

FIRE FIGHTER ADVISORY COMMITTEE**June 10, 2021, 9:00 A.M.****1701 N. Congress Ave., William B. Travis Bldg., Room 1-104, Austin, Texas**

The meeting of the Fire Fighter Advisory Committee will be held in-person at the physical location above.

- 1. Roll call and excuse of committee members.**
- 2. Adoption of the March 11, 2021 Fire Fighter Advisory Committee meeting minutes.**
- 3. Report from the Curriculum and Testing Committee regarding possible changes to the Certification Curriculum Manual as follows:**
 - a. Basic Aircraft Rescue Fire Suppression Curriculum**
 - b. Basic Fire Inspector Curriculum**
 - c. Plan Examiner Curriculum**
- 4. Discussion and possible action on proposed amendments to 37 Tex. Administrative Code, Part 13, Chapter 421, Standards For Certification, §421.17, Requirement To Maintain Certification.**
- 5. Discussion and possible action on proposed amendments to 37 Tex. Administrative Code, Part 13, Chapter 435, Fire Fighter Safety, §435.19, Enforcement of Commission Rules.**
- 6. Request from Curtis Dunn, Firefighter Cancer Support Network regarding Fire Fighter Training Program.**
- 7. Presentation by David Kerr of the Firefighter Air Coalition regarding Firefighter Air Replenishment System (FARS).**
- 8. Request from Kevin Price regarding proposed rule changes to 37 Tex. Administrative Code, Part 13, Chapter 429, Fire Inspector and Plan Examiner, Subchapter A, Minimum Standards For Fire Inspector Certification, §429.3, Minimum Standards For Basic Fire Inspector Certification.**
- 9. Request from Kevin Price regarding proposed rule changes to 37 Tex. Administrative Code, Part 13, Chapter 431, Fire Investigation, Subchapter A, Minimum Standards For Arson Investigator Certification, §431.3, Minimum Standards for Basic Arson Investigator Certification.**
- 10. Discussion of the 2020 data collected on fire fighter injuries, and possible action on developing recommendations to be submitted to the commission for approval and submission to the State Fire Marshal's Office.**
- 11. Subjects for future agenda items.**
- 12. Future meeting dates.**
- 13. Adjourn meeting.**

1. Roll call and excuse of committee members.

2. Adoption of the March 11, 2021 Fire Fighter Advisory Committee meeting minutes.

Assistant Presiding Officer Daniel DeYear called the March 11, 2021 video conference meeting of the Fire Fighter Advisory Committee to order at 9:00 a.m.

Member Attendance	Jim Reidy Jason Collier	Vince Abrigo Daniel DeYear	Ken Swindle Daniel Buford	Keith Schmidt Daniel Anderson	Antonio Ramos
				*absent entire meeting **absent part of meeting	

Staff	Mike Wisko Grace Wilson	Deborah Cowan Paul Maldonado	Joyce Guinn Rick Wallace	Cliff Grant	Tara Youngblood
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Attendees	Albert Cantu Nate Mara Paul Sandman	Chris Watson Michael Glynn Robert Frankovich	J.P. Steelman Landon Whatley Roger Esparza	Jonathan Peacock Pat McAuliff Tim Gibson
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1. Roll call Secretary, Keith Schmidt called roll and a quorum was present.
2. Election of Officers A motion was made by Jason Collier and seconded by Ken Swindle to nominate Daniel DeYear as the Chairman, Daniel Buford as the Vice Chairman, and Keith Schmidt as the Secretary of the committee. The motion carried.
3. Adoption of Minutes A motion was made by Jason Collier and seconded by Daniel Anderson to approve the minutes of the December 10, 2020, fire fighter advisory committee meeting as discussed. The motion carried.
4. Discussion of 2020 Injury Report A motion was made by Keith Schmidt and seconded by Ken Swindle to approve the report with the recommendations identified and send to the commission for review. The motion carried.
5. Subjects for future agenda items Create class for fire departments on NFPA 1851 for certification purposes 2020 Injury Report
6. Future meeting dates Next scheduled meeting is June 10, 2021 beginning at 9:00 a.m.
7. Adjournment A motion was made by Ken Swindle and seconded by Jim Reidy to adjourn the meeting. The motion carried.

Daniel DeYear
Presiding Officer

3. **Report from the Curriculum and Testing Committee regarding possible changes to the Certification Curriculum Manual as follows:**
 - a. **Basic Aircraft Rescue Fire Suppression Curriculum**
 - b. **Basic Fire Inspector Curriculum**
 - c. **Plan Examiner Curriculum**

a. Basic Aircraft Rescue Fire Suppression Curriculum

SECTION 200

BASIC AIRCRAFT RESCUE FIRE SUPPRESSION

Basic Aircraft Rescue Fire Fighting Personnel

The Fire Fighter II who has demonstrated the skills and knowledge necessary to function as an integral member of an aircraft rescue and fire fighting (ARFF) team.

200-4.1 General

200-4.1.1 Qualifications

To be qualified as an **Airport Fire Fighter**, the candidate shall meet the requirements for Texas Commission on Fire Protection (TCFP) certification as Fire Fighter II, as defined in NFPA 1001 **and the requirements for Airport Fire Fighter defined in this standard.**

200-4.1.1.1 Duties

These requirements shall be divided into three major duties: response, fire suppression and rescue.

200-4.1.1.2 Function

The primary function of the **Airport Fire Fighter** shall be to execute fire suppression and rescue activities.

200-4.1.1.3 General Knowledge Requirements

Fundamental aircraft fire-fighting techniques, including the approach, positioning, initial attack, and selection, application, and management of the extinguishing agents; limitations of various sized hand lines; use of personal protective equipment (PPE); fire behavior; fire-fighting techniques in oxygen-enriched atmospheres; reaction of aircraft materials to heat and flame; critical components and hazards of civil aircraft construction and systems related to ARFF operations; special hazards associated with military aircraft systems; a national defense area and limitations within that area; characteristics of different aircraft fuels; hazardous areas in and around aircraft; aircraft fueling systems (hydrant/vehicle); aircraft egress/ingress (hatches, doors, and evacuation chutes); hazards associated with aircraft cargo, including dangerous goods; hazardous areas, including entry control points, crash scene perimeters, and requirements for operations within the hot, warm, and cold zones; and critical stress management policies and procedures.

- 1) Fundamental aircraft fire-fighting techniques of approach
 - a. Size up
 - i. Weather
 - ii. Terrain
 - iii. Debris trail
 - iv. Exposures
 - v. Aircraft
 1. Size/type
 2. Fire
 - a) Absence
 - b) Presence
 3. Souls on Board (SOB)
 4. Fuel on board
- 2) Fundamental aircraft fire-fighting techniques of positioning
 - a. Weather
 - b. Terrain
 - c. Exposures
 - d. Aircraft
 - i. Size/Type
 - ii. Fire
 1. Absence
 2. Presence
 - e. Impact
 - i. High
 - ii. Low
 - f. Non-impact
 - i. Fire
 1. Interior
 2. Exterior
 - ii. No fire
 - g. Egress routes
 - h. Wreckage
 - i. Intact
 - ii. Fragmented
 - iii. Debris trail
 - iv. Upside down
 - i. Scene preservation
 - j. Hazardous areas
 - i. Fuel
 1. Jet fuels

- 2. AVGAS
 - 3. Other fuels
 - ii. Engines
 - 1. Jet turbine
 - 2. Propellers
 - 3. Rotors
 - iii. Military ordnance/armament
 - iv. Collapse zones
 - v. Dangerous goods
- 3) Fundamental aircraft fire-fighting techniques of initial attack
 - a. Rescue of occupants
 - i. Isolation
 - ii. Insulation
 - b. Fire control
 - i. Interior
 - ii. Exterior
 - c. Loss control
- 4) Fundamental aircraft fire-fighting techniques of fire extinguishing agents
 - a. Selection
 - i. Water
 - ii. Foaming agents
 - iii. Dry chemicals
 - iv. Halogenated agents and halon replacements
 - v. Dry powders
 - b. Application
 - i. Turret
 - ii. Hand line
 - iii. Hand held extinguishers
 - iv. Special appliance(s)
 - c. Management
 - i. Conservation of agent
 - ii. Replenishment
- 5) Limitations of various sized hand lines
 - a. Diameter
 - b. Discharge
 - c. Length of hand line
 - d. Reach of agent application

- 6) Use of personal protective equipment (PPE)
 - a. Personal Protective Clothing
 - i. Station/work uniform
 - ii. Structural fire-fighting protective clothing
 - iii. Proximity fire-fighting protective clothing
 - iv. Chemical protective clothing
 - b. Respiratory protection (SCBA)
 - i. Conditions that require respiratory protection
 - 1. Oxygen deficiency
 - 2. Elevated temperatures
 - 3. Toxic environments
 - 4. Smoke (by-products of combustion)
 - c. Donning of PPE
 - d. Doffing of PPE
 - e. Care of PPE
 - f. Cleaning of PPE
 - g. Inspections of PPE
 - h. Limitations of PPE
 - i. Maintenance of PPE
 - i. Replacement
 - ii. Storage
- 7) Conditions that require respiratory protection
 - a. Oxygen deficiency
 - b. Elevated temperatures
 - c. Toxic environments
 - d. Smoke (by-products of combustion)
- 8) Fire behavior
 - a. Class A fires
 - i. Aircraft interior
 - ii. Aircraft cargo
 - iii. Airport structures
 - b. Class B fires
 - i. Pooled fuel
 - ii. Three-dimensional
 - c. Class C fires
 - i. Avionics
 - ii. Wiring
 - d. Class D fires
 - i. Landing gear

ii. Engine components

- 9) Fire-fighting techniques in oxygen-enriched atmospheres
 - a. Recognizing an oxygen enriched atmosphere
 - b. Defensive tactics to reduce oxygen concentration
- 10) Reaction of aircraft materials to heat and flame
 - a. Aluminum and aluminum alloy
 - b. Steel
 - c. Magnesium and magnesium alloy
 - d. Titanium
 - e. Advance aerospace (composite) materials
 - f. Wood
- 11) Critical components and hazards of civil aircraft construction and systems related to ARFF operations
 - a. Pinching and limb severing hazards
 - b. Propeller dangers
 - c. Helicopter hazards
 - d. Jet-Engine hazards
 - e. Evacuation hazards
 - f. Ballistic recovery systems
 - g. Landing gear
 - h. Wheel assemblies
 - i. Electrical systems
 - j. Hydraulic systems
 - k. Advanced aircraft composite materials
 - l. Fuel systems
 - m. Radar systems
 - n. Pressurized cylinders
 - o. Oxygen supply systems
 - p. Protruding devices
 - q. Ram Air Turbine (RAT)
- 12) Special hazards associated with military aircraft systems
 - a. Pinching and limb severing hazards
 - b. Propeller dangers
 - c. Helicopter hazards
 - d. Jet-engine hazards
 - e. Evacuation hazards
 - f. Ejection seats

- g. Landing gear
 - h. Wheel assemblies
 - i. Electrical systems
 - j. Hydraulic systems
 - k. Advanced aircraft composite materials
 - l. Fuel systems
 - m. Special or exotic fuels
 - n. Radar systems
 - o. Pressurized cylinders
 - p. Oxygen supply systems
 - q. Protruding devices
 - r. RAT (Ram Air Turbine)
 - s. Weapons and weapon systems
 - t. Aircraft emergency systems
- 13) A national defense area and limitations within that area
- a. Department of Defense (DOD) designation
 - b. Exclusion area for ARFF
- 14) Characteristics of different aircraft fuels
- a. Civilian
 - b. Military
- 15) Hazardous areas in and around aircraft
- a. Hazard areas in the aircraft
 - i. Cockpit/flight deck
 - ii. Cargo area
 - iii. Galley
 - iv. Avionics area
 - v. Energized electrical area
 - b. Hazardous areas around the aircraft
 - i. Propellers
 - ii. Engines
 - iii. Military armament
 - iv. Collapse zones
 - v. Wheel assembly
 - vi. Aircraft radar
 - vii. RAT (Ram Air Turbine)
 - viii. Ballistic Recovery System
- 16) Aircraft egress/ingress (hatches, doors, and evacuation chutes)

- a. Aircraft egress
 - i. Doors
 - ii. Hatches
 - iii. Slides
 - iv. Door height
 - v. Stairs
 - vi. Emergency exits
 - vii. Emergency rafts
 - viii. Flight deck windows
- b. Aircraft ingress
 - i. Doors
 - ii. Hatches
 - iii. Door height
 - iv. Stairs
 - v. Ladders
 - vi. Emergency exits
 - vii. Air stairs

17) Hazards associated with aircraft cargo, including dangerous goods

- a. Laws and regulations
 - i. Classifications of dangerous goods
 - ii. Shipment of dangerous goods
- b. Product identification
 - i. Identification
 - ii. Verification
 - iii. Information gathering
- c. Personal Protective Equipment (PPE)
 - i. NFPA levels of protection
 - 1. Structural gear
 - 2. Proximity gear (PrPPE)
 - 3. Chemical protective clothing
 - a) Vapor protective
 - b) Liquid splash protective
 - ii. Environmental Protection Agency (EPA) levels of protection
 - 1. Level A
 - 2. Level B
 - 3. Level C
 - 4. Level D
- d. Dangerous goods operations
- e. Agricultural applications

- 18) Hazardous areas, including entry control points, crash scene perimeters, and requirements for operations within the hot, warm, and cold zones
 - a. Hazardous areas
 - b. Entry control points
 - c. Crash scene perimeters
 - d. Operational Zones
 - i. Hot Zone (Restricted Zone)
 - ii. Warm Zone (Limited Access Zone)
 - iii. Cold Zone (Support Zone)
- 19) Critical stress management policies and procedures
 - a. Policies
 - i. Authority Having Jurisdiction (AHJ)
 - b. Procedures
 - i. Coping with stress
 - ii. Critical Incident Stress Debriefing (CISD)

Instructor Note

200-A.4.1.1.3 Airport Fire Fighters should possess knowledge of military aircraft at those airports that accept military aircraft or at those airports that are co-located with a military installation with either separate or shared runways. This knowledge should include the following:

- (1) Military cargo/passenger aircraft**
- (2) Military tanker aircraft**
- (3) Military fighter/attack aircraft**
- (4) Military helicopter aircraft**

Instructor Note (Cont. 200-A.4.1.1.3)

USAF Technical Order 00-105E-9 *Aerospace Emergency Rescue and Mishap Response Information (Emergency Services)*, contains specific information concerning aircraft rescue and firefighting procedures and should be consulted prior to any attempts to perform rescue operations if trained military specialists are not available for immediate assistance. USN/USMC aircraft information is located in NAVAIR 00-80R-14 and 00-80R-14-1. These documents contain specific information concerning fire-fighting and rescue operations for aircraft in the military inventory. They specifically address the following:

(1) Entry. If emergency controls are activated, an explosive charge will explosively separate the canopy from the aircraft.

(2) Ejection systems. All fighter, bomber, and attack aircraft are equipped with ejection seats. Once access has been gained to the cockpit, caution is extremely important, because these ejection seats, when activated, are propelled out of the aircraft by an explosive charge. Airport Fire Fighters should not touch or activate any controls. Note that if a canopy or hatch has been separated from an aircraft, the ejection seat is automatically armed. Extreme caution must be exercised in crew removal.

(3) Extrication. The aircrew member is secured to the seat by a series of straps, harnesses, and restraint belts. These restraints can be released by cutting if the release procedure is unknown.

(4) Ordnance. Fighter and attack aircraft will have forward firing ordnance located in the forward part of the fuselage and wings.

Instructor Note (Cont. 200-A.4.1.1.3)

(5) Engine shutdown. Engine shutdown usually can be accomplished by pulling T-handles, as on a commercial jet.

200-4.1.1.4 General Skills Requirements

Don PPE; operate hatches, doors, and evacuation chutes; approach, position, and initially attack an aircraft fire; select, apply, and manage extinguishing agents; shut down aircraft systems, including engine, electrical, hydraulic, and fuel systems; operate aircraft extinguishing systems, including cargo area extinguishing systems.

200-4.1.2 Occupational Safety and Health

The job performance requirements of this chapter shall be accomplished in accordance with the requirements of the authority having jurisdiction and NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*.

200-4.2 Response

This duty involves the timely arrival at an incident or accident and the capability to perform emergency functions. The duty also includes responding to hazardous conditions and performing standby operations.

200-4.2.1 Respond to day and night incidents or accidents on and adjacent to the airport, given an assignment, operating conditions, a location, a grid map, a vehicle, and a prescribed response time, so that the route selected and taken provides access to the site within the allotted time.

Requisite Knowledge: Airport familiarization, including runway and taxiway designations, frangible gate locations, airport markings, lights, instrument landing system (ILS) critical areas, and critical rescue and fire-fighting access areas, recognize the impact of low-visibility conditions on movement areas and areas of response in and close to the airport; designated isolation areas; vehicular traffic controls on airfield; bridge load limits; controlled access points; aircraft traffic patterns and taxi routes; fuel storage and distribution locations; airport and immediate local area topographic layout, drainage systems, water supplies, airport facilities and security.

Airport familiarization, including:

- 1) Runway and taxiway designations
 - a. Runway identification
 - i. Designation
 1. Compass heading
 2. Numbers and letters
 - ii. Markings
 1. White
 2. Yellow
 - iii. Signage
 - iv. Lighting
 1. White
 2. Amber
 3. Red
 4. Green
 - b. Taxiway identification
 - i. Designation
 1. Phonetic alphabet
 2. Name
 - ii. Markings
 - iii. Signage
 - iv. Lighting
 1. Blue
 2. Green
- 2) Frangible gate locations
 - a. AHJ
 - b. Gate controlled access
 - c. Alternate response route
 - i. Weather
 - ii. Location
 - iii. Terrain
 - iv. Topography
- 3) Airport markings
 - a. Aircraft operations area (AOA)
 - i. Pavement markings
 1. White
 2. Red
 3. Yellow
 - ii. Signs

1. Mandatory instruction
 2. Runway hold position
 3. Location signs
 4. Direction signs
 5. Destination signs
 6. Information signs
 7. Runway distance remaining signs
 - b. Non aircraft operations area
 - i. AHJ
 - ii. Department of Transportation (DOT)
 - iii. Designated diesel vehicle regeneration area
- 4) Lights
- a. Surface lighting
 - i. Blue lights
 - ii. White lights
 - iii. Green lights
 - iv. Red lights
 - v. Amber or yellow lights
- 5) Instrument landing system (ILS) critical areas
- a. Locations per AHJ
 - b. Identification
 - c. Interference
 - d. Alternate response routes
 - e. Hazards
- 6) Critical rescue and fire-fighting access areas (CRFFAA)
- a. Location in relation to grid map (AHJ)
 - b. Size
 - i. Departure and approach area
 - ii. Distance from runway centerline
- 7) Recognize the impact of low-visibility conditions on movement areas and areas of response in and close to the airport
- a. Driver's Enhanced Vision systems (DEVs)
 - i. Night vision
 - ii. Navigation
 - iii. Tracking
- 8) Designated isolation areas (AHJ)

- a. Predetermined area designed for temporary parking for aircraft experiencing hazardous cargo problems
 - b. Know isolation location for your airport (AHJ)
 - i. Hijacking
 - ii. Bomb threat
 - iii. Terrorist attack
 - iv. Weapons of Mass Destruction (WMD)
 - v. Bio-Hazards
 - 1. Cargo
 - 2. Passengers
 - c. Military
- 9) Vehicular traffic controls on airfield
 - a. Navigational Aids (NAVAIDS)
 - b. Construction
 - c. Airport markings
 - i. Hold bars
 - ii. Safety zones
 - d. Airport ramps
 - e. Fences and gates
 - f. All weather roads
- 10) Bridge load limit/overpass clearance (AHJ)
 - a. Road weight limits
 - b. ARFF apparatus weight and height
 - c. Local area bridges in the response area covered by AHJ
 - d. Alternate routes
- 11) Controlled access points
 - a. Solid red marking
 - b. Fences and gates
 - c. Mandatory signs
- 12) Aircraft traffic patterns and taxi routes (AHJ)
 - a. Patterns used by aircraft in the vicinity of the airport
 - b. Emergency declarations for aircraft
 - c. Components of the pattern
 - i. Crosswind leg
 - ii. Downwind leg
 - iii. Base leg
 - iv. Final approach

- d. Designated routes for aircraft to final destinations
- 13) Fuel storage and distribution locations (AHJ)
- a. Airport fuel operations
 - i. Fuel storage
 - ii. Supply methods
 - iii. Fuel distribution systems
 - iv. Aircraft fueling methods
 - b. Airport fuel operation locations
 - c. Emergency fuel operation shut-down
 - d. Preplanning for emergencies
 - e. Fire protection fighting systems
- 14) Airport and immediate local area topographic layout
- a. Airport layout
 - b. Airport markings
 - c. Length and width of runways
 - d. Taxiway identification
 - e. Streets and highway within the emergency response area on airport, and off airport
 - f. Grid map
 - g. Local terrain features
 - h. Response area off airport property
 - i. Bodies of water
 - j. Airport structures
- 15) Drainage systems (AHJ)
- a. Drainage system dynamics
 - b. Drainage system openings
 - c. Fuel/water separator
 - d. Containment for drainage
 - e. Run off locations
 - f. Airport without drainage system
 - i. Pre-planning for the event
 - ii. Confinement
 - iii. Containment
 - iv. Clean up and recovery efforts
- 16) Water supplies (AHJ)
- a. Sources
 - i. Wells

- ii. Tanks
 - iii. Domestic supply
- b. Hydrant locations
- c. Mobile supply types
 - i. Fire apparatus
 - ii. Tankers/tenders
- d. Mutual aid response for water supply
- e. Pre-planning for water supply strategies

17) Airport facilities

- a. Terminals
 - i. Life safety concerns
 - ii. Jetways
 - iii. Baggage handling areas
 - iv. Mass transportation equipment
 - v. Hotels
 - vi. Parking garages
 - vii. Controlled access
- b. Aircraft Maintenance Facilities
 - i. Fuel system repair
 - ii. Painting facilities
 - iii. Hazardous materials storage
 - iv. Aircraft electrical, avionics and radar systems repair locations
 - v. Welding and cutting locations
 - vi. Office locations and high occupancy areas
 - vii. Fire prevention

18) Airport Security and Controlled Access Points

- a. Airfield perimeter fencing/protection
- b. Controlled access points (already stated)
 - i. Manned access points
 - ii. Unmanned access points - Radio Frequency Identification (RFID) or remote control
 - iii. Manually operated gates
 - iv. Frangible gates
- c. Vehicle incursion prevention systems
 - i. Tiger teeth (tire damaging systems)
 - ii. Barriers
- d. Airfield vehicle eligibility markings
 - i. Decals

- ii. Lighting
- e. Airfield personnel eligibility identification
 - i. SIDA (Security Identification Display Area)

Requisite Skills: Read, interpret, and take correct action related to grid maps, water distribution maps, airport markings, and lights.

200-4.2.2 Communicate critical incident information regarding an incident on or adjacent to an airport, given an assignment involving an incident and an incident management system (IMS) protocol, so that the information provided is accurate for the incident commander.

Requisite Knowledge: Incident management system (IMS) protocol, the airport emergency plan, airport and aircraft familiarization, communications equipment and procedures, and incident communications procedures.

- 1) Incident management system (IMS) protocol
 - a. IMS and the functional responsibilities (AHJ)
 - b. Strategic goals
 - c. Tactical objectives
 - d. IMS Organizational Chart (AHJ)
 - e. Chain of command (AHJ)
- 2) The airport emergency plan (AHJ)
 - a. Mutual aid resources
 - b. Fire rescue resources
 - c. Emergency medical resources
 - d. Law enforcement resources
 - e. Other airport personnel
 - f. Critical stress management
 - g. Mitigation
- 3) Airport familiarization (AHJ)
 - a. Airport traffic flow systems
 - i. Aircraft
 - ii. Vehicular
 - b. Location of incident
 - i. Runways
 - ii. Taxiways
 - iii. Grid map
 - c. Access control points

- d. Approach safety areas
 - e. Departure safety areas
 - f. National Defense Area limitations
- 4) Aircraft familiarization
- a. Aircraft types
 - i. Commercial
 - ii. General aviation
 - iii. Military aircraft
 - iv. Unmanned aircraft vehicle (UAV)/Unmanned aircraft systems (UAS)
 - b. Aircraft systems
 - c. Hazards of aircraft
 - d. Aircraft fuels
 - e. Aircraft evacuation
- 5) Communications equipment and procedures
- a. Airport communication systems
 - b. Communication protocols
 - i. Radio communications
 - 1. International Civil Aviation Organization (ICAO)
 - 2. ICAO phonetic alphabet
 - ii. Computers
 - 1. Mobile Data Terminals (MDT)
 - 2. Mobile Computer Terminals (MCT)
 - 3. Global Positioning Systems (GPS)
 - iii. Air Traffic Control Tower (ATCT) Light-gun signals and their meanings
 - 1. Steady green
 - 2. Steady red
 - 3. Flashing red
 - 4. Flashing white
 - 5. Alternating red/green
 - iv. Aircraft Hand signals
 - 1. Recommend evacuation
 - 2. Recommend stop
 - 3. Emergency contained
 - v. Other fire-fighting audible/visible signals
 - 1. Back out or retreat
 - 2. Apparatus is running out of agent
 - 3. Open or close hand line

4. Change hand line nozzle/stream pattern
5. Advance with hand line
6. Back out with hand line

- 6) Incident communications procedures
 - a. Emergency response notification methods (AHJ)
 - i. Categories of emergency alerts (FAA – Federal Aviation Administration)
 - b. Pilot/ARFF (Discrete Emergency Frequency - DEF)
 - c. Agency operations frequencies
 - d. Mutual aid frequencies

Requisite Skills: Operate communications systems, communicate an accurate situation report, implement incident management system (IMS) protocol and airport emergency plan, and recognize aircraft types.

- 200-4.2.3** Communicate with applicable air traffic control facilities, given a response destination on or adjacent to an airport and radio equipment, so that all required clearances are obtained.

Requisite Knowledge: Airfield familiarization, airport operational procedures, avoiding runway/aircraft movement area incursion, communications equipment and frequencies, tower light signals, aviation **terminology**, and phonetic alphabet.

- 1) Airfield familiarization
- 2) Airport operational procedures
- 3) Avoiding runway/aircraft movement area incursion
- 4) Communications equipment and frequencies
 - a. ATCT (Air Traffic Control Tower)
 - i. Ground control
 - ii. Local control or tower frequencies
 - iii. Discrete Emergency Frequency (DEF) (AHJ)
 - b. Aviation radio
 - i. Procedures
 - ii. Terminology
 - c. Fire frequency radio (AHJ)
- 5) ATCT light-gun signals

- a. Used in the event of communication failure with ATCT
- b. Colors
 - i. Steady green
 - ii. Steady red light
 - iii. Flashing red light
 - iv. Flashing white light
 - v. Alternating red and green light

6) Aviation ~~phraseology~~ terminology

7) Phonetic alphabet

Requisite Skills: Operate communications equipment and use aviation **terminology** and phonetic alphabet.

200-4.2.4 Perform an airport operation, given an assignment, a hazardous condition, and the airport policies and procedures, so that unsafe conditions are detected and reduced in accordance with the airport policies and procedures.

Requisite knowledge: Airport and aircraft policies and procedures for hazardous conditions.

- 1) Airport policies and procedures for hazardous conditions
 - a. Airport Certification Manual (ACM)
 - b. Airport Emergency Plan (AEP)
 - c. Notification of the hazardous condition
 - i. Accident
 - ii. Incident
 - iii. Emergency
 - d. Response
 - e. Initiation of IMS
 - f. ARFF safety
 - g. Airport structure emergencies
 - i. Terminals
 - ii. Hangars
 - h. Fuel storage and distribution
 - i. Fuel spills
 - j. Aircraft fueling operations
 - k. Aircraft maintenance areas
 - i. Welding
 - ii. Painting
 - l. Airport Environment
 - i. Construction

- ii. Traffic
 - iii. Drainage
 - iv. Airport Topography
 - v. Review wildlife management plan
 - m. Designated isolation areas
 - i. Bomb threats
 - ii. Terrorists
 - iii. Hazardous materials
 - iv. Hijacking
 - v. Weapons of Mass Destruction (WMD)
 - vi. Bio-Hazards
 - vii. Hot brakes
 - viii. Weapons malfunction
- 2) Aircraft policies and procedures for hazardous conditions
- a. Airport emergency plan (AHJ)
 - b. Standardized response
 - c. Coordination with flight crew
 - d. Aircraft familiarization
 - e. Aircraft emergencies
 - i. Ground emergencies
 - ii. In-flight emergencies

Requisite Skills: Recognize hazardous conditions and initiate corrective action.

Instructor Note

200-A.4.2.4 Hazardous conditions include foreign object debris (FOD), special fuels, fueling operations (grounding and bonding), welding operations, hazardous materials operations, corrosion control, fuel-cell maintenance, and military operations.

200-4.3 **Fire Suppression**

This duty involves the attack, control, and extinguishment of fires involving aircraft, aircraft cargo, airport facilities, and other equipment related to airport operations and property conservation. The primary purpose of this duty is to protect lives and property.

- 200-4.3.1** Extinguish an aircraft fuel spill fire, given approved PPE, an assignment, agent application procedures, a fire-fighting vehicle hand line flowing a minimum of 95 gpm (359 L/min) of approved foam extinguishing agent,

and a fire sized to the flow rate used, so that the agent is applied using the prescribed techniques and the fire is extinguished as required by the AHJ.

Requisite Knowledge: The fire behavior of aircraft fuels in pools, physical properties and characteristics of aircraft fuel, and agent application rates and densities.

- 1) Fire behavior of aircraft fuels in pools
 - a. Flame spread
 - b. Flashback (re-ignition)
 - c. Vapors
 - d. Flammability
- 2) Physical properties of aircraft fuels
 - a. Aviation gasoline (AVGAS)
 - i. Weight
 - ii. Specific gravity
 - iii. Vapor density
 - b. Jet-A (grade of kerosene)
 - i. Weight
 - ii. Specific gravity
 - iii. Vapor density
 - c. Other fuels
 - i. Bio-fuel
 - ii. Blended
 - iii. Military grade
 - iv. Alternative fuels
- 3) Characteristics of aircraft fuels
 - a. Flashpoint
 - b. Auto ignition temperature
 - c. Explosive limits
 - i. Upper
 - ii. Lower
 - d. Flame spread
 - e. Vapor pressure
- 4) Agent application rates and densities
 - a. Agent application - minimum 95 gpm @ at nozzle pressure specified by manufacturer

- b. Agent application and proportioning (in accordance with manufacturer's specifications) approved foam extinguishing agent and a fire sized to the flow rate used

Requisite Skills: Operate fire streams and apply agent.

Instructor Note

200-A.4.3.1 The use of pressurized flammable gas or flammable liquid is acceptable for this simulation Depending on the square footage of the local training simulators and the flow rate of the assigned application device, the specified time of extinguishment might need to be modified. When using simulators with lower square footage or different flow rates of agent application, the specified time of extinguishment will need to be proportional.

For example, a hand line flowing 95 gpm (359 L/min) would be required to extinguish a fire of 750 ft² in 90 seconds. The formula is $95 \text{ gpm} / 0.13 = 730$ fire square footage for 750 ft² (69.7 m²) fire with a flow rate at 359L/min (95 gpm).

- 200-4.3.2** Extinguish an aircraft fuel spill fire, given an assignment, approved PPE, an ARFF vehicle turret flowing the approved minimum required flow, a fire sized to the approved flow rate used, and the procedures for agent application, so that the agent is applied according to procedures and the fire is extinguished as required by the AHJ.

Requisite Knowledge: Operation of ARFF vehicle agent delivery systems, the fire behavior of aircraft fuels in pools, physical properties and characteristics of aircraft fuel, the procedures for agent application, and agent application rates and densities.

- 1) Operation of ARFF vehicle agent delivery systems
 - a. As per manufacturer operating procedures
 - b. Per AHJ
- 2) Fire behavior of aircraft fuels in pools

- a. Flame Spread
 - b. Flashback (re-ignition)
 - c. Vapors
 - d. Flammability
- 3) Physical properties of aircraft fuels
 - a. Aviation gasoline (AVGAS)
 - i. Weight
 - ii. Specific gravity
 - iii. Vapor density
 - b. Jet-A (grade of kerosene)
 - i. Weight
 - ii. Specific gravity
 - iii. Vapor density
 - c. Other fuels
 - i. Bio-fuels
 - ii. Blended
 - iii. Military grade
 - iv. Alternative fuels
- 4) Characteristics of aircraft fuels
 - a. Flashpoint
 - b. Auto ignition temperature
 - c. Explosive limits
 - i. Upper
 - ii. Lower
 - d. Flame spread
 - e. Vapor pressure
- 5) Agent application rates and densities
 - a. Agent application rate - minimum 250 gpm @ at nozzle pressure specified by manufacturer
 - b. Agent application and proportioning (in accordance with manufacturer's specifications) approved foam extinguishing agent and a fire sized to the flow rate used

Requisite Skills: Apply fire-fighting agents and streams using ARFF vehicle turrets.

Instructor Note

200-A.4.3.2 See A.4.3.1. For example, a candidate using a turret flowing 250 gpm (946 L/min) is required to extinguish a fire of 2067 ft² (192 m²) fire with a flow rate at 250 gpm (946 L/min).

200-4.3.3 Extinguish a three-dimensional aircraft fuel fire as a member of a team, given a team, approved PPE, an assignment, fire-fighting vehicle hand line(s) using primary and secondary agents, and agent application procedures, so that a dual-agent attack is used, the agent is applied according to procedures, the fire is extinguished, and the fuel source is secured.

Requisite Knowledge: The fire behavior of aircraft fuels in solid, pressurized, and atomized states; physical properties and characteristics of aircraft fuel; advantages and limitations of agents; agent application rates and densities, agent application procedures; and methods of controlling fuel sources.

- 1) Fire behavior of aircraft fuels in solid, pressurized, and atomized states
 - a. Explosive atmosphere
 - b. Higher proliferation of vapors
- 2) Physical properties of aircraft fuels
 - a. Aviation gasoline (AVGAS)
 - i. Weight
 - ii. Specific gravity
 - iii. Vapor density
 - b. Jet fuel
 - i. Weight
 - ii. Specific gravity
 - iii. Vapor density
 - c. Other fuels
 - i. Bio-Fuels
 - ii. Blended
 - iii. Military grade
 - iv. Alternative fuels

- 3) Characteristics of aircraft fuels
 - a. Flashpoint
 - b. Auto ignition temperature
 - c. Explosive limits
 - i. Upper
 - ii. Lower
 - d. Flame spread
 - e. Vapor pressure
- 4) Advantages of agents
- 5) Limitations of agents
- 6) Agent application rates and densities
 - a. Agent application rate
 - i. Minimum 95 gpm @ at nozzle pressure specified by manufacturer
 - ii. Minimum 5 lbs/second dry chemical
 - b. Agent application densities
 - i. Agent application and proportioning (in accordance with manufacturer's specifications) approved foam extinguishing agent and a fire sized to the flow rate used
 - ii. Amount of dry chemical proportionate to hazard
- 7) Agent application procedures
 - a. Rapid knock down
 - b. Vapor suppression
- 8) Methods of controlling fuel sources
 - a. Shut off source
 - b. Control ignition source
 - c. Suppress vapors
 - d. Prevent run-off

Requisite Skills: Operate fire streams and apply agents; and secure fuel sources.

Instructor Note

200-A.4.3.3 Three-dimensional or running fuel fires involve a fuel leak from an elevated or pressurized source. The fuel burns as it falls through the air, and, once on the ground, the burning fuel can pool or run across the ground surface. These fuel fires are extremely difficult to extinguish. They must be recognized and action must be taken to extinguish them early in the incident or accident for successful fire-fighting operations. Typically, these fires cannot be extinguished by smothering agents such as AFFF, because those agents cannot seal the surface and exclude oxygen. Such fires are more successfully extinguished by shutting off the fuel flow or by using agents, such as dry chemicals, that interfere with the chemical chain reaction.

- 200-4.3.4** Attack a fire on the interior of an aircraft while operating as a member of a team, given a team, approved PPE, an assignment, a fire-fighting vehicle hand line, an extinguishing agent, and a ladder or other means of accessing the aircraft, so that team integrity is maintained, the attack line is deployed for advancement, ladders or other means are used, access is gained into the fire area, effective agent application practices are used, the fire is approached, attack techniques facilitate suppression given the level of the fire, hidden fires are located and controlled, hazards are avoided or managed, and the fire is brought under control.

Requisite Knowledge: Techniques for accessing the aircraft interior according to the aircraft type, methods for advancing hand lines from an fire-fighting vehicle, precautions to be followed when advancing hose lines to a fire, observable results that a fire stream has been applied, dangerous structural conditions created by fire, principles of exposure protection, potential long-term consequences of exposure to products of combustion, physical states of matter in which fuels are found, common types of accidents or injuries and their causes, the role of the backup team in fire attack situations, attack and control techniques, and techniques for exposing hidden fires.

- 1) Techniques for accessing the aircraft interior according to aircraft type
 - a. Assessing the exterior prior to entry
 - i. Blistering or peeling of paint
 - ii. Visible signs of heavy interior fire

- iii. Exterior is very hot to the touch
 - iv. Engine fires
 - v. Wheel assembly fires
 - vi. HVAC system fires
 - b. Access points
 - i. Doors
 - 1. Cabin
 - 2. Cargo
 - ii. Emergency exits
 - iii. Rear stairs
 - iv. Hatches
 - v. Windows
 - vi. Fuselage breach
 - c. Access equipment
 - i. Ladders
 - 1. Ground ladders
 - 2. Specialty ladders
 - ii. Elevated platforms
 - iii. Mobile air stairs
 - iv. Forcible entry tools
- 2) Methods for advancing hand lines from the fire-fighting vehicle
- a. Proper PPE and SCBA
 - b. Deployment of hand line(s)
 - c. Advancement of hand line(s)
 - d. Two-person team
 - e. Two in/two out rule
 - f. Awareness of hazards
- 3) Precautions to be followed when advancing hose lines to a fire
- a. Do not impede passenger evacuation
 - b. Deploy hand line(s) in a safe area
 - c. Watch for sharp objects
 - d. Avoid flammable liquids
 - e. Be aware of hazards present
 - f. Potential backdraft, flashover, rollover, and smoke explosion occurrences
- 4) Observable results that fire stream has been applied
- a. Steam from hose line application on a hot object (steam conversion)
 - b. Cooling
 - c. Fire knock down
 - d. Displacement of products of combustion

- e. Smoke transformation
- 5) Dangerous structural conditions created by fire
 - a. Missing structural components
 - b. Fire/flare spread to concealed areas
 - c. Instability
 - d. Molten metals
 - e. Collapses
 - f. Weakened structural components
- 6) Principles of exposure protection
 - a. Hand line(s) should be in place to protect unburned portions
 - b. Protection of exposed or surrounding objects
 - c. Adequate water supply
 - d. Proper coverage to ensure cooling effect
 - e. Wind direction
- 7) Potential long-term consequences of exposure to products of combustion
 - a. Carcinogenic effects
 - b. Respiratory damage
 - c. Dermatological
 - d. Product specific effects
 - i. Composites
 - ii. Fuels
 - iii. Aircraft fluids
- 8) Physical states of matter in which fuels are found
 - a. Solid
 - b. Liquid
 - c. Vapor
- 9) Common types of accidents or injuries and their causes
 - a. Types
 - i. Physical
 - ii. Psychological
 - b. Causes
 - i. Inadequate training
 - ii. Lack of critical incident stress management
 - iii. Failure to comply with safety standards
 - iv. Dangerous conditions
- 10) The role of the backup team in fire attack situations
 - a. Two in/two out rule

- i. Rescue of primary entry team (Rapid Intervention Team/RIT)
 - ii. Exterior support operations
 - b. Observing and communicating conditions
- 11) Attack and control techniques
 - a. Point of entry
 - b. Never impede egress of passengers
 - c. Observe hottest area of fire
 - d. Direct fire attack
 - e. Indirect fire attack
 - f. Cool exterior if entry is delayed
 - g. Piercing appliances
- 12) Techniques for exposing hidden fires
 - a. Ventilation
 - b. Overhaul
 - c. Thermal imagers
 - d. Interior inspection
 - i. Light ballasts
 - ii. Galley area
 - iii. Lavatories
 - iv. Flight deck area
 - v. Avionics
 - vi. Cargo compartments
 - vii. Electrical components

Requisite Skills: Deploy fire-fighting vehicle hand line on an interior aircraft fire; gain access to aircraft interior; open, close, and adjust nozzle flow and patterns; apply agent using direct, indirect and combination attacks; advance charged and uncharged hose lines up ladders and up and down interior and exterior stairways; and locate and suppress interior fires.

Instructor Note

200-A.4.3.4 This requirement can be met by using a structural burn facility that is configured to simulate the interior layout and dimensions of an aircraft fuselage and that contains mannequins to simulate victims. The mock-up should include at least three metal seats and training dummies to simulate victims. It is intended that the size of the aircraft be the largest type that normally uses the airport and that the hand line be appropriate to the size of the aircraft.

200-4.3.5 Attack an engine or auxiliary power unit/emergency power unit (APU/EPU) fire on an aircraft while operating as a member of a team, given approved PPE, an assignment, fire-fighting vehicle hand line or turret, a correct agent, and agent application procedures, so that agent application procedures are followed, the fire is extinguished, and the engine or APU/EPU is shut down.

Requisite Knowledge: Techniques for accessing the aircraft engines and APU/EPUs, operation of on-board aircraft fire-fighting systems and potential hazards, safety procedures, methods for advancing hand line from a fire-fighting vehicle, methods for operating turrets, and methods for shutting down engine and APU/EPU operation.

- 1) Techniques for accessing the aircraft engines and APU/EPUs
 - a. Assessing the exterior prior to entry
 - a. Blistering or peeling of paint
 - b. Visible signs of compartment fire
 - c. Engine fires
 - b. Gaining access
 - a. Hatches
 - b. Cowlings
 - c. Fire ports
 - c. Access equipment
 - a. Ladders
 - i. Ground ladders
 - ii. Specialty ladders
 - b. Elevated platforms
 - c. Mobile air stairs
 - d. Forcible entry tools

- 2) Safety procedures
 - a. Avoid intake
 - b. Avoid exhaust
 - c. Avoid propellers
 - d. Engine/APU shut down
- 3) Methods for advancing hand line from a fire-fighting vehicle
 - a. Proper PPE and SCBA
 - b. Deployment of hand line(s)
 - i. Reel lines
 - ii. Preconnected hose lines
 - c. Advancement of hand line(s)
 - d. Two-person team
 - e. Two in/two out rule
 - f. Awareness of hazards
- 4) Methods for operating turrets
 - a. Per manufacturer specification
 - b. As per AHJ
- 5) Methods for shutting down engine and APU/EPU operation
 - a. Engine
 - i. By flight crew
 1. Fuel (throttles)
 2. On board extinguishing systems (bottles)
 3. Electrical (batteries)
 - ii. By ARFF crew
 1. Fuel (throttles)
 2. On board extinguishing systems (bottles)
 3. Electrical (batteries)
 - b. Auxiliary power unit (APU/EPU)
 - i. By flight crew
 1. Fuel (throttles)
 2. On board extinguishing systems (bottles)
 3. Electrical (batteries)
 - ii. By ARFF crew
 1. Flight deck
 - a) Fuel (throttles)
 - b) On board extinguishing systems (bottles)
 - c) Electrical (batteries)
 2. External controls

- a) Engine shut down
- b) Extinguishing systems

Requisite Skills: Deploy and operate fire-fighting vehicle hand line, operate turrets, gain access to aircraft engine and APU/EPU, and shut down engine and APU.

Instructor Note

200-A.4.3.5 Shutting down the aircraft includes turning off engines/power units, electrical, and oxygen systems. Training and evaluation of the engine/APU shut down and activation of onboard aircraft fire-fighting systems can be accomplished using simulation on actual aircraft or mock-ups.

200-4.3.6 Attack a wheel assembly fire, as a member of a team, given PPE, a team, an assignment, an ARFF vehicle hand line, and correct agent, so that the fire is extinguished.

Requisite Knowledge: Agent selection and application procedure, special safety considerations, and the characteristics of combustible metals.

- 1) Agent selection and application procedure
 - a. Agent selection
 - i. Water
 - ii. Class D extinguishing agents
 - iii. Dry chemical
 - b. Application procedure
 - i. Mass application of water
 - ii. Adequate amount of class D agent for encapsulation
 - iii. Adequate amount of dry chemical for extinguishment
 - iv. Conservation of agent
- 2) Special safety considerations
 - a. Fusible plugs
 - b. Proper approach
 - c. Tire disintegration
 - d. Wheel fragmentation
 - e. Aircraft collapse

- f. Appropriate utilization of PPE with SCBA
 - g. Hazardous or flammable fluid release
 - h. Engine intake
 - i. Engine exhaust
- 3) The characteristics of combustible metals
- a. High ignition point
 - b. Intense pyrolysis
 - c. Extreme heat
 - d. Reactivity

Requisite Skills: Approach the fire in accordance with safety procedures; and select and apply agent.

200-4.3.7 Ventilate an aircraft through available doors and hatches while operating as a member of a team, given PPE an assignment, tools, and mechanical ventilation devices, so that openings are created, all ventilation barriers are removed, and the heat and other products of combustion are released.

Requisite Knowledge: Aircraft access points; principles, advantages, limitations, and effects of mechanical ventilation; the methods of heat transfer; the principles of thermal layering within an aircraft on fire; and the techniques and safety precautions for venting aircraft.

- 1) Aircraft access points
 - a. Normal door operations
 - b. Over wing access
 - c. Cargo doors
 - d. Hatches
 - e. Breaks in structure of aircraft
- 2) Principles, advantages, limitations, and effects of mechanical ventilation
 - a. Negative pressure ventilation
 - i. Hydraulic
 - ii. Gas powered fans
 - iii. Electrical powered fans
 - b. Positive pressure ventilation
 - i. Gas powered fans
 - ii. Electrical powered fans
- 3) The methods of heat transfer

- a. Conduction
 - b. Convection
 - c. Radiation
 - d. Direct flame impingement
- 4) The principles of thermal layering within an aircraft on fire
 - a. Smoke stratification
 - b. Heat travel
 - i. Vertical
 - ii. Horizontal
- 5) The techniques and safety precautions for venting aircraft
 - a. Techniques for venting aircraft
 - i. Mechanical
 - 1. Positive pressure
 - 2. Negative pressure
 - ii. Natural
 - 1. Horizontal
 - 2. Vertical
 - b. Safety considerations for venting aircraft
 - i. Flashover
 - ii. Rollover
 - iii. Backdraft
 - iv. Smoke explosion

Requisite Skills: Operate doors, hatches, and forcible entry tools; operate mechanical ventilation devices; and remove barriers.

Instructor Note

200-A.4.3.7 Training and evaluation of this task can be accomplished using actual aircraft or mock-ups and smoke-generation devices used for training.

- 200-4.3.8** Replenish extinguishing agents while operating as a member of a team, given an assignment, a fire-fighting vehicle, a fixed or mobile water source, a supply of agent, and supply lines and fittings, so that agents are available for application by the fire-fighting vehicle within the time established by the authority having jurisdiction (AHJ).

Requisite Knowledge: Re-supply procedures during an incident and operation procedures for fire-fighting vehicle replenishment.

- 1) Re-supply procedures during an incident
 - a. Water sources
 - i. Airport water distribution system
 - ii. Mobile water supply
 - iii. Additional water supplies
 - b. Water refill methods
 - i. Direct connection
 - ii. Overhead fill
 - c. Foam re-supply
 - i. Overhead gravity
 - ii. Mechanical or hand foam concentrate transfer pump
 - iii. 5-gallon container direct fill
 - d. Auxiliary agent refill
 - i. Knowledge of agent type
 - ii. Follow manufacturers procedures
 - iii. Service in a well ventilated area and utilize respiratory protection
- 2) Operation procedures for fire-fighting vehicle replenishment
 - a. Per manufacturer specifications
 - b. Procedures per AHJ

Requisite Skills: Connect hose lines and operate valves.

Instructor Note

200-A.4.3.8 The replenishment task is time critical. Evaluating the proficiency potential of ARFF personnel to replenish the extinguishing agents on an ARFF vehicle requires that the AHJ evaluate several factors related to its own airport emergency plan in order to establish a fair benchmark for personnel. The following factors influence this time constraint:

- (1) Size of the ARFF vehicles' agent reservoirs**
- (2) Available replenishment methods and their agent flow capacities**
- (3) Proximity of replenishment means to the potential ARFF emergency locations in and around the airport**

In making these evaluations, the AHJ must keep in mind that its overall objective is to ensure an adequate agent flow at the scene during an emergency. The following is an example of determining the replenishment time variable:

If the ARFF vehicle on the airport runway holds 1500 gal (5677L) of water and 150 gal (568 L) of AFFF, the replenishment means is a fixed water hydrant located at the midpoint of the runways. If the hydrant flow capacity is 250 gal (946 L/min) and if the average time to drive from the approach and departure end of any runway to the midpoint is 2 minutes, then a reasonable time to replenish a vehicle and return it to operation from the end of the runway is 18 minutes. This allows 2 minutes to drive to the hydrant, 4 minutes to connect to the hydrant, 7 minutes to fill the water tank, 3 minutes to disconnect from the hydrant, and 2 minutes to drive back to the end of the runway.

Instructor Note (Cont. 200-A.4.3.8)

This might be considered a reasonable amount of time to replenish the vehicle at this particular airport, if additional vehicles are available continue support at the emergency scene, but it might be entirely too slow for an airport where this ARFF vehicle is the only vehicle available to support an aircraft scene. In this case, the replenishment plan should be re-evaluated and adjusted to reduce the time required.

200-4.3.9 Preserve the aircraft accident scene, given an assignment and procedures, so that evidence is identified, protected, and reported according to procedures.

Requisite Knowledge: Airport emergency plan requirements for preservation of the scene, evidence identification, evidence protection, and evidence reporting procedures.

- 1) Airport emergency plan requirements for preservation of the scene
 - a. Scene security
 - b. Photographs
 - c. Sketches or drawings
 - d. Marking evidence locations
- 2) Evidence identification
 - a. During the primary search of an aircraft accident site
 - i. Life safety is the priority during this phase of the incident
 - ii. Evidence protection is secondary
 - b. During the secondary search of an aircraft accident site
 - i. Protection of evidence should have priority
 - ii. Since all the survivors should be rescued, slow down the search and protect evidence
- 3) Evidence protection
 - a. National Transportation Safety Board (NTSB) regulations
 - i. Removal of persons trapped or injured
 - ii. Protect the aircraft from further damage
 - iii. Protect the public from injury
 - b. Secure the scene

- c. Document the moving of evidence
 - d. Secure and protect the flight data recorder (FDR) or cockpit voice recorder (CVR)
 - e. Special care should be taken in certain areas
 - i. In the cockpit or control areas
 - ii. Areas of primary structural failure or damage
- 4) Evidence reporting procedures
- a. Documentation
 - i. Responder statements
 - ii. Witness statements
 - iii. Incident reporting
 - iv. Photographs
 - v. Maps
 - b. Discuss the relationships between various aircraft parts and occupants

Requisite Skills: Preserve the scene for investigators, and identify, protect, and report evidence.

200-4.3.10 Overhaul the accident scene, given PPE, an assignment, hand lines, and property conservation equipment, so that all fires are located, exposed, and extinguished and all property is protected from further damage.

Requisite Knowledge: Methods of complete extinguishment and prevention of re-ignition, reasons for conservation, operating procedures for property conservation equipment, overhaul procedures, signs of a hidden fire, methods of detecting hidden fires, and tools and equipment used for overhaul.

- 1) Methods of complete extinguishment and prevention of re-ignition
 - a. Thermal imaging cameras/Forward Looking Infra-Red (TIC/FLIR)
 - b. Overhaul
 - c. Secure aircraft operating systems
 - d. Vapor suppression
- 2) Reasons for conservation
 - a. Scene stabilization
 - b. Evidence protection
 - c. NTSB investigation

- 3) Operating procedures for property conservation equipment
 - a. Deployment of loss control systems
 - b. As per manufacturer's specifications
- 4) Overhaul procedures
 - a. Appropriate agency authorization
 - b. Use of PPE including SCBA
 - c. Aircraft stabilization
 - d. Air quality monitoring
 - e. Hazardous materials considerations
 - f. Hand line protection
 - g. Evidence protection
 - h. Hot spots located
 - i. Extinguishment and cooling
 - j. Pressurized systems identified
 - k. Void spaces opened or pierced
- 5) Signs of a hidden fire
 - a. Smoke
 - b. Steam
 - c. Thermal imaging cameras/Forward Looking Infra-Red (TIC/FLIR)
- 6) Methods of detecting hidden fires
 - a. Smoke
 - b. Steam
 - c. Thermal imaging cameras/Forward Looking Infra-Red (TIC/FLIR)
- 7) Tools and equipment used for overhaul
 - a. PPE/SCBA
 - b. Hand line
 - c. Thermal imaging cameras/Forward Looking Infra-Red (TIC/FLIR)
 - d. Forcible entry tools
 - e. Air monitors

Requisite Skills: Use property conservation equipment; detect hidden fires, and use tools and equipment to expose hidden fires.

Instructor Note

200-A.4.3.10 It is known that during overhaul, Fire Fighters remove their respiratory protective equipment and as a result, expose themselves to probable contamination by carcinogens, toxic substances, and so forth. Respiratory protective equipment should be worn during overhaul and all PPE should be washed down after exposure in any incident involving fire.

200-4.4

Rescue

This duty involves gaining access to an aircraft and assisting in the evacuation process, performing disentanglement, and initial triage.

Instructor Note

200-A.4.4 One of the primary tasks of rescue operations is for the airport fire fighter to maintain a habitable environment around the fuselage and to assist with aircraft evacuation by stabilizing slide chutes and assisting and controlling the evacuees.

200-4.4.1

Gain access into and out of an aircraft through normal entry points and emergency hatches, secure and shut down the aircraft, and assist in the evacuation process while operating as a member of a team, given PPE and an assignment, so that passenger evacuation and rescue can be accomplished.

Requisite Knowledge: Aircraft familiarization, including materials used in construction, aircraft terminology, automatic explosive devices, hazardous areas in and around aircraft, aircraft egress/ingress (hatches, doors, and evacuation chutes), military aircraft systems and associated hazards; capabilities and limitations of manual and power rescue tools and specialized high-reach devices, aircraft shutdown and safety procedures.

- 1) Aircraft familiarization
 - a. General aviation
 - b. Commercial
 - c. Military

- 2) Materials used in construction
 - a. Aluminum/aluminum alloys
 - b. Steel
 - c. Magnesium/magnesium alloys
 - d. Titanium
 - e. Advanced aerospace (composite) materials
 - f. Wood
- 3) Aircraft terminology
 - a. Fixed wing
 - b. Rotary wing
- 4) Automatic explosive devices
 - a. Ejection seats
 - b. Canopy removers
 - c. Initiators
 - d. Rotary actuators
 - e. Thrusters
 - f. Explosive squibs
 - g. Seat catapults
 - h. Ballistic recovery system (BRS)
- 5) Hazardous areas in and around aircraft
 - a. Wings
 - i. Fuel leaks and spills
 - ii. Weapons/missiles/rockets
 - iii. Pinching hazards
 - iv. No step areas – flight control surfaces
 - v. Anti-icing systems
 - b. Engines
 - i. Fuel leaks and spills
 - ii. Propellers
 - iii. Jet engines
 1. intake
 2. exhaust
 - c. Fuselage
 - i. Radar systems
 - ii. Appendages
 - iii. Overheated wheel assemblies
 - iv. Tire/wheel failures
 - v. Evacuation slides

- d. Tail
 - i. Engine or APU fires
 - ii. Tail cones
 - iii. Evacuation slides
 - e. General hazards
 - i. Electrocution hazards
 - ii. Composites
 - iii. Aircraft hazardous materials
 - iv. Aircraft cargo hazards
- 6) Aircraft egress/ingress (hatches, doors, and evacuation chutes)
- a. Aircraft doors
 - b. Aircraft hatches
 - c. Rear stairs
 - d. Tail-cone jettison
 - e. Escape slides
 - f. Emergency exits
 - g. Hatches
 - h. Windows
 - i. Fuselage breach
- 7) Military aircraft systems and associated hazards
- a. Fire protection/detection systems
 - b. Ejection systems
 - c. Weapon systems
 - d. Exotic fuels
- 8) Capabilities and limitations of manual and power rescue tools and specialized high-reach devices
- a. Flammable atmosphere
 - b. Stability of aircraft
 - c. Hands-on training
 - d. Safety standards apply
 - e. Hand tools
 - f. Power tools
 - i. Electric
 - ii. Hydraulic
 - iii. Pneumatic
 - g. Lifting and pulling tools
- 9) Aircraft shutdown and safety procedures

- a. Fuel cutoff/throttle
- b. Fire shutoff “T” or “L” handles
- c. Battery switch/disconnect

Requisite Skills: Operate power saws and cutting tools, hydraulic devices, pneumatic devices, and pulling devices; operate specialized ladders and high-reach devices; secure aircraft safety and shutdown.

Instructor Note

200-A.4.4.1 Securing the aircraft can include chocking/pinning the landing gear, safety ejection/ballistic chute systems, canopies, and safety weapon systems. Shutting down the aircraft includes turning off engines/power units, electrical, and oxygen systems. Training and evaluation of these tasks can be accomplished using simulation on actual aircraft or mockups.

- 200-4.4.2** Locate and disentangle an entrapped person from an aircraft as a member of a team, given approved PPE, a team, an assignment, and rescue tools, so that the person is freed from entrapment without undue further injury and hazards are managed.

Requisite Knowledge: Capabilities and limitations of rescue tools, search procedures, hazard identification, and control methods.

- 1) Capabilities and limitations of rescue tools
 - a. Flammable atmosphere
 - b. Stability of aircraft
 - c. Hands-on training
 - d. Safety standards apply
 - e. Hand tools
 - f. Power tools
 - i. Electric
 - ii. Hydraulic
 - iii. Pneumatic
 - g. Lifting and pulling tools
- 2) Search procedures

- a. Exterior search
 - b. Interior search
 - c. Two in/two out rule
 - d. Rescue of survivors
 - e. Primary search
 - f. Secondary search
 - g. Preservation of evidence
- 3) Hazard identification
- a. Aircraft hazardous/flammable materials
 - b. Aircraft dangerous goods
 - c. Post-crash aircraft hazards
 - i. Fire
 - ii. Electrical
 - iii. Disrupted aircraft systems
 - iv. Biohazard
 - v. Debris
 - vi. Hazardous materials
 - vii. Military aircraft hazards
- 4) Control methods
- a. Safety
 - b. Isolation
 - c. Insulation
 - d. Extinguishment

Requisite Skills: Perform search procedures, control hazards, remove victims, and operate rescue tools.

Instructor Note

200-A.4.4.2 Training and evaluation of this task can be accomplished using actual aircraft or mock-ups.

- 200-4.4.3** Implement initial triage of the victims of an aircraft accident, given PPE, an assignment, and the triage protocol of the AHJ, so that each victim is evaluated and correctly categorized according to protocol.

Requisite Knowledge: Categories of triage according to the triage protocol of the AHJ, and methods of assessment.

- 1) Categories of triage according to the triage protocol of the AHJ
- 2) Methods of assessment
 - a. START – simple triage and rapid treatment
 - b. As per AHJ

Requisite Skills: Triage patients per protocol.

REFERENCE LIST FOR THE BASIC AIRCRAFT RESCUE FIRE SUPPRESSION CURRICULUM

This Reference List is provided as a general guide for both instructors and students to locate information pertaining to the specific objectives in the TCFP Curriculum. This list is not all inclusive and does not in any way limit TCFP development and use of questions to test the objectives of the curriculum:

Required References

~~AC 150/5200-12C, Fire Department Responsibility in Protecting Evidence at the Scene of an Aircraft Accident. September 28, 2009: www.airweb.faa.gov~~

~~AC 150/5200-31C, Federal Aviation Administration Airport Emergency Plan. June 30, 2011: www.airweb.faa.gov~~

~~AC 150/5210-6D, Aircraft Fire Extinguishing Agents. July 8, 2004: www.airweb.faa.gov~~

~~AC 150/5210-14 B, Aircraft Rescue Fire Fighting Equipment, Tools and Clothing. September 30, 2008: www.airweb.faa.gov~~

~~AC 150/5210-17C, Programs for Training of Aircraft Rescue and Firefighting Personnel. June 12, 2015: www.airweb.faa.gov~~

Aircraft Rescue and Fire Fighting. (6th edition) (2015). Stillwater, OK: Fire Protection Publications. International Fire Service Training Association (IFSTA)

Code of Federal Regulations, 14 CFR, Part 139, Subpart A, Certification of Airports: General. (Amended January 16, 2013). U.S. Department of Transportation, Federal Aviation Administration <http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr;sid=18b73eada8afcb53ac77dc25df9390cb;rgn=div5;view=text;node=14%3A3.0.1.1.14;idno=14;cc=ecfr>

Code of Federal Regulations, 14 CFR, Part 139, Subpart D, Certification of Airports: Operations. (Amended January 16, 2013). U.S. Department of Transportation, Federal Aviation Administration <http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr;sid=18b73eada8afcb53ac77dc25df9390cb;rgn=div5;view=text;node=14%3A3.0.1.1.14;idno=14;cc=ecfr>

Code of Federal Regulations, 14 CFR, Part 139.311 Marking, signs and lighting. (Amended January 16, 2013). U.S. Department of Transportation, Federal Aviation Administration <http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr;sid=18b73eada8afcb53ac77dc25df9390cb;rgn=div5;view=text;node=14%3A3.0.1.1.14;idno=14;cc=ecfr>

Code of Federal Regulations, 14 CFR, Part 139.325 Airport emergency plan. (Amended January 16, 2013). U.S. Department of Transportation, Federal Aviation Administration <http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr;sid=18b73eada8afcb53ac77dc25df9390cb;rgn=div5;view=text;node=14%3A3.0.1.1.14;idno=14;cc=ecfr>

Code of Federal Regulations, 14 CFR, Part 139.329, Pedestrians and ground vehicles. (Amended January 16, 2013). U.S. Department of Transportation, Federal Aviation Administration <http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr;sid=18b73eada8afcb53ac77dc25df9390cb;rgn=div5;view=text;node=14%3A3.0.1.1.14;idno=14;cc=ecfr>

Code of Federal Regulations, 49 CFR, Part 175.310 Transportation of flammable liquid fuel; aircraft only means of transportation. (October 1, 2011 edition). U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration <https://www.gpo.gov/fdsys/granule/CFR-2011-title49-vol2/CFR-2011-title49-vol2-sec175-310>

Code of Federal Regulations, 49 CFR, Part 830.10 Preservation of aircraft wreckage, mail, cargo, and records. (October 1, 2006 August 24, 2010 edition). U.S. Department of Transportation, National Transportation Safety Board <https://www.gpo.gov/fdsys/granule/CFR-2006-title49-vol7/CFR-2006-title49-vol7-sec830-10>

Certification Curriculum Manual. Texas Commission on Fire Protection. (Most current edition). Austin, TX: Texas Commission on Fire Protection.

Essentials of Fire Fighting and Fire Department Operations. (76th edition) (20183). Stillwater, OK: Fire Protection Publications. International Fire Service Training Association (IFSTA)

National Transportation Safety Board Accident Reports, <http://www.nts.gov>.

NFPA 402: Aircraft Rescue and Fire-Fighting Operations. (2013 edition). NFPA Publications Quincy, MA. National Fire Protection Association

NFPA 1003: Standard for Airport Fire Fighter Professional Qualifications. (20195 edition). NFPA Publications Quincy, MA: NFPA Publications. National Fire Protection Association

NFPA 1403: Standard on Live Fire Training Evolutions. (20182 edition). NFPA Publications Quincy, MA. National Fire Protection Association

NFPA 1500: Standard on Fire Department Occupational Safety and Health Program. (202143 edition). NFPA Publications Quincy, MA: NFPA Publications. National Fire Protection Association

Recommended References

The most current edition of the following publications is recommended (not required) supplemental material for program use.

~~150/5230-4B—Aircraft Fuel Storage, Handling, Training, and Dispensing on Airports.~~ Sept. 28, 2012.

http://www.faa.gov/documentLibrary/media/Advisory_Circular/150_5230_4b.pdf

~~ARFF Vehicle and High Reach Extendable Turret AC 150/5210-23.~~ Sept 30, 2010

http://www.faa.gov/documentLibrary/media/Advisory_Circular/150_5210_23.pdf

~~Ballistic recovery systems (BRS) FAA 13-04 cert alert “Additional Precautions for Approaching Aircraft with Ballistic Parachutes, Ejection Seats, and Airbags.”~~ July 29, 2013. https://www.faa.gov/airports/airport_safety/certalerts/media/cert1304.pdf

~~Commercial Aviation Alternative Fuels Initiative.~~ Information on biodiesel/alternative fuels: <http://www.caafi.org/>

~~Department of Defense Nuclear Accident National Defense Area guidance~~

~~—~~ <http://www.au.af.mil/au/awc/awcgate/dod/d523016p.pdf>

~~Diesel particulate filter (DPF) regeneration~~

https://www.iafc.org/files/1EVM/FAMA_EmerVehEmissionsSysGuide.pdf

~~FAA Advisory Circular AC120-60B (anti-icing, de-icing isolation).~~ December 20, 2004.

https://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.information/documentID/23199

~~International Association for Disaster Preparedness and Response (DERA) guide for responding to a military aircraft crash~~

<http://www.disasters.org/dera/library/ACCIDENT.PDF>

~~National Defense Area (Department of Defense)~~

~~—Official definition:~~ http://www.dtic.mil/doctrine/new_pubs/jp1_02.pdf

National Transportation Safety Board Accident Reports, <http://www.nts.gov>.

Pumping and Aerial Apparatus Driver/Operator Handbook. (3rd edition) (20154). Stillwater, OK: Fire Protection Publications. International Fire Service Training Association.

~~Sustainable Alternative Jet Fuels~~

~~https://www.faa.gov/about/office_org/headquarters_offices/apl/research/alternative_fuels/~~

Unmanned aircraft/drones UAV/UAS

~~<https://www.faa.gov/uas/>~~

USAF TO 00-105E-9 Aerospace Emergency Rescue and Mishap Response Information (Emergency Services). Current Edition April 2015 Revision Number 16.

~~<http://legacy.dodffcert.com/00-105e-9/>~~

[For additional information on solid fuels]

~~*Fire Investigator: Principles and Practices*. (4th edition) (2016). Burlington, MA: Jones and Bartlett Learning. pp. 371-372. See also: *Essentials of Fire Fighting and Fire Department Operations*. (6th edition) (2013). Stillwater, OK: Fire Protection Publications. International Fire Service Training Association (IFSTA) pp. 228-230.~~

EQUIPMENT LIST

Personal Protective Equipment

- A complete NFPA 1971-compliant firefighter protective ensemble per student
- Self-contained breathing apparatus (SCBA)

Communications Equipment

- Two-way radio
- Light Gun (ATC)

SOP/MOP/SOG/PP:

- Airport/FD/Organizational Incident-Specific Response SOPs
- Incident Management Protocol
- Airport Emergency Plan (actual or training version)
- Airport Grid Map
- Aircraft schematics/diagrams
- AHJ Triage Protocol
- Fire attack procedures
- SDS for each extinguishing agent

Access to ATC (or a simulated ATC)

- Radio communication
- Light-gun signals

Training Devices/Props/Simulators

- Aircraft firefighting simulator (interior and exterior)
- Aircraft fuel spill tank/containment area (burn pan or equivalent)
- APU/EPU prop or equivalent
- Wheel assembly fire prop or equivalent

Vehicles

- ARFF vehicles for assigned aircraft
- ARFF vehicle with 250 gpm minimum turret
- Support vehicles per AHJ

Training Extinguishing Agents

- Approved Extinguishing agents as required by aircraft
- Charged and staffed handline

Tools and Equipment

- Electric hand lanterns and portable lighting

- Tube cutter (used to disarm ejection seats – per AHJ)
- Insulated cutter rated with an insulation resistance of 20,000 volts
- Mechanical ventilation device
- Pry axe
- Rotary powered saw
- Harness cutters
- Powered rescue tools (battery-powered, pneumatic, and/or hydraulic)
- Portable fire extinguishers (as needed)
- ~~Powered saws~~
- Cutting tools
- ~~Hydraulic rescue tools~~
- Pulling device
- ~~Pneumatic cutter~~
- Mechanical ventilation device
- Ladders
- Rescue mannequin
- Simulated victims
- Triage tags
- Thermal Imager
- Property conservation equipment
- ~~Ladders~~
- Simulated debris field
- Heat source
- High reach device (airstairs)

b. Basic Fire Inspector Curriculum

CERTIFICATION CURRICULUM MANUAL

CHAPTER FOUR

FIRE INSPECTOR

NFPA 1031, 2014 Edition

Effective June 1, 2016



Texas Commission on Fire Protection
P.O. Box 2286 Austin, Texas 78768-2286 (512) 936-3838

CHAPTER 4 BASIC FIRE INSPECTOR CURRICULUM OUTLINE

(The Fire Inspector I and II curricula are to be completed for the Fire Inspector certification)

FIRE INSPECTOR I		
SECTION	SUBJECT	RECOMMENDED HOURS
401-4.1	General	1
401-4.2	Administration	8
401-4.3	Field Inspection	81
401-4.4	Plans Review	0
FIRE INSPECTOR II		
SECTION	SUBJECT	RECOMMENDED HOURS
402-5.1	General	1
402-5.2	Administration	4
402-5.3	Field Inspection	57
402-5.4	Plans Review	8
	TOTAL RECOMMENDED HOURS	156

The recommended hours include time for skills evaluation and is based on 12 students. Hours needed depends on the actual number of students.

REFERENCE LIST FOR THE BASIC FIRE INSPECTOR CURRICULUM

Certified Training Facilities approved to teach this curriculum must have the following reference materials:

Emergency Response Guidebook, (current edition). U.S. Department of Transportation

Fire Inspection and Code Enforcement (8th ed.) (2016). Stillwater, OK: Fire Protection Publications. International Fire Service Training Association.

Hazardous Materials for First Responders (5th Ed.) (2017). Stillwater, OK: Fire Protection Publications. International Fire Service Training Association.

Local Codes and Standards.

NFPA 1031: Standard for Professional Qualifications for Fire Inspector and Plan Examiner (2014 ed.). Quincy, MA: National Fire Protection Association. NFPA Publications.

NFPA 472: Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents (2013 ed.). Quincy, MA: National Fire Protection Association. NFPA Publications.

Standards Manual for Fire Protection Personnel. Austin, TX: Texas Commission on Fire Protection.

Course Instructor Information

Basic Fire Inspector

Overview

The Fire Inspector curriculum is designed to provide clear guidance that ensures adequate presentation of the information required to meet the Job Performance Requirements (JPRs) of the National Fire Protection Association (NFPA) 1031, *Standard for Professional Qualifications for Fire Inspector and Plan Examiner*, 2014 Edition.

The Fire Inspector curriculum is chapter 4 of the Texas Commission on Fire Protection (TCFP) Curriculum Manual.

To qualify for the Fire Inspector certification, the Fire Inspector I and II curricula must be completed.

~~To qualify for the Plan Examiner I certification, only the Plan Examiner I curriculum must be completed.~~

~~If a student completed training under the Fire Inspector with Plan Examiner I curriculum (offered prior to March 1, 2019), the student is eligible for both the Fire Inspector and Plan Examiner I certification if all sections of the exam are passed. If the student passes only the Inspector I and II sections of the exam, the student is only eligible for the Fire Inspector certification.~~

Certification Level	TCFP Section Number	NFPA 1031 Chapter
Fire Inspector I	401	4
Fire Inspector II	402	5
Plan Examiner I	470	7

Layout

The NFPA numbering sequence is mirrored to allow easy correlation between this document and the NFPA standard. For example, 401-4.2.1 identifies the section in TCFP's Fire Inspector curriculum that corresponds to NFPA section 4.2.1.

NFPA Appendix Information

When a section references information from "Annex A Explanatory Material" in the NFPA standard, it is identified by adding an "A" to the section number. For example, 401-A.4.2.5 identifies the section in Inspector I that corresponds to NFPA Annex A information for NFPA section 4.2.5.

TCFP Standards Manual

It is critical that the course instructor review the chapters in the TCFP Standards Manual that apply to this curriculum. Of primary importance are the following chapters:

- Chapter 421, Standards for Certification
- Chapter 437, Fees
- Chapter 429, Fire Inspector Certification
- Chapter 439(e)(2), Examinations
- Chapter 449.5, Certification as Head of a Prevention Only Department

These chapters do not address every issue that could impact this curriculum. Therefore, the course instructor is encouraged to become familiar with the TCFP Standards Manual.

Supplemental Information

Instructors are expected to provide supplemental information if the main reference (textbook) does not provide adequate information to ensure successful completion of the JPRs as listed in the curriculum.

Components of the Curriculum

Each section of the curriculum identifies the NFPA JPR and subdivides the requisite knowledge requirements into learning components. For example:

Curriculum	Explanation
401-4.2.6 Participate in legal proceedings, given the findings of a field inspection or a complaint and consultation with legal counsel, so that all information is presented and the inspector's demeanor is professional.	Section number and NFPA JPR
Requisite Knowledge: The legal requirements pertaining to evidence rules in the legal system, types of legal proceedings.	Requisite knowledge statement
1. The legal requirements pertaining to evidence rules in the legal system a. Texas Rules of Evidence	First part of requisite knowledge
2. Types of legal proceedings a. Appeals i. Appeals boards ii. Appeals hearings b. Criminal c. Civil	Second part of requisite knowledge
Requisite Skills: The ability to maintain a professional courtroom demeanor, communicate, listen, and differentiate facts from opinions.	Requisite skills statement

Skills

NFPA requisite skill requirements are address in the corresponding skill sheets. The skills are combined depending on whether the skill relates to General, Field Inspection, Administration, or Plans Review.

Levels of Certification

The Fire Inspector I conducts basic fire inspections and applies codes and standards.

The Fire Inspector II conducts most types of inspections and interprets applicable codes and standards.

~~The Plan Examiner I analyzes building construction, hazardous processes and architectural drawings or plans to ensure compliance with building and fire codes.~~

EQUIPMENT LIST

Inspector I

Pitot tube and gauge
 Conversion chart
 Hydrant
 Hydrant wrench
 Fire flow test graph with required information provided
 Applicable Codes and Standards
 Access to existing fire detection and alarm systems
 Portable fire extinguisher

Inspector II

Specific permit application form
 Specific plan review application form
 Complex complaint
 Local and state laws and ordinances
 Example of legal instrument for adopting or modifying the code
 Example of policies and procedures for adopting or modifying the code
 Example of local policies and procedures
 Example of organizational management goals
 Diagram and description of a multi-use building
 Example of approved plans
 Building plans or field observations from a building
 Facility or facility information with a fire protection system
 System plans and specification documentation
 Sprinkler system shop drawings and specification documentation that includes deficiencies
 Example of emergency plan
 Hazard observations or plans
 Examples of performance based design (construction) documents
 Example of operation and maintenance manual
 Examples of applicable design data
 Examples of type 5 construction plans
 Example of floor plan of a building or portion of a building
 Inspection forms
 Measuring tools
 Flashlight

Plan Examiner I

~~Examples of specific observations from a plan review~~
~~Examples of specific plans and specifications~~
~~Examples of specific management objective~~
~~Examples of specific plan review fire protection issue~~
~~Examples of specific plan review findings and legal consultation brief~~
~~Examples of specific plan submittal~~

c. Plan Examiner Curriculum

CERTIFICATION CURRICULUM MANUAL

CHAPTER FOUR

PLAN EXAMINER

NFPA 1031, 2014 Edition

Effective June 1, 2016



Texas Commission on Fire Protection
P.O. Box 2286 Austin, Texas 78768-2286 (512) 936-3838

CHAPTER 4 PLAN EXAMINER CURRICULUM OUTLINE

(Only the Plan Examiner I curriculum is required for the PE1 certification)

PLAN EXAMINER I		
SECTION	SUBJECT	RECOMMENDED HOURS
470-7.1	General	1
470-7.2	Administration	6
470-7.3	Plans Review	29/33
	TOTAL RECOMMENDED HOURS	40

The recommended hours include time for skills evaluation and is based on 12 students. Hours needed depends on the actual number of students.

REFERENCE LIST FOR THE PLAN EXAMINER CURRICULUM

Certified Training Facilities approved to teach this curriculum must have the following reference materials:

Emergency Response Guidebook, (current edition). U.S. Department of Transportation

Fire Inspection and Code Enforcement (8th ed.) (2016). Stillwater, OK: Fire Protection Publications. International Fire Service Training Association.

Hazardous Materials for First Responders (5th Ed.) (2017). Stillwater, OK: Fire Protection Publications. International Fire Service Training Association.

Local Codes and Standards.

NFPA 1031: Standard for Professional Qualifications for Fire Inspector and Plan Examiner (2014 ed.). Quincy, MA: National Fire Protection Association. NFPA Publications.

NFPA 472: Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents (2013 ed.). Quincy, MA: National Fire Protection Association. NFPA Publications.

Plans Examiner for Fire and Emergency Services (2nd ed.) (2016). Stillwater, OK: Fire Protection Publications. International Fire Service Training Association.

Standards Manual for Fire Protection Personnel. Austin, TX: Texas Commission on Fire Protection.

Course Instructor Information

Plan Examiner

Overview

The Plan Examiner curriculum is designed to provide clear guidance that ensures adequate presentation of the information required to meet the Job Performance Requirements (JPRs) of the National Fire Protection Association (NFPA) 1031, *Standard for Professional Qualifications for Fire Inspector and Plan Examiner*, 2014 Edition.

The following items are included in Chapter 4 of this curriculum manual:

- Course Instructor Information
- Reference List (textbooks and other recommended course materials)
- Course Outline (establishes the recommended hours for teaching this course)

This is a voluntary (non-mandatory) certification, therefore **a formal “curriculum is not provided. Please** use chapter 7 of NFPA 1031 as a guide when creating your own course curriculum.

Performance skills are available in Chapter 4 of the Plan Examiner Skills Manual.

~~The Plan Examiner curriculum is chapter 4 of the Texas Commission on Fire Protection (TCFP) Curriculum Manual.~~

To qualify for the Plan Examiner I certification, only the Plan Examiner I curriculum must be completed.

~~If a student completed training under the Fire Inspector with Plan Examiner I curriculum (offered prior to March 1, 2019), the student is eligible for both the Fire Inspector and Plan Examiner I certification if all sections of the exam are passed. If the student passes only the Inspector I and II sections of the exam, the student is only eligible for the Fire Inspector certification.~~

Certification Level	TCFP Section Number	NFPA 1031 Chapter
Fire Inspector I	401	4
Fire Inspector II	402	5
Plan Examiner I	470	7

Layout

The NFPA numbering sequence is mirrored to allow easy correlation between this document and the NFPA standard. For example, 401-4.2.1 identifies the section in TCFP's Fire Inspector curriculum that corresponds to NFPA section 4.2.1.

NFPA Appendix Information

When a section references information from "Annex A Explanatory Material" in the NFPA standard, it is identified by adding an "A" to the section number. For example, 401-A.4.2.5 identifies the section in Inspector I that corresponds to NFPA Annex A information for NFPA section 4.2.5.

TCFP Standards Manual

It is critical that the course instructor review the chapters in the TCFP Standards Manual that apply to this curriculum. Of primary importance are the following chapters:

- Chapter 421, Standards for Certification

- Chapter 437, Fees
- Chapter 429, Fire Inspector Certification
- Chapter 439(e)(2), Examinations
- Chapter 449.5, Certification as Head of a Prevention Only Department

These chapters do not address every issue that could impact this curriculum. Therefore, the course instructor is encouraged to become familiar with the TCFP Standards Manual.

Supplemental Information

Instructors are expected to provide supplemental information if the main reference (textbook) does not provide adequate information to ensure successful completion of the JPRs as listed in the curriculum.

Components of the Curriculum

Each section of the curriculum identifies the NFPA JPR and subdivides the requisite knowledge requirements into learning components. For example:

Curriculum	Explanation
401-7.3.1 Identify the requirements for fire protection or a life safety system, given a set of plans, so that deficiencies are identified, documented, and reported in accordance with the policies and procedures of the jurisdiction.	Section number and NFPA JPR
Requisite Knowledge: Applicable code requirements for life safety systems, interior finish, and third-party testing and evaluation.	Requisite knowledge statement
1. Applicable code requirements for life safety systems.	First part of requisite knowledge
2. Applicable code requirements for interior finish.	Second part of requisite knowledge
3. Applicable code requirements for third-party testing and evaluation.	Third part of requisite knowledge
Requisite Skills: The ability to read basic floor plans or shop drawings and identify symbols used and apply codes and standards.	Requisite skills statement

Skills

NFPA requisite skill requirements are address in the corresponding skill sheets. The skills are combined depending on whether the skill relates to General, Field Inspection, Administration, or Plans Review.

Level(s) of Certification

The Plan Examiner I analyzes building construction, hazardous processes and architectural drawings or plans to ensure compliance with building and fire codes.

EQUIPMENT LIST

Inspector I

~~Pitot tube and gauge~~
~~Conversion chart~~
~~Hydrant~~
~~Hydrant wrench~~
~~Fire flow test graph with required information provided~~
~~Applicable Codes and Standards~~
~~Access to existing fire detection and alarm systems~~
~~Portable fire extinguisher~~

Inspector II

~~Specific permit application form~~
~~Specific plan review application form~~
~~Complex complaint~~
~~Local and state laws and ordinances~~
~~Example of legal instrument for adopting or modifying the code~~
~~Example of policies and procedures for adopting or modifying the code~~
~~Example of local policies and procedures~~
~~Example of organizational management goals~~
~~Diagram and description of a multi-use building~~
~~Example of approved plans~~
~~Building plans or field observations from a building~~
~~Facility or facility information with a fire protection system~~
~~System plans and specification documentation~~
~~Sprinkler system shop drawings and specification documentation that includes deficiencies~~
~~Example of emergency plan~~
~~Hazard observations or plans~~
~~Examples of performance based design (construction) documents~~
~~Example of operation and maintenance manual~~
~~Examples of applicable design data~~
~~Examples of type 5 construction plans~~
~~Example of floor plan of a building or portion of a building~~
~~Inspection forms~~
~~Measuring tools~~
~~Flashlight~~

Plan Examiner I

Examples of specific observations from a plan review
 Examples of specific plans and specifications
 Examples of specific management objective
 Examples of specific plan review fire protection issue
 Examples of specific plan review findings and legal consultation brief
 Examples of specific plan submittal

4. **Discussion and possible action on proposed amendments to 37 Tex. Administrative Code, Part 13, Chapter 421, Standards For Certification, §421.17, Requirement To Maintain Certification.**

CHAPTER 421

STANDARDS FOR CERTIFICATION

§421.17. Requirement to Maintain Certification.

(a) All full-time or part-time employees of a fire department or local government assigned duties identified as fire protection personnel duties must maintain certification by the commission in the discipline(s) to which they are assigned for the duration of their assignment.

(b) In order to maintain the certification required by this section, the certificate(s) of the employees must be renewed annually by complying with §437.5 of this title (relating to Renewal Fees) and Chapter 441 of this title (relating to Continuing Education) of the commission standards manual.

(c) Except for subsection (d) of this section, **or upon determination by the Executive Director when special circumstances are presented.** an individual whose certificate has been expired for one year or longer may not renew the certificate previously held. To obtain a new certification, an individual must meet the requirements in Chapter 439 of this title (relating to Examinations for Certification).

(d) A military service member whose certificate has been expired for three years or longer may not renew the certificate previously held. To obtain a new certification, the person must meet the requirements in Chapter 439 of this title [~~relating to Examinations for Certification~~]. In order to qualify for this provision, the individual must have been a military service member at the time the certificate expired and continued in that status for the duration of the three-year period.

(e) The commission will provide proof of current certification to individuals whose certification has been renewed.

5. **Discussion and possible action on proposed amendments to 37 Tex. Administrative Code, Part 13, Chapter 435, Fire Fighter Safety, §435.19, Enforcement of Commission Rules.**

CHAPTER 435

FIRE FIGHTER SAFETY

§435.19. Enforcement of Commission Rules.

(a) The commission shall enforce all commission rules at any time, including, but not limited to, commission investigations, fire department inspections, or upon receiving a written complaint from an identified person or entity of an alleged infraction of a commission rule.

(b) The commission shall **initiate a biennial inspection with an email notifying the fire department and requesting electronic copies of the Standard Operating Procedures (SOPs), training records, and/or other documentation needed for review, be submitted within 48 business hours of notification. The e-mail will also indicate the date range for an on-site inspection within the upcoming two-week period. Compliance officers may work with the Head of Department to ensure all necessary department representatives will be present at the time of the on-site inspection. Compliance Officers may postpone an inspection for extenuating circumstances with the approval of the Compliance Manager.**~~[not provide prior notification of an inspection to a fire department.]~~

(c) Upon receipt of a signed complaint alleging a violation of a commission rule, the commission shall have 30 days to initiate an investigation and report back to the complainant its progress.

(d) Upon substantiating the validity of a written complaint, the commission shall follow the procedures outlined in Texas Government Code, Chapter 419, §419.011(b) and (c).

6. Request from Curtis Dunn, Firefighter Cancer Support Network regarding Fire Fighter Training Program.

7. **Presentation by David Kerr of the Firefighter Air Coalition regarding Firefighter Air Replenishment System (FARS).**

8. **Request from Kevin Price regarding proposed rule changes to 37 Tex. Administrative Code, Part 13, Chapter 429, Fire Inspector and Plan Examiner, Subchapter A, Minimum Standards For Fire Inspector Certification, §429.3, Minimum Standards For Basic Fire Inspector Certification.**

Attn: Chief Michael Wisko, Executive Director
Texas Commission on Fire Protection

From: Kevin Price

3912 Tranquil Path Dr.

College Station, TX, 77845

Subject: Rule Change Petition

Chief Wisko,

My name is Kevin Price and I am an active firefighter and instructor within Texas, I am writing to you to petition that a change be made to Rule 431.3 (4)(C) and Rule 429.3 (2)(C)(iv). I am writing this petition on my own behalf and not of any agency I work for.

Rule 431.3 (4)(C) currently states; *successful completion of the following college courses: Fire and Arson Investigation I or II, 3 semester hours; Hazardous Materials I, II, or III, 3 semester hours; Building Construction in the Fire Service or Building Codes and Construction, 3 semester hours; Fire Protection Systems, 3 semester hours. Total semester hours, 12.*

Rule 429.3 (2)(C)(iv) states; *Hazardous Materials I, II, or III, three semester hours (total semester hours, 12)*

Regarding these rules I petition that Hazardous Material I, II, or III be removed from the list of courses as they equate to Hazardous Materials Awareness, Operations, and Technician respectively per the course catalogs for LoneStar College. I cross referenced the Texas Higher Education Coordinating Board course list and found no such courses listed anywhere either. Texas Commission on Fire Protection already has separate requirements for these certifications through both Chapter 1 and Chapter 6 of the curriculum manual as well as in Chapters 453 and 423 of the Texas Administrative Code. The proposed changes would be simply striking the above verbiage from the rules in question. Due to this being proposed changes I have not included a full rewrite of each rule as no other issue is found in either of them.

Regards,

Kevin Price

CHAPTER 429

FIRE INSPECTOR AND PLAN EXAMINER

SUBCHAPTER A

MINIMUM STANDARDS FOR FIRE INSPECTOR CERTIFICATION

§429.1. Minimum Standards for Fire Inspector Personnel.

- (a) Fire code enforcement is defined as the enforcement of laws, codes, and ordinances of the authority having jurisdiction pertaining to fire prevention.
- (b) To qualify for appointment to fire code enforcement duties, individuals must be certified as a Fire Inspector, or meet the requirements in subsections (c) and (d) of this section.
- (c) Individuals may be appointed to fire code enforcement duties on a probationary or temporary status if they have successfully passed the commission exam for Fire Inspector, as specified in Chapter 439 of this title (relating to Examinations for Certification).
- (d) Individuals appointed to fire code enforcement duties in subsection (c) of this section must be certified as a Fire Inspector within one year of the appointment.
- (e) Individuals holding any level of fire inspector certification shall be required to comply with the continuing education requirements in §441.13 of this title (relating to Continuing Education for Fire Inspection Personnel).

§429.3. Minimum Standards for Basic Fire Inspector Certification.

In order to be certified as a Basic Fire Inspector, an individual must:

- (1) possess valid documentation as an Inspector I and Inspector II from either:

- (A) the International Fire Service Accreditation Congress; or

- (B) the National Board on Fire Service Professional Qualifications issued by the Texas A&M Engineering Extension Service using the 2009 or later edition of the NFPA standard applicable to this discipline and meeting the requirements as specified in §439.1(a)(2) of this title (relating to Requirements—General); or

- (2) complete a commission approved fire inspector training program and successfully pass the commission examination(s) as specified in Chapter 439 of this title (relating to Examinations for Certification). An approved training program shall consist of one or any combination of the following:

- (A) completion of the commission approved Basic Fire Inspector Curriculum, as specified in the commission's Certification Curriculum Manual; or

- (B) successful completion of an out-of-state, NFA, and/or military training program which has been submitted to the commission for evaluation and found to meet the minimum requirements as listed in the commission approved Basic Fire Inspector Curriculum as specified in the commission's Certification Curriculum Manual; or

- (C) successful completion of the following college courses:

- (ii) Fire Protection Systems, three semester hours;
- (ii) Fire Prevention Codes and Inspections, three semester hours;
- (iii) Building Construction in the Fire Service or Building Codes and Construction, three semester hours; and
- (iv) Hazardous Materials I, II, or III, three semester hours (total semester hours, (12); or

(D) documentation of the receipt of Fire Inspector I and Fire Inspector II certificates issued by the State Firemen's and Fire Marshals' Association of Texas that are deemed equivalent to a commission approved Basic Fire Inspector curriculum.

§429.5. Minimum Standards for Intermediate Fire Inspector Certification.

(a) Applicants for Intermediate Fire Inspector Certification must meet the following requirements:

(1) hold as a prerequisite Basic Fire Inspector Certification as defined in §429.3 of this title (relating to Minimum Standards for Basic Fire Inspector Certification); and

(2) acquire a minimum of four years of fire protection experience and complete the training listed in one of the following options:

(A) Option 1--Successfully complete six semester hours of fire science or fire technology from an approved Fire Protection Degree Program and submit documentation as required by the commission that the courses comply with subsections (b) and (c) of this section; or

(B) Option 2--Completion of coursework from either the A-List or the B-List courses. Acceptable combinations of courses are as follows: two A-List courses; or eight B-List courses; or one A-List course and four B-List courses. (See the exception outlined in subsection (c) of this section); or

(C) Option 3--Completion of coursework from either the A-List or the B-List courses in combination with college courses in fire science or fire protection. Acceptable combinations of courses are three semester hours meeting the requirements of Option 1 with either one A-List course or four B-List courses. (See the exception outlined in subsection (c) of this section.)

(b) Non-traditional credit awarded at the college level, such as credit for experience or credit by examination obtained from attending any school in the commission's Certification Curriculum Manual or for experience in the fire service, may not be counted toward this level of certification.

(c) The training required in this section must be in addition to any training used to qualify for any lower level of fire inspector certification. Repeating a course or a course of similar content cannot be used towards this level of certification.

§429.7. Minimum Standards for Advanced Fire Inspector Certification.

(a) Applicants for Advanced Fire Inspector Certification must complete the following requirements:

(1) hold as a prerequisite an Intermediate Fire Inspector Certification as defined in §429.5 of this title (relating to Minimum Standards for Intermediate Fire Inspector Certification); and

(2) acquire a minimum of eight years of fire protection experience and complete the training listed in one of the following options:

(A) Option 1--Successfully complete six semester hours of fire science or fire technology from an approved Fire Protection Degree Program and submit documentation as required by the commission that the courses comply with subsections (b) and (c) of this section; or

(B) Option 2--Completion of coursework from either the A-List or the B-List courses. Acceptable combinations of courses are as follows: two A-List courses; or eight B-List courses; or one A-List course and four B-List courses. (See the exception outlined in subsection (c) of this section); or

(C) Option 3--Completion of coursework from either the A-List or the B-List courses in combination with college courses in fire science or fire protection. Acceptable combinations of courses are three semester hours meeting the requirements of Option 1 with either one A-List course or four B-List courses. (See the exception outlined in subsection (c) of this section.)

(b) Non-traditional credit awarded at the college level, such as credit for experience or credit by examination obtained from attending any school in the commission's Certification Curriculum Manual or for experience in the fire service, may not be counted toward this level of certification.

(c) The training required in this section must be in addition to any training used to qualify for any lower level of fire inspector certification. Repeating a course or a course of similar content cannot be used towards this level of certification.

§429.9. Minimum Standards for Master Fire Inspector Certification.

(a) Applicants for Master Fire Inspector Certification must complete the following requirements:

(1) hold as a prerequisite an Advanced Fire Inspector Certification as defined in §429.7 of this title (relating to Minimum Standards for Advanced Fire Inspector Certification); and

(2) acquire a minimum of 12 years of fire protection experience, and 60 college semester hours or an associate degree, which includes at least 18 college semester hours in fire science subjects.

(b) College level courses from both the upper and lower division may be used to satisfy the education requirement for Master Fire Inspector Certification.

§429.11. International Fire Service Accreditation Congress (IFSAC) Seal.

(a) Individuals who pass the applicable sections of the state examination may be granted IFSAC seal(s) for Inspector I and Inspector II by making application to the commission for the IFSAC seal(s) and paying the associated fees, provided they meet the following provisions:

(1) To receive the IFSAC Inspector I seal, the individual must:

(A) complete the Inspector I section of a commission approved course; and

(B) pass the Inspector I section of a commission examination.

(2) To receive the IFSAC Inspector II seal, the individual must:

(A) complete the Inspector II section of a commission approved course;

(B) document possession of an IFSAC Inspector I seal; and

(C) pass the Inspector II section of a commission examination.

(b) In order to qualify for an IFSAC seal, an individual must submit the application for the seal prior to the expiration of the examination.

9. **Request from Kevin Price regarding proposed rule changes to 37 Tex. Administrative Code, Part 13, Chapter 431, Fire Investigation, Subchapter A, Minimum Standards For Arson Investigator Certification, §431.3, Minimum Standards for Basic Arson Investigator Certification.**

Attn: Chief Michael Wisko, Executive Director
Texas Commission on Fire Protection

From: Kevin Price

3912 Tranquil Path Dr.

College Station, TX, 77845

Subject: Rule Change Petition

Chief Wisko,

My name is Kevin Price and I am an active firefighter and instructor within Texas, I am writing to you to petition that a change be made to Rule 431.3 (4)(C) and Rule 429.3 (2)(C)(iv). I am writing this petition on my own behalf and not of any agency I work for.

Rule 431.3 (4)(C) currently states; *successful completion of the following college courses: Fire and Arson Investigation I or II, 3 semester hours; Hazardous Materials I, II, or III, 3 semester hours; Building Construction in the Fire Service or Building Codes and Construction, 3 semester hours; Fire Protection Systems, 3 semester hours. Total semester hours, 12.*

Rule 429.3 (2)(C)(iv) states; *Hazardous Materials I, II, or III, three semester hours (total semester hours, 12)*

Regarding these rules I petition that Hazardous Material I, II, or III be removed from the list of courses as they equate to Hazardous Materials Awareness, Operations, and Technician respectively per the course catalogs for Lonestar College. I cross referenced the Texas Higher Education Coordinating Board course list and found no such courses listed anywhere either. Texas Commission on Fire Protection already has separate requirements for these certifications through both Chapter 1 and Chapter 6 of the curriculum manual as well as in Chapters 453 and 423 of the Texas Administrative Code. The proposed changes would be simply striking the above verbiage from the rules in question. Due to this being proposed changes I have not included a full rewrite of each rule as no other issue is found in either of them.

Regards,

Kevin Price

CHAPTER 431**FIRE INVESTIGATION****SUBCHAPTER A****MINIMUM STANDARDS FOR ARSON INVESTIGATOR CERTIFICATION****§431.1. Minimum Standards for Arson Investigation Personnel.**

(a) Fire protection personnel who are appointed arson investigation duties must be certified, as a minimum, as a basic arson investigator as specified in §431.3 of this title (relating to Minimum Standards for Basic Arson Investigator Certification) within one year from the date of initial appointment to such position.

(b) Prior to being appointed to arson investigation duties, fire protection personnel must complete a commission approved basic fire investigator training program, successfully pass the commission examination pertaining to that curriculum, and possess a current peace officer license from the Texas Commission on Law Enforcement or document that the individual is a federal law enforcement officer.

(c) Personnel holding any level of arson investigation certification shall be required to comply with the continuing education requirements in §441.15 of this title (relating to Continuing Education for Arson Investigator or Fire Investigator).

§431.3. Minimum Standards for Basic Arson Investigator Certification.

In order to be certified as a Basic Arson Investigator an individual must:

(1) possess a current basic peace officer's license from the Texas Commission on Law Enforcement or documentation that the individual is a federal law enforcement officer;

(2) hold a current license as a peace officer and notify the commission on the prescribed form regarding the law enforcement agency currently holding the individual's peace officer license; and

(3) possess valid documentation of accreditation from the International Fire Service Accreditation Congress as a Fire Investigator; or

(4) complete a commission approved basic fire investigation training program and successfully pass the commission examination as specified in Chapter 439 of this title (relating to Examinations for Certification). An approved fire investigation training program shall consist of one of the following:

(A) completion of the commission approved Fire Investigator Curriculum, as specified in Chapter 5 of the commission's Certification Curriculum Manual;

(B) successful completion of an out-of-state, NFA, or military training program which has been submitted to the commission for evaluation and found to meet the minimum requirements as listed in the commission approved Fire Investigator Curriculum as specified in Chapter 5 of the commission's Certification Curriculum Manual; or

(C) successful completion of the following college courses: Fire and Arson Investigation I or II, 3 semester hours; Hazardous Materials I, II, or III, 3 semester hours; Building Construction in the Fire Service or Building Codes and Construction, 3 semester hours; Fire Protection Systems, 3 semester hours. Total semester hours, 12.

§431.5. Minimum Standards for Intermediate Arson Investigator Certification.

(a) Applicants for Intermediate Arson Investigator Certification must complete the following requirements:

(1) hold as a prerequisite a Basic Arson Investigator Certification as defined in §431.3 of this title (relating to Minimum Standards for Basic Arson Investigator Certification); and

(2) acquire a minimum of four years of fire protection experience and complete the requirements listed in one of the following options:

(A) Option 1--Successfully complete six semester hours of fire science or fire technology from an approved Fire Protection Degree Program and submit documentation as required by the commission that the courses comply with subsections (b) and (c) of this section; or

(B) Option 2--Completion of coursework from either the A-List or the B-List courses. Acceptable combinations of courses are as follows: two A-List courses; or eight B-List courses; or one A-List course and four B-List courses (See the exception outlined in subsection (c) of this section); or

(C) Option 3--Completion of coursework from either the A-List or the B-List courses in combination with college courses in fire science or fire protection. Acceptable combinations of courses are three semester hours meeting the requirements of Option 1 with either one A-List course or four B-List courses (See the exception outlined in subsection (c) of this section); or

(D) Option 4--Hold current Intermediate Peace Officer certification from the Texas Commission on Law Enforcement with four additional law enforcement courses applicable for fire investigations (See exception outlined in subsection (c) of this section).

(b) Non-traditional credit awarded at the college level, such as credit for experience or credit by examination obtained from attending any school in the commission's Certification Curriculum Manual or for experience in the fire service, may not be counted toward this level of certification.

(c) The training required in this section must be in addition to any training used to qualify for any lower level of Arson Investigator Certification. Repeating a course or a course of similar content cannot be used towards this level of certification.

§431.7. Minimum Standards for Advanced Arson Investigator Certification.

(a) Applicants for Advanced Arson Investigator certification must complete the following requirements:

(1) hold as a prerequisite an Intermediate Arson Investigator Certification as defined in §431.5 of this title (relating to Minimum Standards for Intermediate Arson Investigator Certification); and

(2) acquire a minimum of eight years of fire protection experience and complete the requirements listed in one of the following options:

(A) Option 1--Successfully complete six semester hours of fire science or fire technology from an approved Fire Protection Degree Program and submit documentation as required by the commission that the courses comply with subsections (b) and (c) of this section; or

(B) Option 2--Completion of coursework from either the A-List or the B-List courses. Acceptable combinations of courses are as follows: two A-List courses; or eight B-List courses; or one A-List course and four B-List courses (See the exception outlined in subsection (c) of this section); or

(C) Option 3--Completion of coursework from either the A-List or the B-List courses in combination with college courses in fire science or fire protection. Acceptable combinations of courses are three semester hours meeting the requirements of Option 1 with either one A-List course or four B-List courses (See the exception outlined in subsection (c) of this section); or

(D) Option 4--Advanced Arson for Profit or Complex Arson Investigative Techniques (Bureau of Alcohol, Tobacco, Firearms, and Explosives resident or field course, 80 hours); or

(E) Option 5--Hold current Advanced Peace Officer certification from the Texas Commission on Law Enforcement with four additional law enforcement courses applicable for fire investigations (See exception outlined in subsection (c) of this section).

(b) Non-traditional credit awarded at the college level, such as credit for experience or credit by examination obtained from attending any school in the commission's Certification Curriculum Manual or for experience in the fire service, may not be counted toward this level of certification.

(c) The training required in this section must be in addition to any training used to qualify for any lower level of Arson Investigator Certification. Repeating a course or a course of similar content cannot be used towards this level of certification.

§431.9. Minimum Standards for Master Arson Investigator Certification.

(a) Applicants for Master Arson Investigator Certification must complete the following requirements:

(1) hold as a prerequisite an Advanced Arson Investigator Certification as defined in §431.7 of this title (relating to Minimum Standards for Advanced Arson Investigator Certification); and

(2) acquire a minimum of twelve years of fire protection experience, and 60 college semester hours or an associate's degree, either of which includes at least 18 college semester hours in fire science or criminal justice subjects.

(b) College level courses from both the upper and lower division may be used to satisfy the education requirement for Master Arson Investigator Certification.

§431.11. Minimum Standards for Arson Investigator Certification for Law Enforcement Personnel.

(a) A law enforcement officer employed or commissioned by a law enforcement agency as a peace officer who is designated as an arson investigator by an appropriate local authority is eligible for certification on a voluntary basis by complying with this chapter.

(b) An individual holding commission certification as a fire investigator who becomes a law enforcement officer employed or commissioned by a law enforcement agency as a peace officer, and who is designated as an arson investigator by an appropriate local authority will qualify for a similar level arson investigator certification. To obtain an arson investigator certification the individual must make application to the commission to include confirmation of commission.

§431.13. International Fire Service Accreditation Congress (IFSAC) Seal.

Individuals completing a commission approved basic fire investigator program and passing the applicable state examination may be granted an IFSAC seal as a Fire Investigator by making application to the commission for the IFSAC seal and paying applicable fees. In order to qualify for an IFSAC seal, an individual must submit the application for the seal prior to the expiration of the examination.

10. Discussion of the 2020 data collected on fire fighter injuries, and possible action on developing recommendations to be submitted to the commission for approval and submission to the State Fire Marshal's Office.

TEXAS COMMISSION ON FIRE PROTECTION INJURY REPORT

January 1, 2020 to December 31, 2020



TEXAS COMMISSION ON FIRE PROTECTION

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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, and fatal injuries, as well as toxic exposures
- 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 and exposures
- Identify trends in injuries and exposures
- Identify needed training
- Evaluate and find improvements in procedures
- Track lost time injuries (requested by user community)

Executive Summary

The information in this report is collected by the Texas Commission on Fire Protection (TCFP) via an on-line injury reporting application. The report is a comprehensive analysis of injuries and exposures to Texas fire fighters. These injuries and exposures were reported to the TCFP in 2020 by fire departments throughout the state, and this report contains charts and graphs depicting the results of the information that was collected. The report also compares Texas fire fighter injury statistics with national statistics that were gathered by the National Fire Protection Association (NFPA) in 2019.

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 injuries to fire protection personnel. 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 originally built the data systems necessary to gather this information in 2010. In 2017 the data systems were migrated from a Microsoft Access database structure to a new system which was developed in-house and designed specifically to meet the information resource needs of the TCFP. Fine-tuning of this new system is ongoing as we receive feedback from stakeholders. 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.

A Reminder for Fire Departments

Any injuries to fire protection personnel that are reported to the Texas Worker's Compensation Commission must be reported to the Texas Commission on Fire Protection. This includes cancer diagnoses.

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

This report contains data submitted by regulated and non-regulated entities. The data collected in 2020 was the tenth full year of reporting.

Grand Totals – 2020

Total number of incidents (injury reports) submitted: 5,420

Total number of individuals who sustained an injury or exposure: 6,256*

Total number of injuries reported: 2,528

Total number of exposures reported: 3,944

**Note that an individual could have more than one injury or could have an injury and an exposure. This explains why the total number of individuals who sustained an injury is less than the total number of injuries + total number of exposures. ($6,256 < 2,528 + 3,944$)*

Because the injury reporting system was reconfigured in 2018, the information collected by the TCFP has evolved over the last couple of years. It's important to remember that one incident report can have multiple individuals involved, and each of those individuals can have one or more injuries. For example:

Joe and Bob were burned in a fire while on duty. This resulted in:

- One incident (one injury report), with
- Two individuals who...
- Sustained three injuries
 - Joe was burned on the hand and arm (two injuries)
 - Bob was burned on the leg (one injury)

556 of the 756 regulated departments used TCFP's injury reporting system in 2020. That's a reporting rate of 74%. These departments reported a total of 6,256 individuals who were either injured or exposed in calendar year 2020. Of these, 524 individuals incurred their injuries/exposures during fire suppression activities, representing 8 percent of the total reported injuries (see Table 1).

Injuries and exposures from emergency medical services (EMS) activities surpassed those from fire suppression activities in 2020. EMS activities accounted for 3,070 of the 6,256 total individuals who were injured or exposed, or 49 percent.

After EMS and fire suppression, the next highest number reported in 2020 occurred in the performance of station duties, with 1,440, or 23 percent, of the total reported injuries.

Skills training and wellness/fitness activities again rounded out the top five activities: 425 skills training injuries (7 percent of the total) and 417 wellness/fitness injuries (7 percent of the total).

We feel it's important to note that the total number of injured or exposed individuals reported in station duties, wellness/fitness activities, and skills training (which are all non-emergency activities) accounted for 36 percent of the total injuries reported in 2020.

State of Texas vs. NFPA

Comparison between the State of Texas (2019) and National Fire Protection Association (NFPA) U.S. Firefighter Injuries (2019)

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 categories.
- "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.)

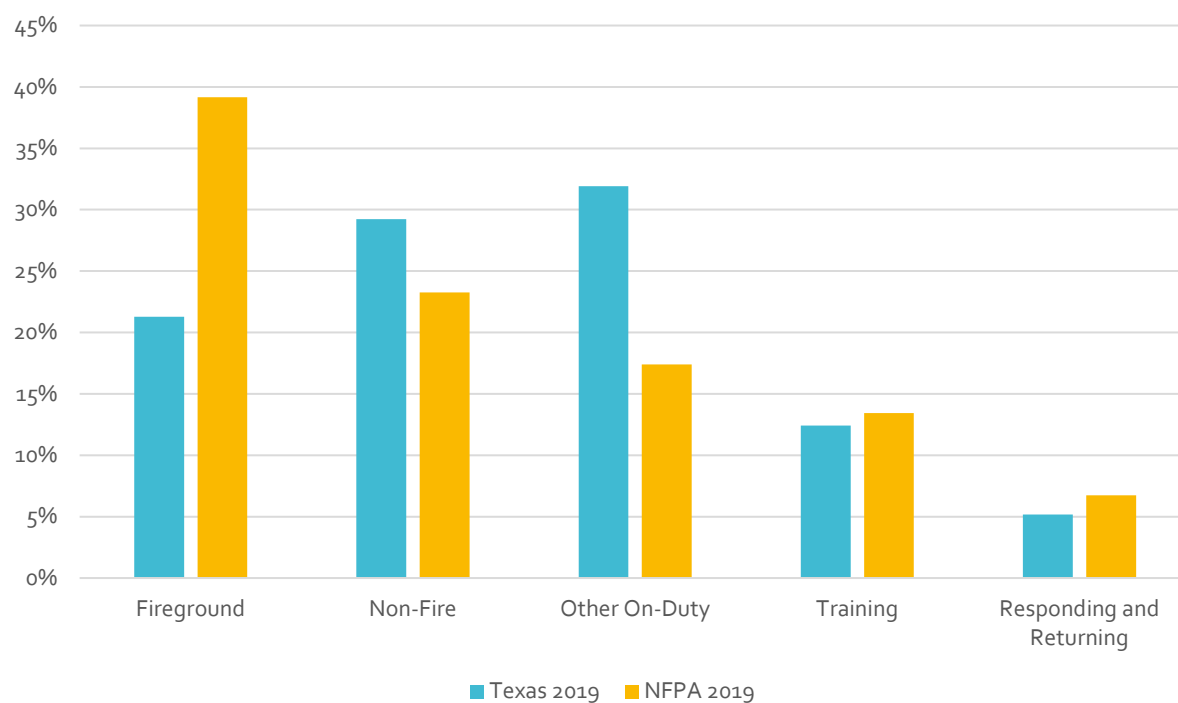
Comparing Texas 2019 and NFPA 2019

Table 1: Comparison of Texas 2019 and NFPA 2019

Category	Texas 2019		NFPA 2019	
	Count	Percent	Count	Percent
Fireground	804	21%	23,825	39%
Non-Fire	1,105	29%	14,150	23%
Other On-Duty	1,206	32%	10,575	17%
Training	469	12%	8,175	13%
Responding and Returning	196	5%	4,100	7%
Total	3,780	100%	60,825	100%

NFPA data is from the [Firefighter Injuries in the United States in 2019](#) report, copyright ©2019 National Fire Protection Association, Quincy, MA.

Figure 1: Injuries by Activity, percentages
(Comparing Texas 2019 and NFPA 2019)

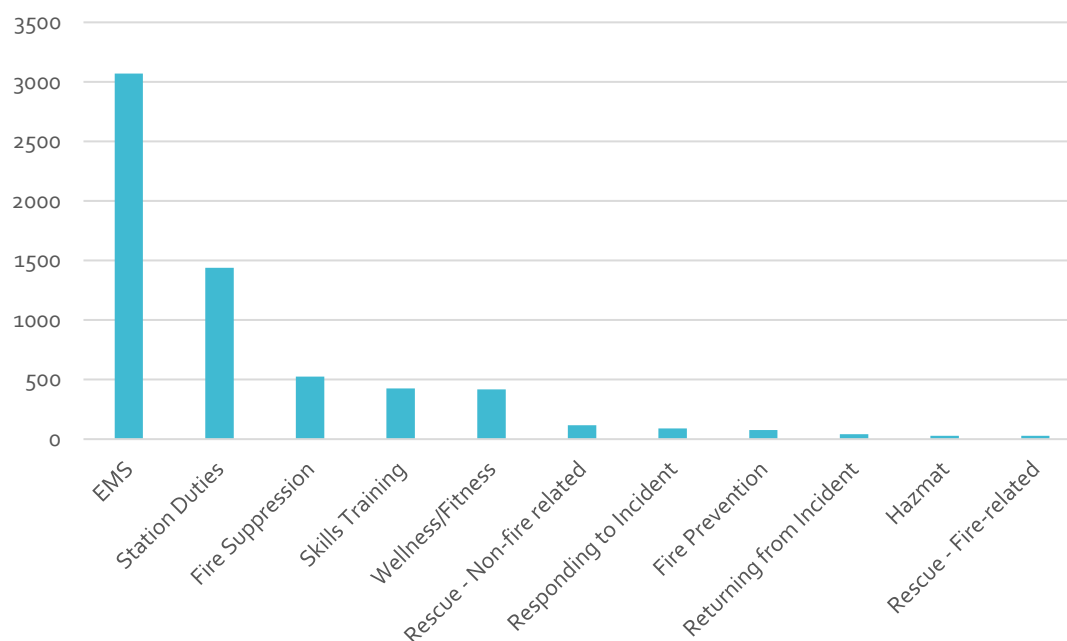


Fire Protection Personnel Injuries

Table 2: Total Injured or Exposed Individuals by Activity and Severity, 2020

Activity	Minor	Serious	Fatal	Total	2019	2018
EMS	2,428	639	3	3,070	922	1,027
Station Duties	717	722	1	1,440	739	639
Fire Suppression	396	127	1	524	763	799
Skills Training	301	124	0	425	469	400
Wellness/Fitness	304	113	0	417	407	417
Rescue - Non-fire related	87	29	0	116	157	183
Responding to Incident	68	23	0	91	143	163
Fire Prevention	49	27	0	76	60	90
Returning from Incident	28	13	0	41	53	91
Hazmat	22	6	0	28	26	28
Rescue - Fire-related	25	3	0	28	41	44
Total	4,425	1,826	5	6,256	3,780	3,881

Figure 2: Total Injured or Exposed Individuals by Activity, 2020



Injuries/Exposures by Activity

EMS activities resulted in the highest number of minor injuries in 2020 (see Table 3), which is consistent with the previous five years. The total numbers of minor and serious injuries and exposures is up significantly in 2020 compared with previous years due to the COVID-19 pandemic.

Definitions

Minor = An injury/exposure that does not result in the employee missing a full duty period.

Serious = An injury/exposure that results in the employee missing one or more full duty periods.

Fatal = The injured/exposed individual did not survive.

Table 3: Minor Injury/Exposure Activities, 2016 – 2020

Activity	2016		2017		2018		2019		2020	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
EMS	882	27.89%	929	28.99%	843	29.09%	776	25.84%	2,428	54.87%
Station Duties	434	13.73%	481	15.01%	437	15.08%	591	19.68%	717	16.20%
Fire Suppression	866	27.39%	662	20.66%	607	20.95%	616	20.51%	396	8.95%
Wellness/Fitness	252	7.97%	254	7.93%	286	9.87%	290	9.66%	304	6.87%
Skills Training	311	9.84%	291	9.08%	277	9.56%	330	10.99%	301	6.80%
Rescue - Non-Fire	161	5.09%	206	6.43%	157	5.42%	140	4.66%	87	1.97%
Responding to Incident	117	3.70%	156	4.87%	99	3.42%	114	3.80%	68	1.54%
Fire Prevention	47	1.49%	50	1.56%	69	2.38%	46	1.53%	49	1.11%
Returning from Incident	37	1.17%	42	1.31%	57	1.97%	39	1.30%	28	0.63%
Rescue - Fire Related	20	0.63%	113	3.53%	39	1.35%	37	1.23%	25	0.56%
Hazmat	35	1.11%	21	0.66%	27	0.93%	24	0.80%	22	0.50%
Total	3,162	100.00%	3,205	100.00%	2,898	100.00%	3,003	100.00%	4,425	100.00%

(Numbers in red above = least amount of injuries for the five-year period.)

Table 4: Serious Injury/Exposure Activities, 2016 – 2020

Activity	2016		2017		2018		2019		2020	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Station Duties	172	18.76%	185	21.29%	201	20.49%	147	19.02%	722	39.54%
EMS	158	17.23%	147	16.92%	184	18.76%	146	18.89%	639	34.99%
Fire Suppression	179	19.52%	157	18.07%	191	19.47%	145	18.76%	127	6.96%
Skills Training	141	15.38%	120	13.81%	123	12.54%	139	17.98%	124	6.79%
Wellness/Fitness	146	15.92%	129	14.84%	131	13.35%	117	15.14%	113	6.19%
Rescue - Non-Fire	52	5.67%	27	3.11%	26	2.65%	17	2.20%	29	1.59%
Fire Prevention	11	1.20%	15	1.73%	21	2.14%	14	1.81%	27	1.48%
Responding to Incident	36	3.93%	53	6.10%	64	6.52%	28	3.62%	23	1.26%
Returning from Incident	18	1.96%	28	3.22%	34	3.47%	14	1.81%	13	0.71%
Hazmat	3	0.33%	7	0.81%	5	0.51%	4	0.52%	6	0.33%
Rescue - Fire Related	1	0.11%	1	0.12%	1	0.10%	2	0.26%	3	0.16%
Total	917	100.00%	869	100.00%	981	100.00%	773	100.00%	1,826	100.00%

(Numbers in red above = least amount of injuries for the five year period.)

Table 5: Number of Individuals Who Sustained Fatal Injuries/Exposures, 2020

Activity	Count	Percent
EMS	3	60%
Fire Suppression	1	20%
Station Duties	1	20%
Total	5	100%

Emergency vs. Non-Emergency Injuries

Table 6: Number of Injured Individuals by Emergency Activity and Severity, 2020

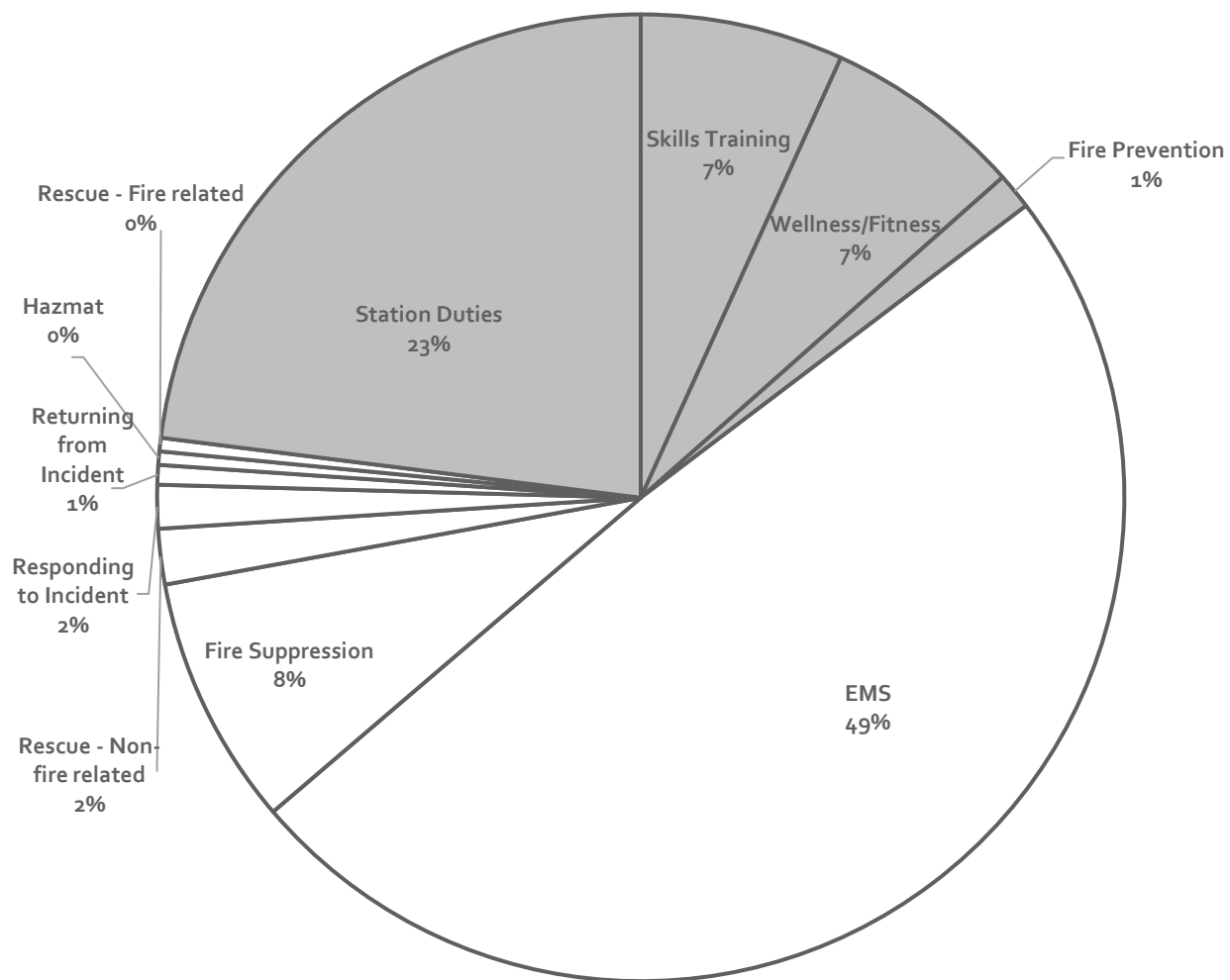
Activity	Minor	Serious	Fatal	Total
EMS	2,428	639	3	3,070
Fire Suppression	396	127	1	524
Rescue - Non-fire related	87	29	0	116
Responding to Incident	68	23	0	91
Returning from Incident	28	13	0	41
Hazmat	22	6	0	28
Rescue - Fire related	25	3	0	28
Total	3,054	840	4	3,898

Table 7: Number of Injured Individuals by Non-Emergency Activity and Severity, 2020

Activity	Minor	Serious	Fatal	Total
Station Duties	717	722	1	1,440
Skills Training	301	124	0	425
Wellness/Fitness	304	113	0	417
Fire Prevention	49	27	0	76
Total	1,371	986	1	2,358

Figure 3: Percentages of Injured Individuals in Emergency and Non-Emergency Activities, 2020

Emergency Activities (white) = 64%
Non-emergency Activities (gray) = 36%

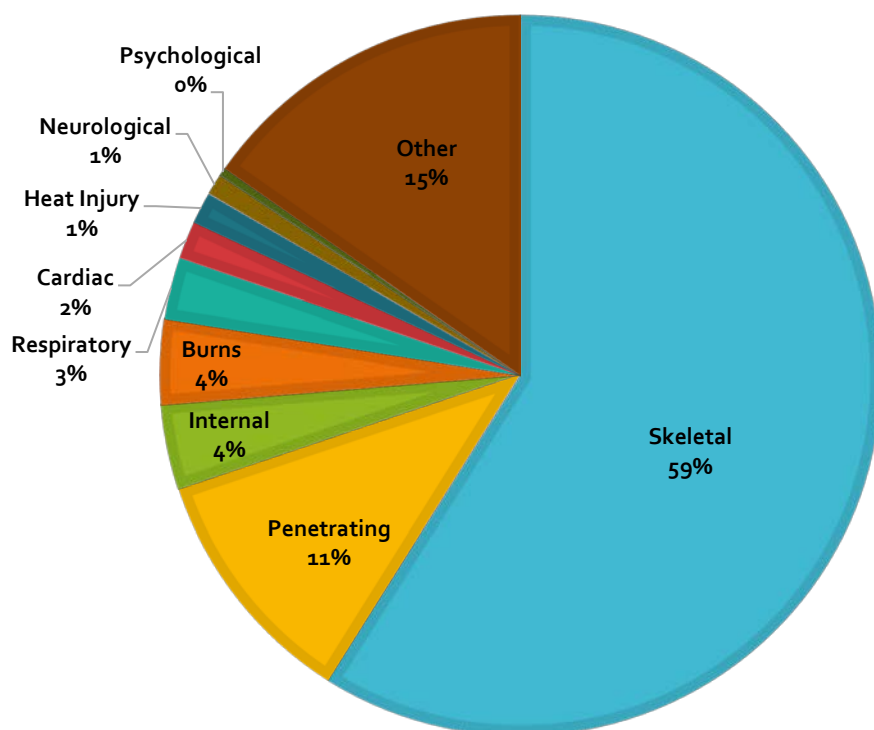


Types of Injuries

Table 8: Types of Injuries, 2020

Type of Injury	2020	
	Count	Percent
Skeletal	1,490	59%
Penetrating	276	11%
Internal	97	4%
Burns	96	4%
Respiratory	70	3%
Cardiac	43	2%
Heat Injury	36	1%
Neurological	24	1%
Psychological	10	0%
Other	386	15%
Total	2,528	100%

Figure 4: Types of Injuries, 2020

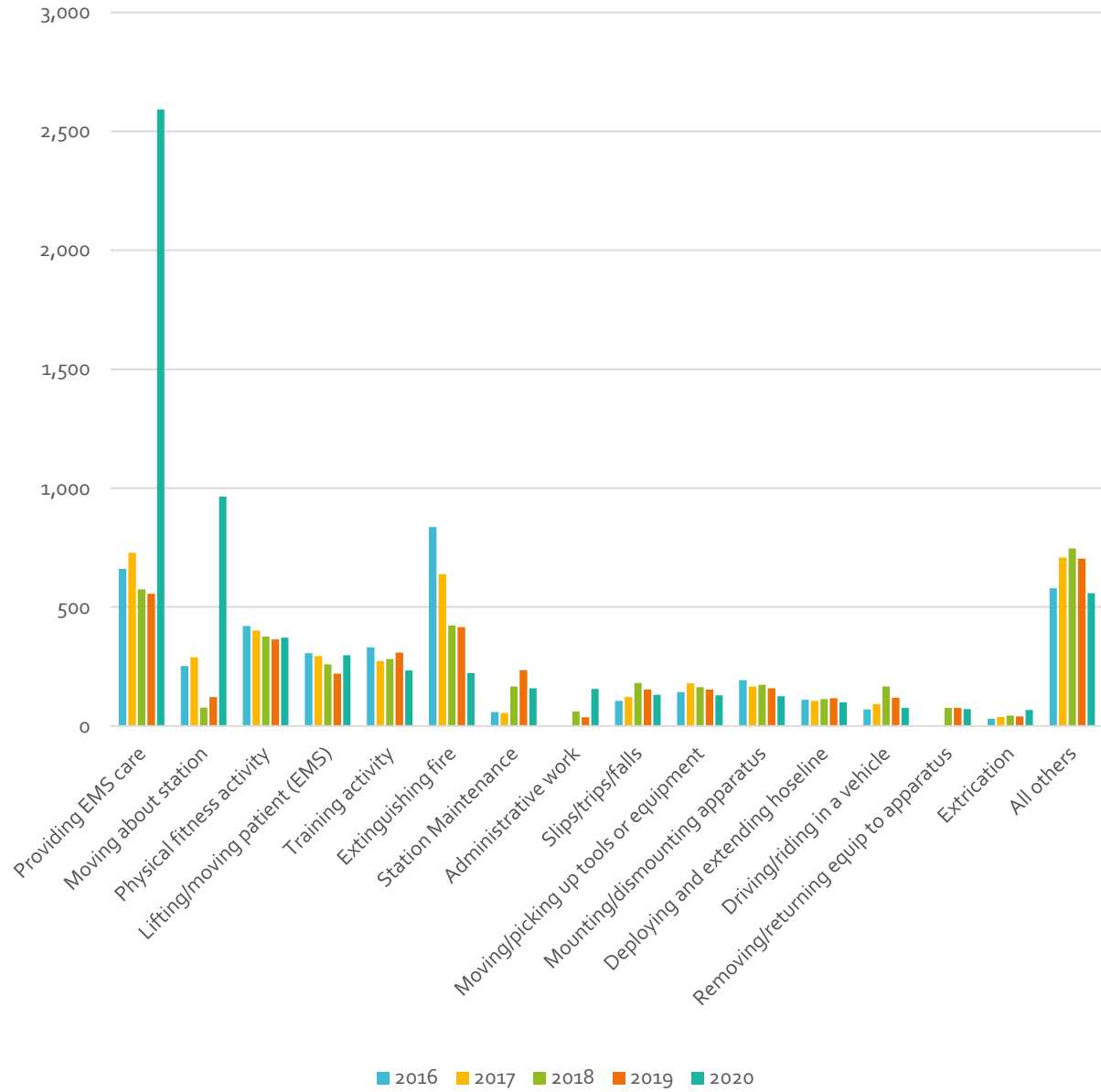


Task at Time of Injury

Table 9: Top 15 Tasks at Time of Injury, 2016-2020 (ordered by 2020, descending)

Task	2016	2017	2018	2019	2020
Providing EMS care	661	728	575	556	2,592
Moving about station	252	289	77	122	965
Physical fitness activity	420	401	376	364	371
Lifting/moving patient (EMS)	306	294	259	220	298
Training activity	331	273	281	309	233
Extinguishing fire	837	638	423	416	222
Station Maintenance	59	55	166	235	159
Administrative work	n/a	n/a	61	37	156
Slips/trips/falls	105	122	181	154	132
Moving/picking up tools or equipment	142	179	163	153	129
Mounting/dismounting apparatus	193	166	173	159	125
Deploying and extending hoseline	111	106	113	117	100
Driving/riding in a vehicle	70	92	166	119	76
Removing/returning equip to apparatus	1	n/a	76	76	71
Extrication	30	38	44	40	68
All others	579	709	747	703	559
Total	4,097	4,090	3,881	3,780	6,256

Figure 5: Top 15 Tasks at Time of Injury, 2016 – 2020



Injuries by Body Part

Table 10: Injuries by Body Part, 2016 – 2017 (ordered by 2017, descending)

Injured Body Part	2016	2017
Multiple body parts, whole body	1,007	1,064
Hand and fingers	359	365
Knee	376	315
Hip, lower back, or buttocks	283	292
Back, except spine	244	248
Shoulder	238	221
Ankle	192	179
Multiple parts	124	151
Face	116	127
Arm, lower, not including elbow or wrist	109	121
Leg, lower	132	113
Foot and toes	85	87
Head	82	78
Ear	74	76
Chest	82	76
Eye	70	73
Multiple body parts, upper body	61	73
Elbow	47	72
Wrist	74	56
Other body parts injured	342	303
Total	4,097	4,090

Because TCFP migrated to a new data management system in 2017, the data collected in years 2018-2020 has been categorized differently than it had been in the past. This is why Table 10 only goes through 2017, and we now have new tables (11 & 12) for 2018-2020 data.

Table 11: Injuries by Body Part Type, 2018 – 2020

Injured Body Part	2018	2019	2020
Upper Extremities	864	795	690
Lower Extremities	810	684	611
Back	490	466	439
Multiple Parts	318	255	281
Head	300	327	197
Internal	105	125	143
Chest	104	108	105
Neck	64	56	33
Hip	23	33	29
Total	3,078	2,849	2,528

Table 12: Injuries by Body Part Sub-Type, 2018 – 2020

Body Part by Sub-Type	2018	2019	2020
Back: Back	198	194	188
Back: Buttocks	1	3	2
Back: Lower Back	282	258	245
Back: Neck	4	4	1
Back: Spine	5	7	3
Chest: Abdomen	5	4	2
Chest: Abdominal Area	10	4	9
Chest: Chest	89	100	94
Head: Cheek	5	7	4
Head: Chin	7	1	4
Head: Ear	77	117	50
Head: Eye	64	60	44
Head: Face	111	112	78
Head: Jaw	1	6	2
Head: Mouth	15	16	10
Head: Nose	20	8	3
Head: Skull	n/a	n/a	2
Hip: Groin	9	14	9
Hip: Hip	13	18	18
Hip: Pelvis	1	1	2
Internal: Genito-urinary	4	11	4
Internal: Heart	5	7	4
Internal: Internal	66	71	74

Internal: Intestinal tract	5	4	3
Internal: Lungs	9	11	51
Internal: Stomach	15	20	7
Internal: Trachea	1	1	0
Lower Extremities: Ankle	206	163	133
Lower Extremities: Foot	93	88	78
Lower Extremities: Knee	347	273	249
Lower Extremities: Lower leg	111	97	95
Lower Extremities: Toes	15	22	13
Lower Extremities: Upper Leg	38	41	43
Multiple Parts: Lower Body	26	19	20
Multiple Parts: Unknown	26	11	27
Multiple Parts: Upper Body	74	76	65
Multiple Parts: Whole Body	192	149	169
Neck: Neck	59	49	30
Neck: Throat	5	7	3
Upper Extremities: Elbow	68	44	34
Upper Extremities: Hands	361	326	311
Upper Extremities: Lower Arm	10	59	55
Upper Extremities: Shoulder	234	235	169
Upper Extremities: Upper Arm	112	72	45
Upper Extremities: Wrist	79	59	76
Total	3,078	2,849	2,528

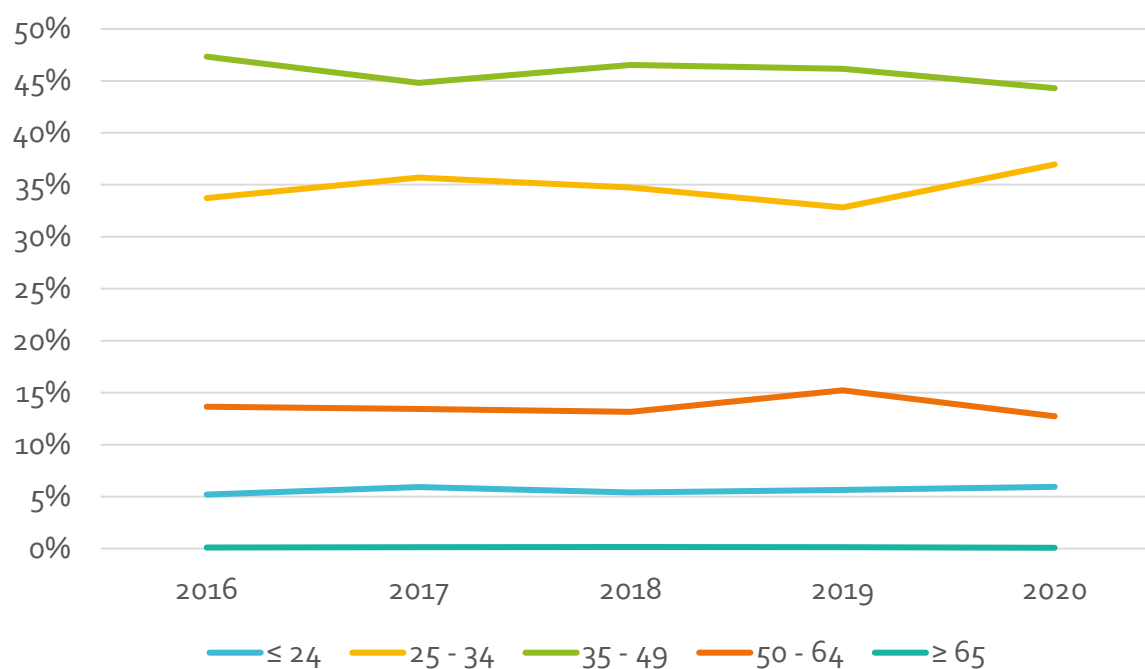
Individuals by Age Group

Table 13: Individuals by Age Group, 2016 – 2020*

Age Group	2016		2017		2018		2019		2020	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
≤ 24	213	5.20%	242	5.92%	210	5.41%	210	5.65%	370	5.94%
25 - 34	1,382	33.73%	1,460	35.70%	1,348	34.73%	1,220	32.82%	2,302	36.96%
35 - 49	1,939	47.33%	1,832	44.79%	1,806	46.53%	1,716	46.17%	2,759	44.29%
50 - 64	559	13.64%	550	13.45%	511	13.17%	566	15.23%	793	12.73%
≥ 65	4	0.10%	6	0.15%	6	0.15%	5	0.13%	5	0.08%
Totals	4,097	100.00%	4,090	100.00%	3,881	100.00%	3,717	100.00%	6,229	100.00%

*Includes injured individuals and individuals with exposures.

Figure 6: Individuals by Age Group, percentages, 2016 – 2020



Activities Resulting in Lost Time

Table 14: Activities Individuals Were Doing that Resulted in Lost Time, 2020 Totals

Activity	Count	Days Missed	
		Average	Sum
EMS	539	21	11,363
Station Duties	434	21	9,261
Wellness/fitness	73	44	3,237
Skills training	84	38	3,265
Fire suppression	76	36	2,795
Returning from incident	10	50	509
Rescue - nonfire-related	17	24	415
Responding to incident	16	39	624
Fire prevention	23	14	335
Rescue - fire-related	1	55	55
Hazmat	3	19	57
Total	1276	33	31,916

Table 15: Activities Individuals Were Doing that Resulted in Lost Time, 2020 Between 1 and 30 days

Activity	Count	Days Missed	
		Average	Sum
EMS	480	14	7,166
Station Duties	393	13	5,218
Skills Training	53	12	660
Wellness/Fitness	42	13	547
Fire Suppression	53	9	529
Fire Prevention	22	13	298
Rescue - Nonfire-related	14	15	211
Responding to incident	10	12	122
Returning from incident	6	10	64
Hazmat	2	4	9
Rescue - fire-related	0	0	0
Total	1075	10	14,824

**Table 16: Activities Individuals Were Doing that Resulted in Lost Time, 2020
Between 31 and 90 days**

Activity	Count	Days Missed	
		Average	Sum
EMS	46	45	2,091
Skills Training	23	61	1,421
Station Duties	25	44	1,121
Wellness/Fitness	20	52	1,051
Fire Suppression	11	49	545
Responding to incident	4	52	209
Returning from incident	2	84	169
Rescue - nonfire-related	2	42	85
Rescue - fire-related	1	55	55
Fire Prevention	1	37	37
Hazmat	1	48	48
Total	136	52	6,832

**Table 17: Activities Individuals Were Doing that Resulted in Lost Time, 2020
91+ days**

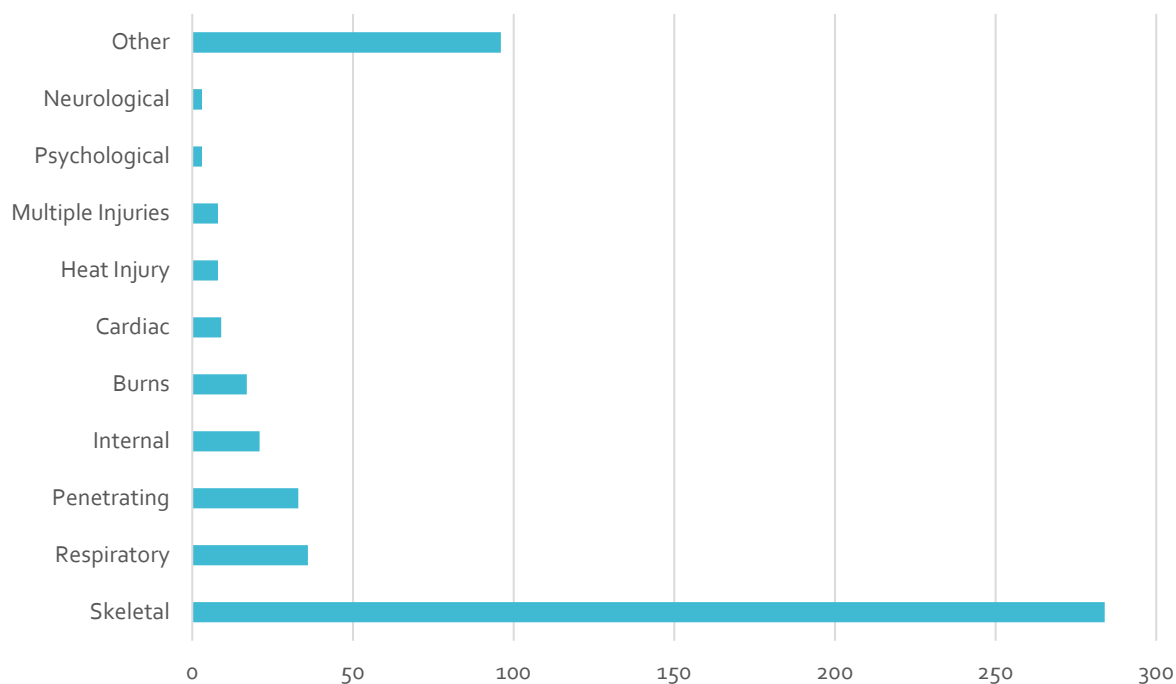
Activity	Count	Days Missed	
		Average	Sum
Station Duties	16	182	2,922
Wellness/Fitness	11	149	1,639
EMS	13	162	2,106
Skills Training	8	148	1,184
Fire Suppression	12	143	1,721
Returning from incident	2	138	276
Rescue - nonfire-related	1	119	119
Rescue - fire-related	0	0	0
Fire Prevention	0	0	0
Responding to incident	2	146	293
Hazmat	0	0	0
Total	65	108	10,260

Types of Injuries with Lost Time

Table 18: Types of Injuries Resulting in Lost Time, 2020

Type of Injury	Count
Skeletal	284
Respiratory	36
Penetrating	33
Internal	21
Burns	17
Cardiac	9
Heat Injury	8
Multiple Injuries	8
Psychological	3
Neurological	3
Other	96
Total	518

Figure 7: Types of Injuries Resulting in Lost Time, 2020



Burn Injuries

Table 19: All Burns, 2016 – 2020

All Burns - Types	2016	2017	2018	2019	2020
Thermal (Heat/Fire)	92	96	108	72	80
Scald or Steam	9	13	12	10	11
Chemical	3	4	6	6	2
Electrical	2	0	1	2	3
Totals	106	113	127	90	96

Table 20: Burns by Body Part Sub-Type, 2020

Body Part Sub-Type	Count
Back: Back	0
Back: Buttocks	0
Back: Lower Back	0
Back: Neck	0
Back: Spine	0
Chest: Abdomen	0
Chest: Abdominal Area	0
Chest: Chest	0
Head: Cheek	1
Head: Chin	3
Head: Ear	12
Head: Eye	3
Head: Face	8
Head: Jaw	0
Head: Mouth	0
Head: Nose	0
Hip: Groin	0
Hip: Hip	0
Hip: Pelvis	0
Internal: Genito-urinary	0
Internal: Heart	0
Internal: Internal	0
Internal: Intestinal tract	0
Internal: Lungs	0
Internal: Stomach	0
Internal: Trachea	0

Lower Extremities: Ankle	1
Lower Extremities: Foot	4
Lower Extremities: Knee	1
Lower Extremities: Lower Leg	1
Lower Extremities: Toes	0
Lower Extremities: Upper Leg	1
Multiple Parts: Lower Body	0
Multiple Parts: Unknown	0
Multiple Parts: Upper Body	11
Multiple Parts: Whole Body	0
Neck: Neck	2
Neck: Throat	0
Upper Extremities: Elbow	1
Upper Extremities: Hands	20
Upper Extremities: Lower Arm	14
Upper Extremities: Shoulder	4
Upper Extremities: Upper Arm	0
Upper Extremities: Wrist	9
Total	96

Table 21: Burns by Body Part, 2016 – 2020, Comparison to Historical Data

Body Part	2016	2017	2018*	2019*	2020*
Ear	14	16	17	17	12
Hand and fingers	27	22	30	16	20
Face	16	9	14	10	12
Wrist	9	7	8	11	9
Multiple body parts, upper body	8	4	10	6	11
Eye	0	0	4	5	3
Hip, lower back, or buttocks	1	0	0	5	0
Foot and toes	3	1	6	4	4
Multiple parts	4	12	5	4	0
Arm, upper, not including elbow or shoulder	1	2	11	3	0
Lower extremities	2	0	8	3	3
Chest	1	1	2	2	0
Neck	4	7	2	2	2
Knee	1	2	0	1	1

Shoulder	3	6	9	1	4
Back, except spine	0	2	1	0	0
Elbow	0	1	0	0	1
Pelvis or groin	0	2	0	0	0
Throat	0	0	0	0	0
Arm, lower, not including elbow or wrist	2	12	n/a	n/a	14
Head	2	1	n/a	n/a	n/a
Leg, lower	3	3	n/a	n/a	n/a
Upper extremities	2	0	n/a	n/a	n/a
Neck and shoulders	0	1	n/a	n/a	n/a
Undetermined	3	2	n/a	n/a	0
Total	106	113	127	90	96

*The 2018, 2019, and 2020 columns were pieced together from the data in Table 20: Burns by Body Part Sub-Type, from the 2018, 2019, and 2020 injury report data. This was done in order to view trends and patterns.

Exposures

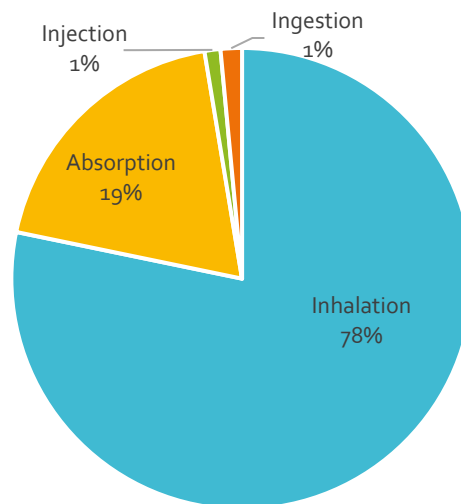
Table 22: Exposure by Sub-Type, 2018 – 2020

Exposure + Sub-Type	2018	2019	2020
Chemical: Ammonia	1	3	0
Chemical: Battery Acid*	n/a	4	0
Chemical: Benzene	2	15	1
Chemical: Bleach	1	11	0
Chemical: Not listed	151	160	70
Chemical: Unidentified	73	55	27
Physical: Animal venom	6	17	5
Physical: Meningitis	38	40	33
Physical: Not listed	138	201	41
Physical: Plant toxin	27	14	12
Physical: Radiation*	n/a	4	1
Physical: Unidentified	87	66	7
Physical: UV Light*	n/a	2	1
Respiratory: Blood	69	73	73
Respiratory: COVID 19*	n/a	1	1,606
Respiratory: Influenza	4	19	6
Respiratory: Not listed	108	118	55
Respiratory: Saliva	24	22	28
Respiratory: Tuberculosis	98	76	31
Respiratory: Unidentified	50	37	5
Respiratory: Vomit	7	8	8
Other: Asbestos*	n/a	3	1
Other: Carbon Monoxide*	n/a	1	5
Other: Carcinogenic Substances*	n/a	1	13
Other: Contaminated Water/Sewage*	n/a	4	11
Other: Heavy Metals*	n/a	0	1
Other: Mold*	n/a	0	8
Other: Smoke/Products of Combustion*	n/a	5	17
Other: Virus	n/a	3	1,878
Total	884	963	3,944

*These exposure types were added to the injury reporting application in 2019, which is why they have n/a in the numbers column for 2018.

Table 23: Exposure by Route, 2020

Route	Count
Inhalation	3,086
Absorption	755
Ingestion	59
Injection/Puncture	44
Total	3,944

Figure 8: Exposure by Route, 2020, percentages*Table 24: Exposure by Substance, 2020*

Substance	Count
Gas/vapor	1,921
Liquid	1,543
Solid	480
Total	3,944

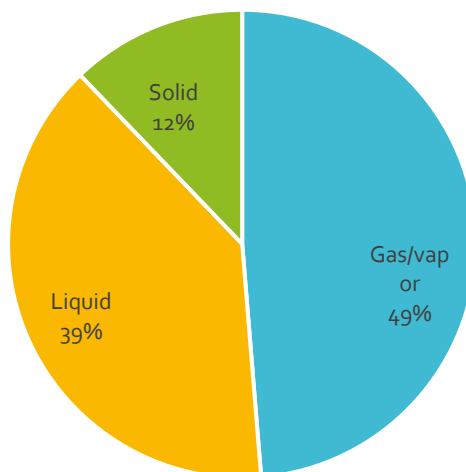
Figure 9: Exposure by Substance, 2020, percentages

Table 25: Routes of Exposure, Historical Data, 2016 – 2017

Exposure Routes	2016	2017
Airborne pathogens	290	354
Undetermined	273	325
Blood pathogens	194	174
Body Fluids	121	173
Chemical (household/industrial)	310	147
Plant toxins	37	36
Chemical (carbon monoxide)	27	1
Total	1,252	1,210

Figure 10: Routes of Exposure, Historical Data, 2016 – 2017

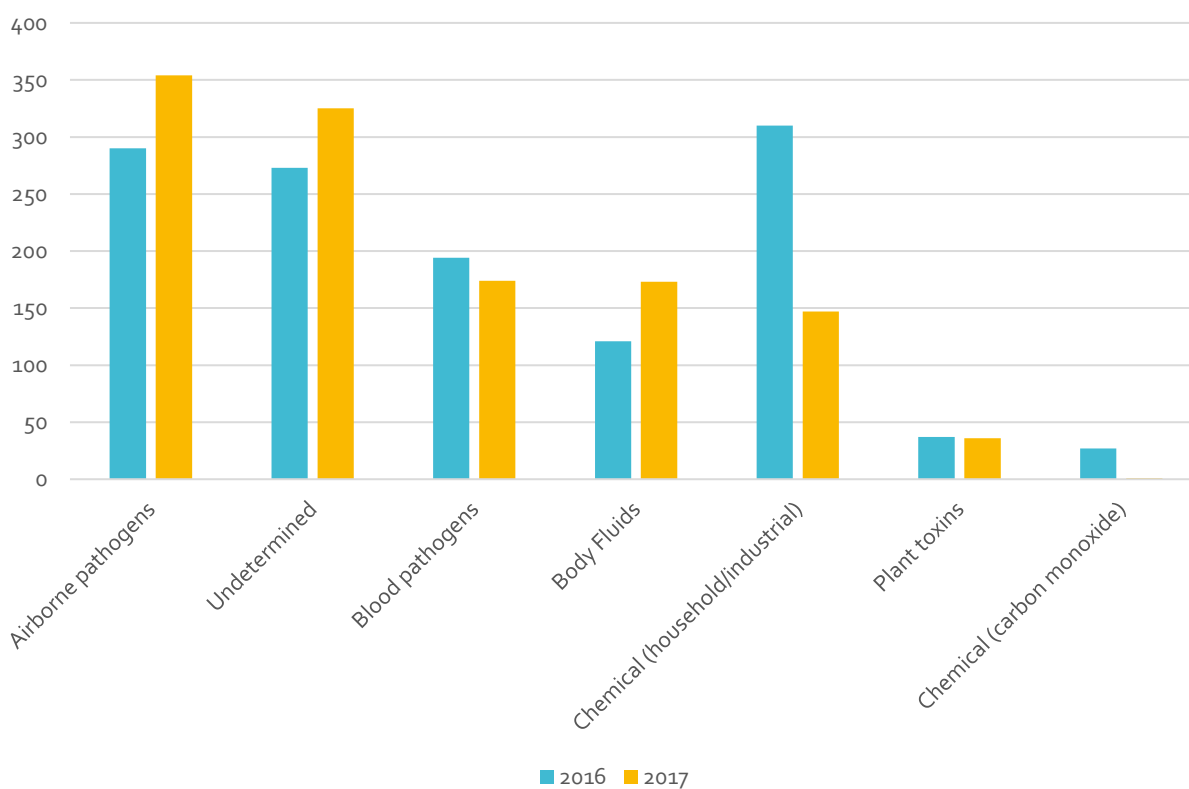


Table 26: Exposure Description, Historical Data, 2016 – 2017

Exposure description	2016	2017
Unknown	148	290
Blood	161	153
Chemicals/household/industrial	310	122
Asbestos	51	112
Tuberculosis	128	109
Body fluids	91	101
Meningitis	62	104
Animals or wildlife	90	58
Sickness, other	24	49
Poison plants	37	37
Vomit	14	17
Chlorine	1	14
Mold	26	10
Airborne, other	40	7
Staph	0	7
Carbon monoxide	26	5
HIV	4	4
Scabies	21	4
Hepatitis C	14	3
MRSA	14	3
Bacterial pneumonia	0	1
Explosive residue	0	0
Influenza	0	0
Lice	0	0
Strep	1	0
Total	1,263	1,210

Cancer

In June of 2019, the Governor of Texas signed Senate Bill 2551 (SB 2551) which expanded the scope of the law in which firefighters and EMTs who suffer from cancer are presumed to have developed the condition during the course and scope of their employment. The types of cancer this law addresses include:

- cancers that originate at the stomach, colon, rectum, skin, prostate, testis or brain
- non-Hodgkin's lymphoma
- multiple myeloma
- malignant melanoma
- renal cell carcinoma

TCFP received **47** reports of cancer diagnoses from fire departments in 2020:

Skin/Melanoma/Basal Cell/Squamous Cell carcinoma – 10

(Males, ages 34, 36, 37, 37, 38, 38, 50, 50, 53, 56)

Prostate – 9

(Males – ages 48, 52, 53, 54, 58, 58, 59, 60, 62)

Non-Hodgkin's Lymphoma – 7

(Males – 30, 38, 47, 61, 61, 64, 64)

Kidney/renal cell carcinoma – 3

(Males – 50, 51, 51)

Colon – 2

(Males – 25, 42)

Testicular – 2

(Males – 26, 33)

Thyroid – 2

(Males – 29, 30)

Breast – 1

(Female – 49)

A Reminder for Fire Departments

Any injuries to fire protection personnel that are reported to the Texas Worker's Compensation Commission must be reported to the Texas Commission on Fire Protection. This includes cancer diagnoses.

Lung – 1

Male – 30)

Stomach – 1

(Male – 43)

Throat – 1

(Male – 68)

Unidentified – 8

(Males – 31, 43, 45, 49, 53, 59, 61; Female – 18)

The commission strongly encourages fire departments to report cancer diagnoses; the commission recognizes that the number of job-related cancers reported during this time-period represents only a 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.

SOP Issues

In 2020 there were 38 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, 2020

Activity	Minor	Serious	Total	2019	2018	2017
EMS	11	7	18	11	9	7
Fire Suppression	3	7	10	10	19	9
Skills Training	4	1	5	1	2	2
Responding to Incident	2	0	2	0	1	3
Station Duties	0	2	2	6	1	4
Wellness/Fitness	1	0	1	1	0	1
Totals	21	17	38	29	32	26

Table 28: Injuries Attributed to PPE & PASS Failures, 2020

Activity	Minor	Serious	Total	2019	2018	2017*
Fire Suppression	5	2	7	2	8	n/a
EMS	2	2	4	0	1	n/a
Skills Training	1	0	1	2	2	n/a
Totals	8	4	12	4	11	n/a

*TCFP did not start collecting information on PPE & PASS failures until 2018.

Fatalities

The commission's 2020 injury report includes five fatalities. Fatalities listed in this report include only those reported to the Texas Commission on Fire Protection (TCFP) by the entities it regulates.

The State Fire Marshal's Office conducted three Texas fire fighter fatality incident investigations between September 1, 2018 and August 31, 2019. Comprehensive information about the investigations may be found on their website at the following web address:

<https://www.tdi.texas.gov/fire/fmloddannuals.html>

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.

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

[LAST YEAR'S RECOMMENDATIONS BELOW ... JUST A PLACE HOLDER UNTIL THE COMMISSION GIVES ITS RECOMMENDATIONS FOR THE 2020 REPORT]

Recommendations for the Texas Fire Service

1. Continue to focus on reducing strains and sprains:
 - Stretching
 - EMS equipment review/patient moving
 - Equipment deployment/apparatus design
2. Continue to focus on reducing weightlifting injuries:
 - Clarify the purpose of weightlifting (functional fitness vs. body sculpting)
 - Review types of exercise routines
3. Focus on safety during non-emergency activities, especially:
 - station duties
 - training exercises
 - wellness/fitness activities
4. Increase cancer reporting and prevention activities:
 - Consider early detection testing
 - Review the Health and Wellness Committee's March 2019 [presentation](#)
 - Read *The Lavender Ribbon Report* (download a copy [here](#))
 - Clean everything often
5. Reduce fire ground injuries through prevention:
 - Fire risk analysis
 - Familiarity walk through
 - Pre-planning with focus on firefighter safety and injury prevention

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

Commission's web page

NFPA Standards adopted by the commission

11. Subjects for future agenda items.

12. Future meeting dates.

13. Adjourn meeting.