

Preventing Emergency Vehicle Accidents in the Philadelphia Fire Department

EXECUTIVE DEVELOPMENT

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## **ABSTRACT**

The Philadelphia Fire Department (PFD) was confronted with an increasing number of vehicle crashes during daily operations. The purpose of this project was to identify methods to prevent future accidents. Historical research methodologies were utilized to answer research questions that looked: at national driver training standards, other measures taken to prevent crashes, at how current PFD policies compared nationally, to determine the common causes of the accidents. The procedures included a questionnaire, interviews, and a literature review. The results identified areas of weakness in the training and operational policies of the PFD. It is recommended that the PFD revise the driver training procedures to meet or exceed the national standards and that more categories of reduced speed responses be implemented.

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## INTRODUCTION

The Philadelphia Fire Department (PFD) is experiencing a significant number of apparatus accidents in their daily operations, which can result in injury and death to citizens and firefighters along with a reduction in service to the community. In the past five years, 2000 through 2004, the annual occurrence of vehicular accidents has continued to escalate culminating in the highest number of accidents ever recorded in the PFD in one year (2004) of 298 ( J. Tetlow, personal communication, March 31, 2005). While no firefighter or paramedic fatalities resulted from these apparatus accidents during the time period being reviewed the number of injuries has continued to skyrocket and several careers ended as a result of the crashes. Karter & Molis (2004) report that in 2003 an estimated 15,900 collisions involving fire department emergency vehicles responding to or returning from emergencies occurred nationwide. This was the highest number of accidents since 1990 when the National Fire Protection Association (NFPA) began tracking them. This high rate of vehicular accidents in 2003 resulted in the highest number of firefighter fatalities (34) due to crashes since 1990.

The PFD represents a significant portion of this staggering national trend of increased emergency response vehicular accident involvement. The resulting reduced availability of front line apparatus also deprives the citizens of having the highest quality equipment available when they need it most. This loss is difficult to quantify but is easily discernible to the firefighters and paramedics delivering the emergency services. All of the negative consequences that are associated with this spiraling number of crashes and the resulting damage is forcing the PFD to take a critical look at this emerging issue.

The purpose of this research project is to identify the cause(s) of the accidents to eliminate preventable accidents. Descriptive research methodologies were utilized to answer the

following research questions:

1. What are the national standards for training emergency vehicle operators?
2. What policies and procedures do other fire departments utilize to prevent apparatus accidents?
3. What PFD emergency vehicle operator programs and policies are currently in place to prevent apparatus accidents?
4. How do these PFD programs and policies compare to the national standard?
5. What are the common causes (if any) linking the PFD's apparatus accidents?

### **BACKGROUND AND SIGNIFICANCE**

The City of Philadelphia, located in southeastern Pennsylvania has a population of approximately 1.5 million people. The city measures 135 square miles and is dominated by a significant number of residential neighborhoods. The city also contains the Port of Philadelphia, over 500 commercial and residential high-rise buildings, Philadelphia International Airport and a substantial urban parks system (United States-U.S. Cities, 2005). To service the needs of this diverse population the PFD is a multi-risk/life safety organization providing fire and emergency medical services which includes patient transport to medical facilities.

The PFD operates 90 Basic Life Support (BLS) engine and ladder companies, staffed by firefighters with at least one Emergency Medical Technician (EMT) and 40 Advanced Life Support (ALS) medic units, staffed by paramedics. These units respond from 63 fire stations dispersed throughout the city. In 2004 the PFD responded to 241,919 incidents of varying types.

The vast majority of these responses were for emergency medical assignments. In fact the Emergency Medical Services (EMS) division accounted for 190,109 of the responses during 2004 (Williams, 2005). This substantially higher number of EMS responses includes the "First

Responder” EMS assignments performed by firefighting forces. In 2004 the PFD was involved in a vehicular accident in 3.4% of the emergency assignments dispatched. This phenomenon is approaching the rate of an accident a day should this trend continue to escalate.

In 2000 there were 194 accidents, in 2001 there were 198 accidents, in 2002 there were 253 accidents and in 2003 there were 284 vehicular accidents (J. Tetlow, personal communication, May 10, 2005). Each year the accident figures rise and the losses mount. The impact of vehicular accidents is continually felt by the personnel and the administration of the PFD. The impact is also felt by the injured civilians and their families as well as all taxpayers who underwrite the settlements that arise from the numerous claims that are filed as a result of these vehicular accidents. There are PFD personnel who have been assigned to long term administrative duties as a result of vehicular accidents; others have been forced into early retirement due to injuries resulting from vehicular accidents. How these situations impact upon the mental health of the affected individuals has not been a part of any official study conducted by the department. However, the impact on the mental health of PFD personnel is real and quite apparent to those assigned to the Employees Assistance Program (EAP) who help affected individuals pull their lives back together (K. Fowler, personal communication, June 10, 2005).

According to Risk Management, the branch of government responsible for investigating and settling claims against the City of Philadelphia, PFD liability claims amounted to more than one million dollars for the fiscal years 2000 through 2003. The litigation surrounding PFD accidents involves the most mundane of events to the most horrific; however each occurrence has associated financial implications (K. Banks, personal communication, July 6, 2005).

During a time of reduced revenues and increasing expenses in the area of public safety, every PFD budgeted dollar not spent directly on public safety diminishes the level of service

provided. While it is practically impossible to measure the loss of life and injury toll in economic terms, that in no way diminishes its existence or its significance.

The PFD is faced with significant budget reductions further eroding the department's capacity to repair or replace the damaged apparatus. Additionally, settling the numerous lawsuits continues to place a drain on city coffers. In fiscal 2003 there were 61 cases of third party claims related to crashes involving a PFD vehicle. During this same period there were 22 cases of employee injuries resulting from crashes involving a PFD vehicle. For fiscal 2004, only 6 months of data are available and the respective numbers are 24 third party claims and 2 cases of employee injury (K. Banks, personal communication, July 27, 2005).

This reduced availability of funding also manifests itself in the deterioration of front line apparatus and equipment and reduced maintenance to the fire station infrastructure. Should the level of vehicular accidents continue to spiral upward, the impact on the PFD could be expected to become even more onerous. It is for all these reasons that the PFD must immediately initiate an introspective organizational investigation to determine what measures can be undertaken to prevent future vehicular accidents.

This research project focuses on preventing vehicular accidents within the PFD and is relevant to the National Fire Academy's (NFA) Executive Development (ED) course. It meets this criteria by using the tenets of Unit 7: Organizational Culture and Change, to assess the conditions that exist in the PFD that allow these high numbers of accidents to occur and also how an executive fire officer "should be an agent of cultural organizational change" (USFA-ED, 2004, p. 7-1). This research project also relates to one of the United States Fire Administration's (USFA) operational objectives, specifically, responding "appropriately in a timely manner to emerging issues" (USFA-EFOP, 2003, p. II-2). Fire department vehicular accidents continue to

escalate nationwide and many departments and their respective governments are attempting to find realistic means of preventing them. While this Applied Research Project (ARP) focuses squarely on the problem that exists within the PFD, it is also relevant on a national scale because of the impact vehicular accidents are having on the fire service in general. This research will identify policies and procedures promulgated on a national level to find data that may suggest changes that the PFD can implement.

### **LITERATURE REVIEW**

A literature review was conducted to survey previously published material regarding the involvement of fire department apparatus in vehicular collisions and to correlate these writings as they relate to this issue. Using descriptive research methods this project was initiated at the National Fire Academy's Learning Resource Center and was supplemented by the PFD Fire Academy Library. Additionally, a further literature review was conducted by using search engines to explore the internet for writings pertinent to this topic including causal factors and accident reduction programs. Academic research, government publications and related trade journals were reviewed to assess their suitability for inclusion in this ARP.

Fire department vehicular accidents have long been a major cause of death and injury to firefighters. The USFA (2004) report, "Firefighter Fatalities in the United States in 2003" indicates that 36 firefighters died in vehicular related incidents in 2003. The "U.S. Firefighter Injuries-2003" report, credits the year 2003 with an estimated 15,900 fire department collisions nationwide where emergency personnel "were responding to or returning from incidents" (Karter and Mollis, 2004, p. 9). This number represented the highest total since fire department apparatus accidents began to be tracked in 1990. These accidents resulted in 850 firefighter injuries. The number of accidents has continued to climb steadily from 1990 through 2003. The total number

of known accidents during that 14-year period is 196,525 with each accident representing an undetermined financial impact as well as a human toll on the various fire departments.

In the USFA (2004) report “Firefighter Fatalities in the United States in 2003,” the data indicates that there were a total of 152 firefighter deaths as a result of apparatus accidents from 1994 through 2003 an average of more than 15 per year. These numbers support the premise that while it is accepted that firefighters face enormous challenges on the fire scene, “what’s often overlooked are the dangers they face en route” (Lowry, 2004, p.18). While dollar figures are not available on a national scale it is a foregone conclusion that each of these accidents resulting in death and injury have associated financial costs. Jakubowski, (2004) writes that safe driving must take on an added importance if there is to be a reduction in the level of significant accidents involving fire department vehicles. He goes on to say “driving to and from calls is one of the most dangerous challenges firefighters face”(p. 40).

With a clear understanding that it is imperative to take actions to prevent these devastating accidents from occurring, fire service professionals are collectively seeking an answer. Smith, (2004) writes, “It’s the rare apparatus accident that could not have been prevented” (p. 28). This belief is founded in the idea that safe driving protocols properly supported with appropriate driver training can and will make a difference. It is aptly pointed out by Smith that, “there are too many competent and professional apparatus drivers who come to work, do their jobs and go home to allow a few “cowboys” to paint the entire cadre with the same brush” (p.28). Wilbur (2005) in the article “The Aftermath of a Fatal Apparatus Wreck: Patti’s Story” provides insight into the pain and suffering that the civilians involved in these devastating accidents with fire department vehicles endure. The anguish that those outside of the

fire service suffer is as important and painful as the personal suffering that fire service personnel must overcome after each of these incidents.

The National Institute for Occupational Safety and Health (NIOSH) (1998) report “Preventing Worker Injuries and Deaths from Traffic-Related Motor Vehicle Crashes” explicitly states the following:

Government and public safety organizations have long studied ways to prevent injuries from motor vehicle crashes. But researchers have paid little attention to preventing work-related motor vehicle crashes. Prevention efforts must be emphasized to reduce the number and rate of occupational fatalities involving motor vehicles. (p.13)

In, *Speaking of Fire*, (2004) it was announced that a cooperative agreement was inked between the USFA, USDOT and IFSTA regarding traffic incident management research. This joint effort is being driven by the United States Fire Administration’s (USFA) and the National Fallen Firefighters Foundation’s (NFFF) joint commitment to develop initiatives that focus on reducing firefighter deaths. Reducing the number of vehicle-related deaths is one of the major undertakings of this program. This initiative is a follow up to the previously released USFA report: “Safe Operation of Fire Tankers” (2003).

In his book, *Safety and Survival on the Fireground*, Dunn (1992) aptly writes, “firefighters have the right to know that we [they] are responsible for our [their] own safety and survival when responding and returning...” and must accept the realization “that responding to and returning from alarms is just as dangerous as the hazards faced on the fireground itself” (p. 39). Wilbur (2004) in the article titled “Ignorance” says “As a firefighter you are in charge of your own personal safety.” Yet, despite this recognition regarding firefighter safety he reports that in 2003 “for the first time, more firefighters died in vehicle accidents that were killed

fighting fires” (p.145). Thirty-three firefighter deaths in 2003 can be attributed to vehicular accidents while twenty-nine deaths resulted from fighting fires.

Clark (2004) says that overall data reveals that “the number two cause of firefighter line-of duty deaths is vehicle crashes” (p.97). The many authorities who have written on this subject seem to agree on several points. Primarily, they collectively indicate that the seriousness of this aspect of firefighter safety can no longer be ignored and secondarily that the responsibility for changing these statistics lie with the people in the fire service. The fact that the documentation has been collected over a period of years and several initiatives have been undertaken by many of the various agencies charged with promulgating safety programs within the fire service underscores the importance of safely operating emergency vehicles. “The safety of the fire service and firefighters is not child’s play” (p.104).

There are extensive writings documenting the problem of fire department vehicles involved in crashes with civilian vehicles and fixed objects, all of which place the situations in context. There are also many published works that describe methods to facilitate the reduction and prevention of emergency vehicle accidents. Dolan and Pollock (2003) indicate that “all the safety programs in the world won’t work unless those responsible for a particular task or risk control procedure do what they are supposed to do” (p. 99). The safety experts in this area seem to agree that the responsibility for safe vehicle operation lies with all those within the fire service. Ensuring safety becomes a matter of identifying exactly what each individual is responsible to do within the system and then helping them fulfill those responsibilities. The idea that safety is something that can become a way of life for fire departments may seem contrary to the traditions that inculcate the fire service culture. Shelly and Cole (2004) advocate that the fire service needs to “develop a culture of safety” to prevent line of duty deaths and injuries from

vehicular accidents. They indicate that the development of this culture must begin by adopting some new initiatives. The success of this culture change will hinge heavily on the ability to “define and advocate the need for cultural change within the fire service relating to safety, incorporating leadership, management, supervision, accountability, and personal responsibility” (p.114). These categories are excellent qualities upon which to build a system designed to reduce fire department apparatus accidents.

Having reviewed the literature regarding the documenting of the problem of fire apparatus accidents this project also reviewed the findings and suggestions that surfaced during this research. Many of the experts and researchers not only recognize the problem but have published works detailing accident prevention methodologies that may be incorporated into the many departments that comprise the fire service nationally. Wilbur (2004) in a column titled “Cause for Optimism At Fire Safety Summit,” writes “there is an urgent need for a cultural change, whereby firefighter fatalities and injuries are never accepted as an inevitability...” (p. 29). The recognition by many leaders in the fire service of this urgency does indeed create an aura of optimism around this issue. The summit attendees were able to coalesce around the idea that there are certainly enough rules and standards in existence to prevent crashes, but the statistics indicate that they are not being enforced or upheld. NIOSH released an informational update urging employers nationally to assess their past experiences and initiate appropriate measures of enforcement to prevent traffic related deaths and injuries among their employees. Then acting Centers for Disease Control (CDC) Director Claire V. Broome went on to say, “Seat belts, driver training, and similar precautions have become integral to public safety, saving thousands of lives every year” (NIOSH, 1998, p.1). These areas of improving safety for those

operating emergency vehicles are all behavioral areas that still require enforcement seven years later.

Dallessandro (2005) lends further credence to the idea that it is not necessary to develop new rules and standards in his article “Creating an Apparatus Driver Response SOP.” He urges those who are developing departmental SOP’s “Don’t reinvent the wheel” (p. 123), rather peruse the available research that has been compiled over the years and consult applicable standards such as NFPA 1002, *Fire Apparatus Driver/Operator Professional Qualifications*. This standard and others are based upon the extensive research that has been collected and should be an integral component of any department’s SOP’s. As many have espoused, having rules and standards might cause people to feel secure but it is through enforcement of the rules that the safety tenets can be successful. While rules and standards are presented to employees as vital and important, “without enforcement, it is hard to identify if there has been a corresponding change in attitude or workplace culture” (Gaspers, 2003, p.53).

Wilbur (2004) writes that “an emergency vehicle is four times more likely to be involved in an accident with lights and sirens activated and 10 times more likely to hurt or kill someone, perhaps even yourself, than when responding “on the quiet” (p. 152). This notion is borne out by the results of Fire Service Research Institute (FSRI) report of an analysis it conducted in Missouri documenting accidents involving emergency vehicles for the years 1998 through 2003. The study revealed that two thirds of fire vehicle accidents occur during the day even though warning devices are used. Also nearly one third of the civilian drivers said they did not see the fire vehicle; “no one reported being blinded by the warning lights” (News in Brief, 2005, para. 3).

The USFA (2004) publication *Emergency Vehicle Safety Initiative* points out that, “Responses that are true emergencies [both fire and EMS] are limited” (p. 41). Despite this fact departments traditionally continue to respond to the majority of responses with lights and siren. The willingness to accept the risk of increased fire department vehicular accidents may be influenced by departments also attempting to be in compliance with 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*. NFPA 1710 holds career fire departments to the four minute initial response requirement and the eight minute full response requirement. This requirement continues despite the fact that the risks for vehicular crashes resulting in injuries and fatalities to both emergency responders civilians are increased when “responding in the emergency mode” (p. 41). Some departments have adopted a response system that utilizes priority dispatch for all fire and EMS calls. Still others have adopted the St. Louis Fire Department’s (SLFD) “On-The-Quiet” response policy or some variation of this reduced speed and corresponding reduced risk response. The SLFD’s ability to comply with NFPA 1710 must be addressed in another forum.

*Pennsylvania Emergency Service Laws* clearly spells out the responsibilities of those who operate fire department vehicles responding to emergency calls in the State of Pennsylvania. While PFD personnel are exempted from the requirement of holding a commercial driver’s license to drive fire apparatus, they are not exempted from exercising “due regard for the safety of all persons” (Gobrecht, 2005, p. 166). This legal liability and moral obligation should be the overriding factor when departments are determining how they intend to manage the risks associated with fire department emergency response procedures. This author was challenged to thoroughly scrutinize several institutionalized beliefs as a result of the literature reviewed for this

ARP. Additionally, this project afforded the author an opportunity to look at the safe operation of emergency vehicles from a more informed perspective as a result of the material that was covered during this research initiative.

## **PROCEDURES**

The research methodology utilized for this ARP was descriptive. The procedures used included personal interviews, telephonic interviews, a literature review and a review of the Philadelphia Fire Department's driving policies and driver training program. A questionnaire was also utilized to determine which other fire department's driving policies and procedures would be reviewed and assessed. All of the above listed items were reviewed and analyzed to ascertain their relativity to this ARP.

### **Questionnaire form**

A questionnaire form was developed and circulated among fire department personnel attending the Dr. Carl Holmes Executive Development Institute at Dillard University in May of 2005. The group of students that participated was Module Two students who represented various fire departments. The questionnaire was designed to serve several purposes; two were primary. First, the questionnaire was distributed to participants of all ranks to obtain information regarding attitudes to this problem from diverse perspectives of the rank structure within the fire service, not just those who drive fire department vehicles. Secondly, the questionnaire served the purpose of identifying other cities that may have developed solutions to the problem of fire department vehicular accidents. This method was chosen over a mail or telephone questionnaire because a high rate of return could be assured and individuals were available for face to face follow up questioning to assess the suitability of utilizing that specific department for further analysis.

Questionnaires were distributed on May 23, 2005, the first day of the week long Module and they were collected on May 26, 2005, the fourth day of classroom activities. This early collection permitted time to peruse the returned questionnaires and ask follow up questions. There were 57 students in the group and 56 returned questionnaires. Twenty-nine of the returned questionnaires were viewed as potentially relevant to this ARP because they represented cities of similar size or demographics or they were instituting an interesting training initiative. Sixteen of the returned questionnaires were deemed to be not relevant to this ARP for various reasons. A copy of the questionnaire and cover letter are included and labeled as Appendix A. Data from the questionnaire was extracted and is included and labeled as Appendix B.

### **Interviews**

A personal interview was conducted with Captain H. Costo (personal communication, March 14, 2005) Safety Officer Philadelphia Fire Department, 5200 Pennypack Street, Philadelphia, Pennsylvania. This interview served the purpose of opening dialogue regarding the incidence of vehicular crashes within the PFD and to gain knowledge regarding the current Driver Training Program and available statistical data regarding the PFD's accident history for the specified time period. Captain Costo provided detailed information regarding the above items and assigned Lieutenant John Tetlow, Safety Office, to follow-up and provide additional detailed information as needed for this ARP. Subsequent interviews were conducted with both individuals and statistical data was obtained from the PFD's Safety Office, Accident and Injury Database. This information is included in the Introduction, Background & Significance and Results sections of this ARP.

A telephonic interview was conducted with Mr. Kendall O. Banks (personal communication, July 27, 2005) City of Philadelphia, Risk Management Division, Acting

Director of Safety and Loss Prevention, City of Philadelphia, 1400 John F. Kennedy Boulevard, Philadelphia, Pennsylvania. The purpose of this interview was to obtain information regarding the financial impact of claims and the subsequent settlements on the City of Philadelphia resulting from PFD vehicular collisions. Mr. Banks was asked pertinent questions to obtain specific outlays regarding the above topic. Mr. Banks provided approximate dollar values based on the available information that was approved for public disclosure. He also provided some data via e-mail at a later date that contained details on the number of claims related to PFD vehicular accidents for the indicated time frames. That information appears in the Introduction and Background & Significance sections of this ARP.

A personal interview was conducted with Fire Service Paramedic (FSP) Kenneth Fowler (personal communication, July 12, 2005) PFD Employee Assistance Program, Director, Philadelphia Fire Department, 611 North 2<sup>nd</sup> Street, Philadelphia, Pennsylvania. The purpose of this interview was to obtain information regarding the emotional and mental impact PFD vehicular accidents have on those individuals involved in crashes who seek counseling and assistance through the EAP. FSP Fowler provided approximate numbers regarding those who had sought counseling through the EAP and as much detailed information as he was permitted to do without violating the confidentiality of any individual. The information that he provided was general in nature and was based upon his experience in counseling and referring PFD members to outside resources for a number of years. This information is included in the Introduction and Background & Significance portion of this ARP.

### **Review of selected fire department's driver training procedures and driving policies**

After reviewing the returned questionnaires a telephonic and e-mail request was made to the 19 fire departments that were deemed to be comparable in size and/or demographics to

Philadelphia to provide copies of their driver training policies and corresponding procedures. Of the 19 departments that were contacted by Lieutenant Darryl Hubbard of the PFD's Research and Planning Unit, 12 departments provided the requested information in a timely enough fashion that permitted them to be reviewed. The purpose of the request was identified as research to assist with conducting a comparison of the PFD's driving and driver training policies and procedures to the policies and procedures of other departments for evaluation.

The Literature Review revealed that a consistent theme was identified by the experts and other researchers of this topic. Specifically, they cited the need for controlled and reduced speed driving while responding to emergencies. The writer's also identified the need for consistent and repeated training. Two fire departments were identified as utilizing these guidelines as catalysts for fire department vehicular accident prevention programs. The Detroit Fire Department (DFD) and the St. Louis Fire Department (SLFD) were selected for analysis and comparison because they were successfully implementing reduced speed responses during diverse circumstances in an attempt to reduce and prevent fire vehicle crashes.

The below listed contacts were responsible for providing the required documentation for review:

- Detroit Fire Department, Captain Beverly Harris, Safety Officer, e-mail format entitled, "*Responding Procedures For All Companies*"
- St. Louis Fire Department, Captain Addington Stewart, Fire Marshal, e-mail format entitled, "*Apparatus Operation, Vehicle Road Operation*"

### **Assumptions and limitations**

The questionnaire utilized in this ARP made several assumptions and similarly had several limitations. The first assumption was that the participants completely understood the

questions. It was further assumed that respondents would answer the questions in a forthright and honest manner. An additional assumption was that the respondents reflected a general attitude regarding fire department apparatus accidents that was representative of the attitude that exists in their respective department. A limitation of the questionnaire was the selective manner in which participants were chosen. All respondents were attending the Dr. Carl Holmes Executive Development Institute as 2<sup>nd</sup> year students.

The process of determining which fire departments would be used for review also made assumptions and posed limitations. The selection criterion was based upon departmental size, demographics and the policies implemented to prevent fire department vehicular accidents. The assumption was that these criteria would identify a sufficient number of departments against which to compare the PFD in a timely manner. Inherent in this assumption is the limitation of not utilizing departments that were more different than more like the PFD. Also, not having access to the accident statistics, or the time to analyze same from the responding departments presented a limitation in this research. This resulted in a lack of comparable crash data. Another limitation was the review of only two fire departments driving policies and procedures, however, due to the time constraints of the Executive Fire Officer Program (EFOP) and the required ARP a narrower review was deemed appropriate by this author. It was further determined that this process would provide enough relevant information and would remain manageable.

This author believes that these assumptions and limitations will have minimal impact on this ARP because the objective was to find ways to prevent future fire department vehicular accidents through operational policies and procedures.

## RESULTS

### **Research Question 1: What are the national standards for training emergency vehicle operators?**

The NFPA 1451, *Standard for a Fire Service Vehicle Operations Training Program* is generally accepted throughout the fire service as representing the minimum requirements that a department's training program should meet. Achieving the objectives of this standard is "intended to help prevent crashes, injuries, and fatalities involving fire service vehicles" (2002, p. 4). This training standard is predicated on the belief that fire vehicle crashes can be prevented through proper training. The training standard defined in NFPA 1451 is exhaustive and thorough. It begins with an administrative policy component and includes a defined training component, an educational section that includes Laws and Liabilities as well as a written procedure requirement for emergency response. That it ends with apparatus maintenance is fitting because the driver/operator is the focus of the training program, not the vehicle.

Individuals who complete an acceptable training program as described in NFPA 1451 should then be capable of meeting the requirements of NFPA 1002, *Standard on Fire Apparatus Driver/Operator Professional Qualifications*. This standard is accepted throughout the fire service as the minimum requirements that individuals who drive fire department vehicles should meet. The NFPA 1002 standard is performance based and provides details of the capabilities individuals should possess to drive various types of fire department apparatus. This standard is based on the concept that individuals who meet these minimum standards will be capable of safely operating the appropriate fire department vehicles (2002).

The International Fire Service Training Association (IFSTA) produces many training manuals that guide the actions of fire departments related to training. In regards to training

drivers of fire department apparatus the *Aerial Apparatus Driver/Operator Handbook* (2001) and *Pumping Apparatus Driver/Operator Handbook* (2001) are viewed as core training material in the fire service. The training guidelines that are contained in these publications guide operators and departments to become compliant with the appropriate NFPA standards. As a result of their close correlation they are accepted as a standardized method of meeting the training needs of fire departments and individuals (IFSTA, 2001).

**Research Question 2: What policies and procedures do other fire departments utilize to prevent accidents?**

**St. Louis Fire Department**

The (SLFD) utilizes a procedure called “On the Quiet” for non-emergency responses. This type of response is initiated when responding units are ordered to “respond on the quiet.” This policy manages the risk of fire department accidents by reducing the number of emergency responses on non-emergency calls. This program has gained national prominence and has been adopted in some form by other fire departments. This program is having the desired effect in reducing the number and severity of accidents involving the (SLFD). It applies to responses by fire trucks as well as EMS vehicles and lists an extensive number of situations that are not deemed appropriate for emergency response unless the assignment is upgraded because additional information becomes available.

**Detroit Fire Department**

The (DFD) utilizes a response policy that is termed “go easy” and is designed to reduce the department’s accident risks during non-emergency calls. Under this type of response companies are directed to proceed at “reduced speeds” and obey all posted traffic limits. While the number of situations under which this “go easy” policy is implemented are not as extensive

as the (SLFD's) policy they are still significant. The utilization of this controlled response procedure appears to be providing the (DFD) with a method to manage the risks encountered with emergency response.

**Research Question 3: What PFD emergency vehicle operator programs and policies are currently in place to prevent apparatus accidents?**

PFD policy currently utilizes a training methodology that decentralizes the training that new recruits receive by having it implemented at the company level after they are assigned to a permanent station. H. Costo, Safety Officer for the PFD, stated that while all personnel must be approved by the Safety Office before they are officially allowed to "respond hot," the approval process may not accurately predict future emergency driving capabilities.

Once an individual has been involved in an accident an investigation is undertaken, with the results reviewed by the Safety Office. If the accident is deemed to have been preventable then the individual is guided through a remedial path by the Safety Office. This includes mandatory participation in an "Enhanced Driver Assist/VFIS Course" under the guidance of the Safety Officer. The ensuing evaluation could result in a suspension of "driver qualifications" for a period of not less than 90 days so that an individual can receive comprehensive training, again at the company level (H. Costo, personal communication, July 26, 2005).

Additionally, the PFD through Directive # 26, Safe Operation of Fire Vehicles (2002), also utilizes a limited "reduced speed" response system but it is narrow in scope and does not seem to be having the desired impact on preventing apparatus accidents (p. 03).

**Research Question # 4: How do these PFD programs and policies compare to the national standard?**

On the surface the PFD driver training policies appear to be comparable to NFPA 1451, *Standard for a Fire Service Vehicle Operations Training Program*, in that there is a standardized written procedure for the training of personnel to operate emergency vehicles. While the other administrative components of this training standard are also being met, the operational guidelines of the PFD need to be better aligned with the national standard. Beginning with the frequency of training, there are several components of the national standard that are lacking in the PFD's driver training program. Specifically, the requirement for annual training is an area that could produce favorable results in the PFD. Additionally, those who become "qualified" drivers in the PFD may or may not be capable of meeting the objectives specified in Chapter 2 of NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications*. Instead of a training policy that leads to everyone qualifying to drive fire apparatus, perhaps only those who meet the objectives of NFPA 1002 should be permitted to drive.

Because a "safety conscious attitude" has been identified as a critical factor in how any trainee views the departmental training policy, developing the appropriate attitude is a key component of the IFSTA training manuals (Aerial App., 2001, p. 78). The areas of weakness that exist in the PFD's driving policies could possibly be strengthened by modeling the national standard and thus changing the general attitude that currently exists in the PFD regarding fire department crashes.

**Research Question # 5: What are the common causes (if any) linking the PFD's apparatus accidents?**

The PFD Safety Office, Accident and Injury Database, indicates that the two major causes of accidents in the PFD during the time period being reviewed are:

1. The failure of PFD drivers to correctly and safely avoid diminishing spaces and

thereby judge apparatus clearances. Of the 1227 accidents occurring between 01/01/2000 and 12/31/2004, these failures contributed to 33% (368) of the PFD accidents.

2. The failure of civilian drivers to properly yield the right of way. Of the same 1227 accidents during the same time period, this factor contributed to 18% (221) of the PFD accidents.

It must be noted that this classification of accidents may be misclassified. The text *Pennsylvania Emergency Service Laws* contains PA Law 3325, Duty of driver on approach of emergency vehicle, which clearly indicates that “the driver of every other vehicle shall yield the right-of-way...” however this law “does not relieve the driver of an emergency vehicle from the duty to drive with due regard for the safety of all persons...” (Gobrecht, 2005, p. 170). This may be interpreted to mean that accidents attributed to some failure of a civilian vehicle operator are really the failure of the emergency vehicle operator.

Additional contributory factors include failure to use, or to properly use guide-person(s) when backing vehicles up. Weather and road conditions also were at times causes of apparatus accidents. The final category “excessive speed” has been verified as a factor in less than 5% of PFD accidents occurring in the time period being reviewed. A valid question could be raised regarding the correlation between road conditions and the need for appropriate speed reduction among drivers. Additionally, it is difficult at best to accurately determine the speeds at which PFD apparatus have actually been traveling at the time of impact (H. Costo, personal communication, August 9, 2005).

## DISCUSSION

The results of this research indicate that the PFD needs to revamp its approach to driver training and also needs to consider the implementation of more comprehensive reduced speed response protocols. The importance of an initial driver training program combined with periodic refresher training is immeasurable. Wibur (2004) indicates that the subject of driver training has become so important that individuals attending the first Firefighter Life Safety Summit spent a significant amount of time discussing this issue. “Driver training performed by someone or some group outside of the fire department was suggested. Re-certification of emergency vehicle operators on a regular basis was also discussed” (p.29). The Fire Service Research Institute (FRSI) in reporting a study conducted in Missouri indicated that “accidents involving fire apparatus declined from 76 in 1998 to 58 in 2003. This was attributed to better driver training...” (News in Brief, 2005, p. 48). Dolan and Pollack (2003) indicate that relevant and consistent training is required for success and write that:

For a program to result in a permanent shift in the safety culture of an organization, it must be able to set measurable expectations for all employees at all levels, help people meet those expectations with the correct education and tools, and provide motivation for continued engagement in the process. (p.105)

Currently, the PFD has an ineffective driver training program based on the results of this study. The evidence of this ineffectiveness lies in the continually escalating numbers of vehicle crashes from year to year. The fact that new drivers are initially trained by company officers and peers based on where they are assigned eliminates any uniformity or consistency in the training process. This random training method does not permit the implementation of a standardized driver training curriculum that all individual drivers could receive. This program is also flawed

in that it assumes that those company officers and peers who are indoctrinating and training the future apparatus drivers were in fact properly trained themselves. Also, the absence of refresher driver training programs for all emergency vehicle operators is another serious flaw in the system because it fails to identify poor drivers before they have an accident. These training deficiencies impact on all PFD apparatus operators regardless of the type of vehicle to which they are assigned.

USFA (2004) indicates “Training is the foundation of all safe practices” (p. 47). This could certainly explain the increasing number of accidents that continue to spiral out of control in the PFD. In the *Emergency Vehicle Safety Initiative* the authors go on to say that, “through attitude and behavior, organization leaders must reflect the importance of safety in all aspects dealing with vehicles. Department commitment to driver competency and accountability can have a profound effect on reducing crashes, injuries, and fatalities” (p. 47). This commitment to competency is exactly the next step that the PFD must take to reduce the response risks that currently are much too high.

Clearly the informal questionnaire that was used in this ARP provided some interesting insight into the problem of fire department vehicular crashes from some diverse perspectives. While the respondents at times seemed to be easily categorized by the manner in which their respective departments chose to classify the position of driver/operator, however, on the issue involving training there was a confluence of opinion. While all 56 respondents said there was some level of formal training for driver/operators in their departments, 50 of those same respondents indicated that their departments needed to update their driver training programs. Another interesting piece of information was uncovered concerning a response system that would limit the number of vehicles responding with lights and siren on multi-unit dispatches.

While only one respondent indicated that their department was currently utilizing that approach, 47 of the respondents thought that this might be a viable method to prevent future fire department crashes. Overall the information that was gleaned from the questionnaire was extremely helpful in this study.

On July 15, 2005 a PFD ladder company was involved in an intersection accident with a civilian vehicle that resulted in the death of the civilian driver. While the preliminary indications are that the responding PFD unit followed all applicable laws and PFD rules in place and the civilian driver took some risks at the intersection, certainly a “reduced speed” response to the reported gas leak would have changed the scenario at that particular intersection on that particular day. Smith (2004) asks “Why are we responding with lights and sirens anyway?” (p. 28). He further intimates that other “proactive fire departments have adopted tiered response policies. This involves assessing the need for lights and sirens on every call. It’s also known as risk management” (p. 28). The SLFD (1998) includes “Natural Gas Leaks” among the classification of incidents that are dispatched as “On The Quiet” which produces a reduced speed response (Sec. 433, p. 1). Perhaps, the incident of July 15, 2005 will spur the PFD to handle future natural gas leaks in a similar manner. Failure to take a comprehensive approach to revamping the manner in which the PFD implements future “risk management” initiatives could lead to other fatal fire department crashes.

### **RECOMMENDATIONS**

As a result of this study, it is recommended that the PFD implement the following changes in an expedited manner to positively impact on the safety of all PFD personnel as well as the public being served. The PFD should implement a driver training program that adheres to or exceeds NFPA 1451, *Standard for a Fire Service Vehicle Operations Training Program*.

Throughout this study the importance of training was thoroughly documented by many experts in the safety realm. There was viable evidence presented that drew a direct correlation between training and the incidence of vehicular crashes. Revising and updating the PFD driver training program should have a profound impact on this issue. The leadership of the PFD should convene a forum to develop, review and initiate an updated training program. It should then be implemented as fully as budgetary constraints allow.

In addition to this change in training policy, it is also recommended that the PFD should consider utilizing quiet dispatch until it is determined that life is in danger, persons are injured or there is a working fire. A committee should be established that will review the current policies of not only the PFD but of the many other jurisdictions that have implemented quite broad categories of incidents that do not require an emergency response by fire department units. This committee should be broad-based and have the ability to offer recommendations based on the results of the review. Those recommendations should be directed at reducing the number of incidents that receive emergency responses. This committee should also explore the practice whereby only the first due fire vehicle responds with lights and siren on a multi-unit dispatch. These initiatives should all receive due consideration in an attempt to prevent future vehicular crashes in the PFD.

The fact that many experts are calling for a culture of safety to be developed in the fire service is an indication that it currently either does not exist or that it is severely lacking. Much the same could be said about the culture of safety currently existing in the PFD. Apparatus accidents have continued to escalate each and every year in the PFD since 2000. As of August 28, 2005 the number of vehicular accidents in the PFD hovers at 223 for this year. Should PFD accidents continue at this pace, last years record high will be exceeded. Certainly without

changes in the policies, procedures and attitudes of all PFD members these numbers will continue to escalate.

Clearly, a culture of safety is needed to impact on the level of accidents that are occurring and to prevent them from happening in the future. It is of vital importance to the PFD and the fire service in general that methodologies are developed and implemented to prevent fire department apparatus crashes, because every fire department is committed to saving lives. It is understandable that such an undertaking in the PFD will require significant technical remedies but more importantly it is also certain to present an adaptive challenge.

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**APPENDIX A**  
**EMERGENCY RESPONSE QUESTIONNAIRE**

I am gathering information as part of my Applied Research Project for the National Fire Academy. I am distributing this questionnaire to Module 2 students attending the 2005 session of EDI. This will provide me a sampling of data from a national cross-section of fire service professionals.

This questionnaire may require some follow up questioning so please be sure to write your name on it. Please complete it to the best of your ability and return it to me as soon as possible but no later than May 26, 2005. Your responses are definitely important because they will be utilized within my overall research.

If you would like a copy of the completed paper, please include your e-mail address and I will forward a copy upon completion.

Thank you for your participation in this project.

Sincerely,

Ernest F. Hargett Jr.  
Deputy Commissioner  
Philadelphia Fire Department

**EMERGENCY RESPONSE QUESTIONNAIRE**

1. What is the name of your department?  
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2. How many stations does your department operate?  
-----
3. How many fire apparatus are deployed?  
-----
4. How many EMS units are deployed?  
-----
5. Do you currently drive emergency response apparatus? (If "YES" answer question #6)  
YES \_\_\_\_\_ NO \_\_\_\_\_
6. How long have you been driving emergency response apparatus?  
-----
7. Is driver/operator a rank in your department?  
YES \_\_\_\_\_ NO \_\_\_\_\_
8. Are all FF/EMS personnel required to be eligible driver/operators?  
YES \_\_\_\_\_ NO \_\_\_\_\_
9. Do driver/operators receive both classroom and practical driver training?  
YES \_\_\_\_\_ NO \_\_\_\_\_ (if yes answer #10)
10. How often do driver/operators receive this training?  
Annually \_\_\_\_\_ Every 2 years \_\_\_\_\_ More than every 2 years \_\_\_\_\_

11. In your opinion, how important of an issue are apparatus accidents in your department?  
Significant\_\_\_\_\_ Moderate\_\_\_\_\_ Negligible
12. Do you believe that your department needs an updated driver training program implemented?  
YES\_\_\_\_\_ NO\_\_\_\_\_
13. On a scale of 1-3, with three being the highest, rate the level of importance you would assign to implementing the following programs in your department. (each number may be used only once)
14. Does your department utilize a structure fire response system that has only the 1<sup>st</sup> due apparatus responding at emergency speed on multi-unit dispatches until additional information is obtained?  
YES\_\_\_\_\_ NO\_\_\_\_\_
15. If the answer to # 14 is "NO" do you think this is a realistic way to reduce accidents?  
YES\_\_\_\_\_ NO\_\_\_\_\_
16. Are you willing to provide an electronic version of your department's driver training procedures and the operational response procedures?  
YES\_\_\_\_\_ NO\_\_\_\_\_
- Name\_\_\_\_\_
- E-mail address: \_\_\_\_\_

## APPENDIX B

### EMERGENCY RESPONSE QUESTIONNAIRE RESULTS

1. What is the name of your department?

The 56 returned questionnaires represented 32 different departments. Twenty-nine of the questionnaires were viewed as relevant, while sixteen were deemed not relevant for various reasons. The other eleven were duplicates and provided little different information. Eventually 19 departments were contacted and 12 provided information for further review.

2. How many stations does your department operate?

Departments were considered for further consideration providing they staffed more than 20 fire stations. Twenty-nine departments met these criteria.

3. How many fire apparatus are deployed?

4. How many EMS units are deployed?

Regarding questions 3 and 4, there were no minimum requirements set for consideration in the study, however this information did help with the final comparison.

5. Do you currently drive emergency response apparatus?

YES 23

NO 33

6. How long have you been driving emergency response apparatus?

The time parameters of the 23 respondents who do drive apparatus varied from two years to 12 years with the average amount of experience being 7 years.

7. Is driver/operator a rank in your department?

YES 7

NO 49

8. Are all FF/EMS personnel required to be eligible driver/operators?

YES 49

NO 7

9. Do driver/operators receive both classroom and practical driver training?

YES 56 NO 0

10. How often do driver/operators receive this training?

Annually (5) Every 2 years (3) More than every 2 years (41)

The above data represent the formal training frequency for those departments that do not encompass driver/operator as a rank.

Annually (3) Every 2 years (4) More than every 2 years (0)

The above data represents the formal training frequency for those departments that do encompass driver/operator as a rank.

11. In your opinion, how important of an issue are apparatus accidents in your department?

Significant 30 Moderate 16 Negligible 3

The above data reflects the responses from the departments that do not maintain driver/operators as a rank.

Significant 4 Moderate 2 Negligible 1

The above data reflects the responses from the departments that do maintain driver/operators as a rank.

12. Do you believe that your department needs an updated driver training program implemented?

YES 50 NO 6

Of the six respondents who checked "NO" only three were from departments that maintain driver/operator as a rank.

13. On a scale of 1-3, with three being the highest, rate the level of importance you would assign to implementing the following programs in your department. (each number may be used only once)

**TABLE # 1**

<u>PROGRAMS</u>	<u>3</u>	<u>2</u>	<u>1</u>
Updated Driver Training Program	48	7	1
Civilian Driver Awareness Program	0	17	39
Annual Driver Recertification Program	8	32	16

**Total number of responses by categories.**

14. Does your department utilize a structure fire response system that has only the 1<sup>st</sup> due apparatus responding at emergency speed on multi-unit dispatches until additional information is obtained?

YES 1                      NO 55

15. If the answer to # 14 is "NO" do you think this is a realistic way to reduce accidents?

YES 47                      NO 9

16. Are you willing to provide an electronic version of your department's driver training procedures and the operational response procedure?

YES 51                      NO 5