



FIREFIGHTER FATALITY INVESTIGATIONS

**Annual Report
FY 2015**

October 2015



TEXAS DEPARTMENT OF INSURANCE

Texas Department of Insurance
David Mattax, Commissioner of Insurance
Chris Connealy, State Fire Marshal

State Fire Marshal's Office
333 Guadalupe Street
Austin, Texas 78701

(512) 676-6800

www.tdi.texas.gov/fire

Table of Contents

Executive Summary	2
Texas Firefighter Fatality Investigation Authority	4
Fiscal Year 2015 Investigation Summary	6
Statistics and Comparisons of Firefighter Fatalities	8
Strategies for Preventing Firefighter Fatalities	10
Firefighter Safety Recommendations	15
Appendix 1: Changing the Culture of Safety in the Fire Service	
Appendix 2: Texas Commission on Fire Protection Injury Report	

Executive Summary

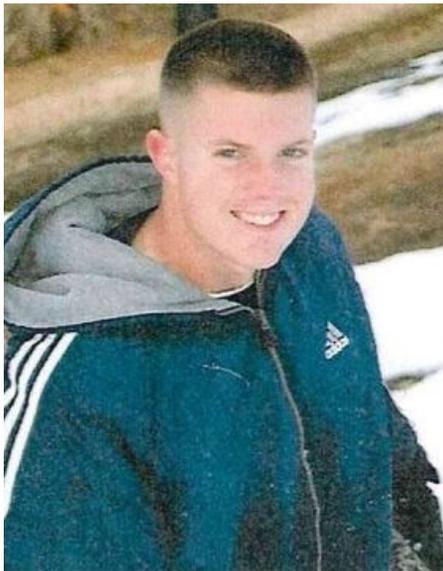
During the State of Texas Fiscal Year 2015 (September 1, 2014, to August 31, 2015), the State Fire Marshal's Office (SFMO) conducted three firefighter fatality incident investigations. The three investigations involved a total of three fatalities.



Firefighter Alejandro Castro
Brownsville Fire Department
November 16, 2014
Cardiac arrest while on duty



Captain Dwight W. Bazile
Houston Fire Department
February 21, 2015
Cardiac arrest while on the scene of a structure fire



Firefighter James Anderson
Katy Volunteer Fire Department
August 23, 2015
On-duty death at station

Texas Firefighter Fatality Investigation Authority

In 2011, the 82nd Legislature enacted SB 396, requiring the SFMO to investigate firefighter fatalities occurring “in the line of duty or in connection with an on-duty incident.” This bill expands the investigative jurisdiction of the SFMO, which had previously investigated only those fatalities occurring in connection with a firefighting incident. This change took effect May 12, 2011.

The statute requires the SFMO to investigate the circumstances surrounding the death of the firefighter, including factors that may have contributed to the death of the firefighter. The term "firefighter" includes an individual who performs fire suppression duties for a governmental entity or volunteer fire department.

The State Fire Marshal is required to coordinate the investigative efforts of local government officials and may enlist established fire service organizations and private entities to assist in the investigation. The State Fire Marshal has appointed an Investigation Panel to provide Firefighter Fatality Investigation Program policy guidance. The following entities serve on the Firefighter Fatality Investigation Panel:

- State Firefighters' and Fire Marshals' Association of Texas
- Texas A&M Engineering Extension Service
- Texas A&M Forest Service
- Texas Chapter of the International Association of Arson Investigators (IAAI)
- Texas Commission on Fire Protection
- Texas Fire Chiefs Association

- Texas Fire Marshals' Association
- Texas State Association of Fire Fighters
- Texas metropolitan fire departments (including Austin, Dallas, El Paso, Fort Worth, Houston, and San Antonio)

The Texas Commission on Fire Protection (TCFP) is charged with developing and establishing criteria to receive and analyze injury information pertaining to Texas firefighters, and to transmit its report to the State Fire Marshal for inclusion in this annual report, through §419.048 of Senate Bill 1011, passed during the 81st Legislature.

The Texas Commission on Fire Protection Injury Report for calendar year 2014 is included as an appendix to this report.

Fiscal Year 2015 Investigation Summary

Firefighter Alejandro Castro

Brownsville Fire Department

November 16, 2014

Cardiac arrest while on duty

On November 16, 2014, Firefighter Alejandro Castro, 40, was found unresponsive at Fire Station 8 while on duty. Firefighters found Castro unresponsive, face down on the restroom floor, after he had been exercising. Paramedics arrived and tried to revive Castro, but were unsuccessful. Firefighter Castro was pronounced dead and transported to the Cameron County Forensic Pathology for autopsy.

The autopsy revealed the cause of death was cardiac arrest.

Captain Dwight W. Bazile

Houston Fire Department

February 21, 2015

Cardiac arrest while on the scene of a structure fire

On February 19, 2015, the Houston Fire Department responded to a house fire. Captain Dwight Bazile, 56, was performing interior firefighting operations with the crew of Engine 46 at a single-story duplex fire. Captain Bazile exited the structure where he was observed to be in distress before collapsing. Paramedics and firefighters on the scene began resuscitation efforts and he was transported to the Hermann Memorial Hospital in

Houston. Captain Bazile passed away on February 21, 2015.

The Harris County Institute of Forensic Sciences performed an autopsy. The cause of death was determined to be cardiovascular disease.

Firefighter James Anderson

Katy Volunteer Fire Department

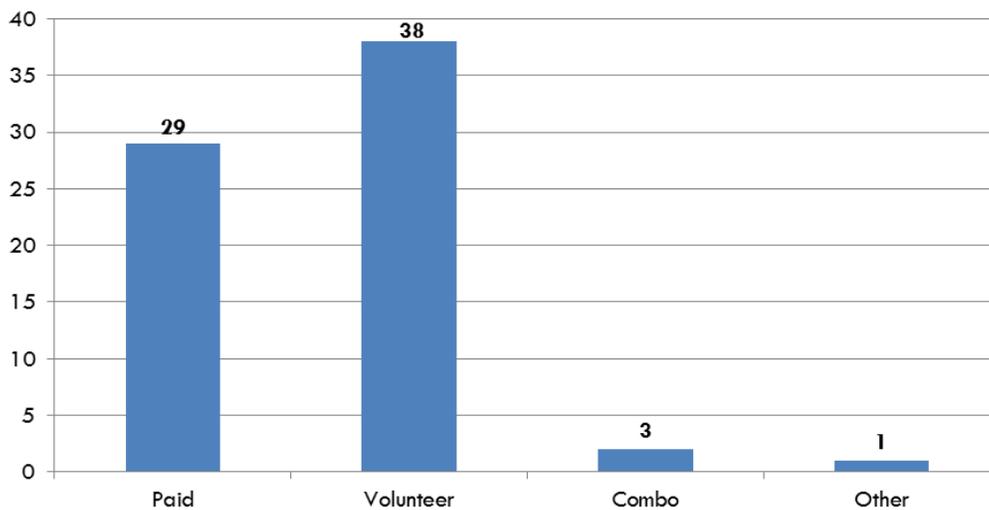
August 23, 2015

On-duty death at station

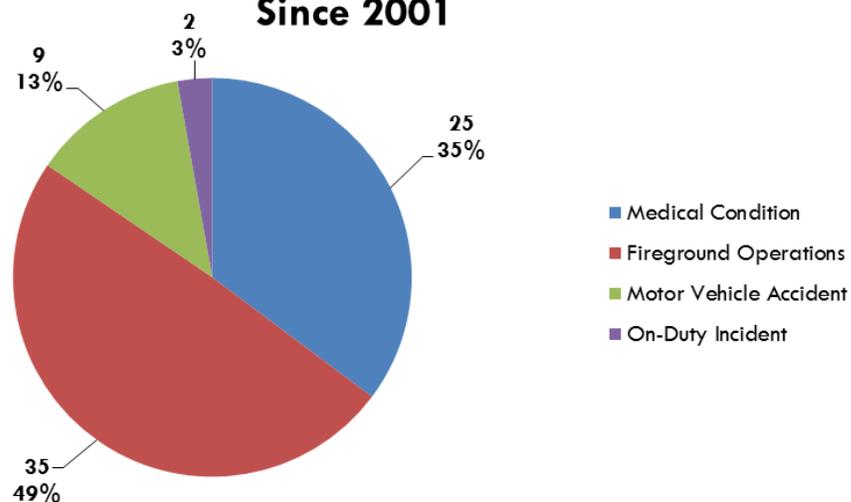
On August 23, 2015, Firefighter James Anderson died while on duty at the department station. The investigation into the fatality is ongoing.

Statistics and Comparisons of Firefighter Fatalities

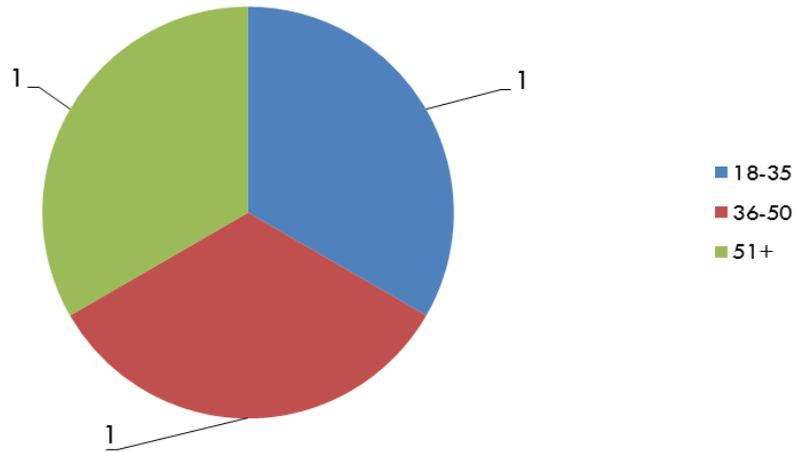
Fatalities by Department Type, 2001-2015



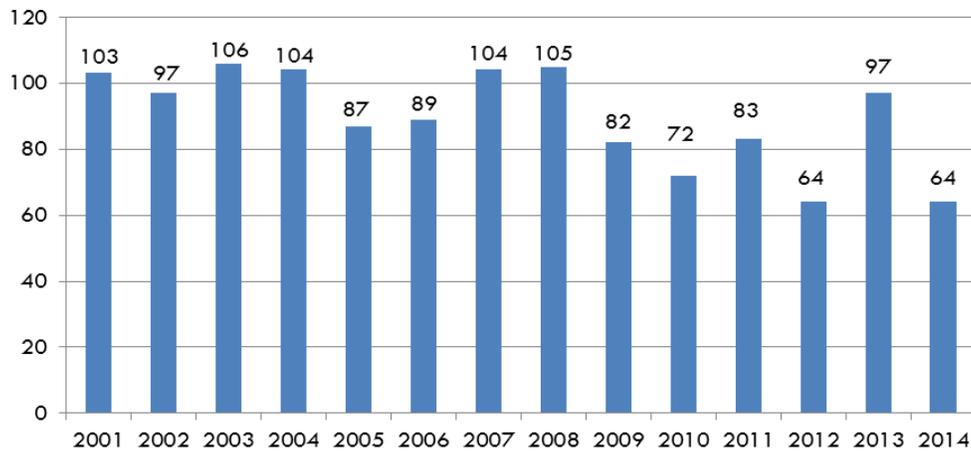
Fatality Types Investigated by the SFMO Since 2001



FY 2015 Fatalities Investigated by Age



National On-Duty Firefighter Deaths, 2001-2014



Strategies for Preventing Firefighter Fatalities

The State Fire Marshal's Office encourages utilization of strategies developed by the State Fire Marshal's Office and nationally recognized organizations in the effort to reduce firefighter fatalities:

- The State Fire Marshal's Office communicates the "lessons learned" from firefighter fatality investigations through the publication of investigation reports, dissemination of information to the Firefighter Fatality Investigation Panel, and presentations at fire service conferences.
- Firefighter fatality investigation reports are sent to the affected fire departments and then placed on the State Fire Marshal's Office website (<http://www.tdi.texas.gov/fire/fmloddiinvesti.html>) for access by the fire service, media, and the public.
- United States Fire Administration (<http://www.usfa.fema.gov>) statistics indicate that heart attacks are the chief cause of firefighter deaths. The National Volunteer Fire Council provides information on how to be heart healthy (<http://www.healthy-firefighter.org>).
- Participate in the "Firefighter Safety Stand Down," sponsored by the International Association of Fire Chiefs (www.iafc.org) and the International Association of Fire Fighters (www.iaff.org).

- Participate in the “Courage to be Safe” (CTBS) program that emphasizes the message “Everyone Goes Home.” Information on the CTBS program is available online at <http://www.everyonegoeshome.com>. (See The 16 Firefighter Life Safety Initiatives below.)
- Implement or expand existing fire prevention programs to assist in reducing the number of fires.
- Participate in the National Fire Service Seat Belt Pledge (www.firehero.org) by the National Fallen Firefighters Foundation, which encourages firefighters to wear seat belts when riding in a fire department vehicle.
- Explore safer strategies and tactics for fighting fires in enclosed structures by publishing findings and recommendations revealed during firefighter fatality investigations.
- Provide information to the fire service and the public on the effectiveness of residential sprinklers in reducing civilian and firefighter fatalities as well as property loss caused by fire.
- Pre-fire incident planning by suppression personnel for high-risk occupancies in their response area. The pre-fire planning should include consideration of life safety for firefighters and occupants, water supply, and structural hazards.
- Include fire prevention and firefighter fatality prevention in all firefighter training and education, including initial training in firefighter academies across the state, as a top priority.
- Emphasize the need for firefighter training on how modern construction technologies such as lightweight structural materials and green building practices can change building performance and fire behavior, and how these new technologies impact firefighter safety and fireground operations (<http://www.greenbuildingfiresafety.org/>).

Everyone Goes Home: The 16 Firefighter Life Safety Initiatives

The 16 Firefighter Life Safety Initiatives were jointly developed by representatives of the major fire service constituencies in 2004 at a Firefighter Safety Summit in Tampa, FL.

At that time, the National Fallen Firefighters Foundation was tasked with promulgating the Initiatives throughout the fire service, and developing material to support their implementation.

Since then, the Initiatives have deeply informed the emerging safety culture in the US fire service, and become the bedrock foundation for thousands of fire departments and EMS organizations who have a desire to ensure that their firefighters and medics return home safely after every shift.

1. Cultural Change

Define and advocate the need for a cultural change within the fire service relating to safety; incorporating leadership, management, supervision, accountability and personal responsibility. (See Appendix 1: *Changing the Culture of Safety in the Fire Service*, by Ronald J. Siarnicki and Richard Gist.)

2. Accountability

Enhance the personal and organizational accountability for health and safety throughout the fire service.

3. Risk Management

Focus greater attention on the integration of risk management with incident management at all levels, including strategic, tactical and planning responsibilities.

4. Empowerment

All firefighters must be empowered to stop unsafe practices.

5. Training & Certification

Develop and implement national standards for training, qualifications, and certification (including regular recertification) that are equally applicable to all

firefighters based on the duties they are expected to perform.

6. Medical & Physical Fitness

Develop and implement national medical and physical fitness standards that are equally applicable to all firefighters, based on the duties they are expected to perform.

7. Research Agenda

Create a national research agenda and data collection system that relates to the 16 Firefighter Life Safety Initiatives.

8. Technology

Utilize available technology wherever it can produce higher levels of health and safety.

9. Fatality, Near-Miss Investigation

Thoroughly investigate all firefighter fatalities, injuries, and near-misses.

10. Grant Support

Grant programs should support the implementation of safe practices and procedures and/or mandate safe practices as an eligibility requirement.

11. Response Policies

National standards for emergency response policies and procedures should be developed and championed.

12. Violent Incident Response

National protocols for response to violent incidents should be developed and championed.

13. Psychological Support

Firefighters and their families must have access to counseling and psychological support.

14. Public Education

Public education must receive more resources and be championed as a critical fire and life safety program.

15. Code Enforcement & Sprinklers

Advocacy must be strengthened for the enforcement of codes and the installation of home fire sprinklers.

16. Apparatus Design & Safety

Safety must be a primary consideration in the design of apparatus and equipment.

Firefighter Safety Recommendations

The following are some recommendations from past reports of investigations conducted by the State Fire Marshal's Office.

1. Define and advocate the need for a cultural change within the fire service relating to safety; incorporating leadership, management, supervision, accountability and personal responsibility.
2. Fire departments should establish standard operating procedures (SOPs) for minimum requirements of a fire service related occupational safety and health program in accordance with the **National Fire Protection Association (NFPA) Standard 1500**, *Standard on Fire Department Occupational Safety and Health Program*, 2007 Edition.
3. Provide mandatory pre-placement and annual medical evaluations to all firefighters consistent with **NFPA 1582**, *Standard on Comprehensive Occupational Medical Program for Fire Departments*, 2007 Edition, to determine their medical ability to perform duties without presenting a significant risk to the safety and health of themselves or others.
4. Perform an annual physical performance (physical ability) evaluation to ensure firefighters are physically capable of performing the essential job tasks of fire fighting. **NFPA 1583**, *Standard on Health Related Fitness Programs for Firefighters*, 2008 Edition.

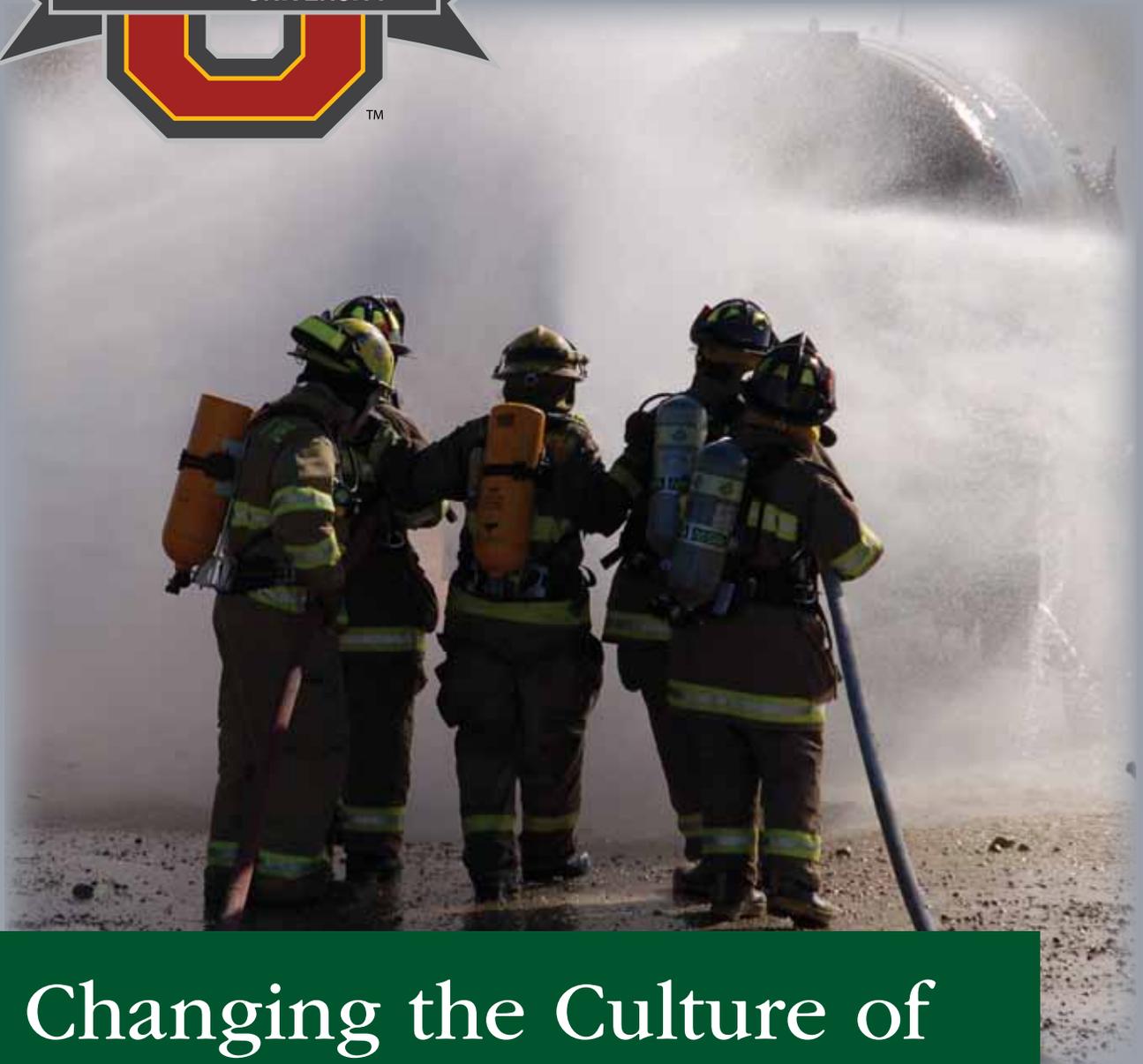
5. Ensure that firefighters are cleared for duty by a physician knowledgeable about the physical demands of firefighting, the personal protective equipment used by firefighters, and the various components of **NFPA 1592**, *Standard on Comprehensive Occupational Medicine Program for Fire Departments*.
6. No risk to the safety of personnel shall be acceptable where there is no possibility to save lives or property. **NFPA 1561**, Chapter 5, Section 5.3.19; **Texas Commission on Fire Protection Standards Manual**, Chapter 435, Section 435.15, Part b, Paragraphs 1 and 2.
7. Always attack a wildland fire from the burned area. If this is done and a sudden change in conditions or wind occurs, the unit can retreat farther into the black where fuel has previously been consumed. **Texas Forest Service**, "Attack from the Black" training DVD, "The black is the best safety zone" <http://txforestservicetamu.edu/main/popup.aspx?id=9514>
National Wildfire Coordinating Group, *Fireline Handbook*, *NWCG Handbook 3*, March 2004.
8. Egress routes and safety zones should be well identified and communicated to everyone on the scene before fire operations begin. Staging areas should be set up to not interfere with ingress or egress, to afford safety to the firefighters using the areas. **NFPA 1143**, Annex Section 5.4.2
Texas Commission on Fire Protection Standards Manual, Chapter 435, Section 435.15, Part a
National Wildfire Coordinating Group, *Fireline Handbook*, *NWCG Handbook 3*, March 2004, Chapter 1, Firefighter Safety
9. All firefighters on the scene of a fire and actively engaged in firefighting operations should be in approved full personal protective equipment (PPE) suitable for the type of fire incident. **National Wildfire Coordinating Group**, *Fireline Handbook*, *NWCG Handbook 3*, March, 2004, Chapter 1, Firefighter Safety
10. Fire departments must use a system of accountability whereby the incident commander can easily and immediately be able to determine not only that a

firefighter is on the fireground but also his location and task assignment at any given time. ***Texas Commission on Fire Protection Standards Manual***, Chapter 435, Section 435.13, Part b, Paragraphs 3 and 4; and Part d

11. Instruct firefighters and command staff that hydration alone will not prevent heat-related illness (HRI). ***NIOSH Report F2011-17***, April 2012
12. Stationary Command: A stationary command offers many advantages; one of the most important is a quiet vantage point from which to receive, process, and relay information. A stationary command post remote from task level operations is also beneficial in building and maintaining an effective fireground organization.
NFPA 1561, 5.3.7.1 “Following the initial stages of the incident, the incident commander shall establish a stationary command post.”
Fire Command, (2nd Edition), Chapter 1, “The Command Post,” Alan V. Brunacini, Von Hoffman Corp.
IFSTA, Essentials of Fire Fighting, (5th Edition), Chapter 1, page 39, Fire Protection Publications, Oklahoma State University
13. The use of all PPE including SCBA is mandatory when operating in areas where members are exposed or potentially exposed to the hazards for which PPE is provided.
NFPA 1500, Chapter 7, Protective Clothing
IFSTA, Essentials of Fire Fighting, (5th Edition), Chapter 5
Texas Commission on Fire Protection Standards Manual, Chapter 435, Fire Fighter Safety
14. Use tools and tactics that help reduce the dangers of roof operations. Become familiar with those indicators that are a precursor to collapse.
IFSTA, Essentials of Fire Fighting, (5th Edition), Chapter 11, pp. 476 and 556-560
IFSTA, Fire Service Ventilation Practices, (7th Edition), pp. 86-89, Fire Protection Publications, Oklahoma State University
15. Consider monitoring and recording fireground activity. ***NFPA 1221***, Chapter 7, Sec. 7.6, Recording



Continuing Education Course



Changing the Culture of Safety in the Fire Service

BY RONALD J. SIARNICKI AND RICHARD GIST

Program supported through an
educational grant provided by:



Fire Engineering
TRAINING THE FIRE SERVICE FOR 134 YEARS

PennWell[®]

To earn continuing education credits, you must successfully complete the course examination.
The cost for this CE exam is \$25.00. For group rates, call (973) 251-5055.

Changing the Culture of Safety in the Fire Service

Educational Objectives

On completion of this course, students will

1. Outline the components of “culture” as it applies to the fire service.
2. Discuss the relationship between attitude and behavior.
3. Identify the main components of the Theory of Planned Behavior and apply them to creating cultural change.
4. Conduct a basic “hot wash” following company-level operations.
5. Explain the implications of consistent and systematic After-Action Review (AAR) for promoting a culture of safety.

Cover photo courtesy of Deputy Chief Roy Bingham, Polk City (IA) Fire Department.

**BY RONALD J. SIARNICKI
AND RICHARD GIST**

WHAT IF THERE WERE ONE SIMPLE THING you could do to help turn the corner toward the “culture of safety” we have all been seeking? What if that one simple thing were something you already do almost instinctively more often than not? What if the only thing it would take to make that difference were to do it every day for everything?

Too good to be true? There may not be instant miracles and patent panaceas for firefighter safety, but there is indeed something we can do that is pretty much that simple and could easily be the most major shift yet toward that culture of safety envisioned in Firefighter Life Safety Initiative 1: *Define and advocate the need for a cultural change within the fire service relating to safety, incorporating leadership, management, supervision, accountability and personal responsibility.*¹

Now, that reads like a very complex and seriously daunting objective—and it is! You are well within your wits if you wonder how getting there could be influenced by anything described as “simple.” But even very complicated things, when you break them down and analyze their pieces, are typically built from relatively simple components. So it is with notions like “cultural change.”

Culture is a difficult term to define. It centers on collective sets of values, beliefs, behaviors, incentives, and prohibitions. It involves things as diverse as economics, politics, religion, custom, and ritual. It is instilled through complex processes that typically include both formal

instruction and subtle elements of socialization. There’s an entire academic discipline—*cultural anthropology*—that devotes its work to exploring how cultures can be defined, how they develop, how they change, and what differentiates one from another.

It’s probably fair to say that we do not have a “fire service culture” *per se*—at least, not any one unified culture we can call our own. We have many levels and variations. A number of observers seem to agree that there are regional cultures that differ in significant ways: The Northeastern fire service, for example, has some clear distinctions from the predominant culture of the Southwestern fire service, and both are distinct in certain ways from the fire service culture of the Pacific Northwest or the culture of the fire service in the Deep South or the Midwest. Many states talk of differing cultures from one area to another. Even neighboring departments boast or bemoan significant cultural differences, and in larger departments different cultures are said to reside at different stations or across different shifts.

Still, though, we have many values, beliefs, traditions, and even rituals that hold us together as a culture. Parts of our working apparel are so widely recognized that the outline of a helmet on an elevator key is sufficient to say whose it is to push. Even a primitive silhouette of a fire truck on a diamond sign communicates that a fire station is just ahead. An ax, a pike pole, a ladder, and a nozzle make a scramble so familiar that it needs no further description. Every October, the assembly of uniformed officers and honor guards at the National Memorial in Emmitsburg, Maryland, reminds us of the rituals we share and the shared tragedies that they represent.

We have proud traditions and deeply held beliefs. Their core will never change, nor should they change. We believe in honor, in courage, in valor, and in self-sacrifice. We believe in brotherhood and fraternity. But we are also known to take risks that may not need to be taken that produce consequences too dire to be left unquestioned, and we are known, even among ourselves, to often resist change and intervention.

HOW DOES CULTURE COME TO BE?

If culture is an amalgamation of values, beliefs, and behaviors that become engrained in people, communities, and organizations, how do these things arise, how are they transmitted from one generation to the next, and—most importantly—how can we change the parts that work against us? To get to that point, we must first understand how it is that people come to do the things they do.

The most tenacious aspects of culture are those driven by *conformity*. They are seen in behaviors and beliefs that are often described as *norms*. Norms are so fundamental that we don't think about them; we don't know how or when we learned them because they seem to have always been a part of our world and our movement within it. Since social norms are so deeply engrained, they're typically quite difficult to change.

For example, the odds are that nobody ever told you exactly how to behave in an elevator. There aren't written rules about it. Still, you know exactly what to do—walk in; turn to face the door; look up, down, or forward. If you know someone, you will probably say hello, but any conversation that follows is usually kept to short, quiet, low-key exchanges.

Let's now try an experiment: Step into the elevator and wait for the doors to close. This time, though, don't turn around. Instead, stand facing the crowd and ask how everyone is doing. Tell them a little bit about yourself; maybe share a few things about your views on current events and politics. You could even follow up with a brief display of talent such as singing, dancing, or telling a few jokes. Security will be waiting for you somewhere before you get to the top floor.

Conformity to social norms is not the same as obedience or compliance. Obedience is following an order or an instruction because it comes from a source that has the power to enforce it. *Obedience* carries the possibility of coercion—sometimes it is implied, sometimes it is explicit, but it always lurks somewhere in the interaction. It's like that “big stick” that Theodore Roosevelt spoke of carrying. The bigger the stick, the more complete and consistent the obedience it is likely to evoke.

But obedience comes with a cost, and that cost can eat away at an organization's more important goals. Competent adults tend to resent coercion. It makes us feel like children; not surprisingly, we push back in ways that can even be somewhat childish. It may change our overt behavior but only when we might get caught and not because we think the change was right or necessary. When no one is watching, we're likely to do whatever it is we're not supposed to be doing, if only for spite. It's a short-term fix at best, and one with a long-term cost. Culture isn't a short-term thing.

Compliance represents a more sophisticated route to behavior change. Compliance comes when the legitimacy of and rationale for behavioral prescriptions are accepted and the authority to prescribe the changes is acknowledged. People are most apt to comply when they accept that a rule or an instruction exists for a reason they see as worthwhile or even beneficial. They also are more likely to comply when they see the source of the instruction as a legitimate authority acting in a legitimate capacity to attain a legitimate objective. This is a much more stable equation but one that waxes and wanes with the perceived legitimacy of information and information sources—in other words, compliance rises and falls as people and ideas come in and out of favor around the firehouse table. We all know how quickly such things can change.

Conformity takes over only when an idea becomes so basic, so fundamental, and so widely practiced that it seems almost absurd to question it. It has to be a part of what everybody does every day. You'd think that safety would by now have reached that stature in a high-risk enterprise such as ours. But culture is a very dynamic balance that often involves competing norms.

The very essence of firefighting pits personal safety against perceived need. Every tribute to firefighters begins with willingness to risk one's life to protect another. We laud those who have made the ultimate sacrifice and reserve our most solemn rituals—the ones that most define for us who we are as a culture—to recognize their passing. For generations, senior firefighters have regaled the new kids with tales of close calls and risks survived. Terms like “courage” and “valor” are implicitly connected to peril and risk. Despite the lip service we give to risk appraisal and measured reactions, the terms typically used to describe “cautious” and “analytical” aren't nearly as flattering to the ego and are sometimes downright harsh. It's the classic example of a mixed message.

ATTITUDE VS. BEHAVIOR

We've spent a lot of time and given a lot of effort to changing firefighters' attitudes toward safety. There are good indicators at many levels suggesting that we've had some success in progressively changing the dominant attitude of the industry. But changing attitude is only a part of the process—what really matters is changing behavior.

It's neither difficult nor uncommon to hold attitudes that are inconsistent with what we actually do, especially in areas related to health and safety. One need only consider how many firefighters still doff the high-tech self-contained breathing apparatus provided to protect their respiratory systems from the harmful effects of various by-products of combustion, only to light a cigarette and suck the toxic colloidal ash of a decidedly noxious plant directly into their bronchial trees. How many times have we ordered a burger and fries even though we know that saturated fats have an ugly impact on our cardiovascular health and firmly believe that cardiovascular health is important? Culture isn't determined by what we say; it's displayed in what we do.

On the other hand, changing behavior is a powerful factor in changing attitudes. Quitting smoking has a much

● SAFETY CULTURE

greater impact on your attitude toward cigarettes than learning the risks of tobacco smoke has on your propensity to light them. Taking up a serious program of diet and exercise will have a much greater impact on your attitude toward activity and nutrition than efforts to change your attitudes will have on dashes through the drive-through and journeys to the gym. When we make a significant and lasting change in what we do, we tend to change our attitudes to match our actions. Persistent attitudes backed by consistent actions are the bedrock of what we call culture.

Too many times, we tend to oversimplify the complex route from attitude to behavior, acting as if people move in a single, bounding leap from information to action. Azjen's "Theory of Planned Behavior,"² among the most widely employed models regarding the relationship between attitudes and behavior, includes a series of factors that influence your path from attitude change to behavior change:

- Your beliefs about whether the behavior can actually produce the desired outcome (*behavioral belief*).
- The value, positive or negative, that you place on performing the behavior and attaining the outcome (*attitude toward the behavior*).
- Your perceptions about the behavior's normative stature among persons significant to you (*normative beliefs*).
- Your perceptions about social pressures to perform or not perform the behavior (*subjective norms*).
- The perceived difficulty of performing the behavior (*behavioral control*).
- Your beliefs regarding factors that promote or inhibit performing the behavior (*control beliefs*).

These factors together influence your *behavioral intention*—your readiness to perform the behavior. Still, the behavior itself can only be displayed if you have both the *capacity* (strength, tools, and setting) and the *capability* (knowledge, skill, and ability) to carry it out when needed. This theory has been tested in research directed toward promoting behavioral intention regarding firefighter safety,³ but truly meaningful change in an area as wide-ranging as the cultural value placed on personal safety is unlikely to come about by trying to change the many, many shifting dimensions of what we believe. We have to start changing what we do.

BIG CHANGES START WITH SMALL BITES

B.F. Skinner was one of the most influential behavioral scientists of all time.⁴ His work on the most basic elements of behavior changed the way we think about learning and reinforcement. He was among the first to explore what it takes to move incrementally, through planned series of small changes, to create lasting patterns of complex behavior change. He and his colleagues stumbled onto this while creating a diversion for themselves during a period of boredom in their laboratory—they decided they would try to teach pigeons to bowl.

Pigeons aren't the brightest creatures. You can't directly teach them something complicated like bowling—they just don't get it. You can dress them in personalized shirts and

take them to the lanes on Saturday morning, but it won't motivate them in the slightest. You have to start with something they already do (*baseline behavior*) and *shape* that behavior bit by bit into the change you ultimately want to see.

To get a pigeon to bowl, you first need to break down the behavior we call bowling into component elements: In this case, we need for the pigeon to put his beak on the floor, face the ball, give it a whack with its beak, and impart to it sufficient force and direction to knock down some pins at the other end of the lane. Fortunately, pigeons peck at the ground as a matter of course—that's our baseline behavior. So here's how we shape that into bowling behavior:

- First, we skip a few feedings to provide some motivation. Then, the first time the pigeon pecks at the ground, we ring a bell to grab its attention and provide a pellet of food. After a surprisingly few rounds of this, our pigeon will be digging a rut in the lane with its beak.
- At that point, we change our pattern a bit: We now provide the pellet only if the pigeon puts its beak on the floor *and* faces the ball.
- When that is established, we provide the pellet only when the pigeon puts its beak down, faces the ball, and moves toward it.
- Next, the pellet only comes when the pigeon puts down its beak, faces the ball, moves toward it, and gives it at least a tap.
- From there, it becomes a pattern of refinements—only when the ball moves at least six inches, only when it makes it halfway down the lane, only when it reaches the pins, only when at least one pin falls.

Ultimately, the truly competitive may try to move toward reinforcement only for strikes and certain complex spares, but there's only so much a pigeon can master. But the point is clear, and it carries over well into many other things: Start with something people already do and shape that incrementally into the behavior you need.

FROM CIRCLES TO PYRAMIDS AND BACK AGAIN

Ten years of systematic investigations have identified maintenance of effective command and control as among the most critical factors in preventing firefighter line-of-duty deaths. The development of the contemporary Incident Management System (IMS) has given the American fire service a critical tool to ensure that every event we encounter, from the most basic and routine to the most complex and demanding, can be managed using a consistent template. That template can expand to accommodate the needs of major, rapidly escalating events and contract to provide safe and effective oversight of even the most ordinary situation or circumstance.

Consistent use of this system, every day for everything, is a vital part of making IMS successful as a safety tool. If the first thing you do when arriving at any scene is to execute the basics of the IMS model—establish command,

broadcast your assessment, assign your resources, project your resource needs—then the behavior to which you will default when you face difficult and dangerous situations will be the same as that you use every day.

The difference this can make in the course and outcome of an event has been demonstrated time and again. The more we move toward consistent application of IMS, the safer our operations become. IMS allows those responsible for safety and execution to concentrate on those features of the evolving event that make it unique and to turn their decisions into effective actions quickly, reliably, and efficiently. But IMS provides an answer to only part of the problem.

How can we just as consistently capture and capitalize on that information that comes to us only from the direct experience of putting the wet stuff on the red stuff? How can we move from the hierarchical structure and interaction patterns of IMS back to the lateral discussions that characterize the firehouse table without leaving critical learning opportunities on the fireground? How do we take what was experienced at the end of a nozzle in the heat of the battle and turn it into something learnable and useable by everybody in the organization? How can we ensure that what we did in that relatively infrequent, high-demand event can have a positive influence on the routine stuff we do every day? Conversely, how can we make sure that the stuff we're doing routinely, day in and day out, is keeping us prepared for "the Big One"? And how can we ensure that safety is a central part of those ongoing discussions?

A big part of what facilitated the integration of IMS in the fire service is found in its similarity to things the best commanders did almost by instinct. The evolution of the IMS model came about over a number of years as fire service leaders distilled those "best practices" into systematic principles that could be taught, learned, and applied consistently by officers at all levels of rank and experience. What we need now is a process to help us do the same thing with all our practices and protocols.

AFTER-ACTION REVIEW: EVERY DAY FOR EVERYTHING

The military's system of After-Action Review (AAR) may be the best model yet for helping the fire service take this next step.⁵ Like IMS, it provides a template that's devilishly simple and easily adaptable. Like IMS, it can expand and contract to meet the needs of any event. Like IMS, it is useful for any encounter, large or small, exceptional or routine. And, like IMS, its utility for the Big One is built on its daily use throughout the organization.

AAR is grounded in the basic premise that organizational progress is driven by individual learning and improvement that can then be transferred throughout the organization. According to that premise, development takes root best where assessment and learning are grounded in what the military calls "local value"—its direct impact for the

individuals doing the learning and what they are engaged in doing right here, right now. Organizational progress comes from gathering, validating, and disseminating local lessons from all levels of the organization regarding every aspect of its missions.

A good operating summary of the AAR can be found in just a few basic questions to be asked in any operating unit, whether a soldier or two handling a logistical function or a reconnaissance group coming back from patrol; whether it's a mission that has been fully completed or a component evolution that will be executed many more times to follow:

1 *What was the intent?* What were we trying to accomplish by whatever it is we just did? Objectives should be simple and clear and should be stated in measurable behavioral terms. After all, if you can't tell me precisely what it was you were trying to do, how can you tell me whether you actually got it done?

2 *What happened when we took to the objective?* What exactly transpired? Who did what and with which and to whom, for what reasons? What results did we achieve? Were they consistent with our objectives? Memory fades and, more importantly, memories change shape with time and discussion—therefore, it's critical to ask these questions as immediately as possible.

3 *What did we learn from this?* What do we know about the situation, its demands, and our objectives that we didn't know before? If we achieved our objectives, what did we do that was critical to our success? If we didn't fulfill our total objective, what was left undone? What got in the way of our objectives? What risks did we encounter, and how did we try to address those risks? What would we have needed to know to have done better? What if the things we learned could improve our outcomes going forward and minimize risks to our health and safety?

4 *What should we do now?* If we have to turn around and do this all again, how would we do it differently to improve our result? If someone else has to do this same thing, what advice would we have for them going into it? If there are aspects left unaccomplished, what needs to be done about that? Most importantly, how might we do what we needed to do more safely and manage the risks we encountered with better awareness and greater success? The driving consideration here is to put the learning to work—now.

5 *Whom should we tell about this?* Who else needs to know about what we've done and learned? What are the critical things we need to tell them? How are we going to get that information "into the pipeline"? How can what we've learned here affect overall organizational performance? Even the smallest lessons can have meaningful impacts—how do we use the organization's overall AAR system to ensure that no lesson is lost?

The concepts for pulling this information together are pretty straightforward, too. There's the unit level "hot wash" in which these questions are sometimes run through

● SAFETY CULTURE

even as the action is still going on. There are, of course, larger and more structured formal reviews to accommodate bigger missions with more “moving parts”; these reviews follow more formal patterns for aggregating, analyzing, and disseminating findings and recommendations. But the crux of it all is the consistency with which those short, straight-forward reviews are conducted where the rubber is meeting the road—in large incidents and small encounters, day in and day out, everywhere in the organization. Even quality management gurus like Peter Senge⁶ have described it as “arguably one of the most successful organizational learning methods yet developed.”

If the truth be known, the best company officers and battalion chiefs use something pretty much like this every day and have been doing so for years. They come back from a call, even a routine one; pour a cup of coffee; and ask questions that sound a lot like those in an AAR at the kitchen table. Where we fall down, as we do in so many areas, is in making the process expected, consistent, and reliable throughout our organizations—and in ensuring that the communications channels are in place and working to gather those “local value” lessons together, glean important information from them, and regularly feed it back to the places where our rubber meets our roads.

MAKING IT WORK FOR YOUR ORGANIZATION

So why isn't everybody doing this? It's made headway in places you might not expect. Harley Davidson, for example, used the approach to prepare for new product launches in its Kansas City manufacturing facility. Shell uses such an approach in its oil exploration business. Wine retailer Geerlings and Wade reportedly uses it in its warehouse operations. It seems that it would be an ideal match for how we do things in our business, too.

A big part of what holds us back may come from our aversion to criticizing our own actions or, worse yet, standing to criticism from others. Our customers usually see our actions as benevolent if not downright heroic. And, in all but the most extreme cases, we can typically claim success—after all, all fires eventually go out, and all bleeding eventually stops. But a fire does its damage in the interval between ignition and extinguishment, so what happens during that interval and how much time is consumed in doing it make a real difference to that person whose home, property, and memories are being converted to colloidal ash and scattered to the winds through the thermal column. The process of putting out a fire wreaks its own havoc on the structure, even beyond what the fire itself consumed—sometimes it can be a toss-up to determine whether more damage arose from the process of combustion or the process of suppression, especially from the homeowner's view of what's left. And if the bleeding stops only as a result of gross desanguination, odds are that the outcome wasn't the one that we and the patient were seeking. How well, how quickly,

how efficiently, and how effectively we do the stuff that puts the brakes on the problem before us are the essence of whatever difference we truly make.

Still, when something goes clearly, inescapably awry—even if all the king's horses and all the king's men couldn't have made it come out differently—we suddenly go into a hardcore, take-no-prisoners, “critique” mode. We take it apart, look at how we did things, dig into anything that might have made a difference, and strive to ensure that we don't repeat whatever it was that got us into trouble. We convene blue ribbon panels; we commission elaborate recreations and simulations; and we publish detailed, “no-holds-barred” reports. Experts of various sorts hit the trade show circuit to explain how things should have been done differently. All too often, we offer up symbolic human sacrifices from among those surviving to atone for those who were lost. But all the while, we know in our hearts and in our guts that there is simply no amount of *ex post facto* exorcism that can undo stuff that's already happened.

Think how much more effective we could be if learning from our experiences was a systematic, organizationally driven, everyday effort in everything we do. Even more to the point, think how much better prepared we could be to deal with things that fall outside the envelope of our usual encounters. After all, the best way to prepare for the Big One is to make sure you've always got the basics handled—that way you can focus your attention on the things that make the Big One big.

The traditional system of critiquing the Big One is full of limitations. Darling and Parry⁷ noted several drawbacks of these retrospective review processes as compared to the AAR approach:

- 1** They are done once in the life of a project, generally well after any opportunity to modify the outcome has been exhausted.
- 2** The focus is usually on drafting recommendations to be implemented by someone other than those making the recommendations.
- 3** The report generally goes somewhere “up the chain” rather than back to where the work was done.
- 4** The process for conducting the reviews is usually an afterthought, not an integral part of the project built into it from the start.
- 5** These are usually lengthy sessions with mandated attendance, where everyone has to come, but few may see the “local value” for what they're doing now.
- 6** Too often, these sessions are called when someone perceives failure or flaw or when unusual levels of stress and conflict are anticipated or experienced—the result is sessions that focus on dissecting past failures rather than building future success.

These distinctions are crucial elements in the effectiveness of the larger AAR process. Unlike the *post mortem* critique, the AAR is an expected part of all activities and events. It is planned into every project from the begin-

ning, to take place repeatedly throughout the effort so that improvements can be made at any step. It deals with the routine aspects as well as the exceptions, with the quality and reliability of basic performance as its central aim. It's a planning and development tool instead of a way to fix flaws and apportion fault and blame. It's designed to find good processes and make them stronger, not just to find weaknesses to correct. It's easy to see how this could ultimately impact every aspect of readiness and execution.

Given the technology we hold today, it should be easier than ever before to put our experience to work in this sort of fashion. It's becoming more important than ever, too. Everyone talks about how the emergency response business is changing, but the pace with which various forces are pulling us forward is much greater than the speed of change we have designed into our organizations. We can no longer depend on on-the-job training to ensure that every rookie learns the trade by following a seasoned veteran into the belly of the beast—things just don't happen that way anymore. The fires aren't as frequent, and the ones that get away from us do so with a vengeance, unlike the "bread and butter" fires of a generation or so ago. Those "seasoned veterans" are retiring in waves now, and with them leaves a ton of experience that never got written down or passed along as efficiently as it should have been. We have to capture the experience we gain systematically and make it work in the same way that the "peacetime army" had to learn to capture the experience of battle without waging war.

We have to be creating ways to ensure that our capacity to execute the basics of the things we do is constantly reinforced, constantly expanding, and constantly improving. We have to redefine ourselves as "learning organizations"—organizations that constantly transform themselves by systematically promoting the learning and growth of their members with respect to their missions. (6) We have to move beyond planning and response to treat each encounter as an opportunity to get better and grow stronger. And we have to make safety a consistent and valued plank in that learning process.

THE "TAKE AWAY" MESSAGE

Culture is the ever-changing product of our values, beliefs, traditions, rituals, and practices. No matter how we choose to describe those things, it is ultimately embedded, expressed, and transferred from one generation to the next in the context of the ways we choose to behave. We can talk as much as we like about changing our culture, but changing our behavior will always be the bottom line.

Here's where you can start: Make that "hot wash" something you do every time you turn a wheel. Come back to the station, take a few minutes, and ask those basic questions. Make sure that safety gets discussed as you review your actions and identify the places you can improve. Turn those lessons into actions. Pass them on to others;

ask others to share their lessons with you.

The capacity of AAR to enhance safety in our industry has already earned some empirical support. Allen et al investigated the impact of AARs on the safety climate among 67 firefighting crews, reporting that these reviews "constitute a specific venue through which managers can promote safety climate in high-risk environments" (5, 750). The importance of safety-oriented group norms and their relationship to the ongoing AAR process were also noted.

Where every encounter is an opportunity to learn and every opportunity to learn is systematically examined, the value the organization places on learning from its actions becomes unquestionably clear. The questions that are asked become, through the consistency of the behavior entailed in asking them, an ongoing expression of the cultural values of the organization. Where safety is a principal element of those queries, a culture of safety takes shape. That's how it starts—and it starts with you. ●

REFERENCES

1. National Fallen Firefighters Foundation. (2004). *16 Firefighter Life Safety Initiatives*. Available online at <http://www.everyonegoeshome.org/initiatives.html>.
2. Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50: 179-211.
3. Welbourne, J., & Booth-Butterfield, S. (2005). Using the theory of planned behavior and a stage model of persuasion to evaluate a safety message for firefighters. *Health Communications*, 18:141-154.
4. Skinner, B. F. (1958). "Reinforcement today," *American Psychologist*, 13: 94-99.
5. Allen, J. A., Baran, B. E., & Scott, C. W. (2010). "After-action reviews: A venue for the promotion of safety climate," *Accident Analysis & Prevention*, 42: 750-757.
6. Senge, P. M. (2006). *The fifth discipline*. New York: Random House.
7. Darling, M. J. & Parry, C. S. (2000). *From post-mortem to living practice: An in-depth study of the evolution of the After Action Review*. Boston, MA: Signet Consulting Group.

● **RONALD J. SIARNICKI** served with the Prince George's County (MD) Fire/EMS Department, where he served 24 years in operations. He retired as chief of the department in 2001 to take the position of executive director of the National Fallen Firefighters Foundation. He has a master's degree from the University of Maryland, University College, and is a certified fire officer IV. In addition, he serves with the United Communities Volunteer Fire Department in Stevensville, Maryland.

● **RICHARD GIST, Ph.D.**, is principal assistant to the director of the Kansas City (MO) Fire Department and a faculty member of the Department of Preventive Medicine at Kansas City University of Medicine and Biosciences. He has earned an international reputation in the emergency response and research communities as an author, a researcher, a lecturer, a consultant, and a commentator on the psychosocial impacts of disaster and community response to catastrophe.

Changing the Culture of Safety in the Fire Service

COURSE EXAMINATION INFORMATION

To receive credit and your certificate of completion for participation in this educational activity, you must complete the program post examination and receive a score of 70% or better. You have the following options for completion.

Option One: Online Completion

Use this page to review the questions and mark your answers. Return to www.FireEngineeringUniversity.com and sign in. If you have not previously purchased the program, select it from the "Online Courses" listing and complete the online purchase process. Once purchased, the program will be added to your **User History** page where a **Take Exam** link will be provided. Click on the "Take Exam" link, complete all the program questions, and submit your answers. An immediate grade report will be provided; on receiving a passing grade, your "Certificate of Completion" will be provided immediately for viewing and/or printing. Certificates may be viewed and/or printed anytime in the future by returning to the site and signing in.

Option Two: Traditional Completion

You may fax or mail your answers with payment to *PennWell* (see Traditional Completion Information on following page). All information requested must be provided to process the program for certification and credit. Be sure to complete ALL "Payment," "Personal Certification Information," "Answers," and "Evaluation" forms. Your exam will be graded within 72 hours of receipt. On successful completion of the posttest (70% or higher), a "Certificate of Completion" will be mailed to the address provided.

COURSE EXAMINATION

- Culture includes which of the following?
 - Beliefs
 - Rituals
 - Traditions
 - Each of these is a part of culture.
- Culture is most directly expressed in
 - Values
 - Attitudes
 - Behaviors
 - Beliefs
- Which of the statements below represents the most accurate description of the relationship between attitude and behavior?
 - Changing a person's attitudes changes a person's behavior.
 - People's actions reveal their attitudes.
 - People's attitudes reliably predict their behavior.
 - Changing a person's behavior typically alters their attitudes.
- Which statement best reflects the culture of the fire service?
 - Fire service cultures vary, but they have much in common.
 - There is a reasonably uniform culture across American fire departments.
 - There are many fire service cultures, and they differ in radical ways.
 - Fire service culture cannot be described or defined.
- Which statement best reflects cultural influences on safety in the American fire service?
 - Beliefs about safety often compete with beliefs about risk and courage.
 - Safety has become the dominant factor in determining fireground behavior.
 - The impact of culture on safety has been relatively limited.
 - Beliefs about safety are not a significant part of fire service culture.
- Senge referred to organizations that practice ongoing refinement and review as
 - Change agents.
 - Growth industries.
 - Cultures of analysis.
 - Learning organizations.
- Adoption of IMS in the fire service was facilitated by
 - The relationship of its structure to existing best practices.
 - Early agreement on its principles and components
 - Imposition of national standards as a first step in the process
 - Extensive research on its implementation.
- To be optimally effective, both IMS and AAR must be
 - Studied extensively at all levels of the organization
 - Used every day for everything
 - Rigidly applied and uniformly critiqued
 - None of these factors is critical
- The "hot wash" element of AAR is intended to be employed
 - At the company level
 - Immediately after every incident or encounter
 - As an informal discussion or review
 - All of these statements are correct
- A formal AAR following more complex operations is comprised of
 - An independent review of operations from the command level
 - External analysis of command and operations
 - Assembly of company and sector level "hot wash" information
 - Formal AARs are not conducted
- Limitations of traditional critique approaches include
 - Perceived lack of "local value"
 - Focus on failures or flaws
 - Timing "after the fact" inhibiting immediate application
 - All of these limitations apply.
- The most powerful contribution that AAR can make is likely to come from
 - Promoting more frequent and intensive formal reviews
 - Generating more research studies and published reports
 - Making safety and performance improvement a matter of daily conversation
 - Instituting a system of checks and balances.

Changing the Culture of Safety in the Fire Service

PROGRAM COMPLETION INFORMATION

If you wish to purchase and complete this activity traditionally (mail or fax) rather than Online, you must provide the information requested below. Please be sure to select your answers carefully and complete the evaluation information. To receive credit, you must receive a score of 70% or better.

Complete online at: www.FireEngineeringUniversity.com

PERSONAL CERTIFICATION INFORMATION:

Last Name (PLEASE PRINT CLEARLY OR TYPE)

First Name

Profession/Credentials License Number

Street Address

Suite or Apartment Number

City/State Zip Code

Daytime Telephone Number with Area Code

Fax Number with Area Code

E-mail Address

TRADITIONAL COMPLETION INFORMATION:

Mail or fax completed answer sheet to
Fire Engineering University, Attn: Carroll Hull,
1421 S. Sheridan Road, Tulsa OK 74112
Fax: (918) 831-9804

PAYMENT & CREDIT INFORMATION

Examination Fee: \$25.00 Credit Hours: 4

Should you have additional questions, please contact Pete Prochilo (973) 251-5053 (Mon-Fri 9:00 am-5:00 pm EST).

I have enclosed a check or money order.

I am using a credit card.

My Credit Card information is provided below.

American Express Visa MC Discover

Please provide the following (please print clearly):

Exact Name on Credit Card

Credit Card # Expiration Date

Signature

ANSWER FORM

Please check the correct box for each question below.

- | | |
|---|---|
| 1. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D | 11. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D |
| 2. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D | 12. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D |
| 3. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D | 13. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D |
| 4. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D | 14. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D |
| 5. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D | 15. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D |
| 6. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D | 16. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D |
| 7. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D | 17. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D |
| 8. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D | 18. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D |
| 9. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D | 19. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D |
| 10. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D | 20. <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D |

COURSE EVALUATION

Please evaluate this course by responding to the following statements, using a scale of Excellent = 5 to Poor = 1.

- | | | | | | |
|--|-------|---|---|-----|----|
| 1. To what extent were the course objectives accomplished overall? | 5 | 4 | 3 | 2 | 1 |
| 2. Please rate your personal mastery of the course objectives. | 5 | 4 | 3 | 2 | 1 |
| 3. How would you rate the objectives and educational methods? | 5 | 4 | 3 | 2 | 1 |
| 4. How do you rate the author's grasp of the topic? | 5 | 4 | 3 | 2 | 1 |
| 5. Please rate the instructor's effectiveness. | 5 | 4 | 3 | 2 | 1 |
| 6. Was the overall administration of the course effective? | 5 | 4 | 3 | 2 | 1 |
| 7. Do you feel that the references were adequate? | | | | Yes | No |
| 8. Would you participate in a similar program on a different topic? | | | | Yes | No |
| 9. If any of the continuing education questions were unclear or ambiguous, please list them. | _____ | | | | |
| 10. Was there any subject matter you found confusing? Please describe. | _____ | | | | |
| 11. What additional continuing education topics would you like to see? | _____ | | | | |

PLEASE PHOTOCOPY ANSWER SHEET FOR ADDITIONAL PARTICIPANTS.

AUTHOR DISCLAIMER
The author(s) of this course has/have no commercial ties with the sponsors or the providers of the unrestricted educational grant for this course.

SPONSOR/PROVIDER
No manufacturer or third party has had any input into the development of course content. All content has been derived from references listed, and/or the opinions of the instructors. Please direct all questions pertaining to PennWell or the administration of this course to Pete Prochilo, peterp@penwell.com.

COURSE EVALUATION and PARTICIPANT FEEDBACK
We encourage participant feedback pertaining to all courses. Please be sure to complete the survey included with the course. Please e-mail all questions to: Pete.Prochilo@penwell.com.

INSTRUCTIONS
All questions should have only one answer. Grading of this examination is done manually. Participants will receive confirmation of passing by receipt of a verification form.

EDUCATIONAL DISCLAIMER
The opinions of efficacy or perceived value of any products or companies mentioned in this course and expressed herein are those of the author(s) of the course and do not necessarily reflect those of PennWell.

Completing a single continuing education course does not provide enough information to give the participant the feeling that s/he is an expert in the field related to the course topic. It is a combination of many educational courses and clinical experience that allows the participant to develop skills and expertise.

COURSE CREDITS/COST
All participants scoring at least 70% on the examination will receive a verification form verifying 4 CE credits. Participants are urged to contact their state or local authority for continuing education requirements.

RECORD KEEPING
PennWell maintains records of your successful completion of any exam. Please go to www.FireEngineeringUniversity.com to see your continuing education credits report.

© 2009 by Fire Engineering University, a division of PennWell.

LEADERSHIP IS MORE THAN BUILDING FIRE APPARATUS.

It's about experience, and helping firefighters train to perform at a higher level. That's why Pierce is committed to LEAP (Learning, Experience And Performance) – to continue the education, safety and effectiveness of firefighters.



PERFORM LIKE NO OTHER.

www.piercemfg.com

An Oshkosh Corporation Company

The Pierce name and Pierce logo are registered trademarks of Oshkosh Corporation.

©2015 PIERCE MANUFACTURING, LLC

Texas Commission on Fire Protection

Injury Report

January 1, 2014 to December 31, 2014



TEXAS COMMISSION ON FIRE PROTECTION

Table of Contents

Table of Contents.....	i
Executive Summary	1
Abstract.....	2
Mission.....	3
Building a Community of Safety	3
Why we are collecting injury data.....	3
What information does the commission collect?	3
How this will help the fire service.....	3
Learn more and get help	3
Reports, Information and Data Collection.....	4
Fire Protection Personnel Injuries.....	5
Table 1: Injuries by Activity and Severity, 2014.....	5
Figure 1: Total Injuries by Activity, 2014.....	5
Emergency vs. Non-Emergency Injuries.....	6
Table2: Injuries by Emergency Activity and Severity, 2014	6
Table3: Injuries by Non-Emergency Activity and Severity, 2014.....	6
Figure 2: Percent of Total Injuries in Emergency and Non-Emergency Activities, 2014.....	6
Injuries by Type	7
Table 4: Types of Injury, 2012-2014 (Note: ordered high to low, 2014)	7
Figure 3: Types of Injury, 2014.....	7
Task at Time of Injury.....	8
Table 5: Top 15 Tasks at Time of Injury, 2013-2014.....	8
Figure 4: Top 15 Tasks at Time of Injury, 2013-2014.....	8
Exposures.....	9
Table 6: Exposure Agents, 2013-2014.....	9
Figure 5: Exposure Types, 2013 - 2014.....	9
Injuries by Body Part.....	10
Table 7: Injuries by Body Part, 2012 - 2014.....	10
Minor and Serious Injuries by Activity	11
Table 8: Minor Injury Activities, 2012 - 2014.....	11
Table 9: Serious Injury Activities, 2012 - 2014.....	11
Injuries by Age Group	12

Table 10: Injuries by Age Group, 2012 - 2014.....	12
Figure 6: Injury Count by Age Group, 2012 - 2014	12
Injury Activities Resulting in Lost Time.....	13
Table 11: Injury Activities Resulting in Lost Time, 2014.....	13
Table 12: Activities Resulting in Lost Time, 2014, between 1 and 30 Days.....	13
Injury Activities Resulting in Lost Time (continued).....	14
Table 13: Activities Resulting in Lost Time, 2014, between 31 and 90 Days.....	14
Table 14: Activities Resulting in Lost Time, 2014, 91+ Days	14
Types of Injuries with Lost Time	15
Table 15: Types of Injuries Resulting in Lost Time, 2014	15
Figure 7: Types of Injuries Resulting in Lost Time, 2014	15
Burn Injuries.....	16
Table 16: All Burns, 2013 - 2014	16
Table 17: Burns with Lost Time by Burn Type, 2014	16
Table 18: Burns by Body Part, 2013 - 2014.....	16
Burn Injuries (continued).....	17
Table 19: Burns by Emergency Activity, 2014.....	17
Figure 8: Burns by Emergency Activity, 2014	17
Burn Injuries (continued).....	18
Table 20: Burns by Non-Emergency Activity, 2014.....	18
Figure 9: Burns by Non-Emergency Activity, 2014.....	18
SOP Issues.....	19
Table 21: Injuries Attributed to SOP Issues, 2014.....	19
Fatalities.....	19
Example Injury Narratives	20
Comparison between the State of Texas (2014) and National Fire Protection Association (NFPA), U.S. Firefighter Injuries – 2013	22
Table 22: Comparison of Texas 2014 and NFPA 2013	22
Figure 10: Injuries by Activity Percentages – Comparing Texas 2014 and NFPA 2013	22
2014 Findings/Recommendations	23
Commission-adopted standards.....	25

Executive Summary

This report includes the abstract, mission, reports, information and data collected. The report includes fire fighter injuries reported to the Texas Commission on Fire Protection in 2014, with charts and graphs depicting the collected information. The report also compares Texas injuries to National Fire Protection Association (NFPA) U.S. Firefighter Injuries - 2013.

Under Texas Government Code §419.048, the Texas Commission on Fire Protection is charged with developing and establishing criteria to receive and analyze injury information pertaining to Texas fire fighters. The commission reviews this information to develop recommendations to help reduce fire protection personnel injuries. The commission provides this information to the State Fire Marshal's Office (SFMO) by September 1 of each year for inclusion in the SFMO's annual Firefighter Fatality Investigations Report. The commission has enacted rules about reporting injuries in the Texas Administrative Code (TAC) Title 37, Chapter 435, and has established the criteria and policies for reporting and analyzing the information.

The commission built the data systems necessary to gather this information in 2010. Development is ongoing as we receive feedback from stakeholders on the efficiency of the system. The reporting process is accomplished online through the commission's website. Every fire department regulated by the commission has been notified of the requirement to report. Several volunteer departments, which are not regulated by the commission, are also participating voluntarily.

This report concludes with recommendations from the commission.

Abstract

Texas fire departments reported 4,055 injuries to the Texas Commission on Fire Protection in calendar year 2014. Of these, 992 occurred during fire suppression activities, representing 24.5 percent of the total reported injuries. This represents a four percent increase in the ratio of fire suppression injuries to the total, which in 2013 accounted for 20.7 percent of injuries.

A larger number of reported injuries occurred in emergency medical services (EMS) activities: 1,065 of the 4,055 total reported injuries, or 26.2 percent. This represents a slight decrease in the ratio of EMS injuries to total injuries from 2013, in which 1,116 of 4,051 total injuries, or 27.5 percent, occurred during EMS activities. As in 2013, more *total* injuries occurred in EMS, but fire suppression activities resulted in more injuries that were serious: 177 of the 992 fire suppression injuries were serious (17.8 percent), and 164 of the 1,065 EMS injuries were serious (15.3 percent). The commission defines a serious injury as one that results in missed work.

After EMS and fire suppression, the next highest number of injuries reported in 2014 occurred in the performance of station duties, with 631, or 15.5 percent, of the total injuries. This is nearly the same as in 2013, with 654, or 16 percent, of the total injuries occurring in the station.

Skills training and wellness/fitness activities again rounded out the top five activities resulting in injuries, with 470 (11.5 percent) and 384 (9.4 percent), respectively. The total number of injuries reported in station duties, skills training, and wellness/fitness activities (which are all non-emergency activities) represented over a third (36.6 percent) of the total injuries. This was nearly identical to 2013.

Mission

The commission shall gather and evaluate data on fire protection personnel injuries and develop recommendations for reducing injuries.

The commission 's educational and outreach programs provide information on the various educational resources available through TCFP's Ernest A. Emerson Fire Protection Resource Library, associated references linked to this subject, TCFP outreach programs such as the "Avoid Injury!" blog and newsletters, and the adoption of the "Courage to be Safe" program.

Building a Community of Safety

The goal of the Texas Commission on Fire Protection's injury reporting program is to help the fire service community identify common injuries and learn how to avoid risk and prevent injuries.

Why we are collecting injury data

Under Texas Government Code §419.048, the Texas Legislature charged the commission with gathering and evaluating data on injuries. The rules requiring regulated entities to report injuries to the commission are in Texas Administrative Code §435.23. The commission encourages volunteer entities to report injuries so that it can gain as accurate a picture as possible concerning injury trends in the Texas fire service. The injury reporting program began in March 2010.

What information does the commission collect?

- Minor, serious, critical and fatal injuries
- Activities where fire personnel are injured
- Types of injuries (burns, strain-sprains, wounds, etc.)
- Body parts being injured
- Tasks performed at the time of injury
- Missed time
- Work assignment after injury
- Malfunctions/failures of personal protective equipment (PPE), self-contained breathing apparatus (SCBA), personal alert safety systems (PASS devices) and standard operating procedures (SOPs)

How this will help the fire service

- Identify common injuries
- Identify trends in injuries
- Identify needed training
- Evaluate and find improvements in procedures
- Track lost time injuries (requested by user community)

Learn more and get help

The commission provides information on reported injuries to the fire service via its website, its "Avoid Injury!" blog, its Facebook page and in its year-end addendum to the State Fire Marshal's Office's annual report.

Reports, Information and Data Collection

This report contains data submitted by regulated and non-regulated entities. The data collected in 2014 was the fourth full year of reporting. The commission anticipates that it will take five full years of reporting to provide more substantive and accurate data for trending and analysis.

Of the approximately 659 commission-regulated entities included in this report, 539, or 81.49 percent, either submitted an injury report or a “no injury” report for months in which their personnel did not have any injuries. (Of the non-reporting departments, 66.36 percent are entities with five or fewer members.) Nine non-regulated departments participated voluntarily in the program.

The commission continually reaches out to fire protection entities to communicate the need to report, the types of information needed, and how to respond to requests for additional information. Commission staff members attend and present at the Texas Fire Chiefs Association’s regional meetings, local chiefs’ meetings, Southwest Fire Rescue, and State Firefighters’ and Fire Marshals’ Association conferences to provide information about the injury reporting program. The commission stresses the need for participation and provides reminders to regulated entities of the statutory requirement to report.

The commission’s “Avoid Injury!” blog provides information on current statistics as well as information about resources available through the Ernest A. Emerson Fire Protection Resource Library. Statistics are updated semi-monthly. Blog posts and Facebook updates provide the fire service with information on the National Fallen Firefighters Foundation’s “Courage to be Safe” program, its “16 Life Safety Initiatives,” and how the initiatives have impacted individual departments or the fire service as a whole.

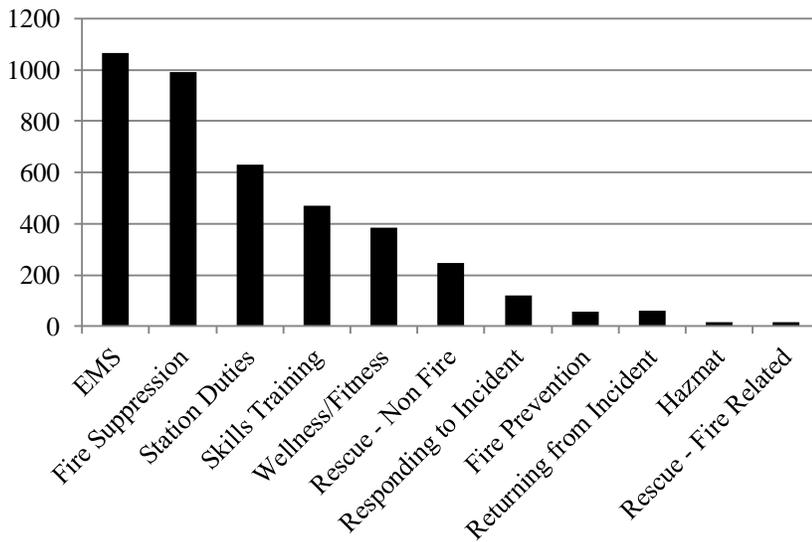
As in previous years, the commission continues to receive feedback from stakeholders on challenges they have experienced and changes they would like to see in the injury reporting program.

Fire Protection Personnel Injuries

Table 1: Injuries by Activity and Severity, 2014

Activity	Minor	Serious	Critical	Fatal	Total
EMS	900	164		1	1065
Fire Suppression	808	177	6	1	992
Station Duties	465	160	5	1	631
Skills Training	365	104	1		470
Wellness/Fitness	254	127	3		384
Rescue - Non Fire	206	38	1		245
Responding to Incident	105	16			121
Fire Prevention	43	11	1		55
Returning from Incident	42	19			61
Hazmat	12	5			17
Rescue - Fire Related	11	3			14
Total	3211	824	17	3	4055

Figure 1: Total Injuries by Activity, 2014



Emergency vs. Non-Emergency Injuries

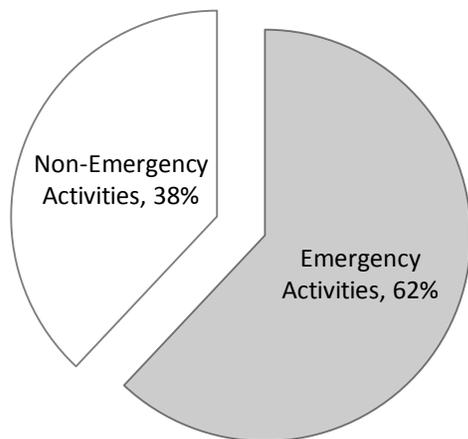
Table2: Injuries by Emergency Activity and Severity, 2014

Activity	Minor	Serious	Critical	Fatal	Total
EMS	900	164		1	1065
Fire Suppression	808	177	6	1	992
Rescue - Non Fire	206	38	1		245
Responding/Returning	147	35			182
Hazmat	12	5			17
Rescue - Fire Related	11	3			14
Total	2084	422	7	2	2515

Table3: Injuries by Non-Emergency Activity and Severity, 2014

Activity	Minor	Serious	Critical	Fatal	Total
Station Duties	465	160	5	1	631
Skills Training	365	104	1		470
Wellness/Fitness	254	127	3		384
Fire Prevention	43	11	1		55
Total	1127	402	10	1	1540

Figure 2: Percent of Total Injuries in Emergency and Non-Emergency Activities, 2014

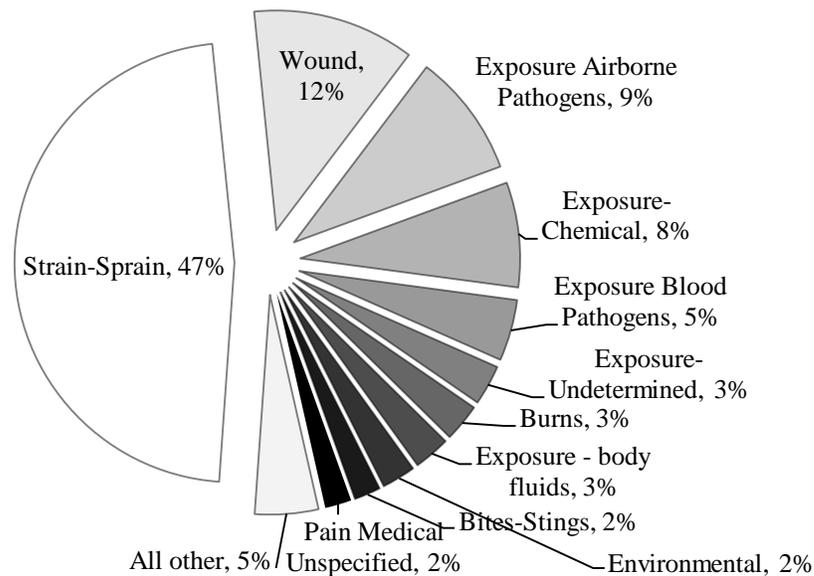


Injuries by Type

Table 4: Types of Injury, 2012-2014 (Note: ordered high to low, 2014)

Type of Injury	2012		2013		2014	
	Count	Percent	Count	Percent	Count	Percent
Strain-Sprain	2140	50.19%	2118	52.30%	1917	47.27%
Wound	631	14.80%	548	13.53%	483	11.91%
Exposure Airborne Pathogens	404	9.47%	281	6.94%	369	9.10%
Exposure-Chemical	128	3.00%	90	2.22%	313	7.72%
Exposure Blood Pathogens	160	3.75%	164	4.05%	183	4.51%
Exposure-Undetermined	23	0.54%	77	1.90%	120	2.96%
Burns	176	4.13%	166	4.07%	113	2.79%
Exposure - Body Fluids	124	2.91%	138	3.41%	109	2.69%
Environmental	133	3.12%	106	2.62%	101	2.49%
Bites-Stings	93	2.18%	87	2.15%	79	1.95%
Pain Medical Unspecified	49	1.15%	62	1.53%	79	1.95%
Chest Pains-Cardiac	40	0.94%	50	1.23%	46	1.13%
Broken Bones	46	1.08%	59	1.46%	39	0.96%
Debris/Penetrating	51	1.20%	38	0.94%	38	0.94%
Hearing Loss - Acute	18	0.42%	14	0.35%	21	0.52%
Smoke-Gas Inhalation	22	0.52%	30	0.74%	20	0.49%
Electrocution	11	0.26%	12	0.30%	12	0.30%
Hearing Loss - Chronic	7	0.16%	2	0.05%	4	0.10%
Broken Spine-Neck	4	0.09%	1	0.02%	4	0.10%
Exposure-Chemical-CO	1	0.02%	6	0.15%	3	0.07%
Heart Attack	2	0.05%	2	0.05%	1	0.02%
Stroke	1	0.02%	0	0.00%	1	0.02%
Total	4264	100.00%	4051	100.00%	4055	100.00%

Figure 3: Types of Injury, 2014



Task at Time of Injury

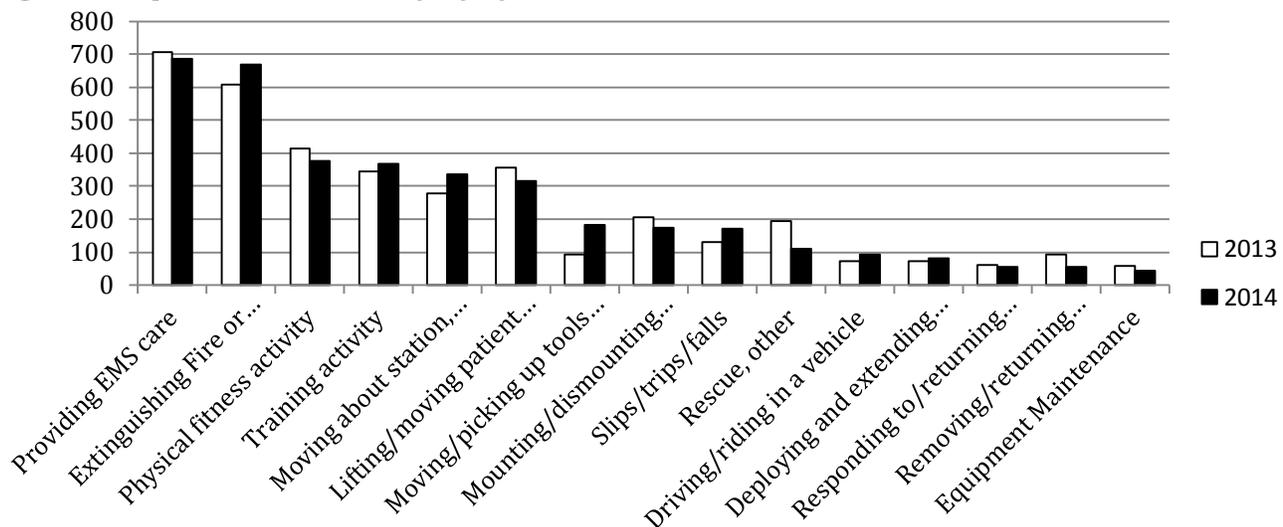
(The commission began gathering task information in mid-2012.)

Table 5: Top 15 Tasks at Time of Injury, 2013-2014

Task	2013	2014
Providing EMS care	708	686
Extinguishing Fire or Neutralizing Incident	609	669
Physical fitness activity	413	376
Training activity	344	367
Moving about station, normal activity	278	335
Lifting/moving patient (EMS)	357	317
Moving/picking up tools or equipment	92	183
Mounting/dismounting apparatus	206	173
Slips/trips/falls	131	171
Rescue, other	193	110
Driving/riding in a vehicle	72	94
Deploying and extending hoseline	74	82
Responding to/returning from incident	62	56
Removing equipment from/returning equipment to apparatus	92	54
Equipment Maintenance	59	43
All other*	361	339*
Total	4051	4055

* All Other, 2014, in Descending Order: Overhaul (42), Forcible entry (38), Operating manual tool (37), Ascending/descending stairs (30), Station maintenance (26), Extrication (23), Ascending/descending ladder (21), Moving about station, alarm sounding (15), Other: description (14), Incident investigation (13), Inspection activity (13), Vehicle maintenance (13), Operating power tool (10), Manually moving item to gain access (9), Carrying/dragging a person (rescue) (8), Crawling in a confined or otherwise hazardous area (5), Non-fire incidents (4), Operating in low/no visibility (4), Operating nozzle (4), Raising/lowering ladder (4), Administrative work (3), Operating fire department apparatus (2), Salvage (1)

Figure 4: Top 15 Tasks at Time of Injury, 2013-2014

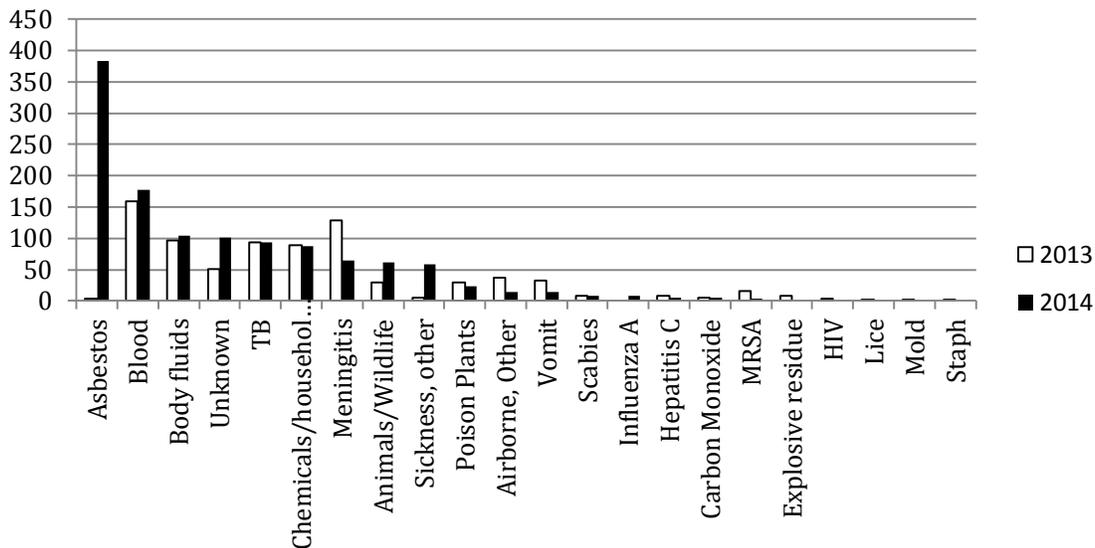


Exposures

Table 6: Exposure Agents, 2013-2014

Exposure Agents	2013	2014
Asbestos	4	383
Blood	159	177
Body fluids	96	105
Unknown	51	101
TB	94	93
Chemicals/household/industrial	89	87
Meningitis	129	65
Animals/Wildlife	29	62
Sickness, other	5	59
Poison Plants	30	24
Airborne, Other	37	15
Vomit	33	15
Scabies	8	9
Influenza A	0	8
Hepatitis C	8	6
Carbon Monoxide	5	5
MRSA	16	4
Explosive residue	8	0
HIV	4	0
Lice	2	0
Mold	2	0
Staph	1	0
Total	810	1218

Figure 5: Exposure Types, 2013 - 2014



Injuries by Body Part

Table 7: Injuries by Body Part, 2012 - 2014

Body Part	2012	2013	2014
Multiple body parts, whole body	760	595	901
Back, except spine	686	588	372
Knee	419	407	367
Hand and fingers	453	403	345
Hip, lower back, or buttocks	35	91	244
Shoulder	272	293	230
Ankle	213	207	177
Multiple Parts	5	62	160
Face	95	128	118
Eye	106	100	98
Arm, lower, not including elbow or wrist	89	84	94
Leg, lower	105	108	86
Foot and toes	132	105	79
Upper extremities	24	16	74
Head	96	94	73
Trachea and lungs	45	51	72
Wrist	71	79	68
Elbow	98	68	66
Chest	30	66	64
Ear	72	54	52
Neck	101	71	50
Other body parts injured	357	381	265*
Total	4264	4051	4055

* **Other body parts injured, 2014, in descending order:** Lower Extremities (35), Abdomen (30), Multiple body parts, upper body (27), Arm, upper, not including elbow or shoulder (26), Leg, upper (25), Pelvis or groin (22), Mouth, included are lips, teeth, and interior (20), Neck and Shoulders (15), Heart (14), Throat (13), Nose (8), Abdominal area (6), Multiple body parts, lower body (5), Spine (5), Genito-urinary (4), Head, other (2), Undetermined (3), (0), Internal (1), Internal, other (1), None (1), Stomach (1), Thorax (1)

Minor and Serious Injuries by Activity

EMS activities resulted in a higher number of minor injuries, but fire suppression activities resulted in a higher number of serious injuries in 2014. The commission defines a serious injury as one which results in the employee missing one or more full duty shifts. (Critical injuries are those in which the injured employee is hospitalized.)

Table 8: Minor Injury Activities, 2012 - 2014

Activity	<u>2012</u>		<u>2013</u>		<u>2014</u>	
	Count	Percent	Count	Percent	Count	Percent
EMS	1042	32.41%	934	30.28%	900	28.03%
Fire Suppression	654	20.43%	619	20.06%	808	25.16%
Station Duties	508	15.80%	452	14.65%	465	14.48%
Skills Training	367	11.42%	317	10.28%	365	11.37%
Wellness/Fitness	294	9.14%	285	9.24%	254	7.91%
Rescue - Non Fire	147	4.57%	243	7.88%	206	6.42%
Responding to Incident	90	2.80%	70	2.27%	105	3.27%
Fire Prevention	45	1.40%	66	2.14%	43	1.34%
Returning from Incident	30	0.93%	37	1.20%	42	1.31%
Hazmat	24	0.75%	44	1.43%	12	0.37%
Rescue - Fire Related	14	0.44%	18	0.58%	11	0.34%
Total	3215	100.00%	3085	100.00%	3211	100.00%

Table 9: Serious Injury Activities, 2012 - 2014

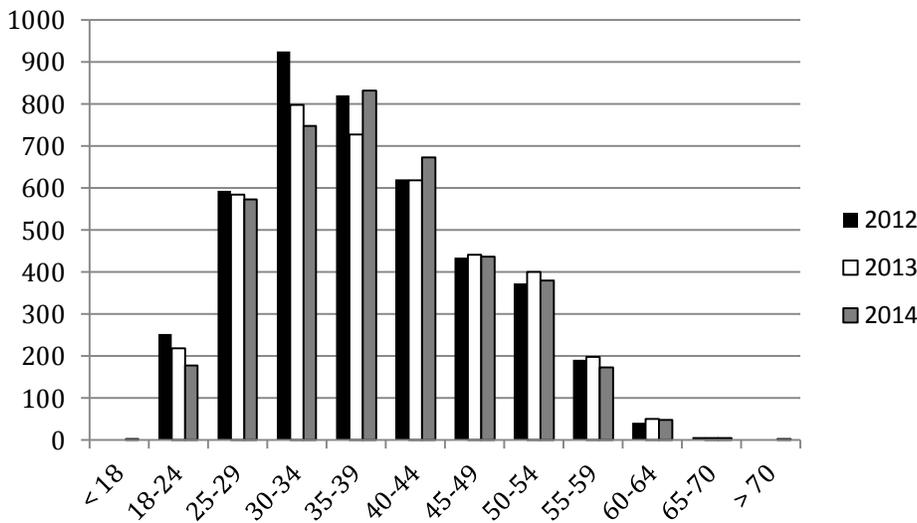
Activity	<u>2012</u>		<u>2013</u>		<u>2014</u>	
	Count	Percent	Count	Percent	Count	Percent
Fire Suppression	231	22.36%	206	21.89%	177	21.48%
EMS	196	18.97%	179	19.02%	164	19.90%
Station Duties	233	22.56%	201	21.36%	160	19.42%
Wellness/Fitness	134	12.97%	122	12.96%	127	15.41%
Skills Training	113	10.94%	99	10.52%	104	12.62%
Rescue - Non Fire	34	3.29%	46	4.89%	38	4.61%
Returning from Incident	24	2.32%	18	1.91%	19	2.31%
Responding to Incident	43	4.16%	42	4.46%	16	1.94%
Fire Prevention	18	1.74%	17	1.81%	11	1.33%
Hazmat	0	0	0	0	5	0.61%
Rescue - Fire Related	7	0.68%	11	1.17%	3	.036%
Total	1033	100.00%	941	100.00%	824	100.00%

Injuries by Age Group

Table 10: Injuries by Age Group, 2012 - 2014

Age group	2012		2013		2014	
	Count	Percent	Count	Percent	Count	Percent
< 18	0	0.00%	0	0.00%	1	0.02%
18-24	254	5.96%	219	5.41%	178	4.39%
25-29	594	13.93%	584	14.42%	573	14.13%
30-34	925	21.69%	799	19.73%	749	18.47%
35-39	821	19.25%	729	18.00%	833	20.54%
40-44	621	14.56%	620	15.31%	674	16.62%
45-49	435	10.20%	443	10.94%	438	10.80%
50-54	373	8.75%	402	9.90%	380	9.37%
55-59	193	4.53%	198	4.89%	173	4.27%
60-64	41	0.96%	51	1.26%	49	1.21%
65-70	7	0.16%	6	0.15%	6	0.15%
> 70	0	0.00%	0	0.00%	1	0.02%
Totals	4264	100.00%	4051	100.00%	4055	100.00%

Figure 6: Injury Count by Age Group, 2012 - 2014



Injury Activities Resulting in Lost Time

Table 11: Injury Activities Resulting in Lost Time, 2014

Activity	Count	Days Missed	
		Average	Total
Fire Suppression	145	43	6258
Station Duties	136	34	4683
EMS	133	37	4955
Wellness/Fitness	99	28	2745
Skills Training	92	33	3021
Rescue - Non Fire	38	29	1083
Returning from Incident	12	24	287
Fire Prevention	12	19	232
Responding to Incident	11	40	443
Hazmat	3	58	174
Rescue - Fire Related	2	19	38
Total	683	33	23919

Table 12: Activities Resulting in Lost Time, 2014, between 1 and 30 Days

Activity	Count	Days Missed	
		Average	Total
Fire Suppression	89	10	889
Station Duties	89	10	910
EMS	82	10	852
Wellness/Fitness	73	11	808
Skills Training	68	12	784
Rescue - Non Fire	29	10	276
Fire Prevention	10	6	63
Returning from Incident	9	12	105
Responding to Incident	6	9	54
Hazmat	2	12	24
Rescue - Fire Related	2	19	38
Total, Between 1 and 30 Days	459	11	4803

Injury Activities Resulting in Lost Time (continued)

Table 13: Activities Resulting in Lost Time, 2014, between 31 and 90 Days

Activity	Count	Days Missed	
		Average	Total
EMS	39	57	2237
Fire Suppression	33	57	1894
Station Duties	32	52	1660
Wellness/Fitness	21	51	1064
Skills Training	15	50	743
Rescue - Non Fire	5	51	253
Responding to Incident	4	63	251
Returning from Incident	2	45	89
Fire Prevention	1	45	45
Total, Between 31 and 90 Days	152	52	8236

Table 14: Activities Resulting in Lost Time, 2014, 91+ Days

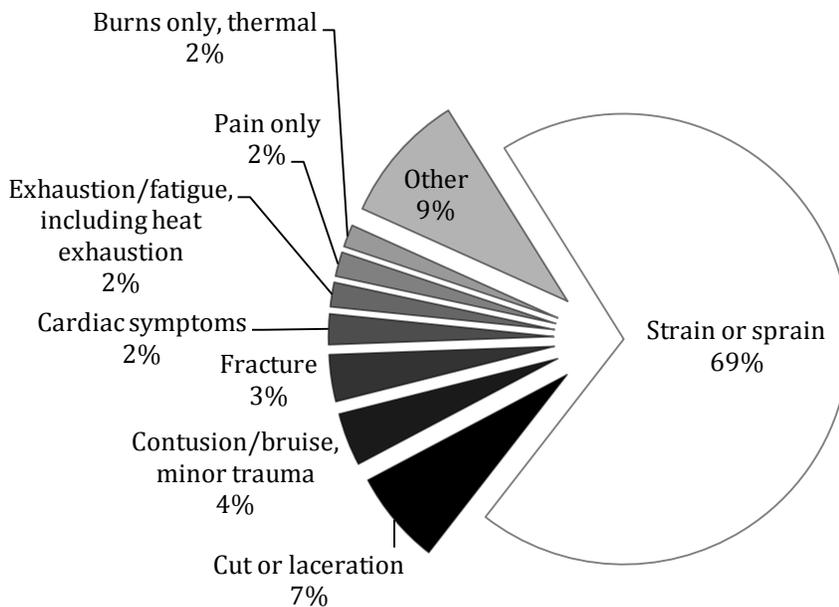
Activity	Count	Days Missed	
		Average	Total
Fire Suppression	23	151	3475
Station Duties	15	141	2113
EMS	12	156	1866
Skills Training	9	166	1494
Wellness/Fitness	5	175	873
Rescue - Non Fire	4	139	554
Hazmat	1	150	150
Responding to Incident	1	138	138
Fire Prevention	1	124	124
Returning from Incident	1	93	93
Total, 91+ Days Missed	72	143	10880

Types of Injuries with Lost Time

Table 15: Types of Injuries Resulting in Lost Time, 2014

Type of Injury	Count
Strain or sprain	474
Cut or laceration	46
Contusion/bruise, minor trauma	26
Fracture	23
Cardiac symptoms	15
Pain only	12
Exhaustion/fatigue, including heat exhaustion	12
Burns only, thermal	11
Crushing	10
Burn, scald or steam	9
Dislocation	6
Puncture wound/stab wound: penetrating	5
All other	34
Total	683

Figure 7: Types of Injuries Resulting in Lost Time, 2014



Burn Injuries

Table 16: All Burns, 2013 - 2014

All Burns - Types	2013	2014
Thermal	92	76
Scald or steam	71	33
Chemical	0	2
Electric	2	2
Total	165	113

Table 17: Burns with Lost Time by Burn Type, 2014

Burns with Lost Time	Count	Average Days Missed	Total Days Missed
Thermal	12	31.20	374
Scald or steam	9	28.00	403
Chemical	2	19.5	39
Total	23	26.2	816

Table 18: Burns by Body Part, 2013 - 2014

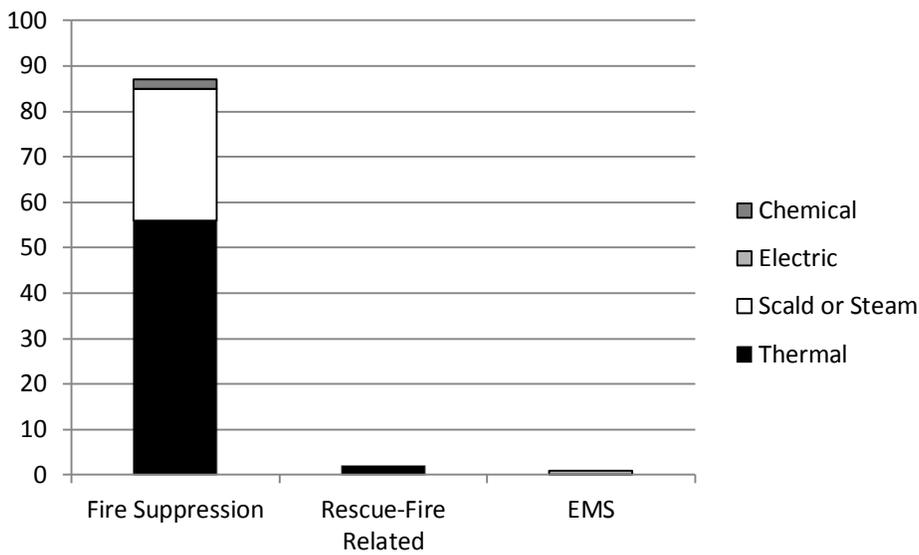
Body Part	2013	2014
Hand and fingers	35	18
Multiple parts	16	16
Ear	29	13
Face	14	13
Arm, lower, not including elbow or wrist	12	9
Neck	9	9
Upper extremities	0	6
Shoulder	13	5
Wrist	10	5
Multiple body parts, upper body	3	4
Head	5	3
Foot and toes	5	2
Arm, upper, not including elbow or shoulder	1	2
Back, except spine	0	2
Lower extremities	5	2
Leg, lower	4	1
Hip, lower back or buttocks	0	1
Eye	0	1
Neck and shoulders	1	1
Chest	1	0
Elbow	1	0
Knee	1	0
Throat	1	0
Total	166	113

Burn Injuries (continued)

Table 19: Burns by Emergency Activity, 2014

Type	Emergency Activities		
	Fire Suppression	Rescue-Fire Related	EMS
Thermal	56	2	-
Scald or Steam	29	-	-
Electric	-	-	1
Chemical	2	-	-
Total	87	2	1

Figure 8: Burns by Emergency Activity, 2014

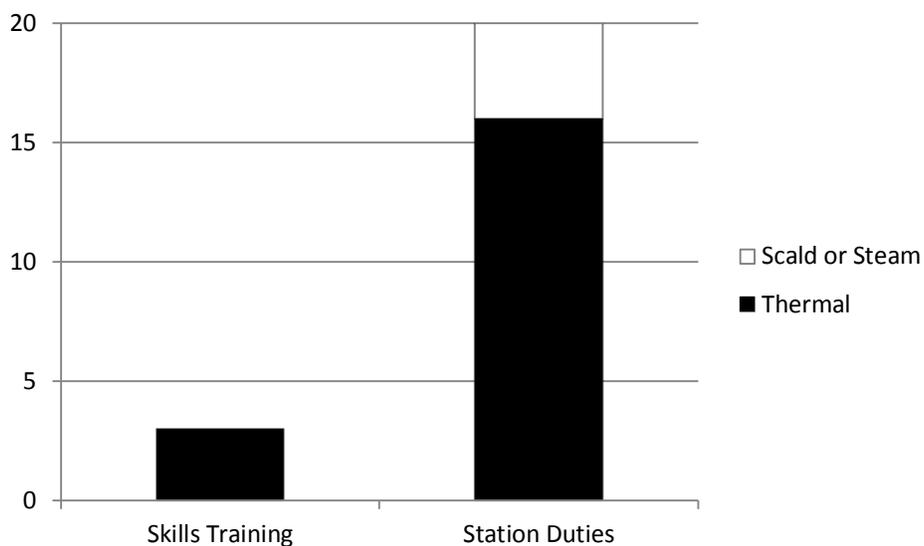


Burn Injuries (continued)

Table 20: Burns by Non-Emergency Activity, 2014

Type	Non-Emergency Activities	
	Skills Training	Station Duties
Thermal	3	16
Scald or Steam	-	4
Total	3	20

Figure 9: Burns by Non-Emergency Activity, 2014



SOP Issues

In 2014 there were 35 injuries attributed to failures of fire protection personnel to follow their departments' standard operating procedures (SOPs). All but a few were instances where the individuals were not wearing their provided PPE/SCBA gear in an environment or situation in which they should have been.

In its compliance inspections, the Texas Commission on Fire Protection verifies that fire departments have written SOPs that cover the appropriate subject matter.

Table 21: Injuries Attributed to SOP Issues, 2014

Activity	Minor	Serious	Total
Fire Suppression	7	5	12
EMS	6	-	6
Responding to Incident	3	-	3
Skills Training	3	1	4
Fire Prevention	2	-	2
Rescue – Non Fire	2	-	2
Station Duties	2	-	2
Hazmat	1	-	1
Rescue – Fire Related	1	-	1
Wellness/Fitness	1	1	2
Total	28	7	35

Fatalities

The commission's 2014 injury report includes three fatalities. The fatalities listed in this report include only those reported to the Texas Commission on Fire Protection (TCFP) by the entities it regulates. (The commission has no statutory authority to require reporting by departments it does not regulate.)

More comprehensive information regarding Texas fire service Line of Duty Deaths is included in the State Fire Marshal's Annual Report.

Example Injury Narratives

The following narratives represent one minor and one serious injury for each of the “activity” categories (EMS, Fire Suppression, Station Duties, Skills Training, Wellness/Fitness, Rescue - Non Fire, Responding to Incident, Returning from Incident, Fire Prevention, Hazmat and Rescue - Fire Related), except for Hazmat, in which no serious injuries were reported.

EMS – Minor - (Exposure Airborne Pathogens)

Fire fighter reports while on a medical call and after transporting the patient to the hospital the patient told the fire fighter that he had recently been tested for tuberculosis. No PPE was in use. The patient had been coughing. Reported as a possible exposure case.

EMS – Serious (Strain/Sprain)

Fire fighter was providing patient care, specifically lifting a patient onto a stretcher. Fire fighter experienced pain in right shoulder and reported through the chain of command. Fire fighter sent for evaluation by physician. Fire fighter suffered a dislocated shoulder and missed two 24-hour periods of work. Fire fighter released for full duty and has returned to work.

Fire Suppression – Minor (Burns)

While on fire attack hoseline inside house, fire fighter suffered a burn to left calf just above bunker boot. Fire fighter was wearing all PPE properly, and inspection of bunker pants and boots found no failure or malfunction. Fire fighters working in same area reported intense heat from burning debris on floor. Fire fighter assessed and treated at scene and remained on duty.

Fire Suppression – Serious (Chest Pain – Cardiac Symptoms)

Developed severe chest pain after firefighting interior house fire for over an hour in 100+ heat index, fully bunkered including SCBA. Was loading equipment, ladders on fire truck; was suddenly struck with severe stabbing pain.

Station Duties – Minor (Bites/Stings)

Fire fighter was attacked by a cat while taking trash to the dumpster. The cat jumped out as he opened the lid and he was scratched on the lip, chin, chest and abdomen before running away.

Station Duties - Serious (Wound)

Fire fighter was closing the door on an apparatus while the vehicle was being backed. The fire fighter’s right forearm became trapped between the apparatus passenger side door and a stationary object. This caused a crushing injury. Driver’s attention was focused on his backer and stopped immediately.

Skills Training – Minor (Broken Bones)

The injury occurred during a swift water course. The fire fighter was performing a training exercise to catch a water curtain in line with the course curriculum. He grabbed a rope while going down a water chute and broke his finger.

Skills Training – Serious (Wound)

Fire fighter was opening a gate valve on a master stream manifold after hose testing to relieve pressure from hose. The fire fighter had straddled the hose and the manifold whipped and struck the fire fighter in the lower legs.

Wellness/Fitness – Minor (Strain/Sprain)

While performing the annual physical agility test and going through the SCBA maze the fire fighter caught his shoulder in the maze and while pulling to get through it felt something give in his right shoulder. It was unknown if it was just a muscle pull or strain at that time. Pain persisted and will need further evaluation.

Example Injury Narratives (continued)

Wellness/Fitness – Serious (Wound)

Fire fighter was doing pull-ups in weight room and a homemade device that was being used to alter the grip for the pull-ups broke. Fire fighter fell backwards against the weight stack and lacerated his head which required 10 staples. Homemade device was thrown in dumpster.

Fire Prevention – Minor (Wound)

At a building where the contractor had removed sections of flooring, fire fighter stepped on unsupported section of floor covered by carpet and foot/leg fell approx 18 inches into sub-floor, bruising left shin and cutting right palm.

Fire Prevention – Serious (Strain/Sprain)

While verifying 911 posts along park trail as part of Fire Dept. 911 marker project, fire fighter jumped out of the way to avoid impact from an approaching cyclist and felt pop/pain in right knee.

HazMat – Minor (Exposure)

Fire fighter was assisting police with opening containers that contained crystal methamphetamines.

HazMat – Serious (Environmental)

Fire fighter was on a decontamination team at a hazardous materials incident wearing proper PPE. Fire fighter was overcome by heat exhaustion and transported to a local hospital.

Rescue – Fire Related – Minor (Burns)

Fire fighter attempted a rescue of a trapped fire fighter. Immediately upon entry through a window of the structure, the fire fighter came in contact with hot materials and burned wrists.

Rescue – Fire Related – Serious (Broken Bones)

While carrying equipment fire fighter tripped and fell, crushing his finger.

Rescue Non-Fire – Minor (Exposure Body Fluids)

Fire fighter was exposed while assessing patient who was restrained by police officers while being combative and spitting. Fire fighter had proper protective equipment on and fully functional at time of injury.

Rescue Non-Fire – Serious (Wound)

While landing a medical helicopter on the roadway, fire fighter's goggles were briefly dislodged from his face by turbulence. This allowed a piece of debris to enter fire fighter's eye causing a lacerated cornea.

Responding to Incident – Minor (Strain/Sprain)

Employee was driver of vehicle when he was involved in motor vehicle accident due to slick roads.

Responding to Incident – Serious (Broken Bones)

Fire fighter was responding to a structure fire when he was involved in a head-on collision with another driver who was travelling in the wrong lane on top of a bridge.

Returning From Incident – Minor (Strain/Sprain)

Fire fighter reports while returning from a fire alarm run he was tilling the truck down a rough road and strained his back.

Returning From Incident – Serious (Strain/Sprain)

FF was getting out of the apparatus on a call and missed the first step on the side of the truck. The fire fighter's foot hit the ground causing a strain on the bottom of his foot.

Comparison between the State of Texas (2014) and National Fire Protection Association (NFPA), U.S. Firefighter Injuries – 2013

For the purposes of comparison, the commission has mapped its categories to the NFPA categories as follows:

- “Fireground” includes the commission’s Fire Suppression and Rescue – Fire Related.
- “Non-Fire” includes Rescue Non-Fire, EMS and Hazmat.
- “Other On-Duty” includes Fire Prevention, Station Duties and Wellness/Fitness.

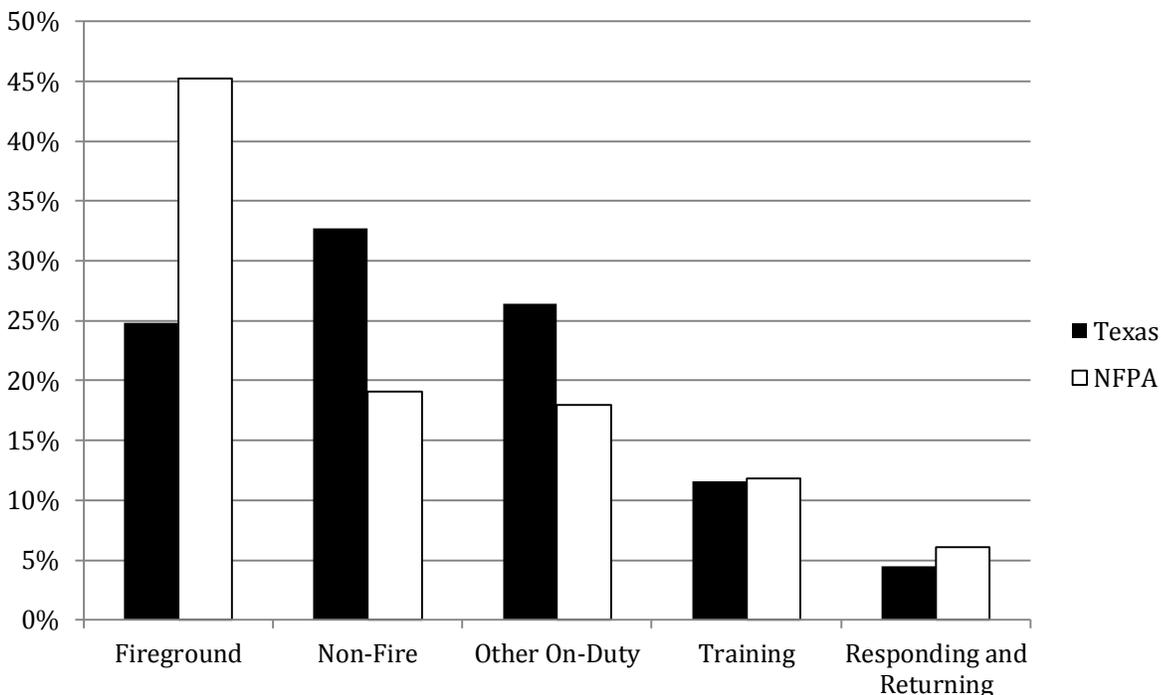
The NFPA’s “Responding and Returning” and “Training” categories appear to correspond closely to the commission’s categories. (The NFPA numbers include Texas statistics, although the reporting populations may not be the same.)

Table 22: Comparison of Texas 2014 and NFPA 2013

Category	Texas 2014		NFPA 2013*	
	Count	Percent	Count	Percent
Responding and Returning	182	4.49%	4015	6.10%
Fireground	1006	24.81%	29760	45.23%
Non-Fire	1327	32.73%	12535	19.05%
Other On-Duty	1070	26.39%	11800	17.93%
Training	470	11.59%	7770	11.81%
Total	4055	100%	65800	100.00%

* NFPA data is from [U.S. Firefighter Injuries – 2013](#), copyright© 2014, National Fire Protection Association, Quincy, MA.

Figure 10: Injuries by Activity Percentages – Comparing Texas 2014 and NFPA 2013



2014 Findings/Recommendations

The injuries reported to the Texas Commission on Fire Protection in 2014 are consistent with previous years' reporting, with one notable exception: there was a large increase in the number of asbestos exposure reports. This increase resulted largely from incidents reported by one of the state's major metropolitan departments. These kinds of reports are likely to continue to increase in future reporting years, not because fire protection personnel are facing new challenges, but because there is a greater recognition, awareness and understanding throughout the fire service that long-term illnesses may represent challenges to the long-term health of its members.

The commission intends to continue monitoring this trend. Although the reported exposures in 2014 show a dramatic increase, the commission believes it may be too soon to determine whether these exposures reports were anomalies, or whether they mark the beginning of a trend. The commission's current guidance to departments is consistent with the instructions we have provided since the beginning of the injury reporting program, which is that when a department files a First Report of Injury with their insurance carrier, it should report the injury to TCFP. This will help us gain a better understanding of how our fire departments are being impacted by these issues on a statewide basis.

Commission rule §435.23 (a) states, "A fire department shall report all Texas Workers' Compensation Commission reportable injuries that occur to on-duty regulated fire protection personnel on the commission form." The commission's guidance states, "When the department files a 'First Report of Injury' they should report the injury to the commission as well."

The commission's injury reporting program gathers and compiles *aggregate* information. The goal of the program is to gain a better understanding of the injuries suffered by the Texas fire service as a whole, rather than tracking the specifics of any individual's injuries and recovery. In fact, Texas Government Code §419.048 specifically prohibits the release of personally identifying information: "The commission may not release, and a person may not gain access to, any information that could reasonably be expected to reveal the identity of injured fire protection personnel." To comply with this statute and to protect every individual's personal medical history and health information, the commission currently does not collect or maintain personally identifying information through its injury reporting form.

This approach creates a record of an injury at a specific incident, but departments must keep detailed records internally and continue to work with the Texas Workers' Compensation Division's reporting program in long-term management of injuries and illnesses.

To help reduce injuries related to fire protection-related exposures, the commission requires that departments follow NFPA 1851, Chapter 7.1.4.2, which states that departments should contact the manufacturer of the PPE for instructions on the decontamination of PPE ensemble elements exposed to known contaminants.

Additionally, the commission encourages departments to review these guidelines from the Firefighter Cancer Support Network's April 2013 white paper, [Taking Action Against Cancer in the Fire Service](#):

What immediate actions can I take to protect myself?

1. *Use SCBA from initial attack to finish of overhaul. (Not wearing SCBA in both active and post-fire environments is the most dangerous voluntary activity in the fire service today.)*
2. *Do gross field decon of PPE to remove as much soot and particulates as possible.*
3. *Use "Wet-Nap" or baby wipes to remove as much soot as possible from head, neck, jaw, throat, underarms and hands immediately and while still on the scene.*
4. *Change your clothes and wash them immediately after a fire.*
5. *Shower thoroughly after a fire.*
6. *Clean your PPE gloves, hood and helmet immediately after a fire.*
7. *Do not take contaminated clothes or PPE home or store them in your vehicle.*
8. *Decon fire apparatus interior after fires.*
9. *Keep bunker gear out of living and sleeping quarters.*
10. *Stop using tobacco products.*
11. *Use sunscreen or sun block.*

The importance of annual medical examinations cannot be overstated — early detection and early treatment are essential to increasing survival.

NFPA 1851, adopted by the commission under §419.040 and 37 TAC Chapter 435, addresses the proper storage of clothing and PPE.

NFPA 1500, Chapter 10, Medical and Physical Requirements, (which under §435.5 is a commission-recommended standard) provides additional guidance, as does NFPA 1582, *Standard on Comprehensive Occupational Medical Program*. The commission encourages comprehensive pre-employment physicals to establish "baselines" against which to measure changes in employees' health throughout their careers.

The issue of occupational illness is somewhat problematic, in that the program's governing statute charges the commission with studying injury data and making recommendations to reduce injuries. The statute does not call for the commission to gather, evaluate or make recommendations for reducing illnesses. Although this may seem like a "semantic" distinction (particularly for a fire fighter who is suffering), it does represent a significant legal and logistical hurdle that may require future legislation to address.

Many fire service entities throughout the nation are studying the long-term health risks to fire protection personnel. Toxic smoke, asbestos, and other hazardous materials are potential hazards at every fire scene. As the commission's fire fighter advisory committee's presiding officer has noted, "Every fire scene is a hazardous materials scene." First responders are frequently exposed to patients with potentially contagious illnesses; in 2014 several fire protection personnel were potentially exposed to the Ebola virus. (None actually contracted the illness.) Water rescues often expose personnel to sewage and chemical hazards.

In recognition of the variety of exposures, at the June 2015 fire fighter advisory committee meeting the agency staff proposed modifying the commission's report form to include separate, specific categories of exposure/illness reporting:

- Exposure with injury
- Exposure with no injury
- Illness

The staff will work to incorporate these categories into a redesigned injury report form between now and the beginning of the 2016 reporting year.

With that noted, however, the commission believes that its injury reporting program can and should be helpful to the profession as a whole. In its relatively short lifespan, the injury reporting program has shown consistent data year-to-year that can help the Texas fire service understand how fire protection personnel are getting hurt on the job, and as a result, can provide insights as to when intervention by departments can help reduce fire protection personnel injuries.

For example, the commission can state with confidence that strains and sprains are the leading fire service injuries. Roughly half of all reported injuries - and 70 percent of lost time injuries - are the result of strains and sprains. The commission has similarly seen a consistent "60/40" balance over the years of injuries incurred in emergency vs. non-emergency situations.

These are data points that the Texas fire service did not have prior to the creation of the injury reporting program. The commission believes that more data, more information and better awareness of the challenges the fire service faces are always good. It may be helpful, for example, for the Texas fire service to know that many of its fire protection personnel are suffering injuries incurred in the performance of water rescues. Although this may not be news to Texas fire fighters, water rescues may not come immediately to the public's mind when considering the challenges its fire departments face. The Texas fire service now has the reference data to draw on which it may not have had prior to the creation of the program.

Commission-adopted standards

The commission has adopted several NFPA and other nationally recognized standards to help keep Texas fire protection personnel safe. This list summarizes the relationships between some of the Texas laws and national standards and is not intended to be all-inclusive:

Texas Government Code

[§419.040, Protective Clothing](#)

[§419.041, Self-Contained Breathing Apparatus](#)

[§419.042, Personal Alert Safety Systems](#)

[§419.043, Applicable National Fire Protection Association Standard](#)

[§419.044, Incident Management System](#)

[§419.045, Personnel Accountability System](#)

[§419.046, Fire Protection Personnel Operating at Emergency Incidents](#)

[§419.047, Commission Enforcement](#)

Texas Administrative Code

[CHAPTER 425 FIRE SERVICE INSTRUCTORS](#)

[§443.9 National Fire Protection Association Standard](#)

[CHAPTER 435 FIRE FIGHTER SAFETY](#)

[§435.21 Fire Service Joint Labor Management Wellness-Fitness Initiative](#)

[§435.23 Fire Fighter Injuries](#)

[§435.25 Courage to be Safe So Everyone Goes Home Program](#)

[§435.27 Live Fire Training Structure Evolutions](#)

[CHAPTER 451 FIRE OFFICER](#)

[CHAPTER 457 INCIDENT SAFETY OFFICER CERTIFICATION](#)

Other resources

See also the commission's web page: [NFPA Standards adopted by the commission.](#)