note: According to NFPA 1710, high-hazard occupancies include high-risk residential occupancies, neighborhoods with structures in close proximity to one another, special medical occupancies, high-rise occupancies, and hazardous materials occupancies.

The initial arriving company must also be able to implement an initial rapid intervention crew (IRIC). Responding companies were faced with a building engulfed in fire, and over 20 occupants requiring rescue on multiple floors in different parts of the structure. Additional staffing may have allowed the

responding companies to perform optimal tactical operations.

Recommendation #2: Fire departments should develop, implement, and enforce standard operating procedures (SOPs) to address the treatment of injuries on-site which include guidelines for evaluating injuries that are not obviously life-threatening.^{1,2}

Discussion: It is unclear whether the force of the civilian hitting the victim triggered the subsequent aneurysm bleed, or if this condition would have been detected upon medical treatment. However, fire departments should develop standard operating procedures (SOPs) to address treatment of injuries on site, including developing guidelines for evaluating injuries that are not obviously life-threatening. Not all potentially life-threatening injuries are apparent during an initial evaluation of the injured person. Evaluation of injuries that are not obviously life-threatening can be difficult at best. It is imperative that protocols be developed in coordination with the local EMS provider and the department’s physician and Chief to cover these types of injuries. For example, medical evaluation may be warranted for all head injuries causing loss of consciousness or persistent pain symptoms, or significant blunt trauma where internal injuries are possible.

Recommendation #3: Municipalities and building owners should consider requiring older structures to meet new building codes and standards to improve safety of occupants and fire fighters.³

Discussion: There are building codes and standards which are used as guidelines for new building design and construction. However, before municipalities adopted or enforced specific codes and standards, many buildings were designed and constructed



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without incorporating such standards. New or improved codes have been established which can improve the safety of existing structures. Sprinkler systems are one example of a safety feature that can be retrofitted into older structures. It is proven that sprinkler systems reduce the loss of property and life. There is also a strong possibility that sprinklers could reduce fire fighter fatalities, since they contain, and even extinguish, fires prior to the arrival of the fire department. Sprinklers are currently the most proactive fire safety approach in building construction. The structure involved in this incident did not incorporate a sprinkler system.

REFERENCES

1. National Fire Protection Association [2001]. NFPA 1710, standard for the organization and deployment of fire suppression operations,

emergency medical operations, and special operations to the public by career fire departments. Quincy, MA: National Fire Protection Association

2. National Fire Protection Association [2002]. NFPA 1582, standard on medical requirements for fire fighters and information for fire department physicians. Quincy, MA: National Fire Protection Association.

3. National Flood Insurance Program, Fire Analysis Division [1987]. Automatic sprinkler systems do have an impact in industry. Fire Journal.

INVESTIGATOR INFORMATION

This incident was investigated by Jay L. Tarley, Safety and Occupational Health Specialist, Division of Safety Research, NIOSH.



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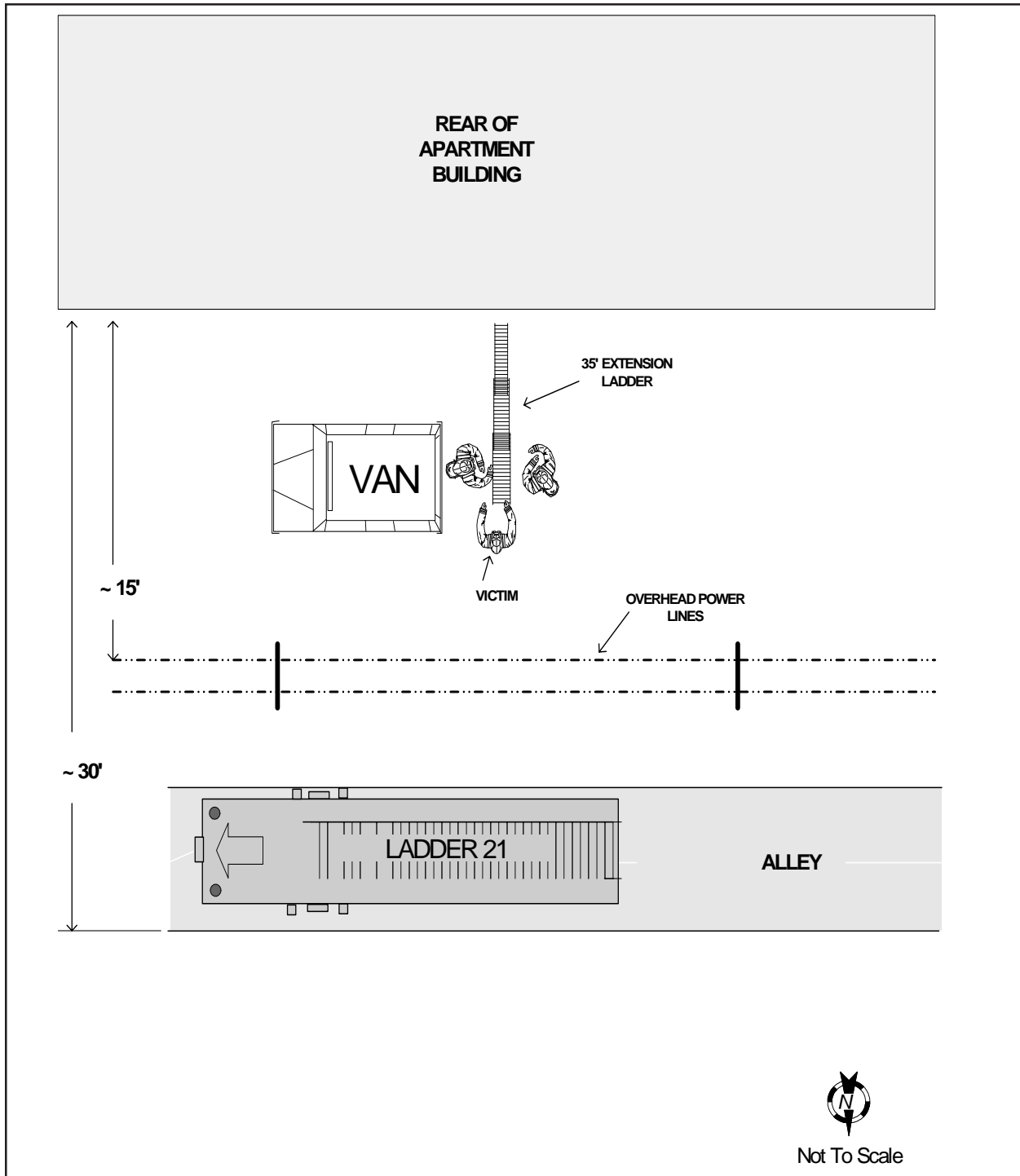


Diagram 1. Incident Scene (Aerial View)



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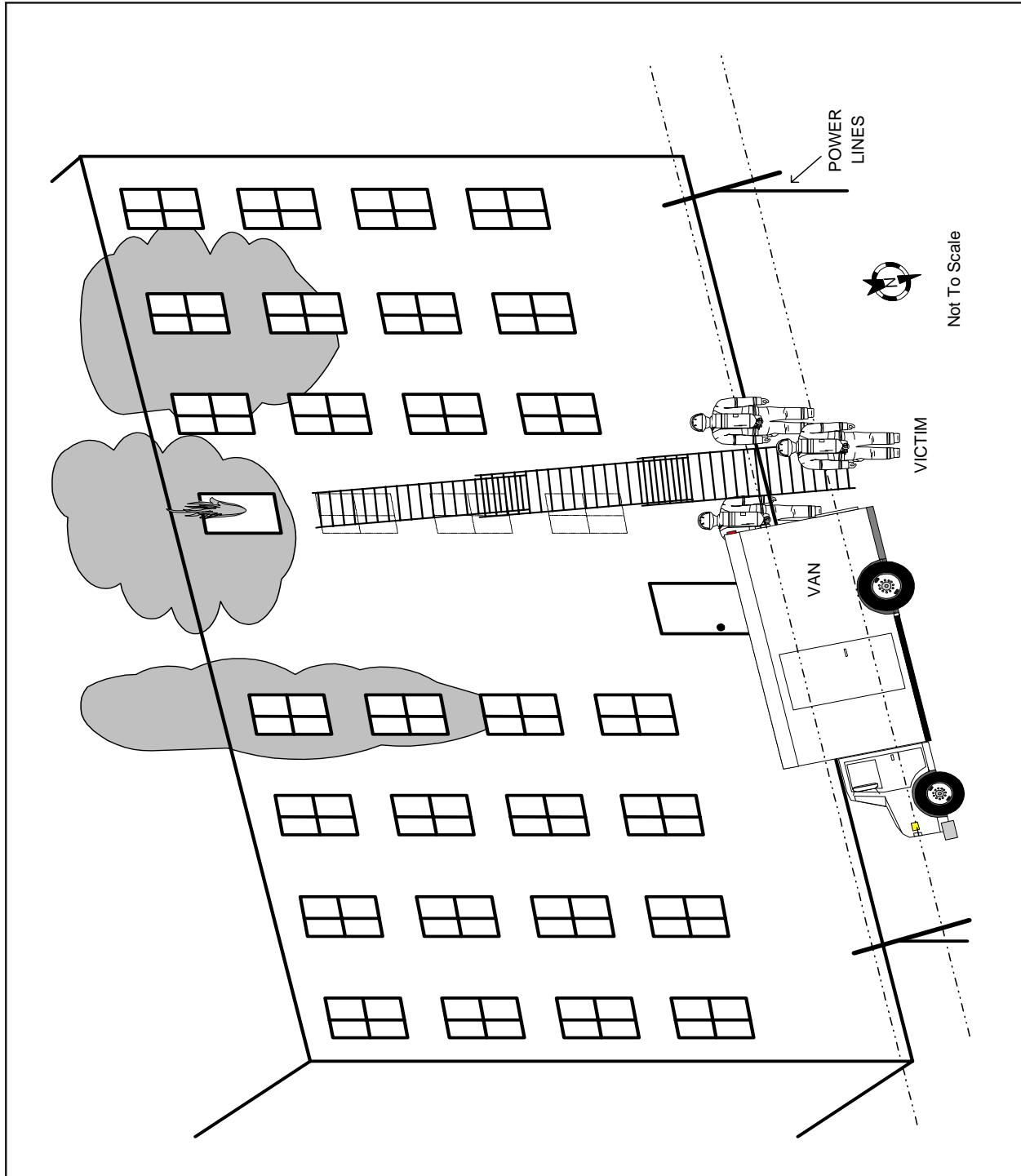


Diagram 2. Rear of Structure (Profile View)

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