



## Volunteer Fire Captain Dies from Injuries Received after a Brush Truck Undergoing Maintenance Strikes and Pins Him Against a Wall—Indiana

### Executive Summary

On November 5, 2010, a 53-year-old male volunteer captain (victim) was fatally injured when he was struck and pinned against a wall by a fire department brush truck. The brush truck was having maintenance performed on the steering column by a fire fighter/mechanic. As the victim and a fire fighter passed in front of the brush truck, the fire fighter/mechanic turned the ignition key to unlock the steering wheel, and the brush truck suddenly started and lunged forward, pinning the victim against construction materials stored along the wall. The victim succumbed to his injuries on scene.



**Open overhead door showing the vehicle and bay where the incident occurred four days prior.**

*(Photo courtesy of Indiana OSHA.)*

### Contributing Factors

- *Vehicle not blocked from inadvertent movement*
- *Vehicle transmission in gear during maintenance*
- *Vehicle not equipped with clutch pedal interlock*
- *Unsafe work practices.*

### Key Recommendations

- *Ensure steps are taken to block vehicles undergoing maintenance against inadvertent movement (e.g., setting the parking brake, wheel chocks, or disconnection of battery)*
- *Develop, implement, and enforce policies and procedures outlining safe work practices within a vehicle maintenance facility*
- *Develop, implement, and enforce a comprehensive preventive maintenance program*
- *Ensure that fire department vehicle operators and vehicle maintenance personnel are aware of available manufacturer pre-market and aftermarket installed safety devices on apparatus*

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Additionally, authorities having jurisdiction (e.g., Federal Excess Personal Property program, state surplus organizations, and individual state foresters) should:

- *Consider developing and implementing a nationwide policy/procedure for excess/surplus vehicles that assists with identifying potential safety concerns, outdated vehicle safety controls, and vehicle modifications so that ample warning, guidance, and information are provided to fire departments before they take possession of such vehicles and place them in service.*



**Incident scene.**  
*(Photo courtesy of Indiana OSHA.)*

The National Institute for Occupational Safety and Health (NIOSH), an institute within the Centers for Disease Control and Prevention (CDC), is the federal agency responsible for conducting research and making recommendations for the prevention of work-related injury and illness. In 1998, Congress appropriated funds to NIOSH to conduct a fire fighter initiative that resulted in the NIOSH “Fire Fighter Fatality Investigation and Prevention Program” which examines line-of-duty-deaths or on duty deaths of fire fighters to assist fire departments, fire fighters, the fire service and others to prevent similar fire fighter deaths in the future. The agency does not enforce compliance with State or Federal occupational safety and health standards and does not determine fault or assign blame. Participation of fire departments and individuals in NIOSH investigations is voluntary. Under its program, NIOSH investigators interview persons with knowledge of the incident who agree to be interviewed and review available records to develop a description of the conditions and circumstances leading to the death(s). Interviewees are not asked to sign sworn statements and interviews are not recorded. The agency's reports do not name the victim, the fire department or those interviewed. The NIOSH report's summary of the conditions and circumstances surrounding the fatality is intended to provide context to the agency's recommendations and is not intended to be definitive for purposes of determining any claim or benefit.

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

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### **Introduction**

On November 5, 2010, a 53-year-old male volunteer captain (victim) was fatally injured when he was struck and pinned against a wall by a fire department brush truck. On November 8, 2010, the U.S Fire Administration notified the National Institute for Occupational Safety and Health (NIOSH) of this incident. On December 5 – 8, 2010, a safety and occupational health specialist from the NIOSH Fire Fighter Fatality Investigation and Prevention Program traveled to Indiana to investigate this incident. The NIOSH investigator met with and interviewed the fire chief, the fire fighter/mechanic who was conducting maintenance on the brush truck at the time of the incident, the fire fighter who was with the victim at the time of the incident, representatives of the Indiana Department of Labor/Indiana Occupational Safety and Health Administration (IOSHA), and employees with the Indiana Department of Natural Resources (IDNR). The NIOSH investigator spoke with the investigating sheriff's deputy and coroner via telephone. The NIOSH investigator reviewed fire department standard operating procedures (SOPs) and/or standard operating guidelines (SOGs), training records for the victim and the fire fighter/mechanic, vehicle history and maintenance records from the fire department, vehicle information and history from the IDNR, the fire department incident report, the sheriff's office incident report and photographs, IOSHA preliminary investigative notes and photographs, and the coroner's report. The NIOSH investigator also visited the location of the incident.

The NIOSH investigator visually inspected the brush truck and tested operability with assistance from the IDNR while at their facility. *Note: Following the incident, the IDNR took back the brush truck as requested by the fire department.* Photographs, video, and measurements of the brush truck were obtained.

### **Fire Department**

This volunteer fire department currently operates out of a single station with 28 members who serve a population of approximately 5,000 within an area of about 64 square miles. The fire department responds to approximately 200 calls a year, of which 20% are fire-related and 80% are medical in nature.

In June 2008, the fire station was damaged by a flood requiring the fire department to relocate their day-to-day operations to a new location. Many records were lost and equipment damaged. At the time of the incident, the fire department had three engines, a tender, two brush trucks, and a utility vehicle. The department's new station was in the final stages of being finished at the time of the NIOSH investigation.

At the time of the incident, all apparatus were stored within the fire department's maintenance building, which was located adjacent to the new fire station under construction. Since the flood, all their apparatus were stored within the maintenance building as well as many other types of equipment. The equipment was neatly organized and out of the walk-ways, but space was limited for personnel to walk about the building. The fire department allowed anyone to walk within the bay when needed, and did not have a policy or procedure in place dictating who was authorized to be in the building when

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vehicles were being worked on. Designated areas or walking paths for nonauthorized personnel were also not established.

The fire department has implemented written SOPs/SOGs covering such topics as day-to-day operations of the fire department, fire ground operations, radio communications, and out-of-service criteria for apparatus. The fire department did not have a written vehicle maintenance program or an SOP for vehicle maintenance.

### **Training and Experience**

The victim had been a volunteer member with this department for approximately 5 years, holding the rank of captain since September 2010. He had completed many structural and wildland fire related courses while a member with this department and with his previous employer.

The fire fighter, who was with the victim at the time of the incident, had been a volunteer member with this department for approximately 3 years holding the rank of medical lieutenant. He had completed many structural and wildland fire-related courses while a member with this department.

The fire fighter/mechanic had been a volunteer member with this department for approximately 1½ years. He was promoted to the rank of maintenance officer in April 2010. He has been employed with the IDNR for the last 14 years. His position at the IDNR for the last 12 years was that of an automotive mechanic. He does not hold any automotive maintenance certifications, nor does the IDNR position require him to have or obtain any. His qualifications for this position have come from personal experience, knowledge, and on-the-job training. This position requires him to work on a variety of vehicles such as dump trucks, forestry dozers, full- and mid-size cars and trucks, and other vehicles as designated. He holds a current Class A commercial driver's license and is required to take an emergency vehicle operator's course every 2 years. He also has certifications for wildland firefighting.

The fire department also offers weekly/monthly training classes for its members. These training classes include many different topics including vehicle maintenance, but specific information covered within the vehicle maintenance courses was not documented.

### **Equipment and Personnel**

The vehicle involved in this incident was a 1990 4-wheel drive work pickup truck that was later converted into a brush truck by the fire department (see Photo 1). The truck had a gross vehicle weight rating of 6,400 pounds and a payload rating of 1,800 pounds. The truck had a 4-speed manual transmission, 4-wheel anti-lock brakes, and a lap/shoulder restraint system. At the time of the incident, the truck had approximately 27,200 miles on the odometer.

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The truck was originally purchased in 1990 through a federal government bid for the Federal Bureau of Prisons. In 2002, the Federal Bureau of Prisons chose to excess the pickup truck, and it was assigned to the Federal Excess Personal Property program (FEPP).<sup>1</sup> The FEPP program loans federal equipment to state foresters for the purpose of converting it for rural and wildland firefighting. In March 2002, the FEPP program assigned the truck to the IDNR,<sup>2</sup> who in turn, sub loaned the truck to the victim's department in June 2002. There was no cost to the department to obtain this equipment. However, cooperating departments must obtain a license plate and maintain liability insurance on any equipment that is intended to be operated on a highway. Departments have 1 year to put the equipment into service and are authorized to keep the equipment as long as it is operated in accordance with the lease agreement.<sup>2</sup>



**Photo 1. Photo taken at IDNR surplus yard following the incident.  
(NIOSH photo.)**

The fire department outfitted the pickup truck with wildland firefighting equipment and registered the pickup with the state of Indiana as an emergency vehicle (brush truck). The fire department added emergency lights, a siren, and a brush guard and painted the pickup truck red.

Due to the flood, many fire department records were lost, including maintenance records for the brush truck. However, in June 2008 following the flood, the brush truck did receive a full service maintenance check, and the brush truck was placed back in service. *Note: The state of Indiana does not require emergency vehicles to obtain a yearly state inspection.* Following this inspection, the brush truck was primarily used to move equipment between the damaged fire station and the new station.

### **Timeline**

This timeline is provided to set out, to the extent possible, the sequence of events. Times are approximate and were obtained from review of the fire department and sheriff's office reports. The timeline is not intended, nor should it be used, as a formal record of events.

- **1832 Hours**

The fire fighter, who was with the victim at the time of the incident, ran next door to notify the fire chief of the incident and alert the 911 system.

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- **1840 Hours**

Victim's fire department, the sheriff's office, and an ambulance were dispatched to incident.

### **Personal Protective Equipment**

The victim was wearing a military battle dress uniform and boots. The fire fighter/mechanic was wearing non-uniform apparel and wildland firefighting boots. No personal protective equipment was required.

### **Weather and Road Conditions**

The weather was not a factor. This incident occurred within a climate controlled maintenance building. The maintenance bay floors were concrete, dry, and relatively level.

### **Investigation**

On the day of the incident, the victim, another fire fighter, and a fire fighter/mechanic met outside the maintenance building. A brief conversation occurred between the three of them before all of them walked through the maintenance bay side door that led into the third bay (see the Diagram). The truck involved in the incident had already been pulled into the third bay by the fire fighter/mechanic so that maintenance could be performed on it. *Note: In July and August of 2010, operators of the brush truck had documented on check sheets that the steering system was loose or sloppy during operation.* The fire fighter/mechanic began preparations to replace the truck's steering shaft coupler, which he believed was the problem (see Photo 2), while the victim and the fire fighter carried on a conversation on the passenger side of the brush truck.



**Photo 2. View from right, front fender well showing the steering coupler.**  
*(NIOSH photo.)*

The fire fighter/mechanic told the NIOSH investigator that he could access the steering shaft coupler from the driver's side fender well. According to the fire fighter/mechanic, this process required him to unlock the steering wheel, enabling him to line up the roll pin on the coupler, so that it could then be driven out and the coupler and roll pin replaced. The fire fighter/mechanic stated that he placed the

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brush truck in low gear to prevent it from accidental movement, a common practice for him. He did not set the parking brake or place wheel chocks under any of the four wheels on the brush truck. He then turned the ignition key to accessory, which unlocked the steering wheel, enabling him to rotate the steering wheel to a position he thought would allow access to the roll pin and coupler. He exited the vehicle and looked through the fender well and noticed that he had over rotated the steering wheel. He then opened the driver's side door, reached around the steering wheel and turned the ignition key again to unlock the steering wheel so that he could rotate the steering wheel in the opposite direction. *Note: The fire fighter/mechanic did not enter the vehicle while turning the ignition key this time.* Around the same time, the victim and the fire fighter were walking alongside the passenger side before passing in front of the brush truck. The fire fighter/mechanic stated that the brush truck started to lunge forward as if it was beginning to start. *Note: The fire fighter/mechanic was unaware that the victim and the fire fighter were passing in front of the brush truck.* The fire fighter/mechanic immediately jumped into the driver's seat putting both his feet on what he thought was the brake pedal. The truck continued to move forward striking the victim and the fire fighter. The victim went to his knees, and the fire fighter stated he was pushed against construction materials that had been stored against the wall in front of the truck. The truck then rolled backwards releasing the fire fighter. While the truck rolled backwards, the fire fighter/mechanic looked down at his feet and realized that both his feet were pressing down on the clutch pedal. Thinking his left foot would still be on the clutch pedal, he then started to move his right foot from the clutch pedal onto the brake pedal. While doing so, his left foot came off the clutch pedal prior to his right foot depressing the brake pedal. With the clutch engaged, the truck lunged forward again striking the victim again and pinning him against the construction materials. The fire fighter/mechanic then stated that the brush truck stopped all movement.

The local sheriff's office investigated the incident immediately after it occurred. Their report stated that the fire fighter/mechanic was possibly in a frantic state of mind when attempting to stop the vehicle from moving forward. The report stated that the clutch pedal may have mistakenly been depressed and/or released in lieu of the brake pedal. Sheriff's office photos showed skid marks on the bay floor where the brush truck was sitting following the incident. The sheriff's office report did not state whether these skid marks belonged to the brush truck or not. No charges were filed against the fire fighter/mechanic.

The fire department returned the brush truck to the IDNR prior to NIOSH's investigation, but it was made available for NIOSH to inspect at the IDNR surplus lot. The NIOSH investigator, a compliance officer with IOSHA, and a representative with IDNR took measurements of the brush truck and inspected it for operability. The clutch pedal measured 3<sup>5</sup>/<sub>8</sub> inches in length and 2<sup>3</sup>/<sub>4</sub> inches in height, the horizontal brake pedal measured 3<sup>5</sup>/<sub>8</sub> inches in length and 2<sup>3</sup>/<sub>4</sub> inches in height, the vertical accelerator pedal measured 2<sup>1</sup>/<sub>4</sub> inches wide and 5<sup>1</sup>/<sub>8</sub> inches in height. The clutch and brake pedals were placed 3<sup>3</sup>/<sub>8</sub> inches apart. The brush truck was 76 inches wide, 54 inches in height, and 216 inches in length.

The brush truck had a 4-speed manual transmission with one reverse gear. The NIOSH investigator noted that it was possible to start the truck in neutral without depressing the clutch pedal. The brush truck would sit and idle until the vehicle was placed into gear and the clutch pedal was engaged. Also, the truck could be started in gear without depressing the clutch pedal. *Note: The fire chief, fire*

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*fighter/mechanic, and the fire fighter with the victim at the time of the incident were all aware that this brush truck was capable of being started without depressing the clutch pedal. They remarked that some of their past personal vehicles with manual transmissions operated in the same way. The NIOSH investigator also noted that if the brush truck was left in gear and the brake pedal was not depressed when starting the engine, then the brush truck would quickly lunge forward in the gear it was in.*

Many modern vehicles that have a manual transmission will not start unless the clutch pedal is depressed. A safety device known as a clutch pedal interlock switch, or clutch safety switch, prevents a vehicle with a manual transmission from starting without the clutch pedal being depressed. This is especially important if the vehicle is left in gear prior to starting. Without the device, the vehicle could lunge forward or backward if left in gear and started. There is no regulation requiring this device to be installed on manual transmission-equipped vehicles, but automakers have installed them as an additional safety measure. The NIOSH investigator was unable to identify a date as to when these devices were voluntarily placed on vehicles by automakers or which automakers have done so.

Upon examination, the NIOSH investigator did not see a clutch pedal interlock switch on the brush truck. Also, there was no obvious indication that one had been placed on the brush truck and then tampered with. The NIOSH investigator believes this vehicle was manufactured without this safety device.

### **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 fatality:

- *Vehicle not blocked from inadvertent movement*
- *Vehicle transmission in gear during maintenance*
- *Vehicle not equipped with clutch pedal interlock*
- *Unsafe work practices.*

### **Cause of Death**

According to the death certificate, the coroner listed the victim's cause of death as due to blunt force trauma.

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### **Recommendations**

***Recommendation #1: Fire departments should ensure steps are taken to block vehicles undergoing maintenance against inadvertent movement (e.g., setting the parking brake, wheel chocks, or disconnection of battery).***

Discussion: Maintenance work on vehicles requires individuals to work on different components, within tight places, and in close proximity to the vehicle increasing the risk of injury from unexpected vehicle movement. Setting a properly adjusted parking brake will provide an added measure of safety to the work environment. In addition to setting the parking brake, other blocking devices, such as wheel chocks, should be used for redundant protection. Also, the simple task of disconnecting a vehicle's battery, where applicable, will prevent against inadvertent starting of vehicles, which is what occurred in this incident. NFPA 1911 *Standard for Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Apparatus*, section 4.4.8 states "Proper methods shall be utilized to lift, support, secure, and stabilize as appropriate, the fire apparatus undergoing maintenance."<sup>3</sup>

A vehicle's parking brake, also known as an emergency brake, is a secondary braking device installed on all types of vehicles. In all cases, the parking brake has to be manually set by the vehicle's operator. For an automatic transmission-equipped vehicle, the parking pawl locks the transmission, keeping the vehicle from moving after the automatic transmission is placed into "park," but this parking pawl can wear out or break, allowing the vehicle to suddenly move or roll, especially when on steep road grades. The same is true for manual transmissions when the vehicle is left in gear, but when not left in gear, the vehicle's wheels are not locked in place so the parking brake must be set.

Placing a manual transmission-equipped vehicle into 1<sup>st</sup> gear, or low gear, serves a similar function as placing an automatic transmission-equipped vehicle into "park." However, as evidenced by the circumstances of this incident, when the starting circuit of a manual transmission-equipped vehicle is energized, the vehicle can move forward if the clutch is not disengaged or the starting circuit is not interrupted by a clutch interlock switch. Also, depending upon the individual vehicle's characteristics and grade steepness, parking a manual transmission-equipped vehicle in gear may not prevent the vehicle from drifting downgrade. Taking the time to set the parking brake, disconnect the battery, and/or use wheel chocks can decrease the chances of a vehicle unintentionally moving.

During this incident, the parking brake and wheel chocks were not used, and the battery was still connected, while maintenance was being performed on the truck. The fire fighter/mechanic believed the floor to be relatively level and placed the manual transmission in a low gear to prevent the vehicle from accidentally moving. The vehicle unintentionally lunged forward after the starting circuit was energized and the vehicle started. A set parking brake and the use of wheel chocks may have prevented the vehicle from lunging forward. Since the incident, the fire department has mandated that a vehicle's parking brake and wheel chocks be used when vehicles are being worked on.

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***Recommendation #2: Fire departments should develop, implement, and enforce policies and procedures outlining safe work practices within a vehicle maintenance facility.***

Discussion: It is important for an employer to provide a safe workplace for their employees at all times, being sure to keep it free of safety and health hazards. Safety practices can include good housekeeping, clear walking paths, safe and adequate material storage, and identifying work areas for authorized personnel. The absence of any one of these can lead to an illness, injury, or death in the workplace.

A vehicle maintenance facility is an example of a workplace where the safety and health of employees needs to be overseen at all times. This type of workplace can expose employees to many types of chemicals, require personal protective equipment to be used or worn, or require employees to work with varying types of tools, and heavy equipment. Only authorized employees should be in this type of environment during operating hours. Allowing nonauthorized employees or civilians to enter this type of work environment could result in an injury or death.

This fire department had their own maintenance building where their apparatus could obtain preventive maintenance. Since the flood, all their apparatus were stored within the building as well as many types of equipment. The equipment was neatly organized and out of the walk-ways, but space was limited for personnel to walk about the building. The fire department allowed anyone to walk within the bay when necessary, and did not have a policy or procedure in place dictating who was authorized to be in the building when vehicles were being worked on. Designated areas or walking paths for nonauthorized personnel were not established either.

Due to the potential exposure to such items as hazardous chemicals, open floors, and operating machines, vehicle maintenance facilities, in conjunction with their insurance companies, have prohibited nonauthorized employees or civilians from entering a work area without an escort and/or proper personal protective equipment. There are many OSHA general industry standards within CFR 1910 that can be applied to a vehicle maintenance facility. NFPA 1500 *Standard on Fire Department Occupational Safety and Health Program*, section 6.1.1, states “The fire department shall consider safety and health as primary concerns in the specification, design, construction, acquisition, operation, maintenance, inspection, and repair of all fire department apparatus.”<sup>4</sup>

Since the incident, the fire department has mandated that only authorized personnel performing work on a vehicle can be within the vehicle maintenance building.

***Recommendation #3: Fire departments should develop, implement, and enforce a comprehensive preventive maintenance program.***

Discussion: Developing policies and procedures on preventive maintenance can assist a fire department in performing scheduled maintenance, outsourcing work to be performed, monitoring maintenance conducted, and inspecting completed maintenance. Performing preventive maintenance on a vehicle can be time consuming and redundant at times, but the overall goal is to lengthen the life

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of a vehicle and diagnose potential problems before they become costly to repair, take a vehicle out-of-service, or pose a safety risk to the operator and/or passenger(s).

NFPA 1911 *Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus* states that all fire apparatus that could be placed in service for emergency response should be inspected, maintained, tested, and retired as required to keep them in safe operating condition and ready for response at all times.<sup>3</sup> Maintenance schedules should be established and recorded as an integral part of a well-planned maintenance program.<sup>3</sup> The maintenance program should include daily, weekly, monthly, yearly, and periodic maintenance service checks. The maintenance checks should be based on the manufacturer's service manuals, the tire manufacturer's recommendations, and operating conditions. Safety and operational readiness need to be the highest priority when inspecting and maintaining apparatus.

NFPA 1911 recommends that information from several sources, including the manufacturer's manuals and NFPA standards, be used to determine fire apparatus preventive maintenance schedules and safe practices (e.g., preventing inadvertent movement, disconnecting the vehicle's battery, etc.). As the necessary maintenance tasks are identified, each should be assigned a schedule based on months, years, apparatus hours, or other appropriate time frame that will determine when it is to be performed and by whom. Once the tasks have been performed, frequency determined, and individuals identified to do the work, the preventive maintenance program can be organized into a series of schedules, check sheets, record sheets, and other documentation that will ensure correct implementation of the program.

NFPA 1500 *Standard on Fire Department Occupational Safety and Health Program* states that the fire department shall establish a list of major defects to be utilized to evaluate when a vehicle shall be declared unsafe.<sup>4</sup> NFPA 1911 specifically addresses criteria for removing an apparatus from service. Once a vehicle is removed from service, the fire department's designated officer should determine who is capable of performing the work, the fire department vehicle maintenance division or a local vendor. A policy addressing preventive maintenance or repair work should be established to better assist the fire department in making this decision.

***Recommendation #4: Fire departments should ensure that fire department vehicle operators and vehicle maintenance personnel are aware of available manufacturer pre-market and aftermarket installed safety devices on apparatus.***

Discussion: During this incident, the fire chief, fire fighter/mechanic, and the fire fighter were all aware that this brush truck was capable of being started without depressing the clutch pedal. They remarked that some of their past personal vehicles with manual transmissions operated in the same way. Currently, there is no U.S. vehicle standard or requirement for the addition of interlocks to manual transmissions to prevent inadvertent vehicle movement if the starting circuit is energized. Federal Motor Vehicle Safety Standard 49 CFR 571.102 requires similar devices for automatic

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transmission-equipped vehicles<sup>a</sup> and in recent years, U.S. auto manufacturers have begun to voluntarily add them to manual transmission-equipped vehicles. A clutch pedal interlock switch may provide redundant protection against injury from unexpected vehicle movement as evidenced by this incident.

As stated above, the voluntary addition of this device may lead fire fighters to conclude that all manual transmission-equipped vehicles include this device as a safety feature and that starting a vehicle without depressing the clutch is a safe practice. Following a safe procedure in which the operator is fully seated at the controls with the clutch pedal of a manual transmission-equipped vehicle depressed and the brake pedal engaged can protect against inadvertent vehicle motion during start up.

Additionally, authorities having jurisdiction (e.g., FEPP, state surplus organizations, and individual state foresters) should:

***Recommendation #5: Consider developing and implementing a nationwide policy/procedure for excess/surplus vehicles that assists with identifying: potential safety concerns, outdated vehicle safety controls, and vehicle modifications, so that ample warning, guidance, and information are provided to fire departments before they take possession of such vehicles and place them in service.***

Discussion: Since 1956, the Federal Excess Personal Property (FEPP)<sup>1</sup> program has loaned federal property to individual state foresters. The FEPP is overseen by the USDA Forest Service and all property must be agreed upon by the USDA Forest Service and state foresters prior to the property being issued to the states. Roughly 70% of this property is then sub loaned for fire department (primarily volunteer) use. This property has included such items as trucks (e.g., military fuel tankers, cargo), fire hose, and motor oil. In most cases, fire departments obtain a vehicle of some type. The USDA Forest Service will retain a vehicle's title while the vehicle is on loan. The fire department is then responsible to convert the vehicle into a fire apparatus and then maintain it according to individual state requirements for emergency vehicles.

Many of the sub loaned vehicles are in need of repair, have missing vehicle safety equipment, were never designed or used for fire fighting,<sup>5</sup> or were modified by other fire departments and returned to the respective state forester for circulation. There is currently no national policy or procedure to assist the state foresters in identifying potential safety concerns, such as mechanical or operational (e.g., fluid leak(s) and steering), missing or outdated vehicle safety devices, or user modifications. The vehicle is loaned to individual state foresters when a need in their area arises for such a vehicle. A fire department would then have an opportunity to sub loan the vehicle from the state forester. In most cases, due to staffing, funding, and the amount of property possessed by an individual state forester,

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<sup>a</sup> Title 49 Code of Federal Regulations Part 571, Standard No. 102 – Transmission Shift Lever Sequence, Starter Interlock, and Transmission Braking Effect – Passenger Cars, Multipurpose Passenger Vehicles, Trucks, and Buses (Effective 1-1-68). This standard specifies the requirements for the transmission shift lever sequence, a starter interlock, and for a braking effect of automatic transmissions, to reduce the likelihood of shifting errors, starter engagement with vehicle in drive position, and to provide supplemental braking at speeds below 40 km/h (25 mph).

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vehicles cannot receive a thorough safety and operational inspection between uses. The state forester may have no idea what is potentially wrong on a vehicle or what modifications were made and if those modifications were done correctly. Vehicles are sub loaned to the fire department on an “as is” basis. Individual state foresters recommend that vehicles be towed from their vehicle lots until appropriate insurance can be obtained and the vehicle is properly inspected for operation. Sometimes the vehicles are driven off the state foresters’ lots in the “as is” condition. These vehicles may have military grade/non-highway tires, mechanical deficiencies, or may not be equipped with seat belts.<sup>5</sup>

It is vital to supply an entity, such as the fire department, with as much information on a vehicle as possible, especially if there is known safety or operational deficiencies. Guidance should also be provided in the form of manufacturer’s manuals (when available), proper operation of military vehicles, where to obtain funding for needed modifications and safety improvements, or information on how to appropriately modify the vehicle.

### **References**

1. Federal Excess Personal Property Program. [<http://www.fs.fed.us/fire/partners/fepp/>]. Date accessed: February 2011.
2. Indiana Department of Natural Resources. [<http://www.in.gov/dnr/forestry/2874.htm>]. Date accessed: February 2011.
3. NFPA [2007]. NFPA 1911 Standard for the inspection, maintenance, testing, and retirement of in-service automotive fire apparatus. 2007 ed. Quincy, MA: National Fire Protection Association.
4. NFPA [2007]. NFPA 1500 Standard on fire department occupational safety and health program. 2007 ed. Quincy, MA: National Fire Protection Association.
5. NIOSH [2010]. Preventing death and injuries of fire fighters operating modified excess/surplus vehicles. Cincinnati, OH: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health (NIOSH) Publication No. 2011-125.

### **Investigator Information**

This incident was investigated by Stacy C. Wertman, Safety and Occupational Health Specialist, with the NIOSH Fire Fighter Fatality Investigation and Prevention Program, Surveillance and Field Investigations Branch, Division of Safety Research, located in Morgantown, WV. An expert technical review was provided by Stephen Wilde, a fire apparatus maintenance expert with Certified Fleet Service of Illinois. Technical reviews were also provided by the National Fire Protection Association, Public Fire Protection Division; the National Highway Traffic and Safety Administration, a representative from the USDA Forest Service’s FEPP program, and representatives from IOSHA.

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### **Additional Information**

Volunteer Fire Assistance Program:

<http://www.fs.fed.us/fire/partners/vfa/>

Roscommon Equipment Center:

<http://www.roscommonequipmentcenter.com/>

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### Volunteer Fire Captain Dies from Injuries Received after a Brush Truck Undergoing Maintenance Strikes and Pins Him Against a Wall—Indiana

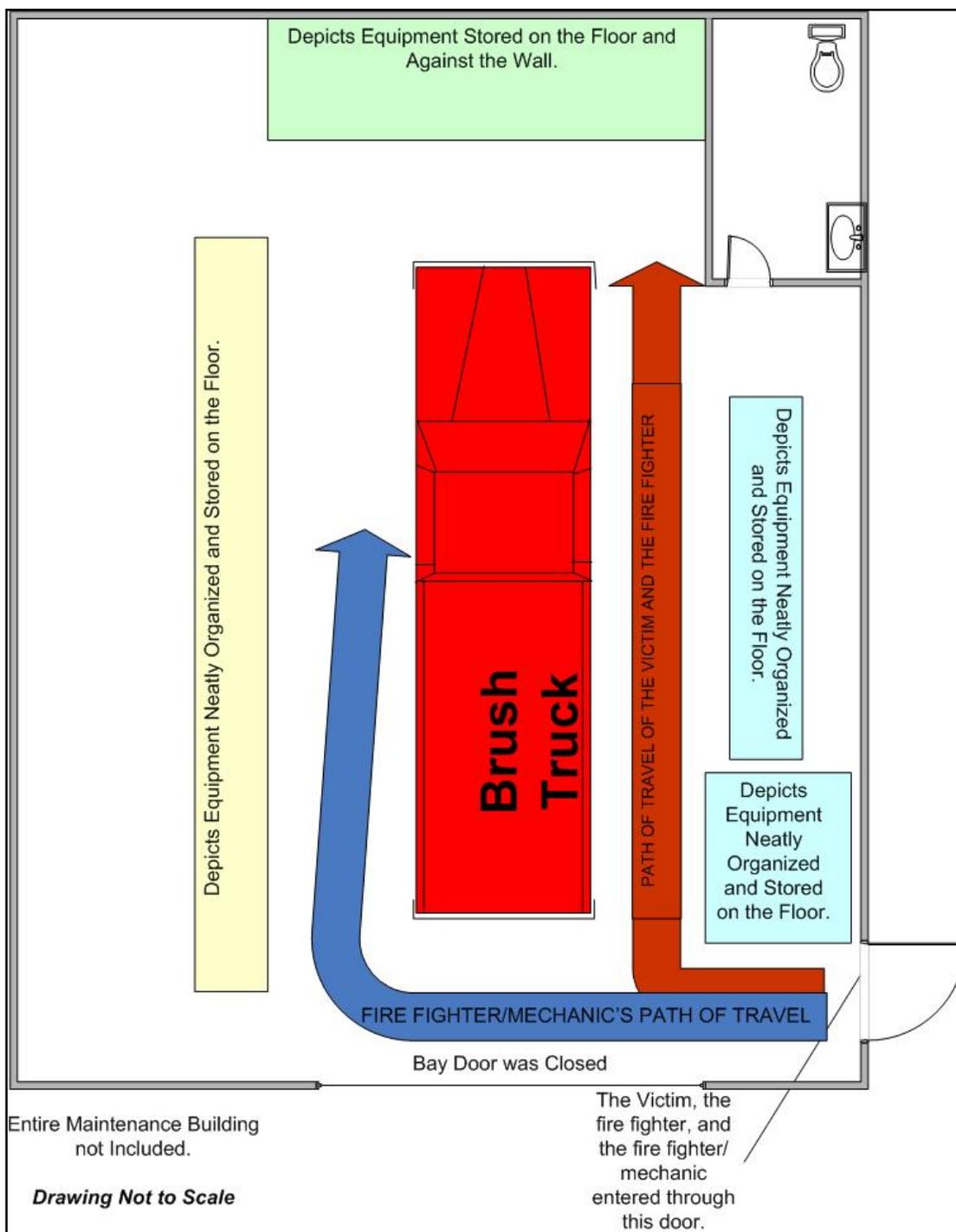


Diagram. Layout of incident scene.