



FIREFIGHTER FATALITY INVESTIGATIONS

**Annual Report
FY 2018**

September 2018

State Fire Marshal's Office

333 Guadalupe Street

Austin, Texas 78701

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www.tdi.texas.gov/fire



The subsequent investigation of this incident provides valuable information to the fire service by examining the lessons learned, to prevent future loss of life and property.

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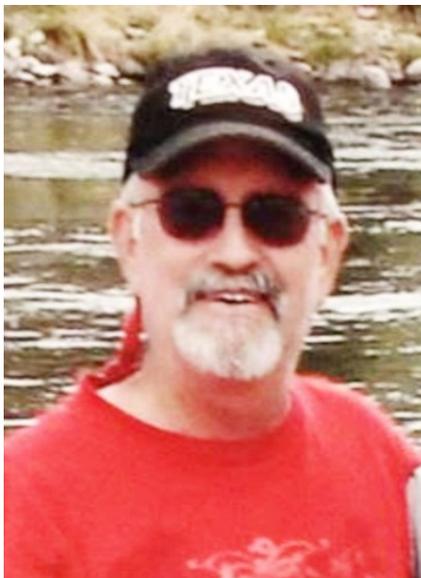
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Executive Summary

During the State of Texas Fiscal Year 2018 (September 1, 2017 to August 31, 2018), the State Fire Marshal's Office (SFMO) conducted nine firefighter fatality incident investigations.



Fire Chief Eric Zapalac
Sealy Fire Department
November 20, 2017
Cardiac event



Firefighter Charles Patterson
Bowie Volunteer Fire Department
December 7, 2017
Cardiac event



Captain Daryl Barber
Brazoria Volunteer Fire Department
December 13, 2017
Cardiac event



Firefighter Martin Hudson, Jr.
New London Volunteer Fire Department
February 28, 2018
Apparatus roll-over



Firefighter Larry Marusik
Ellinger Volunteer Fire Department
March 23, 2018
Burned during wildfire



Assistant Chief Bernard Oliver
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April 5, 2018
Cardiac event



Firefighter Richard Loller
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TIFMAS deployment to Scenic Loop
Complex
June 10, 2018
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Cadet Devon Coney
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Cardiac event



Firefighter Caleb Scott
North Richland Hills Fire Department
April 3, 2018
Cardiac event

Texas Firefighter Fatality Investigation Authority

In 2011, the 82nd Legislature enacted SB 396, requiring the State Fire Marshal's Office (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' & 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's firefighter injury reporting program annual reports are available on the commission's website, http://www.tcfp.texas.gov/injuries/injury_reporting_overview.asp

Fiscal Year 2018 Investigations Summary

November 20, 2017

Fire Chief Eric Zapalac, 39 years old

Sealy Fire Department. Sealy, TX

Cardiac Event while on-duty

On November 20, 2017, Sealy Fire Department (SFD) Chief Eric Zapalac was on duty. Chief Zapalac had completed a pre-fire plan review at a local business with Asst. Chief Kenny Willingham. Chief Zapalac dropped off Asst. Chief Willingham and proceeded to a local auto parts store to pick up items for an apparatus. While at the auto parts store Chief Zapalac collapsed and was pulseless. Employees of the store and citizens began Cardiopulmonary Resuscitation (CPR) and called 911. At approximately 11:50 a.m., SFD Engine 604 and Austin County EMS Medic 2 responded. Upon their arrival they found Chief Zapalac in cardiac arrest with bystander CPR in progress. Advanced Life Support was initiated, and he was transported to Memorial Hermann Katy Hospital. Chief Zapalac was pronounced dead at 12:53 p.m.

On November 21, 2017, Assistant Medical Examiner Sara N. Doyle, MD, with the Harris County Institute of Forensic Sciences, conducted an autopsy on Chief Zapalac. The autopsy concluded the cause of death was from hypertensive and atherosclerotic cardiovascular disease with a contributory condition of obesity. His height was six feet and weight was 319 pounds. The manner of death was ruled as natural.

December 7, 2017

Firefighter Charles Patterson, 60 years old

Bowie Rural Volunteer Fire Department, Bowie, TX

Cardiac event while involved in fire suppression

On December 1, 2017, Bowie Rural Volunteer Fire Department (BRVFD) responded to a reported structure fire on Highway 59 North, Bowie, TX. Firefighter (FF) Patterson was helping advance a hose line during a defensive attack on a fully involved residence. FF Patterson went to his knees and then collapsed. Nearby firefighters found FF Patterson pulseless and initiated Cardiopulmonary Resuscitation (CPR). Bowie Fire/EMS began Advanced Life Support and transported FF Patterson to Central Hospital of Bowie, TX.

FF Patterson was stabilized and later transferred to Wise Health System in Decatur, Texas. FF Patterson remained in the Intensive Care Unit until his death on December 7, 2017.

No autopsy was conducted since FF Patterson died in the hospital while under the care of a physician.

December 13, 2017

Captain Daryl “Dene” Barber, 56 years old

Brazoria Volunteer Fire Department, Brazoria, TX

Cardiac event while involved in fire suppression

On December 13, 2017, Brazoria Volunteer Fire Department (BVFD) responded to a reported structure fire on Yerby Street in Brazoria, TX. Captain (Capt.) Daryl Barber was conducting suppression activities in full Personal Protective Equipment (PPE) including a Self-Contained Breathing Apparatus (SCBA). Capt. Barber exited the structure and stated to other firefighters he did not feel well. He walked to the ambulance and was assessed by West Brazos EMS. He began complaining of chest pain and was transported to CHI St. Luke’s Health Brazosport Medical Center Emergency Department. While en route to the hospital he became pulseless. Cardiopulmonary Resuscitation (CPR) and Advanced Life Support (ALS) were initiated. Life saving measures continued at the hospital and were unsuccessful. He was pronounced deceased on December 13, 2017.

On December 14, 2017, Dr. Erin Barnhart conducted an autopsy at the Galveston Medical Examiner’s Office. The cause of death was identified as Ischemic Heart Disease and the manner natural.

February 28, 2018

Firefighter Martin “M.V.” Hudson, 86 years old

New London Volunteer Fire Department, New London, TX

Injuries sustained in apparatus rollover

On Wednesday, February 28, 2018, a wildland fire was reported near U.S. Highway 259 and Farm to Market Road (FM) 850 in New London, Rusk County, TX. Units from New London Volunteer Fire Department (NLVFD) responded. During the response NLVFD

Tanker 906 left the roadway and rolled over, injuring the driver and two passengers. The driver and middle seat passenger were transported to an area hospital and released a short time later. The right front passenger, Firefighter (FF) M.V. Hudson Jr. was transported by ambulance to Good Shepherd Hospital in Longview, Texas. Texas State Fire Marshal's Office Firefighter Fatality Coordinator Lt. Brian Fine was notified of the incident after this. FF Hudson remained in critical condition and was treated in the Intensive Care Unit (ICU).

On March 12, 2018, New London VFD notified Lt. Fine that FF Hudson had died because of injuries sustained in the crash. A Firefighter Fatality Investigation was initiated.

On March 13, 2018, Dr. Danielle R. Armstrong, D.O., Forensic Pathologist, conducted an autopsy at Forensic Medical of Texas, Tyler. The autopsy results showed FF Hudson died as a result of blunt-force injuries of the chest and extremities. Hypertensive, atherosclerotic, and valvular cardiovascular disease contributed to his death. The manner of death is classified as an accident.

March 23, 2018

Firefighter Larry Marusik, 68 years old

Ellinger Volunteer Fire Department, Ellinger, TX

Burned during wildland fire operations

On March 10, 2018, Ellinger Volunteer Fire Department (EVFD) responded to a reported grass fire on East Tobias Road near Cordes Road in Ellinger, TX. Firefighter (FF) Larry Marusik was conducting suppression activities on the rear of Grass 5 (G5).

FF Marusik was wearing street clothes and no Personal Protective Equipment (PPE). A hose line came off the rear reel of G5 and FF Marusik went to retrieve it. He draped a portion of the hose line over his shoulder and returned to his position on the driver's side rear of the truck. He pulled the door closed but it was not latched. The wind shifted, and the fire began to rapidly approach the vehicle. The operator accelerated away from the fire and the loose hose line pulled FF Marusik out of the truck. The second firefighter on the rear of the truck alerted the driver. FF Marusik was located by the crew and found to have suffered major burns. The second firefighter on the rear of the truck sustained burns to his arm while recovering FF Marusik.

FF Marusik was transported to the staging area by G5, treated by other firefighters, and EMS was called. FF Marusik was transported to Brooke Army Medical Center Emergency Department by Air Evac Lifeteam Air Medical Ambulance Service. FF Marusik was stabilized and transferred to the Burn Unit/ICU. The second firefighter was treated at the scene.

On March 23, 2018, FF Marusik succumbed to his injuries and was pronounced deceased. The Bexar County Medical Examiner's Office conducted an autopsy. The cause of death was determined to be due to complications from thermal burns.

April 5, 2018

Assistant Fire Chief/Fire Marshal Bernard Olive, 68 years old

Baytown Fire Department, Baytown, TX

Cardiac event while on duty

On April 5, 2018, Baytown Fire Department Assistant Fire Chief/Fire Marshal Bernard Olive was found unresponsive and in cardiac arrest in his department vehicle. Chief Olive was treated by department personnel and transported to San Jacinto Hospital Emergency Department where he was later pronounced deceased. On April 5, 2018, SFMO Firefighter Fatality Investigation Coordinator Lt. Brian Fine was notified that Assistant Chief Olive died while on duty. A Firefighter Fatality Investigation was initiated and DSFM Sgt. Johse was assigned.

No autopsy was conducted since Chief Olive was under a physician's care prior to the event and was treated in the Emergency Department.

June 10, 2018

Firefighter Richard "Andy" Loller, 42 years old

Weatherford Fire Department, Weatherford, TX

Assigned to TIFMAS Strike Team 137

Cardiac event while involved in wildland fire operations

Firefighters from Texas Intrastate Fire Mutual Aid System (TIFMAS) Strike Team 137 (ST137) were deployed on June 6, 2018, to the Scenic Loop Complex fire in Jeff Davis

County. On Sunday, June 10, 2018, while conducting fire operations, Weatherford Firefighter (FF) Richard “Andy” Loller experienced a cardiac event. He was transported to Big Bend Regional Medical Center and stabilized. Later the same day he was being transferred by fixed-wing air ambulance to Odessa for more advanced care when he experienced cardiac arrest and could not be resuscitated. On Sunday, June 10, 2018, Texas A&M Forest Service Chief Paul Hannemann notified Deputy State Fire Marshal Lt. Brian Fine of the incident.

On June 10, 2018, Tarrant County Medical Examiner Nizam Peerwani, M.D., conducted an autopsy. The final autopsy results are pending but the initial cause is listed as sudden cardiac death.

This incident is still under investigation.

June 26, 2018

Cadet Devon Coney, 34 years old

Austin Fire Department, Austin, TX

Cardiac event during training

On June 26, 2018, Austin Fire Department cadets were participating in physical training at the training facility located at 4800 Shaw Lane, Austin. Cadets were wearing full PPE and were running evolutions up and down the training tower. During the first 15 minutes of physical training, Cadet Devon Coney collapsed. Academy instructors immediately requested Austin-Travis County EMS and provided Basic Life Support until their arrival. Cadet Coney was transported to South Austin Medical Center where he was pronounced deceased.

The Travis County Medical Examiner’s Office conducted an autopsy. Receipt of the Medical Examiner’s report is pending.

This incident is still under investigation.

April 3, 2018

Firefighter Caleb Scott, 29 years old

North Richland Hills Fire Department, North Richland Hills, TX

Cardiac event while on duty

On April 3, 2018, FF Scott was found unresponsive in the fire station bathroom. Fellow department members initiated Advanced Life Support measures. He was transported to Medical City North Hills Hospital where he later died. Circumstances surrounding the death resulted in an investigation by the North Richland Hills Police Department.

On April 4, 2018, Barrie Miller, M.D., conducted an autopsy at the Tarrant County Medical Examiner's Office. The final autopsy results are pending but the initial cause is listed as sudden cardiac death with small arteriole sclerosis. The manner of death is classified as natural.

This incident is still under investigation.

Prosecution for FY2017 Firefighter Death

On May 18, 2017, at 9:12 p.m., the San Antonio Fire Department (SAFD) responded to a structure fire located in the 6700 block of Ingram Road, San Antonio (Ingram Plaza - Spartan Box Gym) that was reported by a passerby. SAFD Ladder 35 (L35) and Engine 35 (E35) arrived on scene and observed smoke inside the Spartan Box Gym. Firefighters made forcible entry into the business through the front doors. E35 crew was assigned suppression and L35 firefighters Scott Deem and Brad Phipps were assigned to search the Spartan Box Gym. During their search, Firefighter (FF) Deem and FF Phipps located the fire and called for a hose line. Conditions rapidly worsened and L35 FF Deem and FF Phipps declared a “Mayday.” Efforts were focused on their rescue. Several Rapid Intervention Teams (RIT) made entry in an attempt to locate the firefighters. FF Robert Vasquez became separated from his Rapid Intervention Team while searching for firefighters Phipps and Deem. FF Phipps and FF Vasquez were located and extricated. FF Phipps sustained life-threatening injuries and was transported to Brooke Army Medical Center. FF Vasquez suffered minor injuries and was transported and later released from an area hospital. Continued attempts to contact FF Deem or to hear a PASS device were unsuccessful. Conditions worsened, and rescue operations were halted. Defensive tactics were utilized to suppress the fire. A secondary search was conducted, and FF Deem was eventually found deceased inside the gym. FF Phipps was released from the hospital on August 1, 2017, to continue his recovery at home. The Texas State Fire Marshal’s Office Firefighter Fatality Coordinator was notified of the incident and responded, and the State Response Team was dispatched.

The joint investigation conducted by the State Fire Marshal’s Office, San Antonio Arson Bureau, and San Antonio Police Department resulted in the arrest of the owner of the Spartan Box Gym. The Grand Jury indicted the owner for the Arson that resulted in the death of Firefighter Deem and injuries to other firefighters. The criminal case is pending prosecution.

Line of Duty Death Conference

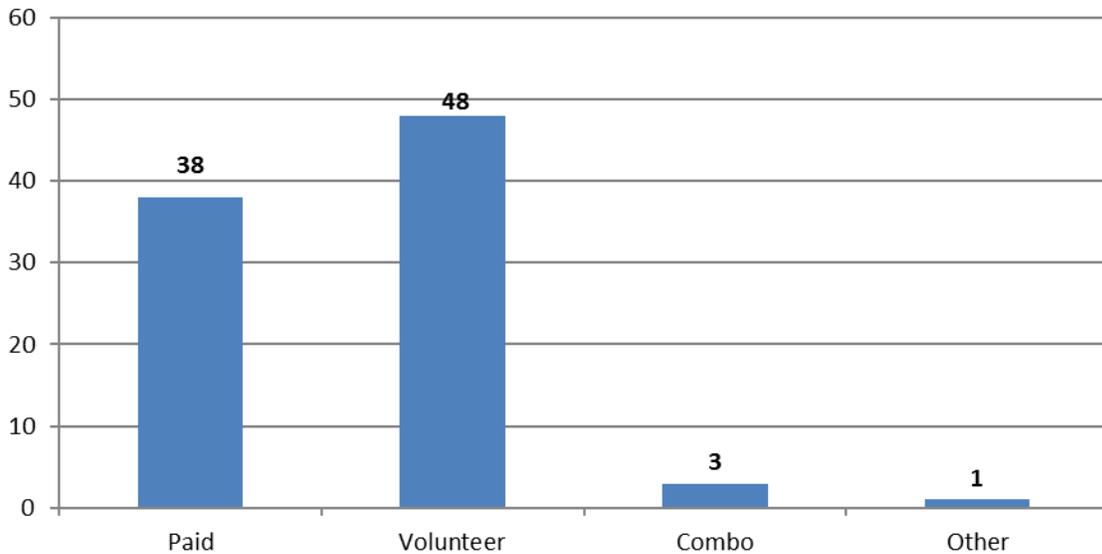
In October 2017, Lt. Brian Fine, SFMO Firefighter Fatality Investigation Program Coordinator presented at and attended the 4th Annual Texas Line of Duty Death (LODD) Conference in Hurst, Texas. This conference is designed to focus on confronting the challenges in the fire service with LODDs. Various case studies of LODD incidents are highlighted that continue to show that firefighters are dying for the same reasons time and time again.

Lt. Fine presented “One Last Call—A Look At Firefighter Fatalities In Texas,” the common causes and possible solutions. Several common factors contribute to firefighter deaths in Texas. The presentation looked at firefighter fatalities in Texas since 2001. The focus was on the findings and recommendations to show the recurrence of similar incidents statewide. Some areas of concern were also identified (firefighter suicide, cancer). Information was provided on changes made by some agencies and the effect they have had on those organizations. There was additional discussion on why changes are not made, e.g., culture, budget, ineffective management, etc.

Lt. Fine also participated in a panel discussion with Stephen T. Miles, an investigator with the National Institute for Occupational Safety and Health Fire Fighter Fatality Investigation Team, on how firefighter fatality investigations are conducted. This panel described the basic details of how their organizations conduct LODD investigations. Based on those ongoing investigations, the same fatality causes tragically occur over and over. The investigation process also includes future recommendations to eliminate those timeless causes. The panel presented their recommendations for what fire service leaders must do to implement the recommendations to prevent fatal outcomes.

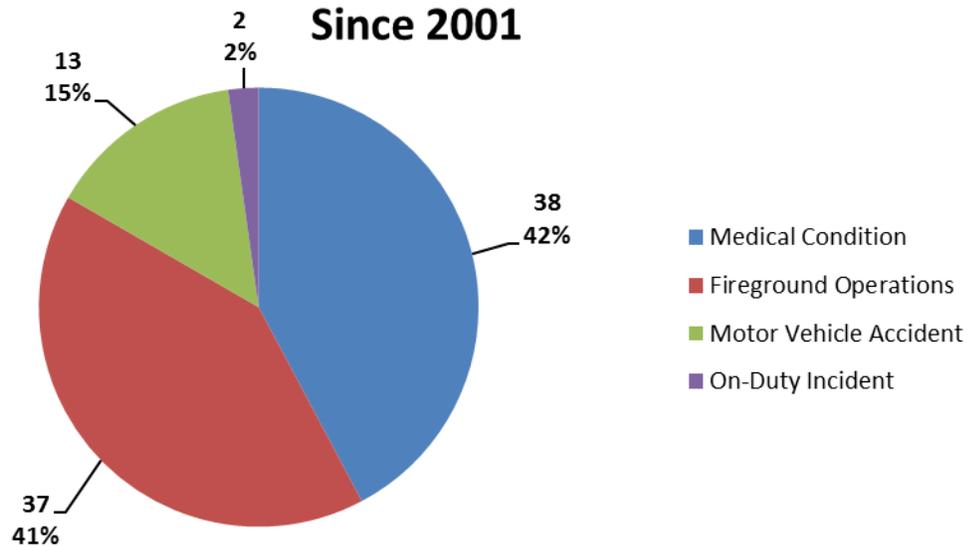
Statistics and Comparisons of Firefighter Fatalities

Fatalities by Department Type, 2001-2017



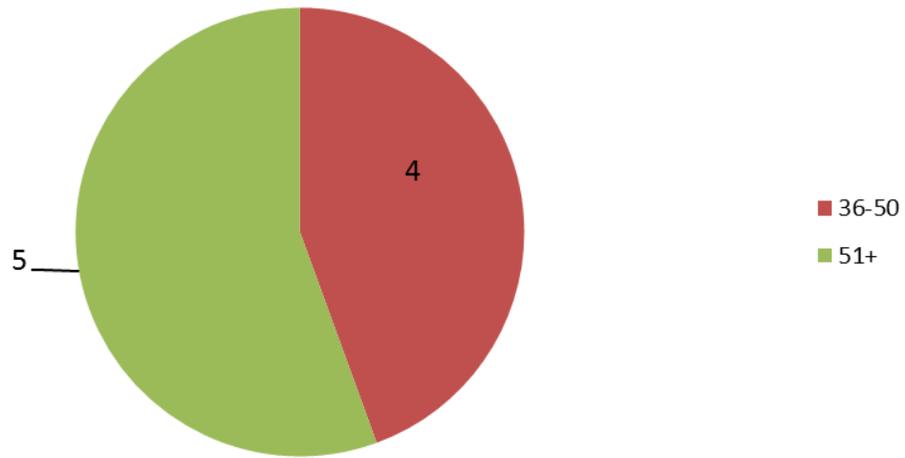
Source: Texas State Fire Marshal's Office

Fatality Types Investigated by the SFMO Since 2001



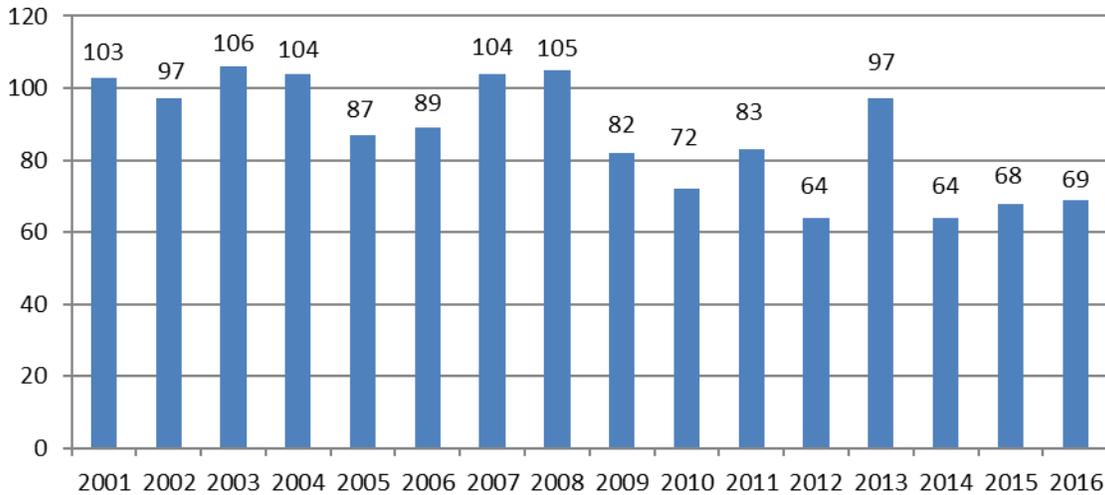
Source: Texas State Fire Marshal's Office

FY 2017 Fatalities Investigated by Age



Source: Texas State Fire Marshal's Office

National On-Duty Firefighter Deaths, 2001-2016



Source: United States Fire Administration

Strategies for Preventing Firefighter Fatalities

SFMO encourages utilization of strategies developed by the SFMO and nationally recognized organizations in the effort to reduce firefighter fatalities. All fire departments are encouraged to utilize and participate in these programs and initiatives.

- 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. The SFMO is now doing follow-up visits to fire departments that have experienced an operational LODD to see what improvements have been made since the incident.
- 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 developed by the National Fallen Firefighters Foundation. CTBS 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 that follow.)

- Implement or expand existing fire prevention programs to assist in reducing the number of fires.
- Participate in the National Fallen Firefighters Foundation's National Fire Service Seat Belt Pledge (www.firehero.org), 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 fire-ground 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, Florida.

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 U.S. 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.) **U.S. Fire Administration National Safety Culture Change Initiative** *FA-342/ April 2015*.

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 and 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 and 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 and Sprinklers

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

16. Apparatus Design and Safety

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

Firefighter Safety Recommendations

The following are some recommendations from past State Fire Marshal's Office investigation reports:

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. *U.S. Fire Administration National Safety Culture Change Initiative FA-342/ April 2015.*
2. 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*, 2018 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*, 2018 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 firefighting. *NFPA 1583, Standard on Health Related Fitness Programs for Firefighters*, 2015 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 1582, Standard on Comprehensive Occupational Medicine Program for Fire Departments*, 2018 Edition.
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 5.3.16 2014 Edition; *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. “Attack from the Black,” a Texas Forest Service training DVD, “The black is the best safety zone” <http://tfsweb.tamu.edu/AttackFromTheBlack/>.

The *Fireline Handbook* has been retired and replaced with an electronic file, a pdf, called *Wildland Fire Incident Management Field Guide* (PMS 210). April 2013.

A memo released by the National Wildfire Coordinating Group (NWCG) suggests that the new 148-page document “can be printed locally in a standard 8½” x 11,” three-ring binder format.”

When it was first introduced, the *Fireline Handbook*, PMS 410-1, was appropriately named, fitting easily in your hand and pocket. Over several decades it became bloated, as committees kept adding everything they could think of to it until it was over an inch thick and weighed almost a pound (15 ounces). It grew to 430 pages without the optional Fire Behavior Appendix and barely fit into your pants pocket. It was last updated in 2004.

The *Fireline Handbook* has become less valuable as other reference guides have been introduced, including the *Incident Response Pocket Guide* (IRPG) and the *Interagency Standards for Fire and Fire Aviation Operations*, better known as the Red Book. The newer guides had some of the same information as the *Fireline Handbook*.

The *Wildland Fire Incident Management Field Guide* still has some information that is duplicated in the *Incident Response Pocket Guide* (IRPG) and FEMA’s *National Incident Management System Emergency Responder Field Operating Guide* (ERFOG), but according to the NWCG, which published the new guide, the documents have different purposes and user groups.

Wildfire Today first wrote about the possible demise of the *Fireline Handbook* in March, 2011.

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 Section (2) (b) 2014 Edition; **Texas Commission on Fire Protection Standards Manual**, Chapter 435, Section 435.15, Part a; **IFSTA (2013) Essentials of Fire Fighting**, (6th Edition), Chapter 6, page 315, Fire Protection Publications, Oklahoma State University

National Wildfire Coordinating Group, *Wildland Fire Incident Management Field Guide* (PMS 210), April 2013, 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**, *Wildland Fire Incident Management Field Guide* (PMS 210), April 2013, Chapter 1, Firefighter Safety; **IFSTA (2013) Essentials of Fire Fighting**, (6th Edition), Chapter 6, Fire Protection Publications, Oklahoma State University

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 fire ground but also the firefighters' 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 fire ground organization.

NFPA 1561, 5.3.7.1 2014 Edition, Following the initial stages of the incident, the incident commander shall establish a stationary command post.

Fire Command, (2nd Edition, 2002), Chapter 1, "The Command Post," Allan V.

Brunacini, Von Hoffman Corp.

IFSTA (2013) *Essentials of Fire Fighting*, (6th 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, 2013 Edition; Protective Clothing
IFSTA (2013), *Essentials of Fire Fighting*, (6th 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 (2013) *Essentials of Fire Fighting*, (6th Edition), Chapter 11, pp. 476 and 556-560, Fire Protection Publications, Oklahoma State University
IFSTA (1994) *Fire Service Ventilation*, (7th Edition), pp. 86-89, Fire Protection Publications, Oklahoma State University

15. Consider monitoring and recording fire ground activity. **NFPA 1221**, Chapter 7, Sec. 7.6, 2016 Edition; Recording.

Texas Commission on Fire Protection

Injury Report

January 1, 2017 to December 31, 2017



TEXAS COMMISSION ON FIRE PROTECTION

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Executive Summary

This report includes the abstract, mission, reports, information and data collected by the Texas Commission on Fire Protection's injury reporting program. The report includes fire fighter injuries reported to the Texas Commission on Fire Protection in 2017, with charts and graphs depicting the collected information. The report also compares Texas fire fighter injury statistics with statistics gathered by the National Fire Protection Association (NFPA) in 2016.

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. Fire departments regulated by the commission have 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 to help reduce the number of fire fighter injuries in Texas and to improve the injury reporting program.

Abstract

Texas fire departments reported 4,090 injuries to the Texas Commission on Fire Protection in calendar year 2017. Of these, 827 occurred during fire suppression activities, representing 20 percent of the total reported injuries. This represents a six percent decrease in the ratio of fire suppression injuries to the total, which in 2016 accounted for 26 percent of injuries. Of the 827 fire suppression injuries, 157, or 19 percent of the fire suppression-related injuries, were serious injuries that resulted in lost time. (Note: The commission defines a serious injury as one which results in the employee missing one or more full duty shifts)

Injuries from emergency medical services (EMS) activities surpassed injuries from fire suppression activities in 2017. EMS activities accounted for 1,079 of the 4,090 total reported injuries, or 26 percent of the total injuries. This represents nearly the same ratio of EMS injuries to total injuries in 2016, in which 1,041 of 4,097 total injuries, or 25 percent, occurred during EMS activities.

After EMS and fire suppression, the next highest number of injuries reported in 2017 occurred in the performance of station duties, with 668, or 16 percent, of the total injuries. This is nearly the same result as in 2016, when 610, or 15 percent, of the total reported injuries occurred in the station.

Skills training and wellness/fitness again rounded out the top five activities resulting in injuries, with 412 skills training injuries (10 percent of the total) and 384 fitness/wellness injuries (9 percent).

The total number of injuries reported in station duties, skills training, and wellness/fitness activities (which are all non-emergency activities) represented just over a third (37 percent) of the total injuries. This was the same ratio of non-emergency to emergency activities as in 2016.

Mission

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

Information the commission collects

- 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)

Reports, Information and Data Collection

This report contains data submitted by regulated and non-regulated entities. The data collected in 2017 was the seventh full year of reporting.

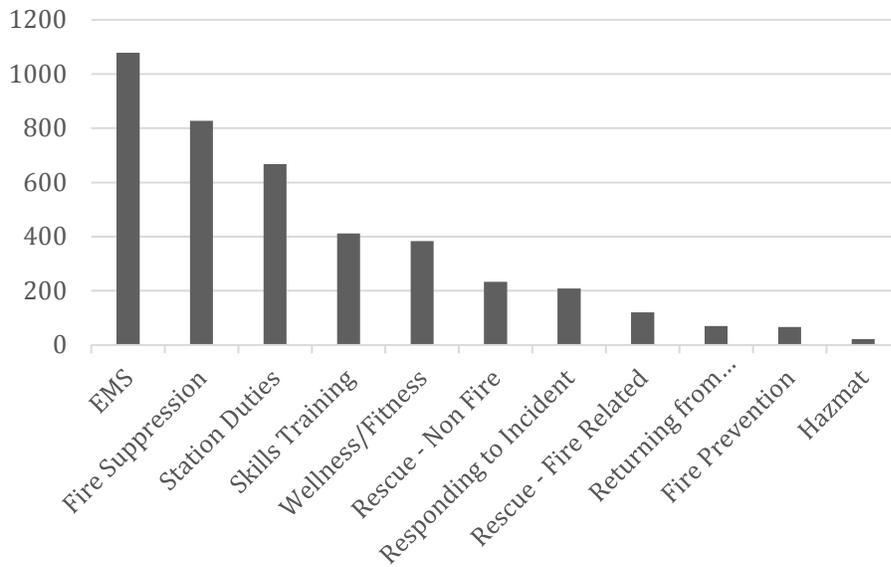
Of the approximately 544 commission-regulated fire departments included in this report, 488, or 90 percent, either submitted an injury report or a “no injury” report for months in which their personnel did not have any injuries. The commission stresses the need for participation and provides reminders to regulated entities of the statutory requirement to report.

Fire Protection Personnel Injuries

Table 1: Injuries by Activity and Severity, 2017

Activity	Minor	Serious	Critical	Fatal	Total
EMS	929	147	3		1079
Fire Suppression	662	157	7	1	827
Station Duties	481	185	2		668
Skills Training	291	120	1		412
Wellness/Fitness	254	129	1		384
Rescue - Non Fire	206	27			233
Responding to Incident	156	53			209
Rescue - Fire Related	113	7			120
Returning from Incident	42	28			70
Fire Prevention	50	15	1		66
Hazmat	21	1			22
Total	3205	869	15	1	4090

Figure 1: Total Injuries by Activity, 2017



Minor and Serious Injuries by Activity

EMS activities resulted in the highest number of minor injuries for 2017. The total number of serious fire suppression injuries is down, compared to 2015 and 2016. (See Table 3. The commission defines a serious injury as one which results in the employee missing one or more full duty shifts.)

Table 2: Minor Injury Activities, 2013 - 2017

Activity	2013		2014		2015		2016		2017	
	Count	Percent								
EMS	934	30.28%	900	28.03%	792	28.25%	882	27.89%	929	28.99%
Fire Suppression	619	20.06%	808	25.16%	618	22.04%	866	27.39%	662	20.66%
Station Duties	452	14.65%	465	14.48%	396	14.12%	434	13.73%	481	15.01%
Skills Training	317	10.28%	365	11.37%	288	10.27%	311	9.84%	291	9.08%
Wellness/Fitness	285	9.24%	254	7.91%	278	9.88%	252	7.97%	254	7.93%
Rescue - Non Fire	243	7.88%	206	6.42%	204	7.28%	161	5.09%	206	6.43%
Responding to Incident	70	2.27%	105	3.27%	122	4.35%	117	3.70%	156	4.87%
Rescue - Fire Related	18	0.58%	11	0.34%	22	0.78%	20	0.63%	113	3.53%
Fire Prevention	66	2.14%	43	1.34%	41	1.46%	47	1.49%	50	1.56%
Returning from Incident	37	1.20%	42	1.31%	33	1.18%	37	1.17%	42	1.31%
Hazmat	44	1.43%	12	0.37%	11	0.39%	35	1.11%	21	0.66%
Total	3085	100%	3211	100%	2805	100%	3162	100%	3205	100%

Table 3: Serious Injury Activities, 2013 - 2017

Activity	2013		2014		2015		2016		2017	
	Count	Percent	Count	Count	Count	Percent	Count	Percent	Count	Percent
Station Duties	201	21.36%	160	19.42%	174	19.31%	172	18.76%	185	21.29%
Fire Suppression	206	21.89%	177	21.48%	160	17.76%	179	19.52%	157	18.07%
EMS	179	19.02%	164	19.90%	185	20.53%	158	17.23%	147	16.92%
Wellness/Fitness	122	12.96%	127	15.41%	125	13.87%	146	15.92%	129	14.84%
Skills Training	99	10.52%	104	12.62%	126	13.98%	141	15.38%	120	13.81%
Responding to Incident	42	4.46%	16	1.94%	44	4.88%	36	3.93%	53	6.10%
Rescue - Non Fire	46	4.89%	38	4.61%	46	5.11%	52	5.67%	27	3.11%
Returning from Incident	18	1.91%	19	2.31%	13	1.44%	18	1.96%	28	3.22%
Fire Prevention	17	1.81%	11	1.33%	12	1.33%	11	1.20%	15	1.73%
Rescue - Fire Related	11	1.17%	3	0.36%	12	1.33%	3	0.33%	7	0.81%
Hazmat	0	0	5	0.61%	4	0.44%	1	0.11%	1	0.12%
Total	941	100%	824	100%	901	100%	917	100	869	100%

Emergency vs. Non-Emergency Injuries

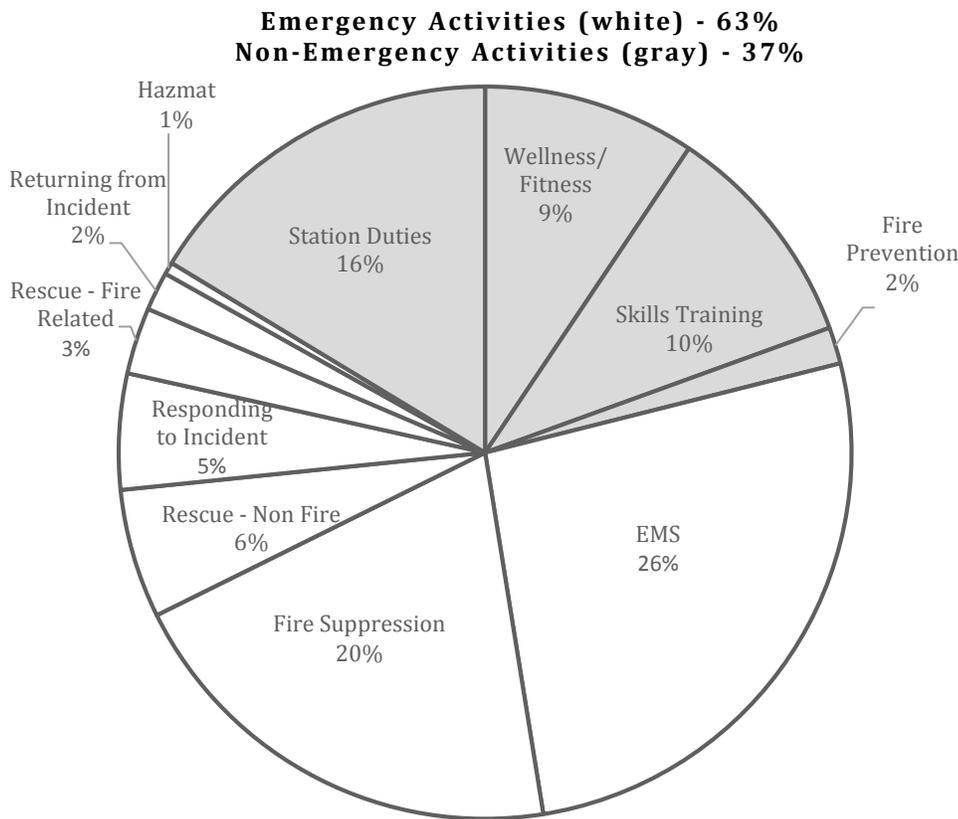
Table 4: Injuries by Emergency Activity and Severity, 2017

Activity	Minor	Serious	Critical	Fatal	Total
EMS	929	147	3		1079
Fire Suppression	662	157	7	1	827
Rescue - Non Fire	206	27			233
Responding to Incident	156	53			209
Rescue - Fire Related	113	7			120
Returning from Incident	42	28			70
Hazmat	21	1			22
Total	2129	420	10	1	2560

Table 5: Injuries by Non-Emergency Activity and Severity, 2017

Activity	Minor	Serious	Critical	Total
Station Duties	481	185	2	668
Skills Training	291	120	1	412
Wellness/Fitness	254	129	1	384
Fire Prevention	50	15	1	66
Total	1076	449	5	1530

Figure 2: Percent of Injuries in Emergency and Non-Emergency Activities, 2017

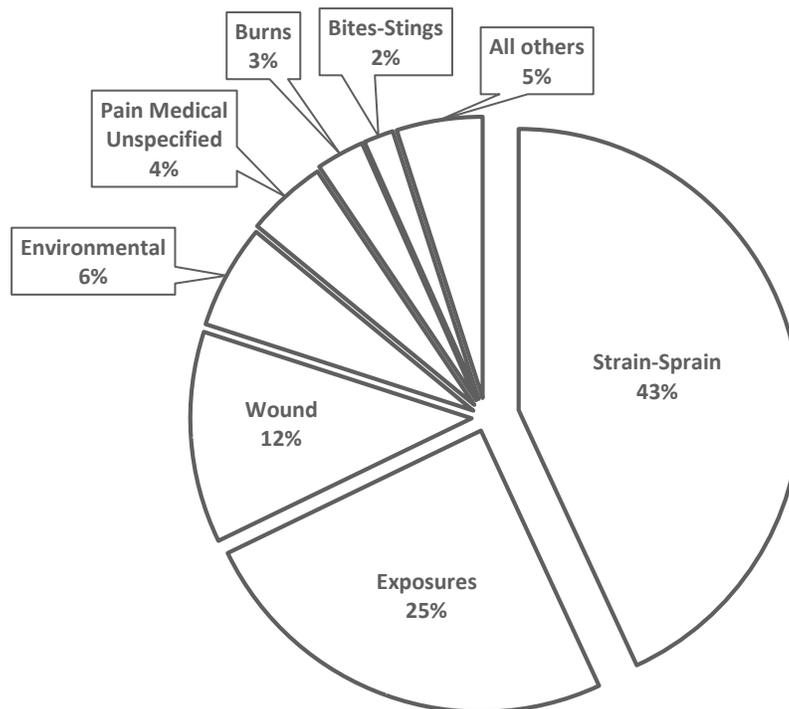


Injuries by Type

Table 6: Types of Injury, 2013-2017 (Note: ordered by 2017, descending)

Type of Injury	2013		2014		2015		2016		2017	
	Count	Percent								
Strain-Sprain	2118	52.28%	1917	47.27%	1839	49.42%	1842	44.96%	1763	43.32%
Exposures	786	19.40%	1117	27.55%	868	23.33%	1092	26.65%	1011	24.84%
Wound	548	13.53%	483	11.91%	491	13.20%	492	12.01%	497	12.21%
Environmental	106	2.62%	101	2.49%	142	3.82%	191	4.66%	245	6.02%
Pain Medical Unspecified	62	1.53%	79	1.95%	66	1.77%	94	2.29%	189	4.64%
Burns	166	4.10%	113	2.79%	95	2.55%	113	2.76%	113	2.78%
Bites-Stings	87	2.15%	79	1.95%	69	1.85%	83	2.03%	70	1.72%
Chest Pains-Cardiac	50	1.23%	46	1.13%	37	0.99%	49	1.20%	51	1.25%
Fractures	59	1.46%	39	0.96%	40	1.07%	41	1.00%	40	0.98%
Debris/Penetrating	38	0.94%	38	0.94%	34	0.91%	35	0.85%	32	0.79%
Hearing Loss - Chronic	2	0.05%	4	0.10%	7	0.19%	35	0.85%	28	0.69%
Hearing Loss - Acute	14	0.35%	21	0.52%	19	0.51%	17	0.41%	23	0.57%
Electrocution	12	0.30%	12	0.30%	9	0.24%	9	0.22%	7	0.17%
Heart Attack	2	0.05%	1	0.02%	3	0.08%	1	0.02%	1	0.02%
Stroke	0	0.00%	1	0.02%	0	0.00%	2	0.05%	0	0.00%
Broken Spine-Neck	1	0.02%	4	0.10%	2	0.05%	1	0.02%	0	0.00%
Total	4051	100%	4055	100%	3721	100%	4097	100%	4070	100%

Figure 3: Types of Injury, 2017



Task at Time of Injury

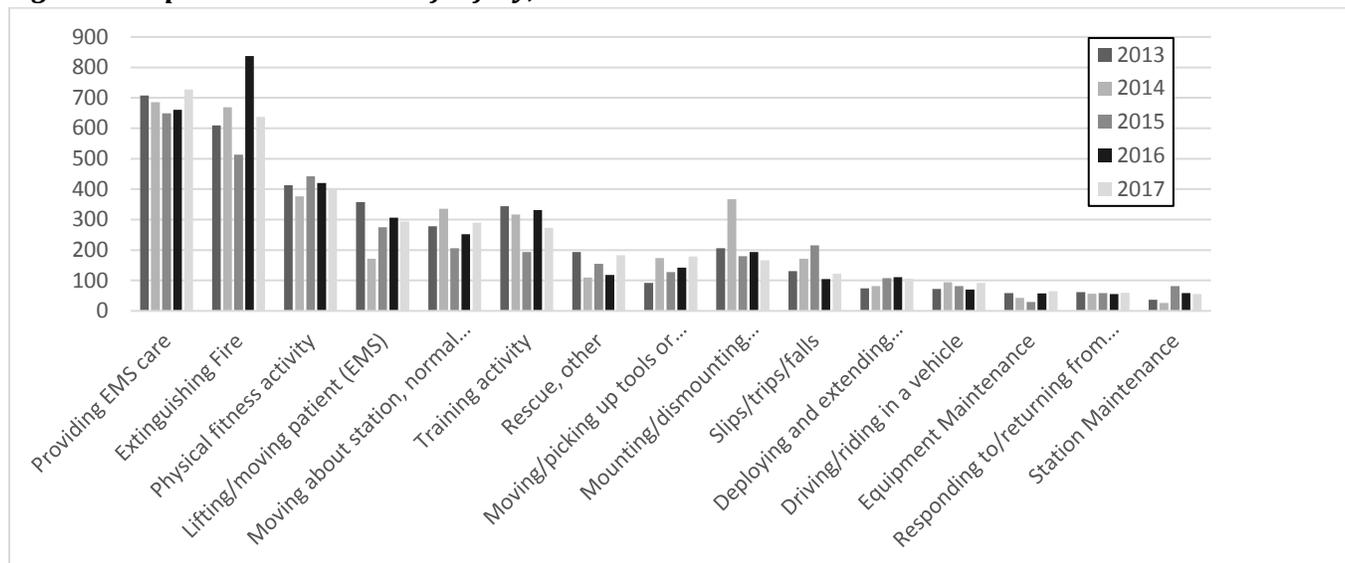
(The commission began gathering task information in mid-2012.)

Table 7: Top 15 Tasks at Time of Injury, 2013-2017 (ordered by 2017, descending)

Task	2013	2014	2015	2016	2017
Providing EMS care	708	686	649	661	728
Extinguishing Fire	609	669	513	837	638
Physical fitness activity	413	376	442	420	401
Lifting/moving patient (EMS)	357	171	275	306	294
Moving about station, normal activity	278	335	206	252	289
Training activity	344	317	193	331	273
Rescue, other	193	110	155	118	183
Moving/picking up tools or equipment	92	173	128	142	179
Mounting/dismounting apparatus	206	367	180	193	166
Slips/trips/falls	131	171	215	105	122
Deploying and extending hoseline	74	82	108	111	106
Driving/riding in a vehicle	72	94	82	70	92
Equipment Maintenance	59	43	29	57	65
Responding to/returning from incident	62	56	59	55	60
Station Maintenance	37	26	81	59	55
All others*	416	379	406	380	440
Total	4051	4055	3721	4097	4090

*All other, 2017: Other: Description: 48; Equipment Maintenance: 43; Extrication: 39; Forcible Entry: 38; Overhaul: 34; Ascending/descending stairs: 32; Operating manual tool: 29; Incident Investigation: 28; Moving about station, alarm sounding: 25; Non-Fire Incidents: 25; Ascending/descending ladder: 22; Inspection Activity: 22; Operating power tool: 11; Manually moving item to gain access: 10; Operating in low/no visibility: 6; Crawling in a confined or otherwise hazardous area: 5; Raising/lowering ladder: 5; Removing equipment from/returning equipment to apparatus: 5; Salvage: 5; Operating nozzle: 3; Carrying/dragging a person (rescue): 2.

Figure 4: Top 15 Tasks at Time of Injury, 2013-2017



Injuries by Body Part

Table 8: Injuries by Body Part, 2013 – 2017 (ordered by 2017, descending)

Body Part	2013	2014	2015	2016	2017
Multiple body parts, whole body	595	901	659	1007	1064
Hand and fingers	403	345	328	359	365
Knee	407	367	369	376	315
Hip, lower back, or buttocks	91	244	316	283	292
Back, except spine	588	372	207	244	248
Shoulder	293	230	241	238	221
Ankle	207	177	202	192	179
Multiple Parts	62	160	180	124	151
Face	128	118	140	116	127
Arm, lower, not including elbow or wrist	84	94	84	109	121
Leg, lower	108	86	117	132	113
Foot and toes	105	79	71	85	87
Head	94	73	69	82	78
Ear	54	52	60	74	76
Chest	66	64	40	82	76
Eye	100	98	75	70	73
Multiple body parts, upper body	57	27	52	61	73
Elbow	68	66	51	47	72
Wrist	79	68	48	74	56
Other body parts injured	381	265	500	342	303
Total	3970	3886	3809	4097	4090

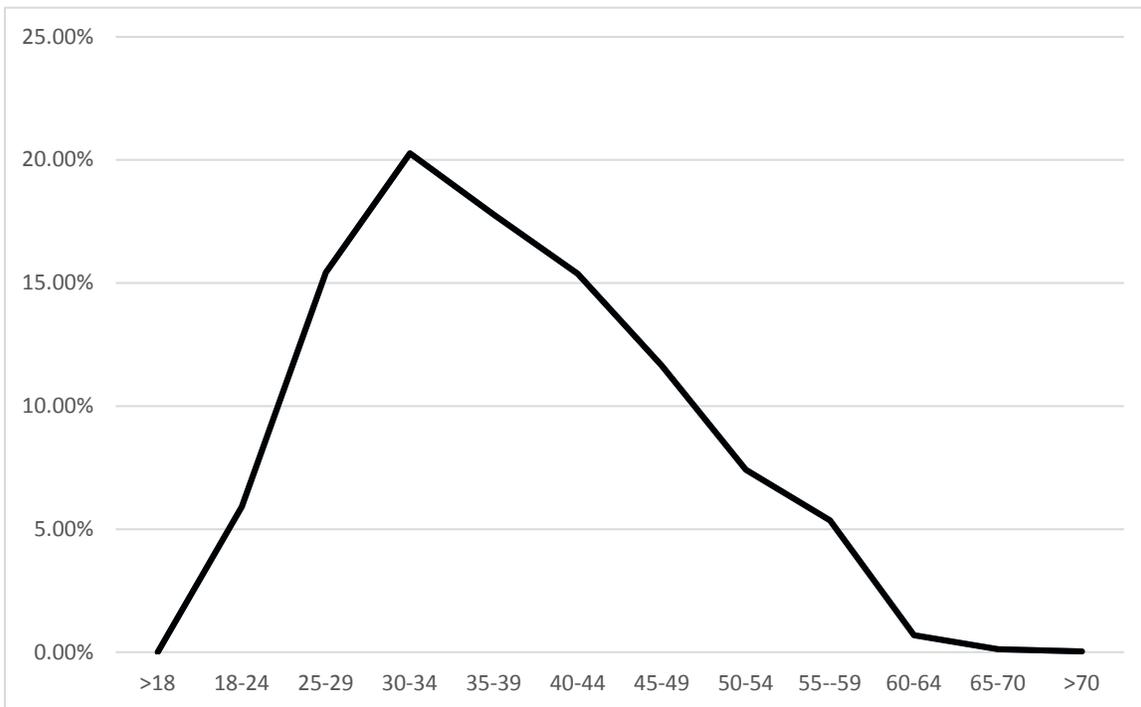
* **Other body parts injured, 2017, in descending order:** Neck: 41; Arm, upper, not including elbow or shoulder: 39; Pelvis or groin: 38; Abdomen: 36; Upper extremities: 28; Leg, upper: 21; Trachea and lungs: 20; Multiple body parts, lower body: 15; Mouth, included are lips, teeth, and interior: 14; Lower Extremities: 13; Neck and Shoulders: 10; Nose: 6; Unidentified: 6; Throat: 5; None: 4; Internal: 3; Thorax: 3; Genito-urinary: 1.

Injuries by Age Group

Table 9: Injuries by Age Group, 2013 - 2017

Age Group	2013		2014		2015		2016		2017	
	Count	Percent								
>18	0	0.00%	1	0.02%	0	0.00%	0	0.00%	0	0.00%
18-24	219	5.41%	178	4.39%	187	5.03%	213	5.20%	242	5.92%
25-29	584	14.42%	573	14.13%	543	14.59%	570	13.91%	631	15.43%
30-34	799	19.72%	749	18.47%	791	21.26%	812	19.82%	829	20.27%
35-39	729	18.00%	833	20.54%	682	18.33%	792	19.33%	727	17.78%
40-44	620	15.30%	674	16.62%	582	15.64%	634	15.47%	629	15.38%
45-49	443	10.94%	438	10.80%	405	10.88%	513	12.52%	476	11.64%
50-54	402	9.92%	380	9.37%	323	8.68%	313	7.64%	303	7.41%
55--59	198	4.89%	173	4.27%	181	4.86%	196	4.78%	219	5.35%
60-64	51	1.26%	49	1.21%	20	0.54%	50	1.22%	28	0.68%
65-70	6	0.15%	6	0.15%	5	0.13%	4	0.10%	5	0.12%
>70	0	0.00%	1	0.02%	2	0.05%	0	0.00%	1	0.02%
Totals	4051	100.00%	4055	100.00%	3721	100.00%	4097	100.00%	4090	100.00%

Figure 5: Injury Percentages by Age Group, 2013- 2017



Injury Activities Resulting in Lost Time

Table 10: Injury Activities Resulting in Lost Time, Totals, 2017

Activity	Count	Days Missed	
		Average	Sum
Station Duties	154	39	5977
Fire Suppression	134	49	6428
EMS	128	57	7274
Wellness/Fitness	115	36	4183
Skills Training	90	46	4132
Responding to Incident	43	31	1338
Rescue - Non Fire	20	27	546
Returning from Incident	24	37	878
Fire Prevention	15	80	1194
Rescue - Fire Related	5	10	51
Hazmat	1	2	2
Total	729	44	32003

Table 11: Activities Resulting in Lost Time, 2017, between 1 and 30 Days

Activity	Count	Days Missed	
		Average	Sum
Station Duties	100	10	1003
Fire Suppression	84	12	1007
Wellness/Fitness	76	11	859
EMS	64	10	656
Skills Training	54	10	547
Responding to Incident	32	9	273
Rescue - Non Fire	14	10	143
Returning from Incident	15	14	209
Fire Prevention	8	17	134
Rescue - Fire Related	5	10	51
Hazmat	1	2	2
Total, Between 1 and 30 Days	453	11	4884

Injury Activities Resulting in Lost Time (continued)

Table 12: Activities Resulting in Lost Time, 2017, between 31 and 90 Days

Activity	Count	Days Missed	
		Average	Sum
EMS	36	58	2099
Station Duties	34	52	1760
Fire Suppression	27	53	1430
Wellness/Fitness	28	60	1688
Skills Training	23	54	1253
Responding to Incident	6	65	390
Rescue - Non Fire	4	35	141
Returning from Incident	6	52	310
Fire Prevention	3	55	166
Total, Between 31 and 90 Days	167	55	9237

Table 13: Activities Resulting in Lost Time, 2017, 91+ Days

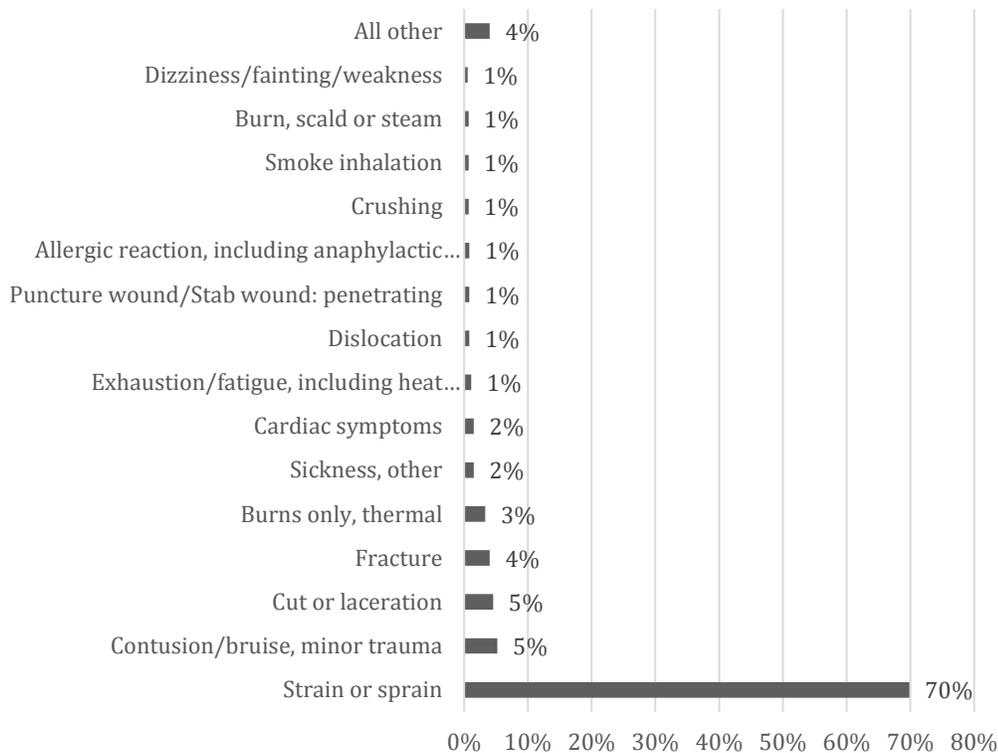
Activity	Count	Days Missed	
		Average	Sum
Fire Suppression	22	181	3991
EMS	28	161	4519
Station Duties	20	161	3214
Skills Training	13	179	2332
Responding to Incident	3	120	675
Wellness/Fitness	11	149	1636
Rescue - Non Fire	2	131	262
Fire Prevention	4	224	894
Returning from Incident	3	120	359
Total, 91+ Days Missed	108	166	17882

Types of Injuries with Lost Time

Table 14: Types of Injuries Resulting in Lost Time, 2017

Type of Injury	Count	Average Days Out
Strain or sprain	509	49
Contusion/bruise, minor trauma	38	39
Cut or laceration	33	14
Burns only, thermal	24	26
Fracture	29	56
Sickness, other	11	57
Cardiac symptoms	11	12
Exhaustion/fatigue, including heat exhaustion	8	14
Dislocation	6	62
Allergic reaction, including anaphylactic shock	6	5
Burn, scald or steam	5	36
Puncture wound/Stab wound: penetrating	6	81
Crushing	5	15
Smoke inhalation	5	17
Dizziness/fainting/weakness	4	8
All other	29	25
Total	729	44

Figure 6: Types of Injuries Resulting in Lost Time, 2017



Burn Injuries

Table 15: All Burns, 2013 - 2017

All Burns - Types	2013	2014	2015	2016	2017
Thermal	92	76	85	92	96
Scald or steam	71	33	10	9	13
Electric	2	2	0	2	0
Chemical	0	2	0	3	4
Total	165	113	95	106	113

Table 16: Burns with Lost Time by Burn Type, 2017

Burns with Lost Time	Count	Average Days Missed	Total Days Missed
Scald or steam	5	36	182
Thermal	24	26	628
Total	29	31	810

Table 17: Burns by Body Part, 2013 - 2017 (ordered by 2017, descending)

Body Part	2013	2014	2015	2016	2017
Hand and fingers	35	18	14	27	22
Ear	29	13	22	14	16
Arm, lower, not including elbow or wrist	12	9	3	2	12
Multiple parts	16	16	8	4	12
Face	14	13	12	16	9
Neck	9	9	6	4	7
Wrist	10	5	4	9	7
Shoulder	13	5	5	3	6
Multiple body parts, upper body	3	4	5	8	4
Leg, lower	4	1	6	3	3
Undetermined	0	0	0	3	2
Arm, upper, not including elbow or shoulder	1	2	2	1	2
Back, except spine	0	2	0	0	2
Pelvis or groin	0	0	0	0	2
Knee	1	0	0	1	2
Elbow	1	0	0	0	1
Head	5	3	4	2	1
Neck and shoulders	1	1	0	0	1
Chest	1	0	0	1	1
Foot and toes	5	2	1	3	1
Eye	0	1	0	0	0
Throat	1	0	0	0	0
Hip, lower back, or buttocks	0	1	0	1	0
Lower extremities	5	2	1	2	0
Upper extremities	0	6	2	2	0
Total	166	113	95	106	113

Burn Injuries (continued)

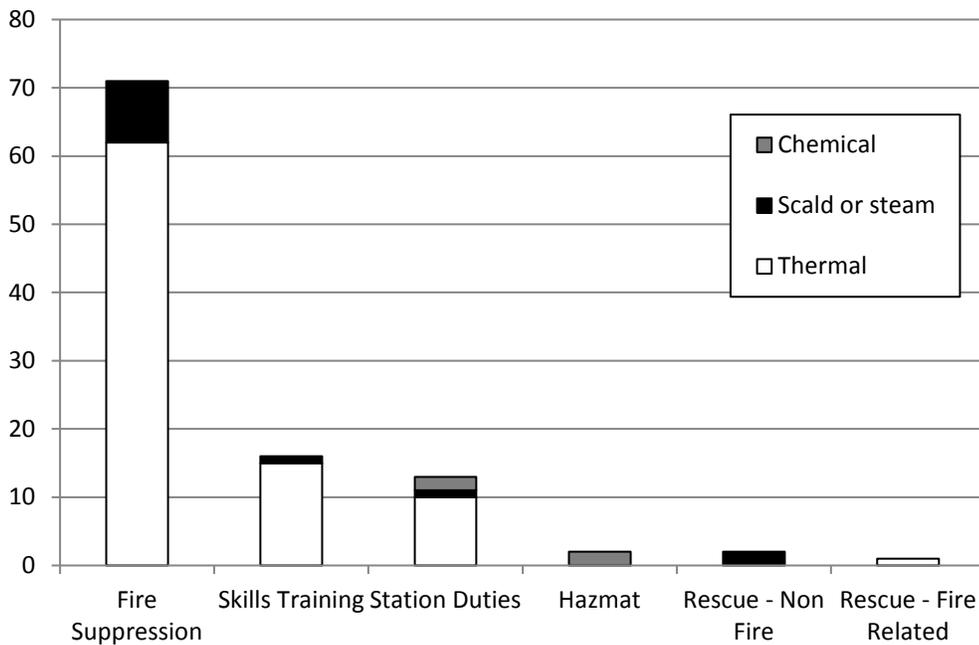
Table 18: Burns by Emergency Activity, 2017

<u>Emergency Activities</u>				
Type	Fire Suppression	Hazmat	Rescue - Non Fire	Rescue - Fire Related
Thermal	68			2
Scald or Steam	9		2	
Chemical		2		
Total	77	2	2	2

Table 19: Burns by Non-Emergency Activity, 2017

<u>Non-Emergency Activities</u>		
Type	Station Duties	Skills Training
Thermal	11	15
Scald or Steam	1	1
Chemical	2	
Total	14	16

Figure 7: Burns by Activity, 2017

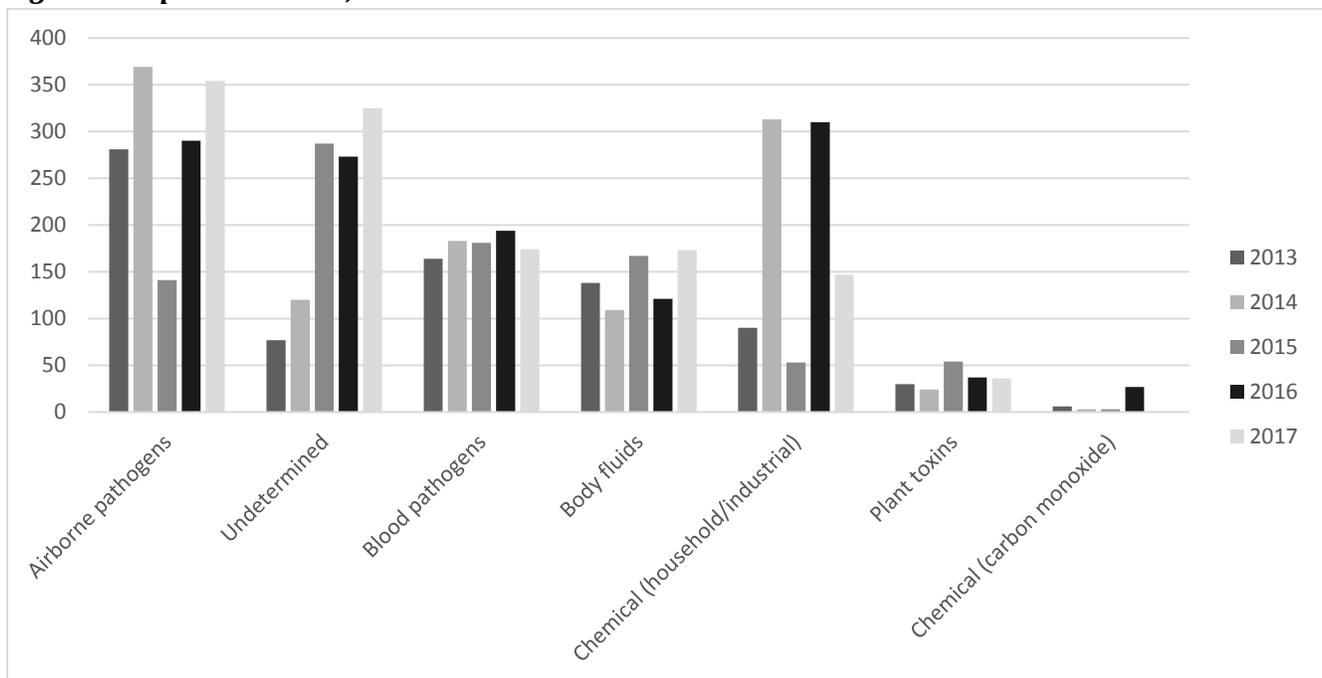


Exposures

Table 20: Routes of Exposure, 2013-2017 (ordered by 2017, descending)

Exposure Routes	2013	2014	2015	2016	2017
Airborne pathogens	281	369	141	290	354
Undetermined	77	120	287	273	325
Blood pathogens	164	183	181	194	174
Body fluids	138	109	167	121	173
Chemical (household/industrial)	90	313	53	310	147
Plant toxins	30	24	54	37	36
Chemical (carbon monoxide)	6	3	3	27	1
Total	786	1121	886	1252	1210

Figure 8: Exposure Routes, 2013 - 2017



Exposures (continued)

Table 21. Exposure description, 2013-2017 (ordered by 2017, descending)

Exposure description	2013	2014	2015	2016	2017
Unknown	51	103	256	148	290
Blood	159	177	167	161	153
Chemicals/household/industrial	89	89	36	310	122
Asbestos	5	384	51	51	112
Tuberculosis	94	93	73	128	109
Body fluids	96	109	92	91	101
Meningitis	129	65	91	62	104
Animals or wildlife	29	63	75	90	58
Sickness, other	5	60	21	24	49
Poison plants	30	24	61	37	37
Vomit	33	16	19	14	17
Chlorine	0	0	4	1	14
Mold	2	0	4	26	10
Airborne, Other	37	15	7	40	7
Staph	1	0	3	0	7
Carbon monoxide	5	6	8	26	5
HIV	4	0	11	4	4
Scabies	8	9	4	21	4
Hepatitis C	8	6	10	14	3
MRSA	16	4	0	14	3
Bacterial pneumonia	0	0	1	0	1
Explosive residue	8	0	0	0	0
Influenza	0	8	0	0	0
Lice	2	0	0	0	0
Strep	0	0	0	1	0
Total	811	1231	984	1263	1210

Note: The commission received 127 exposure reports related directly to Hurricane Harvey; the majority of these exposures were direct exposures to floodwater and/or chemical exposures.

Table 22: Chemical/Mineral Exposures, 2017

Chemical / mineral	Count
Carcinogens, unspecified	144
Asbestos	112
Heavy metals	19
Chlorine	17
Sodium bromide	17
Smoke	15
Unknown chemicals	13
Phosphine gas	9
Oil	8
Solvents	8
Lithium ion batteries	4
Battery acid	4
Carbon monoxide	4
Benzene	3
Firefighting foam	3
Cleaning fluid	3
Ammonia	3
Petroleum byproducts	2
IV fluid	2
Methamphetamine	2
Insecticide / pesticide	1
Sodium hydroxide	1
Personal protective equipment	1
Gasoline	1
Fiberglass	1
Potassium acetate	1
Antifreeze	1
Hydraulic fluid	1
Total	400

Table 23: Other Exposures, 2017

Other	Count
Ricin	6
UV / radiation exposure	5
Mercury	3
Fentanyl	1
Other, unknown puncture	1
Total	16

Table 24: Biological Exposures, 2017

Biological	Count
Blood	174
Contaminated water or sewage	111
TB	108
Meningitis	108
Bodily fluids	89
Vomit	23
Chicken pox / shingles	16
Pertussis / whooping cough	15
Undetermined	12
Mold	10
MRSA / Staph	10
Ebola	7
Hepatitis	4
HIV	4
C. Diff	3
Conjunctivitis	2
Malaria	2
Total	698

Table 25: Poisonous Plants Exposures, 2017

Poisonous plants	Count
Poison plants	36

Table 26: Animal/Wildlife Exposures, 2017

Animals / wildlife	Count
Bees	13
Dog bite	12
Unidentified insect	11
Cat bite	9
Wasps	5
Scabies	4
Spider bite	3
Ants	1
Bedbugs	1
Ticks	1
Total	60

Cancer reports

The commission received ten reports of cancer diagnoses from fire departments in 2017:

Prostate – 3
(Males, 50, 54, 54)

Leukemia – 1
(Male, 60)

Oropharyngeal – 1
(Male, 58)

Colon – 1
(Male, 46)

Cervix – 1
(Female, 53)

Liver – 1
(Male, 42)

Unidentified – 2
(Males, 47, 55)

The commission encourages departments to report these illnesses to help the Texas fire service gain a better understanding of long-term illnesses from which fire protection personnel are suffering.

SOP Issues

In 2017 there were 28 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 27: Injuries Attributed to SOP Issues, 2017

Activity	Minor	Serious	Critical	Total
Fire Suppression	5	3	1	9
EMS	4	3		7
Responding to Incident	2	1		3
Skills Training	2			2
Station Duties	1	3		4
Wellness/Fitness		1		1
Fire Prevention			1	1
Rescue – Non Fire		1		1
Total	14	12	2	28

Fatalities

The commission's 2017 injury report includes one fatality. Fatalities listed in this report include only those reported to the Texas Commission on Fire Protection (TCFP) by the entities it regulates.

Two other fatalities were recognized and communicated to TCFP, however, they were not reported as LODD in the injury reporting system. One LODD resulted from LODIs received in 2013, and the second was a cancer-related fatality.

The State Fire Marshal's Office investigated four Texas fire fighter LODDs in 2017. (Comprehensive information regarding Texas fire service deaths is included in the State Fire Marshal's Annual Report and on its website at <http://www.tdi.texas.gov/fire/fmloddindividuals.html>.)

Close-up: wellness/fitness injuries

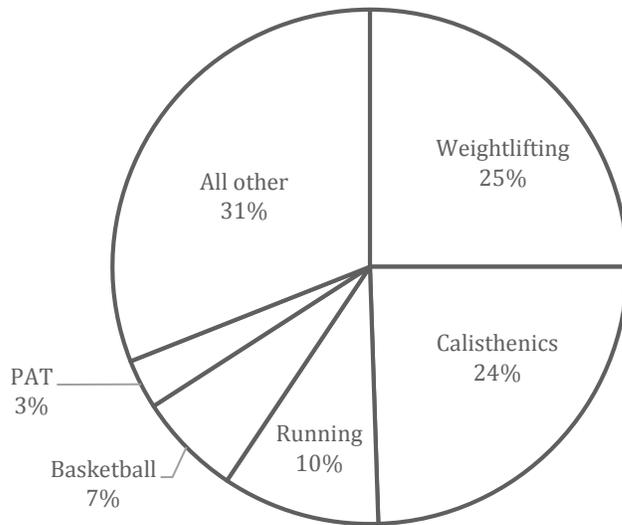
384 wellness/fitness injuries were reported in 2017. The most frequent types of activities that resulted in injury are reported below.

Table 28: Identified fitness activities resulting in injury, 2017

Fitness activity	Count	Percent
Weightlifting	96	25%
Calisthenics	94	24%
Running	38	10%
Basketball	25	7%
PAT/fitness test	12	3%
All other*	119	31%
Total	384	100%

**Other fitness/wellness activities that resulted in injury include a wide variety of activities, such as football, sit ups, push-ups, box jumps, tire flips, squats, burpees, etc.*

Figure 9: Identified fitness/wellness activities resulting in injuries, 2017



Close-up: skills training injuries

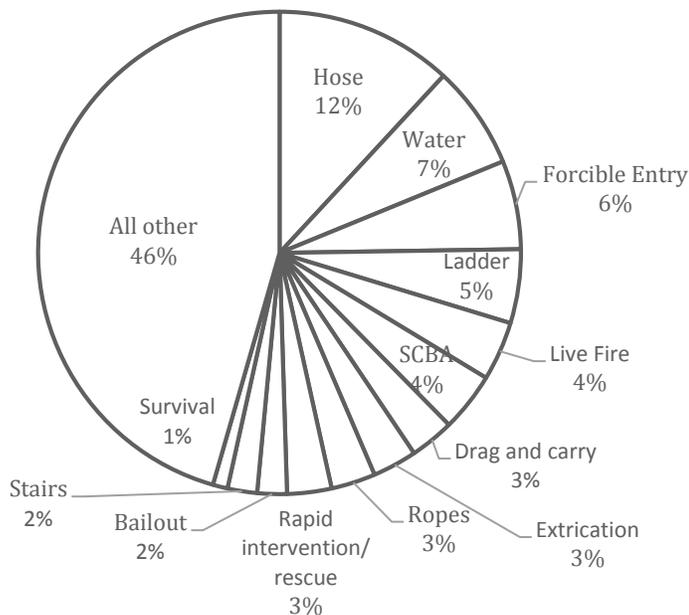
412 skills training injuries were reported in 2017. The most frequent types of activities that resulted in injury are reported below.

Table 29: Identified skills training activities resulting in injury, 2017

Skills training activity	Count	Percent
Deploying/extending hose	49	12%
Water rescue	29	7%
Forcible entry	23	6%
Ladders	21	5%
Live Fire	17	4%
SCBA	17	4%
Drag and carry	14	3%
Extrication	13	3%
Rapid intervention/rescue	13	3%
Ropes	11	3%
Bailout	7	2%
Stairs	7	2%
Survival	3	1%
All other*	188	46%
Total	412	100%

**Other skills training activities that resulted in injury include a wide variety of activities, such as marching, crawling, lifting, high angle, ventilation, wildland, etc.*

Figure 10: Identified skills training activities resulting in injuries, 2017



Comparison between the State of Texas (2017) and National Fire Protection Association (NFPA), U.S. Firefighter Injuries – 2016

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.

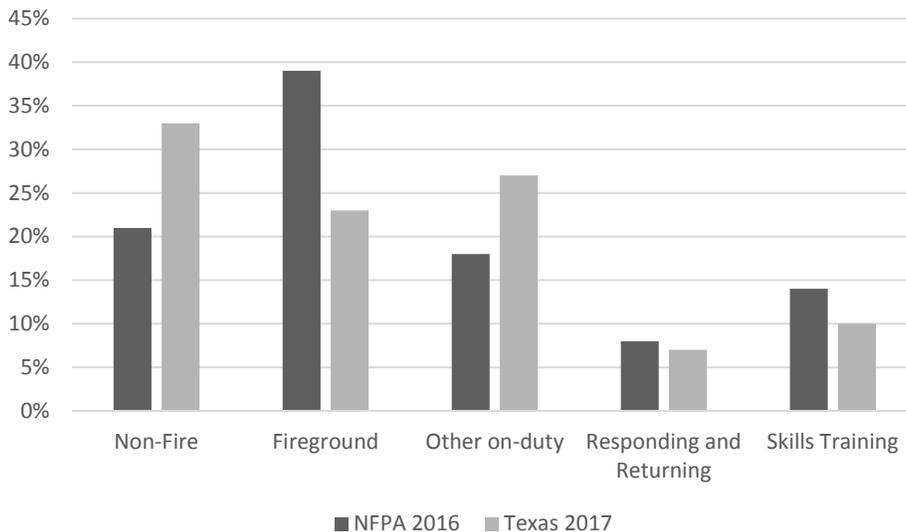
The NFPA’s “Responding and Returning” and “Training” categories appear to correspond closely to the commission’s categories. (The NFPA numbers include Texas statistics, although the reporting populations may not be the same.)

Table 30: Comparison of Texas 2017 and NFPA 2016

Category	Texas 2017		NFPA 2016*	
	Count	Percent	Count	Percent
Fireground	947	23%	24325	39%
Non-Fire	1334	33%	12780	21%
Other On-Duty	1118	27%	11300	18%
Training	412	10%	8480	14%
Responding and Returning	279	7%	5200	8%
Total	4090	100%	62085	100%

* NFPA data is from [U.S. Firefighter Injuries - 2016](#), copyright© 2017 National Fire Protection Association, Quincy, MA.

Figure 11: Injuries by Activity Percentages – Comparing Texas 2017 and NFPA 2016



2017 Findings/Recommendations

The commission would like to thank Texas fire departments for their ongoing participation in reporting fire protection personnel injuries. This report would not be possible without their efforts.

The commission strongly encourages fire departments to continue reporting exposures and further encourages departments to report cancer diagnoses; the commission recognizes that the number of job-related cancers reported during this time period represents only a small fraction of the cases that Texas fire departments are currently managing. There is a growing awareness of the impact that cancer is having on fire protection personnel nationwide, and the commission urges departments to use this reporting tool to help contribute to the education and awareness of the issue in Texas.

Recommendations

Based on their review of the data contained within this report, the commission offers the following recommendations to the Texas fire service:

- ◇ Improve awareness and distribution of the annual injury report by notifying fire department administrators when this and future reports are published and provide a link to the report in the notifications.
- ◇ Enhance program features and “usability” by providing better explanations, descriptions and definitions of terms in both the reporting module and in the annual report.
- ◇ Provide the Texas fire service with injury updates, perhaps on a quarterly basis, targeting trends or other issues noted during the year. This could be accomplished via postings on the agency’s website, social media platforms, or by other means.
- ◇ Explore options for incorporating injury data into annual continuing education opportunities for fire personnel.

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](#)

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



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