4-13 Personal protection during fire and explosion investigation operations

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Background

Following extinguishment of a fire, workers may enter the area for the fire and/or explosion cause and determination investigation.

Concerns/hazards

Products of combustion create a hazardous atmosphere, putting workers at risk of exposure to these contaminants. Fire and explosion investigators require specific and specialized personal protective equipment that is appropriate to the specialized task and identified safety concerns.

Actions for employers

Employers must:

- provide adequate training on all personal protective equipment that includes recognizing the needs for and when to use various types of Personal Protective Equipment (PPE) that are available to investigators
- establish a decontamination protocol for fire investigators that involves cleaning of PPE and cleaning of fire and explosion investigation equipment

- take all measures reasonably necessary in the circumstances to protect workers from exposure to a hazardous biological or chemical agent, including:

    - substitution of the hazardous biological or chemical agent
    - engineering controls
    - administrative controls, including work practices
    - hygiene facilities and practices
    - where applicable, personal protective equipment.

Employers must protect workers from exposure to a hazardous biological or chemical agent without requiring them to use a respirator. Where exposure to these hazards cannot be avoided or effectively controlled, employers must provide a respirator appropriate in the circumstances to protect the workers from exposure and should provide appropriate training on the safe and effective use of the respiratory protection equipment.

Fire and Explosion Investigation PPE considerations

Outerwear

Consideration should be given to atmospheric conditions and contaminants, weather conditions, presence of hazardous materials or chemicals, environmental hazards such as sharp objects and permeability of the outerwear.

Consideration should be given to wearing head and neck coverings that provide protection from particulate.

Helmets

Consideration should be given to the weight of protective helmets, as fire investigations may occur over long periods of time and could result in fatigue or injury if excessive strain is placed on the neck.

Helmets must be equipped to be secured to the head with a chin strap.

Boots

Consideration should be given to the presence of liquids, depth of fire debris, sharp or abrasive items as well as potential for fatigue or injury. At a minimum consider boots that provide full protection and cover the ankle.

Gloves

Consideration should be given to protection against cuts, punctures, permeability and protection of direct contact of contaminants with skin as well as maintaining dexterity to manipulate fire debris and evidence. At a minimum the recommendation should be medical gloves under another layer of cut and/or puncture resistant gloves.

Respiratory protection

Respiratory protection should always be worn while in a fire scene conducting a fire investigation and must be appropriate for the task and hazards. See firefighter Guidance Note 4-9 Respiratory Protection Program for more information.

Eye protection

Contaminants, including particulates, can easily enter the eye and be absorbed into the body. Consideration should be given to wearing eye protection that fully covers the eyes and does not allow passage of toxic gases and particulate.

Hearing protection

Consideration should be given to wearing hearing protection where required on a scene and should be balanced with the need to maintain adequate situational awareness.

Air monitoring

Consideration should be given to providing continuous air monitoring in the immediate vicinity of any Investigator working in a fire scene and should include measuring oxygen concentration (O2), hydrogen cyanide (HCN), hydrogen sulfide (H2S), explosive limits (LEL), volatile organic compounds (VOC), and others as deemed necessary.

Reducing exposure to contaminants and other hazards

Consider the following actions, to reduce exposure to contaminants:

- delay investigations until all phases of fire have been fully extinguished
- put in place adequate and effective ventilation throughout the investigation
- before respiratory protection is removed, conduct gross decontamination
- understand the operation and limitations of air monitoring devices in use as some contaminants and carcinogens may not be detected

Ensure that either the immediate vicinity or the entire area is de-energized and that the natural gas, propane or other fuel sources are isolated, disconnected, or shut off.

Applicable regulations and acts

Read:

- *Fire Protection and Prevention Act*
- *Fire Marshal directive 2023-001: Notification of Fires and Explosions*
- *Occupational Health and Safety Act*
  - clause 25(2)(a) for providing information and instruction to a worker
  - clause 25(2)(d) for making workers aware of hazards
  - clause 25(2)(h) for taking every precaution reasonable in the circumstances to protect workers
- *Regulation 833 - Control of Exposure to Biological or Chemical Agents* for occupational exposure limits and respiratory protection program requirements

Applicable standards

For guidance on the administration of an effective respiratory protection program, fit testing protocols and training requirements, read CAN/CSA Standard Z94.4 (R2023) Selection, use and care of respirators

Related

Firefighter's cancer prevention checklist

International Association of Arson Investigators – Fire Investigator Health and Safety Best Practices

National Fire Protection Association NFPA Standard 1033 - Standard for Professional Qualifications for Fire Investigators

Read firefighter guidance notes:

- 3-2 Asbestos
- 4-1 Structural firefighting protective equipment
- 4-2 Eye protection
- 4-8 Care, maintenance, inspection and replacement of structural fire fighting personal protective equipment
- 4-9 Respiratory protection program
- 5-2: Working alone or in isolation
- 6-1 Hygiene and decontamination
- 6-15 Medication and drug exposure
- 6-17 Clandestine drug labs
- 6-23 Safety during salvage and overhaul
- 6-40 Working at heights
- 6-44 Hoarding conditions

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This resource does not replace the *Occupational Health and Safety Act* (OHSA) and its regulations, and should not be used as or considered legal advice. Health and safety inspectors apply the law based on the facts in the workplace.