FIRE FIGHTER ADVISORY COMMITTEE
March 10, 2022, 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. If you are not feeling well or were possibly exposed to COVID-19, please stay at home.

1. **Roll call and excuse of committee members.**

2. **Election of officers.**

3. **Adoption of the December 2, 2021, Fire Fighter Advisory Committee meeting minutes.**

4. **Report from the Curriculum and Testing Committee regarding possible changes to the Fire Investigator Certification Curriculum Manual.**

5. **Discussion and possible action on proposed amendments to 37 Tex. Administrative Code, Part 13, Chapter 437, Fees, §437.5, Renewal Fees, and §437.15, International Fire Service Accreditation Congress (IFSAC) Seals.**

6. **Discussion and possible action on proposed amendments to 37 Tex. Administrative Code, Part 13, Chapter 461, Incident Commander.**

7. **Discussion and possible action on rule review of 37 Tex. Administrative Code, Part 13, Chapter 435, Fire Fighter Safety.**

8. **Discussion of the 2021 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.**

9. **Discussion and possible action on rule review for the following:**

    1. **37 Tex. Administrative Code, Part 13, Chapter 403, Criminal Convictions and Eligibility For Certification.**

    2. **37 Tex. Administrative Code, Part 13, Chapter 423, Fire Suppression**

    3. **37 Tex. Administrative Code, Part 13, Chapter 425, Fire Service Instructors**

    4. **37 Tex. Administrative Code, Part 13, Chapter 439 Examinations For Certification**

10. **Subjects for future agenda items.**

11. **Future meeting dates.**

12. **Adjourn meeting.**

1. **Roll call and excuse of committee members.**

2. Election of officers.

3. Adoption of the December 2, 2021, Fire Fighter Advisory Committee meeting minutes.

Presiding Officer Daniel DeYear called the December 2, 2021, meeting of the Fire Fighter Advisory Committee to order at 9:06 a.m. at the William B. Travis Building, 1701 N. Congress Ave., Room 1-104, in Austin, Texas.

Member Attendance	Vince Abrigo Jason Collier	Ken Swindle* Daniel DeYear	Keith Schmidt Daniel Buford*	Antonio Ramos Daniel Anderson	Jim Reidy

*absent entire meeting
**absent part of meeting

Staff	Mike Wisko Rick Wallace	Deborah Cowan	Amanda Khan	Cliff Grant	Grace Wilson
Attendees	Steve A. Gutierrez	Kasey Presson	Paul Hamilton	Chris Watson	Kevin Lisman

1.	Roll call	Secretary, Keith Schmidt called roll and a quorum was present.
2.	Adoption of Minutes discussed.	A motion was made by Jim Reidy and seconded by Jason Collier to approve the minutes from the June 10, 2021, fire fighter advisory committee meeting as The motion carried.
3.	Request from Curtis Dunn	A motion was made by Jim Reidy and seconded by Jason Collier to recommend to the commission to make the program required training within two years from date of approval and then within the first year of appointment. The motion carried.
4.	Curriculum & Testing Committee	A motion was made to recommend to the commission approval of the Fire Officer Curriculum amendments as discussed. The motion carried.
5.	Chapter 437 Fees	No action taken.
6.	Chapter 455 Minimum Standards For Wildland Fire Protection Certification	A motion was made by Jim Reidy and seconded by Jason Collier to accept the amendments to 37 TAC, Chapter 455, Minimum Standards For Wildland Fire Protection Certification as proposed by the commission. The motion carried.
7.	Chapter 403 Criminal Convictions and Eligibility For Certification	A motion was made by Jason Collier and seconded by Keith Schmidt to recommend to the commission to create an ad-hoc committee to review Chapter 403 and to include members of the Fire Fighter Advisory Committee, the commission, stakeholder groups and agency staff. The motion carried.
8.	Report from Daniel DeYear on the ad-hoc advisory committee	No action necessary.

8.	Report from Daniel DeYear on the ad-hoc advisory committee	No action necessary.
9.	Report from Daniel DeYear on Chapter 435 ad-hoc committee	No action necessary.
10.	Update from Agency Chief	Mike Wisko, Agency Chief gave a brief update on agency changes to date.
11.	Subjects for future agendas	None identified.
12.	Future meeting Dates	The committee set the following meeting dates: March10, 2022, June 23, 2022, September 15, 2022, and December 8, 2022, all beginning at 9:00 a.m.
13.	Adjournment	A motion was made by Jim Reidy and seconded by Keith Schmidt to adjourn. The motion carried.

Daniel DeYear
Presiding Officer

4. **Report from the Curriculum and Testing Committee regarding possible changes to the Fire Investigator Certification Curriculum Manual.**

CERTIFICATION CURRICULUM MANUAL

CHAPTER FIVE

FIRE INVESTIGATOR

NFPA 921, 2021 Edition
NFPA 1033, ~~2014~~ 2022 Edition

Effective June 1, ~~20212022~~

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

REFERENCE LIST FOR THE FIRE INVESTIGATOR 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

Certification Curriculum Manual. Austin, TX: Texas Commission on Fire Protection.

Emergency Response Guidebook, (Current ed.) U.S. Department of Transportation Research and Special Programs Administration, Office of Hazardous Materials Initiatives and Training.

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

Fire Investigator: Principles and Practice (5th ed.) (2019). Burlington, MA: Jones and Bartlett Learning.

Icove, David J., *Kirk's Fire Investigation*, (8th ed.) (2018). New York, NY: Pearson Education, Inc.

Lentini, John J., Scientific Protocols for Fire Investigation (3rd ed.) (2019). Boca Raton, FL: CRC Press.

NFPA 921: Guide for Fire and Explosion Investigations (2021 ed.) Quincy, MA: National Fire Protection Association. NFPA Publications.

NFPA 1033: Standard for Professional Qualifications for Fire Investigator (~~2014~~ 2022 ed.) Quincy, MA: National Fire Protection Association. NFPA Publications.

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

ASTM E620 *Standard Practice for Reporting Opinions of Scientific or Technical Experts* (current ed.)

ASTM E678 *Standard Practice for Evaluation of Scientific or Technical Data* (current ed.)

ASTM E860 *Standard Practice for Examining and Preparing Items That Are Or May Become Involved in Criminal or Civil Litigation* (current ed.)

ASTM E1188 *Standard Practice for Collection and Preservation of Information and Physical Items by a Technical Investigator* (current ed.)

ASTM E1459 *Standard Guide for Physical Evidence Labeling and Related Documentation* (current ed.)

Recommended References

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

ASTM E1020 *Standard Practice for Reporting Incidents that May Involve Criminal or Civil Litigation* (current ed.)

ASTM E1492 *Standard Practice for Receiving, Documenting, Storing, and Retrieving Evidence in a Forensic Science Laboratory* (current ed.)

ASTM E2917 *Standard Practice for Forensic Science Practitioner Training, Continuing Education, and Professional Development Programs* (current ed.)

Building Construction Related to the Fire Service (4th ed.) (2016). Stillwater, OK: Fire Protection Publications. International Fire Service Training Association.

Cole, Lee S., *Investigation of Motor Vehicles*, (current ed.). Lee Books.

Crime Scene Investigation: A Guide for Law Enforcement (current ed.). Largo, FL: National Forensic Science Technology Center. (On 5/06/21 this publication was available online at https://nist.gov/system/files/documents/forensics/crime-scene-investigation.pdf)

Emergency Field Guide, (current ed.). NFPA. https://catalog.nfpa.org/Emergency-Field-Guide-P13872.aspx

Crime Laboratory Service Manual Part II: Handbook. Texas Department of Public Safety. Current edition. https://txdpslabs.qualtraxcloud.com/showdocument.aspx?ID=67707

Fent, Kenneth. "Contamination of firefighter personal protective equipment and skin and the effectiveness of decontamination procedures." *Journal of Occupational and Environmental Hygiene*. (2017).

Fire and Arson Scene Evidence: A Guide for Public Safety Personnel, (current ed.). Washington, DC: US Department of Justice, Office of Justice Programs.

(On 5/06/21 this publication was available online at https://www.ncjrs.gov/pdffiles1/nij/181584.pdf)

Fire Protection, Detection, and Suppression Systems (5th ed.)(2016). Stillwater, OK: Fire Protection Publications. International Fire Service Training Association (IFSTA).

Fire Protection Handbook (current ed.). National Fire Protection Association.

Fires in Texas, Annual Fire Statistics report (current ed.) Texas State Fire Marshals Office. Department of Insurance, TEXFIRS section. A link to the report can be found on their website: www.tdi.texas.gov/fire/

Gorbett, Gregory E. *Fire Dynamics* (2nd ed.) (2016). Boston: Pearson.

Guide to Wildland Fire Origin and Cause Determination (PMS 412)(current ed.), National Wildfire Coordinating Group. (On 5/06/21 this publication was available online at https://www.nwcg.gov/sites/default/files/publications/pms412.pdf)

Health Hazard Evaluation Report 96-0171-2692. Bureau of Alcohol, Tobacco, and Firearms. Washington D.C. May 1988.

Konefal, Joseph and Edward Nordskog. *Fire Death Scene Investigation.* (2019). Self-published. www.arsonprofiler.com.

Munday, James W., *Safety at Scenes of Fire and Related Incidents* (current ed.). London: The Fire Protection Association.

NFPA 170: Standard for Fire Safety and Emergency Symbols (current ed.) Quincy, MA: National Fire Protection Association. NFPA Publications.

NFPA 472: Standard for Professional Competence of Responders to Hazardous Materials Incidents (current ed.). Quincy, MA: National Fire Protection Association. NFPA Publications.

NFPA 556: Guide on Methods for Evaluating Fire Hazard to Occupants of Passenger Road Vehicles (current ed.) Quincy, MA: National Fire Protection Association. NFPA Publications.

NFPA 1037: Standard on Fire Marshal Professional Qualifications (current ed.). Quincy, MA: National Fire Protection Association. NFPA Publications.

NFPA 1730: Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public

Education Operations (current ed.). Quincy, MA: National Fire Protection Association. NFPA Publications.

NIJ Research Report: *Death Investigation: A Guide for the Scene Investigator* (current ed.). US Department of Justice, Office of Justice Programs, National Institute of Justice. (On 5/06/21 this publication was available online at https://www.ncjrs.gov/pdffiles1/nij/234457.pdf)

Passenger Vehicle Identification Manual (current ed.) National Insurance Crime Bureau, 1111 E. Touhy Avenue, Suite 400, Des Plaines, IL 60018-2805.

Physical Evidence Handbook (current ed.). Texas Department of Public Safety. (On 5/06/21 this publication was available online at https://www.dps.texas.gov/CrimeLaboratory/documents/PEHmanual.pdf)

Pocket Guide to Fire and Arson Investigation (P7923) (current ed.). Factory Mutual Global.

Rules of Criminal Evidence, latest edition. (On 5/06/21, this information was available online at http://www.txcourts.gov/rules-forms/rules-standards.aspx).

Strengthening Fire and Explosion Investigation in the United States: A Strategic Vision for Moving Forward. 1 Apr. 2021, https://doi.org/10.29325/OSAC.TG.0005. Accessed 27 Apr. 2021.

~~Strengthening Fire and Explosion Investigation in the United States: A Strategic Vision for Moving Forward. Available online at https://doi.org/10.29325/OSAC.TG.0005, April 2021~~

Strengthening Forensic Science in the United States: A Path Forward, (current ed.) (Committee on Identifying the Needs for the Forensic Sciences Community. National Research Council. (On 5/06/21 this publication was available online at https://www.ncjrs.gov/pdffiles1/nij/grants/228091.pdf)

Texas Code of Criminal Procedure, latest edition. (On 5/06/21, this information was available online at http://www.statutes.legis.state.tx.us/).

Texas Family Code, current ed. (On 5/06/21, this information was available online at http://www.statutes.legis.state.tx.us/).

Texas Insurance Code, current ed. (On 5/06/21, this information was available online at http://www.statutes.legis.state.tx.us/).

Texas Penal Code, current ed. (On 5/06/21, this information was available online at http://www.statutes.legis.state.tx.us/).

Texas Public Information Act Handbook, current ed. (On 5/06/21, this information

was available online at http://www.oag.state.tx.us/AG_publications/pdfs/publicinfo_hb.pdf. It is available through the Texas Attorney General's office.)

United States Constitution. (On 5/06/21, this information was available online at http://www.archives.gov/exhibits/charters/charters.html).

CHAPTER FIVE
FIRE INVESTIGATOR
COURSE OUTLINE

SECTION	SUBJECT	RECOMMENDED HOURS
501-1	Commission on Fire Protection Rules and Regulations	2
501-2	NFPA 1033 - Administration	
501-3	Definitions	
501-4	Basic Methodology	2
501-5	Basic Fire Science	16
501-6	Fire Effects and Fire Patterns	20
501-7	Building Systems	2
501-8	Active Fire Protection Systems	4
501-9	Electricity and Fire	8
501-10	Building Fuel Gas Systems	4
501-11	Fire-Related Human Behavior	4
501-12	Legal Considerations	12
501-13	Safety	4
501-14	Sources of Information	6
501-15	Planning the Investigation	2
501-16	Documentation of the Investigation	12
501-17	Physical Evidence	12
501-18	Origin Determination	8
501-19	Fire Cause Determination	4
501-20	Analyzing the Incident for Cause and Responsibility	4
501-21	Failure Analysis and Analytical Tools	8
501-22	Explosions	8
501-23	Incendiary Fires	8
501-24	Fire and Explosion Deaths and Injuries	4
501-25	Appliances	2
501-26	Motor Vehicle Fires	8
501-27	Wildfire Investigations	8
501-28	Management of Complex Investigations	2
501-29	Marine Fire Investigations	2
501-30	Practical Exercises	24
	TOTAL HOURS RECOMMENDED	**200**

* The recommended hours includes time for skills evaluation and is based on 12 students. Actual hours needed will depend on the number of students, the number of examiners, availability of equipment, and the student skill level.

NFPA 1033 MATRIX

2014 Objective	LOCATION IN CURRICULUM	SKILL
4.1	**GENERAL**	
4.1.1	1	None
4.1.2	4	None
4.1.3	13, 15, 26	None
4.1.4	14, 15	None
4.1.5	12	None
4.1.6	15, 28	None
4.1.7	4,5,7,8,9,10,13,16,17,20,21,22	None
4.2	**SCENE EXAMINATION**	
4.2.1	15, 17	1
4.2.2	13, 18	2, 26
4.2.3	18,	3
4.2.4	5, 6, 26	4, 5
4.2.5	5, 6, 7, 18, 26	5
4.2.6	5, 17, 26	6
4.2.7	6	7
4.2.8	7, 8, 9, 10, 14, 25	8
4.2.9	22	6
4.3	**DOCUMENTING THE SCENE**	
4.3.1	16, 17	9
4.3.2	16	10
4.3.3	12, 16	11
4.4	**EVIDENCE COLLECTION/PRESERVATION**	
4.4.1	11, 17, 24	12
4.4.2	12, 17	12
4.4.3	14, 17	12
4.4.4	12, 17	13
4.4.5	17	14
4.5	**INTERVIEW**	
4.5.1	14	15
4.5.2	14	16
4.5.3	14	17
4.6	**POST-INCIDENT INVESTIGATION**	
4.6.1	14, 16, 20, 21	18
4.6.2	16, 20, 21	19
4.6.3	12, 14, 15, 20, 21	20
4.6.4	11, 20, 21, 23	21
4.6.5	11, 18, 19, 20, 21, 23	22
4.7	**PRESENTATIONS**	
4.7.1	16, 30	23
4.7.2	30	24
4.7.3	12, 30	25
Annex A	**EXPLANATORY MATERIAL**	
A.1.1	26, 27, 29	

Course Instructor Information

Fire Investigator

Overview

The Fire Investigator curriculum is designed to provide clear guidance that ensures adequate presentation of the information required to meet the Job Performance Requirements (JPRs) of National Fire Protection Association (NFPA) 1033, *Standard for Professional Qualifications for Fire Investigator*, 2022~~14~~ edition.

The Fire Investigator curriculum is Chapter 5 of the Texas Commission on Fire Protection (TCFP) Curriculum Manual.

Certification Level	TCFP Chapter Number	NFPA 1033 Chapter
Fire Investigator	5	4

Layout

The NFPA numbering sequence is mirrored to allow easy correlation between this document and the NFPA Standard. For example, 501-5.5.1 identifies the section in Fire Investigator that corresponds to *NFPA 921, Guide for Fire and Explosion Investigation (2021 Edition)* section 5.5.1.

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 431, Fire Investigator Certification; Chapter 439, Examinations for Certification; 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 text does not provide adequate information to ensure successful completion of the Job Performance Requirements as listed in the curriculum.

Components of the Curriculum

Each section of the curriculum identifies the NFPA JPR in NFPA 1033, *Standard for Professional Qualifications for Fire Investigator*, ~~2014~~ 2022 Edition and knowledge components in *NFPA 921, Guide for Fire and Explosion Investigations, 2021 Edition* and subdivides them into learning components.

For example:

4.6 Post-Incident Investigation.

Duties shall include the investigation of all factors beyond the fire scene at the time of the origin and cause determination.

NFPA 1033 4.6.5* Formulate an opinion concerning origin, cause, or responsibility for the fire, given all investigative findings, so that the opinion regarding origin, cause, or responsibility for a fire is supported by the data, facts, records, reports, documents, and evidence.
(A) Requisite Knowledge: Analytical methods and procedures (e.g., hypothesis development and testing, systems analysis, time lines, link analysis, fault tree analysis, and data reduction matrixing).
(B) Requisite Skills: Analytical and assimilation skills.

501-19.1 ***The Investigator candidate shall define fire cause and identify fire cause factors.***

19.1.1 Fire Cause Factors

19.1.2 First Fuel Ignited

19.1.3 Ignition Source

19.1.4 Oxidant

19.1.5 Ignition Sequence

501-19.2 ***The Investigator candidate shall utilize the scientific method as the overall methodology.***

19.1.1 Consideration of Data

19.1.2 Sequence of Activities

19.1.3 Point and Area of Origin

501-19.3 ***The Investigator candidate shall identify the data that needs to be collected for fire cause determination.***

Skills

NFPA's "Requisite Skills" requirements are addressed in the corresponding Skill Sheets and are based on the JPRs in National Fire Protection Association (NFPA) 1033, *Standard for Professional Qualifications for Fire Investigator*, 20222~~14~~ edition.

Descriptions of Certification Levels

A Fire Investigator is an individual who has demonstrated the skills and knowledge necessary to conduct, coordinate, and complete a fire investigation.

Fire Investigator

A Fire Investigator is an individual who has demonstrated the knowledge, skills, and abilities necessary to conduct, coordinate, and complete a fire investigation employing all the elements of the scientific method as the operating analytical process throughout the investigation. A Fire Investigator can competently determine the origin and cause of a fire and has mastered all the job performance requirements of NFPA 1033: *Standard for Professional Qualifications for Fire Investigator*.

SECTION 1

COMMISSION ON FIRE PROTECTION

RULES AND REGULATIONS

4.1 General
NFPA 1033 4.1.1 The fire investigator shall meet the job performance requirements defined in Sections 4.2 through 4.7.

References:
Certification Curriculum Manual
Standards Manual for Fire Protection Personnel

501-1.1 ***The Investigator candidate shall describe the purpose of the NFPA standard and guide applicable to Fire Investigators.***

1.1.1 NFPA 1033 *Standard for Professional Qualifications for Fire Investigator,* ~~2014~~ 2022 edition.

1.1.2 NFPA 921 *Guide for Fire and Explosion Investigations,* 2021 edition.

501-1.2 ***The Investigator candidate shall identify rules applicable to the Fire/Arson Investigator certification adopted by the Texas Commission on Fire Protection.***

1.2.1 The Investigator candidate shall identify the requirements for certification as a Fire Investigator as stated in the *Standards Manual for Fire Protection Personnel*, Chapter 431.

1.2.2 The Investigator candidate shall identify the requirements for certification as an Arson Investigator as stated in the

Standards Manual for Fire Protection Personnel, Chapter 431.

1.2.3 The Investigator candidate shall identify the various levels of certification for Fire and/or Arson Investigator, as stated in the *Standards Manual for Fire Protection Personnel,* Chapter 431.

1.2.3.1 Basic
1.2.3.2 Intermediate
1.2.3.3 Advanced
1.2.3.4 Master

SECTION 2

NFPA 1033

NFPA 1033 1.1* Scope. This standard shall identify the professional level of job performance requirements for fire investigators.

1.2 * Purpose. This standard shall specify the minimum JPRs for serving as a fire investigator in both the private and public sectors.

1.2.1 This standard shall define the fire investigator position.

1.2.2 The intent of this standard shall be to ensure that individuals who serve as fire investigators are qualified to do so.

1.2.3 It shall not be the intent of this standard to restrict any jurisdiction from exceeding or combining these minimum requirements.

1.2.4 JPRs for each duty are the tasks personnel shall be able to perform to successfully carry out that duty.

1.2.5 Fire investigators who perform or support fire investigations shall remain current with the general knowledge, skills, and JPRs.

1.2.6 Fire investigators who perform or support fire investigations shall remain current with practices and applicable standards.

1.3 Application.

The application of this standard shall be to specify the JPRs that shall apply to specific personnel who perform and support fire investigations.

1.3.1 The JPRs shall be accomplished in accordance with the requirements of the AHJ and all applicable NFPA and other standards development organization (SDO) standards.

1.3.2 Priority.

1.3.2.1 * It shall not be required that the JPRs be mastered in the order in which they appear.

1.3.2.2 The AHJ shall establish instructional priority and the training program content to prepare personnel to meet the JPRs of this standard.

1.3.2.3 * The performance of each requirement of this chapter shall be evaluated by personnel approved by the AHJ.

1.3.2.4 The JPRs for fire investigators shall be completed in accordance with recognized practices and procedures or as defined by law or by the AHJ.

1.3.2.5 Fire investigators who perform or support fire investigations shall meet the requirements of this standard for each fire investigation performed.

1.3.2.6 The AHJ shall provide the necessary personal protective equipment (PPE), force protection, and clothing to conduct assignments.

1.3.2.7 JPRs involving exposure to products of combustion shall be performed in approved PPE.

1.3.2.8 Prior to training to meet the requirements of this standard, personnel shall meet the following requirements:

(1) Be at least age 18
(2) Have a high school diploma or equivalent
(3) Be subjected to a thorough background and character investigation by the AHJ prior to being accepted as an individual candidate for certification as a fire investigator

~~**1.2* Purpose.** The purpose of this standard shall be to specify the minimum job performance requirements for serving as a fire investigator in both the private and public sectors.~~

~~**1.2.1** It is not the intent of this standard to restrict any jurisdiction from exceeding the minimum requirements.~~

~~**1.2.2** Job performance requirements for each duty are the tasks an individual must be able to perform in order to successfully carry out that duty; however, they are not intended to measure a level of knowledge. Together, the duties and job performance requirements define the parameters of the job of fire investigator.~~

~~**1.3 General.**~~

~~**1.3.1** The fire investigator shall be at least age 18.~~

~~**1.3.2** The fire investigator shall have a high school diploma or equivalent.~~

~~**1.3.3** The authority having jurisdiction shall conduct a thorough background and character investigation prior to accepting an individual as a candidate for certification as a fire investigator.~~

~~**1.3.4** The job performance requirements for fire investigator shall be completed in accordance with established practices and procedures or as they are defined by law or by the authority having jurisdiction.~~

~~**1.3.5*** The job performance requirements found in this standard are not required to be mastered in the order they appear. Training agencies or authorities shall establish instructional priority and the training program content to prepare individuals to meet the job performance requirements of this standard.~~

~~**1.3.6*** Evaluation of job performance requirements shall be by individuals who are qualified and approved by the authority having jurisdiction.~~

~~**1.3.7*** The investigator shall have and maintain at a minimum an up-to-date basic knowledge of the following topics beyond the high school level:~~

- ~~(1) Fire science~~
- ~~(2) Fire chemistry~~
- ~~(3) Thermodynamics~~
- ~~(4) Thermometry~~
- ~~(5) Fire dynamics~~
- ~~(6) Explosion dynamics~~
- ~~(7) Computer fire modeling~~
- ~~(8) Fire investigation~~
- ~~(9) Fire analysis~~
- ~~(10) Fire investigation methodology~~
- ~~(11) Fire investigation technology~~
- ~~(12) Hazardous materials~~
- ~~(13) Failure analysis and analytical tools~~
- ~~(14) Fire protection systems~~
- ~~(15) Evidence documentation, collection, and preservation~~
- ~~(16) Electricity and electrical systems~~

~~**1.3.8*** The fire investigator shall remain current in the topics listed in 1.3.7 by attending formal education courses, workshops and seminars and/or through professional publications and journals.~~

4.1.1* The fire investigator shall meet the job performance requirements defined in Sections 4.2 through 4.7. (see below)

4.1.2* The fire investigator shall employ all elements of the scientific method as the operating analytical process throughout the investigation and for the drawing of conclusions.

4.1.3* Because fire investigators are required to perform activities in adverse conditions, site safety assessments shall be completed on all scenes and regional and national safety standards shall be followed and included in organizational policies and procedures.

4.1.4* The fire investigator shall maintain necessary liaison with other interested professionals and entities.

4.1.5* The fire investigator shall adhere to all applicable legal and regulatory requirements.

4.1.6 The fire investigator shall understand the organization and operation of the investigative team within an incident management system.

4.1.7 * In order to successfully complete the tasks identified in the JPRs of Sections 4.2 through 4.7, the fire investigator shall remain current in the subjects listed as “requisite knowledge” as they relate to fire investigations, which include the following:

(1) Fire science:
1. (a) Fire chemistry
2. (b) Thermodynamics
3. (c) Fire dynamics
4. (d) Explosion dynamics

(2) Fire investigation:
5. (a) Fire analysis
6. (b) Fire investigation methodology
7. (c) Fire investigation technology
8. (d) Evidence documentation, collection, and preservation
9. (e) Failure analysis and analytical tools

(3) Fire scene safety:
10. (a) Hazard recognition, evaluation, and basic mitigation procedures
11. (b) Hazardous materials
12. (c) Safety regulations

(4) Building systems:

13. (a) Types of construction
14. (b) Fire protection systems
15. (c) Electricity and electrical systems
16. (d) Fuel gas systems

4.1.7.1 The fire investigator shall remain current in the subjects listed as "requisite knowledge" for the JPRs and as summarized in 4.1.7.

4.1.7.2 The fire investigator shall remain current by attending formal education courses, workshops, in-person or online seminars, and/or through professional publications, journals, and treatises.

~~**4.1.6**~~ **4.1.7.3** The fire investigator shall complete and document a minimum of 40 hours of continuing education training every five years by attending formal education courses, workshops, and seminars.

28 Job Performance Requirements (Annex C, Table C.1)

1-Secure the fire ground (4.2.1)
2-Conduct an exterior survey (4.2.2)
3-Conduct an interior survey (4.2.3)
4-Interpret fire patterns (4.2.4)
5-Interpret and analyze fire patterns (4.2.5)
6-Examine and remove fire debris (4.2.6)
7-Reconstruct the area of origin (4.2.7)
8-Inspect the performance of building systems (4.2.8)
9-Discriminate the effects of explosions (4.2.9)
10-Diagram the Scene (4.3.1)
11-Photographically document the scene (4.3.2)
12-Construct investigative notes (4.3.3)
13-Utilize proper procedures for managing victims and fatalities (4.4.1)
14-Locate, document, collect, label, package, and store evidence (4.4.2)
15-Select evidence for analysis (4.4.3)
16-Maintain a chain of custody (4.4.4)
17-Dispose of evidence (4.4.5)
18-Develop an interview plan (4.5.1)
19-Conduct interviews (4.5.2)
20-Evaluate interview information (4.5.3)
21-Gather reports and records (4.6.1)
22-Evaluate the investigative file (4.6.2)
23-Coordinate expert resources (4.6.3)
24-Establish evidence as to motive and/or opportunity (4.6.4)
25-Formulate an opinion concerning origin, cause, or responsibility for the fire (4.6.5)
26-Prepare a written report (4.7.1)
27-Express investigative findings verbally (4.7.2)
28-Testify during legal proceedings (4.7.3)

SECTION 3

DEFINITIONS

References:
NFPA 921 2021 edition

501-3.1 ***The Investigator candidate shall define the terms used in Chapter 3 of NFPA 921, Guide for Fire and Explosion Investigations (2021 Edition).***

SECTION 4

BASIC METHODOLOGY

4.1 General
NFPA 1033 4.1.2 The fire investigator shall employ all elements of the scientific method as the operating analytical process throughout the investigation and for the drawing of conclusions.

4.1.7 In order to successfully complete the tasks identified in the JPRs of Sections 4.2 through 4.7, the fire investigator shall remain current in the subjects listed as "requisite knowledge" as they relate to fire investigations, which include the following: (2)(b) Fire Investigation Methodology.

References:
J & B, chapter 2
Lentini, chapter 4

501-4.1 ***The Investigator candidate shall describe the nature of fire investigations***.

501-4.2 ***The Investigator candidate shall apply the principles of the systematic approach of the scientific method.***

501-4.3 ***The Investigator candidate shall describe the steps of the scientific method relating to fire investigations.***

4.3.1 Recognize the Need

4.3.2 Define the Problem

4.3.3 Collect Data

4.3.4 Analyze the Data

4.3.5 Develop a Hypotheses (Inductive Reasoning)

4.3.6 Test the Hypotheses (Deductive Reasoning)

4.3.7 Select Final Hypothesis

4.3.8 Avoid Presumption

4.3.9 Expectation Bias

4.3.10 Confirmation Bias

501-4.4 The Investigator candidate shall describe the basic method of fire investigation.

4.4.1 Receiving the Assignment

4.4.2 Preparing for the Investigation

4.4.3 Conducting the Investigation

4.4.4 Collecting and Preserving Evidence

4.4.5 Analyzing the Incident

4.4.6 Conclusions

501-4.5 The Investigator candidate shall properly distinguish between the different levels of certainty.

4.5.1 Probable versus Possible

4.5.2 Suspected

4.5.3 Expert Opinions

501-4.6 The Investigator candidate shall develop "review procedures."

4.6.1 Administrative Review

4.6.2 Technical Review

4.6.3 Peer Review

501-4.7 The Investigator candidate shall describe different reporting procedures.

SECTION 5

BASIC FIRE SCIENCE

NFPA 1033 4.1.7 In order to successfully complete the tasks identified in the JPRs of Sections 4.2 through 4.7, the fire investigator shall remain current in the subjects listed as "requisite knowledge" as they relate to fire investigations, which include the following: (1)(a) Fire Chemistry, (b) Thermodynamics, (c) Fire Dynamics.

4.2 Scene Examination.

Duties shall include inspecting, evaluating, and analyzing the fire scene or evidence of the scene, and conducting a comprehensive review of documentation generated during the examination(s) of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and action or activity that brought the ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.~~Duties shall include inspecting, evaluating, and evaluating analyzing the fire scene, or evidence of the scene and/or conducting a comprehensive review of documentation generated during the examination(s) of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and action act or activity that brought ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.~~

NFPA 1033 4.2.4 Interpret and analyze fire patterns, given standard equipment and tools and some structural or content remains, so that each pattern is identified and analyzed with respect to the burning characteristics of the material involved, the stage of fire development, the effects of ventilation within the context of the scene, the relationship with all patterns observed, and the understanding of the methods of heat transfer that led to the formation of the patterns identified and analyzed, and the sequence in which the patterns were produced is determined.~~Interpret fire patterns, given standard equipment and tools and some structural or content remains, so that each individual pattern is evaluated with respect to the burning characteristics of the material involved and in context and relationship with all patterns observed and the mechanisms of heat transfer that led to the formation of the pattern.~~

(A) Requisite Knowledge. Fire dynamics, fire development, and the interrelationship of heat release rate, form, and ignitibility of materials.

(B) Requisite Skills. Ability to interpret the effects of burning characteristics on different types of materials.

NFPA 1033 4.2.5 Interpret and analyze fire patterns, given standard equipment and tools and some structural or content remains, so that fire development is determined, methods and effects of suppression are evaluated, false origin area patterns are recognized, and all areas of origin are correctly identified.

(A) Requisite Knowledge. Fire behavior and spread based on fire chemistry, fire dynamics, and physics, fire suppression effects, building construction.

(B) Requisite Skills. Ability to interpret variations of fire patterns on different materials with consideration given to heat release rate, form, and ignitibility; distinguish impact of different types of fuel loads; evaluate fuel trails; and analyze and synthesize information.

NFPA 1033 4.2.6 Examine and remove fire debris, given standard equipment and tools, so that all debris is checked for fire cause evidence, potential ignition source(s) is identified, and evidence is preserved without investigator-inflicted damage or contamination.

(A) Requisite Knowledge. Basic understanding of ignition processes, characteristics of ignition

sources, and ease of ignition of fuels; debris-layering techniques; use of tools and equipment during the debris search; types of fire cause evidence commonly found in various degrees of damage; and evidence-gathering methods and documentation.

(B) Requisite Skills. Ability to employ search techniques that further the discovery of fire cause evidence and ignition sources, use search techniques that incorporate documentation, and collect and preserve evidence.

References:
J&B, chapter 3
Kirk's, chapter 2
Lentini, chapter 1-2

501-5.1 ***The Investigator candidate shall define and describe fire science.***

5.1.1 Fire and Energy

5.1.2 Energy

5.1.3 Power

5.1.4 Heat Flux

5.1.5 Identify and describe the elements of the fire tetrahedron.
- 5.1.5.1 Define fuel and describe the three states in which fuel exists.
- 5.1.5.2 Describe the action of oxidizing agents.
- 5.1.5.3 Describe the relationship of heat in the combustion process.
- 5.1.5.4 Describe the uninhibited chemical chain reaction of combustion.

501-5.2 ***The Investigator candidate shall be able to discuss fire chemistry as the study of chemical processes that occur in fires, including changes of state, decomposition, and combustion***.

5.2.1 Phase Changes and Thermal Decomposition

5.2.2 Combustion

501-5.3 ***The Investigator candidate shall identify and describe products of combustion.***

501-5.4 ***The Investigator candidate shall identify and describe fluid***

flows generated by mechanical forces or by buoyant forces generated by temperature differences.

5.4.1 General

5.4.2 Buoyant Flows

5.4.3 Fire Plumes

5.4.4 Ceiling Jets

5.4.5 Vent Flows

501-5.5 The Investigator candidate shall define and describe methods of heat transfer.

5.5.1 General

5.5.2 Conduction

5.5.3 Convection

5.5.4 Radiation

5.5.5 Thermometry
- 5.5.5.1 Different systems
- 5.5.5.2 Empirical Temperature Scales
- 5.5.5.3 Thermodynamic (Absolute) Temperature Scales

501-5.6 The Investigator candidate shall define and describe the fuel load, fuel packages, and properties of flame.

5.6.1 Fuel Load

5.6.2 Fuel Items and Fuel Package

5.6.3 Heat Release Rate

5.6.4 Properties of Flames

5.6.5 Thermal Structure of a Flame
- 5.6.5.1 Continuous Flaming Region
- 5.6.5.2 Intermittent Flame Region
- 5.6.5.3 Plume Region

5.6.6 Heat Fluxes from Flames
- 5.6.6.1 Heat Fluxes from Flames to Contacted Surfaces
- 5.6.6.2 Heat Fluxes from Flames to Remote Surfaces

501-5.7 The Investigator candidate shall describe the different forms and mechanisms of ignition.

5.7.1 Ignition in General

5.7.2 Ignition of Flammable Gases

5.7.3 Ignition of Liquids

5.7.4 Ignition of Solids

501-5.8 The Investigator candidate shall describe the different flame spreads and their characteristics.

5.8.1 General
- 5.8.1.1 Counterflow Flame Spread
- 5.8.1.2 Concurrent Flame Spread
- 5.8.1.3 Fire Spread on Sloped Surfaces

5.8.2 Flame spread on Liquids

5.8.3 Flame spread on Solids

501-5.9 The Investigator candidate shall describe the different methods of fire spread in a compartment.

5.9.1 General

5.9.2 Fire Spread
- 5.9.2.1 Fire Spread by Flame Impingement
- 5.9.2.2 Fire Spread by Remote Ignition

501-5.10 The Investigator candidate shall describe compartment fire development.

5.10.1 General

5.10.2 Compartment Fire Phenomena

5.10.3 Compartment Vent Flows

5.10.4 Flashover

5.10.5 Fully Developed Compartment Fires

5.10.6 Effects of Enclosures on Fire Growth
- 5.10.6.1 Room Volume and Ceiling Height
- 5.10.6.2 Location of the Fire in the Compartment

501-5.11 The Investigator candidate shall identify fire spread between compartments.

5.11.1 Fire Spread via Openings

5.11.2 Fire Spread via Barriers

501-5.12 ***The Investigator candidate shall describe the paths of smoke spread in buildings.***

SECTION 6

FIRE EFFECTS AND FIRE PATTERNS

4.2 Scene Examination.
Duties shall include inspecting, evaluating, and analyzing the fire scene or evidence of the scene, and conducting a comprehensive review of documentation generated during the examination(s) of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and action or activity that brought the ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire~~Duties shall include inspecting and evaluating the fire scene, or evidence of the scene and/or conducting a comprehensive review of documentation generated during the examination(s) of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and act or activity that brought ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.~~

NFPA 1033 4.2. Interpret and analyze fire patterns, given standard equipment and tools and some structural or content remains, so that each pattern is identified and analyzed with respect to the burning characteristics of the material involved, the stage of fire development, the effects of ventilation within the context of the scene, the relationship with all patterns observed, and the understanding of the methods of heat transfer that led to the formation of the patterns identified and analyzed, and the sequence in which the patterns were produced is determined.~~4 Interpret fire patterns, given standard equipment and tools and some structural or content remains, so that each individual pattern is evaluated with respect to the burning characteristics of the material involved and in context and relationship with all patterns observed and the mechanisms of heat transfer that led to the formation of the pattern.~~
(A) Requisite Knowledge. Fire dynamics, fire development, and the interrelationship of heat release rate, form, and ignitibility of materials.
(B) Requisite Skills. Ability to interpret the effects of burning characteristics on different types of materials.

NFPA 1033 4.2.5 Interpret and analyze fire patterns, given standard equipment and tools and some structural or content remains, so that fire development is determined, methods and effects of suppression are evaluated, false origin area patterns are recognized, and all areas of origin are correctly identified.
(A) Requisite Knowledge. Fire behavior and spread based on fire chemistry, fire dynamics, and physics, fire suppression effects, building construction.
(B) Requisite Skills. Interpret variations of fire patterns on different materials with consideration given to heat release rate, form, and ignitibility; distinguish impact of different types of fuel loads; evaluate fuel trails; and analyze and synthesize information.

NFPA 1033 4.2.7 Reconstruct potential area(s) of origin, given standard and, if needed, special equipment and tools as well as sufficient personnel, so that all protected areas and fire patterns are identified and correlated to contents or structural remains; and items potentially critical to cause determination are returned to their prefire location as a means of hypothesis testing, such that the area(s) or point(s) of origin is discovered.~~Reconstruct the area of origin, given standard and, if needed, special equipment and tools as well as sufficient personnel, so that all protected areas and fire patterns are identified and correlated to contents or structural remains, items potentially critical to cause determination and photo documentation are returned to their prefire location, and the area(s) or point(s) of origin is discovered.~~

(A) Requisite Knowledge. The effects of fire on different types of material and the importance and uses of reconstruction.

(B) Requisite Skills. Ability to examine all materials to determine the effects of fire, identify and distinguish among different types of fire-damaged contents, and return materials to their original position using protected areas and fire patterns.

References:
J&B, chapter 4
Kirk's, chapter 5
Lentini, chapter 3

501-6.1 The Investigator candidate shall define fire effects and fire patterns.

501-6.2 The Investigator candidate shall be able to identify fire effects.

6.2.1 Fire Effects
- 6.2.1.1 Deformation
- 6.2.1.2 Deposition
- 6.2.1.3 Discoloration
- 6.2.1.4 Mass Loss

6.2.2 Characteristics and context of fire effects

501-6.3 The Investigator candidate shall be able to analyze the following fire effects.

6.3.1 Introduction

6.3.2 Char
- 6.3.2.1 Char Observations
- 6.3.2.2 Material Sciences – Surface Effect of Char
- 6.3.2.3 Pyrolysis
- 6.3.2.4 Analysis of Char
- 6.3.2.5 Depth of Char Diagram
- 6.3.2.6 Measuring Depth of Char
- 6.3.2.7 Measuring Depth of Char
- 6.3.2.8 Missing Wood
- 6.3.2.9 Depth of Char Surveys with fuel Gases
- 6.3.2.10 Appearance of Char
- 6.3.2.11 Limitations with Char
- 6.3.2.12 Rate of Wood Charring

6.3.3 Clean Burn
- 6.3.3.1 Clean Burn Observations
- 6.3.3.2 Material Sciences Related to Clean Burn
- 6.3.3.3 Analysis of Clean Burn
- 6.3.3.4 Limitations

6.3.4 Color Change
- 6.3.4.1 Color Changes Observations
- 6.3.4.2 Material Sciences Related to Color Changes
- 6.3.4.3 Fabric Dyes
- 6.3.4.4 Light
- 6.3.4.5 Analysis of Color Changes

6.3.4.6 Limitations

6.3.5 Deposition of Smoke on Surfaces
- 6.3.5.1 Deposition of Smoke on Surfaces Observations
- 6.3.5.2 Smoke Characteristics
- 6.3.5.3 Material Sciences for Deposition of Smoke
- 6.3.5.4 Analysis Related to Deposition of Smoke on Surfaces
- 6.3.5.5 Location of Objects
- 6.3.5.6 Position of Switches
- 6.3.5.7 Limitations

6.3.6 Distorted Lightbulbs
- 6.3.6.1 Observations for Distorted Lightbulbs
- 6.3.6.2 Material Science for Distorted Lightbulbs
- 6.3.6.3 Distorted Lightbulb Analysis
- 6.3.6.4 Limitations

6.3.7 Furniture Springs
- 6.3.7.1 Furniture Springs Observations
- 6.3.7.2 Material Science Related to Furniture Springs
- 6.3.7.3 Analysis of Furniture Springs
- 6.3.7.4 Limitations

6.3.8 Gypsum Wallboard
- 6.3.8.1 Gypsum Wallboard Observations
- 6.3.8.2 Material Science related to Gypsum Wallboard
- 6.3.8.3 Analysis of Gypsum Wallboard
- 6.3.8.4 Mass Loss and Density
- 6.3.8.5 General Indications of Calcination
- 6.3.8.6 Depth of Calcination Survey
- 6.3.8.7 Depth of Calcination Diagram
- 6.3.8.8 Measuring Depth of Calcination
- 6.3.8.9 Limitations

6.3.9 Mass Loss of Material
- 6.3.9.1 Mass Loss Observations
- 6.3.9.2 Fire-Damaged Materials and Exemplar Materials
- 6.3.9.3 Material Science Related to Mass Loss
- 6.3.9.4 Analysis of Mass Loss Observations
- 6.3.9.5 Limitations

6.3.9.6 Other conditions of nonuniformity

6.3.10 Melting of Materials
- 6.3.10.1 Melting Observations
- 6.3.10.2 Material Science Related to Melting
- 6.3.10.3 Common Metals
- 6.3.10.4 Thermoplastics
- 6.3.10.5 Glass
- 6.3.10.6 Alloying of Metals
- 6.3.10.7 Analysis of Melting Effects in Fires
- 6.3.10.8 Limitations

6.3.11 Oxidation
- 6.3.11.1 Observations
- 6.3.11.2 Galvanized Steel
- 6.3.11.3 Uncoated Iron or Steel
- 6.3.11.4 Oxidation Versus Melting
- 6.3.11.5 Stainless Steel
- 6.3.11.6 Copper
- 6.3.11.7 Rocks and Soil
- 6.3.11.8 Materials Science Related to Oxidation
- 6.3.11.9 Analysis of Oxidation Observations
- 6.3.11.10 Limitations

6.3.12 Rainbow Effect
- 6.3.12.1 Rainbow Effect Observations
- 6.3.12.2 Material Science for Rainbow Effects
- 6.3.12.3 Analysis of Rainbow Effect
- 6.3.12.4 Limitations

6.3.13 Smoke Alarms - Enhanced Soot Deposition, or Acoustic Soot Agglomeration
- 6.3.13.1 Smoke Alarm Observations
- 6.3.13.2 Enhanced Soot Deposition, or Acoustic Agglomeration
- 6.3.13.3 Analysis of Smoke Alarms
- 6.3.13.4 Limitations

6.3.14 Spalling
- 6.3.14.1 Observations
- 6.3.14.2 Material Science Related to Spalling
- 6.3.14.3 Analysis for Spalling
- 6.3.14.4 Limitations

- 6.3.15 Thermal Expansion and Deformation of Materials
  - 6.3.15.1 Observations of Thermal Expansion and Deformation of Materials
  - 6.3.15.2 Material Science of Thermal Expansion and Deformation of Materials
  - 6.3.15.3 Bending and Buckling
  - 6.3.15.4 Metal Construction Elements
  - 6.3.15.5 Analysis of Thermal Expansion and Deformation
  - 6.3.15.6 Piping Systems
  - 6.3.15.7 Plastered Surfaces
  - 6.3.15.8 Limitations
  - 6.3.15.9 Collapse
- 6.3.16 Victim Injuries
  - 6.3.16.1 Victim Injuries Observations
  - 6.3.16.2 Material Science of Victim Injuries
  - 6.3.16.3 Skin
  - 6.3.16.4 The Body as Fuel
  - 6.3.16.5 Analysis of Victim Injuries
  - 6.3.16.6 Limitations
- 6.3.17 Window Glass
  - 6.3.17.1 Window Glass Observations
  - 6.3.17.2 Material Science of Glass
  - 6.3.17.3 Tempered Glass
  - 6.3.17.4 Analysis of Glass
  - 6.3.17.5 Limitations
- 6.3.18 Fire Patterns
  - 6.3.18.1 Introduction
  - 6.3.18.2 Location of Patterns
  - 6.3.18.3 Location of Objects
  - 6.3.18.4 Penetrations of Horizontal Surfaces
  - 6.3.18.5 Depth of Char Patterns with Fuel Gases
- 6.3.19 Fire Pattern Generation
  - 6.3.19.1 Plume-Generated Patterns
  - 6.3.19.2 Ventilation-Generated Patterns
  - 6.3.19.3 Hot Gas Layer-Generated Patterns
  - 6.3.19.4 Full Room Involvement-Generated Patterns
  - 6.3.19.5 Suppression-Generated Patterns
  - 6.3.19.6 Undetermined-Generated Patterns

6.3.20 Fire Pattern Geometry
- 6.3.20.1 V Patterns on Vertical Surfaces
- 6.3.20.2 Inverted Cone (Triangular) Patterns
- 6.3.20.3 Hourglass Patterns
- 6.3.20.4 U-Shaped Patterns
- 6.3.20.5 Circular-Shaped Patterns
- 6.3.20.6 Truncated Cone Patterns
- 6.3.20.7 Irregular Patterns
- 6.3.20.8 Doughnut-Shaped Patterns
- 6.3.20.9 Linear Patterns
- 6.3.20.10 Area Patterns

6.3.21 Arc Mapping

6.3.22 Pointer and Arrow Patterns

501-6.4 ***The Investigator candidate shall be able to analyze fire patterns.***

6.4.1 Types of Fire Patterns
- 6.4.1.1 Fire Spread (Movement) Patterns
- 6.4.1.2 Heat (Intensity) Patterns
- 6.4.1.3 Combination of Patterns

SECTION 7

BUILDING SYSTEMS

NFPA 1033 4.1.7 In order to successfully complete the tasks identified in the JPRs of Sections 4.2 through 4.7, the fire investigator shall remain current in the subjects listed as "requisite knowledge" as they relate to fire investigations, which include the following: (4)(a) Types of Construction, (b) Fire Protection Systems, (c) Electricity and Electrical Systems, (d) Fuel Gas Systems.

4.2 Scene Examination.

Duties shall include inspecting, evaluating, and analyzing the fire scene or evidence of the scene, and conducting a comprehensive review of documentation generated during the examination(s) of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and action or activity that brought the ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.~~Duties shall include inspecting and evaluating the fire scene, or evidence of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and act or activity that brought ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.~~

NFPA 1033 4.2.5 Interpret and analyze fire patterns, given standard equipment and tools and some structural or content remains, so that fire development is determined, methods and effects of suppression are evaluated, false origin area patterns are recognized, and all areas of origin are correctly identified.

(A) Requisite Knowledge. Fire behavior and spread based on fire chemistry, fire dynamics, and physics, fire suppression effects, building construction.

(B) Requisite Skills. Interpret variations of fire patterns on different materials with consideration given to heat release rate, form, and ignitibility; distinguish impact of different types of fuel loads; evaluate fuel trails; and analyze and synthesize information.

NFPA 1033 4.2.8 Inspect and analyze the performance of building systems, including fire protection, detection and suppression systems, HVAC, electricity and electrical systems, fuel gas systems, and building compartmentation, given standard and special equipment and tools, so that a determination can be made as to the need for expert resources; an operating system's impact on fire growth and spread is considered in identifying origin areas; defeated and failed systems are identified; and the system's potential as a fire cause is recognized.~~Inspect the performance of building systems, including detection, suppression, HVAC, utilities, and building compartmentation, given standard and special equipment and tools, so that a determination can be made as to the need for expert resources, an operating system's impact on fire growth and spread is considered in identifying origin areas, defeated and/or failed systems are identified, and the system's potential as a fire cause is recognized.~~

(A) Requisite Knowledge. Different types of detection, suppression, HVAC, utility, and building compartmentation such as fire walls and fire doors; types of expert resources for building systems; the impact of fire on various systems; common methods used to defeat a system's functional capability; and types of failures.

(B) Requisite Skills. Ability to determine the system's operation and its effect on the fire; identify alterations to, and failure indicators of, building systems; and evaluate the impact of suppression efforts on building systems.

References:
J&B, chapter 5

501-7.1 ***The Investigator candidate shall recognize the reaction of buildings and building assemblies to fire.***

501-7.2 ***The Investigator candidate shall evaluate the features of design, construction and structural elements in evaluating fire development.***

7.2.1 General

7.2.2 Building design

7.2.2.1 General
7.2.2.2 Building Loads
7.2.2.3 Room Size
7.2.2.4 Compartmentation
7.2.2.5 Concealed and Interstitial Spaces
7.2.2.6 Planned Design~~s~~ as Compared to "As-Built" Condition

7.2.3 Materials
7.2.3.1 Ignitability
7.2.3.2 Flammability
7.2.3.3 Thermal Inertia
7.2.3.4 Thermal Conductivity
7.2.3.5 Toxicity
7.2.3.6 Physical State and Heat Resistance
7.2.3.7 Orientation, Position, and Placement

7.2.4 Occupancy

7.2.5 Computer Fire Model Survey of Building Component Variations

7.2.6 Explosion Damage

501-7.3 ***The Investigator candidate shall identify the different types of building construction.***

****Note** (Only 501-7.3.1)**
The following section is not contained in NFPA 921, *Guide for Fire and Explosion Investigations*. The reference for this material is found in IFSTA, *Fire Inspection and Code Enforcement* and *Fire Investigator*.

7.3.1 General
7.3.1.1 Type I – fire resistive
7.3.1.2 Type II – non-combustible
7.3.1.3 Type III – ordinary
7.3.1.4 Type IV – heavy timber
7.3.1.5 Type V – wood frame

7.3.2 Wood Frame (Type V)
7.3.2.1 Platform Frame Construction
7.3.2.2 Balloon Frame
7.3.2.3 Plank and Beam
7.3.2.4 Post and Frame

7.3.2.5 Heavy Timber
7.3.2.6 Alternative Residential Construction
7.3.2.6.1 Manufactured homes (Mobile Homes)
7.3.2.6.2 Modular Homes
7.3.2.6.3 Steel Frame Residential Construction
7.3.2.7 Manufactured Wood Structural Elements

7.3.3 Ordinary Construction (Type III)

7.3.4 Mill Construction (Type IV)

7.3.5 Noncombustible Construction (Type II)
7.3.5.1 General
7.3.5.2 Metal Construction
7.3.5.3 Concrete or Masonry Construction

501-7.4 ***The Investigator candidate shall identify the different construction assemblies.***

7.4.1 General

7.4.2 Floor/Ceiling/Roof Assemblies

7.4.3 Walls

7.4.4 Doors

7.4.5 Concealed Spaces

501-7.5 ***The Investigator candidate shall describe the different construction materials.***

7.5.1 Structural Steel

7.5.2 Reinforced Concrete

7.5.3 Wood

501-7.6 ***The Investigator candidate shall analyze the impact of passive fire protection systems on the investigation.***

501-7.7 ***The Investigator candidate should analyze the design and installation parameters when the passive fire protection system is determined to be a factor.***

501-7.8 ***The Investigator candidate should produce the additional documentation and data collection when the passive fire protection system is determined to be a factor.***

501-7.9 ***The Investigator candidate shall perform the required additional analysis.***

7.9.1 Code Analysis

7.9.2 Design Analysis

7.9.3 Installation Analysis

7.9.4 System Performance

7.9.5 Testing and Maintenance Analysis

7.9.6 Origin and Cause Determination

501-7.10 ***The Investigator candidate shall maintain a basic understanding of heating systems commonly encountered in residential and light commercial fire incidents.***

7.10.1 Systems components
- 7.10.1.1 Fuel Storage and Supply
- 7.10.1.2 Heat Producing Devices
- 7.10.1.3 Chimney/Vent
- 7.10.1.4 Control and Safety Devices

7.10.2 Installation

7.10.3 Operation and maintenance

7.10.4 Potential fire causes
- 7.10.4.1 Improper Installation of Fuel Delivery Systems
- 7.10.4.2 Improper Installation of Heat Producing Systems
- 7.10.4.3 Improper Installation of Control and Safety Devices

7.10.4.4 Improper Installation of Chimneys and Vents
7.10.4.5 Airspace Requirement Violations
7.10.4.6 Utilizing Non-Listed Devices and Accessories
7.10.4.7 Circumvented or Failed Control and Safety Components
7.10.4.8 Inadequate Maintenance or Cleaning
7.10.4.9 Improper Usage
7.10.4.10 Electrical Events

7.10.5 Documentation and Data Collection

7.10.6 Analysis of Origin and Causes

SECTION 8

ACTIVE FIRE PROTECTION SYSTEMS

NFPA 1033 4.1.7 In order to successfully complete the tasks identified in the JPRs of Sections 4.2 through 4.7, the fire investigator shall remain current in the subjects listed as "requisite knowledge" as they relate to fire investigations, which include the following: (4)(b) Fire Protection Systems.

4.2. Scene Examination

Duties shall include inspecting, evaluating, and analyzing the fire scene or evidence of the scene, and conducting a comprehensive review of documentation generated during the examination(s) of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and action or activity that brought the ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.~~Duties shall include inspecting and evaluating the fire scene, or evidence of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and act or activity that brought ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire~~

NFPA 1033 4.2.8 Inspect and analyze the performance of building systems, including fire protection, detection and suppression systems, HVAC, electricity and electrical systems, fuel gas systems, and building compartmentation, given standard and special equipment and tools, so that a determination can be made as to the need for expert resources; an operating system's impact on fire growth and spread is considered in identifying origin areas; defeated and failed systems are identified; and the system's potential as a fire cause is recognized.~~Inspect the performance of building systems, including detection, suppression, HVAC, utilities, and building compartmentation, given standard and special equipment and tools, so that a determination can be made as to the need for expert resources, an operating system's impact on fire growth and spread is considered in identifying origin areas, defeated and/or failed systems are identified, and the system's potential as a fire cause is recognized.~~

(A) Requisite Knowledge. Different types of detection, suppression, HVAC, utility, and building compartmentation such as fire walls and fire doors; types of expert resources for building systems; the impact of fire on various systems; common methods used to defeat a system's functional capability; and types of failures.

(B) Requisite Skills. Ability to determine the system's operation and its effect on the fire; identify alterations to, and failure indicators of, building systems; and evaluate the impact of suppression efforts on building systems.

References:
J&B, chapter 6
IFSTA, Fire Inspection, chapter 12-14

501-8.1 ***The Investigator candidate shall develop basic understanding of active fire protection systems.***

501-8.2 ***The Investigator candidate shall develop basic understanding of documentation of fire protection systems.***

8.2.1 Design Documentation

8.2.2 Permit History

8.2.3 Invoices and Contracts

8.2.4 Installation Documentation

8.2.5 Inspection and Maintenance Records

8.2.6 Product Literature

8.2.7 Alarm / Activation History

501-8.3 The Investigator candidate shall identify the basic components and operation of a fire alarm system.

8.3.1 General information
- 8.3.1.1 Purpose of Systems
- 8.3.1.2 System Components
- 8.3.1.3 General System Operation

8.3.2 Key Components of Systems
- 8.3.2.1 Fire Alarm Control Unit (FACU)
- 8.3.2.2 Power Supply
- 8.3.2.3 Initiating Devices
- 8.3.2.4 Smoke Detection
- 8.3.2.5 Heat Detection
- 8.3.2.6 Other Types of Detectors
- 8.3.2.7 Notification Appliances

8.3.3 Operations and Installation Parameters of the System
- 8.3.3.1 FACU Features
- 8.3.3.2 Location and Spacing of Devices
- 8.3.3.3 Internal System Communication
- 8.3.3.4 Means of Alarm Transmission
- 8.3.3.5 Systems Monitored and Controlled

8.3.4 Analysis
- 8.3.4.1 System Documentation and Data Collection
- 8.3.4.2 Code Analysis
- 8.3.4.3 Design Analysis
- 8.3.4.4 Installation Analysis
- 8.3.4.5 Testing and Maintenance Analysis
- 8.3.4.6 System Performance
- 8.3.4.7 Development of Timeline
- 8.3.4.8 Thermal Damage
- 8.3.4.9 Fire Alarm Effectiveness
- 8.3.4.10 Impact on Human Behavior

501-8.4 The Investigator candidate shall identify the basic components and operation of a water-based fire suppression system.

8.4.1 General Information
- 8.4.1.1 Purpose of Systems
- 8.4.1.2 General System Operation

8.4.2 Key Components of Water-Based Systems

8.4.2.1 Sprinklers/Nozzles
8.4.2.2 Piping
8.4.2.3 Systems Valves
8.4.2.4 Water Supply

8.4.3 Operation and Installation Parameters of the System
8.4.3.1 Location and Spacing of Sprinklers
8.4.3.2 Pipe Sizing and Arrangement
8.4.3.3 Sprinkler Coverage and Distribution
8.4.3.4 Water Flow Rate and Pressure
8.4.3.5 Activation Mechanisms and Criteria
8.4.3.6 Systems Monitored and Controlled

8.4.4 Analysis
8.4.4.1 System Documentation and Data Collection
8.4.4.2 Code Analysis
8.4.4.3 Design Analysis
8.4.4.4 Hazard Protected

501-8.5 ***The Investigator candidate shall identify the basic components and operation of a non-water-based fire suppression system.***

8.5.1 General Information
8.5.1.1 Purpose of Systems
8.5.1.2 Method of Application
8.5.1.3 Suppression Agents

8.5.2 Key Components of Systems
8.5.2.1 Suppression Agent Supply
8.5.2.2 Pressure Sources
8.5.2.3 Distribution Piping
8.5.2.4 Valves, Hoses, and Fittings
8.5.2.5 Proportioners
8.5.2.6 Distribution Nozzles
8.5.2.7 Actuation System
8.5.2.8 System Monitoring and control

8.5.3 Operation and Installation Parameters of the System
8.5.3.1 Location and Spacing of Nozzles
8.5.3.2 Pipe Sizing and Arrangement
8.5.3.3 Nozzle Coverage and Distribution
8.5.3.4 Activation Mechanisms and Criteria
8.5.3.5 Systems Monitored and Controlled

8.5.4 Analysis
8.5.4.1 General Information and Codes
8.5.4.2 Design Analysis

501-8.6 ***The Investigator candidate shall identify spoliation issues regarding the documentation of the fire protection system.***

****Note****
The following sections (501-8.7 through 501-8.12) are not contained in NFPA 921, *Guide for Fire and Explosion Investigations*. The reference for this material is found in IFSTA, *Fire Inspection and Code Enforcement, chapter 12-14*.

501-8.7 ***The Investigator candidate shall describe the types and characteristics of automatic sprinkler systems.***

8.7.1 Identify various types of automatic sprinkler systems.
8.7.1.1 Wet pipe
8.7.1.2 Dry pipe
8.7.1.3 Pre-action
8.7.1.4 Deluge
8.7.1.5 Residential

8.7.2 Identify reasons for unsatisfactory performance of an automatic sprinkler system.

8.7.3 Describe fire sprinkler components and operations.

501-8.8 ***The Investigator candidate shall describe the types, operations, capabilities and the effects of proper application of "special agent" fire extinguishing systems.***

8.8.1 Dry chemical

8.8.2 Wet chemical

8.8.3 Halogenated agent

8.8.4 Carbon dioxide

8.8.5 Foam

8.8.6 Gaseous agent

501-8.9 ***The Investigator candidate shall identify the classes and capabilities of standpipe and hose systems.***

8.9.1 Class I systems

8.9.2 Class II systems

8.9.3 Class III systems

501-8.10 ***The Investigator candidate shall identify alarm-initiating devices.***

8.10.1 Local system

8.10.2 Auxiliary system

8.10.3 Remote station

8.10.4 Proprietary system

8.10.5 Central station system

501-8.11 ***The Investigator candidate shall identify fire detection systems.***

8.11.1 Smoke

8.11.2 Flame

8.11.3 Heat

8.11.4 Gas

501-8.12 ***The Investigator candidate shall describe Heating Ventilation and Air Conditioning (HVAC) system components and their relation to smoke and fire spread.***

8.12.1 Smoke dampers

8.12.2 Automatic shutoffs

8.12.3 Ductwork

8.12.4 Pipe and duct chases

SECTION 9

ELECTRICITY AND FIRE

NFPA 1033 4.1.7 In order to successfully complete the tasks identified in the JPRs of Sections 4.2 through 4.7, the fire investigator shall remain current in the subjects listed as "requisite knowledge" as they relate to fire investigations, which include the following: (4)(c) Electricity and Electrical Systems.

4.2 Scene Examination.
Duties shall include inspecting, evaluating, and analyzing the fire scene or evidence of the scene, and conducting a comprehensive review of documentation generated during the examination(s) of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and action or activity that brought the ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.~~Duties shall include inspecting and evaluating the fire scene, or evidence of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and act or activity that brought ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.~~

NFPA 1033 4.2.8 Inspect and analyze the performance of building systems, including fire protection, detection and suppression systems, HVAC, electricity and electrical systems, fuel gas systems, and building compartmentation, given standard and special equipment and tools, so that a determination can be made as to the need for expert resources; an operating system's impact on fire growth and spread is considered in identifying origin areas; defeated and failed systems are identified; and the system's potential as a fire cause is recognized.~~Inspect the performance of building systems, including detection, suppression, HVAC, utilities, and building compartmentation, given standard and special equipment and tools, so that a determination can be made as to the need for expert resources, an operating system's impact on fire growth and spread is considered in identifying origin areas, defeated and/or failed systems are identified, and the system's potential as a fire cause is recognized.~~

(A) Requisite Knowledge. Different types of detection, suppression, HVAC, utility, and building compartmentation such as fire walls and fire doors; types of expert resources for building systems; the impact of fire on various systems; common methods used to defeat a system's functional capability; and types of failures.

(B) Requisite Skills. Ability to determine the system's operation and its effect on the fire; identify alterations to, and failure indicators of, building systems; and evaluate the impact of suppression efforts on building systems.

References:
J&B, chapter 7
Kirk's, chapter 3-4
Lentini, chapter 6

501-9.1 The Investigator candidate shall understand the basic principles of physics that relate to electricity and fire, including systems and equipment.

501-9.2 The Investigator candidate shall describe basic electrical

theory.

9.2.1 General

9.2.2 Comparing Electricity to Hydraulics

9.2.3 Ampacity

9.2.4 Conductivity of Conductors

9.2.5 Ohm's Law

9.2.6 Electrical Power

9.2.7 Ohm's Law Wheel

9.2.8 Applying Ohm's Law

501-9.3 The Investigator candidate shall describe the typical building electrical systems and its components.

9.3.1 General

9.3.2 Electrical Service
- 9.3.2.1 Single-Phase Service
- 9.3.2.2 Three-Phase Service

9.3.3 Meter and Base

9.3.4 Significance

501-9.4 The Investigator candidate shall identify the functions of service equipment.

501-9.5 The Investigator candidate shall identify the principle of grounding.

9.5.1 General

9.5.2 Floating Neutral (Open Neutral)

501-9.6 The Investigator candidate shall describe the components of overcurrent protection.

9.6.1 General

9.6.2 Fuses
- 9.6.2.1 Operations
- 9.6.2.2 Plug Fuses
- 9.6.2.3 Type S Fuses
- 9.6.2.4 Time-Delay Fuses
- 9.6.2.5 Cartridge Fuses

9.6.3 Circuit Breakers
- 9.6.3.1 Operations
- 9.6.3.2 Main Breakers
- 9.6.3.3 Branch Circuit Breakers
- 9.6.3.4 Ground Fault Circuit Interrupters (GFCI)

9.6.3.5 Arc Fault Circuit Interrupter (AFCI)

9.6.4 Circuit Breaker Panels

501-9.7 ***The Investigator candidate shall describe a branch circuit and its components.***

9.7.1 Conductors

9.7.2 Size of Conductors

9.7.3 Copper Conductors

9.7.4 Aluminum Conductors

9.7.5 Insulation

501-9.8 ***The Investigator candidate shall identify and describe the different types of outlets and devices found in a branch circuit.***

9.8.1 Switches

9.8.2 Receptacles

9.8.3 Other Outlets, Devices, or Equipment

501-9.9 ***The Investigator candidate shall describe how the use of improper electrical components can create sufficient heat for ignition.***

9.9.1 General

9.9.2 Resistance Heating

9.9.3 Overcurrent and Overload

9.9.4 Arcs
- 9.9.4.1 General
- 9.9.4.2 High-Voltage Arcs
- 9.9.4.3 Static Electricity
- 9.9.4.4 Parting Arcs
- 9.9.4.5 Arcing Across a Carbonized Path

9.9.5 Sparks

9.9.6 High-Resistance Faults

501-9.10 The Investigator candidate shall identify and describe types of damage encountered in electrical systems.

9.10.1 General

9.10.2 Short-Circuit and Ground-Fault Parting Arcs

9.10.3 Arcing Through a Carbonized Path Due to Thermal Means (Arcing Through Char)

9.10.4 Overheating Connections

9.10.5 Overload

9.10.6 Effects Not Caused by Electricity
- 9.10.6.1 Conductor Surface Colors
- 9.10.6.2 Melting by Fire
- 9.10.6.3 Alloying
- 9.10.6.4 Mechanical Gouges

9.10.7 Insulation Damage

501-9.11 The Investigator candidate shall identify arc melting of electrical conductors.

9.11.1 Melting Caused by Electrical Arcing

9.11.2 Melting Caused by Fire

9.11.3 Eutectic Melting

9.11.4 Extraneous Melting

9.11.5 Undersized Conductors

9.11.6 Nicked or Stretched Conductors

9.11.7 Deteriorated Insulation

9.11.8 Overdriven or Misdriven Staple

9.11.9 Short Circuit

9.11.10 Beaded Conductor

501-9.12 ***The Investigator candidate shall describe the role of static electricity in an ignition sequence.***

9.12.1 Introduction to Static Electricity

9.12.2 Generation of Static Electricity
- 9.12.2.1 General
- 9.12.2.2 Ignitable Liquids
- 9.12.2.3 Charges on the Surface of a Liquid
- 9.12.2.4 Switch Loading
- 9.12.2.5 Spraying Operations
- 9.12.2.6 Gases
- 9.12.2.7 Dusts and Fibers
- 9.12.2.8 Static Electric Discharge from the Human Body
- 9.12.2.9 Clothing

9.12.3 Incendive Arc

9.12.4 Ignition Energy

9.12.5 Controlling Accumulations of Static Electricity
- 9.12.5.1 Humidification
- 9.12.5.2 Bonding and Grounding

9.12.6 Conditions Necessary for Static Arc Ignition

9.12.7 Investigating Static Electric Ignitions

9.12.8 Lightning
- 9.12.8.1 General
- 9.12.8.2 Lightning Characteristics
- 9.12.8.3 Lightning Strikes
- 9.12.8.4 Lightning Damage
- 9.12.8.5 Lightning Detection Networks

501-9.13 ***The Investigator candidate shall describe characteristics common to most lithium-ion batteries.***

SECTION 10

BUILDING FUEL GAS SYSTEMS

NFPA 1033 4.1.7 In order to successfully complete the tasks identified in the JPRs of Sections 4.2 through 4.7, the fire investigator shall remain current in the subjects listed as "requisite knowledge" as they relate to fire investigations, which include the following: (4)(d) Fuel Gas Systems.

4.2 Scene Examination.
Duties shall include inspecting, evaluating, and analyzing the fire scene or evidence of the scene, and conducting a comprehensive review of documentation generated during the examination(s) of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and action or activity that brought the ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.~~Duties shall include inspecting and evaluating the fire scene, or evidence of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and act or activity that brought ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.~~

NFPA 1033 4.2.8 Inspect and analyze the performance of building systems, including fire protection, detection and suppression systems, HVAC, electricity and electrical systems, fuel gas systems, and building compartmentation, given standard and special equipment and tools, so that a determination can be made as to the need for expert resources; an operating system's impact on fire growth and spread is considered in identifying origin areas; defeated and failed systems are identified; and the system's potential as a fire cause is recognized.~~Inspect the performance of building systems, including detection, suppression, HVAC, utilities, and building compartmentation, given standard and special equipment and tools, so that a determination can be made as to the need for expert resources, an operating system's impact on fire growth and spread is considered in identifying origin areas, defeated and/or failed systems are identified, and the system's potential as a fire cause is recognized.~~

(A) Requisite Knowledge. Different types of detection, suppression, HVAC, utility, and building compartmentation such as fire walls and fire doors; types of expert resources for building systems; the impact of fire on various systems; common methods used to defeat a system's functional capability; and types of failures.

(B) Requisite Skills. Ability to determine the system's operation and its effect on the fire; identify alterations to, and failure indicators of, building systems; and evaluate the impact of suppression efforts on building systems.

References:
J&B, chapter 8
Kirk's, chapter 4
Lentini, chapter 6

501-10.1 The Investigator candidate shall describe building fuel gas systems.

10.1.1 Impact of Fuel Gases on Fire and Explosions Investigations

10.1.2 Additional Fire Spread

501-10.2 ***The Investigator candidate shall identify the different fuel gases***.

10.2.1 Natural Gas

10.2.2 Commercial Propane

10.2.3 Other Fuel Gases

10.2.3.1 Commercial Butane
10.2.3.2 Propane HD5
10.2.3.3 Manufactured Gases

10.2.4 Odorization

501-10.3 ***The Investigator candidate shall identify different natural gas systems.***

10.3.1 Transmission Pipelines

10.3.2 Main Pipelines (Mains)

10.3.3 Service Lines

10.3.4 Metering

501-10.4 ***The Investigator candidate shall identify different LP-Gas Systems.***

10.4.1 LP-Gas Storage Containers
10.4.1.1 Tanks
10.4.1.2 Cylinders

10.4.2 Container Appurtenances
10.4.2.1 Pressure Relief Devices
10.4.2.2 Connections for Flow Control
10.4.2.3 Liquid Level Gauging Devices
10.4.2.4 Pressure Gauges

10.4.3 Pressure Regulation

10.4.4 Vaporizers

501-10.5 ***The Investigator candidate shall identify common fuel gas system components.***

10.5.1 Pressure Regulations (Reduction)

10.5.2 Service Piping Systems

10.5.3 Valves

10.5.4 Gas Burners
10.5.4.1 Manual Ignition
10.5.4.2 Pilot Lights
10.5.4.3 Pilotless Igniters

501-10.6 The Investigator candidate shall identify the common piping in buildings.

10.6.1 Size of Piping

10.6.2 Piping Materials

10.6.3 Joints and Fittings

10.6.4 Piping Installation

10.6.5 Main Shutoff Valves

10.6.6 Prohibited Locations

10.6.7 Electrical Bonding and Grounding

501-10.7 The Investigator candidate shall identify common appliance and equipment requirements.

10.7.1 Installation

10.7.2 Venting and Air Supply

10.7.3 Appliance Controls

501-10.8 The Investigator candidate shall identify common fuel gas utilization equipment.

10.8.1 Air Heating

10.8.2 Water Heating

10.8.3 Cooking

10.8.4 Refrigeration and Cooling

10.8.5 Engines

10.8.6 Illumination

10.8.7 Incinerators, Toilets, and Exhaust Afterburners

~~501-10.9~~ ***The Investigator candidate shall explain investigating fuel gas systems.***

10.9.1 Recognize Limitations

10.9.2 Fuel Gas System Analysis

10.9.3 Compliance with Codes and Standards

10.9.4 Leakage

10.9.5 Pressure Testing

10.9.6 Locating Leaks

10.9.7 Testing Flow Rates and Pressures

10.9.8 Collection of Gas Piping

10.9.9 Underground Migration of Fuel Gases

SECTION 11

FIRE-RELATED HUMAN BEHAVIOR

4.4 Evidence Collection/Preservation

Duties shall include using proper physical and legal procedures to identify, document, collect, and preserve evidence required within the investigation.

NFPA 1033 4.4.1 Utilize proper procedures for managing victims and fatalities, given a protocol and appropriate personnel, so that all evidence is discovered and preserved and the protocol procedures are followed.

(A) Requisite Knowledge: Types of evidence associated with fire victims and fatalities and evidence preservation methods.

(B) Requisite Skills: Observational skills and the ability to apply protocols to given situations.

4.6 Post-Incident Investigation.

Duties shall include the investigation of all factors beyond the fire scene at the time of the origin and cause determination.

NFPA 1033 4.6.4: Establish evidence as to motive and/or opportunity, given an incendiary fire, so that the evidence is supported by documentation and meets the evidentiary requirements of the jurisdiction.

(A) Requisite Knowledge: Types of motives common to incendiary fires, methods used to discover opportunity, and human behavioral patterns relative to fire-setting.

(B) Requisite Skills: Financial analysis, records gathering and analysis, interviewing, and interpreting fire scene information and evidence for relationship to motive and/or opportunity.

NFPA 1033 4.6.5 Formulate an opinion concerning origin, cause, or responsibility for the fire, given all investigative findings, so that the opinion regarding origin, cause, or responsibility for a fire is supported by the data, facts, records, reports, documents, and evidence.

(A) Requisite Knowledge: Analytical methods and procedures (e.g., hypothesis development and testing, systems analysis, time lines, link analysis, fault tree analysis, and data reduction matrixing).

(B) Requisite Skills: Analytical and assimilation skills.

References:
J&B, chapter 9

501-11.1 The Investigator candidate shall recognize that the analyses of fire related human behavior will often be an integral part of the investigation.

501-11.2 The Investigator candidate shall recall the history of research as related to fire related human behavior.

501-11.3 The Investigator candidate shall identify and describe general considerations of human response to fires.

11.3.1 Individual
- 11.3.1.1 Physical Limitations
- 11.3.1.2 Cognitive Comprehension Limitations
- 11.3.1.3 Familiarity and Physical Setting

11.3.2 Groups
- 11.3.2.1 Group Size
- 11.3.2.2 Group Structure
- 11.3.2.3 Group Permanence
- 11.3.2.4 Roles and Norms

11.3.3 Characteristics of the Physical Setting
- 11.3.3.1 Locations of Exits
- 11.3.3.2 Number of Exits
- 11.3.3.3 Height of Structure
- 11.3.3.4 Fire Alarm Systems
- 11.3.3.5 Fire Suppression Systems

11.3.4 Characteristics of the Fire
- 11.3.4.1 Presence of Flames
- 11.3.4.2 Presence of Smoke
- 11.3.4.3 Effects of Toxic Gases and Oxygen Depletion

501-11.4 The Investigator candidate shall identify and describe the factors related to fire initiation.

11.4.1 Factors Involved in Accidental Fires
- 11.4.1.1 Improper Maintenance and Operations
- 11.4.1.2 Housekeeping
- 11.4.1.3 Product Labels, Instructions, and Warnings
- 11.4.1.4 Purpose of Labels
- 11.4.1.5 Purpose of Instructions
- 11.4.1.6 Purpose of Warnings
- 11.4.1.7 Key Elements of a Proper Warning
- 11.4.1.8 Standards on Labels, Instructions, and Warnings

11.4.2 Recalls

11.4.3 Other Considerations

11.4.4 Violations of Fire Safety Codes and Standards

501–11.5 ***The Investigator candidate shall identify and describe the factors related to youth fire-setting behavior.***

11.5.1 Developmental Stages

11.5.2 Mental Health

501-11.6 ***Incendiary fires – see SECTION 501-23.4 for additional information.***

501-11.7 ***The Investigator candidate shall identify and describe human factors related to fire spread.***

501-11.8 ***The Investigator candidate shall identify the basic concepts in recognition and response to fires.***

11.8.1 Perception of the Danger (Sensory Cues)

11.8.2 Decision to Act (Response)

11.8.3 Action Taken

11.8.4 Escape Factors

11.8.5 Information Received from Survivors

SECTION 12

LEGAL CONSIDERATIONS

4.1 General

NFPA 1033 4.1.5* The fire investigator shall adhere to all applicable legal and regulatory requirements.

4.3 Documenting the Scene

Duties shall include diagramming the scene, photographing, and taking field notes to be used to compile a final report.

NFPA 1033 4.3.3 Construct investigative notes, given a fire scene, available documents (e.g., prefire plans and inspection reports), and interview information, so that the notes are accurate, provide further documentation of the scene, and represent complete documentation of the scene findings.

(A) Requisite Knowledge. Relationship between notes, diagrams, and photos, how to reduce scene information into concise notes, and the use of notes during report writing and legal proceedings.

(B) Requisite Skills. Data-reduction skills, note-taking skills, and observational and correlating skills.

4.4 Evidence Collection/Preservation.

Duties shall include using proper physical and legal procedures to identify, document, collect and preserve evidence required within the investigation.

NFPA 1033 4.4.2 Locate, document, collect, label, package and store evidence, given standard or special tools and equipment and evidence collection materials, so that evidence is identified, preserved, collected, packaged and stored for use in testing, legal, or other proceedings and examinations, ensuring cross-contamination and investigator-inflicted damage and the chain of custody is established.

(A) Requisite Knowledge. Types of evidence, authority requirements, impact of removing evidentiary items on civil or criminal proceedings (exclusionary or fire-cause supportive evidence), types, capabilities, and limitations of standard and special tools used to locate evidence, types of laboratory tests available, packaging techniques and materials, and impact of evidence collection on the investigation.

(B) Requisite Skills. Ability to recognize different types of evidence and determine whether evidence is critical to the investigation.

NFPA 1033 4.4.4 Maintain a chain of custody, given standard investigative tools, marking tools, and evidence tags or logs, so that written documentation exists for each piece of evidence and evidence is secured.

(A) Requisite Knowledge. Rules of custody and transfer procedures, types of evidence (e.g., physical evidence obtained at the scene, photos, and documents), and methods of recording the chain of custody.

(B) Requisite Skills. Ability to execute the chain of custody procedures and accurately complete necessary documents.

4.6 Post-Incident Investigation.

Duties shall include the investigation of all factors beyond the fire scene at the time of the origin and cause determination.

NFPA 1033 4.6.3 Coordinate expert resources, given the investigative file, reports, and documents, so that the expert's competencies are matched to the specific investigation needs, financial expenditures are justified, and utilization clearly furthers the investigative goals of determining cause or affixing responsibility.

(A) Requisite Knowledge. How to assess one's own expertise, qualification to be called for expert testimony, types of expert resources (e.g., forensic, CPA, polygraph, financial, human behavior disorders, and engineering), and methods to identify expert resources.

(B) Requisite Skills. Ability to apply expert resources to further the investigation by networking with other investigators to identify experts, questioning experts relative to their qualifications, and developing a utilization plan for use of expert resources.

4.7 Presentations.

Duties shall include the presentation of findings to those individuals not involved in the actual investigations.

NFPA 1033 4.7.3 Testify during legal proceedings, given investigative findings, contents of reports, and consultation with legal counsel, so that all pertinent investigative information and evidence are presented clearly and accurately and the investigator's demeanor and attire are appropriate to the proceedings.

(A) Requisite Knowledge. Types of investigative findings, types of legal proceedings, professional demeanor requirements, and an understanding of due process and legal proceedings.

(B) Requisite Skills. Communication and listening skills and ability to differentiate facts from opinion and determine accepted procedures, practices, and etiquette during legal proceedings.

References:
J&B, chapter 10

501-12.1 ***The Investigator candidate shall recognize the legal consideration impact on every phase of the fire investigation.***

501-12.2 ***The Investigator candidate shall ensure that constitutional considerations are observed.***

12.2.1 Amendment Four

12.2.2 Amendment Five

12.2.3 Amendment Six

501-12.3 The Investigator candidate shall observe all legal considerations during the investigation.

12.3.1 Authority to Conduct the Investigation

12.3.2 Right of Entry

12.3.3 Method of Entry
- 12.3.3.1 Consent
- 12.3.3.2 Exigent Circumstance
- 12.3.3.3 Administrative Search Warrant
- 12.3.3.4 Criminal Search Warrant

12.3.4 The Questioning of Suspects

12.3.5 Spoliation of Evidence
- 12.3.5.1 Responsibility
- 12.3.5.2 Documentation
- 12.3.5.3 Remedies for Spoliation
- 12.3.5.4 Notification to Interested Parties
- 12.3.5.5 Documentation Prior to Alteration
- 12.3.5.6 Alteration and Movement of Evidence
- 12.3.5.7 Notification Prior to Destructive Testing

501-12.4 The Investigator candidate shall recognize pretrial legal considerations.

12.4.1 Introduction

12.4.2 Forms of Discovery
- 12.4.2.1 Request to Produce
- 12.4.2.2 Interrogatories
- 12.4.2.3 Depositions
  - 12.4.2.3.1 Procedure
  - 12.4.2.3.2 Discovery Depositions
  - 12.4.2.3.3 Trial Depositions
- 12.4.2.4 Reports

12.4.3 Motions

501-12.5 The Investigator candidate shall identify the trial procedures in criminal and civil cases.

12.5.1 Rules of Evidence

12.5.2 Types of Evidence
- 12.5.2.1 Demonstrative Evidence
  - 12.5.2.1.1 Photographs/Illustrative Forms of Evidence
  - 12.5.2.1.2 Samples
- 12.5.2.2 Documentary Evidence
- 12.5.2.3 Testimonial Evidence
  - 12.5.2.3.1 Fact Witnesses
  - 12.5.2.3.2 Expert Witnesses
  - 12.5.2.3.3 Admissibility of Expert Testimony
  - 12.5.2.3.4 Relevance
  - 12.5.2.3.5 Qualifications of Expert
  - 12.5.2.3.6 Reliability of Opinions

12.5.3 Forms of Examination
- 12.5.3.1 Direct Examination
- 12.5.3.2 Cross-Examination

12.5.4 Forms of Testimony
- 12.5.4.1 Affidavits
- 12.5.4.2 Answers to Interrogatories
- 12.5.4.3 Depositions and Trial Testimony

12.5.5 Burden of Proof

12.5.6 Criminal Prosecution
- 12.5.6.1 Arson
- 12.5.6.2 Arson Statutes
- 12.5.6.3 Factors to be Considered
- 12.5.6.4 Other Fire-Related Criminal Acts
- 12.5.6.5 Arson-Reporting/Immunity Statutes

12.5.7 Civil Litigation
- 12.5.7.1 Negligence
- 12.5.7.2 Codes, Regulations, and Standards
- 12.5.7.3 Product Liability
- 12.5.7.4 Strict Liability

SECTION 13

SAFETY

4.1 General

NFPA 1033 4.1.3* Because fire investigators are required to perform activities in adverse conditions, site safety assessments shall be completed on all scenes and regional and national safety standards shall be followed and included in organizational policies and procedures.

NFPA 1003 4.1.7

4.2 Scene Examination.

Duties shall include inspecting, evaluating, and analyzing the fire scene or evidence of the scene, and conducting a comprehensive review of documentation generated during the examination(s) of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and action or activity that brought the ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.~~Duties shall include inspecting and evaluating the fire scene, or evidence of the scene and/or conducting a comprehensive review of documentation generated during the examination(s) of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and act or activity that brought ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.~~

NFPA 1033 4.2.2* Conduct an exterior survey, given standard equipment and tools, so that evidence is identified and preserved, fire damage is interpreted, hazards are identified to avoid injuries, accessibility to the property is determined, and all potential means of ingress and egress are discovered.

(A) Requisite Knowledge. The types of building construction and the effects of fire on construction materials, types of evidence commonly found in the perimeter, evidence preservation methods, the effects of fire suppression, fire behavior and spread, fire patterns, and a basic awareness of the dangers of hazardous materials.

(B) Requisite Skills. Ability to assess fire ground and structural condition, observe the damage from and effects of the fire, and interpret fire patterns.

References:

J&B, chapter 11

Journal of Occupational and Environmental Hygiene, "Contamination of Firefighter Personal Protective Equipment and Skin and the Effectiveness of Decontamination Procedures"

The Bureau of Alcohol, Tobacco and Firearms, HETA 96-0171-2692, Health Hazard Evaluation Report

501-13.1 The Investigator candidate shall describe the safety issues as they relate to the fire investigation.

13.1.1 General Injury/Health Statistics

13.1.2 Health and Safety Programs
13.1.2.1 Five Critical Elements of Safety and Health Programs
13.1.2.1.1 Management Commitment and Employee Participation
13.1.2.1.2 Hazard and Risk Assessment
13.1.2.1.3 Hazzard Prevention and Control
13.1.2.1.4 Safety and Health Training and Education
13.1.2.1.5 Long- Term Commitment

501-13.2 ***The Investigator candidate shall describe factors that have an influence on general fire scene safety.***

13.2.1 Investigating the Scene Alone

13.2.2 Investigator Fatigue

13.2.3 Working Above or Below Grade Level

13.2.4 Working Around Mechanized Equipment

13.2.5 Safety of Bystanders

13.2.6 Status of Suppression

13.2.7 First Aid Kit and Emergency Notification Numbers

13.2.8 Emergency Notification Signal

501-13.3 ***The Investigator candidate shall describe general and particular hazards of the fire scene.***

13.3.1 Physical Hazards

13.3.2 Structural Stability Hazards

13.3.3 Electrical Hazards

13.3.4 Chemical Hazards

13.3.5 Biological Hazards

13.3.6 Mechanical Hazards

13.3.7 Miscellaneous Hazards

13.3.7.1 Radiological Hazards
13.3.7.2 Utilities
13.3.7.3 Mechanized Equipment Hazards

501-13.4 ***The Investigator candidate shall describe safety plans that may be part of the investigative process.***

13.4.1 Hazard and Risk Assessment
- 13.4.1.1 Identify the Hazards
- 13.4.1.2 Determine the Risk of the Hazard
- 13.4.1.3 Control the Hazard
  - 13.4.1.3.1 Engineering Controls
  - 13.4.1.3.2 Administrative Controls
  - 13.4.1.3.3 Proper Selection and Use of Personal Protective Equipment (PPE)

13.4.2 Site-Specific Safety Plans
- 13.4.2.1 Hazard Communication Site Plan (HazCom Plan)
- 13.4.2.2 Confined Space Program

13.4.3 Management of Plans and Site Safety

13.4.4 Safety Meetings and Briefings

501-13.5 ***The Investigator candidate shall describe factors associated with chemical and contaminant exposure.***

13.5.1 Types of Exposure Effects
- 13.5.1.1 Local Effect
- 13.5.1.2 Systemic Effect

13.5.2 Routes of Exposure
- 13.5.2.1 Inhalation
- 13.5.2.2 Cutaneous
- 13.5.2.3 Ingestion
- 13.5.2.4 Injection
- 13.5.2.5 Ocular Exposure Route

13.5.3 Toxicity Exposure Levels
- 13.5.3.1 Acute Exposure
- 13.5.3.2 Chronic Exposure
- 13.5.3.3 Cumulative Exposure
- 13.5.3.4 Latency Period

501-13.6 ***The Investigator candidate shall understand the utilization of personal protective equipment on fire and explosion scenes.***

13.6.1 Proper Selection and Use of Personal Protective Equipment (PPE)
13.6.1.1 Safety Clothing and Equipment
13.6.1.2 PPE Use
13.6.1.3 Decontamination

13.6.2 Examples of Personal Protective Equipment (PPE)
13.6.2.1 Respiratory Protection
13.6.2.2 Hand Protection
13.6.2.3 Other Specialized Equipment

501-13.7 ***The Investigator candidate shall describe the potential emergency situations that could occur while processing a fire scene and the different types of emergency action plans needed.***

13.7.1 Emergency Evacuation Plans

13.7.2 Medical Emergency Plans

13.7.3 Severe Weather Plans

13.7.4 Fire Emergency Plan

13.7.5 Additional Emergency Action Plans

501-13.8 ***The Investigator candidate shall describe post-scene safety activities.***

13.8.1 Decontamination

13.8.2 Medical Screening

501-13.9 ***The Investigator candidate shall describe safety considerations in off-scene investigation activities.***

501-13.10 ***The Investigator candidate shall identify the special hazards associated with investigating the fire scene.***

13.10.1 Criminal Acts or Acts of Terrorism
13.10.1.1 Secondary Devices

13.10.2 Residue Chemicals

13.10.3 Biological and Radiological Terrorism

13.10.4 Drug Labs

****Note****
The following part of Section 13 (501-13.11 through 501-13.15) is not contained in NFPA 921, *Guide for Fire and Explosion Investigations*. The reference for this material is found in IFSTA, *Fire Inspection and Code Enforcement*. See also the *Emergency Response Guidebook (ERG).*

501-13.11 ***The Investigator candidate shall demonstrate knowledge of safety principles applicable to hazardous materials response.***

501-13.12 ***The Investigator candidate shall identify the difference between hazardous materials incidents and other emergencies.***

501-13.13 ***The Investigator candidate, utilizing the Emergency Response Guidebook, shall:***

1) Identify the Three Methods for Determining the Appropriate Guide Page for a Specific Hazardous Material.
   a) Locate UN Number in the Yellow-Bordered Pages.
   b) Locate Name of Material in the Alphabetic Listing in the Blue-Bordered Pages.
   c) Locate a Matching Placard in the Table of Placards and Consult the Two-Digit Guide Number Located Next to the Similar Placard.

2) Identify Two General Types of Hazards Found on each Guide Page.
   a) Fire/Explosive
   b) Health

501-13.14 ***The Investigator candidate, given an example of an NFPA 704 marking, shall identify the significance of the following components.***

1) Three Categories of Hazard
   a) Health - Blue Color
   b) Flammability - Red Color
   c) Instability - Yellow Color

2) Special Hazards that may be Indicated

a) OX (or OXY)
b) COR
c) ALK
d) ACID

3) Numerical rating system of hazards

501-13.15 The Investigator candidate shall identify the following information from safety data sheets (SDS).

1) The Investigator Candidate Shall List Four Organizations from Which to Obtain a Safety Data Sheet (SDS)
   a) Manufacturer of the Material
   b) Supplier
   c) Facility Hazard and Communication Plan
   d) Local Emergency Planning Committee (LEPC)

2) The Investigator Candidate Shall be Familiar with the Different SDS Chapters

SECTION 14

SOURCES OF INFORMATION

4.1 General

NFPA 1033 4.1.4 The fire investigator shall maintain necessary liaison with other interested professionals and entities.

4.2 Scene Examination.

Duties shall include inspecting, evaluating, and analyzing the fire scene or evidence of the scene, and conducting a comprehensive review of documentation generated during the examination(s) of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and action or activity that brought the ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.~~Duties shall include inspecting and evaluating the fire scene, or evidence of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and act or activity that brought ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.~~

NFPA 1033 4.2. Inspect and analyze the performance of building systems, including fire protection, detection and suppression systems, HVAC, electricity and electrical systems, fuel gas systems, and building compartmentation, given standard and special equipment and tools, so that a determination can be made as to the need for expert resources; an operating system's impact on fire growth and spread is considered in identifying origin areas; defeated and failed systems are identified; and the system's potential as a fire cause is recognized.~~8 Inspect the performance of building systems, including detection, suppression, HVAC, utilities, and building compartmentation, given standard and special equipment and tools, so that a determination can be made as to the need for expert resources, an operating system's impact on fire growth and spread is considered in identifying origin areas, defeated and/or failed systems are identified, and the system's potential as a fire cause is recognized.~~

(A) Requisite Knowledge. Different types of detection, suppression, HVAC, utility, and building compartmentation such as fire walls and fire doors; types of expert resources for building systems; the impact of fire on various systems; common methods used to defeat a system's functional capability; and types of failures.

(B) Requisite Skills. Determine the system's operation and its effect on the fire; identify alterations to, and failure indicators of, building systems; and evaluate the impact of suppression efforts on building systems.

4.4 Evidence Collection/Preservation.

Duties shall include using proper physical and legal procedures to identify, document, collect, and preserve evidence required within the investigation.

NFPA 1033 4.4.3 Select evidence for analysis given all information from the investigation, so that items for analysis support specific investigation needs.

(A) Requisite Knowledge. Purposes for submitting items for analysis, types of analytical services available, and capabilities and limitations of the services performing the analysis.

(B) Requisite Skills. Evaluate the fire incident to determine forensic, engineering, or laboratory needs.

4.5 Interview.

Duties shall include obtaining information regarding the overall fire investigation from others through verbal communication.

NFPA 1033 4.5.1 Develop an interview plan, given no special tools or equipment, so that the plan reflects a strategy to further determine the fire cause and affix responsibility and includes a

relevant questioning strategy for each individual to be interviewed that promotes the efficient use of the investigator's time.

(A) Requisite Knowledge. Persons who can provide information that furthers the fire cause determination or the affixing of responsibility, types of questions that are pertinent and efficient to ask of different information sources (first responders, neighbors, witnesses, suspects, and so forth), and pros and cons of interviews versus document gathering.

(B) Requisite Skills. Planning skills, development of focused questions for specific individuals, and evaluation of existing file data to help develop questions and fill investigative gaps.

NFPA 1033 4.5.2 Conduct interviews, given incident information, so that pertinent information is obtained, follow-up questions are asked, responses to all questions are elicited, and the response to each question is documented accurately.

(A) Requisite Knowledge. Types of interviews, personal information needed for proper documentation or follow-up, documenting methods and tools, and types of nonverbal communications and their meaning.

(B) Requisite Skills. **Ability to** ~~Adjust~~ adjust interviewing strategies based on deductive reasoning, interpret and analyze verbal and nonverbal communications, apply appropriate legal requirements, ~~applicable~~, and exhibit strong listening skills.

NFPA 1033 4.5.3 Evaluate interview information, given interview transcripts or notes and incident data, so that all interview data is individually analyzed and correlated with all other interviews, corroborative and conflictive information is documented, and new leads are developed.

(A) Requisite Knowledge. Types of interviews, report evaluation methods, and data correlation methods.

(B) Requisite Skills. Data correlation skills and the ability to evaluate source information (e.g., first responders and other witnesses).

4.6 Post-Incident Investigation.

Duties shall include the investigation of all factors beyond the fire scene at the time of the origin and cause determination.

NFPA 1033 4.6.1 Gather reports and records, given no special tools, equipment, or materials, so that all gathered documents are applicable to the investigation, complete, and authentic; the chain of custody is maintained; and the material is admissible in a legal proceeding.

(A) Requisite Knowledge: Types of reports needed that facilitate determining responsibility for the fire (e.g. police reports, insurance policies, financial records, deeds, private investigator reports, outside photos, and videos) and location of these reports.

(B) Requisite Skills: Identify the reports and documents necessary for the investigation, implement the chain of custody, and organizational skills.

NFPA 1033 4.6.3 Coordinate expert resources, given the investigative file, reports, and documents, so that the expert's competencies are matched to the specific investigation needs, financial expenditures are justified, and utilization clearly furthers the investigative goals of determining cause or affixing responsibility.

(A) Requisite Knowledge: How to assess one's own expertise, qualification to be called for expert testimony, types of expert resources (e.g., forensic, CPA, polygraph, financial, human behavior disorders, and engineering), and methods to identify expert resources.

(B) Requisite Skills: Apply expert resources to further the investigation by networking with other investigators to identify experts, questioning experts relative to their qualifications, and developing a utilization plan for use of expert resources.

References:
J&B, chapter 12
ASTM E678
ASTM E860
ASTM 1188

501-14.1 ***The Investigator candidate shall identify sources of information and assistance available to the Investigator during a fire investigation.***

14.1.1 Purpose of Obtaining Information

14.1.2 Number and Diversity of Informational Sources

14.1.3 Data Relevance, Accuracy, and Reliability

501-14.2 ***The Investigator candidate shall describe the legal considerations on sources of information.***

14.2.1 Freedom of Information Act

14.2.2 Privileged Communications

14.2.3 Confidential Communications

14.2.4 Privacy Considerations

14.2.5 Authorizations for Release of Information

501-14.3 ***The Investigator candidate shall identify the ASTM standards for collecting, preserving and evaluating data.***

501-14.4 ***The Investigator candidate shall distinguish differing forms of information.***

14.4.1 Verbal Information

14.4.2 Written and Printed Information

14.4.3 Visual Information

14.4.4 Digital Information

501-14.5 ***The Investigator candidate shall identify sources of non-scene data.***

14.5.1 Witness Data

14.5.2 Property Data

14.5.3 Electronically Stored Information

14.5.4 Existing Research and Publications

14.5.5 Experimentation and Testing

14.5.6 Governmental Sources of Information

14.5.7 Federal Government

14.5.8. Other Federal Agencies

501-14.6 ***The Investigator candidate shall identify private sources of information useful during a fire investigation.***

14.6.1 National Fire Protection Association (NFPA)

14.6.2 Society of Fire Protection Engineers (SFPE)

14.6.3 American Society for Testing and Materials (ASTM)

14.6.4 American National Standards Institute (ANSI)

14.6.5 National Association of Fire Investigators (NAFI)

14.6.6 International Association of Arson Investigators (IAAI)

14.6.7 Regional Fire Investigations Organizations

14.6.8 Real Estate Industry

14.6.9 Abstract and Title Companies

14.6.10 Financial Institutions

14.6.11 Insurance Industry

14.6.12 Educational Institutions

14.6.13 Utility Companies

14.6.14 Trade Organizations

14.6.15 News Organizations

14.6.16 Lightning Detection Networks

SECTION 15

PLANNING THE INVESTIGATION

4.1 General

NFPA 1033 4.1.3 Because fire investigators are required to perform activities in adverse conditions, site safety assessments shall be completed on all scenes and regional and national safety standards shall be followed and included in organizational policies and procedures.

NFPA 1033 4.1.4 The fire investigator shall maintain necessary liaison with other interested professionals and entities.

NFPA 1033 4.1.6 The fire investigator shall understand the organization and operation of the investigative team within an incident management system.

4.2 Scene Examination.

Duties shall include inspecting, evaluating, and analyzing the fire scene or evidence of the scene, and conducting a comprehensive review of documentation generated during the examination(s) of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and action or activity that brought the ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.~~Duties shall include inspecting and evaluating the fire scene, or evidence of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and act or activity that brought ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.~~

NFPA 1033 4.2.1 Secure the fire ground, given marking devices, sufficient personnel, and special tools and equipment, so that unauthorized persons can recognize the perimeters of the investigative scene and are kept from restricted areas and all evidence or potential evidence is protected from damage or destruction.

(A) Requisite Knowledge. Fire ground hazards, types of evidence, and the importance of fire scene security, evidence preservation, and issues relating to spoliation.

(B) Requisite Skills. Use of marking devices.

4.6 Post-Incident Investigation

Duties shall include the investigation of all factors beyond the fire scene at the time of the origin and cause determination.

NFPA 1033 4.6.3 Coordinate expert resources, given the investigative file, reports, and documents, so that the expert's competencies are matched to the specific investigation needs, financial expenditures are justified, and utilization clearly furthers the investigative goals of determining cause or affixing responsibility.

(A) Requisite Knowledge. How to assess one's own expertise, qualifications to be called for expert testimony, types of expert resources (e.g. forensic, CPA, polygraph, financial, human behavior disorders, an engineering), and methods to identify expert resources.

(B) Requisite Skills. Apply expert resources to further the investigation by networking with other investigators to identify experts, questioning experts relative to their qualifications, and developing a utilization plan for use of expert resources.

References:
J&B, chapter 13
Kirk's, chapters 1 and 5
Lentini, chapter 4

501-15.3 The Investigator candidate shall be able to organize the basic investigation functions that are commonly performed in each investigation.

501-15.4 The Investigator candidate shall identify the goals of a pre- investigation team meeting.

15.4.1 Equipment and Facilities

15.4.2 Personal Safety Equipment

15.4.3 Tools and Equipment

501-15.5 The Investigator candidate shall identify the specialized personnel and technical consultants that may be needed to provide technical assistance.

501-15.6 The Investigator candidate shall identify a method to organize information generated throughout the investigation and coordinate the efforts of the various people involved.

SECTION 16

DOCUMENTATION OF THE INVESTIGATION

NFPA 1033 4.1.7 In order to successfully complete the tasks identified in the JPRs of Sections 4.2 through 4.7, the fire investigator shall remain current in the subjects listed as "requisite knowledge" as they relate to fire investigations, which include the following: (2)(c) Fire Investigation Technology.

4.3 Documenting the Scene.

Duties shall include diagramming the scene, photographing, and taking field notes to be used to compile a final report.

NFPA 1033 4.3.1 Diagram the scene, given standard tools and equipment, so that the scene is accurately represented and evidence, pertinent contents, significant patterns, and area(s) or point(s) of origin are identified.

(A) Requisite Knowledge. Commonly used symbols and legends that clarify the diagram, types of evidence and patterns that need to be documented, and formats for diagramming the scene.

(B) Requisite Skills. Ability to sketch the scene, basic drafting skills, and evidence recognition and observational skills.

NFPA 1033 4.3.2 Photographically document the scene, given standard tools and equipment, so that the scene is accurately depicted and the photographs support scene findings.

(A) Requisite Knowledge. Working knowledge of high-resolution camera and flash, the types of film, media, and flash available, and the strengths and limitations of each.

(B) Requisite Skills. Ability to use a high-resolution camera, flash, and accessories.

NFPA 1033 4.3.3 Construct investigative notes, given a fire scene, available documents (e.g., prefire plans and inspection reports), and interview information, so that the notes are accurate, provide further documentation of the scene, and represent complete documentation of the scene findings.

(A) Requisite Knowledge. Relationship between notes, diagrams, and photos, how to reduce scene information into concise notes, and the use of notes during report writing and legal proceedings.

(B) Requisite Skills. Data-reduction skills, note-taking skills, and observational and correlating skills.

4.6 Post-Incident Investigation.

Duties shall include the investigation of all factors beyond the fire scene at the time of the origin and cause determination.

NFPA 1033 4.6.1 Gather reports and records, given no special tools, equipment, or materials, so that all gathered documents are applicable to the investigation, complete, and authentic; the chain of custody is maintained; and the material is admissible in a legal proceeding.

(A) Requisite Knowledge. Types of reports needed that facilitate determining responsibility for the fire (e.g., police reports, fire reports, insurance policies, financial records, deeds, private investigator reports, outside photos, and videos) and location of these reports.

(B) Requisite Skills. Ability to identify the reports and documents necessary for the investigation, implement the chain of custody, and organizational skills.

NFPA 1033 4.6.2 Evaluate the investigative file, given all available file information, so that areas for further investigation are identified, the relationship between gathered documents and information is interpreted, and corroborative evidence and information discrepancies are discovered.

(A) Requisite Knowledge. File assessment and/or evaluation methods, including accurate documentation practices, and requisite investigative elements.

(B) Requisite Skills. Information assessment, correlation, and organizational skills.

4.7 Presentations

Duties shall include the presentation of findings to those individuals not involved in the actual investigations.

NFPA 1033 4.7.1 Prepare a written report, given investigative findings, so that the report accurately reflects the facts, data, and scientific principles on which the investigator relied; clearly identifies and expresses the investigator's opinions and conclusions; and contains the reasoning by which each opinion or conclusion was reached in order to meet the requirements of the intended audience(s).

(A) Requisite Knowledge. Elements of writing, typical components of a written report, and types of audiences and their respective needs or requirements.

(B) Requisite Skills. Writing skills, ability to analyze information and determine the reader's needs or requirements.

References:
J&B, chapter 14
Kirk's, chapter 6
Lentini, chapter 4
ASTM E860
ASTM E620

501-16.1 ***The Investigator candidate shall describe the purpose of recording the fire scene.***

501-16.2 ***The Investigator candidate shall describe the purpose of fire scene photography and the importance of timing.***

16.2.1 General

16.2.2 Timing

16.2.3 Basics

16.2.3.1 Types of Cameras

16.2.4 Understanding the Parts of a Camera
16.2.4.1 Lenses
16.2.4.2 Focal Length
16.2.4.3 Depth of Field
16.2.4.4 Filters
16.2.4.5 Shutter Speed

16.2.5 Lighting

16.2.6 Special Types of Photography
16.2.6.1 Composition and Techniques
16.2.6.2 Sequential Photographs
16.2.6.3 Mosaic Photographs
16.2.6.4 Photo Diagram
16.2.6.5 Assisting Photographer
16.2.6.6 Photography and the Courts

16.2.7 Video

16.2.8 Suggested Activities to Be Documented
16.2.8.1 During the Fire
16.2.8.2 Overhaul Photographs
16.2.8.3 Bystander Photographs
16.2.8.4 Exterior Photographs
16.2.8.5 Structural Photographs
16.2.8.6 Interior Photographs
16.2.8.7 Utility Photographs
16.2.8.8 Evidence Photographs
16.2.8.9 Victim Photographs
16.2.8.10 Witness Viewpoint Photographs
16.2.8.11 Aerial Photographs
16.2.8.12 Satellite Imagery

16.2.9 Photography Tips

16.2.10 Presentation of Photographs

501-16.3 The Investigator candidate shall describe the importance of note taking.

16.3.1 Forms of Incident Field Notes

16.3.2 Forms for Collecting Data

16.3.3 Dictation of Field Notes

501-16.4 The Investigator candidate shall explain the importance of diagrams and drawings.

16.4.1 Types of Drawings
- 16.4.1.1 Sketches
- 16.4.1.2 Diagrams

16.4.2 Selection of Drawings

16.4.3 Drawing Tools and Equipment

16.4.4 Diagram Elements
- 16.4.4.1 General Information
- 16.4.4.2 Identification of Compass Orientation
- 16.4.4.3 Scale
- 16.4.4.4 Symbols
- 16.4.4.5 Legend

16.4.5 Drawings
- 16.4.5.1 Site or Area plans
- 16.4.5.2 Floor Plans
- 16.4.5.3 Elevations
- 16.4.5.4 Details and Sections
- 16.4.5.5 Exploded View Diagrams
- 16.4.5.6 Three-Dimensional (3D) Representations
- 16.4.5.7 Specialized Fire Investigation Diagrams

16.4.6 Prepared Design and Construction Drawings
- 16.4.6.1 General
- 16.4.6.2 Architectural and Engineering Drawings
- 16.4.6.3 Architectural and Engineering Schedules
- 16.4.6.4 Specifications
- 16.4.6.5 Appliances and Building Equipment

501-16.5 The Investigator candidate must understand the purpose of the report to effectively communicate the observations analyses and conclusions made during an investigation.

16.5.1 Purpose

16.5.2 Report Organization

16.5.3 Descriptive Information

16.5.4 Opinions and Conclusions

16.5.5 Pertinent Facts

16.5.6 Reference to Methodology

****Note: The following part of Section 16 does not come from NFPA 921****
The reference for this material is found in ASTM E620 *Standard Practice for Reporting Opinions of Scientific or Technical Experts* (current ed.)

501-16.6 The Investigator candidate shall identify and describe the process of preparing and completing a final, accurate and concise report.

SECTION 17

PHYSICAL EVIDENCE

NFPA 1033 4.1.7 In order to successfully complete the tasks identified in the JPRs of Sections 4.2 through 4.7, the fire investigator shall remain current in the subjects listed as "requisite knowledge" as they relate to fire investigations, which include the following: (2)(d) Evidence Documentation, Collection, and Preservation.

4.2 Scene Examination.

Duties shall include inspecting, evaluating, and analyzing the fire scene or evidence of the scene, and conducting a comprehensive review of documentation generated during the examination(s) of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and action or activity that brought the ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.~~Duties shall include inspecting and evaluating the fire scene, or evidence of the scene if the scene, and/or conducting a comprehensive review of documentation generated during the examination(s) of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and act or activity that brought the ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.~~

NFPA 1033 4.2.1 Secure the fire ground, given marking devices, sufficient personnel, and special tools and equipment, so that unauthorized persons can recognize the perimeters of the investigative scene and are kept from restricted areas and all evidence or potential evidence is protected from damage or destruction.

(A) Requisite Knowledge. Fire ground hazards, types of evidence, and the importance of fire scene security, evidence preservation, and issues relating to spoliation.

(B) Requisite Skills. Use of marking devices.

NFPA 1033 4.2.6 Examine and remove fire debris, given standard equipment and tools, so that all debris is checked for fire cause evidence, potential ignition source(s) is identified, and evidence is preserved without investigator-inflicted damage or contamination.

(A) Requisite Knowledge. Basic understanding of ignition processes, characteristics of ignition sources, and ease of ignition of fuels; debris-layering techniques; use of tools and equipment during the debris search; types of fire cause evidence commonly found in various degrees of damage; and evidence-gathering methods and documentation.

(B) Requisite Skills. Employ search techniques that further the discovery of fire cause

(C) evidence and ignition sources, use search techniques that incorporate documentation, and collect and preserve evidence.

4.3 Documenting the Scene.

Duties shall include diagramming the scene, photographing, and taking field notes to be used to compile a final report.

NFPA 1033 4.3.1 Diagram the scene, given standard tools and equipment, so that the scene is accurately represented and evidence, pertinent contents, significant patterns, and area(s) or point(s) of origin are identified.

(A) Requisite Knowledge. Commonly used symbols and legends that clarify the diagram.

4.4 Evidence Collection/Preservation

Duties shall include using proper physical and legal procedures to retain evidence required within the investigation.

NFPA 1033 4.4.1 Utilize proper procedures for managing victims and fatalities, given a protocol and appropriate personnel, so that all evidence is discovered and preserved and the protocol procedures are followed.

(A) Requisite Knowledge. Types of evidence associated with fire victims and fatalities and evidence preservation methods.

(B) Requisite Skills. Observational skills and the ability to apply protocols to given situations.

NFPA 1033 4.4.2* Locate, collect, and package evidence, given standard or special tools and equipment and evidence collection materials, so that evidence is identified, preserved, collected, and packaged to avoid contamination and investigator-inflicted damage and the chain of custody is established.

(A) Requisite Knowledge. Types of evidence, authority requirements, impact of removing evidentiary items on civil or criminal proceedings (exclusionary or fire-cause supportive evidence), types, capabilities, and limitations of standard and special tools used to locate evidence, types of laboratory tests available, packaging techniques and materials, and impact of evidence collection on the investigation.

(B) Requisite Skills. Ability to recognize different types of evidence and determine whether evidence is critical to the investigation.

NFPA 1033 4.4.3 Select evidence for analysis given all information from the investigation, so that items for analysis support specific investigation needs.

(A) Requisite Knowledge. Purposes for submitting items for analysis, types of analytical services available, and capabilities and limitations of the services performing the analysis.

(B) Requisite Skills. Evaluate the fire incident to determine forensic, engineering, or laboratory needs.

NFPA 1033 4.4.4 Maintain a chain of custody, given standard investigative tools, marking tools, and evidence tags or logs, so that written documentation exists for each piece of evidence and evidence is secured.

(A) Requisite Knowledge. Rules of custody and transfer procedures, types of evidence (e.g., physical evidence obtained at the scene, photos, and documents), and methods of recording the chain of custody.

(B) Requisite Skills. Ability to execute the chain of custody procedures and accurately complete necessary documents.

NFPA 1033 4.4.5 Dispose of evidence, given jurisdictional or agency regulations and file information, so that the disposal is timely, safely conducted, and in compliance with jurisdictional or agency requirements.

(A) Requisite Knowledge. Disposal services available and common disposal procedures and problems.

(B) Requisite Skills. Documentation skills.

References:
J&B, chapter 15
Kirk's, chapter 7

Lentini, chapter 4
ASTM E1188
ASTM E1459

501-17.1 ***The Investigator candidate shall describe the recommended and accepted methods of processing physical evidence.***

501-17.2 ***The Investigator candidate shall define physical evidence.***

501-17.3 ***The Investigator candidate shall describe the importance of preservation of the fire scene and physical evidence.***

17.3.1 General

17.3.2 Fire Patterns as Physical Evidence

17.3.3 Artifact Evidence

17.3.4 Protecting Evidence

17.3.5 Role and Responsibilities of Fire Suppression Personnel in Preserving the Fire Scene
17.3.5.1 General
17.3.5.2 Preservation
17.3.5.3 Caution in Fire Suppression Operations

17.3.6 Roles and Responsibilities of the Fire Investigator

17.3.7 Practical Considerations

501-17.4 ***The Investigator candidate shall describe contamination of physical evidence.***

17.4.1 Contamination of Evidence Containers

17.4.2 Contamination During Collection

17.4.3 Contamination by Fire Fighters

501-17.5 ***The Investigator candidate shall describe methods of collection.***

17.5.1 General

17.5.2 Documenting the Collection of Physical Evidence

17.5.3 Collection of Traditional Forensic Physical Evidence

17.5.4 Collection of Evidence for Accelerant Testing
- 17.5.4.1 Liquid Accelerant Characteristics
- 17.5.4.2 Canine-Handler Teams
- 17.5.4.3 Collection of Liquid Samples for Ignitable Liquid Testing
- 17.5.4.4 Collection of Liquid Evidence Absorbed by Solid Materials
- 17.5.4.5 Collection of Solid Samples for Accelerant Testing
- 17.5.4.6 Comparison Samples

17.5.5 Collection of Gaseous Samples

17.5.6 Collection of Electrical Equipment and System Components

17.5.7 Collection of Appliances or Small Electrical Equipment

501-17.6 The Investigator candidate shall identify and describe different types of evidence containers.

17.6.1 General

17.6.2 Liquid and Solid Accelerant Evidence Containers
- 17.6.2.1 Metal Cans
- 17.6.2.2 Glass Jars
- 17.6.2.3 Special Evidence Bags
- 17.6.2.4 Common Plastic Bags

501-17.7 The Investigator candidate shall understand the benefits and limitations of utilizing Canine-Handler Teams.

17.7.1 Preferred Designation

17.7.2 Other Designations for IGL Canines

17.7.3 Investigators' Discretion

17.7.4 Handlers' Expertise

17.7.5 Canine-Handler Teams

17.7.6 Purpose of Canine-Handler Team

17.7.7 Limitations on the Use of Alerts by Canine-Handler Teams

17.7.8 Canine-Handler Teams and Accelerant Detection

17.7.9 Coordinating the Investigation with the Handler

17.7.10 Safety of Canine, Handler, and Others

501-17.8 ***The Investigator candidate shall identify the ASTM standards related to physical evidence.***

501-17.9 ***The Investigator candidate shall describe the proper methods of transportation and storage of physical evidence.***

17.9.1 Hand Delivery

17.9.2 Shipment

17.9.3 Storage of Evidence

501-17.10 ***The Investigator candidate shall identify and describe the evidence chain of custody of physical evidence.***

501-17.11 ***The Investigator candidate shall identify types of analytical methods and tests applicable to certain fire investigations, and the capabilities and limitations of the services that perform the analysis.***

17.11.1 Evidence Collection or Inspections Involving Alteration Without Changes to the Evidentiary Value of the Artifacts

17.11.2 Test Methods

17.11.3 Sufficiency of Samples

17.11.4 Comparative Examination and Testing

501-17.12 ***The Investigator candidate shall describe the proper procedure for evidence disposition.***

SECTION 18

ORIGIN DETERMINATION

4.2 Scene Examination.
Duties shall include inspecting, evaluating, and analyzing the fire scene or evidence of the scene, and conducting a comprehensive review of documentation generated during the examination(s) of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and action or activity that brought the ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.~~Duties shall include inspecting and evaluating the fire scene, or evidence of the scene and/or conducting a comprehensive review of documentation generated during the examination(s) of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and act or activity that brought the ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.~~

NFPA 1033 4.2.2* Conduct an exterior survey, given standard equipment and tools, so that evidence is identified and preserved, fire damage is interpreted, hazards are identified to avoid injuries, accessibility to the property is determined, and all potential means of ingress and egress are discovered.

(A) Requisite Knowledge. The types of building construction and the effects of fire on construction materials, types of evidence commonly found in the perimeter, evidence preservation methods, the effects of fire suppression, fire behavior and spread, fire patterns, and a basic awareness of the dangers of hazardous materials.
(B) Requisite Skills. Assess fire ground and structural condition, observe the damage from and effects of the fire, and interpret fire patterns.

NFPA 1033 4.2.3 Conduct an interior survey, given standard equipment and tools, so that areas of potential evidentiary value requiring further examination are identified and preserved, the evidentiary value of contents is determined, and hazards are identified in order to avoid injuries.

(A) Requisite Knowledge. The types of building construction and interior finish and the effects of fire on those materials, the effects of fire suppression, fire behavior and spread, evidence preservation methods, fire patterns, effects of building contents on fire growth, the relationship of building contents to the overall investigation, weather conditions at the time of the fire, and fuel moisture.
(B) Requisite Skills. Assess structural conditions, observe the damage and effects of the fire, discover the impact of fire suppression efforts on fire flow and heat propagation, and evaluate protected areas to determine the presence and/or absence of contents.

NFPA 1033 4.2.5 Interpret and analyze fire patterns, given standard equipment and tools and some structural or content remains, so that fire development is determined, methods and effects of suppression are evaluated, false origin area patterns are recognized, and all areas of origin are correctly identified.

(A) Requisite Knowledge. Fire behavior and spread based on fire chemistry, fire dynamics, and physics, fire suppression effects, building construction.

(B) Requisite Skills. Ability to interpret variations of fire patterns on different materials with consideration given to heat release rate, form, and ignitibility; distinguish impact of different types of fuel loads; evaluate fuel trails; and analyze and synthesize information.

4.6 Post-Incident Investigation.
Duties shall include the investigation of all factors beyond the fire scene at the time of the origin and cause determination.
NFPA 1033 4.6.5* Formulate an opinion concerning origin, cause, or responsibility for the fire, given all investigative findings, so that the opinion regarding origin, cause, or responsibility for a fire is supported by the data, facts, records, reports, documents, and evidence.
(A) Requisite Knowledge: Analytical methods and procedures (e.g., hypothesis development and testing, systems analysis, time lines, link analysis, fault tree analysis, and data reduction matrixing).
(B) Requisite Skills: Analytical and assimilation skills.

References:
J&B, chapter 16
Kirk's, chapters 1 and 5
Lentini, chapter 4

501-18.1 ***The Investigator candidate shall identify witness information and/or electronic data, fire patterns, and fire dynamics used in origin determination***.

501-18.2 ***The Investigator candidate shall identify and describe the overall methodology of conducting a scene assessment.***

18.2.1 Scientific Method

18.2.2 Sequence of Activities

18.2.3 Sequential Pattern Analysis

18.2.4 Systematic Procedure

18.2.5 Recommended Methodology

501-18.3 ***The Investigator candidate shall identify the data collection process for origin determination***.

18.3.1 Initial Scene Assessment
- 18.3.1.1 Safety Assessment
- 18.3.1.2 Scope of the Examination
- 18.3.1.3 Order of the Examination
- 18.3.1.4 Surrounding Areas
- 18.3.1.5 Structure Exterior
- 18.3.1.6 Structure Interior
- 18.3.1.7 Post-Fire Alterations
- 18.3.1.8 Determination of the Safety of the Fire Scene

18.3.2 Excavation and Reconstruction
- 18.3.2.1 Scope of Excavation and Reconstruction
- 18.3.2.2 Safety
- 18.3.2.3 Excavation
- 18.3.2.4 Heavy Equipment
- 18.3.2.5 Avoiding Spoliation
- 18.3.2.6 Avoiding Contamination
- 18.3.2.7 Washing Floors
- 18.3.2.8 Contents

18.3.3 Additional Data Collection Activities for Origin Determination
- 18.3.3.1 Pre-Fire Conditions
- 18.3.3.2 Description of Fuels
- 18.3.3.3 Structure Dimensions
- 18.3.3.4 Weather Conditions
- 18.3.3.5 Electrical Systems
- 18.3.3.6 Electrical Loads
- 18.3.3.7 HVAC Systems
- 18.3.3.8 Fuel Gas Systems
- 18.3.3.9 Liquid Fuel Systems
- 18.3.3.10 Fire Protection Systems
- 18.3.3.11 Fire Protection Systems Data
- 18.3.3.12 Security Cameras
- 18.3.3.13 Intrusion Alarm Systems
- 18.3.3.14 Witness Observations

501-18.4 ***The Investigator candidate shall recognize the importance of analyzing the following data***.

18.4.1 Fire Patterns Analysis
- 18.4.1.1 Consideration of All Patterns
- 18.4.1.2 Sequence of Patterns
- 18.4.1.3 Pattern Generation
- 18.4.1.4 Ventilation
- 18.4.1.5 Movement and Intensity Patterns
- 18.4.1.6 Evaluation of Every Pattern

18.4.2 Heat and Flame Vector Analysis
- 18.4.2.1 Complementary Vectors
- 18.4.2.2 Heat Source
- 18.4.2.3 Additional Tools for Pattern Visualization

18.4.3 Analysis of Sequential Events

18.4.4 Fire Dynamics

18.4.5 Origin Matrix Analysis

501-18.5 ***The Investigator candidate shall identify the process of developing origin hypotheses***.

18.5.1 Initial Hypothesis

18.5.2 Modifying the Initial Hypothesis

501-18.6 ***The Investigator candidate shall identify means and methods for testing the validity of the origin hypothesis.***

18.6.1 Means of Hypothesis Testing

18.6.2 Analytical Techniques and Tools
- 18.6.2.1 Time Line Analysis
- 18.6.2.2 Fire Modeling
- 18.6.2.3 Experimental Testing

501-18.7 ***The Investigator candidate shall select a final hypothesis***.

18.7.1 Defining the Area of Origin

18.7.2 Inconsistent Data

18.7.3 Case File Review

501-18.8 ***The Investigator candidate shall identify when there is insufficient data to define the origin***.

18.8.1 Large Area Adequate for Determination

18.8.2 Justification of a Large Area of Origin

18.8.3 Eyewitness Evidence of Origin Area

SECTION 19

FIRE CAUSE DETERMINATION

4.6 Post-Incident Investigation.
Duties shall include the investigation of all factors beyond the fire scene at the time of the origin and cause determination.

NFPA 1033 4.6.5* Formulate an opinion concerning origin, cause, or responsibility for the fire, given all investigative findings, so that the opinion regarding origin, cause, or responsibility for a fire is supported by the data, facts, records, reports, documents, and evidence.
(A) Requisite Knowledge. Analytical methods and procedures (e.g., hypothesis development and testing, systems analysis, time lines, link analysis, fault tree analysis, and data reduction matrixing).
(B) Requisite Skills. Analytical and assimilation skills.

References:
J&B, chapter 17
Kirk's, chapters 1 and 5

501-19.1 The Investigator candidate shall define fire cause and identify fire cause factors.

19.1.1 Fire Cause Factors

19.1.2 First Fuel Ignited

19.1.3 Ignition Source

19.1.4 Oxidant

19.1.5 Ignition Sequence

501-19.2 The Investigator candidate shall utilize the scientific method as the overall methodology.

19.2.1 Consideration of Data

19.2.2 Sequence of Activities

19.2.3 Point and Area of Origin

501-19.3 The Investigator candidate shall identify the data that needs to be collected for fire cause determination.

19.3.1 Identify Fuels in the Area of Origin

19.3.2 Identify Source and Form of the Heat of Ignition

19.3.3 Identify Items and Activities in Area of Origin

19.3.4 Identify the Oxidant

19.3.5 Identify Ignition Sequence Data

501-19.4 ***The Investigator candidate shall demonstrate the proper use of the scientific method to analyze the data.***

19.4.1 Fuel Analysis
- 19.4.1.1 Geometry and Orientation
- 19.4.1.2 Ignition Temperature
- 19.4.1.3 Quantity of Fuel

19.4.2 Ignition Source Analysis

19.4.3 Oxidant

19.4.4 Ignition Sequence

501-19.5 ***The Investigator candidate shall develop cause hypotheses.***

501-19.6 ***The Investigator candidate shall test the cause hypothesis for validity.***

19.6.1 Scientific Method

19.6.2 Deductive Reasoning

19.6.3 Hypotheses Testing Questions

19.6.4 Means of Hypothesis Testing
- 19.6.4.1 Scientific Literature
- 19.6.4.2 Fundamental Principles of Science
- 19.6.4.3 Physical Experiments or Testing
- 19.6.4.4 Cognitive Experiments
- 19.6.4.5 Time Lines
- 19.6.4.6 Fault Trees
- 19.6.4.7 Additional Techniques

19.6.5 Appropriate Use of the Process of Elimination
19.6.5.1 Cause Undetermined
19.6.5.2 Ignition Source vs. Fire Cause

501-19.7 ***The Investigator candidate shall demonstrate the proper selection of a final hypothesis.***

19.7.1 Establishing the Cause

19.7.2 Inconsistent Data

19.7.3 Safety Devices and Features

19.7.4 Undetermined Fire Cause

501-19.8 ***The Investigator candidate shall use a set of prescribed incident classification system when classification is required of the investigator.***

(1) NFIRS

(2) NFPA 901

(3) BATS

(4) UCR

(5) The Canadian Code Structure

(6) NIBRS

SECTION 20

ANALYZING THE INCIDENT FOR CAUSE AND RESPONSIBILITY

NFPA 1033 4.1.7 In order to successfully complete the tasks identified in the JPRs of Sections 4.2 through 4.7, the fire investigator shall remain current in the subjects listed as "requisite knowledge" as they relate to fire investigations, which include the following: (2)(a) Fire Analysis, (e) Failure Analysis and Analytical Tools.

4.6 Post-Incident Investigation.

Duties shall include the investigation of all factors beyond the fire scene at the time of the origin and cause determination.

NFPA 1033 4.6.1 Gather reports and records, given no special tools, equipment, or materials, so that all gathered documents are applicable to the investigation, complete, and authentic; the chain of custody is maintained; and the material is admissible in a legal proceeding.

(A) Requisite Knowledge. Types of reports needed that facilitate determining responsibility for the fire (e.g., police reports, fire reports, insurance policies, financial records, deeds, private investigator reports, outside photos, and videos) and location of these reports.

(B) Requisite Skills. Ability to identify the reports and documents necessary for the investigation, implement the chain of custody, and organizational skills.

NFPA 1033 4.6.2 Evaluate the investigative file, given all available file information, so that areas for further investigation are identified, the relationship between gathered documents and information is interpreted, and corroborative evidence and information discrepancies are discovered.

(A) Requisite Knowledge. File assessment and/or evaluation methods, including accurate documentation practices, and requisite investigative elements.

(B) Requisite Skills. Information assessment, correlation, and organizational skills.

NFPA 1033 4.6.3 Coordinate expert resources, given the investigative file, reports, and documents, so that the expert's competencies are matched to the specific investigation needs, financial expenditures are justified, and utilization clearly furthers the investigative goals of determining cause or affixing responsibility.
(A) Requisite Knowledge. How to assess one's own expertise, qualification to be called for expert testimony, types of expert resources (e.g., forensic, CPA, polygraph, financial, human behavior disorders, and engineering), and methods to identify expert resources.
(B) Requisite Skills. Ability to apply expert resources to further the investigation by networking with other investigators to identify experts, questioning experts relative to their qualifications, and developing a utilization plan for use of expert resources.

NFPA 1033 4.6.4 Establish evidence as to motive and/or opportunity, given an incendiary fire, so that the evidence is supported by documentation and meets the evidentiary requirements of the jurisdiction.
(A) Requisite Knowledge. Types of motives common to incendiary fires, methods used to discover opportunity, and human behavioral patterns relative to fire-setting
(B) Requisite Skills. Financial analysis, records gathering and analysis, interviewing, and interpreting fire scene information and evidence for relationship to motive and/or opportunity.

NFPA 1033 4.6.5 Formulate an opinion concerning origin, cause, or responsibility for the fire, given all investigative findings, so that the opinion regarding origin, cause, or responsibility for a fire is supported by the data, facts, records, reports, documents, and evidence.

(A) Requisite Knowledge. Analytical methods and procedures (e.g., hypothesis development and testing, systems analysis, time lines, link analysis, fault tree analysis, and data reduction matrixing).
(B) Requisite Skills. Analytical and assimilation skills.

References:
J&B, chapter 19
Kirk's, chapters 1 and 5

501-20.1 ***The Investigator candidate shall describe methods for analyzing the incident for cause and responsibility.***

20.1.1 (1) The cause of the fire or explosion.

(2) The cause of damage to property resulting from the incident.

(3) The cause of bodily injury or loss of life.

(4) The degree to which human fault contributed to any one or more of the causal issues described in 20.1.1(1), 20.1.1(2), and 20.1.1(3).

20.1.2 Based on the scope of the assignment, an individual investigator may not have responsibility or be required to address all of the aspects of this chapter.

20.1.3 The cause of a fire or the causes of damage or casualties may be grouped in broad categories for general discussion, for assignment of legal responsibility or culpability, or for reporting purposes.

501-20.2 ***The Investigator candidate shall identify the competent ignition source, the fuel first ignited, and the events that brought them together.***

501-20.3 ***The Investigator candidate shall describe the causes of damage to property resulting from the Incident.***

20.3.1 Considerations

20.3.2 Fire/Smoke Spread
20.3.2.1 Compartmentation
20.3.2.2 Change of occupancy/hazard
20.3.2.3 Detection/alarm systems

20.3.2.4 Human behavior
20.3.2.5 Fire suppression
20.3.2.6 Fuel loads
20.3.2.7 Housekeeping
20.3.2.8 Ventilation
20.3.2.9 Code violations
20.3.2.10 Structural failure

20.3.3 Other consequential damage

501-20.4 ***The Investigator candidate shall describe the causes of bodily injury or loss of life. See Chapters 11 and 24.***

20.4.1 Fire/Smoke Spread
20.4.1.1 Toxicity
20.4.1.2 Hazardous materials
20.4.1.3 Compartmentation
20.4.1.4 Change of occupancy/hazard
20.4.1.5 Detection/alarm systems
20.4.1.6 Human behavior
20.4.1.7 Fire suppression
20.4.1.8 Housekeeping
20.4.1.9 Fuel loads
20.4.1.10 Ventilation
20.4.1.11 Code violations
20.4.1.12 Means of egress/refuge
20.4.1.13 Structural failure
20.4.1.14 Intentional acts

20.4.2 Emergency Preparedness

501-20.5 ***The Investigator candidate shall describe the determination of responsibility.***

20.5.1 Nature of Responsibility

20.5.2 Definition of Responsibility

20.5.3 Assessing of Responsibility

20.5.4 Degrees of Responsibility

SECTION 21

FAILURE ANALYSIS AND ANALYTICAL TOOLS

NFPA 1033 4.1.7 In order to successfully complete the tasks identified in the JPRs of Sections 4.2 through 4.7, the fire investigator shall remain current in the subjects listed as "requisite knowledge" as they relate to fire investigations, which include the following: (2)(e) Failure Analysis and Analytical Tools.

4.6 Post-Incident Investigation.

Duties shall include the investigation of all factors beyond the fire scene at the time of the origin and cause determination.

NFPA 1033 4.6.1 Gather reports and records, given no special tools, equipment, or materials, so that all gathered documents are applicable to the investigation, complete, and authentic; the chain of custody is maintained; and the material is admissible in a legal proceeding.

(A) Requisite Knowledge. Types of reports needed that facilitate determining responsibility for the fire (e.g., police reports, fire reports, insurance policies, financial records, deeds, private investigator reports, outside photos, and videos) and location of these reports.

(B) Requisite Skills. Ability to identify the reports and documents necessary for the investigation, implement the chain of custody, and organizational skills.

NFPA 1033 4.6.2 Evaluate the investigative file, given all available file information, so that areas for further investigation are identified, the relationship between gathered documents and information is interpreted, and corroborative evidence and information discrepancies are discovered.

(A) Requisite Knowledge. File assessment and/or evaluation methods, including accurate documentation practices, and requisite investigative elements.

(B) Requisite Skills. Information assessment, correlation, and organizational skills.

NFPA 1033 4.6.3 Coordinate expert resources, given the investigative file, reports, and documents, so that the expert's competencies are matched to the specific investigation needs, financial expenditures are justified, and utilization clearly furthers the investigative goals of determining cause or affixing responsibility.

(A) Requisite Knowledge. How to assess one's own expertise, qualification to be called for expert testimony, types of expert resources (e.g., forensic, CPA, polygraph, financial, human behavior disorders, and engineering), and methods to identify expert resources.

(B) Requisite Skills. Ability to apply expert resources to further the investigation by networking with other investigators to identify experts, questioning experts relative to their qualifications, and developing a utilization plan for use of expert resources.

NFPA 1033 4.6.4 Establish evidence as to motive and/or opportunity, given an incendiary fire, so that the evidence is supported by documentation and meets the evidentiary requirements of the jurisdiction.

(A) Requisite Knowledge. Types of motives common to incendiary fires, methods used to discover opportunity, and human behavioral patterns relative to fire-setting.

(B) Requisite Skills. Financial analysis, records gathering and analysis, interviewing, and interpreting fire scene information and evidence for relationship to motive and/or opportunity.

NFPA 1033 4.6.5 Formulate an opinion concerning origin, cause, or responsibility for the fire, given all investigative findings, so that the opinion regarding origin, cause, or responsibility for a fire is supported by the data, facts, records, reports, documents, and evidence.

(A) Requisite Knowledge. Analytical methods and procedures (e.g., hypothesis development and testing, systems analysis, time lines, link analysis, fault tree analysis, and data reduction matrixing).
(B) Requisite Skills. Analytical and assimilation skills.

References:
J&B, chapter 20
Kirk's, chapters 1 and 5

501-21.1 ***The Investigator candidate shall describe failure analysis and the use of analytical tools.***

501-21.2 ***The Investigator candidate shall describe time lines available for use in analyzing fire cause.***

21.2.1 General

21.2.2 Hard Time (Actual)

21.2.3 Soft Time (Estimated)

21.2.4 Benchmark Events

21.2.5 Multiple Time Lines

501-21.3 ***The Investigator candidate shall describe system analysis techniques.***

21.3.1 Fault Trees

21.3.2 Failure Mode and Effects Analysis (FMEA)

501-21.4 ***The Investigator candidate shall describe the purpose for mathematical modeling.***

21.4.1 General and Limitations of Mathematical Modeling

21.4.2 Heat Transfer Analysis

21.4.3 Flammable Gas Concentrations

21.4.4 Hydraulic Analysis

21.4.5 Thermodynamic Chemical Equilibrium Analysis

21.4.6 Structural Analysis

21.4.7 Egress Analysis

21.4.8 Fire Dynamics Analysis

21.4.9 Guidelines for Selection and Use of a Fire Model

501-21.5 ***The Investigator candidate shall describe the role of fire testing.***

21.5.1 Role of Fire Testing

21.5.2 Fire Test Methods

21.5.3 Limitations of Fire Testing

501-21.6 ***The Investigator candidate shall identify the data required for modeling and testing.***

21.6.1 Materials and Contents

21.6.2 Ventilation

SECTION 22

EXPLOSIONS

NFPA 1033 4.1.7 In order to successfully complete the tasks identified in the JPRs of Sections 4.2 through 4.7, the fire investigator shall remain current in the subjects listed as "requisite knowledge" as they relate to fire investigations, which include the following: (1)(e) Explosion Dynamics.

4.2 Scene Examination.
Duties shall include inspecting, evaluating, and analyzing the fire scene or evidence of the scene, and conducting a comprehensive review of documentation generated during the examination(s) of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and action or activity that brought the ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.~~Duties shall include inspecting and evaluating the fire scene, or evidence of the scene, and/or conducting a comprehensive review of documentation generated during the examination(s) of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and act or activity that brought the ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.~~

NFPA 1033 4.2.9 Discriminate the effects of explosions from other types of damage, given standard equipment and tools, so that an explosion is identified and its evidence is preserved.

(A) Requisite Knowledge. Different types of explosions and their causes, characteristics of an explosion, and the difference between low- and high-order explosions.

(B) Requisite Skills. Identify explosive effects on glass, walls, foundations, and other building materials; distinguish between low- and high-order explosion effects; and analyze damage to document the blast zone and origin.

References:
J&B, chapter 21
Kirk's, chapter 3

501-22.1 ***The Investigator candidate shall define the term "explosion".***

501-22.2 ***The Investigator candidate shall identify the different types of explosions.***

22.2.1 Mechanical Explosions

22.2.2 Boiling Liquid Expanding Vapor Explosion (BLEVE)

22.2.3 Chemical Explosions

22.2.4 Electrical Explosions

22.2.5 Nuclear Explosions

501-22.3 ***The Investigator candidate shall distinguish between the characterization of explosion damage***.

22.3.1 Low-Order Damage

22.3.2 High-Order Damage

501-22.4 ***The Investigator candidate shall be able to describe the effects of explosions.***

22.4.1 Blast Overpressure and Wave Effect
- 22.4.1.1 General
- 22.4.1.2 Positive Pressure Phase
- 22.4.1.3 Negative Pressure Phase
- 22.4.1.4 Shape of Blast Wave (Front)
- 22.4.1.5 Rate of Pressure Rise versus Maximum Pressure

22.4.2 Shrapnel Effect (Projectiles)

22.4.3 Thermal Effect

22.4.4 Seismic Effect (Ground Shock)

501-22.5 ***The Investigator candidate shall identify the factors controlling explosion effects***.

22.5.1 Fuel

22.5.2 Turbulence

22.5.3 Nature of Confining Space

22.5.4 Location and Magnitude of Ignition Source

22.5.5 Venting

22.5.6 Blast Pressure Wave (Blast Pressure Front) Modification by Reflection

22.5.7 Blast Pressure Front Modification by Refraction and Blast Focusing

501-22.6 ***The Investigator candidate shall be able to identify a seated explosion.***

22.6.1 General

22.6.2 Explosives

22.6.3 Boiler and Pressure Vessels

22.6.4 Confined Fuel Gas and Liquid Vapor

22.6.5 Boiling Liquid Expanding Vapor Explosion (BLEVE)

501-22.7 ***The Investigator candidate shall be able to identify a non-seated explosion.***

22.7.1 Fuel Gases

22.7.2 Pool Flammable/Combustible Liquids

22.7.3 Dusts

22.7.4 Backdraft (Smoke Explosion)

501-22.8 ***The Investigator candidate shall be able to describe the characteristics of gas/vapor combustion explosions.***

22.8.1 Ignition of Gases and Vapors

22.8.2 Interpretation of Explosion Damage
- 22.8.2.1 Fuel-to-Air Ratio
- 22.8.2.2 Specific Gravity

22.8.3 Underground Migration of Fuel Gases

22.8.4 Multiple Explosions

501-22.9 ***The Investigator candidate shall describe the characteristics of dust explosions.***

22.9.1 General

22.9.2 Particle Size

22.9.3 Concentration

22.9.4 Turbulence in Dust Explosions

22.9.5 Moisture

22.9.6 Minimum Temperature and Ignition Energy for Dust

22.9.7 Multiple Explosions

501-22.10 ***The Investigator candidate shall be able to describe backdraft (smoke explosions).***

501-22.11 ***The Investigator candidate shall be able to identify an unconfined vapor cloud explosion.***

501-22.12 ***The Investigator candidate shall be able to distinguish the two types of explosives.***

22.12.1 Low Explosives

22.12.2 High Explosives

501-22.13 ***The Investigator candidate shall describe the complexity of the investigation of explosive incidents.***

501-22.14 ***The Investigator candidate shall be able to investigate the explosion scene.***

22.14.1 General

22.14.2 Securing the Scene
- 22.14.2.1 Establishing the Scene
- 22.14.2.2 Obtain Background Information
- 22.14.2.3 Establish the Scene Search Pattern
- 22.14.2.4 Safety at the Explosion Scene

22.14.3 Initial Scene Assessment
- 22.14.3.1 General
- 22.14.3.2 Identify Explosion or Fire
- 22.14.3.3 Document Damage
- 22.14.3.4 Seated or Nonseated Explosion
- 22.14.3.5 Identify Type of Explosion
- 22.14.3.6 Identify Potential General Fuel Type
- 22.14.3.7 Establish the Origin
- 22.14.3.8 Establish Ignition Source

22.14.4 Detailed Scene Assessment
- 22.14.4.1 Identify Damage Effects of Explosion
- 22.14.4.2 Identify Pre-Blast and Post-Blast Fire Damage
- 22.14.4.3 Locate and Identify Articles of Evidence
- 22.14.4.4 Identify Force Vectors

501-22.15 The Investigator candidate shall analyze the origin (epicenter) of an explosion scene.

501-22.16 The Investigator candidate shall analyze a fuel source.

501-22.17 The Investigator candidate shall analyze the ignition source.

501-22.18 The Investigator candidate shall analyze to establish cause.

22.18.1 General

22.18.2 Time Line Analysis

22.18.3 Damage Pattern Analysis
- 23.18.3.1 Debris Analysis
- 23.18.3.2 Relative Structural Damage Analysis

22.18.4 Correlation of Explosion Type and Energy with Damage Incurred

22.18.5 Analysis of Damaged Items and Structures

22.18.6 Correlation of Thermal Effects

SECTION 23

INCENDIARY FIRES

4.6 Post-Incident Investigation.

Duties shall include the investigation of all factors beyond the fire scene at the time of the origin and cause determination.

NFPA 1033 4.6.4 Establish evidence as to motive and/or opportunity, given an incendiary fire, so that the evidence is supported by documentation and meets the evidentiary requirements of the jurisdiction.

(A) Requisite Knowledge. Types of motives common to incendiary fires, methods used to discover opportunity, and human behavioral patterns relative to fire-setting.

(B) Requisite Skills. Financial analysis, records gathering and analysis, interviewing, and interpreting fire scene information and evidence for relationship to motive and/or opportunity.

NFPA 1033 4.6.5 Formulate an opinion concerning origin, cause, or responsibility for the fire, given all investigative findings, so that the opinion regarding origin, cause, or responsibility for a fire is supported by the data, facts, records, reports, documents, and evidence.

(A) Requisite Knowledge: Analytical methods and procedures (e.g., hypothesis development and testing, systems analysis, time lines, link analysis, fault tree analysis, and data reduction matrixing).

(B) Requisite Skills: Analytical and assimilation skills.

References:
J&B, chapter 21
Kirk's, chapter 11
Lentini, chapter 8

501-23.1 The Investigator candidate shall define "incendiary" fires.

501-23.2 The Investigator candidate shall identify and describe indicators of incendiary fires.

23.2.1 Multiple Fires

23.2.2 Trailers

23.2.3 Lack of Expected Fuel Load and Ignition Sources

23.2.4 Unusual Fuel Load or Configuration

23.2.5 Burn Injuries

23.2.6 Incendiary Devices

23.2.7 Assessment of Fire Growth and Fire Damage

501-23.3 ***The Investigator candidate shall identify and explain potential indicators of incendiary fires not directly related to combustion.***

23.3.1 Remote Locations with View Blocked or Obscured

23.3.2 Forced Entry

23.3.3 Fires Near Service Equipment and Appliances

23.3.4 Removal or Replacement of Contents Prior to the Fire
- 23.3.4.1 Replacement
- 23.3.4.2 Removal
- 23.3.4.3 Absence of Personal Items Prior to the Fire

23.3.5 Entry Blocked or Obstructed

23.3.6 Sabotage to the Structure or Fire Protection Systems
- 23.3.6.1 Definition of Sabotage
- 23.3.6.2 Damage to Fire-Resistive Assemblies
- 23.3.6.3 Damage to Fire Protection Systems

23.3.7 Open Windows and Exterior Doors

501-23.4 ***The Investigator candidate shall identify and describe other evidentiary factors associated with incendiary fires.***

23.4.1 Evidentiary Factors that should be recorded and examined

23.4.2 Analysis of Confirmed Incendiary Fires
- 23.4.2.1 Geographic Areas, or Clusters
- 23.4.2.2 Temporal Frequency
- 23.4.2.3 Materials and Method

23.4.3 Evidence of Other Crimes, Crime Concealment

23.4.4 Indications of Financial Stress

23.4.5 Existing or History of Code Violations

- 23.4.6 Owner with Fires at Other Properties
- 23.4.7 Overinsurance
- 23.4.8 Timed Opportunity
  - 23.4.8.1 Fires During Severe Natural Conditions
  - 23.4.8.2 Fires During Civil Unrest
  - 23.4.8.3 Fire Department Unavailable
- 23.4.9 Motives for Firesetting Behavior
  - 23.4.9.1 Define “Motive”
  - 23.4.9.2 Motive Versus Intent
  - 23.4.9.3 Classifications of Motive
    - 23.4.9.3.1 Introduction
    - 23.4.9.3.2 Vandalism
      - 23.4.9.3.2.1 Willful and Malicious Mischief
      - 23.4.9.3.2.2 Peer or Group Pressure
    - 23.4.9.3.3 Excitement
      - a. Thrill Seeking
      - b. Attention Seeking
      - c. Recognition
      - d. Sexual Gratification or Perversion
    - 23.4.9.3.4 Revenge
      - a. Personal Retaliation
      - b. Societal Retaliation
      - c. Institutional Retaliation
      - d. Group Retaliation
    - 23.4.9.3.5 Crime Concealment
      - a. Murder Concealment
      - b. Burglary Concealment
      - c. Destruction of Records or Documents
    - 23.4.9.3.6 Profit
    - 23.4.9.3.7 Extremism
      - a. Terrorism
      - b. Riot/Civil Disturbance

SECTION 24

FIRE AND EXPLOSION DEATHS AND INJURIES

4.4 Evidence Collection/Preservation.

Duties shall include using proper physical and legal procedures to identify, document, collect and preserve evidence required within the investigation.

NFPA 1033 4.4.1 Utilize proper procedures for managing victims and fatalities, given a protocol and appropriate personnel, so that all evidence is discovered and preserved and the protocol procedures are followed.

(A) Requisite Knowledge. Types of evidence associated with fire victims and fatalities and evidence preservation methods.

(B) Requisite Skills. Observational skills and the ability to apply protocols to given situations.

References:
J&B, chapter 23
Kirk's, chapter 12
Konefal, Fire Death Scene Investigation
ASTM E678

501-24.1 The Investigator candidate shall demonstrate the ability to utilize specialized skills associated with death and injuries from fire and explosions.

501-24.2 The Investigator candidate shall identify the mechanisms of death and injury.

24.2.1 Carbon Monoxide

24.2.2 Cyanide

24.2.3 Other Toxic Gases

24.2.4 Hyperthermia

24.2.5 Skin Burns

24.2.6 Inhalation of Hot Gases

24.2.7 Soot and Smoke

24.2.8 Hypoxia

24.2.9 Sublethal Inhalation Exposure Effects on the Individual

24.2.9.1 Narcotic Gases
24.2.9.2 Irritant Gases
24.2.9.3 Smoke

24.2.10 Explosion-Related Injuries
24.2.10.1 Blast Pressure Injuries
24.2.10.2 Shrapnel Injuries
24.2.10.3 Thermal Injuries
24.2.10.4 Building Collapse Injuries

501-24.3 ***The Investigator candidate shall describe the consumption of the body by fire.***

24.3.1 Skin

24.3.2 Muscle

24.3.3 Bone

24.3.4 Fat

501-24.4 ***The Investigator candidate shall describe the postmortem changes that a deceased body will undergo when exposed to heat and to death.***

24.4.1 Lividity

24.4.2 Rigor Mortis

501-24.5 ***The Investigator candidate shall describe the considerations to be made before the investigation of a fatal fire.***

24.5.1 Notification

24.5.2 The Fire Department

24.5.3 Team Investigation

24.5.4 Safety

24.5.5 Scene Documentation

24.5.6 Victim Documentation

24.5.7 Recovery of Bodies and Evidence
- 24.5.7.1 Layering of Debris
- 24.5.7.2 Sifting of Debris
- 24.5.7.3 Body Removal
- 24.5.7.4 Victim Clothing

24.5.8 Collection of Other Physical Evidence

501-24.6 The Investigator candidate shall describe the steps of investigating fire scenes with injuries.

24.6.1 Notification Laws

24.6.2 Scene Documentation

24.6.3 Victim Documentation

24.6.4 Victim Timeline

24.6.5 Physical Evidence

501-24.7 The Investigator candidate shall describe the documentation of an explosion incident where injury and/or death has occurred.

24.7.1 Collecting Physical Evidence from Explosions

501-24.8 The Investigator candidate shall describe post scene investigation of injuries.

24.8.1 Burns
- 24.8.1.1 Degree of Burns
- 24.8.1.2 Body Area (Distribution)

24.8.2 Inhalation Medical Evidence

24.8.3 Hospital Tests and Documentation

24.8.4 Access to Medical Evidence

501-24.9 The Investigator candidate shall describe the fire death pathological and toxicological examination.

24.9.1 The Coroner or Medical Examiner

24.9.2 Identifying the Remains
- 24.9.2.1 Human vs. Animal Remains
- 24.9.2.2 Visual Identification
- 24.9.2.3 Identification by Clothing and Personal Effects
- 24.9.2.4 Fingerprint Identification
- 24.9.2.5 X-ray Identification
- 24.9.2.6 DNA Identification

24.9.3 X-ray Examination

24.9.4 Carbon Monoxide Levels

24.9.5 Cyanide Levels

24.9.6 Presence of Other Toxicants

24.9.7 Smoke and Soot Exposure

24.9.8 Burns

24.9.9 Physical Trauma and Wounds

24.9.10 Stomach Contents

24.9.11 Internal Body Temperature

24.9.12 Pre-Existing Medical Conditions

24.9.13 Death Pre-Fire

24.9.14 Death from a Medical Condition

501-24.10 The Investigator candidate shall describe how to analyze the data developed from the death or injury investigation and correlate it with the other data from the investigation.

24.10.1 Timeline Development

24.10.2 Victim Activity

24.10.3 Pre-Fire Victim Impairment

24.10.4 Medical History

24.10.5 Fire Pattern

24.10.6 Burns

24.10.7 Clothing

24.10.8 Applications of Toxicology in Fire Investigation
- 24.10.8.1 Toxicological Analysis Techniques
- 24.10.8.2 Physiological Models
  - 24.10.8.2.1 The Steward Equation
  - 24.10.8.2.2 The Colburn Forster Kane (CFK) Equation

SECTION 25

APPLIANCES

4.2 Scene Examination.
Duties shall include inspecting, evaluating, and analyzing the fire scene or evidence of the scene, and conducting a comprehensive review of documentation generated during the examination(s) of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and action or activity that brought the ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.~~Duties shall include inspecting and evaluating the fire scene, or evidence of the scene, and/or conducting a comprehensive review of documentation generated during the examination(s) of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and act or activity that brought the ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.~~

NFPA 1033 4.2.8 Inspect and analyze the performance of building systems, including fire protection, detection and suppression systems, HVAC, electricity and electrical systems, fuel gas systems, and building compartmentation, given standard and special equipment and tools, so that a determination can be made as to the need for expert resources; an operating system's impact on fire growth and spread is considered in identifying origin areas; defeated and failed systems are identified; and the system's potential as a fire cause is recognized.~~Inspect the performance of building systems, including detection, suppression, HVAC, utilities, and building compartmentation, given standard and special equipment and tools, so that a determination can be made as to the need for expert resources, an operating system's impact on fire growth and~~

References:
J&B, chapter 24
Kirk's, chapter 4
Lentini, chapter 6

501-25.1 ***The Investigator candidate shall analyze appliances as it relates to investigation of the cause of fires.***

501-25.2 ***The Investigator candidate shall record the scene involving an appliance.***

25.2.1 Recording Specific Appliances

25.2.2 Measurements of the Location of the Appliances

25.2.3 Positions of Appliance Controls

25.2.4 Document Appliance Information

25.2.5 Gathering All of the Parts from the Appliance

501-25.3 ***The Investigator candidate shall analyze the origin of fires involving appliances.***

25.3.1 Relationship of the Appliance to the Origin

25.3.2 Fire Patterns

25.3.3 Plastic Appliance Components

25.3.4 Reconstruction of the Area of Origin

501-25.4 ***The Investigator candidate shall analyze the cause of fires involving appliances.***

25.4.1 How the Appliance Generated Heat

25.4.2 The Use and Design of the Appliance

25.4.3 Electrical Appliances as Ignition Sources

25.4.4 Photographing Appliance Disassembly

25.4.5 Obtaining Exemplar Appliances

25.4.6 Testing Exemplar Appliances

501-25.5 ***The Investigator candidate shall describe each of the common parts or components that might be found in various appliances.***

25.5.1 Appliance Housings

25.5.2 Power Sources
- 25.5.2.1 Power Cords
- 25.5.2.2 Voltages Less than 120
- 25.5.2.3 Batteries
- 25.5.2.4 Overcurrent Protection

25.5.3 Switches
- 25.5.3.1 Manual Switches
- 25.5.3.2 Automatic Switches

25.5.4 Solenoids and Relays

25.5.5 Transformers

25.5.6 Motors

25.5.7 Heating Elements

25.5.8 Lighting
25.5.8.1 Fluorescent Lighting Systems
25.5.8.2 High Intensity Discharge Lighting Systems

25.5.9 Miscellaneous Components

501-25.6 The Investigator candidate shall describe the operation and components of common residential appliances.

25.6.1 Range or Oven

25.6.2 Coffee Makers

25.6.3 Toaster

25.6.4 Electric Can Opener

25.6.5 Refrigerator

25.6.6 Dishwasher

25.6.7 Microwave Oven

25.6.8 Portable Space Heater

25.6.9 Electric Blanket

25.6.10 Window Air Conditioner Unit

25.6.11 Hair Dryer and Hair Curler

25.6.12 Clothes Iron

25.6.13 Clothes Dryer

25.6.14 Consumer Electronics

25.6.15 Lighting

SECTION 26

MOTOR VEHICLE FIRES

Annex A Explanatory Material
NFPA 1033 A.1.1 The intent of this standard applies to all fire investigation, including outside, wildland, vehicle, and structural fires.

4.1 General

NFPA 1033 4.1.3 Because fire investigators are required to perform activities in adverse conditions, site safety assessments shall be completed on all scenes and regional and national safety standards shall be followed and included in organizational policies and procedures.

4.2 Scene Examination.

Duties shall include inspecting, evaluating, and analyzing the fire scene or evidence of the scene, and conducting a comprehensive review of documentation generated during the examination(s) of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and action or activity that brought the ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.~~Duties shall include inspecting and evaluating the fire scene, or evidence of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and act or activity that brought ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.~~

NFPA 1033 4.2.4 Interpret and analyze fire patterns, given standard equipment and tools and some structural or content remains, so that each pattern is identified and analyzed with respect to the burning characteristics of the material involved, the stage of fire development, the effects of ventilation within the context of the scene, the relationship with all patterns observed, and the understanding of the methods of heat transfer that led to the formation of the patterns identified and analyzed, and the sequence in which the patterns were produced is determined.~~Interpret fire patterns, given standard equipment and tools and some structural or content remains, so that each individual pattern is evaluated with respect to the burning characteristics of the material involved and in context and relationship with all patterns observed in the mechanisms of heat transfer that lead to the formation of the pattern.~~

(A) Requisite Knowledge. Fire dynamics, fire development, and the interrelationship of heat release rate, form, and ignitability of materials.

(B) Requisite Skills. Ability to interpret the effects of burning characteristics on different types of materials.

NFPA 1033 4.2.5 Interpret and analyze fire patterns, given standard equipment and tools and some structural or content remains, so that fire development is determined, methods and effects of suppression are evaluated, false origin area patterns are recognized, and all areas of origin are correctly identified.
(A) Requisite Knowledge. Fire behavior and spread based on fire chemistry, fire dynamics, and physics, fire suppression effects, building construction.
(B) Requisite Skills. Interpret variations of fire patterns on different materials with consideration given to heat release rate, form, and ignitibility; distinguish impact of different types of fuel loads; ~~evaluate fuel trails; and analyze and synthesize information.~~

NFPA 1033 4.2.6 Examine and remove fire debris, given standard equipment and tools, so that all debris is checked for fire cause evidence, potential ignition source(s) is identified, and evidence is preserved without investigator-inflicted damage or contamination.

(A) Requisite Knowledge. Basic understanding of ignition processes, characteristics of ignition sources, and ease of ignition of fuels; debris-layering techniques; use of tools and equipment during the debris search; types of fire cause evidence commonly found in various degrees of damage; and evidence-gathering methods and documentation.

B) Requisite Skills. Employ search techniques that further the discovery of fire cause evidence and ignition sources, use search techniques that incorporate documentation, and collect and preserve evidence.

References:
J&B, chapter 25
Kirk's, chapter 7

501-26.1 ***The Investigator candidate shall describe the factors related to the investigation of fires involving motor vehicles.***

501-26.2 ***The Investigator candidate shall describe the differences, in safety related concerns, that burned vehicles pose as compared to those found in structure fires.***

501-26.3 ***The Investigator candidate shall describe and identify the different types of fuels that may be involved in vehicle fires.***

26.3.1 Ignitable Liquids
26.3.1.1 Hot Surface Ignition

26.3.2 Gaseous Fuels

26.3.3 Solid Fuels

501-26.4 ***The Investigator candidate shall describe and identify the different ignition sources that can be present in vehicle fires.***

26.4.1 Open Flames

26.4.2 Electrical Sources
26.4.2.1 Recreational Vehicles
26.4.2.2 Overloaded Wiring
26.4.2.3 Electrical High Resistance Connections
26.4.2.4 Electrical Short Circuits and Arcs - Electric Discharge
26.4.2.5 Arc, Carbon, Tracking
26.4.2.6 Lamp Bulbs and Filaments
26.4.2.7 External Electrical Sources Used in Vehicles

26.4.3 Hot Surfaces

26.4.4 Mechanical Sparks

26.4.5 Smoking Materials

501-26.5 ***The Investigator shall identify the different types of systems that a motor vehicle may possess and their respective functions.***

26.5.1 Fuel Systems
- 26.5.1.1 Vacuum/Low-Pressure Carbureted Systems
- 26.5.1.2 High-Pressure Fuel-Injected Systems
- 26.5.1.3 Diesel Fuel System
- 26.5.1.4 Natural Gas
- 26.5.1.5 Propane Fuel
- 26.5.1.6 Turbochargers

26.5.2 Emission Control System

26.5.3 Motor Vehicle Electrical Systems

26.5.4 Mechanical Power Systems

26.5.5 Mechanical Power Distribution

26.5.6 Accessories to the Mechanical Power System

26.5.7 Hydraulic Braking System

26.5.8 Windshield Washer Systems

501-26.6 ***The Investigator candidate shall identify the different body systems that can be found within or upon motor vehicles.***

26.6.1 Interior Finishes and Accessories

26.6.2 Cargo Areas

501-26.7 ***The Investigator candidate shall identify and employ the proper technique for investigating motor vehicle fires.***

26.7.1 Vehicle Identification

26.7.2 Vehicle Fire Scene History

26.7.3 Vehicle Particulars

26.7.4 Documenting the Vehicle at the Fire Scene

26.7.5 Documenting the Vehicle Away from the Scene

501-26.8 ***The Investigator candidate shall identify factors related to the examination of motor vehicles after they have burned.***

26.8.1 General

26.8.2 Examination of Vehicle Systems

26.8.3 Switches, Handles, and Levers

501-26.9 ***The Investigator candidate shall define total burns as it relates to motor vehicle fires and describe the actions that should be taken when these types of fires are encountered.***

501-26.10 ***The Investigator candidate shall identify factors related to incendiary vehicle fires.***

501-26.11 ***The Investigator shall identify components of the vehicle's ignition system as they relate to the fire investigation.***

501-26.12 ***The Investigator candidate shall identify factors concerning vehicle fires in structures and evaluate them as a potential source of fire ignition.***

501-26.13 The Investigator candidate shall identify and describe the factors relative to the investigation of recreational vehicle fires.

501-26.14 ***The Investigator candidate shall identify the factors related to fire investigations involving heavy equipment.***

26.14.1 Medium- and Heavy-Duty Trucks, and Buses

26.14.2 Mass Transit Vehicles

26.14.3 Earth-Moving Equipment

26.14.4 Forestry/Logging Equipment

26.14.5 Landfill Equipment

26.14.6 Agricultural Equipment

501-26.15 ***The Investigator candidate shall identify the factors related to fire investigations involving self-propelled agricultural equipment and drawn implements.***

26.15.1 Agricultural Equipment Investigation Safety

26.15.2 Equipment Classification and Description

26.15.3 Unique Safety Concerns

26.15.4 Unique Fire Cause Concerns

26.15.5 Fuels

26.15.6 Ignition Sources

501-26.16 ***The Investigator candidate shall identify factors related to the investigation of fires involving hybrid vehicles.***

26.16.1 Hybrid Vehicle Investigation Safety

26.16.2 Hybrid Vehicle Technology

26.16.3 Investigation of Hybrid Vehicle Fires

501-26.17 ***The Investigator candidate shall identify factors related to towing or vehicle transport as it relates to fire investigations.***

501-26.18 ***The Investigator candidate shall identify factors related to the investigation of fires involving hydrogen fueled vehicles.***

SECTION 27

WILDFIRE INVESTIGATIONS

Annex A Explanatory Material
NFPA 1033 A.1.1 The intent of this standard applies to all fire investigation, including outside, wildland, vehicle, and structural fires.

References:
J&B, chapter 26
Kirk's, chapter 7

501-27.1 ***The Investigator candidate shall identify the specialized techniques, practices, equipment, and terminology associated with the investigation of wildfires.***

501-27.2 ***The Investigator candidate shall identify and describe wildfire fuels.***

27.2.1 Fuel Condition Analysis

27.2.2 Ground Fuels
- 27.2.2.1 Duff
- 27.2.2.2 Roots

27.2.3 Surface Fuels
- 27.2.3.1 Fine Dead Wood
- 27.2.3.2 Dead Leaves and Coniferous Litter
- 27.2.3.3 Grass
- 27.2.3.4 Downed logs, Stumps, and Large Limbs
- 27.2.3.5 Low Brush and Reproduction

27.2.4 Aerial Fuels
- 27.2.4.1 Tree Branches and Crowns
- 27.2.4.2 Tree Moss
- 27.2.4.3 High Brush

27.2.5 Species

27.2.6 Fuel Size

27.2.7 Fuel Moisture Content

27.2.8 Oil Content

501-27.3 ***The Investigator candidate shall identify and describe the effects of weather on fire spread.***

27.3.1 Weather History

27.3.2 Temperature

27.3.3 Relative Humidity

27.3.4 Wind Influences
- 27.3.4.1 Meteorological Winds
- 27.3.4.2 Diurnal Winds
- 27.3.4.3 Foehn Winds
- 27.3.4.4 Fire Winds

501-27.4 ***The Investigator candidate shall identify, describe and interpret the effect of topography on fire spread.***

27.4.1 Slope

27.4.2 Aspect

501-27.5 ***The Investigator candidate shall be able to describe fire shape.***

27.5.1 Fire Head

27.5.2 Fire Flanks

27.5.3 Fire Heel

27.5.4 Factors Affecting Fire Spread
- 27.5.4.1 Lateral Confinement
- 27.5.4.2 Fuel Influence
- 27.5.4.3 Suppression

27.5.5 Other Natural Mechanisms of Fire Spread
- 27.5.5.1 Embers and Firebrands
- 27.5.5.2 Fire Storms
- 27.5.5.3 Animals

501-27.6 ***The Investigator candidate shall identify and describe indicators of a wildfire.***

27.6.1 Wildfire V-Shaped Patterns

27.6.2 Degree of Damage

27.6.3 Grass Stems

27.6.4 Angle of Char

27.6.5 White Ash Deposit

27.6.6 Cupping

27.6.7 Die-Out Pattern

27.6.8 Exposed and Protected Fuels

27.6.9 Staining and Sooting

27.6.10 Depth of Char

27.6.11 Spalling

27.6.12 Foliage Freeze

27.6.13 Curling

501-27.7 The Investigator candidate shall identify the area of origin of a wildfire.

27.7.1 Initial Area of Investigation

27.7.2 General Origin Area

27.7.3 General Origin Investigation Techniques

27.7.4 Specific Origin Investigation Techniques

27.7.5 Search Equipment

501-27.8 The Investigator candidate shall determine the cause of a wildfire.

27.8.1 Natural Fire Cause

27.8.2 Human Fire Cause

501-27.9 ***The Investigator candidate shall recognize that evidence protection, preservation, collection, and documentation at wildfires are similar to other fires.***

501-27.10 ***The Investigator candidate shall identify special safety considerations associated with investigation of wildfires.***

501-27.11 ***The Investigator candidate shall identify sources of information as prescribed in Annex B and Section B.11. .***

SECTION 28

MANAGEMENT OF COMPLEX INVESTIGATIONS

NFPA 1033 4.1 General

NFPA 1033 4.1.6 The fire investigator shall understand the organization and operation of the investigative team within an incident management system.

References:
J&B, chapter

501-28.1 ***The Investigator candidate shall distinguish those issues that are unique to managing investigations that are complex due to size, scope, or duration.***

28.1.1 Governmental Inquiry

28.1.2 Intent

28.1.3 Purpose

28.1.4 Interested Parties

28.1.5 Chapter Definitions

501-28.2 ***The Investigator candidate shall describe the basic information and documents associated with complex investigations.***

501-28.3 ***The Investigator candidate shall recognize the importance of communications among interested parties.***

28.3.1 Notice to Interested Parties
- 28.3.1.1 Entity in Control
- 28.3.1.2 All Interested Parties
- 28.3.1.3 Roster of Interested Parties
- 28.3.1.4 Notification of Changes
- 28.3.1.5 Making Notification
- 28.3.1.6 Content of Notification
- 28.3.1.7 Subsequent Notifications

28.3.2 Meetings
- 28.3.2.1 Preliminary Meeting
- 28.3.2.2 Meetings as the Investigation Progresses

28.3.3 Website

28.3.4 Additional Dissemination of Information

501-28.4 ***The Investigator candidate shall recognize the complexity of the investigation and ensure that all known interested parties are afforded an opportunity to investigate the incident and protect their respective interests, understandings or agreements.***

28.4.1 Purposes

28.4.2 Scheduling

28.4.3 Cost Sharing

28.4.4 Nondisclosure Agreements

28.4.5 Protocols

28.4.6 Information Sharing

28.4.7 Interviews

28.4.8 Amendments to Agreements

28.4.9 Disagreements

501-28.5 ***The Investigator candidate shall identify and describe the components of managing a complex investigation.***

28.5.1 Organizational Models

28.5.2 Control of the Site and Scene
- 28.5.2.1 Securing the Site and Scene
- 28.5.2.2 Delegation of Control
- 28.5.2.3 Transfer of Control
- 28.5.2.4 Site and Scene Access
- 28.5.2.5 Site-Specific Restrictions or Requirements
- 28.5.2.6 Scene Integrity
- 28.5.2.7 Release of Information

501-28.6 ***The Investigator candidate shall recognize the unique components of handling evidence of a complex investigation.***

28.6.1 Evidence Control
29.6.1.1 Evidence Custodian
29.6.1.2 Interested Party Responsibility

28.6.2 Evidence Removal from the Scene

28.6.3 Evidence Storage

28.6.4 Evidence Inspections
28.6.4.1 Nondestructive Inspections
28.6.4.2 Destructive Inspections
28.6.4.3 Testing of Evidence

501-28.7 The Investigator candidate shall identify logistical support needs involving the complex investigation.

28.7.1 Transportation

28.7.2 Equipment

28.7.3 Investigation Site Security

28.7.4 Decontamination

28.7.5 Environmental

28.7.6 Communications

28.7.7 Sanitary and Comfort Needs

28.7.8 Trash Disposal and Removal

28.7.9 Snow and Ice Removal

28.7.10 Lighting

28.7.11 Evidence Storage

501-28.8 The Investigator candidate shall distinguish the unique characteristics of safety at the complex investigation site.

SECTION 29

MARINE FIRE INVESTIGATION

Annex A Explanatory Material
NFPA 1033 A.1.1 The intent of this standard applies to all fire investigation, including outside, wildland, vehicle, and structural fires.

References:
J&B, chapter 28
Kirk's, chapter 7

501-29.1 ***The Investigator candidate shall identify the factors related to the investigations of fires involving recreational boats.***

501-29.2 ***The Investigator candidate shall define the following terms as they relate to Power Boat and Sailboat terminology***.

29.2.1 Accommodation space

29.2.2 Adrift

29.2.3 Afloat

29.2.4 Aft

29.2.5 Aground

29.2.6 Beam

29.2.7 Below

29.2.8 Bilge

29.2.9 Boat

29.2.10 Bulkhead

29.2.11 Cabin

29.2.12 Capsize

29.2.13 Chain plate

29.2.14 Deck

29.2.15 Dock

29.2.16 Dorade Vent

29.2.17 Fender

29.2.18 Forward

29.2.19 Freeboard

29.2.20 Galley

29.2.21 Gear

29.2.22 Gunwale

29.2.23 Hatch

29.2.24 Hold

29.2.25 Hull

29.2.26 Inboard

29.2.27 Inboard/Out-Drive (I/O)

29.2.28 Outboard

29.2.29 Overboard

29.2.30 Port

29.2.31 Rub Rail

29.2.32 Shore Power

29.2.33 Shroud

29.2.34 Sole

29.2.35 Starboard

29.2.36 Superstructure

29.2.37 Topside

29.2.38 Transom

29.2.39 Underway

29.2.40 Vessel

29.2.41 Waterline

501-29.3 ***The Investigator candidate shall recognize the importance of boat investigation safety***.

29.3.1 Safety Assessment

29.3.2 Inspection of Boats on Land

29.3.3 Inspection of Boats Afloat

29.3.4 Underwater Inspections

29.3.5 Specific Safety Concerns
- 29.3.5.1 Confined Spaces
  - 29.3.5.1.1 Automatic Fire Suppression Systems Inactive/Deactivated
- 29.3.5.2 Airborne Particulates
- 29.3.5.3 Identify and Assess Energy Sources
  - 29.3.5.3.1 Batteries
  - 29.3.5.3.2 Inverters
  - 29.3.5.3.3 Shore Power
- 29.3.5.4 Fuel Leaks
- 29.3.5.5 Sewage Holding Tank
- 29.3.5.6 Hydrogen Gas
- 29.3.5.7 Other Hydrocarbon Contaminants
- 29.3.5.8 Stability
- 29.3.5.9 Damage to the Structure of the Boat
- 29.3.5.10 Wharves, Docks, and Jetties
- 29.3.5.11 Submerged Boat
- 29.3.5.12 Visual Distress Signals and Pyrotechnics

29.3.6 Openings

501-29.4 ***The Investigator candidate shall identify the different marine systems and functions***.

29.4.1 Fuel Systems: Propulsion and Auxiliary
- 29.4.1.1 Vacuum/Low Pressure Carbureted
- 29.4.1.2 High-Pressure/Marine Fuel Injection Systems, Including Return Systems
- 29.4.1.3 Diesel

29.4.2 Fuel Systems: Cooking and Heating
- 29.4.2.1 Liquefied Petroleum Gases
- 29.4.2.2 Compressed Natural Gas
- 29.4.2.3 Alcohol
- 29.4.2.4 Solid Fuels
- 29.4.2.5 Diesel

29.4.3 Turbochargers/Super Chargers

29.4.4 Exhaust System
- 29.4.4.1 Dry Exhaust Systems
- 29.4.4.2 Wet Exhaust Systems
- 29.4.4.3 De-watered Exhaust Systems

29.4.5 Electrical Systems
- 29.4.5.1 Alternating Current (AC)
- 29.4.5.2 Direct Current (DC)

29.4.6 Engine Cooling Systems

29.4.7 Ventilation

29.4.8 Transmissions
- 29.4.8.1 Mechanical Gear Transmissions
- 29.4.8.2 Hydraulic-Geared Transmissions

29.4.9 Accessories

501-29.5 The Investigator candidate shall identify the exterior construction of the vessel.

29.5.1 Hull Construction

29.5.2 Superstructure Construction Material

29.5.3 Deck

29.5.4 Exterior Accessories

501-29.6 ***The Investigator candidate shall identify the interior construction of the vessel.***

29.6.1 Construction Materials

29.6.2 Finishes
- 29.6.2.1 Accommodation Furnishings
- 29.6.2.2 Interior Accessories
- 29.6.2.3 Engine/Machinery Compartments
- 29.6.2.4 Flammable/Explosive Vapor Detectors
- 29.6.2.5 Storage and Holds
- 29.6.2.6 Fuel Tanks

501-29.7 ***The Investigator candidate shall identify the propulsion system of the vessel***.

29.7.1 Electric Systems

29.7.2 Fuels for Boats with Motorized Propulsion Systems
- 29.7.2.1 Fuel Systems
  - 29.7.2.1.1 Engines
    - 29.7.2.1.1.1 Outboard Engines (Outboard Motors)
    - 29.7.2.1.1.2 Inboard Gasoline Engines
    - 29.7.2.1.1.3 Diesel Engines
    - 29.7.2.1.1.4 Propulsion System Fluids
- 29.7.2.2 Appliance Fuel Systems
- 29.7.2.3 Electric Generators

29.7.3 Other Fuel Systems Used for Propulsion

501-29.8 ***The Investigator candidate shall identify common ignition sources found in marine vessels***.

29.8.1 Open Flames

29.8.2 Electrical Sources
- 29.8.2.1 Overloaded Wiring
- 29.8.2.2 Electrical Short Circuiting and Arcs
- 29.8.2.3 Electrical Connections
- 29.8.2.4 Lightning
- 29.8.2.5 Static Electricity and Incendive Arcs

29.8.3 Hot Surfaces
- 29.8.3.1 Manifolds
- 29.8.3.2 Exhaust Systems
- 29.8.3.3 Cooking Surfaces
- 29.8.3.4 Heating Systems

29.8.4 Mechanical
- 29.8.4.1 Bearing Failures
- 29.8.4.2 Friction

29.8.5 Smoking Materials

501-29.9 ***The Investigator candidate shall describe proper documentation of the boat fire scene.***

29.9.1 On Land

29.9.2 In Water
- 29.9.2.1 Moored
- 29.9.2.2 Anchored and Underway
- 29.9.2.3 Underwater

29.9.3 Boat Identification
- 29.9.3.1 Hull Identification Number (HIN)
- 29.9.3.2 Registration Numbers
- 29.9.3.3 U.S. Coast Guard Documentation Numbers
- 29.9.3.4 Boat Name and Hailing Port
- 29.9.3.5 Boat History
- 29.9.3.6 Fire Scene History
  - 29.9.3.6.1 Actions Before the Fire
  - 29.9.3.6.2 Actions During the Fire
  - 29.9.3.6.3 Actions After the Fire

29.9.4 Boat Particulars

501-29.10 ***The Investigator candidate shall identify the steps of a proper boat examination***.

29.10.1 General

29.10.2 Examination of Boat Systems

501-29.11 ***The Investigator candidate shall describe marine fire investigations of boats in structures***.

501-29.12 ***The Investigator candidate shall describe legal considerations related to marine fire investigations***.

SECTION 30

PRACTICAL EXERCISES

4.7 Presentations.

Duties shall include the presentation of findings to those individuals not involved in the actual investigations.

NFPA 1033 4.7.1 Prepare a written report, given investigative findings, so that the report accurately reflects the facts, data, and scientific principles on which the investigator relied; clearly identifies and expresses the investigator's opinions and conclusions; and contains the reasoning by which each opinion or conclusion was reached in order to meet the requirements of the intended audience(s).

(A) Requisite Knowledge. Elements of writing, typical components of a written report, and types of audiences and their respective needs or requirements.

(B) Requisite Skills. Writing skills, ability to analyze information and determine the reader's needs or requirements.

NFPA 1033 4.7.2 Express investigative findings verbally, given investigative findings, notes, a time allotment, and a specific audience, so that the information is accurate, the presentation is completed within the allotted time, and the presentation includes only need-to-know information for the intended audience.

(A) Requisite Knowledge. Types of investigative findings, the informational needs of various types of audiences, and the impact of releasing information.

(B) Requisite Skills. Communication skills and ability to determine audience needs and correlate findings.

NFPA 1033 4.7.3 Testify during legal proceedings, given investigative findings, contents of reports, and consultation with legal counsel, so that all pertinent investigative information and evidence are presented clearly and accurately and the investigator's demeanor and attire are appropriate to the proceedings.

(A) Requisite Knowledge. Types of investigative findings, types of legal proceedings, professional demeanor requirements, and an understanding of due process and legal proceedings.

(B) Requisite Skills. Communication and listening skills and ability to differentiate facts from opinion and determine accepted procedures, practices, and etiquette during legal proceedings.

501-30.1 The Investigator candidate shall demonstrate proficiency in all required skills in the TCFP Fire Investigator Skills Manual.

5. **Discussion and possible action on proposed amendments to 37 Tex. Administrative Code, Part 13, Chapter 437, Fees, §437.5, Renewal Fees, and §437.15, International Fire Service Accreditation Congress (IFSAC) Seals.**

CHAPTER 437

FEES

§437.5. Renewal Fees.

(a) A non-refundable annual renewal fee of **$60** [~~$75~~] shall be assessed for each certified individual and certified training facility. If an individual or certified training facility holds more than one certificate, the commission may collect only one renewal fee of **$60** [~~$75~~], which will renew all certificates held by the individual or certified training facility.

(b) A regulated employing entity shall pay the renewal fee for each individual who is required to possess certification as a condition of employment.

(c) If a person re-enters the fire service whose certificate(s) has been expired for less than one year, the regulated entity must pay all applicable renewal fee(s) and any applicable additional fee(s). Upon payment of the required fees, the certificates previously held by the individual, for which he or she continues to qualify, will be renewed.

(d) If a person wishes to renew a certificate(s) which has been expired less than one year and the individual is not employed by a regulated employing entity as defined in subsection (b) of this section, the individual must pay all applicable renewal fee(s) and any applicable additional fee(s). Upon payment of the required fee(s), the certificate(s) previously held by the individual, for whom he or she continues to qualify, will be renewed.

(e) Nothing in this section shall prohibit an individual from paying a renewal fee for any certificate which he or she is qualified to hold providing the certificate is not required as a condition of employment.

(f) Certification renewal information will be sent to all regulated employing entities and individuals holding certification at least 60 days prior to October 31 of each calendar year. Certification renewal information will be sent to certified training facilities at least 60 days prior to February 1 of each calendar year.

(g) If renewal payment is submitted by mail, all certification renewal fees must be submitted with the renewal invoice to the commission.

(h) All certification renewal fees must be paid on or before the last day of the certification period (see subsection (i) of this section) to avoid additional fee(s).

(i) The certification period shall be a period not to exceed one year. The certification period for employees of regulated employing entities, and individuals holding certification is November 1 to October 31. The certification period of certified training facilities is February 1 to January 31.

(j) All certification renewal fees received from one to 30 days after the last day of the certification period will cause the individual or entity responsible for payment to be assessed a non-refundable late fee of **$30** [~~$37.50~~] in addition to the renewal fee for each individual or training provider for which a renewal fee was due.

(k) All certification renewal fees received more than 30 days after the last day of the certification period will cause the individual or entity responsible for payment to be assessed a non-refundable late fee of **$60** [~~$75~~] in addition to the renewal fee for each individual or training provider for which a renewal fee was due.

(l) In addition to any non-refundable late fee(s) assessed for certification renewal, the commission may hold an informal conference to determine if any further action(s) is to be taken.

(m) An individual or entity may petition the commission for a waiver of the late fees required by this section if the person's certificate expired because of the individual or regulated employing entity's good faith clerical error[,] or expired as a result of termination of the person's employment where the person has been restored to employment through a disciplinary procedure or a court action.

(1) Applicants claiming good faith clerical error must submit a sworn statement together with any supporting documentation that evidences the applicant's good faith efforts to comply with commission renewal requirements and that failure to comply was due to circumstances beyond the control of the applicant.

(2) Applicants claiming restoration to employment as a result of a disciplinary or court action must submit a certified copy of the order restoring the applicant to employment.

(n) An individual, who is a military service member, or returning from activation to military service, must notify the commission in writing if the individual wishes to renew an expired certification. Provided other qualifications for renewal are met, the individual will have any normally associated late fees waived and will be required to pay a renewal fee of **$60** [~~$75~~].

§437.15. International Fire Service Accreditation Congress (IFSAC) Seal Fees.

A non-refundable **$30** [~~$15~~] fee shall be charged for each IFSAC seal issued by the commission.

6. **Discussion and possible action on proposed amendments to 37 Tex. Administrative Code, Part 13, Chapter 461, Incident Commander.**

CHAPTER 461

INCIDENT COMMANDER

MINIMUM STANDARDS FOR INCIDENT COMMANDER

§461.1. Incident Commander Certification.

(a) An Incident Commander is defined as an individual responsible for all incident activities, including the development of strategies and tactics and the ordering and release of resources, who has overall authority and responsibility for conducting and managing all incident operations at the incident site.

(b) All individuals holding an Incident Commander certification shall be required to comply with the continuing education requirements in Chapter 441 of this title (relating to Continuing Education).

~~[(c) Special temporary provision. Individuals are eligible to take the commission examination for Incident Commander by:~~

~~(1) holding as a minimum, Fire Officer II certification through the commission; and~~

~~(2) providing documentation of completion of the National Incident Management System courses 100, 200, 700 and 800; and~~

~~(3) providing documentation acceptable to the commission that the individual has successfully completed Incident Commander training that meets the minimum requirements of the National Fire Protection Association Standard 1026; or~~

~~(4) providing documentation acceptable to the commission, in the form of an affidavit from the individuals Head of Department or Chief Training Officer, that the individual has met the departments requirements to perform as an Incident Commander and has demonstrated proficiency as an Incident Commander.~~

(5) ~~This subsection will expire on January 1, 2022.~~]

7. Discussion and possible action on rule review of 37 Tex. Administrative Code, Part 13, Chapter 435, Fire Fighter Safety.

CHAPTER 435

FIRE FIGHTER SAFETY

§435.1. Protective Clothing.

(a) A regulated **entity**[~~fire department~~] shall:

(1) purchase, rent, lease, provide, and maintain a complete set of protective clothing for **each**[~~all~~] fire protection personnel who would be exposed to hazardous conditions from fire or other emergencies or where the potential for such exposure exists. A complete set of **properly fitting** protective clothing shall consist of garments including bunker coats, bunker pants, boots, gloves, helmets, and protective hoods, worn by fire protection personnel in the course of performing fire-fighting operations;

(2) ensure that all protective clothing [~~which are used by fire protection personnel assigned to fire suppression duties~~] **complies**[~~comply~~] with the minimum standards of the National Fire Protection Association suitable for the tasks the individual is expected to perform. The National Fire Protection Association standard applicable to protective clothing is the standard in effect at the time the entity contracts for new, **repaired** [~~rebuilt~~], or used protective clothing; and

(3) maintain, provide to the commission upon request, and comply with a departmental standard operating procedure regarding the use, selection, care, and maintenance of protective clothing which complies with NFPA 1851, Standard on Selection, Care, and Maintenance of Structural Fire Fighting Protective Ensembles **or its successor**.

(b) To ensure that protective clothing for fire protection personnel continues to be suitable for assigned tasks, risk assessments **must be** conducted in accordance with NFPA 1851 **or its successor**[~~shall be reviewed and revised as needed, but in any case, not more than five years following the date of the last risk assessment~~].

§435.3. Self-Contained Breathing Apparatus.

The **regulated**[~~employing~~] entity shall:

(1) [~~purchase,~~] provide, and maintain a complete self-contained breathing apparatus **that complies with the minimum standards of the National Fire Protection Association identified in NFPA 1981, Standard on Open-Circuit Self-Contained Breathing Apparatus for Fire Fighters** for each on-duty fire protection personnel who engage in operations where IDLH atmospheres may be encountered, where the atmosphere is unknown or would be exposed to hazardous atmospheres from fire or other emergencies or where the potential for such exposure exists;

[~~(2) ensure that all self-contained breathing apparatus used by fire protection personnel complies with the minimum standards of the National Fire Protection Association identified in NFPA 1981, Standard on Open-Circuit Self-Contained Breathing Apparatus for Fire Fighters;~~]

(2) (~~A~~) the National Fire Protection Association standard applicable to a self-contained breathing apparatus is the standard in effect at the time the entity contracts for new, rebuilt, **repaired,** or used self-contained breathing apparatus;

(3)[~~(B)~~] an entity may continue to use a self-contained breathing apparatus in use or contracted for before a change in the National Fire Protection Association standard, unless the commission determines that the continued use of the self-contained breathing apparatus constitutes an undue risk to the wearer, in which case the commission shall order that the use be discontinued and shall set an appropriate date for compliance with the revised standard;

(4)[~~(3)~~] develop an air quality program that complies with the most recent edition of the NFPA 1989 Standard on Breathing Air Quality for Emergency Services Respiratory Protection;

(5)[~~(4)~~] maintain and supply upon request by the commission, records and reports documenting compliance with commission requirements concerning self-contained breathing apparatus and breathing air. Records of all tests shall be made and the records shall be retained for a period of no less than three years;

(6)[~~(5)~~] maintain and provide upon request by the commission, **an entity's**[~~a departmental~~] standard operating procedure regarding the use of self-contained breathing apparatus; and

(7)[~~(6)~~] maintain and provide upon request by the commission, **an entity's** [~~a department~~] standard operating procedure regarding the selection, care, and maintenance of self-contained breathing apparatus that complies with the most recent edition of the NFPA 1852 Standard on Selection, Care, and Maintenance of Open-Circuit Self-Contained Breathing Apparatus (SCBA).

(8) In any workplace where respiratory protection is necessary to protect the health of the employee or whenever respiratory protection is required by the employer, the employer shall establish and implement a written respiratory program that complies with NFPA 1500, Respiratory Protection Program. The program shall be updated as necessary to reflect those changes in workplace conditions that affect respiratory protection use. Documents related to this rule shall be provided to the Texas Commission on Fire Protection upon request.

§435.5. Commission Recommendations.

The commission recommends that all **regulated**[~~employing~~] entities use as a guide the National Fire Protection Standard 1500 "Fire Department Occupational Safety and Health Program". [~~following publications:~~]

[~~(1) NFPA 1403 "Live Fire Training Evolutions";~~]

[~~(2) NFPA 1500 "Fire Department Occupational Safety and Health Program;"~~]

[~~(3) IAFF/IAFC - "Fire Service Joint Labor Management Wellness-Fitness Initiative."~~]

§435.7. Implementation of Mandatory NFPA Standards[~~**Fire Department Staffing Studies**~~]**.**

[~~(a)~~] **Allow implementation of TCFP mandated NFPA standards at the Commissioners discretion up to 365 days from the effective date of the new NFPA standard.**[~~Section 419.022(a)(4) Texas Government Code provides that the commission may on request, assist in performing staffing studies of fire departments. Staffing studies must take into consideration all the objectives and missions of the fire department. Many staffing studies have been developed that can be used to assist in evaluating the needs of a fire department.~~]

[~~(b) A city should ultimately decide on the level of fire protection it is willing to provide to its citizens. The city and fire department should, as a minimum, address the needs of prevention, investigation and suppression as outlined in the appropriate National Fire Protection Association~~

~~Standards. That decision should be based on facts, the safety of its citizens, and the safety of the fire fighters providing that protection.]~~

~~[(c) The commission will assist by maintaining information pertinent to fire department staffing. The information shall be maintained in the Ernest A. Emerson Fire Protection Resource Library at the commission. Copies shall be made available, free of charge, to anyone requesting such information to the extent permitted by copyright laws.]~~

§435.9. Personal Alert Safety System (PASS).

The **regulated**[~~employing~~] entity shall:

(1) [~~purchase,~~] provide[~~,~~] and maintain a PASS device **complying with the minimum standards of the National Fire Protection Association identified in NFPA 1982, Standard on Personal Alert Safety Systems (PASS) for Fire Fighters** for each on duty fire protection personnel who engage in operations where IDLH atmospheres may be encountered, or where the atmosphere is unknown, or where hazardous conditions from fire or other emergencies exist, or where the potential for such exposure exists**.**[~~;~~]

(2) ensure that all PASS devices used by fire protection personnel comply with the minimum standards of the National Fire Protection Association identified in NFPA 1982, Standard on Personal Alert Safety Systems (PASS) for Fire Fighters**.**[:] **The National Fire Protection Association standard applicable to a PASS device is the standard in effect at the time the entity contracts for new, rebuilt, repaired, or used PASS devices**.

~~[(A) the National Fire Protection Association standard applicable to a PASS device is the standard in effect at the time the entity contracts for new, rebuilt, or used PASS devices;]~~

~~[(B) an entity may continue to use a PASS device that meets the requirements of an earlier edition of NFPA 1982, unless the commission determines that the continued use of the PASS device constitutes an undue risk to the wearer, in which case the commission shall order that the use be discontinued and shall set an appropriate date for compliance with the revised standard;~~]

(3) ensure that the PASS device assigned to an individual user be inspected at the beginning of each duty period and before each use.

(4) maintain and provide upon request by the commission, **an entity's**[~~a departmental~~] standard operating procedure regarding the proper use, selection, care**,** and maintenance of PASS devices.

§435.11. Incident Management System (IMS).

(a) The **regulated entity**[~~fire department~~] shall develop, maintain**,** and use an incident management system.

(b) The incident management system shall:

(1) include a written **standard** operating procedure for the management of emergency incidents**.**[~~;~~]

(2) require that the IMS be used at all emergency incidents**.**[~~;~~]

(3) require operations to be conducted in a manner that recognizes hazards and assists in the prevention of accidents and injuries**.**[~~;~~]

(4) require that all fire protection personnel be trained in the use of the IMS; and

(5) require that the IMS be applied to all drills, exercises and all other situations that involve hazards similar to those encountered at an actual emergency.

(c) The IMS shall meet the requirements of [~~the applicable sections of the~~] NFPA 1561, Standard on **Emergency Services Incident Management System and Command Safety or its successor**[Fire Department Incident Management System].

[~~(d) The commission recommends departments follow the National Incident Management System (NIMS) when developing their incident management system.~~]

§435.13. Personnel Accountability System.

(a) The **regulated entity**[~~fire department~~] shall develop, maintain**,** and use a personnel accountability system that provides for a rapid accounting of all personnel at an emergency incident.

(b) The accountability system shall:

(1) require all fire protection personnel be trained in the use of the accountability system;

(2) require that the fire protection personnel accountability system be used at all incidents;

(3) require that all fire protection personnel operating at an emergency incident to actively participate in the personnel accountability system; and

(4) require that the incident commander be responsible for the overall personnel accountability system for the incident.

(c) The fire department shall be responsible for developing the system components required to make the personnel accountability system effective.

(d) The personnel accountability system shall meet the minimum standards required by the National Fire Protection Association 1561, Standard on **Emergency Services Incident Management System and Command Safety or its successor**[~~Fire Department Incident Management System. If the standard is revised, the fire department shall have one (1) year from the effective date of the new standard to comply~~].

§435.15. Operating At Emergency Incidents.

(a) The fire department shall develop, maintain**,** and use a standard operating procedure for fire protection personnel operating at emergency incidents.

(b) The standard operating procedure shall:

(1) specify an adequate number of personnel to safely conduct emergency scene operations**.**[~~;~~]

(2) limit operations to those that can be safely performed by personnel at the scene**.**[~~;~~]

(3) require all personnel to be trained in and use the standard operating procedures; and

(4) comply with §435.17 (Procedures for Interior Structural Fire Fighting).

(c) The **regulated entity**[~~fire department~~] may use standards established by the National Fire Protection Association for fire protection personnel operating at an emergency incident.

§435.17. Procedures for Interior Structural Fire Fighting (2-In /2-Out Rule).

(a) The **regulated entity shall develop, maintain, and comply with written standard operating procedures that adhere**[~~fire department shall develop written procedures that comply~~] with the Occupational Safety and Health Administration's Final Rule, 29 CFR Section 1910.134(g)(4) by requiring:

(1) a team of at least four fire protection personnel must be assembled before an interior fire attack can be made when the fire has progressed beyond the incipient stage.[;]

(2) at least two fire protection personnel to enter the IDLH atmosphere and remain in visual or voice (not radio) contact with each other.[;]

(A) Visual means that the fire protection personnel must be close enough to see each other.

(B) Voice means that the fire protection personnel of the entry team must be close enough to speak to one another without the use of radios.

(3) at least two fire protection personnel remain located outside the IDLH atmosphere to perform rescue of the fire protection personnel inside the IDLH atmosphere.[;]

(4) all fire protection personnel engaged in interior structural fire fighting use self-contained breathing apparatus and be clothed in a complete set of protective clothing as identified in Chapter 435.[;]

(5) all fire protection personnel located outside the IDLH atmosphere be equipped with appropriate retrieval equipment where retrieval equipment would contribute to the rescue of the fire protection personnel that have entered the IDLH atmosphere.[;]

(6) one of the outside fire protection personnel must actively monitor the status of the inside fire protection personnel and not be assigned other duties. The second outside fire protection personnel may be assigned to an additional role, including, but not limited to, incident commander, safety officer, driver-operator, command technician or aide, or fire fighter/EMS personnel, so long as this individual is able to perform assistance or rescue activities without jeopardizing the safety or health of any fire protection personnel working at the scene.[;]

(7) **All fire protection personnel entering an IDLH atmosphere mut be equipped with an operable portable radio**[~~the fire protection personnel outside the IDLH atmosphere must remain in communication (including, but not limited to, radio) with the fire protection personnel in the IDLH atmosphere. Use of a signal line (rope) as a communications instrument for interior fire fighting is not permitted by the commission. This does not preclude the use of rescue guide ropes (guide line or lifeline or by what ever name they may be called) used during structural searches~~]; and

(8) each outside fire protection personnel must have a complete set of protective clothing and self-contained breathing apparatus, as identified in Chapter 435, immediately accessible for use if the need for rescue activities inside the IDLH atmosphere is necessary.

(b) The **regulated entity**[~~fire department~~] shall comply with the 2-in/2-out rule as described in this section except in **a reasonable belief of** an imminent life-threatening situation when immediate action could prevent the loss of life or serious injury before the team of four fire protection personnel are assembled.

(c) Whenever there is a variance to these procedures, a supplemental report must be submitted to the Texas Commission on Fire Protection, documenting the rationale used to deviate from these written procedures.

§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 **any[** ~~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 inspection. Compliance Officers may postpone an inspection for extenuating circumstances with the Compliance Manager's approval.

(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).

§435.21. Fire Service Joint Labor Management Wellness-Fitness Initiative.

(a) A fire department shall assess the wellness and fitness needs of the personnel in the department. The procedure used to make this assessment shall be written and made available for Commission inspection.

(b) A fire department shall develop and maintain a standard operating procedure to address those needs.

(c) The approach to the fitness needs of the department shall be based on the local assessment and local resources.

(d) The standard operating procedure shall be made available to the Commission for inspection.

§435.23. Fire Fighter Injuries.

(a) A **regulated entity**[~~fire department~~] shall report all Texas Workers' Compensation Commission reportable injuries that occur to on-duty regulated fire protection personnel on the Commission form.

(b) Minor injuries are those injuries that do not result in the **fire protection personnel**[~~fire fighter~~] missing more than one duty period or does not involve the failure of personal protective equipment. Minor injuries shall be reported within 30 business days of the injury event.

(c) Major injuries are those that require the **fire protection personnel**[~~fire fighter~~] to miss more than one duty period. Major injuries shall be reported within five business days of the injury event.

(d) Investigatable **fire protection personnel** injuries are those resulting from the malfunction of personal protective equipment, failure of personal protective equipment to protect the **fire protection personnel**[~~fire fighter~~] from injury, or injuries sustained from failure to comply with any provision of Commission mandated department SOPs. Investigatable injuries shall be reported within five business days of the injury event.

(e) The regulated entity shall secure any personal protective equipment involved in **an investigatable fire protection personnel**[~~a fire fighter~~] injury and shall be made available to the Commission for inspection.

§435.25. Courage to be Safe So Everyone Goes Home Program.

[~~(a) In an effort to improve firefighter safety in the State of Texas, all regulated entities will ensure that the National Fallen Firefighters Foundation's "Courage to be Safe So Everyone Goes Home" program be completed as part of the continuing education required for certified fire protection personnel. Individuals will be credited with four hours of continuing education credit for completing this program.~~]

(a) [~~(b)~~] All fire protection personnel will be required to complete the National Fallen Firefighters Foundation's "Courage to be Safe So Everyone Goes Home" program training within one year following appointment to a **regulated entity**[~~fire department~~] if the individual has not previously completed the program. **Individuals will be credited with four hours of continuing education credit for completing this program.**

(b) Regulated entities[~~(c) Departments~~] will report the completion of training through the commission's **web-based**[~~web based~~] reporting system.

(c)[~~(d)~~] Failure to complete the National Fallen Firefighters Foundation's "Courage to be Safe So Everyone Goes Home" program before the required **deadline**[~~deadlines~~] will be considered a violation of continuing education rules found in Chapter 441 of this title (relating to Continuing Education).

§435.27. Live Fire Training Structure Evolutions.

The most current edition of NFPA 1403, Standard on Live Fire Training Evolutions **or its successor**, shall be used as a guide when developing standard operating procedures for conducting live fire training. The following requirements shall apply for all Live Fire Training Structure Evolutions conducted.

(1) The officer in charge or instructor will ensure that the water supply rate and duration for each individual Live Fire Training Structure Evolution is adequate to control and extinguish the training fire, the supplies necessary for backup lines to protect personnel, and any water needed to protect exposed property.

(2) The instructor-in-charge shall assign the following personnel:

(A) One instructor to each functional crew, which shall not exceed five students.

(B) One instructor to each backup line.

(C) Additional personnel to backup lines to provide mobility.

(D) One additional instructor for each additional functional assignment.

(3) The officer in charge or instructor will ensure that the buildings or props being utilized for live fire training are in a condition that would not pose an undue safety risk.

(4) A safety officer shall be appointed for all Live Fire Training Structure Evolutions. The safety officer shall have the authority, regardless of rank, to alter, suspend or control any aspect of the operations when, in his or her judgment, a potential or actual danger, accident, or unsafe condition exists. The safety officer shall not be assigned other duties that interfere with safety responsibilities.

(5) No person(s) shall play the role of a victim inside the building.

(6) Prior to the ignition of any fire, instructors shall ensure that all personal protective clothing and/or **self-contained**[~~self contained~~] breathing apparatus are NFPA compliant and being worn in the proper manner.

(7) Prior to conducting any live fire training, a pre-burn briefing session shall be conducted. All participants shall be required to conduct a walk-through of the structure in order to have a knowledge of, and familiarity with, the layout of the building and to be able to facilitate any necessary evacuation of the building.

(8) A standard operating procedure shall be developed and utilized for Live Fire Training Structure Evolutions. The standard operating procedure shall include, but not be limited to:

(A) a Personal Alert Safety System (PASS). A PASS device shall be provided for all participating in live fire training and shall meet the requirements in §435.9 of this title (relating to Personal Alert Safety System (PASS))**.**[~~;~~]

(B) a Personnel Accountability System that complies with §435.13 of this title (relating to Personnel Accountability System) shall be utilized**.**[~~;~~]

(C) an Incident Management System**.**[~~;~~]

(D) use of personal protective clothing and self-contained breathing apparatus**.**[~~;~~]

(E) an evacuation signal and procedure; and

(F) pre-burn, burn and post-burn procedures.

§435.29. Federal Highway Administration Traffic Incident Management Program.

~~[(a) In an effort to improve firefighter safety in the State of Texas, all regulated entities will ensure that the Federal Highway Administration Traffic Incident Management program or an equivalent course that is approved by the commission be completed as part of the continuing education required for certified fire protection personnel by December 1, 2020. Individuals will be credited with four hours of continuing education credit for completing this program.]~~

~~[(b) All regulated fire protection personnel must complete the Federal Highway Administration Traffic Incident Management program or an equivalent course that is approved by the commission prior to December 1, 2020.]~~

(a)~~[(c)]~~ All fire protection personnel[~~appointed after December 1, 2020~~] will be required to complete the Federal Highway Administration Traffic Incident Management program training or an equivalent course that is approved by the commission within one year of appointment to a **regulated entity**[~~fire department~~]. **Individuals will be credited with four hours of continuing education credit for completing this program.**

(b)~~[(d)]~~ Departments will report the completion of training through the commission's **web-based** [~~web based~~] reporting system.

(c)~~[(e)]~~ Failure to complete the Federal Highway Administration Traffic Incident Management program or an equivalent course that is approved by the commission before the required deadline will be considered a violation of continuing education rules found in Chapter 441 of this title (relating to Continuing Education).

(F) pre-burn, burn and post-burn procedures.

§435.31. Firefighter Cancer Support Network Cancer Awareness Training Program.

(a) In an effort to improve firefighter safety in the State of Texas, all regulated entities will ensure that the Firefighter Cancer Support Network Cancer Awareness Training program or an equivalent course that is approved by the commission be completed as part of the continuing education required for certified fire protection personnel by December 1, 2027. Individuals will be credited with 2 hours of continuing education credit for completing this program.

(b) All regulated fire protection personnel must complete the Firefighter Cancer Support Network Cancer Awareness Training program or an equivalent course that is approved by the commission prior to December 1, 2027.

(c) All fire protection personnel appointed after December 1, 2027, will be required to complete the Firefighter Cancer Support Network Cancer Awareness Training program training or an equivalent course that is approved by the commission within one year of appointment to a fire department.

(d) Departments will report the completion of training through the commission's web-based reporting system.

(e) Failure to complete the Firefighter Cancer Support Network Cancer Awareness Training program or an equivalent course that is approved by the commission before the required deadline will be considered a violation of continuing education rules found in Chapter 441 of this title (relating to Continuing Education).

8. **Discussion of the 2021 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.**

2021 INJURY REPORT

An Annual Summary of Fire Fighter Injuries, Exposures, and Cancer Diagnoses Reported to the Texas Commission on Fire Protection for Calendar Year 2021

By
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of the
Texas Commission on Fire Protection

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https://www.tcfp.texas.gov/services/injury-reports

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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,
- Exposures (toxic and pathogenic)
- Cancer diagnoses
- 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

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 2021 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 2020.

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 newer system is ongoing as we receive feedback from stake-holders. The reporting process is accomplished online via TCFP's FIDO system. Fire departments regulated by the commission have been notified of the requirement to report. Several volunteer departments, which are not regulated by the commission, are also participating voluntarily.

This report concludes with recommendations from the commission to help reduce the number of fire fighter injuries in Texas and to improve the injury reporting program.

A Note About COVID-19

The on-going COVID-19 pandemic continued to cause the numbers of injuries and exposures to spike sharply in the areas of EMS-related duties (i.e., patient care) and station duties (i.e., contact with contagious co-workers) compared to previous years. Please keep this in mind as you review the report.

Abstract

This report contains data submitted by regulated and non-regulated entities.

Grand Totals – 2021

Total number of incidents (injury reports) submitted: 5,536
Total number of individuals who sustained an injury or exposure: 5,706*
Total number of injuries reported: 2,979
Total number of exposures reported: 2,974

**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. (5,706 < 2,979 + 2,974)*

Because the on-line 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)

The "Bird's Eye View"

Reporting Rate 72%. 559 of the 772 regulated departments used TCFP's injury reporting system in 2021.

Top 5 activities that resulted in injuries or exposures

1. EMS = 2,303 injured individuals (40% of the total reported injuries/exposures)
2. Station Duties = 1,451(25% of the total)
3. Fire Suppression = 670 (12% of the total)
4. Wellness/Fitness = 421 (7% of the total)
5. Skills Training = 398 (7% of the total)

State of Texas vs. NFPA

Comparison between the State of Texas (2020) and National Fire Protection Association (NFPA) U.S. Firefighter Injuries (2020)

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.)

Please keep in mind that Table 1 and Figure 1 reflect 2020 data, *and not 2021 data as in the rest of this report. NFPA's 2021 injury data will not be published and available until 2023.*

Comparing Texas 2020 and NFPA 2020

Table 1: Texas 2020 vs. NFPA 2020

	Texas 2020		NFPA 2020	
Category	**Count**	**Percent**	**Count**	**Percent**
Fireground	720	13%	22,450	35%
Non-Fire	2,457	43%	13,650	21%
Other On-Duty	1,916	34%	16,250	25%
Training	398	7%	7,550	12%
Responding and Returning	215	4%	4,975	8%
Total	**5,706**	**100%**	**64,875**	**100%**

NFPA data is from the *Firefighter Injuries in the United States in 2020* report, copyright 2021 National Fire Protection Association, Quincy, MA.

Special note about COVID-19

The NFPA estimates there were 20,900 exposures to infectious diseases in 2020. This is more than two and a half times the 7,675 exposures in 2019. In Texas, we had 3,600 reports of infectious diseases in 2020, while in 2019 we had only 23.

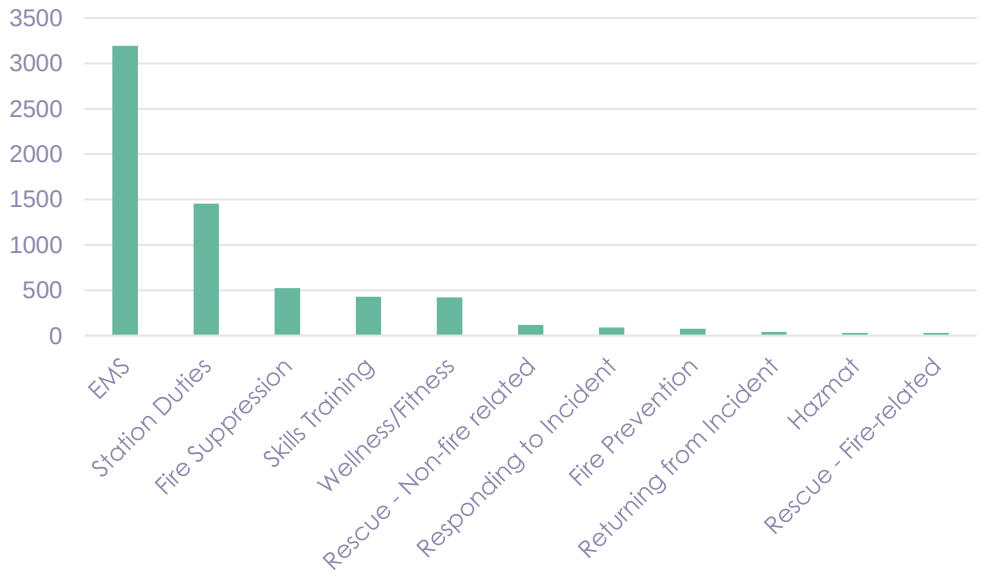
Figure 1: Injuries by Activity, percentages
(Comparing Texas 2020 and NFPA 2020)

Fire Protection Personnel Injuries

Table 2: Total Injured or Exposed Individuals by Activity and Severity, 2021

Activity	Minor	Serious	Fatal	Total	2020	2019
EMS	1,633	667	3	2,303	3,192	922
Station Duties	750	701	0	1,451	1,454	739
Fire Suppression	522	147	1	670	525	763
Wellness/Fitness	290	131	0	421	422	469
Skills Training	284	114	0	398	429	407
Responding to Incident	117	35	0	152	91	157
Rescue - nonfire	89	22	0	111	118	143
Returning from Incident	40	23	0	63	41	60
Rescue - fire-related	40	10	0	50	29	53
Fire prevention	35	9	0	44	76	26
Hazmat	40	3	0	43	29	41
Total	**3,840**	**1,862**	**4**	**5,706**	**6,406**	**3,780**

Figure 2: Total Injured or Exposed Individuals by Activity, 2021



Injuries/Exposures by Activity

EMS activities resulted in the highest number of minor injuries in 2021 (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 2021 compared with the years prior to 202 due to the continuing 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, 2017 – 2021

	2017		2018		2019		2020		2021	
Activity	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**
EMS	929	29%	843	30%	776	26%	2,529	56%	1,633	43%
Station Duties	481	15%	437	15%	591	20%	722	16%	750	20%
Fire Suppression	662	21%	607	21%	616	21%	397	9%	522	14%
Wellness/Fitness	254	8%	286	10%	290	10%	306	7%	290	8%
Skills Training	291	9%	277	10%	330	11%	304	7%	284	7%
Responding to Incident	156	5%	99	3%	114	4%	68	2%	117	3%
Rescue - Non-Fire	206	7%	157	6%	140	5%	89	2%	89	2%
Hazmat	21	1%	27	1%	24	1%	22	0%	40	1%
Rescue - Fire Related	113	4%	39	1%	37	1%	26	1%	40	1%
Returning from Incident	42	1%	57	2%	39	1%	28	1%	40	1%
Fire Prevention	50	2%	69	2%	46	2%	49	1%	35	1%
Total	**3,155**	**100%**	**2,829**	**100%**	**2,957**	**100%**	**4,491**	**100%**	**3,840**	**100%**

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

Table 4: Serious Injury/Exposure Activities, 2017 – 2021

Activity	2017 Count	2017 %	2018 Count	2018 %	2019 Count	2019 %	2020 Count	2020 %	2021 Count	2021 %
Station Duties	185	21%	201	20%	147	19%	731	39%	701	38%
EMS	147	17%	184	19%	146	19%	660	35%	667	36%
Fire Suppression	157	18%	191	19%	145	19%	127	7%	147	8%
Wellness/Fitness	129	15%	131	13%	117	15%	116	6%	131	7%
Skills Training	120	14%	123	13%	139	18%	125	7%	114	6%
Responding to Incident	53	6%	64	7%	28	4%	23	1%	35	2%
Returning from Incident	28	3%	34	3%	14	2%	13	1%	23	1%
Rescue - Non-Fire	27	3%	26	3%	17	2%	29	2%	22	1%
Rescue - Fire Related	1	0%	1	0%	2	0%	3	0%	10	1%
Fire Prevention	15	2%	21	2%	14	2%	27	1%	9	0%
Hazmat	7	1%	5	1%	4	1%	7	0%	3	0%
Total	**869**	**100%**	**981**	**100%**	**773**	**100%**	**1,861**	**100%**	**1,862**	**100%**

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

Fatalities

The commission's 2021 injury report includes three fatalities (two from COVID-19 and one from colon cancer). Fatalities noted 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 four Texas fire fighter fatality incident investigations in 2021. Comprehensive information about the investigations may be found on their website at the following web address:
https://www.tdi.texas.gov/fire/fmloddannuals.html

Table 5: Number of Individuals Who Sustained Fatal Injuries/Exposures, 2021

Activity	Count	Percent
EMS	2	67%
Fire Suppression	1	33%
Total	**3**	**100%**

Emergency vs. Non-Emergency Injuries

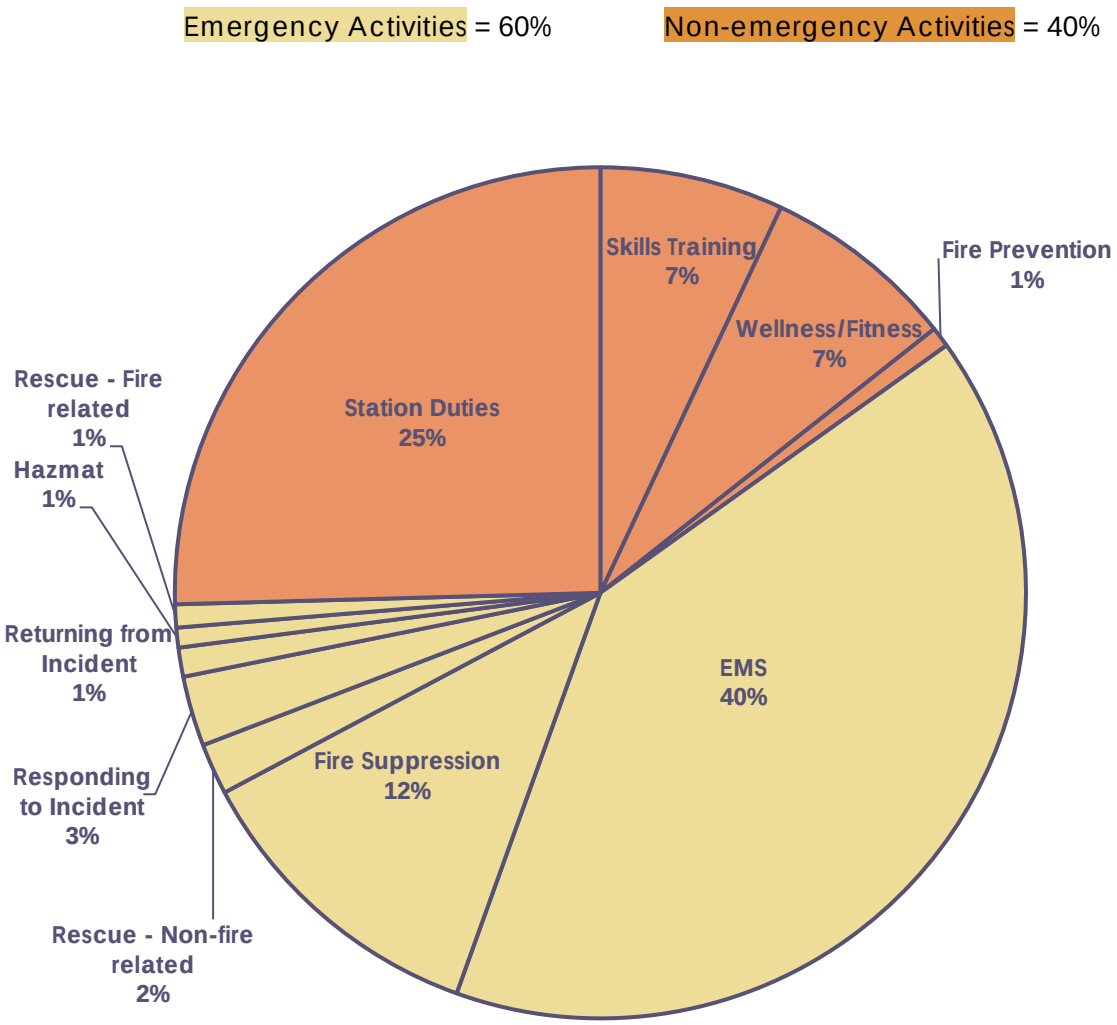
Table 6: Number of Injured Individuals by Emergency Activity and Severity, 2021

Activity	Minor	Serious	Fatal	Total
EMS	1,633	667	3	2,303
Fire Suppression	522	147	1	670
Rescue - Non-fire related	89	22	0	111
Responding to Incident	117	35	0	152
Returning from Incident	40	23	0	63
Hazmat	40	3	0	43
Rescue - Fire related	40	10	0	50
Total	**2,481**	**907**	**4**	**3,392**

Table 7: Number of Injured Individuals by Non-Emergency Activity and Severity, 2021

Activity	Minor	Serious	Fatal	Total
Station Duties	750	701	0	1,451
Skills Training	284	114	0	398
Wellness/Fitness	290	131	0	421
Fire Prevention	35	9	0	44
Total	**1,359**	**955**	**0**	**2,314**

Figure 3: Percentages of Injured Individuals in Emergency and Non-Emergency Activities, 2021

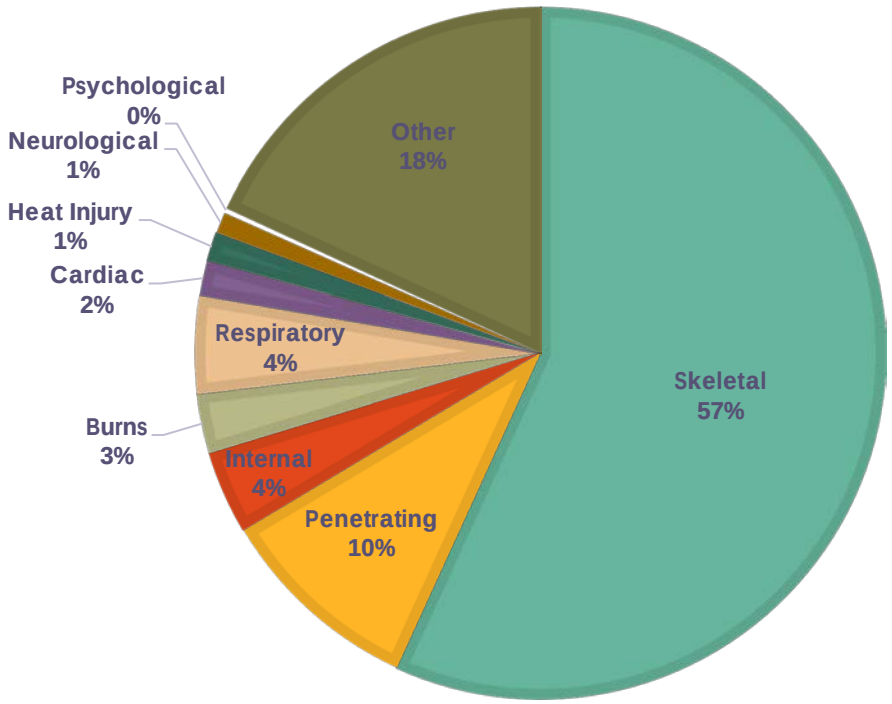


Types of Injuries

Table 8: Types of Injuries, 2021

Type of Injury	2021	
	Count	Percent
Skeletal	1,693	57%
Penetrating	286	10%
Respiratory	135	5%
Internal	116	4%
Burns	83	3%
Cardiac	49	2%
Heat Injury	41	1%
Neurological	29	1%
Psychological	8	0%
Other	539	18%
Total	**2,979**	**100%**

Figure 4: Types of Injuries, 2021

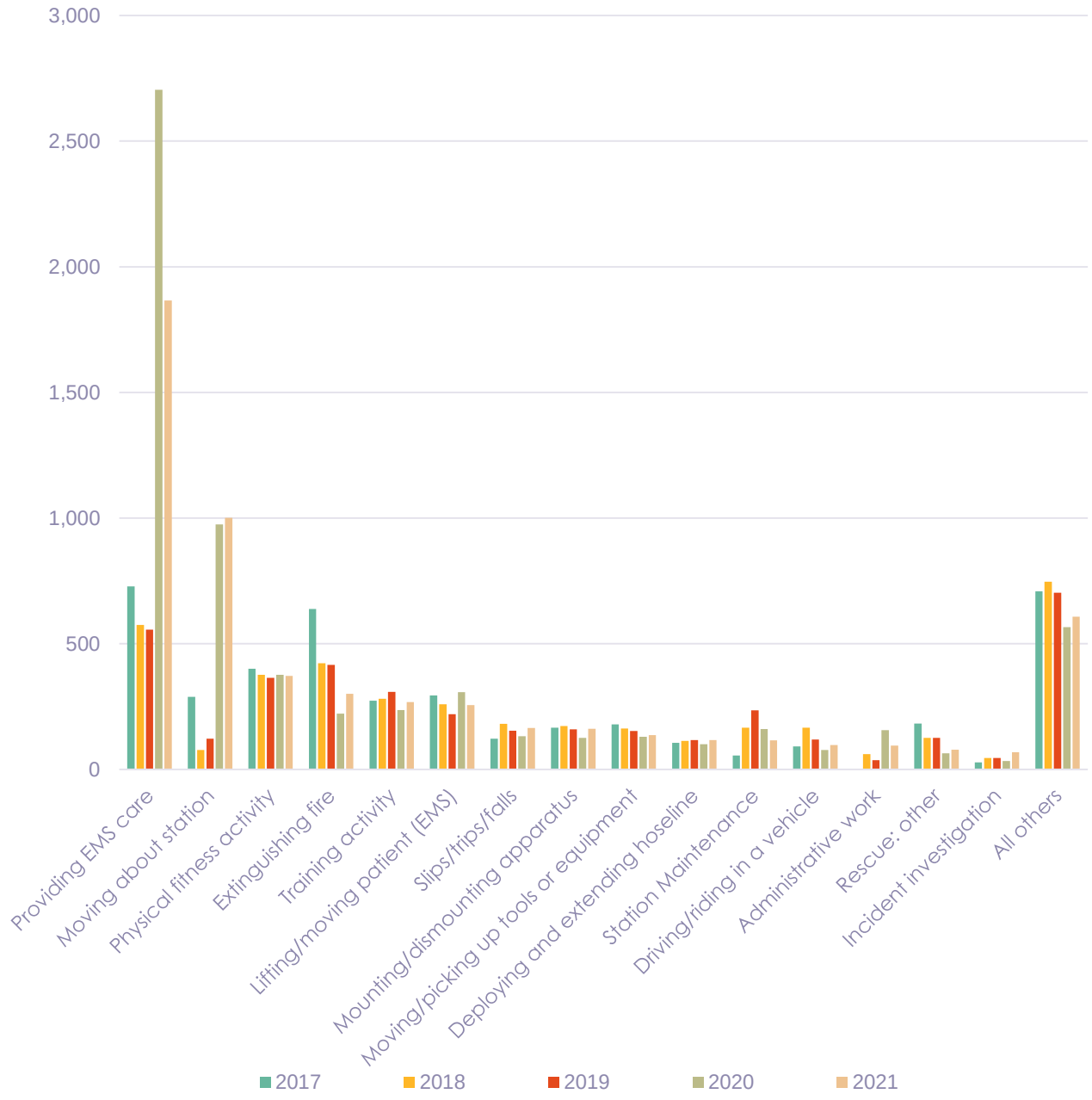


Task at Time of Injury

Table 9: Top 15 Tasks at Time of Injury, 2017 – 2021 (ordered by 2021, descending)

Task	2017	2018	2019	2020	2021
Providing EMS care	728	575	556	2,704	1,866
Moving about station	289	77	122	975	1,001
Physical fitness activity	401	376	364	376	372
Extinguishing fire	638	423	416	222	301
Training activity	273	281	309	236	268
Lifting/moving patient (EMS)	294	259	220	307	256
Slips/trips/falls	122	181	154	132	165
Mounting/dismounting apparatus	166	173	159	125	162
Moving/picking up tools or equipment	179	163	153	130	136
Deploying and extending hoseline	106	113	117	100	117
Station Maintenance	55	166	235	161	116
Driving/riding in a vehicle	92	166	119	77	97
Administrative work	n/a	61	37	156	95
Rescue: other	183	126	126	64	78
Incident investigation	28	45	46	34	68
All others	709	747	703	566	608
Total	**4,263**	**3,932**	**3,836**	**6,365**	**5,706**

Figure 5: Top 15 Tasks at Time of Injury, 2017 – 2021



Injuries by Body Part

Table 10: Injuries by Body Part, 2017

Injured Body Part	2017
Multiple body parts, whole body	1,064
Hand and fingers	365
Knee	315
Hip, lower back, or buttocks	292
Back, except spine	248
Shoulder	221
Ankle	179
Multiple parts	151
Face	127
Arm, lower, not including elbow or wrist	121
Leg, lower	113
Foot and toes	87
Head	78
Ear	76
Chest	76
Eye	73
Multiple body parts, upper body	73
Elbow	72
Wrist	56
Other body parts injured	303
Total	**4,090**

Because TCFP migrated to a new data management system in 2017, the data collected in years 2018-2021 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 - 2021 data.

Table 11: Injuries by Body Part Type, 2018 – 2021

Injured Body Part	2018	2019	2020	2021
Upper Extremities	864	795	700	769
Lower Extremities	810	684	616	684
Back	490	466	445	459
Internal	105	125	144	379
Multiple Parts	318	255	281	277
Head	300	327	197	228
Chest	104	108	107	116
Hip	23	33	29	34
Neck	64	56	33	33
Total	**3,078**	**2,849**	**2,552**	**2,979**

Table 12: Injuries by Body Part Sub-Type, 2018 – 2021

Body Part by Sub-Type	2018	2019	2020	2021
Back: Back	198	194	191	172
Back: Buttocks	1	3	2	2
Back: Lower Back	282	258	248	274
Back: Neck	4	4	1	7
Back: Spine	5	7	3	4
Chest: Abdomen	5	4	2	3
Chest: Abdominal Area	10	4	9	5
Chest: Chest	89	100	96	108
Head: Brain	n/a	n/a	n/a	5
Head: Cheek	5	7	4	7
Head: Chin	7	1	4	2
Head: Ear	77	117	50	51
Head: Eye	64	60	44	42
Head: Face	111	112	78	53
Head: Forehead	n/a	n/a	n/a	3

Head: Jaw	1	6	2	2
Head: Mouth	15	16	10	8
Head: Nose	20	8	3	8
Head: Skull	n/a	n/a	2	47
Hip: Groin	9	14	9	12
Hip: Hip	13	18	18	22
Hip: Pelvis	1	1	2	0
Internal: Genito-urinary	4	11	4	1
Internal: Heart	5	7	4	6
Internal: Internal	66	71	74	257
Internal: Intestinal tract	5	4	3	2
Internal: Lungs	9	11	51	99
Internal: Stomach	15	20	8	13
Internal: Trachea	1	1	0	1
Lower Extremities: Ankle	206	163	135	160
Lower Extremities: Foot	93	88	78	73
Lower Extremities: Knee	347	273	252	302
Lower Extremities: Lower leg	111	97	95	100
Lower Extremities: Toes	15	22	13	13
Lower Extremities: Upper Leg	38	41	43	36
Multiple Parts: Lower Body	26	19	20	15
Multiple Parts: Unknown	26	11	27	20
Multiple Parts: Upper Body	74	76	65	74
Multiple Parts: Whole Body	192	149	169	168
Neck: Neck	59	49	30	32
Neck: Throat	5	7	3	1
Upper Extremities: Elbow	68	44	34	42
Upper Extremities: Hands	361	326	319	302
Upper Extremities: Lower Arm	10	59	55	53
Upper Extremities: Shoulder	234	235	170	251
Upper Extremities: Upper Arm	112	72	45	63
Upper Extremities: Wrist	79	59	77	58
Total	**3,078**	**2,849**	**2,552**	**2,979**

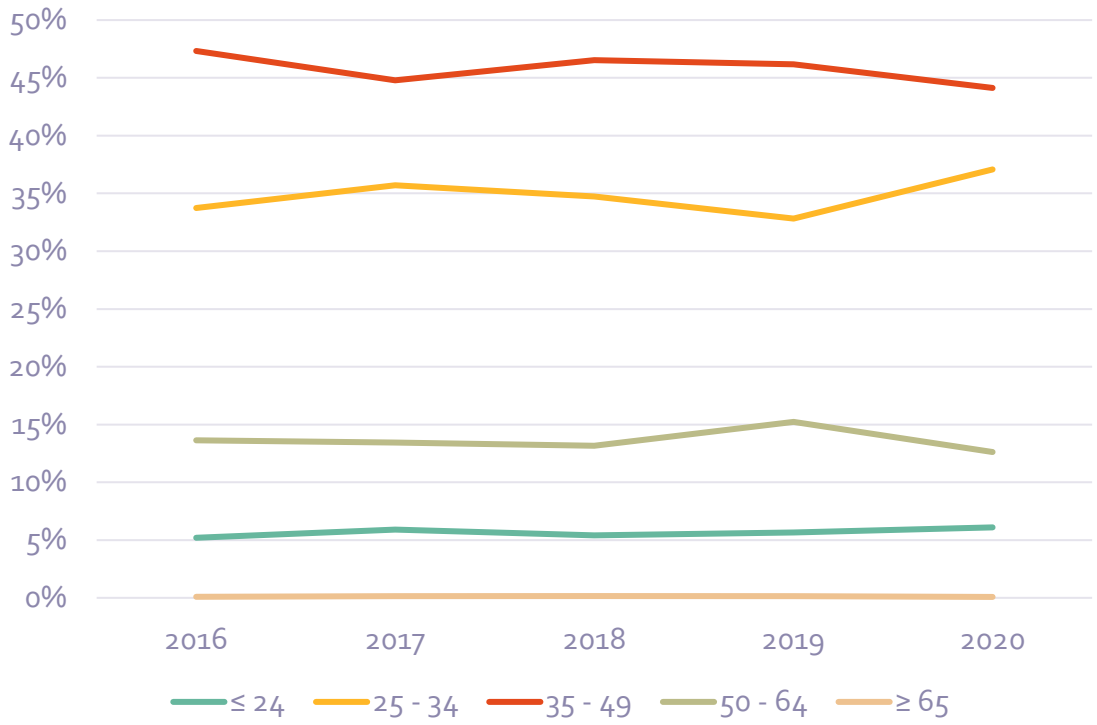
Individuals by Age Group

Table 13: Individuals by Age Group, 2017 – 2021*

Age Group	2017		2018		2019		2020		2021	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
≤ 24	242	5.92%	210	5.41%	210	5.65%	389	6.10%	257	4.52%
25 - 34	1,460	35.70%	1,348	34.73%	1,220	32.82%	2,365	37.07%	1,773	31.15%
35 - 49	1,832	44.79%	1,806	46.53%	1,716	46.17%	2,815	44.13%	2,829	49.70%
50 - 64	550	13.45%	511	13.17%	566	15.23%	805	12.62%	827	14.53%
≥ 65	6	0.15%	6	0.15%	5	0.13%	5	0.08%	6	0.11%
Totals	**4,090**	**100.00%**	**3,881**	**100.00%**	**3,717**	**100.00%**	**6,379**	**100.00%**	**5,692**	**100.00%**

*Includes injured individuals and individuals with exposures.

Figure 6: Individuals by Age Group, percentages, 2017 – 2021



Activities Resulting in Lost Time

Table 14: Activities Individuals Were Doing that Resulted in Lost Time, 2021

Totals

Activity	Count	Days Missed	
		Average	Sum
EMS	600	19	11,753
Station Duties	440	15	6,743
Fire suppression	85	42	3,612
Skills training	67	34	2,280
Wellness/fitness	68	27	1,856
Responding to incident	22	39	860
Rescue - nonfire-related	15	34	518
Returning from incident	15	25	385
Rescue - fire-related	9	24	223
Fire prevention	7	13	96
Hazmat	1	9	9
Total	**1,329**	**26**	**28,335**

Table 15: Activities Individuals Were Doing that Resulted in Lost Time, 2021

Between 1 and 30 days

Activity	Count	Days Missed	
		Average	Sum
EMS	541	13	7,367
Station Duties	413	9	3,958
Wellness/fitness	46	13	626
Fire suppression	59	10	621
Skills training	52	10	557
Responding to incident	15	10	156
Rescue - nonfire-related	10	13	137
Fire prevention	7	13	96
Rescue - fire-related	6	15	93
Returning from incident	11	8	92
Hazmat	1	9	9
Total	**1,161**	**11**	**13,712**

Table 16: Activities Individuals Were Doing that Resulted in Lost Time, 2021

Between 31 and 90 days

Activity	Count	Days Missed	
		Average	Sum
EMS	44	49	2,194
Wellness/Fitness	20	51	1,021
Station Duties	14	55	772
Fire Suppression	12	50	611
Skills Training	8	55	445
Responding to incident	4	47	191
Rescue - nonfire-related	3	57	173
Rescue - fire-related	3	43	130
Returning from incident	2	47	95
Fire Prevention	0	0	0
Hazmat	0	0	0
Total	**110**	**41**	**5,632**

Table 17: Activities Individuals Were Doing that Resulted in Lost Time, 2021

91+ days

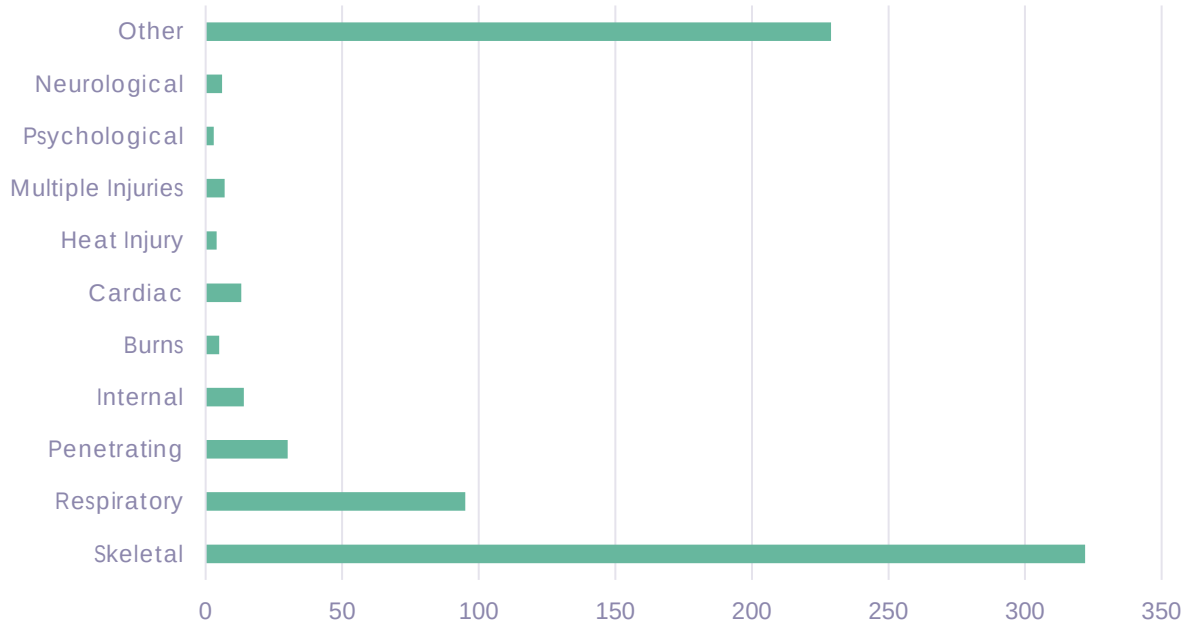
Activity	Count	Days Missed	
		Average	Sum
Fire Suppression	14	170	2,380
EMS	15	146	2,192
Station Duties	13	154	2,013
Skills Training	7	182	1,278
Responding to incident	3	171	513
Wellness/Fitness	2	104	209
Rescue - nonfire-related	2	104	208
Returning from incident	2	99	198
Fire Prevention	0	0	0
Hazmat	0	0	0
Rescue - fire-related	0	0	0
Total	**29**	**102**	**4,419**

Types of Injuries with Lost Time

Table 18: Types of Injuries Resulting in Lost Time, 2021

Type of Injury	Count
Skeletal	322
Respiratory	95
Penetrating	30
Internal	14
Burns	5
Cardiac	13
Heat Injury	4
Multiple Injuries	7
Psychological	3
Neurological	6
Other	229
Total	**728**

Figure 7: Types of Injuries Resulting in Lost Time, 2021



Burn Injuries

Table 19: All Burns, 2017 – 2021

All Burns - Types	2017	2018	2019	2020	2021
Heat/Fire (thermal)	96	108	72	80	64
Scald or Steam	13	12	10	11	12
Chemical	4	6	6	2	3
Electrical	0	1	2	3	4
Totals	**113**	**127**	**90**	**96**	**83**

Table 20: Burns by Body Part Sub-Type, 2021

Body Part Sub-Type	Count
Back: Back	2
Back: Buttocks	0
Back: Lower Back	0
Back: Neck	0
Back: Spine	0
Chest: Abdomen	0
Chest: Abdominal Area	0
Chest: Chest	0
Head: Brain	0
Head: Cheek	1
Head: Chin	0
Head: Ear	13
Head: Eye	0
Head: Face	2
Head: Jaw	0
Head: Mouth	0
Head: Nose	1
Head: Skull	0
Hip: Groin	0
Hip: Hip	1
Internal: Genito-urinary	0
Internal: Heart	0
Internal: Internal	0
Internal: Intestinal tract	0
Internal: Lungs	0

According to the Texas State Fire Marshal's Office, there were _____ fires in 2021. (I don't have this number yet. I have done a public information request w/the SFMO. – gw)

Internal: Stomach	0
Internal: Trachea	0
Lower Extremities: Ankle	1
Lower Extremities: Foot	3
Lower Extremities: Knee	0
Lower Extremities: Lower Leg	3
Lower Extremities: Toes	0
Lower Extremities: Upper Leg	0
Multiple Parts: Lower Body	0
Multiple Parts: Unknown	0
Multiple Parts: Upper Body	7
Multiple Parts: Whole Body	3
Neck: Neck	2
Neck: Throat	0
Upper Extremities: Elbow	2
Upper Extremities: Hands	24
Upper Extremities: Lower Arm	8
Upper Extremities: Shoulder	3
Upper Extremities: Upper Arm	3
Upper Extremities: Wrist	3
Total	**82**

Table 21: Burns by Body Part, 2017 – 2021, Comparison to Historical Data

Body Part	2017	2018*	2019*	2020*	2021*
Ear	16	17	17	12	13
Hand and fingers	22	30	16	20	24
Face	9	14	10	12	4
Wrist	7	8	11	9	3
Multiple body parts, upper body	4	10	6	11	7
Eye	0	4	5	3	0
Hip, lower back, or buttocks	0	0	5	0	1
Foot and toes	1	6	4	4	3
Multiple parts	12	5	4	0	3
Arm, upper, not including elbow or shoulder	2	11	3	0	3
Lower extremities	0	8	3	3	4
Chest	1	2	2	0	0
Neck	7	2	2	2	2
Knee	2	0	1	1	0
Shoulder	6	9	1	4	3

Back, except spine	2	1	0	0	2
Elbow	1	0	0	1	2
Pelvis or groin	2	0	0	0	0
Throat	0	0	0	0	0
Arm, lower, not including elbow or wrist	12	n/a	n/a	14	8
Head	1	n/a	n/a	n/a	0
Leg, lower	3	n/a	n/a	n/a	n/a
Upper extremities	0	n/a	n/a	n/a	n/a
Neck and shoulders	1	n/a	n/a	n/a	n/a
Undetermined	2	n/a	n/a	n/a	n/a
Total	**113**	**127**	**90**	**96**	**82**

*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 – 2021

Exposure + Sub-Type	2018	2019	2020	2021
Chemical: Ammonia	1	3	0	6
Chemical: Battery Acid*	n/a	4	0	2
Chemical: Benzene	2	15	1	1
Chemical: Bleach	1	11	0	2
Chemical: Not listed	151	160	70	40
Chemical: Unidentified	73	55	27	34
Physical: Animal venom	6	17	5	7
Physical: Meningitis	38	40	33	3
Physical: Not listed	138	201	42	27
Physical: Plant toxin	27	14	12	24
Physical: Radiation*	n/a	4	1	0
Physical: Unidentified	87	66	13	16
Physical: UV Light*	n/a	2	1	0
Respiratory: Blood	69	73	78	53
Respiratory: COVID 19*	n/a	1	1,715	2,256
Respiratory: Influenza	4	19	7	2
Respiratory: Not listed	108	118	56	8
Respiratory: Saliva	24	22	28	15
Respiratory: Tuberculosis	98	76	31	16
Respiratory: Unidentified	50	37	6	19
Respiratory: Vomit	7	8	13	4
Other: Asbestos*	n/a	3	1	109
Other: Carbon Monoxide*	n/a	1	6	2
Other: Carcinogenic Substances*	n/a	1	13	15
Other: Contaminated Water/Sewage*	n/a	4	11	8
Other: Chlorine	n/a	n/a	n/a	6
Other: Heavy Metals*	n/a	0	1	0
Other: Mold*	n/a	0	9	4
Other: Smoke/Products of Combustion*	n/a	5	19	36
Other: Virus	n/a	3	1,878	259
Total	**884**	**963**	**4,077**	**2,974**

*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, 2021

Route	Count
Inhalation	2,437
Absorption	428
Injection/Puncture	66
Ingestion	43
Total	**2,974**

Figure 8: Exposure by Route, 2021, percentages

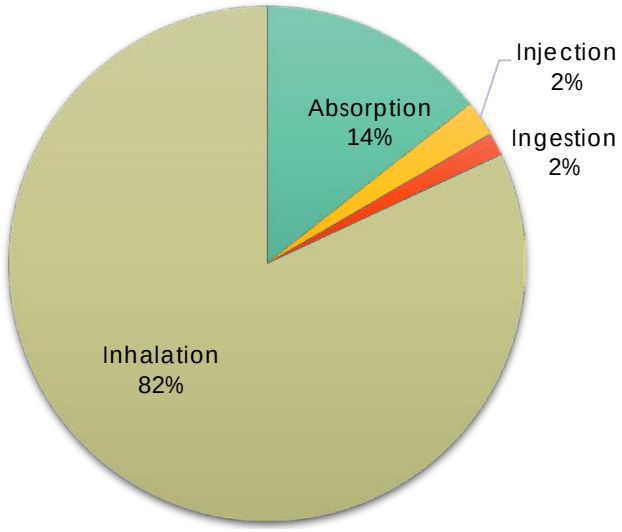


Table 24: Exposure by Substance, 2021

Substance	Count
Liquid	1,376
Gas/vapor	858
Solid	740
Total	**2,974**

Figure 9: Exposure by Substance, 2021, percentages

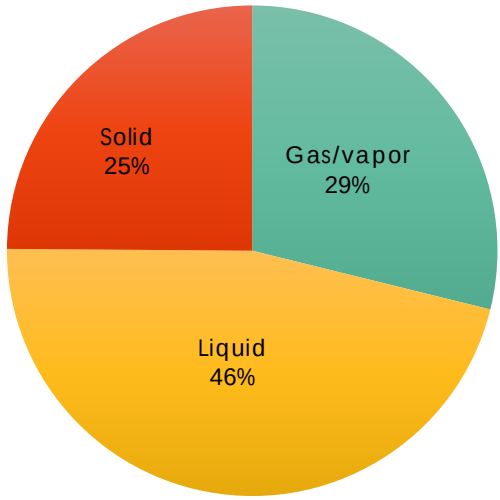


Table 25: Routes of Exposure, Historical Data, 2017

Exposure Routes	2017
Airborne pathogens	354
Undetermined	325
Blood pathogens	174
Body Fluids	173
Chemical (household/industrial)	147
Plant toxins	36
Chemical (carbon monoxide)	1
Total	**1,210**

Figure 10: Routes of Exposure, Historical Data, 2017

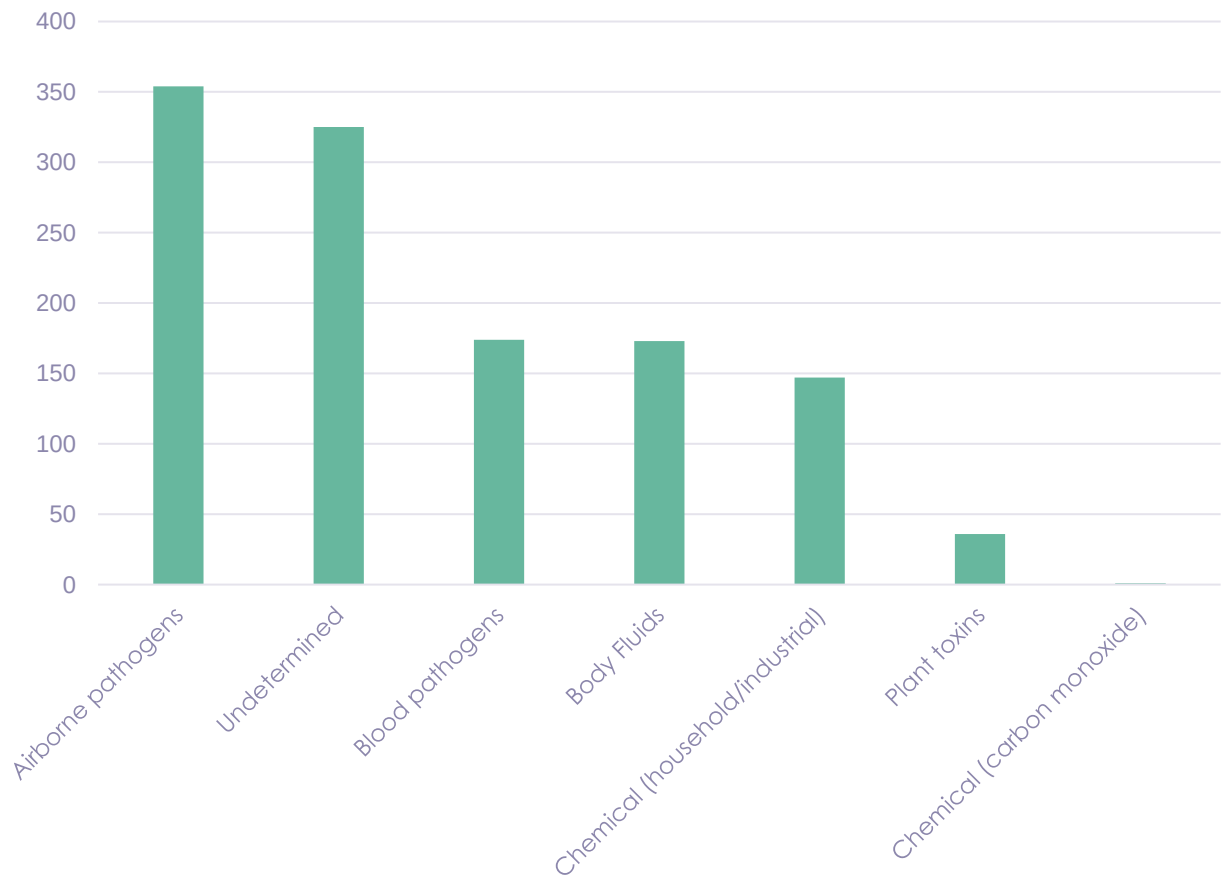


Table 26: Exposure Description, Historical Data, 2017

Exposure description	2017
Unknown	290
Blood	153
Chemicals/household/industrial	122
Asbestos	112
Tuberculosis	109
Body fluids	101
Meningitis	104
Animals or wildlife	58
Sickness, other	49
Poison plants	37
Vomit	17
Chlorine	14
Mold	10
Airborne, other	7
Staph	7
Carbon monoxide	5
HIV	4
Scabies	4
Hepatitis C	3
MRSA	3
Bacterial pneumonia	1
Explosive residue	0
Influenza	0
Lice	0
Strep	0
Total	**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 **34** reports of cancer diagnoses from fire departments in 2021:

Skin/Melanoma/Basal Cell/Squamous Cell carcinoma – 5 reports
(Males, ages 29, 42, 46, 46, 47)

Prostate – 4
(Males – 43, 52, 55, 60)

Testicular – 3
(Males – 29, 40, 45)

Kidney/renal cell carcinoma – 2
(Males – 27, 53)

Colon – 1
(Male - 61)

Thyroid – 1
(Male - 34)

Unidentified to TCFP – 16
(Males – 24, 35, 38, 38, 38, 38, 43, 46, 54, 56, 56, 57, 58, 58)
(Females – 18, 18)

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.

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 2021 there were12 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 wearing it.

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, 2021

				Previous years' totals			
Activity	**Minor**	**Serious**	**Total**	**2020**	**2019**	**2018**	**2017**
EMS	1	0	1	18	11	9	7
Fire Suppression	5	2	7	10	10	19	9
Skills Training	2	0	2	5	1	2	2
Responding to Incident	0	0	0	2	0	1	3
Station Duties	0	1	1	2	6	1	4
Wellness/Fitness	0	1	1	1	1	0	1
Totals	**8**	**4**	**12**	**38**	**29**	**32**	**26**

Table 28: Injuries Attributed to PPE & PASS Failures, 2021

					Previous years' totals			
Activity	**Minor**	**Serious**	**Fatal**	**Total**	**2020**	**2019**	**2018**	**2017***
Fire Suppression	4	0	0	4	7	2	8	n/a
EMS	1	0	1	2	4	0	1	n/a
Skills Training	1	0	0	1	1	2	2	n/a
Totals	**6**	**0**	**1**	**7**	**12**	**4**	**11**	**n/a**

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

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:

Recommendations for the Texas Fire Service:

1. **THESE ARE ALL LAST YEAR'S RECOMMENDATIONS** … Departments should evaluate their SOPs related to station duties to see if improvements can be made.
2. Consider early detection testing for cancer.
3. NFPA 1851 is required by state law and departments are strongly encouraged to follow it.
4. Clean everything often (e.g., clean cab, clean tools, equipment, PPE, self-decontamination after incidents, etc.)

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

9. Discussion and possible action on rule review for the following:

1. 37 Tex. Administrative Code, Part 13, Chapter 403, Criminal Convictions and Eligibility For Certification.

2. 37 Tex. Administrative Code, Part 13, Chapter 423, Fire Suppression

3. 37 Tex. Administrative Code, Part 13, Chapter 425, Fire Service Instructors

4. 37 Tex. Administrative Code, Part 13, Chapter 439 Examinations For Certification

1. 37 Tex. Administrative Code, Part 13, Chapter 403, Criminal Convictions and Eligibility For Certification.

CHAPTER 403

CRIMINAL CONVICTIONS AND ELIGIBILITY FOR CERTIFICATION

§403.1. Purpose.

(a) The purpose of this chapter is to establish policy, procedures, and criteria on the eligibility of persons with a criminal conviction for a certificate or renewal of a certificate issued by the Texas Commission on Fire Protection (the commission) and to establish procedures for suspension, probation, revocation, or denial of a certificate held or applied for by persons with a criminal conviction pursuant to Chapter 53, Texas Occupations Code.

(b) The duties and responsibilities of persons who hold certifications issued by the commission each involve matters that directly relate to public safety, specifically to the reduction of loss of life and property from fire. Thus, conduct involving the injury to a person or the destruction of property by fire, relates directly to the fitness of the individual to be fire protection personnel. Fire protection personnel often have access to areas not generally open to the public. The public relies on the honesty, trustworthiness, and reliability of persons certified by the commission. Thus, crimes involving moral turpitude, including, but not limited to, fraud and dishonesty, are directly relevant. In addition, the ability of such persons to function unimpaired by alcohol or the illegal use of drugs, in dangerous or potentially dangerous circumstances, including, but not limited to, the operation of emergency vehicles is paramount in light of the duty to protect the health and safety of the public.

§403.3. Scope.

(a) The policy and procedures established in this chapter apply to a person who holds or applies for any certificate issued under the commission's regulatory authority contained in Government Code, Chapter 419.

(b) When a person is convicted of a crime of a sexual nature, the conviction of which would require the individual to be registered as a sex offender under Chapter 62 of the Code of Criminal Procedure; or

(c) When a person is convicted of a crime that is an offense under Title 7 of the Texas Penal Code, or a similar offense under the laws of the United States of America, another state, or other jurisdiction, the person's conduct directly relates to the competency and reliability of the person to assume and discharge the responsibilities of fire protection personnel. Such conduct includes, but is not limited to, intentional or knowing conduct, without a legal privilege, that causes or is intended to cause a fire or explosion with the intent to injure or kill any person or animal or to destroy or damage any property. The commission may:

(1) deny a person the opportunity to be examined for a certificate;

(2) deny the application for a certificate;

(3) grant the application for a new certificate with the condition that a probated suspension be placed on the newly granted certificate;

(4) refuse to renew a certificate;

(5) suspend, revoke, or probate the suspension or revocation of an existing certificate; or

(6) limit the terms or practice of a certificate holder to areas prescribed by the commission.

(d) When a person's criminal conviction of a felony or misdemeanor directly relates to the duties and responsibilities of the holder of a certificate issued by the commission, the commission may:

(1) deny a person the opportunity to be examined for a certificate;

(2) deny the application for a certificate;

(3) grant the application for a new certificate with the condition that a probated suspension be placed on the newly granted certificate;

(4) refuse to renew a certificate;

(5) suspend, revoke, or probate the suspension or revocation of an existing certificate; or

(6) limit the terms or practice of a certificate holder to areas prescribed by the commission.

§403.5. Access to Criminal History Record Information.

(a) Criminal history record. The commission is entitled to obtain criminal history record information maintained by the Department of Public Safety, or another law enforcement agency to investigate the eligibility of a person applying to the commission for or holding a certificate.

(b) Confidentiality of information. All information received under this section is confidential and may not be released to any person outside the agency except in the following instances:

(1) a court order;

(2) with written consent of the person being investigated;

(3) in a criminal proceeding; or

(4) in a hearing conducted under the authority of the commission.

(c) Early review. A fire department that employs a person regulated by the commission, a person seeking to apply for a beginning position with a regulated entity, a volunteer fire department, or an individual participating in the commission certification program may seek the early review under this chapter of the person's present fitness to be certified. Prior to completing the requirements for certification, the individual may request such a review in writing by following the required procedure. A decision by the commission based on an early review does not bind the commission if there is a change in circumstances. The following pertains to early reviews:

(1) The commission will complete its review and notify the requestor in writing concerning potential eligibility or ineligibility within 90 days following receipt of all required and necessary information for the review.

(2) A notification by the commission regarding the results of an early review is not a guarantee of certification, admission to any training program, or employment with a local government.

(3) A fee assessed by the commission for conducting an early review will be in an amount sufficient to cover the cost to conduct the review process, as provided in §437.19 of this title (relating to Early Review Fees).

(4) An early review request will be considered incomplete until the requestor submits all required and necessary information. Early review requests that remain incomplete for 90 days following receipt of the initial request will expire. If the request expires and an early review is still desired, a new request and fee must be submitted.

§403.7. Criminal Convictions Guidelines.

(a) The following crimes are considered to relate directly to the ability, capacity, and fitness required to perform the duties and discharge the responsibilities of persons certified by the commission:

(1) offenses under the Government Code, Chapter 419, relating to the Texas Commission on Fire Protection;

(2) offenses under the Texas Transportation Code Title 6 Roadways, which are punishable by fines greater than $200, or imprisonment, or both fine and imprisonment;

(3) offenses under the Health and Safety Code, Chapter 481, concerning controlled substances;

(4) offenses under the Health and Safety Code, Chapter 483, concerning dangerous drugs;

(5) offenses under the following titles of the Texas Penal Code:

(A) Title 5--offenses against the person;

(B) Title 6--offenses against the family;

(C) Title 7--offenses against property;

(D) Title 8--offenses against public administration;

(E) Title 9--offenses against public order and decency;

(F) Title 10--offenses against public health, safety, and morals;

(G) Title 11--offenses involving organized crime; and

(H) Title 4--inchoate offenses Chapter 15 preparatory offenses to any of the offenses in this section;

(6) the offenses listed in this subsection are not inclusive, in that the commission may consider other particular crimes in special cases in order to promote the intent of the statutes administered by the commission.

(b) In all cases the commission shall consider:

(1) the nature and seriousness of the crime;

(2) the relationship of the crime to the purposes for requiring the certificate issued by the commission;

(3) the extent to which the certificate might offer an opportunity to engage in further criminal activity of the same type as that in which the person previously had been involved;

(4) the relationship of the crime to the ability, capacity, or fitness required to perform the duties and discharge the responsibilities of the certificate holder;

(5) the level and nature of supervision of the person by others; and

(6) the level and nature of access to public, commercial, and residential properties, including access after regular business hours and access to areas not open to the general public.

§403.9. Mitigating Factors.

(a) In addition to the factors that must be considered under §403.7 of this title (relating to Criminal Convictions Guidelines), in determining the present fitness of a person who has been convicted of a crime, the commission shall consider the following evidence:

(1) the extent and nature of the person's past criminal activity;

(2) the age of the person at the time of the commission of the crime;

(3) the amount of time that has elapsed since the person's last criminal activity;

(4) the conduct and work activity of the person prior to and following the criminal activity;

(5) evidence of the person's rehabilitation or rehabilitative effort while incarcerated or following release; and

(6) other evidence of the person's present fitness, including letters of recommendation from:

(A) prosecution, law enforcement, and correctional officers who prosecuted, arrested, or had custodial responsibility for the person;

(B) the sheriff or chief of police in the community where the person resides; and

(C) any other persons in contact with the convicted person.

(b) It shall be the responsibility of the applicant to the extent possible to secure and provide to the commission as required the recommendations of prosecution, law enforcement, and correctional authorities as required by statute and these rules upon request by the commission staff. The applicant shall upon request also furnish:

(1) a copy of the indictment, information, or complaint;

(2) a copy of the judgement(s) or order(s) of the court adjudicating guilt, granting probation, community supervision, deferred adjudication, or discharge from probation or community supervision;

(3) a record of steady employment in the form of a letter from current or former employers;

(4) a record that the applicant has supported his or her dependents in the form of a letter from a person in the applicant's community with personal knowledge of the circumstances;

(5) evidence that the applicant has paid all outstanding court costs, supervision fees, fines, and restitution as may have been ordered in all criminal cases in which he or she has been convicted, in the form of copies of official records, documents, or a letter from the person's probation or parole officer where applicable concerning his or her current status; and

(6) a copy of the police or offense report(s).

§403.11. Procedures for Suspension, Revocation, or Denial of a Certificate to Persons with Criminal Backgrounds.

(a) If the commission proposes to suspend, revoke, limit, or deny a certificate based on the criteria in this chapter, the division shall notify the individual per Government Code, Chapter 2001. The notice of intended action shall specify the facts or conduct alleged to warrant the intended action.

(b) If the proposed action is to limit, suspend, revoke, or refuse to renew a current certificate, or deny an application for a new certificate, a written notice of intended action shall comply with the preliminary notice requirements of Government Code §2001.054(c). The individual may request, in writing, an informal conference with the commission staff in order to show compliance with all requirements of law for the retention of the certificate, pursuant to Government Code §2001.054(c). A written request for an informal staff conference must be submitted to the division director no later than 15 days after the date of the notice of intended action. If the informal staff conference does not result in an agreed consent order, a formal hearing shall be conducted in accordance with the Administrative Procedure Act, Government Code, Chapter 2001.

(c) If the individual does not request an informal staff conference or a formal hearing in writing within the time specified in this section, the individual is deemed to have waived the opportunity for a hearing, and the proposed action will be taken.

(d) If the commission limits, suspends, revokes, or denies a certificate under this chapter, a written notice shall be provided to the person that includes:

(1) the reasons for the decision;

(2) that the person may appeal the decision of the executive director to the commission in accordance with §401.63 of this title (relating to Final Decision and Orders) within 30 days from the date the decision is final and appealable;

(3) that the person, after exhausting administrative appeals, may file an action in a district court of Travis County, Texas, for judicial review of the evidence presented to the commission and its decision; and that such petition must be filed with the court no later than 30 days after the commission action is final and appealable.

§403.15. Report of Convictions by an Individual or a Department.

(a) A certificate holder must report to the commission, any conviction, other than a minor traffic offense (Class C misdemeanor) under the laws of this state, another state, the United States, or foreign country, within 14 days of the conviction date.

(b) A fire department or local government entity shall report to the commission, any conviction of a certificate holder other than a minor traffic offense (class C misdemeanor) under the laws of this state, another state, the United States, or foreign country, that it has knowledge of, within 14 days of the conviction date.

(c) A certificate holder is subject to suspension, revocation, or denial of any or all certifications for violation of the requirements of subsection (a) of this section. Each day may be considered a separate offense.

(d) A fire department or government entity regulated by the commission violating subsection (b) of this section may be subject to administrative penalties of up to $500. Each day may be considered a separate offense.

(e) Notification may be made by mail, e-mail, or in person to the Texas Commission on Fire Protection (TCFP) Austin office. TCFP Form #014 shall be used.

2. 37 Tex. Administrative Code, Part 13, Chapter 423, Fire Suppression

CHAPTER 423

FIRE SUPPRESSION

SUBCHAPTER A

MINIMUM STANDARDS FOR STRUCTURE FIRE PROTECTION PERSONNEL CERTIFICATION

§423.1. Minimum Standards for Structure Fire Protection Personnel.

(a) Fire protection personnel who are appointed to structure fire protection duties must be certified by the commission within one year from the date of their appointment.

(b) Prior to being appointed to structure fire protection duties, personnel must:

(1) complete a commission approved basic structure fire protection program;

(2) successfully pass the commission examination as required by §423.3 of this title (relating to Minimum Standards for Basic Structure Fire Protection Personnel Certification); and

(3) successfully complete a commission recognized emergency medical training program. The commission recognizes the following emergency medical training:

(A) Department of State Health Services Emergency Medical Service Personnel certification training;

(B) an American Red Cross Emergency Response course, including the optional lessons and enrichment sections;

(C) an American Safety and Health Institute First Responder course;

(D) National Registry of Emergency Medical Technicians certification; or

(E) medical training deemed equivalent by the commission.

(c) Personnel holding any level of structure fire protection personnel certification must comply with the continuing education requirements specified in Chapter 441 of this title (relating to Continuing Education).

§423.3. Minimum Standards for Basic Structure Fire Protection Personnel Certification.

(a) In order to be certified as Basic Structure Fire Protection Personnel, an individual must:

(1) possess valid documentation from the International Fire Service Accreditation Congress or the National Board on Fire Service Professional Qualifications issued by the Texas A&M Engineering Extension Service using the 2008 or later edition of the NFPA standard applicable to this discipline and meeting the requirements as specified in §439.1 of this title (relating to Requirements—General) as:

(A) Fire Fighter I, Fire Fighter II, Hazardous Materials Awareness Level Personnel; and

(B) Hazardous Materials Operations Level Responders including the Mission-Specific Competencies for Personal Protective Equipment and Product Control under the current edition; or

(C) NFPA 472 Hazardous Materials Operations prior to the 2008 edition; and

(D) meet the medical requirements outlined in §423.1 of this title (relating to Minimum Standards for Structure Fire Protection Personnel); or

(2) complete a commission approved basic structure fire protection program, meet the medical requirements outlined in §423.1(c) of this title (relating to Minimum Standards for Structure Fire Protection Personnel), and successfully pass the commission examination(s) as specified in Chapter 439 of this title (relating to Examinations for Certification). An approved basic structure fire suppression program shall consist of one or any combination of the following:

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

(B) completion of an out-of-state, and/or military training program deemed equivalent to the commission approved Basic Fire Suppression Curriculum; or

(C) documentation of the receipt of a Fire Fighter II certificate, an advanced certificate, or confirmation of training from the State **Firefighters'** [~~Firemen's~~] and Fire Marshals' Association of Texas that is deemed equivalent to a commission approved Basic Fire Suppression Curriculum.

§423.5. Minimum Standards for Intermediate Structure Fire Protection Personnel Certification.

(a) Applicants for Intermediate Structure Fire Protection Personnel certification must complete the following requirements:

(1) hold, as a prerequisite, a Basic Structure Fire Protection Personnel certification as defined in §423.3 of this title (relating to Minimum Standards for Basic Structure Fire Protection Personnel 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 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 Structure Fire Protection Personnel certification. Repeating a course or a course of similar content cannot be used towards this level of certification.

§423.7. Minimum Standards for Advanced Structure Fire Protection Personnel Certification.

(a) Applicants for Advanced Structure Fire Protection Personnel certification must complete the following requirements:

(1) hold as a prerequisite an Intermediate Structure Fire Protection Personnel certification as defined in §423.5 of this title (relating to Minimum Standards for Intermediate Structure Fire Protection Personnel 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 Structure Fire Protection Personnel certification. Repeating a course or a course of similar content cannot be used towards this level of certification.

§423.9. Minimum Standards for Master Structure Fire Protection Personnel Certification.

(a) Applicants for Master Structure Fire Protection Personnel certification must complete the following requirements:

(1) hold as a prerequisite an Advanced Structure Fire Protection Personnel certification as defined in § 423.7 of this title (relating to Minimum Standards for Advanced Structure Fire Protection Personnel Certification); and

(2) acquire a minimum of twelve 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 Structure Fire Protection Personnel Certification.

§423.11. Higher Levels of Certification.

(a) An individual may receive higher levels of certification in structure fire protection while being assigned to another discipline, provided all requirements for the higher level or levels of certification are met.

(b) Repetitive training cannot be used toward higher levels of certification.

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

(a) Individuals completing a commission approved basic structure fire protection program, meeting any other NFPA requirement, and passing the applicable commission examination(s) may be granted IFSAC seal(s) for Hazardous Materials Awareness Level Personnel, Hazardous Materials Operations Level Responders (including the Mission-Specific Competencies for Personal Protective Equipment and Product Control), Fire Fighter I, and/or Fire Fighter II by making application to the commission for the IFSAC seal(s) and paying applicable fees, provided they meet the following provisions:

(1) To receive the IFSAC Hazardous Materials Awareness Level Personnel seal, the individual must:

(A) complete the Hazardous Materials Awareness section of a commission approved course; and

(B) pass the Hazardous Materials Awareness section of a commission examination.

(2) To receive the IFSAC Hazardous Materials Operations Level Responders seal (including the Mission-Specific Competencies for Personal Protective Equipment and Product Control) the individual must:

(A) complete the Hazardous Materials Operation section of a commission approved course; and

(B) document possession of an IFSAC Hazardous Materials Awareness Level Personnel seal; and

(C) pass the Hazardous Materials Operations section of a commission examination.

(3) To receive the IFSAC Fire Fighter I seal, the individual must:

(A) complete a commission approved Fire Fighter I course; and

(B) provide medical documentation as outlined in subsection **(b)** ~~[(c)]~~ of this section; and

(C) document possession of an IFSAC Hazardous Materials Awareness Level Personnel seal; and

(D) document possession of an IFSAC Hazardous Materials Operations Level Responders seal; and

(E) pass the Fire Fighter I section of a commission examination.

(4) To receive the IFSAC Fire Fighter II seal, the individual must:

(A) complete a commission approved Fire Fighter II course; and

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

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

(b) In order to qualify for a Fire Fighter I seal, the individual must document successful completion of an emergency medical training course or program that includes those subject areas required by NFPA 1001.

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

CHAPTER 423

FIRE SUPPRESSION

SUBCHAPTER B

MINIMUM STANDARDS FOR AIRCRAFT RESCUE FIRE FIGHTING PERSONNEL

§423.201. Minimum Standards for Aircraft Rescue Fire Fighting Personnel.

(a) Aircraft rescue fire fighting personnel are employees of a local governmental entity who are appointed to aircraft rescue fire fighting duties. These duties may include fighting aircraft fires at airports, standing by for potential crash landings, and performing aircraft rescue and fire fighting duties.

(b) Personnel appointed to aircraft rescue fire fighting duties must be certified by the commission within one year from the date of their employment.

(c) Prior to being appointed to aircraft rescue fire fighting duties, all personnel must:

(1) successfully complete a commission approved basic structure fire protection program and pass the commission's examination; and

(2) successfully complete a commission approved basic aircraft rescue fire fighting program and pass the commission's examination.

(d) "Stand by" means the act of responding to a designated position in the movement area on the airfield at which initial response fire and rescue units will await the arrival of an aircraft experiencing an announced emergency.

(e) "Movement area" is comprised of all runways, taxiways, and other areas of the airport which are used for taxiing or hover taxiing, take-off, and landing of aircraft, exclusive of loading ramps and aircraft parking areas.

(f) Personnel holding any level of aircraft rescue fire fighting personnel certification shall be required to comply with the continuing education specified in Chapter 441 of this title (relating to Continuing Education).

(g) Aircraft rescue fire fighting personnel that perform structure fire protection duties must be certified, as a minimum, as basic structure fire protection personnel.

§423.203. Minimum Standards for Basic Aircraft Rescue Fire Fighting Personnel Certification.

In order to be certified as Basic Aircraft Rescue Fire Fighting Personnel an individual must:

(1) hold a Basic Structure Fire Protection Personnel certification; and

(2) possess valid documentation as an Airport Fire Fighter 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 2010 or later edition of the NFPA standard applicable to

this discipline and meeting the requirements specified in §439.1 of this title (relating to Requirements—General); or

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

(A) a commission approved Basic Aircraft Rescue Fire Suppression Curriculum as specified in the commission's Certification Curriculum Manual; or

(B) an out-of-state, and/or military training program that has been submitted to the commission for evaluation and found to be equivalent to or exceeds the commission approved Basic Aircraft Rescue Fire Suppression Curriculum.

§423.205. Minimum Standards for Intermediate Aircraft Rescue Fire Fighting Personnel Certification.

(a) Applicants for Intermediate Aircraft Rescue Fire Fighting Personnel certification must complete the following requirements:

(1) hold as a prerequisite a Basic Aircraft Rescue Fire Fighting Personnel certification as defined in §423.203 of this title (relating to Minimum Standards for Basic Aircraft Rescue Fire Fighting Personnel 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 Aircraft Rescue Fire Fighting certification. Repeating a course or a course of similar content cannot be used towards this level of certification.

§423.207. Minimum Standards for Advanced Aircraft Rescue Fire Fighting Personnel Certification.

(a) Applicants for Advanced Aircraft Rescue Fire Fighting Personnel certification must complete the following requirements:

(1) hold as a prerequisite an Intermediate Aircraft Rescue Fire Fighting Personnel certification as defined in §423.205 of this title (relating to Minimum Standards for Intermediate Aircraft Rescue Fire Fighting Personnel 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 Aircraft Rescue Fire Fighting Personnel certification. Repeating a course or a course of similar content cannot be used towards this level of certification.

§423.209. Minimum Standards for Master Aircraft Rescue Fire Fighting Personnel Certification.

(a) Applicants for Master Aircraft Rescue Fire Fighting Personnel certification must complete the following requirements:

(1) hold, as a prerequisite, an Advanced Aircraft Rescue Fire Fighting Personnel certification as defined in §423.207 of this title (relating to Minimum Standards for Advanced Aircraft Rescue Fire Fighting Personnel Certification); and

(2) acquire a minimum of twelve years of fire protection experience, and 60 college semester hours or an associate's 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 Aircraft Rescue Fire Fighting Personnel Certification.

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

Individuals completing a commission approved basic aircraft rescue fire fighting program, documenting an IFSAC seal for Fire Fighter II, and passing the applicable commission examination may be granted an IFSAC seal as an Airport Fire Fighter 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.

CHAPTER 423

FIRE SUPPRESSION

SUBCHAPTER C

MINIMUM STANDARDS FOR MARINE FIRE PROTECTION PERSONNEL

§423.301. Minimum Standards for Marine Fire Protection Personnel.

(a) Marine fire protection personnel are employees of a local governmental entity who work aboard a fire boat with a minimum pumping capacity of 2,000 gallons per minute, and fight fires that occur on or adjacent to a waterway, waterfront, channel, or turning basin.

(b) Fire protection personnel appointed to marine fire protection duties must be certified by the commission within one year from the date of their appointment.

(c) Prior to being appointed to marine fire protection duties, all personnel must:

(1) successfully complete a commission approved basic structure fire protection program and pass the commission's examination; and

(2) successfully complete a commission approved basic marine fire protection program and pass the commission's examination.

(d) Personnel holding any level of Marine Fire Protection Personnel certification shall be required to comply with the continuing education specified in Chapter 441 of this title (relating to Continuing Education).

§423.303. Minimum Standards for Basic Marine Fire Protection Personnel Certification.

In order to be certified as Basic Marine Fire Protection Personnel an individual must:

(1) hold a Basic Structure Fire Protection Personnel certification; and

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

(A) the commission approved Basic Marine Fire Protection Curriculum as specified in Chapter 3 of the commission's Certification Curriculum Manual; or

(B) An out-of-state, and/or military training program that has been submitted to the commission for evaluation and found to be equivalent to or exceed the commission approved Basic Marine Fire Protection Curriculum.

§423.305. Minimum Standards for Intermediate Marine Fire Protection Personnel Certification.

(a) Applicants for Intermediate Marine Fire Protection Personnel certification must complete the following requirements:

(1) hold, as a prerequisite, a Basic Marine Fire Protection Personnel certification as defined in §423.303 of this title (relating to Minimum Standards for Basic Marine Fire Protection Personnel 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 fire service, may not be counted towards 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 Marine Fire Protection Personnel certification. Repeating a course, or a course of similar content, cannot be used towards this level of certification.

§423.307. Minimum Standards for Advanced Marine Fire Protection Personnel Certification.

(a) Applicants for Advanced Marine Fire Protection Personnel certification must complete the following requirements:

(1) hold as a prerequisite an Intermediate Marine Fire Protection Personnel certification as defined in §423.305 of this title (relating to Minimum Standards for Intermediate Marine Fire Protection Personnel 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 towards 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 Marine Fire Protection Personnel certification. Repeating a course or a course of similar content cannot be used towards this level of certification.

§423.309. Minimum Standards for Master Marine Fire Protection Personnel Certification.

(a) Applicants for Master Marine Fire Protection Personnel certification must complete the following requirements:

(1) hold, as a prerequisite, an Advanced Marine Fire Protection Personnel certification as defined in §423.307 of this title (relating to Minimum Standards for Advanced Marine Fire Protection Personnel Certification); and

(2) acquire a minimum of twelve years of fire protection experience, 60 college semester hours or an associate's 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 Marine Fire Protection Personnel Certification.

3. 37 Tex. Administrative Code, Part 13, Chapter 425, Fire Service Instructors.

CHAPTER 425

FIRE SERVICE INSTRUCTORS

§425.1. Minimum Standards for Fire Service Instructor Certification.

(a) Training programs that are intended to satisfy the requirements for fire service instructor certification must meet the curriculum and competencies based upon NFPA 1041. All applicants for certification must meet the examination requirements of this section.

(b) Prior to being appointed to fire service instructor duties, all personnel must complete a commission approved fire service instructor program and successfully pass the commission examination pertaining to that curriculum.

(c) Personnel who receive probationary or temporary appointment to fire service instructor duties must be certified by the commission within one year from the date of appointment to such position.

(d) An out-of-state, military, or federal instructor training program may be accepted by the commission as meeting the training requirements for certification as a fire service instructor if the training has been submitted to the commission for evaluation and found to be equivalent to or to exceed the commission approved instructor course for that particular level of fire service instructor certification.

(e) An individual who holds a bachelor's degree or higher in education from a regionally accredited educational institution or a teaching certificate issued by the State Board for Educator Certification or an associate's degree with twelve semester hours of education instructional courses is considered to have training equivalent to the commission's curriculum requirements for Instructor I, II and III training.

(f) Personnel holding any level of fire service instructor certification must comply with the continuing education requirements specified in §441.21 of this title (relating to Continuing Education for Fire Service Instructor).

§425.3. Minimum Standards for Fire Service Instructor I Certification.

In order to be certified as a Fire Service Instructor I, an individual must:

(1) have a minimum of three years of experience as defined in §421.5 of this title (relating to Definitions) in fire protection in one or more or any combination of the following:

(A) a paid, volunteer, or regulated non-governmental fire department; or

(B) a department of a state agency, education institution or political subdivision providing fire protection training and related responsibilities; and

(2) possess valid documentation as a Fire Instructor I, II or III from either:

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

(B) the National Board on Fire Service Professional Qualifications issued by the Texas A&M Engineering Extension Service using the 2007 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

(3) have completed the appropriate curriculum for Fire Service Instructor I contained in Chapter 8 of the commission's Certification Curriculum Manual, or meet the equivalence as specified in

§425.1(d) or (e) of this title (relating to Minimum Standards for Fire Service Instructor Certification); and

(4) successfully pass the applicable commission examination as specified in Chapter 439 of this title (relating to Examinations for Certification).

§425.5. Minimum Standards for Fire Service Instructor II Certification.

In order to be certified as a Fire Service Instructor II, an individual must:

(1) hold as a prerequisite a Fire Instructor I certification as defined in §425.3 of this title (relating to Minimum Standards for Fire Service Instructor I Certification); and

(2) have a minimum of three years of experience as defined in §421.5 of this title (relating to Definitions) in fire protection in one or more or any combination of the following:

(A) a paid, volunteer, or regulated non-governmental fire department; or

(B) a department of a state agency, education institution or political subdivision providing fire protection training and related responsibilities; and

(3) possess valid documentation as a Fire Instructor II or III from either:

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

(B) the National Board on Fire Service Professional Qualifications issued by the Texas A&M Engineering Extension Service using the 2007 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

(4) have completed the appropriate curriculum for Fire Service Instructor II contained in Chapter 8 of the commission's Certification Curriculum Manual, or meet the equivalence as specified in §425.1(d) or (e) of this title (relating to Minimum Standards for Fire Service Instructor Certification); and

(5) successfully pass the applicable commission examination as specified in Chapter 439 of this title (relating to Examinations for Certification).

§425.7. Minimum Standards for Fire Service Instructor III Certification.

In order to be certified as a Fire Service Instructor III an individual must:

(1) hold as a prerequisite, a Fire Instructor II Certification as defined in §425.5 of this title (relating to Minimum Standards for Fire Service Instructor II Certification); and

(2) have a minimum of three years of experience (as defined in §421.5(47) of this title (relating to Definitions)) in fire protection in one or more or any combination of the following:

(A) a paid, volunteer, or regulated non-governmental fire department; or

(B) a department of a state agency, education institution or political subdivision providing fire protection training and related responsibilities; and

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

(4) have completed the appropriate curriculum for Fire Service Instructor III contained in Chapter 8 of the commission's Certification Curriculum Manual, or meet the equivalence as specified in §425.1(d) or (e) of this title (relating to Minimum Standards for Fire Service Instructor Certification); and

(5) successfully pass the applicable commission examination as specified in Chapter 439 of this title (relating to Examinations for Certification) and either:

(A) hold as a prerequisite an advanced structural fire protection personnel certification, an advanced aircraft fire protection personnel certification, advanced marine fire protection personnel certification, advanced inspector certification, advanced fire investigator, or advanced arson investigator certification; or

(B) have 60 college hours from a regionally accredited educational institution; or

(C) hold an associate's degree from a regionally accredited educational institution.

§425.9. Minimum Standards for Master Fire Service Instructor III Certification.

In order to be certified as a Master Fire Service Instructor III the individual must:

(1) hold as a prerequisite a Fire Service Instructor III certification; and

(2) be a member of a paid, volunteer, or regulated non-governmental fire department; or a department of a state agency, education institution or political subdivision providing fire protection training and related responsibilities; and

(3) hold as a prerequisite a master structural fire protection personnel certification, a master aircraft rescue fire fighting personnel certification, master marine fire protection personnel certification, master inspector certification, master fire investigator certification, or master arson investigator certification; or

(4) hold a bachelor’s degree or higher in education from a regionally accredited educational institution or a teaching certificate issued by the Texas State Board of Education.

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

(a) Individuals completing a commission approved Fire Service Instructor I training program and passing the applicable state examination may be granted an IFSAC seal for Instructor I by making application to the commission and paying the applicable fee.

(b) Individuals holding an IFSAC Instructor I seal, completing a commission approved Fire Service Instructor II training program, and passing the applicable state examination may be granted an IFSAC seal for Instructor II by making application to the commission and paying the applicable fee.

(c) Individuals holding an IFSAC Instructor II seal, completing a commission approved Fire Service Instructor III training program, and passing the applicable state examination may be granted an IFSAC seal for Instructor III by making application to the commission and paying the applicable fee.

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

4. 37 Tex. Administrative Code, Part 13, Chapter 439 Examinations For Certification

CHAPTER 439

EXAMINATIONS FOR CERTIFICATION

SUBCHAPTER A

EXAMINATIONS FOR ON-SITE DELIVERY TRAINING

§439.1. Requirements—General.

(a) The administration of examinations for certification, including performance skill evaluations, shall be conducted in compliance with commission rules and; as applicable, with:

(1) International Fire Service Accreditation Congress (IFSAC) regulations; or

(2) National Board on Fire Service Professional Qualifications (Pro Board) regulations for examinations administered by the Texas A&M Engineering Extension Service. Only Pro Board examinations administered by the Texas A&M Engineering Extension Service will be accepted by the commission for certification. In order for a Pro Board document to be accepted for certification, it must:

(A) List the commission issued course approval number for which the examination was conducted;

(B) Indicate that the examination was conducted in English; and

(C) List any special accommodations provided to the examinee. The commission may not issue a certificate for an examination conducted under special accommodations other than those specified in §439.13 of this title (relating to Special Accommodations for Testing).

(b) It is incumbent upon commission staff, committee members, training officers and field examiners to maintain the integrity of the state certification examination process (or portion thereof) for which they are responsible.

(c) The commission shall reserve the authority to conduct an annual review of Pro Board examinations, procedures, test banks, and facilities utilized by the Texas A&M Engineering Extension Service. The commission may also conduct a review at any time for cause and as deemed necessary to ensure the integrity of the certification examination process.

(d) Exams will be based on the job performance requirements and knowledge and skill components of the applicable NFPA standard for that discipline[,] if a standard exists and has been adopted by the commission. If a standard does not exist or has not been adopted by the commission, the exam will be based on curricula as currently adopted in the commission's Certification Curriculum Manual.

(e) Commission examinations that receive a passing grade shall expire two years from the date of the examination.

(f) An examination for Basic Structure Fire Protection shall consist of four sections: Fire Fighter I, Fire Fighter II, Hazardous Materials Awareness Level, and Hazardous Materials Operations Level including the Mission-Specific Competencies for Personal Protective Equipment and Product Control. The examinee must pass each section of the examination with a minimum score of 70% in order to qualify for certification.

(g) An examination for Basic Fire Inspector shall consist of two sections: Inspector I, and Inspector II. The examinee must pass each section of the examination with a minimum score of 70% in order to qualify for certification.

(h) An examination for Basic Structure Fire Protection and Intermediate Wildland Fire Protection shall consist of five sections: Fire Fighter I, Fire Fighter II, First Responder Awareness, First Responder Operations, and Intermediate Wildland Fire Protection. The examinee must pass each section of the examination with a minimum score of 70% in order to qualify for certification.

(i) All other state examinations consist of only one section.

(j) The individual who fails to pass a commission examination for state certification will be given one additional opportunity to pass the examination or section(s) thereof. This opportunity must be exercised within 180 days after the date of the first failure. An examinee who fails to pass the examination within the required time may not sit for the same examination again until the examinee has re-qualified by repeating the curriculum applicable to that examination.

(k) An individual may obtain a new certificate in a discipline which was previously held by passing a commission proficiency examination.

(l) If an individual who has never held certification in a discipline defined in §421.5 of this title (relating to Definitions), seeks certification in that discipline, the individual shall complete all certification requirements.

(m) If an individual completes a commission approved training program, or a program that has been evaluated and deemed equivalent to a certification curriculum approved by the commission, such as an out-of-state or military training program or a training program administered by the State Firemen's and Fire Marshals' Association of Texas, the individual may use only one of the following examination processes for certification:

(1) pass a commission examination; or

(2) submit documentation of the successful completion of the Pro Board examination process administered by the Texas A&M Engineering Extension Service; and

(3) meet any other certification requirements in order to become eligible for certification as fire protection personnel.

(4) An individual cannot use a combination of the two examination processes in this subsection from a single commission approved class for certification. An individual who chooses to submit to the commission examination process may not utilize the other process toward certification.

(n) An individual or entity may petition the commission for a waiver of the examination required by this section if the person's certificate expired because of the individual's or employing entity's good faith clerical error or expired as a result of termination of the person's employment where the person has been restored to employment through a disciplinary procedure or a court action. All required renewal fees including applicable late fees, and all required continuing education must be submitted before the waiver request may be considered.

(1) Applicants claiming good faith clerical error must submit a sworn statement together with any supporting documentation that evidences the applicant's good faith efforts to comply with commission renewal requirements and that failure to comply was due to circumstances beyond the control of the applicant.

(2) Applicants claiming restoration to employment as a result of a disciplinary or court action must submit a certified copy of the order, ruling or agreement restoring the applicant to employment.

§439.3. Definitions.

The following words and terms, when used in this chapter, have the following definitions unless the context clearly indicates otherwise.

(1) Certificate of Completion--A statement by the provider of training certifying that an individual has successfully completed a commission-approved certification curriculum or phase program for a particular discipline, including having been evaluated by field examiners on performance skills identified by the commission. The certificate of completion qualifies an individual to take an original certification examination. The certificate expires two years from the date of completion. If an individual does not take the certification examination prior to the expiration of the certificate of completion, he or she must again complete the curriculum in order to obtain a new certificate of completion.

(2) Curriculum--The competencies established by the commission as a minimum requirement for certification in a particular discipline.

(3) Designee--An entity or individual approved by commission staff to administer commission certification examinations and/or performance skills in accordance with this chapter.

(4) Eligibility--A determination of whether or not an individual has met the requirements set by the commission and would therefore be allowed to take a commission examination.

(5) Endorsement of eligibility--A statement testifying to the fact that an individual has met all requirements specified by the commission and is qualified to take a commission examination. An endorsement of eligibility will be issued by a member of the commission staff.

(6) Examination--A state test which an examinee must pass as one of the requirements for certification.

(7) Examinee--An individual who has met the commission requirements and therefore qualifies to take the commission examination.

(8) Field examiner--An individual authorized to evaluate performance skills in commission approved curricula. The field examiner must possess a Fire Instructor Certification or other instructor qualification as allowed by §427.307(h) and (i) of this title (relating to On-Site and Distance Training Provider Staff Requirements) for Wildland courses only, complete the on-line commission field examiner course, and sign an agreement to comply with the commission's testing procedures. The field examiner must be approved by the commission to instruct all subject areas identified in the curriculum that he or she will be evaluating. The field examiner must repeat the examiner course every two years and submit a new Letter of Intent.

(9) Lead Examiner--A member of the commission staff or a designee who has been assigned by the commission to administer a commission examination.

(10) Letter of Intent--A statement, signed by an individual applying to the commission for field examiner status, that he or she is familiar with the commission's examination procedures, and agrees to abide by the policies and guidelines as set out in Chapter 439 of this title (relating to Examinations for Certification).

(11) Sectional examination—A test that covers one section of a multiple section examination.

§439.5. Procedures.

(a) Procedures for conducting examinations are determined by the commission.

(b) All application processing fees due to the commission must be paid in a timely manner. Late payments shall be assessed a late fee in accordance with §437.13 of this title (relating to Processing Fees for Test Application).

(c) Each examination must be administered by a lead examiner.

(d) The lead examiner must:

(1) ensure that the tests remain secure, and that the examination is conducted under conditions warranting honest results;

(2) monitor the examination while in progress;

(3) control entrance to and exit from the test site;

(4) assign or re-assign seating; and

(5) bar admission to or dismiss any examinee who fails to comply with any of the applicable provisions of this chapter.

(e) All official grading and notification must come from the commission or its designee. The preliminary test results shall be made available within seven (7) business days after completion of the examination.

§439.7. Eligibility.

(a) An examination may not be taken by an individual who currently holds an active certificate from the commission in the discipline to which the examination pertains, unless required by the commission in a disciplinary matter, or test scores have expired, and the individual is testing for IFSAC seals.

(b) An individual who passes an examination and is not certified in that discipline, will not be allowed to test again if the original examination grade is still active, unless required by the commission in a disciplinary matter.

(c) In order to qualify for a commission examination, the examinee must:

(1) meet or exceed the minimum requirements set by the commission as a prerequisite for the specified examination;

(2) submit a test application, meet any other prerequisite requirements, and submit the appropriate application processing fee(s);

(3) receive from the commission an "Endorsement of Eligibility" letter and provide this letter to the lead examiner;

(4) bring to the test site, and display upon request, a current and valid government issued identification which contains the name and photograph of the examinee;

(5) report on time to the proper location; and

(6) comply with all the written and verbal instructions of the lead examiner.

(d) No examinee shall be permitted to:

(1) violate any of the fraud provisions of this section;

(2) disrupt the examination;

(3) bring into the examination site any books, notes, or other written materials related to the content of the examination;

(4) refer to, use, or possess any such written material at the examination site;

(5) give or receive answers or communicate in any manner with another examinee during the examination;

(6) communicate at any time or in any way, the contents of an examination to another person for the purpose of assisting or preparing a person to take the examination;

(7) steal, copy, or reproduce any part of the examination;

(8) engage in any deceptive or fraudulent act either during an examination or to gain admission to it;

(9) solicit, encourage, direct, assist, or aid another person to violate any provision of this section; or

(10) bring into the examination site any electronic devices.

(e) No person shall be permitted to sit for any commission examination who has an outstanding debt owed to the commission.

§439.9. Grading.

(a) If performance skills are required as a part of the examination, the examinee must demonstrate performance skill objectives in a manner consistent with performance skill evaluation forms provided by the Commission. The evaluation format for a particular performance skill will determine the requirements for passage of the skill. Each performance skill evaluation form will require successful completion of one of the following formats:

(1) all mandatory tasks; or

(2) an accumulation of points to obtain a passing score as indicated on the skill sheet; or

(3) a combination of both paragraphs (1) and (2) of this subsection.

(b) The minimum passing score on each written examination or section thereof shall be 70%. This means that 70% of the total possible active questions must be answered correctly. The commission may, at its discretion, invalidate any question.

(c) If the commission invalidates an examination score for any reason, it may also, at the discretion of the commission, require a retest to obtain a substitute valid test score.

§439.11. Commission-Designated Performance Skill Evaluations.

(a) The commission-designated performance evaluations are randomly selected from each subject area within the applicable curriculum containing actual skill evaluations. This applies only for curricula in which performance standards have been developed.

(b) The training provider shall test the commission designated performance skills for competency. The skill evaluations may only take place after all training on the identified subject area has been completed. The date(s), time(s) and location(s) for the commission designated skill evaluations must be submitted on the commission designated skill schedule contained within the Training Prior Approval system. The commission must be notified immediately of any deviation from the submitted commission designated skill schedule. All skills must be evaluated by a commission approved field examiner. The individual who served as the instructor of a particular subject may not evaluate the performance skill for the subject.

(c) In order to qualify for the commission certification examination, the student must successfully complete and pass all designated skill evaluations. The student may be allowed two attempts to complete each skill. A second failure during the evaluation process will require remedial training in

the failed skill area with a certified instructor before being allowed a third attempt. A third failure shall require that the student repeat the entire certification curriculum.

(d) If performance skill evaluations are not conducted for a student during the course of instruction, they must be conducted within ninety days (90) following the end date of the course. In a case such as this the training provider must also obtain a new set of commission designated skills for which to evaluate the student; the provider may not use the same set of skills provided during the original course of instruction. If performance skill evaluations are not conducted within the ninety day (90) period, the student must repeat the course. The ninety (90) day period may be extended for students who were unable to complete their performance skill evaluations due to injury, illness, military commitment, or other situation beyond their control.

(e) The training facility must maintain records (electronic or paper) of skills testing on each examinee. Test results must be recorded and saved on the applicable performance skill sheets provided in the commission Curriculum Skills Manual[,] and must include all information called for on the skill sheet.

(f) For certification disciplines in which an IDLH environment may exist, all skill testing participants shall have available for use NFPA compliant PPE and SCBA as defined in §435.1 of this title (relating to Protective Clothing) and §435.3 of this title (relating to Self-Contained Breathing Apparatus).

§439.13. Special Accommodations for Testing.

(a) Special accommodation testing is for those individuals that have a documented disability which may hamper their success on a Texas Commission on Fire Protection written examination. Some accommodations that can be allowed are:

(1) A testing room to oneself (examinee is allowed to read the questions out loud to him or herself). To accommodate the request the examinee will have to test in the Commission's Austin headquarters location or any location deemed appropriate by the Commission.

(2) The test to be split in two with up to an hour break in between (no access to the first half of the examination will be allowed during or after the break). To accommodate the request the examinee will have to test in the commission's Austin headquarters location or any location deemed appropriate by the Commission.

(3) The questions to be printed in a larger font (approximately 7% larger).

(4) The test to be copied on off-white paper (i.e., cream colored).

(5) The use of highlighters or a highlighter sheet.

(6) Any requests that changes the condition of the examination or the examination process.

(b) If the applicant is seeking a special accommodation test, the applicant must submit written documentation of the disability and a written statement as to which of the allowable accommodations is being requested. The applicant may ask for accommodations not listed above. The request will be reviewed, and the applicant will receive a written response regarding the Commission's position on the request.

§439.19. Number of Test Questions.

(a) Each examination may have two types of questions: pilot and active. Pilot questions are new questions placed on the examination for statistical purposes only. These questions do not count against an examinee if answered incorrectly. The maximum possible number of pilot questions will be 10% of the number of exam questions, rounded up.

(b) The number of questions on an examination, sectional examination, or retest will be based upon the specific examination, or number of recommended hours for a particular curriculum or section as shown in the table below. Any pilot questions added to an examination, sectional examination, or retest will be in addition to the number of exam questions.

Figure: 37 TAC §439.19(b)

Examination	Section	Number of Exam Questions	Maximum Possible Number of Pilot Questions	Time Allowed
Basic Structure FP	Hazardous Materials Awareness	25		
	Hazardous Materials Operations	25		
	Firefighter I	100		
	Firefighter II	75		
	TOTAL	225	25	4.5 Hours
Basic Fire Inspector	Inspector I	50		
	Inspector II	50		
	TOTAL	100	15	2.0 Hours
Basic Structure FP/ Intermediate Wildland FP	Hazardous Materials Awareness	25		
	Hazardous Materials Operations	25		
	Firefighter I	100		
	Firefighter II	75		
	Intermediate Wildland FP	25		
	TOTAL	250	25	5.0 Hours
FOR ALL OTHER EXAMINATIONS, SECTIONAL EXAMINATIONS, AND RETESTS				
	Recommended Hours	Number of Exam Questions	Maximum Possible Number of Pilot Questions	Time Allowed
IF THE RECOMMENDED HOURS FOR THE CURRICULUM OR SECTION IS:	Less than 30	25	3	30 Minutes
	31 to 100	50	5	1.0 Hour
	101 to 200	75	8	1.5 Hours
	201 to 300	100	10	2.0 Hours
	301 to 400	125	13	2.5 Hours
	401 or More	150	15	3.0 Hours

CHAPTER 439

EXAMINATIONS FOR CERTIFICATION

SUBCHAPTER B

EXAMINATIONS FOR DISTANCE TRAINING

§439.201. Requirements—General.

The examination requirements for those completing distance training shall be the same as those in Subchapter A of this chapter, except as noted in this subchapter.

§439.205. Performance Skill Evaluation.

If the performance skill portion of a state exam is to be evaluated by an approved field examiner who will not observe the completion of the skill while in the immediate physical presence of the examinee, a letter of assurance from the candidate's training officer or fire chief is required stating that the fire department assures the integrity of the evaluation procedure. If the candidate is not a member of a fire department, then a certified fire instructor, fire chief, or training officer may provide a letter of assurance that meets the requirements of this section. The provider of distance training is required to keep a record of this assurance and provide it to the commission upon request.

10. Subjects for future agenda items.

11. Future meeting dates.

12. Adjourn meeting.