OSHA Standards Applicable to U.S. Fire Investigators and Others Who Work at Post-fire Scenes

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The first edition of this paper was published in September 2021. This edition clarifies some of the earlier material and adds related or additional information.

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The text highlighted in red is for added emphasis.

Introduction

In the U.S., the Department of Labor's Occupational Safety and Health Administration (OSHA) standards apply to most private-sector employers and workers, as well as many federal employees (some federal agencies have their own occupational health and safety standards). However, it does not cover many state and local government workers. All states have the option to participate in the federal Occupational Safety & Health Administration (OSHA) program, implement a separate state program that addresses workplace safety (known as a State Plan), or run a hybrid program of the two (Hybrid Federal-State Plan). Currently, twenty-three states and territories have these state plan programs (see https://www.osha.gov/stateplans for additional information). Seven other states and the US Virgin Islands have OSHA-approved hybrid programs specifically for state and local government workers; the federal regulations cover most other workers. This can result in different standards for different workers. See **Appendix A** for the current list of these plans by state. Additionally, some states may have other occupational safety and health plans or regulations that may or may not include state and local government workers. Every employer and worker needs to be aware of the local, state, and federal occupational standards that apply to them.

Every effort has been made here to list the OSHA standards applicable to fire investigators and others working in the post-fire environment, primarily based on a detailed examination of Part 1910 and related sections of the OSHA standards, and the reporting requirements in Part 104. As a strong proponent of wearing adequate and appropriate PPE at most fire scenes, I view these standards as minimum requirements. There are times when higher levels of protection are necessary. As a profession, fire investigators are inconsistent in their awareness of the health hazards associated with the post-fire environment. Awareness of and compliance with these standards are necessary first steps in improving fire investigator health and safety. When we know better, we need to do better. This also applies to many others who work in the post-fire environment.

This paper summarizes many of the OSHA standards, also referred to as regulations, that apply to fire investigators and most others working in the post-fire environment, along with the author's opinion on their applicability to this area of work. This material is presented for informational purposes only and does not represent the full content of the referenced standards. Readers should review the complete text of the standards identified herein on the OSHA website to understand their requirements fully. Other standards not listed here could apply in some situations.

The Occupational Safety and Health Act of 1970 (OSH Act), which established the Occupational Safety and Health Administration, requires OSHA to promulgate safety standards. These standards are statutory. OSHA's mission is to ensure that employees work in a safe and healthful environment by setting and enforcing standards and providing training, outreach, education, and assistance. The OSHA standards are codified in the U.S. Code of Federal Regulations (CFR).

Covered employers and employees must comply with all applicable OSHA standards. They are enforceable, and violations can result in fines or other penalties. When discussing OSHA standards, the terms "standard" and "regulation" are often used interchangeably. According to the OSHA website, "a standard (or regulation) is a regulatory requirement established and published by the agency to serve as criteria for measuring whether employers are following the OSH Act laws." OSHA standards are published in Title 29 of the Code and are divided into four parts: general industry, construction, agriculture, and maritime standards. The General Industry standard, Section 1910, covers persons working at post-fire scenes.

Many of the OSHA standards include the term "shall." OSHA clearly defines this term as meaning mandatory; in other words, the standard or regulation must be followed exactly as written. When used in a standard referenced here, the word is highlighted in **bold**.

Some OSHA standards incorporate the standards of other agencies and entities by reference. Section 1910.6(a)(1)(i) says that "[T]he standards of agencies of the U.S. Government, and organizations which are not agencies of the U.S. Government which are incorporated by reference in this part, have the same force and effect as other standards in this part. Only the mandatory provisions (i.e., provisions containing the word "shall" or other mandatory language) of standards incorporated by reference are adopted as standards under the Occupational Safety and Health Act." 1910.6 goes on to list many referenced documents. The NFPA documents are found at 1910.6(x) and do not include 921, 1033, 1321, or 1550.

If you are employed by a fire brigade, which is defined in 1910.15(c)(18) as an industrial fire department or a private or contractual fire department, you should familiarize yourself with 1910.156, as it has some specific requirements and exemptions.

OSHA has proposed major changes to the Fire Brigade standard (29 CFR 1910.156), which would be renamed Emergency Response and would incorporate many NFPA standards, but not NFPA 921 or 1033. Currently, the final implementation date, language, and their impact are unknown.

Occupational safety and health regulators are responsible for ensuring workers' health and safety nationwide. When workplace safety dangers need to be addressed, they are the ones to take a closer look. There will almost certainly be an OSHA (or the equivalent state/local agency) investigation whenever there is a worker fatality or severe injury. They can and will issue civil fines for failure to comply with these standards. Additionally, severe cases may be referred for prosecution. There is a common misbelief that government agencies cannot be fined. However, while uncommon, it has happened.

It is worth noting that anyone can file a complaint with OSHA or the state or local equivalent. This could be someone attending a joint/multi-party scene exam with you, a nosy neighbor, or an employee or coworker. There does not have to be an injury or similar incident for an inspection or investigation to occur. Employers are prohibited from retaliating against an employee who files an OSHA complaint. The best way to prevent an inquiry is to comply with the standards.

Since federal OSHA standards apply to most U.S. workers, this paper summarizes the relevant standards that affect most workers at post-fire scenes. It is essential to understand that not every situation is covered by the OSHA standards, and some subjects that should be addressed are not. However, there is a catch-all standard that addresses this! Where no specific OSHA standard applies to a particular hazard, the General Duty Clause (OSH Act, Section 5) requires a workplace "free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees." This means that it is each fire investigator's responsibility to survey every post-fire scene regarding actual and potential hazards, assess the risk associated with any identified

hazards, take any necessary remedial actions to make the scene as safe as possible, and correctly use all required protective equipment and practices. This is the site safety assessment.

Many of the standards referenced here have a training component. **Appendix B** is a matrix of the training requirements. OSHA document 2254-09R 2015 Training Requirements in OSHA Standards provides thorough coverage of this subject.

Some of the standards also require a written program. See the Written Program Requirements section for further information.

As fire investigators or others working in the post-fire environment, we face the challenge that OSHA standards are designed for the traditional workplace, with readily identifiable hazards, rather than the vagaries and uniqueness of the post-fire environment. However, the standards still apply, so we must do our best to fit them into our work environment and comply with them. The key to doing this is understanding the regulations, having training that addresses them, and keeping good records.

Small Businesses

Certain small businesses may be exempt from some OSHA regulations based on size, business type, industry, and location. Companies that employed ten or fewer persons during the previous calendar year do not need to keep OSHA injury and illness records unless OSHA or the Bureau of Labor Statistics informs them in writing that they must keep records under §1904.41 or §1904.42. However, as required by §1904.39, all employers covered by the OSH Act must report to OSHA any work-related incident that results in a fatality, the inpatient hospitalization of one or more employees, an employee amputation, or an employee loss of an eye. And while small businesses may be less likely to incur fines, they are not exempt from being fined!

As noted above, some states have limited or nonapplicable OSHA regulations; however, state occupational safety regulations may still apply in these areas. Additionally, if you are self-employed, the OSHA regulations do not apply to you. However, safe work practices should always be followed.

Other than these exemptions, OSHA regulations apply to all U.S. small-business employers and workers.

Penalties

The OSH Act of 1970, Section 17, addresses the penalties for employers and employees who willfully violate OSHA regulations, which can be significant. The most relevant are listed below, but there are others.

(a) Any employer who willfully or repeatedly violates the requirements of section 5[1] of this Act, any standard, rule, or order promulgated pursuant to section 6[2] of this Act, or regulations prescribed pursuant to this Act, may be assessed a civil penalty of not more than $70,000 for each violation, but not less than $5,000 for each willful violation.

[1] Section 5 is the general duty clause.
[2] Section 6 establishes the development and issuance of the specific OSHA regulations.

(b) Any employer who has received a citation for a serious violation of the requirements of section 5 of this Act, of any standard, rule, or order promulgated pursuant to section 6 of this Act, or of any regulations prescribed pursuant to this Act, shall be assessed a civil penalty of up to $7,000 for each such violation.

(c) Any employer who has received a citation for a violation of the requirements of section 5 of this Act, of any standard, rule, or order promulgated pursuant to section 6 of this Act, or of regulations prescribed pursuant to this Act, and such violation is specifically determined not to be of a serious nature, may be assessed a civil penalty of up to $7,000 for each violation.

(d) Any employer who fails to correct a violation for which a citation has been issued under section 9(a) within the period permitted for its correction (which period shall not begin to run until the date of the final order of the Commission in the case of any review proceeding under section 10 initiated by the employer in good faith and not solely for delay or avoidance of penalties), may be assessed a civil penalty of not more than $7,000 for each day during which such failure or violation continues.

(e) Any employer who willfully violates any standard, rule, or order promulgated pursuant to section 6 of this Act, or of any regulations prescribed pursuant to this Act, and that violation caused death to any employee, shall, upon conviction, be punished by a fine of not more than $10,000 or by imprisonment for not more than six months, or by both; except that if the conviction is for a violation committed after a first conviction of such person, punishment shall be by a fine of not more than $20,000 or by imprisonment for not more than one year, or by both.

(f) Any person who gives advance notice of any inspection to be conducted under this Act, without authority from the Secretary or his designees, shall, upon conviction, be punished by a fine of not more than $1,000 or by imprisonment for not more than six months, or by both.

(g) Whoever knowingly makes any false statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained pursuant to this Act shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than six months, or by both.

Employer Responsibilities

Among other requirements, all covered employers must:

- Show reasonable diligence in complying with the standards.
- Provide a workplace free from serious recognized hazards and comply with standards, rules, and regulations issued under the OSH Act.
- Examine workplace conditions to make sure they conform to applicable OSHA standards.
- Ensure employees have access to and use safe tools and equipment, and maintain this equipment properly.
- Establish or update operating procedures and communicate them so that employees follow safety and health requirements, and
- Provide medical examinations and training when required.

For a complete list, see https://www.osha.gov/workers/employer-responsibilities

Employers of specific North American Industry Classification System (NAICS) categories are not required to keep OSHA injury and illness records unless they are asked in writing to do so by OSHA,

the Bureau of Labor Statistics (BLS), or a state agency operating under the authority of OSHA or the BLS. This includes NAICS category 5616 Investigation and Security Services. All employers, including those partially exempted by reason of company size or industry classification, must report to OSHA any workplace incident that results in a fatality, inpatient hospitalization, amputation, or loss of an eye (see 20 CFR 1904.39).

OSHA Reporting

Employers are required to report serious injuries and fatalities (SIF) in a timely manner to either federal OSHA or their state OSHA organization, if applicable. All employers under OSHA jurisdiction must report these incidents to OSHA, even employers who are exempt from routinely keeping OSHA records due to company size or industry. For temporary workers, the employer that provides the day-to-day supervision of the worker must report to OSHA any work-related reportable incident. Additionally, if a fatality occurs within 30 days of the work-related incident, or if an inpatient hospitalization, amputation, or loss of an eye occurs within 24 hours of the work-related incident, then you must report the event to OSHA. This report is in addition to the illness and injury reporting that is addressed in 29 CFR 1904.31.

Several states administer job safety laws that cover only state and local government workers that are not federally approved. Some states have Right-to-Know laws that require employers to provide information and training to state and local government workers about hazardous chemicals used on the job.

OSHA compliance for Serious Injury and Fatality events requires strict adherence to mandatory federal reporting timeframes. Employers must report work-related fatalities within 8 hours and inpatient hospitalizations, amputations, or eye loss within 24 hours. This can be done by calling your nearest OSHA office, calling the OSHA 24-hour hotline at 1-800-321-6742 (OSHA), or completing an online report at https://www.osha.gov/form/ser. Be ready to provide the business name; the names of employees affected; the location and time of the incident; a brief description of the incident; and a contact person and phone number.[3]

Illness and injury records must be maintained for 5 years previous to the current year and must be available in the establishment for inspection. Under OSHA, only employers with more than 10 employees are required to maintain these records, but there are some exemptions. All public employers are required to maintain the forms, regardless of the number of employees, and Form 300A must be submitted every year. Employers are strongly encouraged to read 29 CFR Part 1904 for specific reporting information and requirements.

Employee Responsibilities

Employees also have responsibilities under the OSH Act. “Each employee **shall** comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which apply to his own actions and conduct.” (OSH Act, Section 5, Duties)

Emergency Action Plans

An employer must have an emergency action plan whenever an OSHA standard in Part 1910 requires one (see 29 CFR 1910.38 (a)). The only 1910 standard that addresses an emergency action

[3] https://www.osha.gov/report

plan is 1910.157, Portable Fire Extinguishers, which covers exemptions that don't really apply to fire investigations.

That said, large or complex post-fire investigations may be best served by having a written emergency action plan. If there is a plan, the employer must designate and train employees to assist in a safe and orderly evacuation of other employees.

Personal Protective Equipment

Wearing adequate and appropriate personal protective equipment (PPE) is an integral part of minimizing exposure to post-fire health hazards. The most important OSHA standards for everyone working at a post-fire scene are those on PPE, which are found in Subpart I (29 CFR 1910.132 - .138). These standards cover the respiratory protection requirements and protection for the head, hands, feet, and eyes, as well as hearing protection. Appendix B of 29 CFR 1910.132 provides compliance assistance for employers and employees in implementing the requirements for hazard assessment and the selection of personal protective equipment. The current edition of the International Association of Arson Investigators' (IAAI) Fire Investigator Health and Safety Best Practices also provides excellent guidance on PPE assessment and selection.

Proper PPE for most post-fire scenes

The introductory language in 29 CFR 1910.132(a) provides general guidance for fire investigators and their employers. "Protective equipment, including personal protective equipment for eyes, face, head, and extremities, protective clothing, respiratory devices, and protective shields and barriers, **shall** be provided, used, and maintained in a sanitary and reliable condition wherever it is necessary by reason of hazards of processes or environment, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation or physical contact." Gas and particulate hazards that can be inhaled or absorbed and cause injury or impairment are present at almost all post-fire scenes; therefore, fire investigators must be provided with and use PPE.

This section goes on to say that "the employer **shall** assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of personal protective equipment (PPE). If such hazards are present or will likely be present (based on several recent research projects, they ARE likely to be present in the post-fire environment), "the employer **shall** . . . select and have each affected employee use the types of PPE that will protect the affected employee from the hazards identified, communicate the decisions to each affected employee and select PPE that properly fits each affected employee" (29 CFR 1910.132(d)(1)).

Additionally, "[t]he employer **shall** verify that the required workplace hazard assessment has been performed through a written certification that identifies the workplace evaluated; the person certifying that the evaluation has been performed; the date(s) of the hazard assessment; and, which identifies the document as a certification of hazard assessment." (29 CFR 1910.132(d)(2))

I don't foresee employers doing this for each worksite, as that would be very labor-intensive. However, a blanket policy statement on the health hazards at post-fire scenes that would require

PPE use would likely be acceptable.

Training

The training component in the general PPE requirement standard requires the employer to provide training to each employee who is required to use this PPE that, at a minimum, covers when the PPE is necessary, what PPE is necessary, how to don, doff, adjust, and wear PPE properly; the limitations of the PPE; and the proper care, maintenance, useful life, and disposal of the PPE. Each employee must demonstrate an understanding of the training and their ability to use PPE properly before being allowed to perform work requiring the use of PPE (29 CFR 1910.132(f)(1) and (f)(2). There are retraining requirements under certain circumstances, but there is no annual retraining requirement for every employee.

Respiratory Protection

The most extensive standard in the PPE subpart is the respiratory protection standard (29 CFR 1910.134). My copy of this standard, in 12-point font, is 27 pages long, not including the related appendices.

NOTE: Unlike some of the other OSHA regulations, ALL of the 1910.134 appendices are mandatory.

Because of the amount of information on this subject, OSHA has prepared an overview document titled MAJOR REQUIREMENTS OF OSHA'S RESPIRATORY PROTECTION STANDARD 29 CFR 1910.134. I highly recommend that each employer and employee download and review this document and consult OSHA's Respiratory Protection webpage.[4] The following summarizes this information.

OSHA requires employers to evaluate workplace respiratory hazards, identify relevant workplace and user factors, and base respirator selection on these factors. Then, they must provide employees with respirators that are "applicable and suitable" for the purpose intended, when such equipment is necessary to protect the health of the employee (29 CFR 1910.134(a)(2)). Several recent fire investigator-focused research studies, including those by Horn, Madrzykowski, Neumann, Mayer, and Fent (2021), have documented hazardous levels of certain gases in the post-fire environment for as long as three days after extinguishment and particulates until the scene has been thoroughly cleaned or no longer exists. This means that respiratory protection equipment is necessary for almost every post-fire scene exam.

The employer must establish and implement a written respiratory protection program with worksite-specific procedures when this protection is needed. The program must be administered by a suitably trained program administrator who "is qualified by appropriate training or experience that is commensurate with the complexity of the program to administer or oversee the respiratory protection program and conduct the required evaluations of program effectiveness." There must also be a "competent decision-maker."[5] involved in PPE selection. The employer must conduct workplace evaluations as necessary to ensure proper implementation of the program, consult with

[4] See https://www.osha.gov/respiratoryprotection/standards

[5] OSHA more recently uses the term competent person. They define this as "[o]ne who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them." A competent person needs both knowledge and authority.

employees to ensure its appropriate use, and retain a written copy of the current program.

Pursuant to NFPA 1550 Section 9.11.9, "Respiratory protection for any entry into the post-fire environment before or after overhaul shall be at least a NIOSH-certified self-contained breathing apparatus for at least the first 2 hours post-extinguishment." This usage requires compliance with 29 CFR 1910.134, as discussed here, including, but not limited to, initial and annual refresher training.

NOTE: I have a free model respiratory protection program document that includes all of the required sections available upon request.

For workers in a non-IDLH atmosphere where gases and particulates are present (which is almost every post-fire scene), the standard lists multiple respirator requirements, but the employer must select a NIOSH-certified respirator. If employers follow the minimum respiratory protection guidelines listed in Appendix B of the current edition of the IAAI's Fire Investigator Health and Safety Best Practices, these requirements will be met. In addition, the standard specifically notes that anything less than an N-100, R-100, or P-100.[6] filter with a half- or full-facepiece air-purifying respirator (APR) or a powered air-purifying respirator (PAPR) is not an acceptable level of respiratory protection against particulates. Therefore, the only filter fire investigators should use is a P100. See 29 CFR 1910.134(d)(3)(iv) and 29 CFR 1910.134(d)(3)(iv)(B). A magenta color identifies these filters. You must then add a gas cartridge. For fire investigators, especially public investigators, this cartridge should, at a minimum, protect against oily vapors (OV), acid gases (AG), and formaldehyde (FM). These cartridges have an olive-colored identifier. Because we know that hazardous levels of formaldehyde dissipate after about three days, private fire investigators at the scene after this time could use a gas filter without formaldehyde protection (yellow color). These identifying colors are a NIOSH standard.

Medical Examination

The employer must provide a medical evaluation to determine the employee's physical ability to use a respirator before any fit test and respirator use. This evaluation must be done by a physician or other licensed healthcare professional (PLHCP) using the OSHA medical questionnaire or an initial medical examination that obtains the same information as the medical questionnaire. The approved questionnaire is included in Appendix C of 29 CFR 1910.134. In addition, the PLHCP must provide a written recommendation regarding the employee's ability to use the respirator. Although an annual review of employees' medical status is not required, additional medical evaluations may be necessary. Refer to the standard for additional information and record retention requirements.

Fit Testing

Every employee who uses a facepiece necessary for working in the post-fire environment must pass a qualitative or quantitative fit test before initial use, whenever a different facepiece is used,

[6] N means not oil-resistant, R means mostly oil-resistant, and P means highly oil-resistant. If oil particles (e.g., lubricants, solvents, glycerin, etc.) are present, and they likely are in the post-fire environment, and the filter is to be used more than once, then a P-series respirator must be used per 42 CFR 84. A 100-rated filter is a high-efficiency particulate air (HEPA) filter that is at least 99.97% efficient in removing monodisperse particles of 0.3 micrometers (aka microns) in diameter. The only thing better is SCBA.

and at least annually thereafter. The specific fit test protocols are detailed in the standard and the above-referenced summary document. A record of all fit tests must be established and retained until the next fit test. If an employee has multiple respirators, each one must be tested.

Respirator Use

Tight-fitting respirators (which we should be using) "**shall** not be worn by employees who have facial hair or any condition that interferes with the face-to-facepiece seal or valve function." "Personal protective equipment **shall** be worn in such a manner that it does not interfere with the seal of the facepiece on the user's face." "Employees **shall** perform a user seal check (this used to be called a fit check) each time they put on a tight-fitting respirator," using the procedures in the mandatory 29 CFR 1910.134 Appendix B-1 or equally effective manufacturer's guidelines to ensure a tight seal before entering any potentially contaminated area, also known as the scene's warm and hot zones.

Maintenance and Care

Employees using respirators must clean and disinfect them according to the procedures in 29 CFR 1910.134, Appendix B-2, or the manufacturer's equally effective guidelines, as often as necessary to maintain sanitary conditions for the exclusive use of respirators. This is typically done using warm, slightly soapy water. Alcohol wipes should not be used because they can degrade the elastomeric facepiece material over time. There are additional requirements for respirators when multiple people use them during fit testing. It's best to store respirators in an airtight container when not in use and after cleaning.

Training

Unless another employer has provided acceptable training within the preceding twelve months before initial use, employers must provide training to employees using respirators that includes why the respirator is necessary and how improper fit, use, or maintenance can compromise the protective effect of the respirator; the limitations and capabilities of the respirator; their use in emergencies; how to inspect, put on and remove, use and check the seals; procedures for maintenance and storage; recognition of medical signs and symptoms that may limit or prevent effective use; and the general requirements of this standard.

Additionally, annual retraining is required, and whenever workplace conditions change, new types of respirators are used, or inadequacies in the employee's knowledge or use are identified, further training is necessary.

Hand Protection

Employers **shall** select and require employees to use appropriate hand protection when employees' hands are exposed to hazards, including those from skin absorption of harmful substances; severe cuts or lacerations; severe abrasions; punctures; chemical burns; thermal burns; and harmful temperature extremes. Employers **shall** base the selection of the appropriate hand protection on an evaluation of the performance characteristics of the hand protection relative to the task(s) to be performed, conditions present, duration of use, and the hazards and potential hazards identified." (29 CFR 1910.138) These conditions are present at almost every post-fire scene.

Eyes and Face Protection

"The employer **shall** ensure that each affected employee uses appropriate eye or face protection when exposed to eye or face hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation." The protective eye and face protection devices must comply with any of the consensus standards listed in the standard (29 CFR 1910.133). Particulates are a known health hazard present at almost all post-fire scenes, so this protection is necessary. Goggles must be worn with half-facepiece APRs to protect the eyes and reduce the risk of absorption through the ocular mucous membranes. Using a full-facepiece respirator would also satisfy this requirement.

Foot Protection

"The employer **shall** ensure that each affected employee uses protective footwear when working in areas where there is a danger of foot injuries due to falling or rolling objects, or objects piercing the sole, or when the use of protective footwear will protect the affected employee from an electrical hazard, such as a static-discharge or electric-shock hazard, that remains after the employer takes other necessary protective measures." The protective footwear must comply with one of the listed consensus standards. (29 CFR 1910.136) These conditions are present at almost every post-fire scene.

Head Protection

"The employer **shall** ensure that each affected employee wears a protective helmet when working in areas where there is a potential for injury to the head from falling objects. In addition, the employer **shall** ensure that a protective helmet designed to reduce electrical shock hazard is worn by each such affected employee when near exposed electrical conductors which could contact the head." The protective helmet must comply with any of the consensus standards listed in the standard, or demonstrate that it is at least as effective as head protection devices constructed in accordance with one of those standards (29 CFR 1910.135).

This standard addresses only falling objects; in such cases, an approved hard hat meets the requirement when no electricity is involved. However, a fire investigator's work is often more complex. Head protection includes a chin strap that protects from ladder falls, slips, and trips. 29 CFR 1910.22 states that walking-working surfaces must be hazard-free. It's challenging to do this at a fire scene! Without a secured chin strap, if the investigator falls, the headgear may land before they do, providing no protection.

Other Possible Fire Scene Hazards

Asbestos

If a fire investigator believes a structure may contain asbestos, which includes most structures built before 1980 but may include newer structures, appropriate testing should be conducted pursuant to 29 CFR 1910.1001, and all remediation completed before any fire investigation activities start. The asbestos standard applies to all occupational asbestos exposures across all industries. This necessarily includes fire investigators who may be exposed to asbestos if they enter before an asbestos identification is made or unknowingly work in an asbestos environment.

This standard lists asbestos-specific PPE requirements that must be followed whenever an employee works in this environment, including for a fire investigator at a scene before or in the absence of an asbestos determination. Employers must provide, and employees must use,

respiratory protection (see the requirements above), coveralls or similar full-body work clothing, gloves, head coverings, foot coverings, face shields, vented goggles, or other appropriate protective equipment that complies with the eye and face protection listed above. Of course, this is what should be worn regardless!

The standard identifies two permissible exposure limits (PEL): the time-weighted average limit (TWA)[7] and the excursion limit.[8]

Training. For employees who may be exposed to asbestos at or above either PEL, the required training **shall** be provided at or before the initial assignment and at least annually thereafter. The standard lists the required training subjects, including the purpose, proper use, and limitations of respirators and protective clothing.

Bloodborne Pathogens

OSHA defines a bloodborne pathogen occupational exposure as "reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that may result from the performance of an employee's duties." Most post-fire scenes do not have these exposures, but they can occur, especially at fatal fire scenes. Engineering and work practice controls **shall** be used to eliminate or minimize employee exposure: "[w]here occupational exposure remains after institution of these controls, personal protective equipment shall also be used" (29 CFR 1910.1030(d)(2)(i). Even if adequate PPE is used, when there is a suspected or known exposure to a bloodborne pathogen, the employee shall clean their hands and other skin areas as soon as possible with soap and water or an antiseptic cleaner. 29 CFR 1910.1030 also addresses the control, documentation, and management of exposure to bloodborne pathogens.

Training. Training **shall** be "provided at the time of initial assignment to tasks where occupational exposure may take place." "Annual training for all employees **shall** be provided within one year of their previous training." See 29 CFR 1910.1030(g)(2) for complete information.

Formaldehyde

As noted, OSHA regulations are designed for traditional workplaces, and that is not the environment in which we work. However, to comply with the regulations, we need to adapt them to our work environment as best we can. For example, hazardous formaldehyde levels have been documented in recent studies for several hours after suppression and overhaul have ended. They can remain in the post-fire environment for up to three days in some instances. Formaldehyde molecules could also be trapped in fire debris and released later when the scene is dug out, where they could attach to airborne particulates. Since testing for formaldehyde is not easily done, we should assume it is present in every hot and warm scene, based on this recent research.[9] This is particularly important to public fire investigators.

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[7] "Time-weighted average limit (TWA). The employer **shall** ensure that no employee is exposed to an airborne concentration of asbestos in excess of 0.1 fiber per cubic centimeter of air as an eight (8)-hour time-weighted average (TWA) as determined by the method prescribed in Appendix A to this section or by an equivalent method." (29 CFR 1910.1001(c)(1))

[8] "Excursion limit. The employer **shall** ensure that no employee is exposed to an airborne concentration of asbestos in excess of 1.0 fiber per cubic centimeter of air (1 f/cc) as averaged over a sampling period of thirty (30) minutes as determined by the method prescribed in Appendix A to this section, or by an equivalent method." (29 CFR 1910.1001(c)(2))

[9] These are defined in the current edition of the IAAI Fire Investigator Health and Safety Best Practices document, which is available to all at www.iaaiwhitepaper.com

The OSHA formaldehyde standard (29 CFR 1910.1048) applies to all occupational exposures to formaldehyde. This standard also identifies an action level of 0.5 parts per million (ppm) of formaldehyde in air, calculated as an eight (8)-hour time-weighted average (TWA) concentration. This is small, but measuring it is not typically practical in post-fire environments, so we need to rely on other data and related research.

The employer must implement a respiratory protection program in accordance with 29 CFR 1910.134(b) through (d) (except (d)(1)(iii), (d)(3)(iii)(b)(1), and (2)), and (f) through (m), which covers each employee required by this section to use a respirator. (29 CFR 1910.1048(g)(2)(i)).

This standard requires employers and employees to comply with the respiratory protection requirements outlined above (29 CFR 1910.134), a straightforward task, as we have already determined that the conditions of the post-fire scene necessitate this protection. In addition, the employer needs to ensure that the gas cartridge includes formaldehyde protection (identified by an olive-colored label). There is a further requirement to use an air-purifying half-mask respirator with the appropriate filter/cartridge combination, along with effective gas-proof goggles. Alternatively, the employee can wear a full-facepiece respirator with the appropriate filter/cartridge combination or SCBA. Finally, employers and employees must comply with the general PPE requirements (29 CFR 1910.132) and the eye and face protection requirements (29 CFR 1910.133).

It is interesting to note that this standard requires the employer to "assure that no employee takes home equipment or clothing that is contaminated with formaldehyde." It is fair to say that clothing worn by fire investigators, especially public fire investigators, may be formaldehyde-contaminated if they have spent any time in the hot zone at the scene during the timeframe in which they typically conduct their scene exam.

Additionally, the employer shall inform anyone who launders, cleans, or repairs such clothing or equipment of the potentially harmful effects of formaldehyde and the procedures for safely handling the clothing and equipment. This is certainly an interesting statement. There are also packaging and labeling requirements regarding the storage and cleaning of contaminated apparel. See 29 CFR 1910.1048(h)(2) Maintenance of protective equipment and clothing for additional information.

"The employer **shall** make medical surveillance available for employees who develop signs and symptoms of overexposure to formaldehyde and for all employees exposed to formaldehyde[10] in emergencies. When determining whether an employee may be experiencing signs and symptoms of possible overexposure to formaldehyde, the employer may rely on the evidence that signs and symptoms associated with formaldehyde exposure will occur only in exceptional circumstances when airborne exposure is less than 0.1 ppm and when formaldehyde is present in the material in concentrations less than 0.1 percent." For this standard, "emergency" is any occurrence, such as but not limited to equipment failure, rupture of containers, or failure of control equipment that results in an uncontrolled release of a "significant amount of formaldehyde." These situations are

[10] Overexposure to formaldehyde irritates the eyes, nose, throat, and skin. Formaldehyde can cause allergic reactions of the skin (dermatitis) and the lungs (asthma). Formaldehyde is a known cause of cancer in humans.
https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/OHB/HESIS/CDPH%20Document%20Library/formaldehy de.pdf

typically not encountered in a post-fire scene examination; however, they can lead to overexposure symptoms.

Training. The formaldehyde standard also requires initial and annual training for all employees who may be exposed to formaldehyde. The training program shall be conducted in a manner that the employee can understand and shall include a discussion of this regulation's contents. The purpose for and a description of the medical surveillance program required by this standard, including a description of the potential health hazards associated with exposure to formaldehyde and a description of the signs and symptoms of exposure to formaldehyde; instructions to immediately report to the employer the development of any adverse signs or symptoms that the employee suspects are attributable to formaldehyde exposure; description of operations in the work area where formaldehyde is present and an explanation of the safe work practices appropriate for limiting exposure to formaldehyde; and the purpose for, proper use of, and limitations of personal protective clothing and equipment." Additionally, this standard encompasses other training requirements that typically do not apply to fire investigators. See 29 CFR 1910.1048(n) Employee information and training for additional information.

Lead

Another toxic substance found in fire smoke and the post-fire environment is lead, a component of particulate matter. Due to the complexities of the composition of post-fire particulate matter, it is impossible in most circumstances to determine whether lead is present; however, given the many household and building construction items that contain lead, it can be assumed that there is likely a lead component to these particulates and therefore a potential exposure hazard for employees, which would trigger the below training requirement. There are additional requirements when exposures are above the permissible exposure limit, which is not easily determined at a post-fire scene. As with the formaldehyde standard, there are PPE and medical surveillance requirements here for certain exposure circumstances. See 29 CFR 1910.1025 and its appendices for additional information.

Training. Each employer who has a workplace in which there is potential exposure to airborne lead at any level shall inform employees of the content of Appendices A and B of this regulation. The employer shall train each employee who is subject to exposure to lead at or above the action level or who may experience skin or eye irritation, in accordance with the requirements of this section. This training program must inform these employees of the specific hazards associated with their work environment, protective measures they can take, the dangers of lead exposure to their bodies (including their reproductive systems), and their rights under the standard. The employer shall establish a training program and ensure that employees participate in it. The employer shall provide initial training to employees before assigning them to their first job. The training program shall be repeated at least annually for each employee. The employer shall make a copy of the standard and its appendices available to all employees.

Respirable Crystalline Silica

Respirable crystalline silica (RCS) is likely present in most post-fire environments. For fire investigators and others working in the post-fire environment, it’s one of the most common—and most overlooked—airborne hazards after a structure fire. Fire doesn’t create silica, but it fractures, pulverizes, and thermally transforms silica-containing materials into fine dust. That dust becomes respirable when particles are ≤10 microns, small enough to reach the gas-exchange regions of the

lungs. Many building materials contain crystalline silica (quartz, cristobalite, tridymite). After a fire, they can degrade into respirable dust:

- Concrete → spalls, cracks, and crumbles into fine silica-bearing dust
- Mortar and grout → powder when exposed to heat and water
- Brick and block → fracture into dust during collapse or overhaul
- Drywall joint compound → contains silica; becomes airborne when disturbed
- Ceramic tile, porcelain, and glass → shatter into fine particles

29 CFR 1910.1053 applies to all occupational RCS exposures in the post-fire environment unless the employer has objective data demonstrating that employee exposure to respirable crystalline silica will remain below 25 micrograms per cubic meter of air (25 µg/m3) as an 8-hour time-weighted average (TWA) under any foreseeable conditions. However, in most instances, air sampling at post-fire scenes, as referenced in this regulation, is not practical at this level.

The standard requires an exposure assessment, mitigation when feasible, and the use of adequate and appropriate respiratory protection, as referenced in this paper. A written exposure control plan is required. This should be part of the written respiratory protection plan. There is a requirement to place signage. See the regulation for additional information, as well as the section in this paper on Accident Prevention Tags. There is a requirement for medical screening, specific warning signage, recordkeeping, and training. The training language does not specify initial or ongoing, but implies initial in their wording.

Grain Handling Facilities

These facilities can be extremely hazardous after a fire, and the hazards can vary depending on the specific facility type. The employer **shall** develop and implement an emergency action plan meeting the requirements contained in 29 CFR 1910.38.

"All mechanical, electrical, hydraulic, and pneumatic equipment which presents a danger to employees inside grain storage structures **shall** be deenergized and shall be disconnected, locked-out and tagged, blocked-off, or otherwise prevented from operating by other equally effective means or methods." (1910.272(g)(1)(ii))

"The atmosphere within a bin, silo, or tank **shall** be tested for the presence of combustible gases, vapors, and toxic agents when the employer has reason to believe they may be present. Additionally, the atmosphere within a bin, silo, or tank shall be tested for oxygen content unless there is continuous natural air movement or continuous forced-air ventilation before and during the period employees are inside. If the oxygen level is less than 19.5%, or if combustible gas or vapor is detected in excess of 10% of the lower flammable limit, or if toxic agents are present in excess of the ceiling values listed in subpart Z of 29 CFR part 1910, or if toxic agents are present in concentrations that will cause health effects which prevent employees from effecting self-rescue or communication to obtain assistance, the following provisions apply." (1910.272(g)(1)(iii))

Ventilation **shall** be provided until the unsafe condition or conditions are eliminated, and the ventilation shall be continued as long as there is a possibility of recurrence of the unsafe condition while the bin, silo, or tank is occupied by employees. (1910.272(g)(1)(iii)(A)) If toxicity or oxygen deficiency cannot be eliminated by ventilation, employees entering the bin, silo, or tank shall wear

an appropriate respirator. Respirator use shall be in accordance with the requirements of § 1910.134. (1910.272(g)(1)(iii)(B))

The employer **shall** provide training to employees at least annually and when changes in job assignment will expose them to new hazards. Current employees and new employees prior to starting work shall be trained regarding the hazards that may be encountered in these types of facilities and safety procedures that may be needed. Training for an employee who enters grain storage structures includes training about engulfment and mechanical hazards and how to avoid them.

Each entry operation requires an observer. The employee acting as observer **shall** be trained in rescue procedures, including notification methods for obtaining additional assistance.

See 29 CFR 1910.272 and its Appendix A for additional training information.

Other Relevant Training and Procedural Requirements

Medical

"In the absence of an infirmary, clinic, or hospital in proximity to the workplace, which is used for the treatment of all injured employees, a person or persons shall be adequately trained to render first aid. Adequate first aid supplies shall be readily available" (29 CFR 1910.151).

For public fire investigators, this is easily accomplished in most instances through EMT training or having their EMS services nearby or readily available. However, this training requirement and equipment are essential for private fire investigators, especially when working alone.

29 CFR 1910.151 does not require annual or refresher training; however, it is a best practice to have an annual first aid refresher and to include CPR training in both initial and refresher training. Regarding online or computer-based training, OSHA clarified in a Letter of Interpretation that online training alone would not meet the standard's requirements. Basic first aid and CPR require physical skills training, and learning those skills requires practice. A training program should develop hands-on skills through practice with mannequins and partners. (Pauley, 2024)

When in-person training or retraining is not possible, providers may offer alternative options such as an online portion now and a hands-on portion later. Check with your training provider to see how they approach first aid training.

HAZWOPER

The Hazardous Waste Operations and Emergency Response (HAZWOPER) standard (29 CFR 1910.120) is lengthy and detailed. The beginning of the standard lists the scope of covered activities, and the first four apply to sites where fire investigators are typically not involved. However, the last covered operation says, "emergency response operations for releases of, or substantial threats of releases of, hazardous substances without regard to the location of the hazard." Public fire investigators could become involved with a scene of this type, in which case this standard would apply, and they would need the requisite training (see below). For private fire investigators, if the emergency has ceased and any government-required cleanup operations have

begun, you should not enter the scene until you have ensured compliance with all parts of this standard.

Supervisors/managers must understand the definition of this type of scene, as any work-related activities at these scenes require specialized training. "Employees shall not be permitted to participate in or supervise field activities until they have been trained to a level required by their job function and responsibility." This means that every applicable fire investigator must be adequately trained before an incident occurs, enabling them to safely carry out their duties based on their level of participation. At a minimum, this means training at the hazmat operations level. The employer is required to document and certify each employee's level of training.

Other Relevant Standards

Employers and employees must be aware of some additional required training subjects beyond those mentioned above. The document Training Requirements in OSHA Standards (OSHA 2254-09R 2015) provides more detail on these requirements, and readers are encouraged to review it along with each applicable standard. In addition, while every attempt has been made to include all OSHA-required training relevant to fire investigators and others working at post-fire scenes here, there may be other OSHA training requirements not listed.

Confined Space

Any activities involving work in permit-required confined spaces require specialized training. For further information, see 29 CFR 1910.146. There is no reason for a fire investigator to enter a permit-required confined space! But all need to know about non-permit-required confined space requirements.

Electrical Hazards

Employees who may reasonably be expected to face a comparable risk of injury due to electric shock or other electrical hazards above 50V must be trained. The training requirements contained in this section apply to employees who face a risk of electric shock that is not reduced to a safe level by the electrical installation requirements of 29 CFR 1910.303 through .308." See 29 CFR 1910.332 for the training requirements.

Fall Protection Systems and Falling Object Protection

29 CFR 1910.26 addresses various situations related to these subjects. While compliance with these regulations may be necessary at a post-fire scene, a better practice is to conduct a thorough hazard and risk analysis as part of the site safety assessment and eliminate any identified hazards. This would also likely eliminate the need for the required training (29 CFR 1910.30) associated with this subject.

Hand and Portable Powered Tools and Equipment

"Each employer shall be responsible for the safe condition of tools and equipment used by employees, including tools and equipment which employees may furnish" (29 CFR 1910.242). Additionally, 29 CFR 1910.243 explicitly covers the guarding of portable powered tools.

Ladders

"The employer must ensure that each ladder used meets the requirements of this section" (29 CFR 1910.23). "Ladders are to be inspected before initial use, and more frequently as necessary, to

identify any visible defects that could cause employee injury, and not used and taken out of service if defects are identified. Ladders are to be used only on stable and level surfaces unless they are secured or stabilized to prevent accidental displacement. Portable ladders used on slippery surfaces are securely and stably positioned. Portable ladders used to gain access to an upper landing surface have side rails that extend at least 3 feet (0.9 m) above the upper landing surface." Based on the above language in 29 CFR 1910.242, it is reasonable to assume that the employer is also responsible for the safe condition and use of ladders.

Noise

When employees are subjected to excessive levels of sound, "feasible administrative or engineering controls shall be utilized. If such controls fail to reduce sound levels within the levels of Table G-16, personal protective equipment shall be provided and used to reduce sound levels within the levels of the table" (29 CFR 1910.95). This calculation can be somewhat complex, based on factors such as dB level and exposure time, which can be particularly challenging at most post-fire scenes. If workers are exposed to over 85 dB for an eight-hour time-weighted average, initial and annual training is required.

Portable Fire Extinguishers

"Where an employer has provided portable fire extinguishers for employee use in the workplace, the employer shall also provide an educational program to familiarize employees with the general principles of fire extinguisher use and the hazards involved with incipient stage firefighting. The employer shall provide the education required in this section upon initial employment and at least annually thereafter." See 29 CFR 1910.157 for further information. In addition, if an employer provides a fire extinguisher in their agency/company vehicle(s) used by fire investigators, this regulation will apply. Public fire investigators may have received this training as part of their initial firefighter training, but may not receive the required annual retraining. Private fire investigators may not have received this training.

Safety Color Codes for Marking Physical Hazards

Whenever a hazard cannot be eliminated, it must be identified and controlled. While this may not occur often, and when a fire investigator is at a scene by themselves, it may seem unnecessary, there could be times when marking physical hazards at a post-fire scene is necessary, in which case OSHA regulation 1910.144 is applicable. "Red lights shall be provided at barricades and temporary obstructions. Danger signs shall be painted red." "Yellow shall be the basic color for designating caution and for marking physical hazards such as striking against, stumbling, falling, tripping, and 'caught in between' hazards."

Lockout/Tagout

While this regulation pertains to maintenance and service work, if other standards require the use of lockout or tagout procedures or lockout/tagout procedures (such as the next section) are to be used as part of a fire investigation, documented energy control procedures must be developed, and employee training is required before conducting those activities. See 29 CFR 1910.147 for further information.

Electrical Work Practices

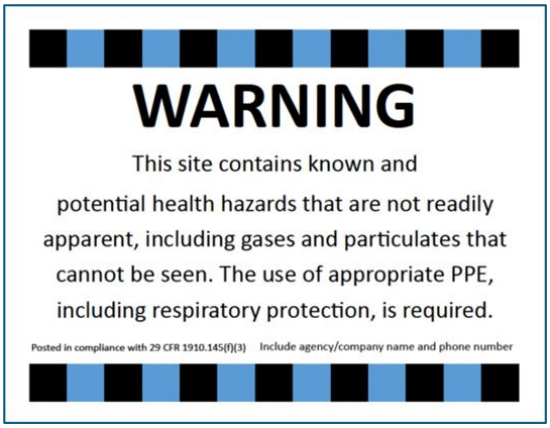
“Safety-related work practices **shall** be employed to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts, when work is performed near or on

equipment or circuits which are or may be energized. The specific safety-related work practices shall be consistent with the nature and extent of the associated electrical hazards." "Safe procedures for deenergizing circuits and equipment **shall** be determined before circuits or equipment are deenergized." See 29 CFR 1910.333 for further information.

Accident Prevention Tags

OSHA requires what it calls accident prevention tags (signs) when it is necessary to identify hazardous or potentially hazardous conditions, including those that cause illness or injury, "which are out of the ordinary, unexpected, or not readily apparent." Potentially hazardous illnesses that are not readily apparent are highlighted because the most prevalent health hazard at a post-fire scene is nanoparticulates in the air, too small to be seen. These pose a respiratory hazard that requires appropriate respiratory protection. There could be additional reasons as well.

For temporary situations, such as fire investigation scenes, these signs are to be posted near the hazard (e.g., at entrance points) and be appropriate for the problem. They must contain the required signal word and a message indicating the specific hazardous condition or instruction. The four approved signal words are Danger, Caution, Warning, and Biological. For our purposes, Warning is most appropriate for post-fire health hazards. Workers shall be informed of the meaning of the tags (signs) used and of the special precautions necessary. This is typically done during the safety briefing. See 29 CFR 1910.145(f) for complete information.



Here is an example of sign language when required. If only recommended, change the last word. The organization's name and contact person/number should be included. The required sign is used when OSHA compliance applies, and the recommended sign is used when OSHA does not apply. Still, the organization is being proactive in its safety consciousness.

NOTE: The Respirable Crystalline Silica standard (1910.1053) has a separate wording requirement that may be in addition to the language here.

Ladders

The employer must ensure that each ladder used meets the requirements of this section. This section covers all ladders, except when used in emergency operations such as firefighting, rescue, and tactical law enforcement, or when training for these operations, or when they are designed into or are an integral part of machines or equipment. Ladders are to be inspected before initial use in each work shift and more frequently as necessary to identify any visible defects that could cause employee injury and removed from service if such defects are found. Ladders are used only on stable and level surfaces unless they are secured or stabilized to prevent accidental displacement. (29 CFR 1910.23)

Walking-Working Surfaces

Walking-working surfaces are to be maintained free of hazards, including sharp or protruding objects, loose boards, corrosion, leaks, spills, snow, and ice. Hazardous conditions on walking-working surfaces **shall** be corrected or repaired before an employee uses the walking-working surface again. If the correction or repair cannot be made immediately, the hazard must be guarded

to prevent employees from using the walking-working surface until the hazard is corrected. (29 CFR 1910.22)

Powered Platforms, Manlifts, and Vehicle-Mounted Work Platforms

Only trained persons **shall** operate an aerial lift of any type. A personal fall arrest or travel restraint system that meets the requirements in subpart I of this part shall be worn and attached to the boom or basket when working from an aerial lift. (29 CFR 1910.67)

Hand and Portable Powered Tools and Other Hand-Held Equipment

Each employer **shall** be responsible for ensuring the safe condition of tools and equipment used by employees, including those that employees may provide, as well as compressed air used for cleaning. Compressed air shall not be used for cleaning purposes, except when reduced to less than 30 psi, and then only with effective chip guarding and personal protective equipment. (29 CFR 1910.242)

Hazard Communications

While this standard typically applies to workers in a more structured environment with identifiable and quantifiable hazards, it is possible that, in certain circumstances, the requirements here could apply to a post-fire scene. For example, this standard (29 CFR 1910.1200) says, "Employers **shall** provide employees with effective information and training on hazardous chemicals in their work area at the time of their initial assignment, and whenever a new chemical hazard the employees have not previously been trained about is introduced into their work area." If this applies to a specific post-fire scene, please refer to the entire standard for further details.

The respirable crystalline silica standard discussed above requires a hazard communication to employees. “The employer shall ensure that at least the following hazards are addressed: Cancer, lung effects, immune system effects, and kidney effects.”

Training Records

Employers must keep accurate and complete records of the training they provide to their employees. At a minimum, this should include:

- Course syllabus
- Attendee list
- The test itself and the scores for each attendee
- All student feedback forms/information
- Instructor bios with credentials

These records should be retained in accordance with the employer's document retention schedule.

Written Program Requirements

While OSHA does not require that you have ONE written company health and safety program, depending on the nature and scope of your operations, you may need one or more of the written programs below.

- Emergency Action Plan: 1910.38(b)
- Fire Protection and Prevention: 1910.39(b)
- Hazard Communication: 1910.1200(e)

- Respiratory Protection: 1910.134(c),
- Occupational Noise Exposure: 1910.95(c)(1)
- Electrical Safety: 1910.333(b)(2)(i)
- Bloodborne Pathogens: 1910.1030(c)(1)(i)
- Asbestos Safety: 1910.1001(f)(2)(i)
- Lead Safety: 1910.1025(e)(3)(i)
- Respirable Crystalline Silica: 1910.1053(f)(2)
- Hazardous Waste Operations and Emergency Response: 1910.120(b)(1)(i)(l)(1)(i)(p)(1)(q)(1)
- Personal Protective Equipment (Hazard Assessment): 1910.132(d)(2)

If you are in a state-plan state, you may be required to have an overall safety and health plan if certain criteria are met. It may be called an Injury and Illness Prevention Plan or Written Workplace Safety Plan. This is required in California.

Appendix A – State Coverage Breakdown

Federal OSHA States	OSHA State Plans: Include Private, State, and Local Gov't. Workers	Hybrid Federal-State Plans: Cover State/Local Government Only
Alabama	Alaska	Connecticut
American Samoa	Arizona	Illinois
Arkansas	California	Maine
Colorado	Hawaii	Massachusetts
Delaware	Indiana	New Jersey
District of Columbia	Iowa	New York
Florida	Kentucky	Virgin Islands
Georgia	Maryland	
Guam	Michigan	
Idaho	Minnesota	
Kansas	Nevada	
Louisiana	New Mexico	
Mississippi	North Carolina	
Missouri	Oregon	
Montana	Puerto Rico	
Nebraska	South Carolina	
New Hampshire	Tennessee	
North Dakota	Utah	
Northern Mariana Islands	Vermont	
Ohio	Virginia	
Oklahoma	Washington	
Pennsylvania	Wyoming	
Rhode Island		
South Dakota		
Texas		
West Virginia		
Wisconsin		

This chart is correct as of the date this document was published.

Appendix B – OSHA Training Requirement Matrix

Subject	Initial Training Required	Annual Retraining Required	Other Information
Asbestos	Y	Y	
Bloodborne Pathogen	Y	Y	
Electrical Safety	Y	N	
Emergency Action Plan, if used	Y	N	
Eye and Face Protection	N	N	
First Aid	Y	N	
Foot Protection	N	N	
Formaldehyde	Y	Y	
Grain Handling Facilities	Y	Y	
Hand Protection	N	N	
Hazard Communications, as applicable	Y	N	
HAZWOPER (if applicable) *	Y	Y	
Head Protection	N	N	
Lead	Y	Y	
Lock-out/Tag-out	Y	N	
Noise (if exposed to over 85 dB/8-hour TWA)	Y	Y	
Portable Fire Extinguishers	Y	Y	
PPE - General	Y	N	Retraining in certain circumstances
Respirable Crystalline Silica	Y	Y	
Respiratory Protection	Y	Y	Additional training in some circumstances

NOTE: Some other subject areas may require specialized training not listed here.

Refer to the OSHA publication Training Requirements in OSHA Standards, OSHA 2254-09R 2015, for additional information.

* There are significant additional training requirements.

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About the Author

An internationally recognized health and safety expert on the post-fire environment, Jeff Pauley is a senior partner and the Fire Group manager at Pacific Pointe Consulting, Inc. in Summerfield, NC. There, he provides training, support, and policy development assistance for the fire and post-fire environments.

After a twenty-three-year career in law enforcement, Jeff was recruited to become a fire investigator in 2010. He served as a deputy fire marshal for the Bedford County (Virginia) Department of Fire & Rescue for five years and as the battalion chief/fire marshal there for two and a half years. He then spent over four years as a fire investigator for EFI Global, Inc. in North Carolina. Jeff also spent many years as a volunteer firefighter. Now retired from the active fire service, he shares his passion for fire service health and safety through consulting, teaching, and serving as a subject-matter expert. He is also an adjunct instructor for the Virginia Department of Fire Programs' Virginia Fire Marshal Academy specializing in fire investigator health and safety.

Jeff was a member of the International Association of Arson Investigators (IAAI) Health & Safety Committee from its establishment in 2016 until January 2025 and served as its chairman from April 2018 to January 2024. He was the principal author of the committee's first three groundbreaking editions of Fire Investigator Health and Safety Best Practices. In April 2024, Jeff received the IAAI's Presidential Certificate of Appreciation for his "untiring support and service to the IAAI and commitment to this organization's goals by creating a robust and motivating Health and Safety Program."

Jeff serves on the national advisory boards for the University of Miami's Firefighter Cancer Initiative and its AFG-funded Fire Investigator Comprehensive Occupational (FICO) Health and Safety Assessment Cohort Study, where he chairs the advisory board, as well as the external advisory board for the North Carolina Firefighter Cancer Cohort Study. He is a long-time member of the Oversight and Planning Board for the federally funded Fire Fighter Cancer Cohort Study. He was a member of the previous US Fire Administrator's Fire Fighter Cancer workgroup. Jeff has served as a technical advisor on post-fire health-related university research projects and has co-authored several research reports and related papers. He was a member of the task group that completely rewrote the Fire Investigator Safety, Health, and Wellness chapter for the 2024 edition of NFPA 921, Guide for Fire and Explosion Investigations. He contributed to five safety-related online training lessons on CFITrainer.net for fire investigators. He was also part of the team that developed the Firefighter Cancer Support Network's 2024 document, Doing It Right: Reducing Cancer In The Fire Service. Jeff has written numerous published articles and given many presentations on fire service

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Jeff is an IAAI-Certified Fire Investigator and holds many other fire service certifications. He is a member of the IAAI's North Carolina Chapter, the International Society for Respiratory Protection, and the American Society of Safety Professionals, through which he earned its Leadership in Safety Management certificate. To complement his extensive public safety experience, Jeff holds an associate's degree in law enforcement and a bachelor's degree in management studies from the University of Maryland, a graduate certificate in public administration from Southern New Hampshire University, and a master's degree in occupational safety and health from Columbia Southern University. He is also an FAA-licensed drone pilot.