Its in the numbers: Collecting injury and near-miss data can improve safety in the Dallas Fire

Rescue Department

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Certification Statement

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of another.

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Abstract

Every year in the United States, over 80,000 firefighters are injured and close to 100 die, despite countless improvements in firefighter safety and health. Researchers contend that a better understanding of how and why these casualties occur is the first step toward reducing the losses suffered annually by the U.S. fire service. The problem was that the Dallas Fire Rescue (DFR) Department does not collect injury or near-miss data for analysis or reporting and therefore cannot identify corrective actions to reduce firefighter injury and death. The purpose of this project was to improve firefighter safety in DFR by using action research to develop two new reporting forms that provide injury and near-miss data for analysis. The research focused on four questions: (a) How can injury reporting impact firefighter safety? (b) How can near-miss reporting impact firefighter safety? (c) How do organizations use injury and near-miss data to make changes that affect firefighter safety? (d) What factors influence the success of an injury or near-miss reporting program? A literature review, combined with original research in the form of interviews, a questionnaire, a SWOT analysis, and a round table discussion contributed to the findings. Results indicate that: (a) firefighters use injury and near-miss data in different ways to impact their own safety, (b) organizations use injury and near-miss data in different ways to improve firefighter safety, and (c) there are certain factors that affect the success of a reporting program. Finally, DFR's reporting program was evaluated, found to be outdated, and two new forms and an Injury/Event Codebook were created. Recommendations included establishing a Safety Committee, updating reporting forms and policies, and using injury/near-miss data as a training tool. Future researchers should: (a) examine the relationship between an organization's injury rate and its reporting compliance, and (b) define "total injury cost."

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Introduction

Every year in the United States, over 80,000 firefighters are injured and close to 100 die while fighting fires, training, and responding to medical, technical, and hazardous emergencies ("Fire-related firefighter injuries," 2011). Firefighter deaths and injuries significantly impact the victims' families, departments, and communities. In 2011, the Dallas Fire Rescue Department (DFR) suffered two line-of-duty deaths and numerous on-duty injuries. These casualties, like the thousands of others in the American fire service, occurred despite decades of improvements in firefighter safety, health, training, protective gear, and equipment.

Many researchers contend that a better understanding of how and why these fatalities and injuries occur can help identify corrective actions that will save lives (Karter & Molis, 2011, p. 1; Hofmann & Stetzer, 1998). Consider the following example: "If the Fire Service and safety researchers have comprehensive, consistent, and accurate information about who is being injured, how they are being injured, and what types of injuries occur, then these injuries can be prevented" (FIRST, Drexel School of Public Health Website, n.d., p. 1). An often-quoted and poignant remark from Retired Chief Vincent Dunn echoes this consensus; "In order for a firefighter to survive the danger of firefighting, he or she must know how other firefighters have died" (Hoff & Kolomay, 2003, p. 1). To that end, this research aimed to strengthen the understanding of firefighter injuries in the Dallas Fire Rescue Department.

The problem is that the Dallas Fire Rescue Department does not collect on-duty injury or near-miss data for analysis or reporting and therefore cannot identify corrective actions to reduce firefighter injury and death in the Department. The purpose of this project was to positively impact firefighter safety in DFR by using action research to develop two new reporting forms that provide injury and near-miss data for analysis. This applied research focused on the

following four questions: (a) How can injury reporting impact firefighter safety? (b) How can near-miss reporting impact firefighter safety? (c) How do organizations use injury and near-miss data to make changes that affect firefighter safety? (d) What factors influence the success of an injury or near-miss reporting program?

Background and Significance

Dallas is the ninth largest city in the country and home to 1.3 million people. The city spans 385 square miles and is often the top-rated leisure and visitor destination in Texas. It was founded in 1841 and has grown into a major metropolitan area, complete with several professional sports and arts venues, fine dining and entertainment, bus, trolley, and light-rail transportation services, and numerous college and university campuses. The climate in Dallas is humid, with mild winters, but residents suffer through extreme summer temperatures. Tornadoes and severe storms are perhaps the largest natural threats to the area. Recreational areas can be found along the Trinity River and also along the banks of several lakes and reservoirs. Dallas' economy is diverse and businesses based in banking, technology, energy, and healthcare are well established.

The demographics, climate, geography, activity, and economic profiles of Dallas are all significant because they represent the service population and working environment for DFR. Emergency responses to these areas and to citizens in need represent risk, and exposure to injury or illness, for the Department's almost 1900 career members. In the last fiscal year, DFR responded to 292,906 incidents (126,321 fire service calls and 166,585 Emergency Medical Service (EMS) calls). In addition to fire and EMS services, DFR operates its own training academy, provides life safety education and inspections, arson investigations, explosive ordinance handling and disposal, technical rescue, hazardous materials response, aircraft rescue

and firefighting at two airports, swift-water and shore-based rescue, and wildland firefighting. The Department's Urban Search and Rescue (USAR) team is part of FEMA Task Force 2 and responds to 16 counties in the North Central Texas region. DFR is an all-hazards emergency response organization.

Several factors related to DFR's size, call volume, and response type correspond to an increased incidence of firefighter injury. For example, firefighters are almost 13 times more likely to be injured in a structure fire than in other types of fires (Karter & Molis, 2011; "Fire-related firefighter injuries," 2011) and Dallas firefighters responded to 1,070 structure fires last year (Burns, Sr., 2011). Additionally, career firefighters are more likely to be injured than non-career firefighters and they experience proportionally more lost-time injuries ("Fire-related firefighter injuries," 2011). Finally, the severity of an on-duty injury is positively related to the number of emergency responses attended prior to the injury; DFR's busiest engines average nine emergency responses per workday, while the busiest rescues average 14.

Given the number of emergency responses and types of services provided, it is clear that DFR firefighters are exposed to great risk of on-duty injury. In fact, many members are injured each year; DFR averages $1 million in Workers' Compensation expenditures annually (this includes medical, weekly time off benefits, and impairment payments) (J. Lewis, personal communication, January 20, 2012). In response to on-duty injury and deaths, DFR has changed response policies and staffing requirements, and has invested in advanced technology and personal protective equipment. Yet, despite the extreme personal, organizational, and financial costs, DFR does not have an injury tracking program and, consequently, it cannot systematically evaluate injuries for root causes or trends.

When questioned about developing such a program, DFR officials state that staffing, software costs, and reporting compliance are problematic. Staffing and software costs are technical problems, but the issue of reporting compliance is complex. The Department's Safety Officer estimates that he receives only 55% of the injury reports that are mandated by DFR (F. Gray, personal communication, October 12, 2011). These injury reporting forms were developed in 2007 because the Fire Chief and the Safety Division recognized that the Workers Compensation forms did not provide sufficient information to track and investigate on-duty firefighter injuries (Burns, 2007). The technical fix for the compliance problem is simply enforcement, but the problem is an adaptive challenge. Injury reporting requirements are not being met in DFR and implementing an effective solution will require a series of changes in organizational values regarding reporting, safety, and accountability.

Minus an effective injury and near-miss analysis program, DFR cannot evaluate the causes of its firefighter injuries; nor can it evaluate or defend "safety" related changes in staffing, equipment, and training. As a result, the Department and its members continue to suffer physical, psychological, and financial losses because of injuries that may have been prevented or avoided.

DFR's injury reporting problem is not uncommon; occupational injury and illness surveillance is poor, regardless of profession or industry (TriData Corporation, 2004). Documentation of work-related injury is not standardized, and furthermore, the data produced is often described as "fragmentary, unreliable, and inconsistent"(Azaroff, Levenstein, & Wegman, 2002, p. 1421). Many safety programs are faulty and ineffective because of the under-reporting of accidents and incidents (Krause & Russell, 1994).

Organizational risk management efforts are, at the very least, hindered without reliable data relating to accidents and incidents. Following the Challenger and Columbia disasters, both the Rogers Commission and the Columbia Accident Investigation Board (CAIB) documented the need for a program that is capable of integrating accident and injury data into a usable form that can direct management, engineering, and safety decisions (Maher & Casamayou, 2009, p. 149). NASA was directed to reemphasize safety by determining the underlying causes of accidents and to increase its emphasis on reporting close calls (Maher & Casamayou, 2009, p. 116). The space shuttle disasters gave national attention to the problems, and consequences, related to poor accident documentation and analysis.

Since then, numerous national and fire service-based efforts have been dedicated to compiling and analyzing worker injury data and this indicates the seriousness, and relevance, of this applied research problem. In 2011, the National Prevention Council, headed by the U.S. Surgeon General, issued its National Prevention Strategy which recommended improving workplace safety and reducing occupational injuries through electronic tracking systems to help identify hazards and measure progress (Taylor, 2011). Additionally, the National Institute for Occupational Safety and Health's (NIOSH) Surveillance Strategic Plan recommended the development of alternative data collection methods for occupational injury and illness as well as stronger surveillance of certain populations (Azaroff et al., 2002).

The focus of these national plans spans across several occupations. However, there are programs dedicated specifically to firefighter injury and illness. Jennifer Taylor leads the Firefighter Injury Research and Safety Trends (FIRST) Program and she linked injury data collection to injury prevention in her report, "A Call to Collect Industry and Occupation Codes in Healthcare Data" (Taylor, 2011). The FIRST Program represents a joint effort between fire

service leaders, occupational health professionals, and public health departments, designed to create a national firefighter injury tracking system (Costo, 2011). The program was developed at Drexell University and has been awarded a grant from the United States Fire Administration/Department of Homeland Security (USFA/DHS) (Taylor & Roman, 2011).

The goals of FIRST are similar to those of a different program supported by NIOSH, called the National Occupational Research Agenda (NORA). NORA partners researchers and contributors from universities, businesses, professional societies, and government and worker organizations. The program's Sector Agendas provide the framework for the nation in occupational safety and health research. The Public Safety Sector's Strategic Goal 2 is to "Reduce injuries and fatalities associated with structural firefighting operations by 30% by 2015" (NIOSH, 2011, p. 9). The intermediate, research, and translation goals that support this strategic goal are directly related to the subject of this applied research project (ARP). They include: (a) evaluating existing surveillance systems for occupational injuries among firefighters, (b) documenting steps to improve these data collection systems, and then (c) developing an injury surveillance system for the fire service that captures detailed data on the event, nature, sources and severity of injury and is stored in a central repository (NIOSH, 2011, p. 9).

Similarly, the 2nd National Fire Research Agenda, established by the National Fallen Firefighters Foundation, has a subsection dedicated to Data Collection (National Fallen Firefighters Foundation [NFFF], 2011). The goals of the subsection are almost identical to NORA's. The Agenda writers recognized the lack of data reporting and coordination between fire service organizations. And, just as this researcher contends, they highlighted how organizations can use this data to justify and validate decisions and spending that prioritize firefighter health and safety (National Fallen Firefighters Foundation, 2011, p. 19).

As noted above, occupational injury tracking has become the goal of some federal programs, and firefighter-specific injury tracking has attracted research attention from university and national organizations like NIOSH, the Centers for Disease Control (CDC), and the USFA/DHS. There have been similar changes at the state level. Texas Senate Bill 1011 passed during the 81st Legislature and it required the Texas Commission on Fire Protection (TCFP) to develop and establish criteria to receive and analyze injury information related to Texas firefighters (State Fire Marshal's Office, 2011, p. A-1). Subsequently, the Commission was ordered to review the information gathered and make recommendations to reduce firefighter injuries. TCFP completed the development process in 2010 and the new firefighter injury reporting program is entirely web-based.

The costs of supporting the types of research initiatives and reporting programs listed here are great. But, so are the costs of firefighter injuries. The TriData Corporation estimated the total cost of firefighter injuries to be somewhere between $2.8 and $7.8 billion (TriData Corporation, 2004). Financial costs associated with firefighter injuries are extreme; "the jurisdiction where they work must absorb the direct costs of lost work time, possibly higher insurance premiums, disability and early retirement payments, overtime for substitutes, and costs to train replacement personnel" (TriData Corporation, 2004, p. 1).

Aside from the financial cost associated with firefighter injury prevention, there is moral support for these efforts because they reduce pain and suffering and protect employees (TriData Corporation, 2004, p. 2). In "Making safety a basic value," Earnest noted that: "Preventing employee injuries is simply good business" (2000, para. 24). Similarly, Drucker (1986) emphasized the avoidance of loss as a sound business practice in *The Principles of Management*.

Undoubtedly, the losses associated with occupational injury exact a great human toll (TriData Corporation, 2004, p. 1). In 2011, DFR suffered two such losses.

The impact of the recent line-of-duty deaths (LODDs) and severe injuries in DFR is tangible. A severe near-miss event that resulted in a loss-time injury happened just months before a fire officer lost his life in a very similar incident. An After Action Report (AAR) was not issued for the near-miss event until *after* the subsequent LODD occurred. This was the only formal communication, in the form of a report on the department's intranet page, that related to the circumstances of the near-miss. In hindsight, it seems that the few months between the two events may not have been sufficient to investigate and determine the cause of the first injury, or to develop and deliver training or procedure changes to the entire department. But, like any fire department grieving the loss of their own, members question: what could have been done to prevent these tragedies? Researchers emphasize that major injury events are usually preceded by minor incidents or near-misses (Reason, 1997; see also Krause, Groover, & Martin, 2010; Lauver, Lester, & Le, 2009; Maher & Casamayou, 2009; Sklet, 2004). A detailed injury and near-miss reporting and analysis program, as suggested by this ARP, is part of the answer.

The purpose of this ARP coincides with the Executive Fire Officer Program (EFOP) goal to provide senior fire officers and key leaders with "an understanding of the need to transform fire and emergency services organizations from being reactive to proactive" (U.S. Fire Administration [USFA], 2011, p. 4). It also expressly supports the EFOP *Executive Development Course* goal of providing Executive Fire Officers with an opportunity to use research to solve real-world problems in their own work environments (United States Fire Administration, 2011, p. 7). Specifically, this researcher sought to reduce risk at the local, organizational level by preventing firefighter injuries and this corresponds to *Operational Goal*

#1 of the USFA's Strategic Plan: Fiscal Years 2010 to 2014 (as cited in United States Fire

Administration, 2011, p. 3).

This research topic meets the selection criteria as recommended in the *Executive Fire*

Officer Program: Applied Research Project Guidelines (United States Fire Administration, 2011,

p. II-2). This project is significant to DFR because it describes how injury and near-miss

analysis and reporting can improve firefighter safety. The recent LODDs in DFR were "focusing

events"; this is the ideal time for action to acknowledge problems and work on solutions that can

impact firefighter safety (Maher & Casamayou, 2009, p. 173). This project is significant to the

fire service; with complete and accurate reporting, DFR's membership is large enough to support

statistically significant data results that can contribute to the national research agenda that

focuses on firefighter injuries. Finally, this project is important to overall occupational health

because improving DFR's injury reporting supports the broader goals recognized by NIOSH and

the CDC to standardize occupational injury coding for research purposes.

<div align="center">Literature Review</div>

A comprehensive literature review was conducted to examine existing research related to

injury and near-miss data collection, analysis, and reporting. The review highlighted current

challenges and benefits of occupational injury and illness reporting and it shaped the research

questions for this ARP. The need for a standardized occupational injury reporting system, as

well as a searchable, near-miss database to record lessons learned, is well established and

supported in the literature.

It should be noted that literature related to many different occupations is incorporated

here, primarily because refereed research articles relating to firefighting are extremely limited in

both number and topic. General labor and occupational research was used to describe the

importance of injury data collection to organizations and professions. However, much of the literature presented in this review is based on injuries, accidents, and experiences in high reliability organizations (HROs). Firefighting teams, fire department administrators, and emergency incident commanders have all been included as subjects in research focusing on HROs (Compton, 2008; Meyers, 2005; Scott & Tretheway, 2008; Weick, 1993). And, there is extensive research on professions that are similar to the fire service (in terms of risk factors, complex systems, and normal accidents) that are considered to be HROs. Therefore, research based on professions that are similar to firefighting is perhaps the closest substitute. The work examined for this ARP looks at those that are specifically comparable to the fire service: the military, national defense systems (NASA and U.S. Navy nuclear submarines), high-risk industrial organizations (mining and electrical line work), and the commercial airlines.

How can injury reporting improve firefighter safety?

Occupational injury surveillance is a critical component of an organization's risk management efforts. Research has shown that injury reporting can reduce risk and improve worker safety because of changes at both the employee and organizational level. If minor accidents and injuries go unreported, more serious injuries are likely to occur (Lauver, Lester, & Le, 2009). Often, individual members change or adjust their own behaviors when they learn of an accident (Madsen, 2009). Furthermore, reporting even minor accidents and injuries reminds workers of the hazards inherent in their jobs; Madsen (2009, p. 872) showed that participants respond by changing their own mental safety model and by becoming more compliant with existing safety regulations.

Firefighters have a tendency to discount the hazards and danger associated with their profession (Scott & Tretheway, 2008) and researchers emphasize that perceived hazards

influence a worker's safety values and behavior (Clarke, 1998; Earnest, 2000; Pransky, Snyder, Dembe, & Himmelstein, 1999). Earnest (2000) noted that workers are unlikely to develop basic safety values if they believe the hazards and injury experiences of their job are normal, average, or as expected. Injury reporting paints an accurate picture of accident and injury experiences in the workplace; this impacts worker safety because they adjust their safety values and behavior based on their perception of occupational hazards. For example, a critical review of NASA's experiences following the shuttle disasters indicated that actors are most likely to learn when they have access to data about past results (Maher & Casamayou, 2009).

Injury reporting and analysis can affect worker safety because of changes at the organizational level as well. Employers can track when and where injuries occur so that current safety problems and potential issues can be addressed (Lauver et al., 2009). Injury investigations allow agencies to discover the root causes of accidents and system failures (Welborn & Boraiko, 2009). These investigations often result in corrective measures. Consider the following example: the U.S. Navy was experiencing a high percentage of aviation accidents and it found that nearly one-third related to routine violations. Using a specific accident investigation system, the Navy identified the cause and implemented interventions that reduced the percentage of accidents related to the violations, and sustained the reduction over time ("About HFACS," n.d.).

Hofmann and Stetzer (1998) found that when administrators foster a positive safety climate, workers are more open to discussing errors and problems. Open communication is necessary so that administrators, and workers, may have a clear understanding of the hazards associated with their work duties. In fact, organizations where employees believe their administration is serious about safety performance, welcomes suggestions about safety and accidents, and is "approachable" have lower occupational injury rates than others that do not

score well on safety climate ratings (Krause et al., 2010). Relatedly, senior leadership familiarity or knowledge of their company's injury history (like employee names and the details of the injury event) is positively correlated to low occupational injury rates (Krause et al., 2010).

How can near-miss reporting impact firefighter safety?

Lauver et al. defined a near-miss as "anytime an employee felt that they were in an unsafe situation due to circumstances, equipment, or their own actions which had a high probability of resulting in an injury, and only by good fortune did the employee remain uninjured" (2009, para. 5). Near-miss definitions vary and may even include incidents that result in damage or injuries but not death. For instance, the largest firefighter near-miss reporting site lists seven "loss potential" categories that vary by degree of damage: life-threatening injury, lost-time injury, minor injury, property damage, environmental damage, unknown, and other (National Fire Fighter Near-Miss Reporting System website, n.d.).

Essentially, injury data capture the unfortunate individuals. To illustrate this, Lauver et al. cited Heinrich's (1931) finding that for every 300 unsafe acts, 29 minor injuries occur and one major injury occurs (Lauver et al., 2009, para. 2). Thus, near-misses are often pre-cursors and valuable warning signs of existing safety problems (Maher & Casamayou, 2009). "A near miss by luck is no different to a midair collision from an organizational failure viewpoint and hence the reaction to the two should be identical" (Rose, 2004, p. 470).

Documenting near-misses can provide a more true picture of workplace hazards (Krause et al., 2010). Injury reports alone are often unreliable because of the many barriers that complicate employee reporting (Azaroff et al., 2002). Krause et al. (2010) found that an organization's number of near-miss events was positively correlated with its injury rate. Likewise, Lauver et al. (2009) emphasized that the reporting of near-misses is a critical concern

for organizations because they account for such a large portion of unsafe acts. Can organizations learn from near-miss reports?

Learning from experience about how some seemingly minor error can result in a major failure or severe injury leads to concentrated efforts to find ways to recognize and prevent future accidents (Maher & Casamayou, 2009, p. 32). Madsen (2009) compared the effects of prior disaster experience on subsequent organizational safety in the U.S. coal mining industry. Specifically, he examined the impact of direct versus vicarious experience of disasters and minor accidents on mine safety. Although organizational learning depreciates at different rates based on the type and age of experience (vicarious versus direct, recent versus old), organizations can, and do, learn from injury and near-miss events. Research also indicates that a variety of experiences is preferable; it results in a larger set of causal interpretations and a wider search for effective solutions (Maher & Casamayou, 2009, p. 179).

"The aviation industry has traditionally been good at learning from its accidents.… As commercial aviation successfully reduces its accident rate the opportunity for learning from accidents diminishes and learning from *potential accidents* [emphasis added] becomes more important" (Rose, 2004, p. 467). More and more effort is being placed on sharing lessons learned from near-miss incidents in the commercial airline industry. Research shows that pilots and students transmit lessons and learn from the experiences of others even in simulated situations, and that these lessons can result in improved future performance (Morris & Moore, 2000).

At the 2010 Engineering and Operations Conference Lineworkers Roundtable, those present recommended capturing near-miss data as a way to improve their existing safety programs. Consequently, the American Public Power Association (APPA) collected a selection

of near-miss forms and policies to help members start programs of their own. The APPA recognized that near-miss reporting can help focus safety training and provide a foundation for worker "tailgate talks" (American Public Power Association, 2010, p. 3). Furthermore, the collection authors noted that using a near-miss form is an excellent way to reinforce the group's safety culture and promote organizational learning.

For many years, the U.S. Army has recognized the need to share information, lessons, and experiences from training and combat operations. Soldiers learned from "combat bulletins" beginning in World War II, and the Army established the Center for Army Lessons Learned (CALL) in 1985 (U.S. Army, n.d.). The Army believes its Lessons Learned program was critical to its successes in the Cold War, Desert Storm, and now, in supporting Soldiers engaged in Iraq and Afghanistan. The Army's CALL program was expanded to include the larger military community and civilian partner agencies. Lessons published by this program may be positive or negative; they are not always a true near-miss.

Some fire service agencies recommend incorporating lessons learned programs similar to CALL into fire department injury prevention and risk management programs. The most recent annual report from the Texas State Fire Marshal's office advocates communicating "lessons learned" from firefighter fatality investigations as a strategy for preventing future firefighter fatalities (State Fire Marshal's Office, 2011, p. 9). Additionally, the International Association of Fire Chiefs introduced the National Fire Fighter Near-Miss Reporting System in 2005. The goal of this reporting system is to prevent firefighter injuries and deaths by "collecting, sharing, and analyzing near-miss experiences" (National Fire Fighter Near-Miss Reporting System, 2005, para. 1).

Researchers caution, however, that some severe injuries and fatalities are not always preceded by a series of unsafe behaviors or near-misses (Krause et al., 2010). Certain behaviors and events always result in an injury or fatality. For example, unprotected exposure to high-energy events like explosions, radiation, and nuclear reactions consistently results in personal insult, injury, and even death.

How do organizations use injury and near-miss data to make changes that affect firefighter safety?

Current research illustrates the many ways that organizations use injury and near-miss data to make changes that improve worker safety. A safety program that includes clear accident and incident reporting requirements, incorporates trend analysis, and encourages open discussion enhances the overall safety of an organization (Rogers Commission, 1986). A strong organizational safety culture is correlated with safer working environments (Columbia Accident Investigation Board, 2003). Reason (1997) noted that a healthy safety culture should focus on reporting and learning, rather than assigning blame. And, the goal of any organization's incident reporting and investigation system should be to support corporate safety measures that come from lessons learned (Rose, 2004). Accurate accident and incident reporting can help organizations decide where to focus resources to make cultural changes for safety (Krause & Russell, 1994). When employees believe their supervisors value safety they are more likely to report occupational injuries and illnesses and participate in investigations (Lauver et al., 2009). Finally, supervisor support for safety behavior and a safety culture often results in a positive change in employee attitude towards safety (Littlejohn, Margaryan, & Lukic, 2010).

Injury and near-miss analyses allow organizations to assemble key information related to employee safety. This is a prerequisite for the process that allows organizational and individual

learning to occur; workers must have access to data and acknowledge that results or outcomes are unsatisfactory (Maher & Casamayou, 2009). Once employees or managers acknowledge this, change can begin through informal processes like casual communication and adjustments in expectations and norms.

Next, injury and near-miss data is used in the decision-making process by organizations when they make formal policy, equipment, and training changes. Often, data analyses indicate problem areas and identify systems that need improvement (Columbia Accident Investigation Board, 2003; Krause & Russell, 1994). Monitoring minor accidents and near-misses allows organizations to adjust safety policies and procedures and possibly prevent future incidents (Lauver et al., 2009). Actually, making policy, rule, and standard operating procedure changes based on injury and accident data is recognized as one of the first steps towards organizational learning (Maher & Casamayou, 2009). Research has found that organizations with very low frequencies of accidents and injuries have processes in place that allow them to develop new rules and procedures when faced with unexpected or undesirable results. The same research also shows that formal and repeated training efforts based on past experiences lead to low organizational accident and injury rates (Wong, Desai, Madsen, Roberts, & Ciavarelli, 2005).

Injury and near-miss reporting can help organizations evaluate the current state of operations and changes in policy, training, and equipment, as well as individual and team performance. Measuring performance can help organizations determine whether safety efforts are having the desired outcome (Petersen, 1998). Certain programs can be used to assess an organization's present safety environment and even provide insight to trends through past or historical event analysis ("About HFACS," n.d.). Earnest (2000) emphasized the value of measuring before-the-fact and after-the-fact performances; a system like this provides a means to

hold managers or workers accountable for injury and loss experienced after a policy or procedure change. It also gives organizations a way to measure the effectiveness of the change.

Injury and near-miss reporting is an essential part of an organization's risk management plan. In general, the fire service effectively manages public risk, yet most fire departments do not apply the same risk management practices to their own organizations (Loflin & Kipp, 1997, p. 32). Past accident and injury statistics help identify high-risk processes or behaviors and the frequency and severity of these events helps managers set priorities for action. After new safety measures and policies are developed and put in place, the final step is monitoring the results. Importantly, the changes that stem from injury and near-miss data analysis should result in better safety and financial security for employees, as well as improved productivity and cost savings for employers (FIRST, Drexel School of Public Health Website, n.d., p. 5).

Participating in an injury and near-miss data collection and analysis program also allows organizations to comply with workplace and professional requirements. Some National Fire Protection Association (NFPA) standards (specifically NFPA 1250, 1500 and 1521) require agencies to develop a risk management plan and to document and investigate all accidents, near-misses, injuries, fatalities, occupational illnesses, and exposures (Karter & Molis, 2011). In "Patterns of Firefighter Fireground Injuries," Karter noted that NFPA standard compliance can reduce present firefighter injury levels (Karter, 2009). By the same token, the Texas Commission on Fire Protection has mandated that all certified personnel complete the "Everyone Goes Home – Courage to Be Safe" program from the National Fallen Firefighters Foundation, which includes 16 life safety initiatives (Fire Fighter Advisory Board, 2011, para. 7). Some of the 16 initiatives advocate organizational accountability for safety, increased attention to risk management, and a greater focus on firefighter fatalities, injuries, and near-misses ("Life Safety

Initiatives," n.d.). Maintaining accurate data on injury and near-miss events strengthens an

organization's risk management program and proves compliance with certain workplace

standards.

Employers can use injury and near-miss data analysis as a foundation for learning.

Organizational learning is especially difficult for public agencies (Maher & Casamayou, 2009).

Maher and Casamayou (2009) identify three steps necessary for public organizational learning:

(a) problem recognition or acknowledgement that results are unsatisfactory, (b) analyzing results

to understand cause and effect so that a better outcome can be achieved, and (c) institutionalizing

the new findings so that others can use it (p.166). It is important to share lessons learned and

store knowledge in policies, procedures, and programs in order to reduce the loss of institutional

knowledge. For example, Naval reactor programs document the history and rationale of each

technical or procedural requirement; and, knowledge gained from both good and bad experiences

is stored in the corporate memory (Columbia Accident Investigation Board, 2003, p. 183-184).

Institutional knowledge is lost when there is frequent personnel turnover or department

reorganization and when data is inaccessible or conflicts with existing norms and assumptions.

Many modern fire service organizations are vulnerable to this type of loss.

Often, when organizations recognize unsatisfactory results, they strive to produce more

favorable outcomes. Frequently, these types of changes carry a financial impact; organizations

can use injury and near-miss data to aid in budgeting and resource allocation. Research suggests

that there are many ways to impact firefighter safety. The majority of firefighter injuries occur

on the fireground (Karter, 2009; Karter & Molis, 2011; TriData Corporation, 2004). So, many

argue that any investment that reduces structure fires can impact overall firefighter safety.

Organizations can use injury and near-miss data to bolster support for changes in staffing and

equipment, and to promote investments in training, fire prevention, technology, physical fitness, and recruiting (Loflin & Kipp, 1997; TriData Corporation, 2004).

Injury and near-miss data can also be used to educate researchers, industry, and the public. Feedback from analyses contributes to equipment modifications by manufacturers and changes in professional standards. Changes in firefighter protective ensembles, self-contained breathing apparatus design and standards of use, closed-cab apparatus, and advanced restraint systems have all been improved as a result of injury information sharing (TriData Corporation, 2004).

Occupational health researchers can benefit from organizational injury and near-miss data collection. For example, NORA aims to develop a system to collect firefighter injury information in a central repository by 2012 and NIOSH recognizes that all federal agencies can benefit from increasing coordination and information exchange ("Surveillance Strategic Plan," n.d.; NIOSH, 2011). Madsen (2009) found that fatal accident experiences in mines had a significant and measurable impact on worker safety because they prompted changes in government mine safety laws and regulations. Public officials and stakeholders can be persuaded to modify their expectations, change municipal requirements, and support budget items when they are educated about the nature of an organization's safety or health problem, possible solutions, and resources needed (Levy, 1996). Alternatively, if statistics are not available to describe a safety problem and its consequences, stakeholders and officials are likely to invest in solving other, more immediate problems (Maher & Casamayou, 2009).

What factors influence the success of an injury or near-miss reporting program?

Considering the literature presented above, one can see that researchers agree that injury and near-miss reporting programs are vital and do influence worker safety, yet, the literature is

not as clear when it comes to identifying important features of reporting systems. Program

success can be measured by employee participation and the degree to which the information

gathered influences changes that improve worker, or organizational, safety.

A method to communicate results and share information with others is a critical

component of an injury and near-miss reporting system. Failure or weakness in this area has

been cited as a causal factor in numerous accident and fatality investigation (Rogers

Commission, 1986; Columbia Accident Investigation Board, 2003). In the aftermath of some

well-publicized system failures, NASA spent the years between the Challenger and Columbia

shuttle accidents working on a unified reporting center, to make it easier to spot problems and

trends as well as disseminate lessons learned across the organization (Maher & Casamayou,

2009). The system must be accessible, or "user-friendly," as well. NASA's problems with this

are well documented; key information about previous failures and near-misses was not getting to

the right players. Furthermore, reporting systems should be empowering for all. There were

instances where workers suspected a hazard or problem but stayed silent because they did not

have access to data that could provide objective support or justify their feelings (Maher &

Casamayou, 2009, p. 175). And, in some cases, low-level workers who knew of problems did

not have enough clearance to submit a report; thus, serious information was not recorded or

communicated to decision-makers.

An organization's intent, or motivation, for requiring injury and near-miss reporting

influences worker participation. Workers that fear punishment, retribution, or criticism are likely

to remain silent (Maher & Casamayou, 2009; Rose, 2004). Fortunately, research suggests that

there are ways to encourage employee participation. A shift towards an organizational culture

that allows workers to feel like reporting is an opportunity rather than a self-sacrificing event can

increase reporting and organizational safety (Hofmann & Stetzer, 1998; Morris & Moore, 2000). The outstanding success of the U.S. Army's CALL Center is an example of this type of change (United States Army, n.d.).

Two additional ways to effect positive change toward injury and near-miss reporting is to ensure anonymity or re-direct accountability to an outside agency. One model system, the Aviation Safety Reporting System (ASRS), ensures confidentiality to reporters, waives fines and penalties in approved cases, and uses the information to promote aviation safety in a variety of ways (ASRS - Aviation Safety Reporting System website, n.d.). Similarly, the system used by the American Medical Association is non-punitive, and guarantees confidentiality and protection in legal proceedings for those who report accidents and failures (Morris & Moore, 2000). Finally, the Fire Fighter Near-Miss Reporting System also emphasizes that its program is confidential, non-punitive, voluntary, and secure (National Fire Fighter Near-Miss Reporting System website, n.d., para. 1).

There is ample evidence that accountability influences the frequency and accuracy of employee injury and near-miss reports. Performance and organizational pressures to achieve cause workers conflict when they are faced with choices about reporting (Lebovic, 1995). Likewise, the personal desire to avoid discipline and embarrassment shapes worker decisions about reporting (Lerner & Tetlock, 1999; Rose, 2004). In fact, increasing levels of accountability and the potential for punishment are associated with less individual learning and fewer reports (Morris & Moore, 2000). Mahler and Casamayou (2009) pointed out that this is especially troubling for public organizations, because accountability is vital and expected in civic departments.

Certain logistical aspects of injury and near-miss reporting systems seem to impact their success. Research indicates that investigations should examine system and organizational processes that may be the root causes for individual accidents or failures (Columbia Accident Investigation Board, 2003; Petersen, 1998). It has been argued that incident analyses should examine all actors that directly or indirectly influence the work situations or processes involved in the accident (Kunadharaju, Smith, & DeJoy, 2011; Sklet, 2004). In their detailed examination of NIOSH firefighter LODD investigations, Kunadharaju et al. (2011) found that the contributing factors for the deaths could all be traced back to four core causes at the system and/or organizational level: under-resourcing, inadequate preparation for/anticipation of adverse events, incomplete adoption of incident command procedures, and sub-optimal personnel readiness. Therefore, injury reporting forms should allow for this type of input ("About HFACS," n.d.; Taylor & Roman, 2011). Furthermore, report analysts must maintain a certain awareness; Hofmann and Stetzer (1998) stressed that investigators must consciously work to avoid certain biases, specifically those that underestimate system and situational effects and overestimate human error.

Researchers caution that deriving occupational injury data from Worker Compensation claims can result in inaccuracies. For a variety of reasons, workers are unlikely to report certain injuries and illnesses for Worker Compensation. This makes Worker Compensation records an unreliable source for safety information (Azaroff et al., 2002; Taylor & Roman, 2011).

Several factors impact a reporting system's value or worth. Surveillance systems are investments, and organizations must monitor their cost and benefits. Petersen (1998) advised that a safety program should reveal the financial impact of employee injuries and near-misses (see also TriData Corporation, 2004). Likewise, the FIRST Program added a financial variable

to its descriptions of firefighter non-fatal injuries (Taylor & Roman, 2011). Report forms should also conform to an organization's legal and insurance requirements, and professional standards when possible (Petersen, 1998).

Lastly, researchers have made recommendations about the types of data that organizations should collect. Recall that NIOSH's NORA program is focusing specifically on reducing fireground injuries. Recent reports indicate that collecting information about fireground injuries may have the largest influence on firefighter safety, because the majority of injuries occur here ("Fire-related firefighter injuries," 2011). Currently, researchers are promoting the use of a standardized set of occupational injury codes (Taylor, 2011; Taylor & Roman, 2011). Evidence suggests that entire professions and industries could benefit from such a system; organizations can contribute to the benefit of a larger group if they incorporate standardized codes into their reporting systems ("Surveillance Strategic Plan," n.d.).

In summary, the research reviewed here stresses the need for injury and near-miss reporting in all professions. The existing research is primarily qualitative and descriptive; the majority of the data reported was derived from interviews, focus groups, and participant observers. Therefore, these types of research methods were the foundation for the type of original research applied to this project. Finally, the literature reviewed here supported the research purpose and highlighted the relevance of the research questions presented in this ARP.

Based on the literature reviewed here, one can understand the individual, organizational, and professional benefits and challenges that are associated with reporting programs. Occupational health researchers note the importance of reporting in a profession like the fire service because it is a high hazard occupation suffering a steady rate of fatalities and injuries every year. Yet, peer-reviewed research articles based specifically on injury and near-miss

reporting in the fire service are largely absent from the current occupational health dialogue. This researcher aimed to address this gap in the existing occupational health literature by examining how injury and near-miss data collection is being used in the fire service.

Procedures

This applied research project began with the identification of a relevant research problem: the Dallas Fire Rescue Department does not collect on-duty injury or near-miss data for analysis or reporting. Then, the research purpose was developed to address a portion of this problem and specific research questions were drafted to provide focus for this study. A literature review, interviews, a questionnaire, and a round-table discussion were used to provide answers to the research questions. Finally, the action method was used to conduct a situational analysis and accomplish the stated purpose of creating new injury and near-miss reporting forms.

As mentioned above, subsequent to the identification of the research problem, purpose, and questions, a comprehensive literature review was performed. This researcher sought out all materials related to occupational injury and illness reporting, as well as near-miss, close-call, and lessons learned reporting. Intentionally, the majority of the literature was taken solely from peer-reviewed journals and edited materials. Because of this self-imposed restriction, most of the works focused on occupations outside of the fire service. Therefore, a portion of the literature review aimed to: (a) establish the relationship between the fire service and high reliability organizations that are discussed in scientific literature and (b) to provide a foundation for this researcher's inference that the fire service may have experiences, challenges, and outcomes that are comparable to those organizations. Valuable information was gained specifically from researching injury and near-miss reporting in the U.S. Armed Services, NASA, the U.S. mining industry, and the commercial airlines. Information and examples from firefighters and fire

departments were obtained in order to compensate for the lack of scientific literature related directly to fire department injury and near-miss reporting. These are discussed in detail below.

How can injury and near-miss reporting impact firefighter safety?

To answer the first and second research questions, the following procedures were used: a literature review, an Internet search for firefighter testimonials, a round table discussion, and interviews. This portion of the literature review was driven by a need to understand how injury and near-miss reporting impacts worker safety at the level of the individual. Specifically, this researcher searched for articles describing changes in an individual's behavior, decision making, or learning that authors attributed to injury reporting, near-miss reporting, or knowledge of worker injuries.

The search for firefighter testimonials was performed on the Internet and focused on two websites: the Firefighter Near-Miss website (http://www.firefighternearmiss.com/) and the Texas Commission on Fire Protection's Avoid Injury! Blog (http://www.tcfpblog.blogspot.com/). These websites were checked throughout the research process for statements from firefighters describing how they use the information presented by the sites.

Prior to conducting telephone and face-to-face interviews and the round table discussion, this researcher prepared by reading literature regarding biases, interview structure, validity, and attitudinal neutrality (Berry, 2002; Hester & Francis, 1994; Leech, 2002; Podell, 1955). The design of the interviews and the round table discussion was semi-structured with open-ended questions (Leech, 2002). Leech (2002) noted that conversational-type interviews are useful for gaining insight rather than hypothesis testing. The semi-structured interview style allowed this researcher to establish a professional rapport with subjects and to put them at ease. At the beginning of each interview and the round table discussion, this researcher explained the

research questions, the parameters of the ARP, and the voluntary nature of participation.

Subjects were informed that this research was not related to any DFR policy and that this

researcher was not authorized to make policy changes; the discussions were informal and the

researcher acted as an interviewer only, not a participant or fire officer-in-charge.

On February 13, 2012, an interview was conducted with a Dallas Fire Rescue Operations

Battalion Chief. The interview questions were designed to examine how injury and/or near-miss

reporting influences his behavior or decision-making as an Incident Commander. Questions and

documentation from this interview can be found in Appendix A. The interview time was 30

minutes and this researcher initially used written notes to record the conversation.

Also on February 13, 2012, this researcher organized and moderated a round table

discussion with four firefighters. In compliance with the American Psychological Association

(APA) Ethics Code, the four firefighters were voluntary participants and were given a Consent

Form at the beginning of the discussion. A copy of this form is in Appendix B. This extra

measure was taken because this researcher is a supervising officer and shares work assignments

with some of the firefighters. The participants at the round table discussion share decades of

career firefighting experience and all four, uniquely, have personal experience with two DFR

LODDs that occurred at structure fires. The roundtable discussion time was 90 minutes and this

researcher initially used written notes to document the conversation.

Finally, on February 15, 2012, an interview was conducted with a fire officer from an

outside department. Initially, electronic mails (e-mails) were sent to introduce the researcher and

to prepare the respondent for questions that would be covered in the telephone interview. The

questions and documentation from this interview can be found in Appendix C. This participant

was selected because he was willing to discuss his experiences as a fire officer in a large, urban

department that is involved in near-miss and lessons learned reporting. Recently his crew experienced a near-miss while he was on scheduled leave. The near-miss occurred at a structure fire and an After Action Report (AAR) was published; it gave the details of the event and noted that the focus of upcoming training was changed as a result of the lessons learned from this incident. The interview focused on the participant's behavioral and decision-making changes in response to the AAR, as well as changes at the individual member and company officer levels that he has observed since the incident. The telephone interview lasted about 30 minutes and this researcher initially used written notes to document the conversation. E-mails were also sent by the participant to provide the After Action Report and to follow-up on interview items.

How do organizations use injury and near-miss data to make changes that affect firefighter safety?

Telephone and e-mail interviews, a five item questionnaire, examples of fire department policies and reporting guidelines, and a literature review were used to answer the third research question. This portion of the literature review focused on how organizations use injury and near-miss data to impact worker safety. In contrast to the review done for research questions #1 and #2, this effort examined changes at the organizational (rather than the individual) level. Specifically, this researcher looked for policy, equipment, training, and purchasing decisions that were made in response to a worker's injury or the report of a near-miss. Importantly, the organization did not have to experience the injury or near-miss first-hand; for example, the reviewed literature documented how many organizations have acted in response to a loss experienced by another company in the same industry.

Eleven fire departments that Dallas Fire Rescue uses as comparison departments were contacted for information related to injury and near-miss reporting. An index of the cities used

can be found in Appendix D. The first step in this process included a phone call to the

department headquarters. The purpose of this initial conversation was to introduce the

researcher, provide a description of this ARP, and ask for a referral to the Safety Officer or

person that receives on-duty injury and illness reports. The second step, the conversation with

the Safety Officer or respondent, consisted of the same introduction and description of the

research followed by a question about whether their department participates in injury and/or

near-miss reporting. If they answered "no" then they were asked if they could identify some

barriers to reporting for their department. If they answered "yes," they were asked if they would

answer a five item questionnaire via e-mail (see a visual description of this in Appendix D).

Respondents that agreed were sent an e-mail with an introduction, a description of the research,

and the questionnaire (Appendix E). They were asked to reply to the e-mail with their answers.

The e-mail included a request for any reporting template that their department uses; respondents

had been briefed about this request during the phone conversations.

The five item questionnaire was reviewed by a Subject Matter Expert (SME) before it

was sent to respondents. An Incident Safety Officer (this individual holds a Fire Suppression

Certification from the Fire Department Safety Officers Association) was asked to critique the e-

mail and questions as if he were a respondent (see SME contact information in Appendix F). He

recommended minor changes to the first draft of the questionnaire; he was not asked to respond

to the items and his department is not included in the list of respondents.

Respondents returned a variety of items as attachments to their survey responses. Their

injury and accident reporting policies, examples of near-miss reports and injury reports, and

accident/injury forms were reviewed. These items were used to supplement the responses from

each department.

DFR's Injury Reporting Procedures were reviewed (Appendix G). Specifically, they were examined for statements regarding the purpose of injury reporting and the use of the data.

The five item questionnaire was related primarily to how fire departments use injury and near-miss reporting. The first four questions addressed reporting and data use at the organizational level and helped provide answers for research question #3.

Finally, three interviews were conducted to help answer the third research question. On February 14, 2012, this researcher interviewed the Safety Officer for the Dallas Police Department (DPD). A list of the telephone interview questions and a summary of responses can be found in Appendix H. The interview focused on how DPD uses injury and/or near-miss reporting to impact the safety of its officers. DPD and DFR are the only sworn city departments in Dallas and they share many policies and practices in common. There are almost twice as many police officers as there are firefighters, yet both departments are often treated as a single public safety group by the city council. The telephone interview lasted about 30 minutes and this researcher initially used written notes to document the conversation.

Also on February 14, 2012, this researcher interviewed the Assistant Director for the Dallas Parks and Recreation Department (see Appendix I). The interview focused solely on near-miss reporting and was solicited primarily because the Parks and Recreation Department is another large division of city workers that operate outdoors and use city equipment. The telephone interview lasted about 10 minutes; it consisted of an introduction and description of the project and only one question: "Does the Parks and Rec Department do any type of near-miss, lessons learned, or close-call reporting?" This researcher initially used written notes to document the conversation.

Interview questions were submitted to the DFR Safety Officer over a series of e-mails during the months of September 2011 through February 2012. A list of the questions and his responses can be found in Appendix J. The questions focused on how DFR uses injury information. The Safety Officer returned several e-mails with responses and these e-mails were referred to throughout this research process.

What factors influence the success of an injury or near-miss reporting program?

The following methods were used to answer research question #4: a literature review, two interviews with subject matter experts (see Appendix F for contact information), and a segment of the round table discussion. Research related to employee participation in injury and near-miss reporting was examined. Specifically, articles discussing reporting forms, types, and tools, and organizational traits that influence reporting were all reviewed.

The literature review also included a study of related material submitted by Safety Officers that responded to a request for information. This request was included in the e-mail with the five item questionnaire that was sent to DFR's comparison departments. Many officers sent examples of their departments' reporting forms as well as "lessons learned" distributions that described injury or near-miss events. A description of their contributions can be found in Appendix K.

A portion of the round table discussion focused on anonymous reporting and communication (see questions # 8-10 in Appendix L). Participants were asked to comment on their likelihood to submit a near-miss report within DFR and the factors that influence their decision. Additionally, participants discussed injury reporting and the need for department-wide communication following near-misses and severe injuries within the Department.

On February 20, 2012, a telephone interview was conducted with Leah A. Roman, MPH, MCHES. She is the Project Manager for the Firefighter Injury Research & Safety Trends (FIRST) Program. The interview focused on the specifics of the FIRST program and what the program investigators have learned so far (see the list of interview questions and a summary of her responses in Appendix M). This researcher used e-mails prior to the interview to describe the ARP and the telephone portion took about 30 minutes. Written notes were initially used to document the conversation.

During the telephone interview, Roman referenced the *Power Point©* presentation, "Working with your fire department data: Maximizing potential for injury prevention," given by the FIRST Program leaders at the Annual Safety Forum of the Fire Department Safety Officers Association in Orlando, Florida on September 22-23, 2011. Following the interview, she provided this researcher with a copy of the presentation slides and was available to answer questions related to the material. Portions of this presentation provided answers to research question #4.

On February 29, 2012, a telephone interview was conducted with Laurie Taylor, the Injury Reporting Specialist for the Texas Commission on Fire Protection. The interview focused on reporting compliance in Texas, suggestions on how to ease the burden of reporting, and how fire departments are using the state's *Avoid injury! Blog* to report near-misses and lessons learned. A portion of this interview was used to review Texas reporting guidelines to ensure that the new reporting forms will capture all required data. A complete list of the interview questions and a summary of her responses can be found in Appendix N. As with Roman's interview, e-mails were exchanged prior to the interview to provide Taylor with questions and details of this

research. The telephone interview lasted about 30 minutes and the conversation was initially documented with written notes.

Using action research to evaluate and improve reporting in Dallas Fire Rescue

The action method of research was selected as the primary procedure for this project following a thorough literature review. Action research methods, challenges, and benefits were explored. Action research is particularly appropriate for managers seeking to make changes in their organization or work environment (Coghlan, 2007; Whitehead, 2005; Zuber-Skerrit & Fletcher, 2007). It was determined, after learning from the literature, that action research was the most appropriate method for this project. This researcher used academic critiques of action research in the social sciences to organize her research process.

Following the identification of the research problem, the broad goal of impacting firefighter safety in DFR was reduced to the specific purpose of developing new injury and near-miss reporting forms. This researcher recognized that the Department could not do effective reporting and analysis because the current injury reporting worksheet was outdated and not used. A focused analysis was used to identify factors that influence the acceptance, use, accuracy, and efficiency of the injury report form. Specifically, a SWOT (**S**trengths, **W**eaknesses, **O**pportunities, and **T**hreats) analysis was performed to evaluate DFR's injury reporting program. This analysis can be found in Appendix O.

To assess the specific strengths and weaknesses of DFR's *Battalion Chief's Injury Report*, the data variables on the current form (Appendix P) were compared to the Texas Commission on Fire Protection's list of mandatory firefighter injury reports (Appendix Q). This comparison was used to evaluate whether the current report collects all of the injury data that is

required by the Commission. The gaps in what is currently collected and what is required were considered weaknesses and are shown in the SWOT diagram.

Additionally, DFR's reporting process was compared to the recommendations provided by existing literature as well as interview and round table respondents.

DFR's Safety Officer was contacted so that he could provide recommendations for the SWOT analyses based on his professional experience in receiving injury forms and making injury reports. His responses were transmitted via e-mail to this researcher. His contributions were included in the SWOT matrix.

Limitations

Certainly, there were some limitations associated with this ARP. Beginning with the Literature Review, this researcher's conclusion that fire departments may be included as a high reliability organization was a limitation. Ideally, more scientific literature from peer-reviewed journals that focus specifically on fire departments would be reviewed.

Upon further consideration, it seems that relying on the term "near-miss" was a limitation. The term is not universal and does not cross all occupations. It was found that some industries do report accidents and "good catches" that are similar to near-misses, lessons learned, and close-calls. Therefore, because there is not one single definition and names vary across organizations and industries, this researcher's literature review and data collection may not have captured all of the programs that do this type of reporting.

This researcher did not find or define an objective, quantitative way to measure the success of a reporting program. Injury reporting specialists note that a department's rate of injury (the ratio of injuries compared to total responses) is a critical component of evaluating the success of a program, yet most departments do not do this type of analysis. Furthermore,

establishing a statistically significant correlation between injury reporting and injury rates requires a much more scientific calculation.

This researcher acknowledges that there are limitations related to the selection of interview and round table participants. Participants were not randomly selected and their participation was entirely voluntary. Each person that was asked to participate agreed to do so, yet their participation may have been influenced, for example, by their relationship with this interviewer or their feelings about injury and near-miss reporting.

This researcher recognizes that there are limitations to interviews and surveys. Particularly, these instruments depend on the subject's motivation, honesty, and their knowledge of the research topic. However, these methods were chosen because they were the primary means of data collection for the majority of the research discussed in the Literature Review.

Similarly, there are limitations in the selection of comparison cities that were contacted for this project. There are many ways that this could have been approached. However, this researcher decided to use the list that DFR routinely uses for departmental research and planning. DFR's list of index cities is based not only on the fire department's size; it also factors in similarities in municipal government structure and financial situation, as well as the socioeconomic conditions of communities and businesses. The cities were not selected randomly and this researcher was unable to contact two of the cities on DFR's list.

Some departments that were contacted did not respond. Therefore, errors due to non-response and non-participation may exist. For example, it is possible that those who did not respond do not have an injury reporting program or, for that matter, do not have a safety officer or person in charge of receiving injury reports.

Finally, there are limitations related to this researcher's position as an insider-action researcher. Coghlan (2007) notes that conflict is inherent in this dual role of organization member and action researcher. Insider action researchers can provide insight and perspective from within their organization, yet avoiding personal bias and maintaining distance are often limiting factors in this type of research.

Results

The procedures used for this project generated important findings related to the four questions that were the foundation of this research. The variety of resources used produced consistently similar results. This outcome allowed the researcher to use action research to incorporate all relevant data to produce new injury and lessons learned reporting forms.

How can injury and near-miss reporting improve firefighter safety?

The literature reviewed to answer research questions #1 and #2 indicated that injury and near-miss reporting can improve worker safety at the level of the individual. Yet, the focus of this ARP was more specific than the broad category of occupational safety. Therefore, the purpose of the original research used to answer these questions was to gather data related to how this type of reporting can improve firefighter safety by encouraging individual changes in behavior and decision-making. The results indicated that firefighters use injury and near-miss data in a variety of different ways to improve their own safety.

Testimonials from two Internet near-miss reporting sites were studied for clues as to how individual firefighters use this type of information to make changes that affect their safety. The most recent review performed netted 38 testimonials from the National Fire Fighter Near-Miss Reporting System. Almost 3900 reports have been submitted over five years, 2006-2010. Fifty percent of last year's reports describe incidents that occurred at structure fires and 74% of the

reports were submitted by someone involved in the near-miss, rather than by a witness or a

Safety Officer (National Fire Fighter Near-Miss, 2011). All of the posted testimonials gave

positive accounts related to the reporter's experience with the Near-Miss website. Eight (21%)

of the testimonials were submitted anonymously. This researcher reviewed the testimonials and

determined that the reporters' experiences could be reduced down to the following five concepts:

- Vicarious learning – using reports as company and individual training tools

- Increase awareness – using reports to remind others about inherent dangers and risks

- Searchable database – report website is easy to navigate, and serves as a central location to document knowledge and events

- Change attitudes and behaviors – testimonials report changes in individual thinking

- Sense of altruism – reporting as a way to educate others or help keep others safe

In contrast to the national near-miss reporting website, the Texas Commission on Fire

Protection's *Avoid Injury! Blog*, shows only a few comments from readers or users. The few that

are posted are positive and directly relate to the Commission's monthly newsletter topic about

firefighter safety. Both websites moderate the testimonials and blog comments before posting

them.

A DFR Operations Battalion Chief was interviewed to assess if, and how, injury and

near-miss reporting has influenced his behavior and decision-making. He noted that this type of

reporting has a direct impact on his safety and an indirect impact on other firefighters, his

subordinates. His responses indicated that an increase in awareness of injury causes would make

him more cautious and that, as an incident commander, it would improve his risk assessment.

He voiced concern about the injuries sustained by our members and believes that increased

communication about injuries and near-misses could help potential victims be more aware.

A company officer from a large, urban department was interviewed specifically to document his experiences as a member of a fire department that he described as proactive and safety-minded. Injuries and accidents are thoroughly investigated in his department and they are reported and shared within the fire service. Close-calls and near-misses are submitted internally using a memorandum or letter through the chain of command. He provided an After Action Report that documented a structure fire with a close-call for firefighters. The AAR documented changes in the department's scheduled training related to the lessons learned from this event. Following this close-call, the fire officer reported a noticeable change in his co-workers' behavior and decision-making; this is remarkable because the incident took place over one year prior to the interview.

The round table discussion (questions #1-8) provided informative results related to how injury and near-miss reporting can influence firefighter safety at the individual level. The answers reported here represent the majority opinion of the group, however all relevant exceptions are noted in this section. Following a discussion of near-miss, close call, and lessons learned definitions, participants answered the questions asked by the researcher and many times their discussion led to more questions. Discussion questions #2 and #3 related specifically to the two DFR structure fires in 2011 that resulted in a severe injury and a LODD. Two DFR members were injured in very similar ways (falls through a pitched roof into the attic space). Three of the four participants in the round table discussion were not aware of the circumstances that led to the severe injury (discussion question #2), the fourth participant responded to the event and therefore knew about the details. As a reminder, there was no formal communication, for example, in the form of a safety bulletin or alert, to raise awareness in the Department about the events that led to the severe injury. All participants agreed that whenever they learn of an

injury they become more aware of dangers that are inherent in the job and they are more cautious (discussion question #3 and #5). However, they adamantly stated that the practices that occurred leading up to the LODD were routine and commonly accepted and therefore they believe it "would have happened to anybody."

In contrast, discussion question #4 discussed a recent apparatus collision involving a safety violation by the apparatus driver and all participants agreed that learning about this type of event does influence their behavior. Notably, they stated that increased departmental communication about events with negative outcomes could prevent injuries and damage by raising member awareness.

Participants' answers to discussion question #6 indicated that they were not likely to talk about dangerous or near-miss type events that they were personally involved in; this prompted a larger discussion. It seems that the details of the event influence their willingness to share their experiences. For example, if the event resulted because of an equipment, apparatus, or other type of mechanical malfunction, participants would talk about it. However, if the firefighter believed *his* decision-making caused the near-miss, he was unlikely to tell others about his experience. Formally reporting to a larger audience like a supervisor or the entire department was unlikely regardless of the situation.

Participants' responded in the affirmative to question #7 when asked if they feared formal punishment and/or agitation and teasing for reporting a near-miss event, if it occurred (in their belief) because of *their own* actions or decision-making. However, they all agreed that if the event occurred because of *someone else's* error or decision-making, they were likely to discuss it with their co-workers but not likely to make a formal report. It seemed that, in this case, raising

awareness was important enough that they would share their experiences with others. They expressed hope that raising awareness could prevent future near-miss occurrences.

How do organizations use injury and near-miss data to make changes that affect firefighter safety?

A large portion of the Literature Review addressed the broad topic of how organizations use injury and near-miss data to make changes that affect worker safety. However, specific details about how fire departments use this type of data to influence firefighter safety were needed for this project. Therefore, a review of fire department reporting policies and guidelines, in addition to original research in the form of a questionnaire and three interviews, were used to answer research question #3. The results showed that fire departments use injury and near-miss data in a variety of different ways to impact firefighter safety.

Injury reporting guidelines from the Austin (TX), Dallas (TX), El Paso (TX), and Phoenix (AZ) Fire Departments were received and reviewed. These guidelines give insight as to how the departments use injury data. The *Post Incident Review Policy and Procedure* for the Austin Fire Department details how lessons learned documents will be prepared, approved, and placed on the Education Services website (R. Garza, personal communication, February 9, 2012). The *Standard Procedures for the El Paso Fire Department* state that the *Accident, Injury, and Illness Report* is essential to an effective accident prevention program, and that it should include reports of near-misses (S. Mathewson, personal communication, February 7, 2012). Similarly, the section of the *Operations Manual for the Phoenix Fire Department* regarding injury reports emphasizes that the information will be used by the Health Center and the Safety Section to develop protective training programs, educational packages, and safety procedures (Phoenix Fire Department, 2006). Two DFR Directives (Appendix G) address the *Battalion*

Chief's Injury Report; the directives describe it as a tool used to record injuries in the

Department and note that it is necessary to comply with state mandated reporting requirements.

DFR's *On-Duty Injuries and Illnesses* procedures (the complete set is included in Appendix G)

do not indicate that injury data is used for cause analysis or as part of an injury prevention or risk

management program. Finally, DFR does not systematically or routinely disperse information

about how its members are injured; communication is informal and Departmental procedures do

not address how to share injury data for educational purposes.

A five-item questionnaire (questions #1-4 relate directly to research question #3) and a

request for information was sent to seven Safety Officers and one risk manager from eight fire

departments that are considered comparison departments for DFR. Initially, 11 fire departments

were contacted, but two departments did not respond to the initial and follow-up phone calls.

Additionally, one department referred the researcher to a county office outside of the fire

department and this researcher was unable to make contact with that office. Ultimately, eight

departments responded and provided information (73% response rate).

Seven of the surveyed departments answered in the affirmative for question items #1-4.

These responses show that many fire departments that are similar to DFR do collect injury data

for analysis and participate in some type of near-miss reporting program. Furthermore, they

confirmed that these departments use this type of data to support organizational changes that

have positively impacted firefighter safety in their departments. Only one of the comparison city

departments surveyed does not collect injury data for analysis, nor does it participate in any type

of near-miss reporting program. Table 1 shows a breakdown of the responses related to research

question #3.

Table 1

Comparison Cities' Responses to Questionnaire Items #1-4		
Question	Yes	No
Does your department collect injury data for analysis?	7	1
Does your department have (or participate in) a near-miss or lessons learned reporting program?	6 + 1 in development	1
Has injury or near-miss reporting influenced firefighter safety in your department?	7	1
Does your department use injury or near-miss data to justify purchases or support changes in policy, training, equipment, etc.?	7	1

Academic researchers have found that organizations use injury and near-miss data in the

decision-making process and to track improvements following policy, equipment, and training

changes. Many of the surveyed departments provided examples of how this type of data was

used in their own organization to affect firefighter safety. For instance, the Phoenix, Houston,

and El Paso Fire Departments purchased powered EMS stretchers in response to the number of

back injuries sustained by their members while lifting traditional stretchers (S. Mathewson,

personal communication, February 7, 2012; M. Ong, personal communication, February 11,

2012; J. Snow, personal communication, February 6, 2012). The San Antonio Fire Department

received several reports of firefighter neck burns; and, following a thorough investigation, it was

determined that the Velcro on the bunker coat neck piece needed to be larger (easier to grab) and

the manufacturer made the required repairs (A. Villareal, personal communication, March 1,

2010). Finally, the Los Angeles County Fire Department (LACoFD) responded to several

chemical suicides that were originally dispatched as a medical call only. Many LACoFD

members reported the details of these incidents, a training notice was distributed, and, as a result

of this near-miss type reporting, LACoFD members report an increase in situational awareness and personal safety (N. Berkuta, personal communication, February 7, 2012).

As mentioned above, organizations use this type of reporting to make purchasing and policy decisions and to evaluate changes. The El Paso Fire Department recently experienced a near-miss when a firefighter dropped a hose roll; it fell about forty feet from a training tower's exterior stairwell (S. Mathewson, personal communication, February 7, 2012). As a result, structural changes were made to the stairwell to prevent equipment from falling onto the training/drill area. The Austin Fire Department reported that a *Fireground Standard Operating Guideline* (SOG) was changed as a result of a critical injury (R. Garza, personal communication, February 9, 2012). Likewise, Miami Fire Rescue reported that they use injury and near-miss data to develop new safety procedures and to evaluate the effectiveness of their equipment (A. Plasencia, personal communication, February 7, 2012). Similarly, the Risk Manager for the Houston Fire Department reported that injury data, especially those related to burns, are used to justify large bunker gear purchases (J. Snow, personal communication, February 6, 2012).

The Dallas Police Department Safety Sergeant was interviewed to provide information related to DPD's injury and near-miss data collection (C. Cornish, personal communication, February 13, 2012). DPD does collect information documenting officer injuries but they do not actually analyze their injury data. DPD does not participate in any type of near-miss reporting and the Safety Sergeant responded that she did not see the value in this type of reporting. However, DPD does use information gathered internally as well as from other police agencies to develop training topics, Safety Bulletins, and policy changes. DPD Safety Bulletins are distributed to every officer in the Department, and they are maintained in a searchable on-line database.

The Assistant Director to the Dallas Parks and Recreation Department (DPRD) was interviewed to ascertain only if DPRD participates in near-miss or close-call reporting (J. McRorey, personal communication, February 13, 2012). DPRD operates a large fleet of heavy machinery and vehicles, and workers are involved with hazards ranging from pool chemicals to landscape and tree maintenance near power lines, above and below grade. However, the Assistant Director answered that they do not participate in near-miss reporting.

The DFR Safety Chief was contacted on numerous occasions to provide answers about how DFR uses firefighter injury information (F. Gray, personal communications, September 2011-February 2012). He responded that any type of analysis would be unreliable because the reporting rate is inaccurate and only about 55%. DFR does not have a near-miss reporting program and does not officially participate in this type of reporting. Sometimes, Safety Update topics are developed from information received relating to an injury or motor vehicle collision report. The Safety Chief indicated that DFR injury information is used only to develop the Safety Updates and not to justify changes in training, equipment, policy, or staffing.

What factors influence the success of an injury or near-miss reporting program?

A thorough search for factors affecting the success or quality of an injury or near-miss reporting program was performed. Existing literature describes many different types of reporting programs and reporting tools, yet there is not a clear definition of how to measure success. Most of the available literature discusses programs used by organizations other than the fire service. Consequently, a large portion of the answers to research question #4 stem from the experiences of the surveyed Safety Officers and the round table participants, in addition to the answers provided by two injury reporting specialists. The results indicate that there are specific factors that can affect the success of these reporting programs.

According to the literature, the issue of reporter anonymity appears to be a strong factor affecting participation in these types of programs. Reporting sites like the National Fire Fighter Near-Miss website credit the anonymous reporting aspect of their program as a key to their success. In fact, the Phoenix Fire Department is working on developing an internal near-miss reporting program and the current plan will allow users to remain anonymous (M. Ong, personal communication, February 26, 2012). Similarly, the round table participants explained that anonymity would strongly influence their participation in a reporting program in DFR. However, four comparison departments returned comments or examples of near-miss and lessons learned reports and none of the reports in their departments are submitted anonymously. Comments from the Safety Officers seem to indicate that fear of discipline is the issue rather than anonymity; many reported that it is essential for the reporting process to be non-punitive.

The literature clearly describes the importance of communication when it comes to worker safety. The responses from the surveyed Safety Officers and the fire department personnel (all round table and interview participants) confirm that open communication about injuries, near-misses, and lessons learned is wanted by workers and necessary for a safety program's success. Their comments stressed that it is important that the safety message "comes from the top." During his interview, the San Antonio Fire Department Safety Officer offered an example: the Fire Chief recently met with every member of the department following a serious apparatus rollover; his presence signaled to the Department that safety is a priority (A. Villareal, personal communication, March 1, 2012).

Information received from several fire departments and DPD indicates that safety messages are transmitted to every member via e-mail, internal website postings, or paper distribution. This is one area where the round table participants, DFR members, voiced extreme

concern. Their sentiment is that members are being injured and that others are learning of the causes and warning signs only by informal communication, or "through the grapevine."

Interviews with two injury reporting specialists provided informative results related to research question #4. Leah Roman, the FIRST Program director, explained how the program is receiving data from its pilot participants. In order to lessen the burden of reporting, no new reporting forms were created for the FIRST Program. Rather, the data is gathered from several points (fire department injury, accident, and incident report forms, worker compensation programs, hospital records) and it is coded and processed by FIRST. Roman mentioned that fire departments should be calculating their rate of injury, but that many do not do this type of analysis. FIRST researchers are calculating a cost for each firefighter injury that they receive. The total cost of an injury is a variable that is very desirable, but this researcher was unable to find any other comparison city department that included cost in its injury report.

During the interview, Roman provided a summary of a presentation given at the 2011 Fire Department Safety Officers Association Annual Safety Forum. This proved to be directly related to research question #4. The presentation was designed to: (a) identify current limitations in firefighter injury data, (b) discuss strategies for improving firefighter injury data collection, and (c) describe the lessons learned from the FIRST project. Roman and her colleagues emphasized that existing firefighter injury data that is stored in the National Fire Incident Reporting System (NFIRS) and collected by NFPA surveys is not generalizable, not reliable, and not reproducible. They note that because of this, it is important for individual fire departments to analyze their injury data to understand the specifics about safety in their own departments. The presenters stressed that existing data collection efforts are missing important information

regarding the nature, cause, and context of injuries, and they are not scientifically based (Taylor & Roman, 2011).

Relatedly, they provided recommendations that fire departments can use to improve their own injury reporting systems. Departments should code injuries for analysis by using a standard classification of body region and nature of injury; this will allow for comparison. Narrative portions of reports should be analyzed. Both Roman and Taylor, the TCFP injury reporting specialist, mentioned that the narratives are often the first place where clues to new hazards may surface. Additionally, a "data dictionary," used to describe code definitions, should be developed or adopted, Roman said. Finally, she identified "cultural barriers to reporting," such as a firefighter's fear of punishment, that need to be addressed in order for reporting systems to be effective.

The interview with Laurie Taylor described the Texas Commission on Fire Protection firefighter injury data collection program that was recently mandated by law. The reporting process is brief and provides very basic information related to the firefighter and the circumstances of the injury. The initial reports are reviewed to ensure compliance, to allow for information in the narrative portion to be analyzed, and to evaluate whether a follow up or investigation is needed. Taylor did mention that the reporting process is designed to minimize the burden of reporting. When asked about her overall impression of the data, she indicated that they are collecting a lot of information, but that perhaps the numbers are just one very small piece of the puzzle.

Using action research to evaluate and improve injury reporting in Dallas Fire Rescue

The primary tool used to assess the status of the current injury reporting system in DFR was the SWOT analysis. The results of this analysis are shown in Appendix O. The strengths,

weaknesses, opportunities, and threats to/of the program were measured against the recommendations found in the literature review as well as standards set by other industries and reporting agencies. Using this comparison approach allowed the researcher to organize and identify ways to improve DFR's injury reporting form.

The positive aspects of the *BC's Injury Report* (Appendix P) were determined to be mostly administrative in nature. For example, it is stored online in a fillable form, ready to print, there are large sections for narrative comments, it prompts the reporter for action (disposition of report, damaged PPE or SCBA), and it is sent directly to the Department's Safety Officer. This researcher aimed to retain these features for the new injury and near-miss report forms.

The weaknesses of the *BC's Injury Report* are primarily content related. Given the extensive amount of published research related to occupational injuries, the *BC's Injury Report* is outdated. It does not specifically address any of the factors that many injury reporting specialists believe to be root causes of worker injuries. According to the literature, cultural (accepted practice), supervisory, and personal (ill, fatigued, inexperienced, over-tasked) factors present at the time of injury should be included in the description of the event. The narrative sections were listed as a Strength in the first section of the SWOT analysis because it allows the reporter to be descriptive. However, large narrative sections are considered undesirable because they take up valuable space on the document form. A review of the injury report templates submitted by the Safety Officers from the comparison city fire departments showed that many forms today have several sections of check-boxes with standardized injury codes, as recommended in the literature, and a small narrative space; attachments can be made as needed. Also, the *BC's Injury Report* does not list the TCFP "investigable" injuries (Appendix Q) and it requires a lot of interpretation and coding by a single person, the Safety Officer. "Investigable" injuries are ones that involve a

malfunction of personal protective equipment, SCBA, or personal alert safety system (PASS), or a failure to comply with commission mandated department standard operating procedures. A final, seemingly minor weakness is that the form lists incorrect information regarding the disposition of damaged PPE or SCBA.

The results from the Strength and Weakness assessment in the SWOT analysis were the key factors considered during the design of the new injury reporting form (Appendix R). One-third of the new form contains space for data code entries that describe the injury and event. The codes are defined in the Injury/Event Codebook (Appendix S); it was designed to match the NFIR System (retrieved from: www.usfa.fema.gov/downloads/xls/NFIRS4_Codes.xls). NFIRS codes were selected because the TCFP uses them to document injuries and the FIRST program retrieves NFIRS data from one of its pilot sites. The remainder of the form gathers specific data related to organizational, supervisory, and personal factors that may have contributed to the injury event. The form requires a narrative attachment and it prompts the reporter with three specific questions about the event. Instructions regarding the correct disposition of the form and any damaged PPE are highlighted. Finally, TCFP investigable injuries, failures, and violations are marked with an asterisk to indicate their importance. The new injury reporting form was the first component of the final product of the action research.

The factors listed in the Opportunities and Threats section of the SWOT analysis relate mostly to the Discussion and Recommendations sections of this project. Therefore, they are reviewed in that context further in this ARP.

Using action research to improve near-miss reporting in Dallas Fire Rescue

DFR does not formally participate in near-miss reporting; neither does the Dallas Police Department or the Dallas Parks and Recreation Department. The interviews with administrative

staff members from all three departments confirmed that they participate in injury reporting only. Therefore, the results garnered from related literature, near-miss reporting websites, and information from firefighter and Safety Officer interviews were used to build a lessons learned reporting form.

The design of the lessons learned reporting form was driven by concerns for the user/reporter and the need to investigate root causes. Several sources indicated that the option for anonymous reporting was at least desirable and some said they would only make a report if they could remain anonymous. Also, one of the strengths of the injury reporting form was that it was easy to access and available in a fillable form online; the lessons learned form is intended to be used the same way in order to decrease the burden of reporting. The National Fire Fighter Near-Miss reporting program found that most of the people reporting to its site have less than ten years of experience and hold the non-officer rank of firefighter; thus, the lessons learned form was designed for use by everyone, regardless of rank and years of experience.

The final issue related to the user/reporter involves accountability. Results from the Safety Officer and reporting specialist interviews, and responses from the round table participants, showed that firefighters avoid reporting because they fear punishment. Although punishment is an administrative action, these results suggest that clearly designating the report as non-punitive is important.

The format of the lessons learned reporting form was built around the need to investigate the root causes of the event. Traditionally, report forms have focused only on the actions of individuals. However, researchers have found that undesirable, dangerous, and unacceptable events are caused predominantly by organizational and supervisory culture and practice rather than individual members. Therefore, a large portion of the lessons learned reporting form allows

the user to identify organizational traits and supervisory issues, in addition to individual actions, as causes or contributing factors. Its layout is very similar to the new injury report form; it highlights TCFP investigable injuries and it prompts the reporter with three questions related to the event that should be answered in an attached narrative. This was the second component of the final product of the action research methodology and it can be found in Appendix T.

Discussion

"Bring the past only if you are going to build from it."

- Doménico Cieri Estrada

The broad goal of this project was to strengthen the understanding of firefighter injuries in the Dallas Fire Rescue Department. Recent severe injuries and two Line of Duty Deaths established the importance of this project at the local, jurisdictional level and a comprehensive literature review proved that overall injury and near-miss reporting and analysis is a concern and challenge across many occupations. Four questions were used to focus and guide original research specifically aimed at describing how fire departments use injury and near-miss reporting to positively impact firefighter safety. The corresponding results were compared to findings in the literature review and they are discussed here.

The first major finding of this study was that firefighters use injury and near-miss data in different ways to impact their own safety. Most often, the data or reports of injuries and near-misses encourage behavioral and decision-making changes in the individual. Madsen (2009) found that members change or adjust their behaviors when they learn of an accident; they update their own mental safety model and become more compliant with existing safety regulations. Interview and round table participants confirmed this and the analysis of Internet testimonials indicated that firefighters do use this type of information to change their attitudes and behaviors.

Recall that Scott and Tretheway (2008) described how firefighters tend to discount the hazards and dangers associated with the job. The sentiments expressed by the round table discussion participants imply that this is true in DFR, specifically among experienced firefighters who were closely involved with two LODDs at structure fires. Although the findings from the round table are not generalizable, they are significant because researchers know that a worker's perception of hazards and inherent risks influences his or her safety values and behavior (Clarke, 1998; Earnest, 2000; Pransky, Snyder, Dembe, & Himmelstein, 1999). As expected, the interview and the round table participants all agreed that when their awareness of safety problems is raised, they modify their behaviors accordingly.

In his analysis of the U.S. mining industry, Madsen (2009) concluded that the type (direct versus vicarious) and timing (new versus old) of events influence worker learning and a portion of this project supports his findings. This researcher interpreted the responses from the round table participants to mean that the saliency and primacy of events has influenced their learning. Additionally, the analysis of the firefighter testimonials showed that vicarious learning does occur and is used often as a training tool in the fire service. This finding is related to research that shows that formal and repeated training efforts based on past experiences leads to safer organizational behaviors (Wong et al., 2005) and this relationship could be tested if fire departments calculated their rates of injury.

The second major finding of this research was that organizations use injury and near-miss data in many different ways to improve firefighter safety. Lauver et al. (2009) established that employers can track when and where injuries occur so that current safety problems and potential issues can be addressed. And, as injury investigations allow organizations to discover root causes of accidents and system failures, corrective measures can be designed and implemented

(Welborn & Boraiko, 2009). Several Safety Officers provided examples of how detailed injury investigations and near-miss reports have been used to identify and mitigate safety problems in their departments.

A positive safety climate and open communication regarding safety issues has been associated with decreased injury rates in other occupations (Hofmann & Stetzer, 1998; Krause et al., 2010). However, this finding has not been confirmed in the fire service because, as mentioned above and emphasized by Leah Roman and the FIRST program, fire departments do not calculate their injury rates. Yet, the impact of open communication and a positive safety climate on overall injury and near-miss reporting was supported by the research presented here. When employees believe their supervisors value safety they are more likely to report negative events (Lauver et al., 2009; Littlejohn et al., 2010) and the fire officers who were interviewed specifically noted that reporting compliance has increased as their department's safety climate has improved.

Relatedly, Maher and Casamayou (2009) found that in order for organizational learning to occur, workers must have access to data and then acknowledge that the results are unsatisfactory. The DFR round table participants clearly desire more communication regarding injuries, safety violations, and near-misses. And, several of the Safety Officers indicated (in their answers to questionnaire item #5) that they would like access to accident and injury information from similar departments or from their state, so that they can have a relative measure of their safety situation. Finally, many of the respondents from comparison city departments indicated that they present injury and near-miss data reports as learning opportunities, as recommended by Maher and Casamayou (2009) and the Columbia Accident Investigation Board (2003).

Building a centralized, searchable database is another way to facilitate organizational and individual learning (Columbia Accident Investigation Board, 2003; Maher & Casamayou, 2009; Rogers Commission, 1986; United States Army, n.d.). Several articles in the literature review supported this and the responding Safety Officers emphasized the importance of sharing and retaining institutional knowledge. The primary way respondents achieved this was by compiling injury and near-miss reports online or by distributing them to individual members in their organization.

Tri Data (2004) and NIOSH's Surveillance Strategic Plan encourage organizations to share injury data with researchers. This was identified as an Opportunity for DFR during the SWOT analysis. The interviews with the two injury reporting specialists highlighted the importance of data sharing and its probable impact on firefighter safety. To facilitate data sharing, standardized injury codes are recommended (Taylor, 2011) and this research found that the FIRST program and the TCFP use NFIRS codes in their data analysis.

Researchers found that injury and near-miss data are used by organizations when making formal policy, equipment, and training changes. Data analysis allows for the identification and targeting of problem areas (Columbia Accident Investigation Board, 2003; Krause & Russell, 1994) and it facilitates the evaluation of safety policies and procedures (Lauver et al., 2009). Furthermore, measuring performance can help determine whether safety efforts are having the desired outcome (Petersen, 1998). These findings were directly supported by the information gathered from the Safety Officers during this research. Seven of the eight respondents stated that they use this type of data for resource and budget allocation. These departments also use injury and near miss data to justify policy and training changes.

Two findings in the literature were not completely supported by this research. Scientific research shows that organizational factors are often the root causes of dangerous or careless worker behaviors. Thus, the literature recommends that injury investigations focus on identifying organizational and systemic failures rather than simply examining individual errors ("About HFACS," n.d.; Columbia Accident Investigation Board, 2003; Kunadharaju et al., 2011; Petersen, 1998; Sklet, 2004). This researcher found that the reporting worksheets for the commercial airline industry and many of the electrical lineworker companies allow the user to cite these causes. However, despite this, this researcher did not find any accident or injury reporting forms in the fire service that addresses organizational or systemic causes.

The question of anonymity was the second issue investigated that produced mixed results. The vast majority of the literature reviewed indicated that anonymous reporting was an important factor affecting the success of a near-miss reporting program. The National Fire Fighter Near Miss Reporting System and the program that is being developed by the Phoenix (AZ) Fire Department both allow anonymous submissions. Yet, none of the near-miss and lessons learned reports returned to this researcher by comparison departments were submitted anonymously. The majority of the testimonials submitted to the national near-miss website were signed, identifying the reporter. It is this researcher's conclusion that it is the fear of punishment that is impacting reporting participation (as suggested by Lerner & Tetlock, 1999; Rose, 2004) and driving the need for anonymous submissions. DFR round table participants seemed adamant about avoiding punishment and stated they would only participate in an anonymous reporting program. Clearly, organizations need to address this problem. Fostering a safety climate can overcome the fear of reprisal (Hofmann & Stetzer, 1998; Morris & Moore, 2000; United States Army, n.d.); the fire department officers surveyed for this project confirmed this.

The third major finding of this research was that there are factors that affect the success of an injury and near-miss reporting program. Results from this research strongly supported the findings in the literature. A significant amount of research ties the success of reporting programs to the organization's ability to communicate or share the results with others (Columbia Accident Investigation Board, 2003; Maher & Casamayou, 2009; Rogers Commission, 1986). Respondents indicated that communication is critical, whether it is in the form of an online database, individual e-mails, or paper documentation that is posted or dispersed to members. The DFR Operations Battalion Chief and the round table participants expressed sincere concern about the striking similarities between the severe injury and the LODD within the Department and they questioned whether increased communication about injury causes could have made a difference.

An organization's motivation or intent impacts the success of reporting programs as well. Investigations should be aimed at finding cause, not fault (Maher & Casamayou, 2009; Rose, 2004), and reporting should be an opportunity, not a self-sacrificing experience (Hofmann & Stetzer, 1998; Morris & Moore, 2000; United States Army, n.d.). More specifically, organizations should examine root causes like systemic and cultural factors instead of focusing only on the actions of individuals (Columbia Accident Investigation Board, 2003; Hofmann & Stetzer, 1998; Kunadharaju et al., 2011; Petersen, 1998; Sklet, 2004; Taylor & Roman, 2011; "About HFACS," n.d.). Taylor and Roman (2011) recommended analyzing cultural factors as possible causes and Roman confirmed the importance of this in her interview. Underestimating the importance of these recommendations can impact reporting participation; the DFR round table participants reported a definite fear of punishment and negative feelings toward an organization determined to find fault rather than solutions. In contrast, the comparison cities'

Safety Officer respondents exhibited a true interest in improving safety and they advocated non-punitive reporting programs. Art Villareal, the San Antonio (TX) Fire Department Safety Officer made it clear when he said that, "(basically) the only thing you will get in trouble for is *not* reporting" (A. Villareal, personal communication, March 1, 2012).

Researchers recognize that achieving a positive safety climate in an organization requires significant cultural changes. Considering this, this researcher can see the value in anonymous reporting programs (like the National Fire Fighter Near-Miss Reporting System) or programs that re-direct accountability to outside agencies (like the Aviation Safety Reporting System). The goal, however, should be to create a cause-finding program that does not intimidate users.

Finally, certain logistical aspects of a reporting program influence its success. In order to capture the true picture of an organization's safety situation, the department cannot rely on Worker Compensation reports alone (Azaroff et al., 2002), it should calculate the cost of each injury and its injury rate (L. Roman, personal communication, February 20, 2012; Petersen, 1998; TriData Corporation, 2004), it should use standardized injury reporting codes (NIOSH 2011; Taylor, 2011; Taylor & Roman, 2011), and report narratives should be analyzed (L. Roman, personal communication, February 20, 2012; L. Taylor, personal communication, February 29, 2012). These recommendations directly relate to the contents of injury and near-miss reporting forms and were strongly considered during the design of the two forms produced for this project.

There are particular implications for DFR, based on the three major findings of this research. As noted by Taylor and Roman (2011) and NIOSH (2011), current fire service data collection programs are not generalizable and not reliable; this confirms the importance of this ARP and it underscores the need to build a successful reporting program in DFR. This research

found that several fire departments that are similar to DFR have well-developed injury reporting programs. They have procedures that define how injury data is shared, where it is stored, and how it used for educational and decision-making purposes. Furthermore, all of the responding fire departments that have injury programs also have or participate in some sort of near-miss or lessons learned reporting. Finally, the state regulatory agency, TCFP, has mandated that all fire departments complete the "Courage to Be Safe Program" by 2015; one of the Program's initiatives requires departments to thoroughly investigate all firefighter fatalities, injuries, and near misses. The TCFP also encourages all regulated departments to communicate lessons learned to their members. Clearly, an injury and near-miss reporting program is a fundamental component of a fire department's risk management plan, and operating one has become a national standard of practice. Based on the findings presented here, DFR's injury reporting program is substandard.

As mentioned, DFR has implemented policy and emergency response changes following recent LODDs and severe injuries that occurred at structure fires. These changes included adding a second ladder truck and a second battalion chief (after a severe injury in 2005), originally when there was confirmation by first responders of a working fire, and now, they are automatically dispatched as part of a first alarm response on a reported fire (following a 2011 LODD). Additionally, the special/technical rescue group's response was upgraded from a third alarm to a second alarm, after a LODD in 2011. Fireground policies have been changed as well, particularly those that involve truck company operations. These emergency response changes are not without risk; dispatching additional emergency responders increases exposure to both members and citizens during travel to and from the emergency scene and to firefighters operating at incidents. An increase in costs has accompanied these changes as well; financially, in terms of

apparatus wear and tear, and perhaps in safety by making apparatus unavailable for assignment in their first due area. Currently, DFR does not evaluate or analyze the cost, benefits, or the effectiveness of these changes. A comprehensive injury and near-miss reporting system could provide a variety of objective feedback on the quality and necessity of these policy and response changes.

Recommendations

The purpose of this project was to develop new reporting forms that can provide injury and near-miss data for analysis. This was accomplished with the action research method, and aided by a detailed literature review and original research efforts that included interviews, a questionnaire, and a round table discussion. However, new reporting forms are only the first step in a complicated process aimed at positively impacting firefighter safety in the Dallas Fire Rescue Department. Therefore, following extensive study, this researcher developed specific recommendations that can improve injury and near-miss reporting. Based on the findings presented here, the recommendations are:

- So as to comply with national fire service standards, DFR should thoroughly investigate all accidents, injuries, and near-misses. The Department should use a non-punitive process to ensure that every accident, injury, and near-miss is reported.

- So as to distribute the responsibilities and develop the potential positive impact of the Department's one (single) Safety Officer, DFR should establish a Safety Committee. The Safety Committee should be subordinate to the Safety Officer. It should represent the diversity of the Department and be charged with investigating all accidents, injuries, and near-misses. Furthermore, it should provide recommendations and research related to policy, procedure, training, and equipment changes that may impact the safety of the Department's

members. Finally, Committee members should be safety advocates and change agents as the Department moves forward in this effort.

- So as to protect the Department and the City of Dallas, DFR should investigate and determine the consequences of acknowledging the impact of organizational and systemic factors on accidents and injuries. The reporting forms recommended in this ARP allow the user to document organizational causes of injuries. DFR should explore any liability related to this type of reporting that "blames" systemic, rather than individual factors.

- So as to improve its injury reporting process and to establish a way to document near-misses, DFR should adopt the injury and near-miss reporting forms that were the end-product of this ARP. These forms were developed following extensive research and they represent a vast improvement from the current, outdated reporting form. The forms were designed to prompt the user to recognize TCFP investigable injuries, they evaluate individual, environmental, and organizational causes, and they use standardized injury codes to facilitate data entry, data submission, and data sharing. These reports provide data so that reliable comparisons can be made and analyses can be performed to evaluate trends.

- So as to define Departmental expectations and performance standards, DFR should update its injury reporting policies and procedures and then enforce them. DFR policies and procedures should be updated to reflect the current standard of injury and near-miss reporting. They should outline reporting requirements and detail how the data will be used, shared, and stored. The policies should include a description of how formal communication will be used to inform members of the circumstances and corrective actions related to accidents, injuries, and near-misses.

- So as to improve firefighter safety in the Department, DFR should use accident, injury, and near-miss reports as training tools. Nine years passed before the Department developed and administered a training lesson related to the last fire-related LODD it experienced in 2002. Research shows that organizations that train regularly on actual events experience a lower injury rate (Wong et al., 2005).

- So as to improve reporting compliance and thereby gain an accurate picture of the Department's safety situation, DFR should commit to fostering a positive safety climate. The findings in the published literature and in this paper show a strong correlation between a positive safety climate, increased event reporting, and fewer accidents and injuries.

Future researchers may wish to replicate portions of this study in their own departments. Existing research suggests that occupational injury data is not generalizable and therefore, organizations should evaluate their own reporting programs. Future researchers are invited to explore possible partnerships between their organizations and outside agencies that have the resources and knowledge to develop, analyze, and monitor an injury and near-miss reporting program. Methods to calculate total injury costs vary and future researchers should define the term and standardize its calculation. Finally, future researchers should examine the relationship between injury and near-miss reporting and injury rates in the U.S. fire service. Establishing a correlation between reporting and injury rates will provide substantial support for these programs and, more importantly, may finally suggest a solution to the steady rate of firefighter injuries and deaths suffered every year.

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Appendix A

Interview with Dallas Fire Rescue Operations Battalion Chief – February 13, 2012

1. Do you think that increased communication about the circumstances and causes of DFR injuries and near-misses would affect your safety as an individual firefighter?

- Yes, individually, it would make me more cautious

2. Do you think that this type of communication could improve your ability as an Incident Commander?

- Yes, it would aid in my decision making and "risk assessment"

3. As a Battalion Chief, could you use this type of communication to educate your subordinates or provide additional training?

- Yes, currently I use this type of information from other departments as tools for training

4. Based on your career experiences, are you concerned that the lack of injury-related communication within DFR may negatively impact firefighter safety?

- Yes, it bothers me when serious injuries result from similar circumstances. I believe that increased communication about the specifics can make our members more aware

Appendix B

Consent Form

Round Table Discussion
February 13, 2012

1. **Contact Information:** For questions or requests for additional information, contact the researcher: Lauren Johnson, lauren.johnson@ ██████████.com, or call (214)███-
   ███.

2. **Research Purpose:** Results from this discussion will be used to answer questions about how injury and near-miss reporting can be used to improve firefighter safety.

3. **Voluntary Nature of Participation:** Your participation in this discussion is strictly voluntary. Should you choose, you may stop participating at any time during the discussion and you may contact me to revoke your participation any time, up to the time that the paper is submitted. You may withdraw your consent at any time without penalty.

4. **Protection of Confidentiality and Privacy:** Your personal privacy will be maintained. A description of your gender, age, rank, and years of service will be documented in the Appendix of the paper. Any statements you make will be attributed to "Respondent" or "Participant" only.

5. **Use of Data:** Initially, your responses will be documented in writing during this discussion. Then, they will be listed as responses in the Appendix of my paper. They will be preserved in a digital format without personal identifiers on my personal computer only.

Appendix C

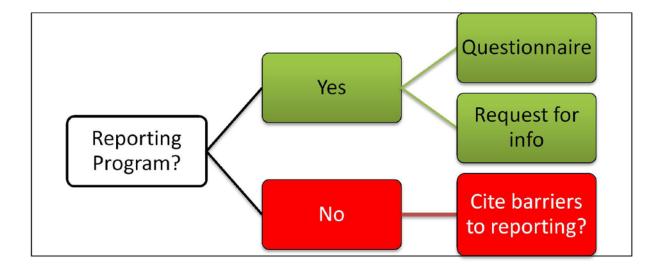Interview – Fire Lieutenant, Combination Department, February 15, 2012

# of Firefighters	# of Fire Stations	Population Served
1400 career, 300 volunteer	38	1, 000, 000

1. Can you provide me with your age and years of service?

- 35 years old, about 10 years with the department

2. Can you describe how firefighter injury and near-miss reporting has impacted

    firefighter safety in your department?

- We do a really good job at this, so do other departments (mentioned Prince

  William Co.)

- It has raised awareness, increased knowledge about dangers inherent in our job

- We share information and are very open and detailed with our investigations

- Culture has changed towards accepting this

3. Has this type of reporting changed your behavior and/or aided in your decision-

    making as a company officer?

- Yes, learning about the close call helped change

4. Have you noticed, or been told of, how this type of reporting is affecting other

    firefighters and officers?

- Yes, noticed a change in the other officer that I work with as well as with the crew

  members, following the close call and the lessons learned report

Appendix D

Comparison Departments

Department Name	Location	# Stations	# Firefighters	Population Served
Dallas Fire Rescue	Dallas, TX	56	1900	1,300,000
Austin Fire Department	Austin, TX	45	1100	790,000
Denver Fire Department	Denver, CO	34	900	600,000
El Paso Fire Department	El Paso, TX	34	878	650,000
Ft. Worth Fire Department	Ft. Worth, TX	44	900	742,000
Houston Fire Department	Houston, TX	92	3851	2,000,000
Los Angeles County Fire	Los Angeles, CA	172	3550	1,000,000
Miami Fire Rescue	Miami, FL	14	545	400,000
Miami-Dade Fire Rescue	Miami, FL	66	2070	
Philadelphia Fire Department	Philadelphia, PA	61	2200	1, 526, 000
Phoenix Fire Department	Phoenix, AZ	57	1936	1, 603, 000
San Antonio Fire Department	San Antonio, TX	50	1600	1, 400, 000

Appendix E

Example of E-mail and Five Item Questionnaire

Chief Mathewson:

Just to follow up after our phone conversation: I am working on an applied research project as a student in the Executive Fire Officer Program at the National Fire Academy. My paper focuses on firefighter injury and "near-miss" (or accident or lessons learned) reporting. Thank you so much for your help.

Please see the 5 item questionnaire below. If it is most convenient, you can just reply to this e mail and enter your answers on the same message. Also, if you are able to scan or attach the form(s) that you use for injury or accident reporting, that would be extremely helpful.

1. Does your department collect on-duty injury data for analysis?
2. Does your department have (or participate in) a near-miss or lessons learned reporting program?
3. Has injury or near-miss reporting influenced firefighter safety in your department? If yes, please give an example.
4. Does your department use injury or near-miss data to justify purchases or support changes in policy, training, equipment, etc.?
5. As a safety or training officer, what piece of data do you wish you had that your department does not currently collect?

Currently, Dallas Fire-Rescue uses one form to report injuries to the Safety Chief; but we do not have a near-miss reporting program. I'd be happy to share any information related to our injury reporting process. If you have any questions about this research or if I can be of any help in the future to you, please do not hesitate to call.

Best regards,
Lauren

Lauren Johnson
████, Station ██
Dallas Fire Rescue
Cell: (214)████████

Appendix F

Subject Matter Experts

Subject Matter Experts

Title	Name	Organization	Contact Information
Incident Safety Officer, Division Chief (Ret.)	Steve Peggs	Green Bay (WI) Fire Dept.	(469)273-0500 speggs@me.com
Program Manager	Leah Roman	FIRST	(215)571-4030 lar92@drexel.edu
Injury Reporting Specialist	Laurie Taylor	Texas Commision on Fire Protection	(512)936-3831 laurie.taylor@tcfp.state.tx.us

Appendix G

DFR Injury Reporting Procedures and Directives

2007 DEPARTMENTAL DIRECTIVE #19

May 16, 2007

TO: All Members of the Fire-Rescue Department
SUBJECT: Battalion Chief's Injury Report

One of the responsibilities of the Safety Division is to track and investigate on-duty firefighter injuries. The results from injury investigations and data will be utilized in determining the future PPE needs, identifying training issues, and reviewing departmental procedures.

The current set of injury forms utilized by our workers comp office do not provide the Safety Division with the initial information needed to determine which incidents need additional investigation. In an effort to enhance our efficiency within Safety, a Battalion Chief's Injury Report has been created to address these needs.   This form will be completed on all on-duty injuries and submitted DIRECTLY to the Safety Officer prior to the end of the shift. The form will be distributed to each Battalion Chief.

The Safety Officer is currently notified by pager of all on-duty injuries transported to a medical facility. 831 or 832 are available nights and weekends to assist in any injury investigation and have additional resources available.

The RM1A, Supplement, and other injury paperwork will be sent to workers comp. General Procedures is currently in revision and the Battalion Chief's Injury Report will be reflected in the updated edition. The BC's Injury Report will be distributed and can be printed from the IDS Directive. In an effort to streamline the current injury paperwork, IDS is currently working on getting all injury forms on-line.

Eddie Burns Sr.

EDDIE BURNS, SR., Fire Chief
Dallas Fire-Rescue

2011 DFR DEPARTMENTAL DIRECTIVE # 58

DALLAS FIRE-RESCUE

DATE: October 18, 2011

TO: All Dallas Fire-Rescue Members

SUBJECT: Texas Commission on Fire Protection-Injury Reporting

The Dallas Fire-Rescue Department (DFR) is required to report all on the job injuries to the Texas Commission on Fire Protection (TCFP). The information captured is utilized to ensure departments are in compliance with state mandates and also to monitor trends within the fire service. The Safety and Worker's Compensation Section works in conjunction with TCFP to provide the required data.

The **Battalion Chief Injury Report** is a tool utilized by the Safety Section to accurately record injuries occurring within the department. This document must be completed by a supervisor anytime a member is injured. It can be accessed from IDS under the FORMS drop-down menu. The report will be sent thru channels to the Section Chief of the Training and Support Services Bureau (832) within 24 hours.

Emergency Response members should also note that additional information and actions are required in the event of a burn injury. All of the injured member's Personal Protective Equipment (PPE) must be delivered to the Clothing and Supply Section as soon as possible (preferably by the injured member to ensure the replacement gear is the appropriate size). The Clothing and Supply Section will provide loaner equipment, deliver the gear to the third party vendor for cleaning/inspection, and notify 832 of the disposition of the gear. The Section Chief of Training and Support Services will be responsible for photographing the gear, gathering the data related to the incident, and responding to the TCFP inquiry. This process will ensure that DFR is compliant with all TCFP injury reporting mandates.

In addition, as required by TCFP, DFR has an advanced cleaning program that ensures all PPE is cleaned and inspected bi-annually. Participation in the program is mandatory. Supervisors of individuals assigned PPE are required to monitor their subordinates' participation. Non-compliance will result in appropriate disciplinary action. Clothing and Supply provides the PPE cleaning and inspection schedule to all Deputy Chiefs. In the future this document will be posted on IDS under member information.

Please contact Section Chief Fernando Gray, Training and Support Services, with any questions or concerns at 214-243-1190.

Louie Bright, III, Interim Fire Chief
Dallas Fire-Rescue Department

VI. ON-DUTY INJURIES AND ILLNESSES

A. Introduction
1. The City of Dallas is self-insured under the Workers' Compensation Act of the State of Texas, and all rules of this Act are applicable.

2. In the case of an on-duty injury or job-related illness, expenses for medical treatment, weekly compensation during periods of lost-time and lump-sum settlements for any permanent disabilities resulting from such job-related injury or illness are covered by the Workers' Compensation Act.

3. The City of Dallas retains an adjusting company to administer claims. City Of Dallas
    a) The current City of Dallas Workers' Compensation Administrator/Adjuster is Ward North America, 8585 Stemmons, Suite 200, Dallas, TX 75247, telephone (214) 688-1992.

4. The City of Dallas retains various consulting companies that provide medical case management and rehabilitation services.
    a) These companies are retained to:
        (1) Keep the Department informed of the patient's recuperative needs;
        (2) Assist patients in obtaining care;
        (3) Provide patient counseling;
        (4) Advise the Department.
    b) These companies are consulted when:
        (1) The quality of the medical care being received by member is in question;
        (2) It appears that the patient's recovery is not proceeding as rapidly as others with similar problems;

(3) The member has a history of frequent or recurring injuries;

(4) The validity, legitimacy, or circumstance of occurrence of the injury is in question;

(5) It is believed by the Department Workers' Compensation Representative or the City Risk Management Manager that it is in the best interest of the City to utilize any specialized expertise.
    a) Members will be notified by phone or by mail when the services of a rehabilitation specialist have been called upon in a given case. The member and his physician will be expected to cooperate fully with these representatives of the City.

B. Definitions
1. On-duty injuries and illnesses occur whenever:
    a) Members suffer a physical injury within the course and scope of their employment;
    b) Members suffer an illness that is job related;
    c) Members, within the course and scope of their employment, are exposed to a hazardous chemical or a known carcinogen.
        (1) "Expose" or "exposure" means that a member is subjected to a hazardous chemical through any route of entry, including inhalation, ingestion, skin contact, or absorption.
        (2) Exposure includes potential or accidental exposure.
    d) Members, within the course and scope of their employment, have contact with a communicable disease; whereby the member may contract that disease.
        (1) A communicable disease contact includes any method whereby the disease can be spread.
        (2) A communicable disease contact may include, but is not limited to blood, urine, air, saliva, or skin contact.

2. For purposes of Workers' Compensation, injury designations are:
    a) First aids - Injury/illness sustained but no medical treatment rendered.
    b) Medical only - Injury/illness sustained and medical treatment rendered, but time lost is less than one full day or shift.

c) Lost time - Injury sustained, medical treatment rendered and one or more days lost from work, excluding the day or shift on which the injury occurred and the day or shift of return to work.

3. Adjusting Company - Private firm employed by City to administer provisions of the Workers' Compensation Laws.

4. Texas Workers Compensation Commission - State agency empowered to administer provisions of the Workers' Compensation Laws.

5. Department Workers' Compensation Representative - staff person who functions as liaison between servicing agent and the Department.

C. Injury Leave and Wage Supplementation
1. Injury leave and wage supplementation will be allotted and administered per the City of Dallas Personnel Rules, Article VII, Section 34-42 and 34-43. City Personnel Rules are listed separately in the Department's IDS MOPs section.
    a) Members are responsible for submitting current medical reports justifying their continued absence.
    b) Medical reports are to be submitted in advance of the period of absence addressed.
    c) Members failing to comply with Article VII, Section 34-43 are subject to having wage supplementation payments stopped.

2. Extensions of injury leave beyond the first four (4) weeks must be approved by the Chief of the Department or his designee, and must be reviewed every four (4) weeks or more often as necessary. Extensions beyond 12 weeks, in addition to the initial four (4) weeks, must be authorized by the Director of Risk Management, upon recommendation of the Chief of the Fire-Rescue Department.
    a) When considering requests for extensions beyond four (4) weeks, the Department:
        (1) Will grant extensions up to 12 weeks, in addition to the first four (4) weeks, and request, through Risk Management, extensions beyond 16 weeks for injuries received in the course of performing emergency operations or in vehicle collisions en route to a dispatched emergency.
        (2) Will grant extensions up to 8 weeks, in addition to the first four (4) weeks, for injuries received in the course of performing required job activities, such as plug maintenance or the Department Physical Fitness Program, when appropriate efforts are being made by the member to achieve recovery and return to duty.
        (3) Will not grant extensions of more than four (4) weeks, in addition to the initial four (4) weeks, for simple muscle strains or sprains without medically confirmed disc involvement in backs or severe damage in knees or shoulders.
        (4) Will not grant extensions for injuries unrelated to emergency operations or required job activities.
        (5) Will not grant extensions in any case when a violation of a safety rule or regulation contributed to the injury.
    b) The Department Workers' Compensation Coordinator will notify the member two (2) weeks prior to the time that the member is to run out of injury time.
    c) Leave extensions will not be considered without a current Wage Supplementation Extension Request Form (DFD Form 357) completed and signed by the attending physician. Actual estimated date of return to work must be included. Unknown or undetermined dates of return to work will not be accepted.

3. Injury leave with full wage supplementation is a privilege that may be granted by the City to the Fire-Rescue Department and its members.

D. Forms
1. The Workers' Compensation Law of the State of Texas requires that specific forms be properly completed and submitted in line with established procedures of the State of Texas. For detailed instructions concerning proper completion of these forms, refer to the Dallas Fire-Rescue Department Manual of Procedures, Records and Reports, Volume 7. For clarification in unusual situations, assistance should be requested from the member's immediate supervisor.

2. Supervisor's Injury Investigation Report (RM1a) should be submitted whenever an on-duty injury or illness occurs.

    a) The RM1a should be submitted as follows:

        (1) Alone in first aid cases or to report a possible exposure.

        (2) With an Order for Medical Treatment in medical-only cases or lost-time cases.

    b) Members are required to seek medical attention within 24 hours when excused from duty for an on-duty injury or illness.

3. The Supervisor's Supplemental Report of Injury (SSRI) is submitted:

    a) Immediately on a member's return to work if the member lost time.

        (1) A doctor's release is also required unless previously submitted.

        (2) The left side of the Order for Medical Treatment may serve as a doctor's release if properly completed.

    b) If the member begins losing time when the RM1a indicated no lost time (NLT).

    c) If the member begins losing time again after returning to work from a previous lost-time injury or illness.

    d) If the member terminates from City employment before returning to work.

    e) If the member dies as a result of the injury.

4. The Order for Medical Treatment

    a) An Order for Medical Treatment will be issued and a physician must be consulted anytime a member is excused from duty for an on-duty injury or illness.

    b) An Order for Medical Treatment is required for each visit to a physician.

    c) The issuance of an Order for Medical Treatment is not an agreement to pay for the treatment or examination unless the member's claim is accepted as an occupational injury or illness.

    d) An officer or acting officer will fill out the right side of the form prior to the member receiving medical treatment by a physician.

    e) The form will be given to the attending physician who will complete the left side of the form and return it to the member or the officer accompanying the member.

    f) The form will then be returned to the member's station officer or supervisor, who will check it for completeness and accuracy, and send it through channels to the Department Workers' Compensation Representative.

E. Responsibilities

1. The injured member will have the following duties and responsibilities:

    a) Notify the supervisor immediately upon becoming aware of any on-duty injury, occupational illness/disease, exposure to a hazardous substance or possible contact with a communicable disease.

    b) Notify the on-duty supervisor at their place of assignment when they become aware of an injury or illness after their normal shift, if their place of assignment is staffed around the clock. Members who work eight-hour shifts may wait until their regular shift time to inform their supervisor unless medical treatment is required.

    c) Notify the on-duty supervisor at their place of assignment, if staffed around the clock, when an on-duty injury or illness requires medical attention after the member has left their place of assignment. Members who work eight hour shifts may wait until their regular shift time to inform their supervisor. Obtain a signed Order for Medical Treatment before seeing a physician for treatment of an on-duty injury or illness.

    d) Obtain a signed Order for Medical Treatment from the most convenient Department facility when an on-duty injury or illness requires immediate medical attention after the member has left their place of assignment.

    e) Inform their physician that the placing of any restriction on their activities does not constitute a release to full duty if they are assigned to field operations in the Emergency Operations Division.

    f) If on injury leave, remain at home during their normally scheduled work shift between the hours of 0800 and 1700 as required in Dallas Fire-Rescue Department Manual of Procedures, Volume 5, General Procedures.

    g) Refrain from taking vacation or extended trips while on injury leave, because:

        (1) The Department's position is that if a member has recuperated sufficiently to travel, then he is capable of filling a light-duty position.

        (2) There is the possibility that travel could slow or stop the recuperative process.

(3) Exceptions will be reviewed on a case-by-case basis by the Assistant Chief of Administration.

h) Refrain from subbing or working off duty until returned to full-duty status. Availability for full duty status will be the release date identified on the doctor's release or Order for Medical Treatment.

i) Inform the on-duty station officer or Workers' Compensation Representative immediately of any change of status or missed doctor's appointments.

j) Notify the Workers' Compensation Representative or appropriate supervisor if they cannot return to duty on the date entered on the OMT by the attending physician, and see the physician again to receive a new release date.

k) In cases where the member cannot return to duty, the supervisor will advise the Department Workers' Compensation Representative of the change by telephone during regular business hours, and submit an SSRI through channels within 24 hours.

l) Provide an updated Wage Supplementation Extension Request Form (DFD Form 357) at intervals not to exceed four (4) weeks.

m) Complete the Employee Injury Investigation Form, as directed by supervisor.

2. The supervisor/station officer will have the following duties and responsibilities:

a) When notified by an employee that they have been exposed to a hazardous substance through one of the primary routes of exposure (inhalation, ingestion, injection, absorption), the supervisor will be required to perform the following:

(1) Request that the Hazardous Materials Team (HMRT) be sent to the location for sampling purposes.

(2) Isolate the hazardous substance so the HMRT can obtain a representative sample. If a sample can be obtained, the HMRT will perform all available tests based upon their capabilities. If further testing is required, the HAZMAT Officer will determine if a sample and the employee's condition warrants immediate testing of the material by an outside laboratory.

(3) Inform Fire Dispatch to notify the Department Safety Officer (832). If 832 is unavailable, Fire Dispatch will notify the Hazardous Materials Coordinator (810).

b) Cause an RM1a to be completed as soon as they are made aware a member under their supervision has incurred an injury or illness on duty as defined in this article.

c) Collect and place all pertinent information in the Station Officer's Log Book when notified that a member assigned to your station on another shift incurred an on-duty injury or illness or that an Order for Medical Treatment has been issued.

d) Collect all pertinent information and prepare a memorandum to send to the member's supervisor when an Order for Medical Treatment is issued to a member who is not assigned to your facility.

e) Sign and issue an Order for Medical Treatment to any member of the Department who presents himself at your place of assignment and requests the same for an on-duty injury or illness.

(1) An Order for Medical Treatment is not a guarantee that the cost will be picked up by Workers' Compensation; if the claim is denied, responsibility will fall back on the member to file the claim through Employee Benefits.

(2) The responsibility for determining that a claim is or is not compensable belongs to the adjusting company. However, discretion should be used when issuing Orders for Medical Treatment. Supervisors will:

(a) Verify that an RM1a has been completed or obtain sufficient information to enable the member's supervisor to do so.

(b) Verify through the member that the adjusting company has approved any change of physicians or second opinions for which the Order for Medical Treatment is being issued.

(c) Claimed injuries, unless obvious and clearly justifying time off, should not be charged against "I" time until the supervisor or Workers' Compensation Representative receive a medical statement confirming that an injury or illness exists and in the physician's opinion resulted from the occupational incident claimed. Until accepted, the members should be placed temporarily on sick or administrative leave.

f) Verify that an Order for Medical Treatment or a Doctor's Certificate releasing a member to regular duty does not contain restrictions that will prevent the member from performing regular duties.

g) Assist, as necessary, in obtaining proper medical treatment for members who sustain on-duty injuries or illnesses. A supervisor may accompany an incapacitated member to assist in obtaining medical treatment and proper completion of the Order for Medical Treatment.

h) Complete a Supervisor's Supplemental Report of Injuryor an Order for Medical Treatment as required.

i) Accountability for completeness and accuracy will lie with the supervisor who signs the RM1a, Order for Medical Treatment, or Supervisor's Supplemental Report of Injury.

j) Monitor the progress of the member by periodic contacts.

k) Notify the Department Workers' Compensation Representative by phone anytime the member's duty status changes. Example: After filling out an RMla, the member's condition worsens, an OMT is issued, and the physician puts him off duty. The Workers' Compensation Representative should be notified by phone so that the member's status can be changed with the carrying Agent.

l) Notify the member's Battalion/Section Chief of all injuries.

m) Retain the goldenrod copy for the injured member's personnel file.

n) Submit the RM1a through channels within 24 hours of the injury or illness.

o) For all injuries not involving lost time or requiring overnight hospitalization, complete the Supervisor's Injury Investigation Form and submit it to the Battalion Chief/Manager by the end of the shift or work day.

F. Injury Investigations

1. A Priority III Injury is defined as a First Aid injury or one that requires an Order for Medical Treatment, but does not result in lost time or require overnight hospitalization.

a) In the event of a Priority III injury, the first line supervisor in the chain of command will complete and submit a Supervisor's Injury Investigation Form, through departmental mail, to the Safety Officer no later than the end of the shift or work day in which the injury occurred. The report will include recommendations for measures to prevent future occurrences of similar injuries.

b) The Safety Officer will evaluate the form and, if appropriate, forward to the Assistant Chief, Special Services, recommendations for preventing future occurrences.

2. A Priority II Injury is one for which the injured member loses time or is kept in a hospital overnight.

a) The injured member's Battalion Chief or Division Manager will make an investigation of the injury, which will include an inspection of the incident scene. The Supervisor's Injury Investigation Form will be completed, including recommendations for measures to prevent future occurrences, and will be submitted, through departmental mail, to the Safety Officer by the end of the shift or work day.

b) In the event another Battalion Chief is dispatched to the hospital, it will be the responsibility of that Chief Officer to obtain, at the hospital, the information required to complete the form and provide it to the member's Battalion Chief, who will include it in the Supervisor's Injury Investigation Form.

c) The Battalion Chief or Manager will collect statements from all witnesses, departmental or civilian, by means of a Witness Injury Investigation Form and, if possible, will collect a statement from the injured member, using the Employee Injury Investigation Form.

d) These forms will be attached to the Supervisor's Injury Investigation Form, when submitted.

e) In the event of multiple Priority II injuries at the same incident, copies of the original reports sent to the Safety Officer will be sent separately to the Deputy Chief. The Deputy Chief will conduct an investigation and will submit a critique in memorandum form, through channels, to the Safety Officer within 3 days after the incident at which the multiple injuries occurred.

f) The Safety Officer will review all submitted forms and make a further investigation, if necessary. Upon completion of the investigation, the information will be reviewed by the Safety Panel, comprised of the Safety Officer, and two members of the Safety Advisory Committee, who will be appointed by the Safety Officer on a rotating basis. The Safety Officer will serve as chair and will recommend to the Assistant Chief of Administration, procedural changes for preventing future accidents of a similar nature, if such changes are warranted.

g) In the event that a Priority II injury is upgraded to Priority I, the Executive Panel will review and evaluate, submitting a report with recommendations, as appropriate.

3. Priority I Injury is an injury that results in the death of an employee.

a) In the case of a fatality, the Chain of Command Deputy Chief will respond immediately to the scene, if not already on location. The Deputy Chief will determine as much about the incident as possible by interviewing witnesses and will submit a written report, summarizing these findings, to the chain of command Assistant Chief, along with the Injury Investigation Forms submitted by the Battalion Chief.

b) The Battalion Chief or supervisor in the chain of command will conduct an investigation, including an inspection of the incident scene, using Supervisor's Injury Investigation Form. This form will be completed

and submitted to the chain of command Deputy Chief by the end of the shift or work day. The form must include recommendations for measures which should be taken to prevent future occurrences.

Appendix H

Interview – Sergeant Cheryl Cornish, Dallas Police Department, February 14, 2012

1. Does the Dallas Police Department do near-miss reporting?

- No

- When I think of Near-Miss reporting I think of something like, "oh, I *almost* hit my head on the cabinet," I don't see the value in it (in reporting "almost" events)

2. Does the Dallas Police Department analyze officer injury reports for trends?

- No, we don't analyze our injury info per se, but we are interested in general trends

- The Department of Justice is producing an injury analysis that DPD will look at

- DPD does use experiences from other departments for training and policy changes and for Safety Bulletins

3. Does the Dallas Police Department disseminate information related to police officer injuries? If so, how?

- Yes, in the form of a Safety Bulletin

- We "punch it out" department-wide

- It is stored online in a database that people can search and look back at, it goes to everybody, there is no way they can say that they haven't seen it

Appendix I

Interview – Assistant Director Jennifer McRorey, Dallas Parks and Recreation, February 14, 2012

1. Does the Parks and Rec Department do any type of near-miss, lessons learned, or close-

   call reporting?

- No, we do not do any kind of near-miss reporting

Appendix J

Interview Questions, Answered via e-mail – Battalion Chief Fernando Gray, Safety Officer, Dallas Fire Rescue, September 2011 through February 2012

1. Does DFR get an accurate measure of firefighter injuries from the BC Injury Report?

- My database will not give you an accurate measure of the number of injuries that have occurred within the department. I estimate that we have progressed to the point that we receive 45% of the reports up from about 40% when I assumed the role of Safety Officer.

2. What are the strengths of the reporting program?

- The current reporting system provides detailed, reliable information. This data can easily be inserted into a database for analysis.

3. What are the weaknesses of the reporting program?

- Compliance. We cannot capture accurate trends without compliance.

4. What are the opportunities that you can identify for the program?

- If we can gain compliance, the injury reporting system will aid in the continued effort to raise awareness of safety issues specific to our department

5. What threatens the program, or is a barrier to its success?

- Again, the major barrier is the lack of compliance with the injury reporting program.

6. What information do you wish we had that we currently do not collect?

- I am actually quite pleased with the information that we receive from the BC Injury Report. The biggest issue is again the compliance aspect.

7. Ideally, even if you don't do it now, would you like to use the injury data to justify changes in training, equipment, policy, and/or staffing?

- Currently, we do utilize the Injury and Collision Database to identify trends. The identified issues are utilized to develop topics for our Safety Updates.

Appendix K

Information on Response and Items Returned from Comparison Cities

CITY	CONTACT	RESPONDED?	INFO RETURNED
Austin	Rene Garza	YES	Injury report forms & policies, Safety Bulletin example, Post Incident Review policy, Lessons Learned guidelines
Denver	Steven Bales	YES	No injury data collection, cited cultural barriers
El Paso	Steve Mathewson	YES	Accident Investigation policy, example of Near-Miss Distribution
Ft. Worth	Mark Hunka	NO	
Houston	James Snow	YES	Questionnaire answers only
LA County	Nick Berkuta	YES	Safety Bulletins, example of Safety Investigations
Miami	Adrain Plasencia	YES	Questionnaire answers only
Miami-Dade	Rich Richardson	YES	None, referred to other county department
Philadelphia	Henry Costo	YES	None
Phoenix	Mike Ong	YES	Questionnaire answers via telephone interview
San Antonio	Art Villareal	YES	Questionnaire answers via telephone interview

Appendix L

Round Table Discussion and Participant Information – February 13, 2012

Round Table Participant Demographics

Gender	Age	Rank	Years of Service
Male	48	Firefighter	19
Male	49	Firefighter	20
Male	51	driver-engineer	30
Male	54	driver-engineer	33

1. Are you familiar with terms like "near miss," "close-call," and "lessons learned" reporting?
- Entire group: no, not technically

2. About six weeks before Lt. ████'s death, ████ ████ was seriously injured in almost the same way. Did you hear about his close call?
- 3 participants: no, not until after (the LODD), people told us when we were talking about (the LODD)
- 1 participant: yes, we made the fire

3. Do you think we can learn from hearing about how other DFR firefighters are being injured?
- Entire group: yes
- Sometimes at least. Maybe in this case.

4. A DFR apparatus was involved in a serious collision this week. The apparatus driver is facing discipline and possibly a suspension. What goes through your mind when you hear about incidents like this?
- This happens all the time, we just don't get caught or have a wreck.
- We all do it.
- There is so much pressure on a box (structure fire call) especially
- They did have a rescue at the fire, by the first-in company

5. Considering your career experience, do you notice any changes in your own behavior or decision-making following a DFR serious injury or LODD?
- It depends on the situation, it depends on the circumstances
- I feel like we make the effort to change immediately after something bad happens, but then we revert to our old ways
- (The recent LODD) and (another LODD) were just "luck," "it would have happened to any of us," "it was just his time to go"
- There are times when I hear of something and I realize I do the same thing, "that could have been me"

6. Looking back over the years, can you think of a time when you found yourself in a dangerous situation that you managed to escape without serious injury?
- Group: Yes
    a. How likely are you to talk about the circumstances of that event –
        i. With co-workers?
        ii. With supervisors?
        iii. With the entire department?
- Its just part of the job
- We don't talk about a lot of it
- That's what we do, its not a big deal, if you're doing your job you will be in situations like that
- Researcher prompt: "Would you formally document it or send it up the chain?"
- No

7. In the past, I've worried about agitation, judgment, teasing, and "throwing someone under the bus," if I were to give details about these kinds of events. Do any of you fear these types of things or even formal punishment for reporting what could be labeled a near-miss?
- Don't want to get someone in trouble who was trying to do the right thing
- If the department thinks we were at fault, we will get in trouble for it

8. What type of reporting would you feel comfortable participating in?
- I think the only way to go is anonymous
- Anything that takes extra work just won't be done
- Most of these things are just part of the job, I don't see them as something worth "reporting"

9. Other than increasing communication within the Department, what one change could help affect our safety?
- I just wish we knew about what is going on
- We want to hear about how people are getting hurt instead of just hearing it through the grapevine

10. What changes can the department make to encourage you to report injuries and near-misses?
- They (the administration) are so set on punishing or holding people accountable that I'm afraid to say anything
- Don't want to report something and then have to turn all of my bunker gear in for just one little thing
- It all depends on how they (the administration or the chain of command) receives it
- So far they (the administration) just punish, they are not encouraging
- They (the administration) should hold themselves accountable

Appendix M

Interview – Leah Roman, FIRST Program Director, February 20, 2012

1. Can you tell me about how FIRST receives data from its pilot participants?

- We didn't create a template, there is not a template that we asked them to use

- We get some through the safety office like from their (Philadelphia FD) injury database and their accident database

- We use their NFIRS information

- Our other site is Florida and all of the data is from the state level

- We use their state workers comp info and hospital ER info

2. What are some of the variables in your data set?

- We are actually calculating the rate of injury

- We also gather years of experience, assignments, workers comp info about the injury and time off

3. Do you have any advice for fire departments that are working on their own injury reporting programs?

- We need to analyze injury rates within our departments

- You need to create a "data dictionary"

- Procedures about collecting data need to be very clear

- Protecting information and confidentiality is a big deal

- A lot of the info you (the researcher) are looking for may be found in the presentation we did at the Fire Department Safety Officers Association conference last year, I can send it to you and then you can see what you think and ask any questions

4. What are the goals for the program upon completion of this phase?

- We'll finish this part in June 2013

- The plan is to evaluate how to collect this data nationwide

- Evaluate whether we can get/we need more funding

- Propose to move forward and collect data on a larger scale

5. How will you share the information that is collected?

- We share regularly in our stakeholders and sponsors meetings

- Have plans to share with the USFA and the Dept. of Homeland Security, FEMA

Appendix N

Interview – Laurie Taylor, TCFP Injury Reporting Specialist, February 29, 2012

1. Is there an area of firefighter injury reporting in Texas that is deficient?

- No, things have really gotten better

- The only question is that right now the law is sort of unclear, all paid departments are required to report and we are still trying to understand about the volunteer departments

- But, many of them are submitting reports already

2. Do you know of a template for injury data reporting that includes all state required information?

- No, and we did not really create a template, we ask for basic information that the departments already collect

- We don't see the forms that the departments use to collect their data

3. Do you have suggestions about how to lessen the burden of injury reporting?

- Right now we are collecting basic info only, we don't want to create an additional burden

- But, we do look for trends that need to be shared with other agencies or departments

- We do use a standard classification system for the injuries; we use the NFIRS codes

4. Are many departments submitting close-call reports to the *Avoid Injury! Blog*?

- The Blog is moderated and we receive comments from readers

- Departments are submitted close-call reports and lessons learned reports to the Commission just to share and give us the information

- They are not always submitting directly to the Blog

5. Can you name a "model" safety division of a fire department? One that sets a good example for reporting, data submission, etc.?

- You should talk to Art Villareal from San Antonio. He is always sending me good stuff, pictures, and even following up after they do their own investigation to let us know what they found.

Appendix O

SWOT ANALYSIS

Strengths	Weaknesses
On-line, ready to print	Compliance - often (approx. 55%) not submitted
Section for narrative	Incorrect information re: disposition of damaged PPE
Prompts reporter for action:	Requires Safety Officer to interpret and code as data
(disposition of report, PPE, SCBA)	Missing pertinent information regarding type of injury:
Can be examined to identify trends	wellness/fitness injury?
Sent directly to Safety Officer	exercising or training injury?
Reporters are Certified Safety Officers	previous injury?
Used to:	Does not address cultural factors:
identify issues and develop Safety Update topics	widely accepted pratice?
	Does not address personal factors:
	familiar with activity?
	1st time performing activity?
	Does not address level of supervision
	Does not address cost:
	amount of lost time?
	total cost?
	Does not identify TCFP "reportable" conditions

Opportunities	Threats
Prevent future injuries	Workers already feel over-burdened with paperwork
Decrease cost associated with injuries	Personnel have a constant fear of punishment,
Raise awareness of issues specific to DFR	may lead to inaccurate reporting
Paticipate in national reporting programs	Fire service culture:
Evaluate policy, response, and staffing changes	"danger and injuries are just part of the job"
Justify equipment purchases and training investments	Costs related to analysis, staffing, and software
Obtain grant funding related to injury data collection	

Appendix P

DALLAS FIRE-RESCUE DEPARTMENT
Battalion Chief's Injury Report

Date of Incident: _____ Time: _____ Service Years: _____

Injured member: _____ Employee #: _____

Type of Injury: ☐First Aid   ☐Medical Only   ☐Lost Time   Multiple injuries? Y / N

Division: ☐Operations ☐Maintenance ☐Training ☐311 / 911 ☐Arson   ☐FPE&I

Operations: Area _____ Battalion _____ Station _____ Shift _____ Apparatus _____ Rank _____

Supervisor at time of Injury: _____ Supervisors Assignment: _____

Address where injury occurred: _____

Incident #: _____ Type of Incident: _____

Complete description of incident: _____
_____
_____
_____
_____

What actions or inactions led to the injury: _____
_____
_____
_____

What part of the body was injured and in what way: _____
_____
_____

Was all protective gear and procedures in use? Y / N   If No, explain: _____
_____

Was any part of the PPE or SCBA damaged? Y / N   If Yes, explain: _____
_____
_____

*If the PPE or SCBA was severely damaged, remove item from service & contact the Safety Officer (832)

Disposition of damaged PPE/SCBA: _____

Was member taken to medical facility for evaluation? Y / N   Facility: _____

Transported by: Battalion Chief: _____ Rescue: _____ Other: _____

Was there a witness to the injury? Y / N   If yes, name: _____

Investigating Battalion Chief: _____ Assignment: _____

This form is to be completed by the responsible Battalion Chief ANYTIME an on-duty injury occurs. A copy of the form should be sent to the Deputy Chief and to the Safety Division, 5000 Dolphin Rd. by the end of the shift.

Appendix Q

Texas Commission on Fire Protection Compliance Inspection Guide

The following information is required to be readily available for review by commission staff during an inspection. Any requested information not available will constitute a violation.

☐ List of all compensated full-time, part-time and volunteer fire protection personnel with SSN or TCFP PIN.

☐ Department utilizing FIDO to report Firefighter Injuries – Chapter 435.23.

☐ Courage to Be Safe So Everyone Goes Home Program is required of certified fire protection personnel by December 1, 2015 – Chapter 435.25.

☐ SOP for Protective Clothing Use, Selection, Care and Maintenance – Chapter 435.1 (3).

☐ SOP for SCBA Use, Selection, Care and Maintenance – Chapter 435.3 (8).

☐ SOP for PASS Use, Selection, Care and Maintenance SOP – Chapter 435.9.

☐ SOP for Incident Management System – Chapter 435.11.

☐ SOP for Personnel Accountability System (may be part of the Incident Management System SOP) –
Chapter 435.13.

☐ SOP for Operating at Emergency Incidents (may be part of the Incident Management System SOP) –
Chapter 435.15.

☐ SOP for Interior Structural Fire Fighting (2-In/2-Out Rule) – Chapter 435.17.

☐ SOP for Wellness-Fitness Initiative – Chapter 435.21.

☐ Protective Clothing Inspection Records that complies with NFPA 1851 – Chapter 435.1 (3).

☐ Breathing Air Records that comply with NFPA 1989 Records – Chapter 435.3 (4).

☐ SCBA Cylinder Hydrostatic Test Records – Chapter 435.3 (5).

☐ SCBA Annual Full-Function Test Records – Chapter 435.3 (6).

☐ SCBA Duty Period Inspection Records for In-Service Units – Chapter 435.3 (3).

☐ Reserve SCBA Weekly Inspection Records – Chapter 435.3 (3).

☐ Personal Alert Safety System (PASS) In Service Duty Period Inspection Records –
Chapter 435.9 (3).

☐ SCBA Maintenance Authorization Certificate – Chapter 435.9 (8).

☐ SCBA Full Function Test Machine Calibration Certificate – Chapter 435.3 (8).

☐ SCBA Bottle Hydrostatic Testing Vendor DOT Certificate – Chapter 435.3 (5).

☐ SCBA cylinder fill records – Chapter 435.3 (4) – NFPA 1989.

☐ Inspect PPE and SCBA for On-Duty Personnel.

Appendix R

Injury Reporting Form

Name:_____	Assignment:_____	Supervisor @ Injury:
Emp. #:_____	Assignment @ Injury:_____	_____
Hire Date:_____	Witness to Injury:_____	

Briefly describe injury:

1. Casualty type ☐	9. Patient taken to ☐	COAT	17.a.☐	17.b.☐	17.c.☐	NOTE:
2. Knowledge of bldg ☐	10. # Responses/24° ☐	TROUSERS	18.a.☐	18.b.☐	18.c.☐	ALL PPE MUST BE TAKEN
3. Activity at injury ☐	11. Physical condition ☐	BOOTS/SHOES	19.a.☐	19.b.☐		TO PROPERTY ROOM
4. Cause of injury ☐	12. Status prior ☐	HELMET	20.a.☐	20.b.☐	20.c.☐	
5. Nature of injury ☐	13. FF activity ☐	FACE PROTECTION	21.a.☐	21.b.☐	21.c.☐	DISPOSITION:
6. Case Severity ☐	14. Where? ☐	BREATHING APP.	22.a.☐	22.b.☐		FORWARD TO 832
7. Primary symptom ☐	15. Cause? ☐	GLOVES	23.a.☐	23.b.☐		WITHIN 24 HOURS
8. Primary body part ☐	16. Care provided ☐	SPECIAL EQUIP.	24.a.☐	24.b.☐	24.c.☐	

CONTRIBUTING FACTORS: Check ALL that apply

Environmental	Structure	Organizational Influences		
☐ Temperature	☐ Other	☐ Culture/Climate	SOPs	
☐ Weather	☐ Outside	☐ Under-resourcing	None apply ☐	Followed, unacceptable result ☐
☐ Light/Visibility	☐ Vehicle		Needs revision ☐	Not followed ☐
Failure/Malfunction	☐ Building			
☐ Apparatus	Residential ☐	**Supervisory Conditions**		
☐ Equipment	Commercial ☐	Situational Awareness	SOPs	Communication
☐ Tool	Vacant (actual) ☐	☐ Size Up	☐ ICS*	☐ Ineffective
☐ PPE*	Vacant (perceived) ☐	☐ Failed to correct problem	☐ Accountability*	☐ Unclear
☐ SCBA*	Occupied (actual) ☐	☐ Inappropriate strategy/tactic	☐ 2 in - 2 out*	☐ Insufficient
☐ PASS*	Occupied (perceived) ☐	☐ Risk assessment	☐ Resource Management	

Factors Affecting Individual Performance

Action/ Inaction		Member/Victim		
Error	Violation	☐ Needs more training	☐ Short-cut/ Rushing	☐ Risk assessment
☐ Decision	☐ Routine (accepted practice)	☐ Fitness (mental or physical)	☐ Overconfidence/ Complacency	☐ Illness/ Fatigue
☐ Skill-based	☐ Exceptional	☐ Inexperience/ Unfamiliarity	☐ Not regular assignment	☐ 1st day back after leave?
☐ Perception		☐ Peer pressure	☐ Free-lancing	☐ 1st arriving En/ Tr/ Re?

Activity/ Work Performed

☐ Multiple tasks	☐ Lack of clear SOP	☐ Extreme conditions	☐ Improper USE of equipment	☐ Repetitive/ Monotonous
☐ Time pressure	☐ Vague guidance	☐ Communications	☐ Improper equipment	☐ Distracted/ Interrupted

Attach a narrative to answer the following 3 questions, considering this review:
1. What is the cause of this event?   2. Where else could it occur?
3. What corrections/ changes/ actions are necessary to prevent reoccurences?   *TCFP INVESTIGABLE

Appendix S

Injury/Event Codebook

1. CASUALTY TYPE	5. NATURE OF INJURY	7. PRIMARY SYMPTOM CONT.	7. PRIMARY SYMPTOM CONT.
1.1. Fire	5.1. Burns & asphyxia, smoke	7.21. Dislocation	7.54 Unconscious
1.2. Other action	5.2. Burns only	7.22. Disorientation	7.55. Vomiting
1.3. EMS	5.3. Asphxia/ smoke only	7.23. Dizzy/fainting/weakness	7.59. Other long-term illness
2. KNOWLEDGE OF BLDG	5.4. Wound, cut, bleeding	7.24. Drowing	7.98. No apparent symptom
2.1. Less than 1 day	5.5. Dislocation, fracture	7.25. Drug overdose	7.99. Not classified
2.2. 1-7 days	5.6. Pain, Heart Attack, Stroke	7.06. Electric burn	7.00. Undetermined/No report
2.3. 8-30 days	5.7. Shock	7.49. Electric shock	8. PRIMARY BODY PART
2.4. 1-2 months	5.8. Strain, sprain	7.04. Eye (avulsion of) trauma	8.1. Head area
2.5. 3-6 months	5.9. Not classified	7.26. Fever	8.11. Ear
2.6. 7-11 months	5.0. Undetermined/No report	7.27. Foreign body, obstruction	8.12. Eye
2.7. Less than 1 year	6. CASE SEVERITY	7.28. Fracture: closed	8.13. Face
2.8. Not a structure	6.1. Minor	7.29. Fracture: open	8.14. Mouth - lips
2.9. Undetermined/No report	6.2. Moderate	7.30. Frostbite	8.15. Mouth - interior
3. ACTIVITY AT INJURY	6.3. Severe	7.46. Gunshot,projectile wound	8.16. Nose
3.1. Escaping	6.4. Life Threatening	7.31. Hemorrhaging, bleeding	8.17. Nose lining
3.2. Rescue attempt	6.5. D.O.A.	7.32. Hypersensitivity	8.18. Teeth
3.3. Fire control	6.6. Died subsequent to arrival	7.33. Impairment sim. to ETOH	8.19. Head area - other
3.4. Response/Return	7. PRIMARY SYMPTOM	7.34. Internal (closed blunt)	8.10. Head - insuff. info.
3.5. Cleanup, salvage, mop-up	7.1. Abrasion	7.35. Laceration, cut	8.2. Trunk
3.6. Sleeping	7.2. Amputation	7.36. Mental disorder	8.21. Neck
3.7. Unable to act	7.3. Asphyxiation	7.39. Abortion/miscarraige/ob	8.22. Shoulder
3.8. Irrational action	7.4. Avulsion (of eye)	7.37. Nausea	8.23. Back-upper, surface only
3.9. Not classified	7.31. Bleeding/ hemorrhaging	7.42. Numbness/tingling	8.24. Back-lower, surface only
3.0. Undetermined/No report	7.5. Burn: chemical	7.38. OB - delivery	8.25. Chest
4. CAUSE OF INJURY	7.6. Burn: electric	7.39. OB - miscarriage	8.26. Abdomen
4.1. Caught in,under, trapped	7.7. Burn: thermal	7.40. Pain only	8.27. Buttocks
4.2. Exposed - fire products	7.8. Burn: scald	7.41. Paralysis	8.28. Groin
4.3. Exposed - chem./ radiation	7.9. Cancer	7.42. Parasthesia,numb,tingling	8.29. Trunk - other
4.4. Fell/stepped on,over,into	7.10 Cardiac arrest	7.43. Pneumonia	8.20. Trunk - insuff. Info
4.5. Overexertion	7.11. Cardiac symptoms	7.44. Puncture/penetrating	8.3. Arm/Hand
4.6. Rubbed by/ contact with	7.05. Chemical burn	7.45. Poison not listed	8.31. Upper arm
4.7. Struck by	7.12. Chills	7.46. Projectile/high velocity	8.32. Lower arm
4.8. Not applicable	7.13. Contusion/bruise-minor	7.47. Respiratory arrest	8.33. Elbow
4.9. Not classified	7.14. Convulsion/unspecified	7.08 Scald	8.34. Wrist
4.0. Undetermined/no report	7.15. Convulsion/systemic	7.48. Shock: analphylactic	8.35. Hand
	7.16. Crushing	7.49. Shock: electrical	8.36. Fingers
	7.35. Cut, lacerations	7.50. Sickness	8.37. Thumb
	7.17. Dehydration	7.03. Smoke inhalation/asphyx.	8.39. Arm/Hand - other
	7.38. Delivery, obstetrics	7.51. Sprain/ strain	8.30. Arm/Hand - insuff. info.
	7.18. Diabetic coma	7.52. Stroke (CVA)	8.4. Leg/Foot
	7.19. Diabetic shock	7.53. Swelling	8.41. Upper leg
	7.20. Difficulty breathing	7.07. Thermal burn	8.42. Lower leg

8. PRIMARY BODY PART CONT.	9. PATIENT TAKEN TO:	13. FIREFIGHTER ACTIVITY CONT.	13. FIREFIGHTER ACTIVITY CONT.
8.43. Knee	9.1. Hospital, ER, or admission	13.19. Riding - other	13.63. Rescue of non-fire victim
8.44. Ankle	9.2. Doctor's office/clinic	13.10. Riding - insuff. Info.	13.64. Water rescue
8.45. Foot	9.3. Long-term care facility	13.2. Driving/Operating App.	13.65. Providing EMS
8.46. Toes	9.4. Morgue	13.21. Driving fire apparatus	13.66. Diving operations
8.49. Leg/Foot - other	9.5. Funeral home	13.22. Tillering	13.67. Extraction/ power tools
8.40. Leg/Foot - insuff. Info.	9.6. Residence	13.23. Driving other emer. veh.	13.68. Extraction/ hand tools
8.5. Internal	9.7. Not transported	13.24. Flying aircraft	13.69. Rescue - other
8.51. Throat	9.9. Other	13.25. Operating engine/pump	13.60. Rescue - insuff. Info.
8.52. Trachea	9.0. Undetermined/no report	13.26. Operating truck/platform	13.7. Misc. Scene Activity
8.53. Lungs	10. # RESPONSES/ 24°	13.27. Operating other equip.	13.71. Directing traffic
8.54. Heart	10.1. One	13.29. Driving/Operating other	13.72. Catching hydrant
8.55. Stomach	10.2. Two	13.20. Driving - insuff. Info.	13.73. Laying hose
8.56. Intestinal tract	10.3. Three	13.3. Extinguishing/ Neutralizing	13.74. Moving tools/equip.
8.57. Genito-urinary	10.4. Four	13.31. Handling charged hoses	13.75. Picking up tools/equip.
8.58. Internal organ - other	10.5. Five	13.32. Using hand extinguisher	13.76. Setting lights/generator
8.59. Internal - other	10.6. Six to eight	13.33. Operating master stream	13.77. Operating portable pump
8.50. Internal - insuff. Info.	10.7. Nine to twelve	13.34. Using hand tools	13.79. Misc. Activity - other
8.6. Other Body Parts	10.8. Over twelve	13.35. Removing power lines	13.70. Misc. Activity-insuff. Info.
8.61. Spine	10.9. None	13.36. Removing liquids/chem.	13.8. Station Activity
8.62. Pelvis	10.0. Undetermined/no report	13.37. Shutting off util., gas, etc.	13.81. Moving about + alarm
8.63. Hip	11. PHYSICAL CONDITION	13.39. Extinguishing - other	13.82. Moving about + normal
8.7. Multiple Body Parts	11.1. Rested	13.30. Extinguishing- insuff.info.	13.83. Station maintenance
8.71. Multiple head parts	11.2. Fatigued	13.4. Suppression support	13.84. Vehicle maintenance
8.72. Multiple trunk parts	11.3. Impaired (drugs/alcohol)	13.41. Forcible entry	13.85. Equipment maintenance
8.73. Multiple arm/hand parts	11.4. Impaired (illness/meds)	13.42. Ventilation/power tools	13.86. Supervised fitness activity
8.74. Multiple leg/foot parts	11.9. Other	13.43. Ventilation/hand tools	13.87. Unsuperv. Fitness activity
8.75. Multiple internal parts	11.0. Undetermined/no report	13.44. Salvage	13.88. Training activity/ drill
8.76. Multiple upper body parts	12. STATUS PRIOR	13.45. Overhaul	13.89. Station activity - other
8.77. Multiple lower body parts	12.1. Asleep	13.49. Support - other	13.80. Station - insuff. Info.
8.78. Multiple/whole body parts	12.2. Awake	13.40. Support - insuff. Info.	13.9. Other activity
8.9. Other	12.9. Other	13.5. Access/Egress	13.91. Investigation/During Inc.
8.98. Part of body - N/A	12.0. Undetermined/no report	13.51. Carrying ground ladder	13.92. Investigation/After Inc.
8.99. Part of body - other	13. FIREFIGHTER ACTIVITY	13.52. Raising ground ladder	13.93. Inspection activity
8.00. Undetermined/No report	13.1. Riding vehicle	13.53. Lowering ground ladder	13.94. Administrative work
	13.11. Boarding emer.fire app.	13.54. Climbing ladder	13.95. Communication work
	13.12. Riding app.: standing	13.55. Scaling	13.99. Activity - other
	13.13. Riding app.: sitting	13.56. Escaping fire/hazard	13.90. Activity - insuff. Info.
	13.14. Riding: position unknown	13.59. Access/Egress - other	
	13.15. Riding other emer. veh.	13.50. Access/Egress-insuff.info.	
	13.16. Riding non-emer. veh.	13.6. Rescue	
	13.17. Exiting app./emer. veh.	13.61. Searching for fire victim	
	13.18. Jumping from aircraft	13.62. Rescue of fire victim	

14. WHERE?	14. WHERE? CONT.	15. CAUSE? CONT.	15. CAUSE? CONT.
14.1. Enroute/Returning	14.6. Inside vehicle	15.113. From app. No seatbelt	15.318 Fire dept. apparatus
14.11. Enroute/ emergency	14.61. Passenger compart.	15.114. From app. Belt failed	15.319. Non FD vehicle
14.12.Returning/emerg.	14.62. Cargo compart.	15.115. In or into emerg. App.	15.320. Falling objects
14.13. Enroute/public asst.	14.63. Rail vehicle	15.116. Off station sliding pole	15.321. Thrown objects
14.14. Return/public asst.	14.64. Boat/ship/barge	15.117. Over/off curb	15.322. App./Compart. Doors
14.15. Enroute/other duty	14.65. Aircraft	15.199. Fell/Slipped - other	15.323. Other doors
14.19. Enrt./Return - other	14.69. Inside vehicle - other	15.100. Fell/Slipped - insuff.info.	15.324. Fire station equipment
14.2. Outside/Above grade	14.60. Inside vehicle - insuff.	15.2. Caught/Trapped/Between	15.325. Other personnel
14.21. Outside on ground	14.7. FD Managed Location	15.201. Collapsing roof	15.399. Struck by - other
14.22.Outside above grade	14.71. At fire station	15.202. Collapsing wall	15.300. Struck by - insuff. Info.
14.23. On structure roof	14.72. At training school	15.203. Collapsing floor	15.4. Contact/Exposure
14.24. On aerial/in basket	14.73. At off station drill site	15.204. Collapsing ceiling	15.401. Heat
14.25. On ground ladder	14.74. At admin. Offices	15.205. Fire progress	15.402. Embers
14.26. On wall/ledge	14.75. At maintenance facility	15.206. Back draft	15.403. Hot metal
14.27. On fire escape	14.76. At communication cent.	15.207. Flashover	15.404. Hot tar, etc.
14.28. On steep hillside	14.77. At off station work site	15.208. Explosion	15.405. Fire
14.29. Out/Above - other	14.79. At FD Location - other	15.209. Falling object(s)	15.406. Splinters
14.20. Out/Above - insuff.	14.70. At FD Location - insuff.	15.210. Between objects	15.407. Nails
14.3. Outside/Below grade	14.8. Inspection site	15.211. Lost inside building	15.408. Glass
14.31. In open pit	14.81. Inside/normal area	15.212. Fire dept. apparatus	15.409. Water
14.32. In ditch/trench	14.82. Inside/service or storage	12.213. Earth cave-in	15.410. Steam
14.33. In quarry/mine	14.83. On roof/outside stairway	15.214. Under water object	15.411. Smoke/toxic products
14.34. In ravine	14.84. On ground outside	15.299. Caught/Trapped - other	15.412. Unusual fumes/gases
14.35. In well	14.89. Inspection site - other	15.200. Caught/Trapped-insuff.	15.413. Chemicals
14.36. In water	14.80. Inspection site - insuff.	15.3. Struck by	15.414. Radioactive material
14.39. Out/Below - other	14.9. Other	15.301. Collapsing roof	15.415. Electricity
14.30. Out/Below - insuff.	14.99. Other location	15.302. Collapsing wall	15.416. Utility flame/flare/torch
14.4 Inside/Above grade	14.90. Undetermined/no report	15.303. Collapsing ceiling	15.417. Underwater objects
14.41. Grade level	15. CAUSE?	15.304. Pieces of wall	15.418. Insects
14.42. 2-4th stories/above	15.1. Fell/Slipped	15.305. Ceiling pulled by self	15.419. Poisonous plants
14.43. 5-7th stories/above	15.101. In hole,outside structure	15.306. Ceiling pulled by others	15.420. Contagious disease
14.44. Above 7th or equiv.	15.102. In hole burned in floor	15.307. Dirt particles	15.421. Extreme weather
14.45. In attic	15.103. In hole burned in roof	15.308. Flying glass	15.499. Contact - other
14.49. Inside/Above - other	15.104.Unguarded floor opening	15.309. Glass broken by self	15.400. Contact - insuff. Info
14.40. Inside/Above-insuff.	15.105.Unguarded roof opening	15.310. Glass broken by others	15.5. Overexvtertion/strain
14.5. Inside/Below grade	15.106. Over object	15.311.Water stream/handline	15.501. While lifting hose
14.51. One story below	15.107. On wet surface	15.312. Master stream water	15.502. While lifting ladder
14.52. Two or more below	15.108. On icy surface	15.313. Portable extinguisher	15.503. While lifting tools
14.53. In tunnel	15.109. On flat surface	15.314. Ladder	15.504. While lifing fire victim
14.54. In sewer	15.110. On steps, stairs	15.315. Hand tool/equipment	15.505. While lifting property
14.50. Inside/Below-insuff.	15.111. From ladder	15.316. Hose	15.506. While lifting/rescue
	15.112. From structure	15.317. Coupling	15.507. While lifting - other

15. CAUSE? CONT.	15. CAUSE? CONT.	17. PROTECTIVE COAT CONT.	19. BOOTS/SHOES CONT.
15.508. While carrying hose	15.803. Struck by thrown object	c.2. Ripped	a.4. 3/4 length/steel toe only
15.509. While carrying ladder	15.804. Cut/stabbed	c.3. Melted	a.5. shoes/steel base & toe
15.510. While carrying tools	15.805. Gunshot	c.4. Cut	a.6. shoes/steel toe only
15.511.While carrying fire victim	15.806. Bitten	c.5. Trapped steam/gases	a.7. boots/ without steel
15.512.While carrying property	15.899. Assault - other	c.7. No failure of prot. Coat	a.8. non-safety shoes
15.513. While carrying/rescue	15.800. Assault - insuff. Info.	c.8. No protective coat worn	a.9. Boots/Shoes - other
15.514. While carrying - other	15.9. Other cause	c.9. Problem with coat - other	a.0. Undetermined/no report
15.515. While pulling hose	15.999. Cause - other	c.0. Undetermined/no report	19.b. STATUS
15.516. While pulling ladder	15.000.Undetermined	18. TROUSERS	b.1. 3/4 pulled up
15.517. While pulling tools	16. CARE PROVIDED	18.a. BEING WORN	b.2. 3/4 not pulled up
15.518. Pulling fire victim	16.1. None	a.1. Nomex with liner	b.3. knee length boots worn
15.519. Pulling property	16.2. Treated at scene	a.2. Nomex without liner	b.8. no boots worn
15.520. Pulling/rescue	16.3. Treated at medical clinic	a.3. Canvas with liner	b.9. Status - other
15.521. Pulling - other	16.4. Treated at doctor's office	a.4. Canvas without liner	b.0. Undetermined/no report
15.522. While in rescue ops	16.5. Hospital ER	a.5. Rubber with liner	19.c. PROBLEM
15.523. While climbing ladders	16.6. Hospital outpatient	a.6. Rubber without liner	c.1. Burned
15.524. While climbing stairs	16.7. Hospital inpatient	a.7. Other trousers with liner	c.2. Ripped
15.525. While climbing cliff/wall	16.8. Continued care after hosp.	a.8. Other trousers w/out liner	c.3. Cut
15.526. While climbing - other	16.9. Medical care - other	a.9. No protective trousers worn	c.4. Punctured
15.599. Overextertion - other	16.0. Undetermined/no report	a.0. Undetermined/no report	c.5. Object fell into
15.500. Overextertion - insuff.	17. PROTECTIVE COAT	18.b. STATUS	c.6. Failed under impact
15.6. Exiting/Escaping - Jumped	17.a. BEING WORN	b.1. Worn properly	c.8. No failure of boots/shoes
15.601. From ladder	a.1. Nomex with liner	b.2. Worn inside boots	c.9. Problem - other
15.602.From wall, ledge,window	a.2. Nomex without liner	b.3. Worn w/o suspension	c.0. Undetermined/no report
15.603. From roof	a.3. Canvas with liner	b.8. No protective trousers worn	20. HELMET
15.604. From other part/bldg	a.4. Canvas without liner	b.9. Trouser status - other	20.a. BEING WORN
15.605. From FD apparatus	a.5. Rubber with liner	b.0. Undetermined/no report	a.1. Leather helmet
15.699. Exiting/Escaping- other	a.6. Rubber without liner	18.c. PROBLEM	a.2. Aluminum helmet
15.600. Exiting - insuff. Info.	a.7. Other coat with liner	c.1. Burned	a.3. Glass fiber helmet
15.7. FD Apparatus Accident	a.8. Other coat without liner	c.2. Ripped	a.4. Polycarbonate/Lexan
15.701. Collision w other veh.	a.9. No protective coat worn	c.3. Melted	a.8. No helmet worn
15.702. Collision w pedestrian	a.0. Undetermined/no report	c.4. Cut	a.9. Helmet - other
15.703. Collision w object	17.b. STATUS	c.5. Trapped steam/gases	a.0. Undetermined/no report
15.704. Collision - other	b.1. Open	c.7. No failure of prot. Trousers	20.b. STATUS
15.705. Collision - insuff. Info.	b.2. Partially open	c.8. No protective trousers worn	b.1. Chin strap in use
15.706. Left road (no collision)	b.3. Closed, collar up	c.9. Trouser problem - other	b.2.Chin strap + ear/neck flap
15.707.Overturned (no collision)	b.4. Closed, collar down	c.0. Undetermined/no report	b.3. Ear/neck flap only
15.799. FD Accident - other	b.8. No coat worn	19. BOOTS/SHOES	b.4. No strap or flap in use
15.700. Accident - insuff. Info.	b.9. Status - other	19.a. WORN	b.8. No helmet worn
15.8. Assaulted	b.0. Undetermined/no report	a.1.knee length/steel base & toe	b.9. Status - other
15.801. Struck by individual	17.c. PROBLEM	a.2. knee length/steel toe	b.0. Undetermined/no report
15.802. Struck by people/crowd	c.1. Burned	a.3. 3/4 length/steel base & toe	

20. HELMET CONT.	22. BREATHING APP.	22. BREATHING APP. CONT.	24. SPECIAL EQUIPMENT CONT.
20.c. PROBLEM	22.b. STATUS	22.c. PROBLEMS CONT.	24.a. WORN
c.1. Burned	b.1. Facepiece/Regulator connected	c.5. SUPPLY CYLINDER VALVE	a.3. Scuba gear
c.2. Melted	b.2. Air supply off	c.51. Failed to operate	a.4. Exposure suit
c.3. Fractured	b.3. Facepiece not in place	c.52. Damaged by contact	a.5. Life preservers
c.4. Punctured	b.4. Harness not secured	c.53. Contained insuff. Air	a.6. Life belt, ladder belt
c.5. Knocked off	b.5. App. Properly worn	c.59. Problem - other	a.7. Personnel lighting
c.7. No helmet failure	b.8. No breathing app.	c.50. Problem - insuff. Info.	a.8. No spec. equip. worn
c.8. No helmet worn	b.9. Status - other	c.9. Other Problems - Br. App.	a.9. Spec. equip - other
c.9. Problem - other	b.0. Undetermined	c.97. No failure of Br. App.	a.0. Undetermined/no report
c.0.Undetermined	22.c. PROBLEMS	c.98. No Breathing App. Used	24.b. STATUS
21. FACE PROTECTION	c.1. FACEPIECE/HOSE	c.99. Problems - other	b.1. Worn properly, right use
21.a. BEING WORN	c.11. Burned	c.00. Problems - insuff. Info.	b.2. Worn, but not proper use
a.1. Full face protection	c.12. Ripped	23. GLOVES	b.3.Worn improperly,right use
a.2. Partial face protection	c.13. Melted	23.a. BEING WORN	b.4. Worn improperly,wrong use
a.3. Goggles worn	c.14. Cracked/broken	a.1. Cotton	b.8. No spec. equip. worn
a.8. No face protection	c.15. Detached	a.2. Wool	b.0. Undetermined/no report
a.9. Worn - other	c.16. Inoperative/damaged	a.3. Canvas	24.c. PROBLEM
a.0. Undetermined	c.19. Problem - other	a.4. Leather	c.1. Burned
21.b. PROBLEM	c.10. Problem - insuff. Info.	a.5. Asbestos	c.2. Ripped, torn, cut, punctured
b.1. Burned	c.2. HARNESS	a.6. Rubber	c.3. Melted
b.2. Melted	c.21. Burned	a.7. Synthetic - Includes Nomex	c.4.Serviced/Stored improperly
b.3. Fractured/cracked	c.22. Ripped	a.8. No gloves worn	c.5.Not used for designed use
b.4. Scratched	c.23. Melted	a.9. Gloves - other	c.6.Not used as recommended
b.7. No failure	c.24. Detached/separated	a.0. Undetermined/no report	c.7. No problem with equip.
b.8. No protection used	c.29. Problem - other	23.b. PROBLEMS	c.8. No spec. equip. used
b.9. Problem - other	c.20. Problem - insuff. Info.	b.1. Burned	c.9. Problem - other
b.0. Undetermined	c.3. REGULATOR	b.2. Ripped	c.0. Undetermined/no report
22. BREATHING APP.	c.31. Failed	b.3. Melted	
22.a. BEING USED	c.32. Damaged by contact	b.4. Cut, punctured	
a.1. Self-contained, open circuit, demand	c.33. Prob. W admissions valve	b.5. Object fell into	
a.2. Self-contained, open circuit, pressure	c.39. Problem - other	b.6. Insufficient insulation	
a.3. Self-contained, close circuit	c.30. Problem - insuff. Info.	b.7. No failure of gloves	
a.4. Not self-contained	c.4. ALARM	b.8. Gloves not being worn	
a.8.No breathing app. used	c.41. Failed to operate	b.9. Problem - other	
a.9.Breathing app - other	c.42. Damaged by contact	b.0. Undetermined/no report	
a.0. Undetermined	c.49. Problem - other	24. SPECIAL EQUIPMENT	
	c.40. Problem - insuff. Info.	24.a. WORN	
		a.1. Proximity suit	
		a.2. Chemical suit	

Appendix T

Lessons Learned Reporting Form

This is NON-PUNITIVE. Information provided here can help keep others safe. Describe the lesson learned, close-call, or near-miss:

CONTRIBUTING FACTORS: Check ALL that apply

Environmental	Structure	Organizational Influences		
☐ Temperature	☐ Other	☐ Culture/Climate	SOPs	
☐ Weather	☐ Outside	☐ Under-resourcing	None apply ☐	Followed, ☐ unacceptable result
☐ Light/Visibility	☐ Vehicle		Needs revision ☐	Not followed ☐
Failure/Malfunction	☐ Building			
☐ Apparatus	Residential ☐	**Supervisory Conditions**		
☐ Equipment	Commercial ☐	Situational Awareness	SOPs	Communication
☐ Tool	Vacant (actual) ☐	☐ Size Up	☐ ICS*	☐ Ineffective
☐ PPE*	Vacant (perceived) ☐	☐ Failed to correct problem	☐ Accountability*	☐ Unclear
☐ SCBA*	Occupied (actual) ☐	☐ Inappropriate strategy/tactic	☐ 2 in - 2 out*	☐ Insufficient
☐ PASS*	Occupied (perceived) ☐	☐ Risk assessment	☐ Resource Management	

Factors Affecting Individual Performance				
Action/ Inaction		**Member/Victim**		
Error	Violation	☐ Needs more training	☐ Short-cut/ Rushing	☐ Risk assessment
☐ Decision	☐ Routine **(accepted practice)**	☐ Fitness (mental or physical)	☐ Overconfidence/ Complacency	☐ Illness/ Fatigue
☐ Skill-based	☐ Exceptional	☐ Inexperience/ Unfamiliarity	☐ Not regular assignment	☐ 1st day back after leave?
☐ Perception		☐ Peer pressure	☐ Free-lancing/ Role Maintenance	☐ 1st arriving Engine/ Truck/ Rescue?

Activity/ Work Performed				
☐ Multiple tasks	☐ Lack of clear SOP	☐ Extreme conditions	☐ Improper USE of equipment	☐ Repetitive/ Monotonous
☐ Time pressure	☐ Vague guidance	☐ Communications	☐ Improper equipment	☐ Distracted/ Interrupted

Attach a narrative to answer the following 3 questions, considering this review:

1. What is the cause of this event?
2. Where else could it occur?
3. What corrections/ changes/ actions are necessary to prevent reoccurences?

*TCFP INVESTIGABLE