Fire Investigator Safety Series

Series 1: Introduction to Fire Investigator Scene Safety

Welcome!

Introduction to Fire Investigator Scene Safety

Disclaimer

Please note, the opinions expressed during this presentation are those of the presenter and may not reflect the opinions of the Technical Committee on Fire Investigations or the National Fire Protection Association (NFPA).

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Fire Investigator Safety Series

The “Fire Investigator Safety Series” will be comprised of four programs that will provide the participants an opportunity to explore the common health and safety hazards found on the fire and explosion investigation scene and during subsequent evidence inspections and other post scene analysis.

Fire Investigator Safety Series

Through this exploration process the participant will be able to put control mechanisms in place to eliminate hazards or limit potential exposure to those working on the fire or explosion scene or during post scene activities.

Series 2: Hazard and Risk Assessment, the Process

Series 3: Personal Protective Equipment (PPE), Selection and Use

Series 4: Safety and Health Programs and Program Management
References


Bibliography

The Bibliography is included as Appendix A of the participants handout.

Copies of the reports included in this presentation can be obtained from the TRACE Fire Protection and Safety website www.tracefireandsafety.com

Links to the US Government websites are provided in the Bibliography, Appendix A

I. Introduction

13.1* General. Fire scenes, by their nature, are dangerous places. Fire investigators have an obligation to themselves and perhaps to others (such as other investigators, equipment operators, laborers, property owners, attorneys) who may be endangered at fire scenes during the investigation process.
A. The Problem

How many fire investigators die or suffer injuries while investigating fires?

1. Fire Fighter Fatality Investigation and Prevention Program, NIOSH

SUMMARY
On January 19, 1995, a 45-year-old male cancer
investigator was killed during an
investigation to determine the origin and cause of
a residential fire that occurred on January 14, 1995.
The victim, who was one of the senior investigators
and an electrical consultant, was about 1000 feet
from the fire scene. He was conducting an
unusually intense investigation of the fire. About 10
minutes into the investigation, the investigator
decided to enter the house and proceed to the lower
levels. He was accompanied by two other investigators.

The scene was searched for clues to the origin of the
fire. After working for about 2 hours, the first
investigator reported that the chimney was
completely destroyed. Another investigator, who was
detected in the area, reported that the chimney was
completely destroyed. Upon further investigation, it
was determined that the victim had moved the
chimney away from the fire. He had moved the
chimney away from the fire and had made an
unusual move to remove the chimney. The victim was
found dead in the vicinity of the fire. He had been
working at the fire scene for about 3 days, in all weather
conditions. As a result of the unusual
move by the investigator, the fire was extinguished
and the victim was killed.

B FAIRE

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IAFI

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Arson Investigator Dies from Injuries Sustained from a Fall During an Arson Investigation. Illinois Report issued April 23, 2001

A. The Problem?

• How many fire investigators die or suffer injuries while investigating fires?
• How many fire investigators are affected by exposure to health risks while investigating fires?

Fire Investigator Statistics?

• Fire Investigation Community is a sub-set population and specific data is generally not known.
• Fire Investigation Community has both public and private sector members.
• Currently, only Public Sector Investigators are included in the NIOSH reports.
• Public Sector Fire Investigators are often transient and frequently move to another area of the Fire Service.
A. The Problem?

• How many fire investigators die or suffer injuries while investigating fires?
• How many fire investigators are affected by exposure to health risks while investigating fires?
• What types of diseases are fire investigators exhibiting as a result of the exposures?

Study of Cancer among US Fire Fighters

• In a NIOSH update, April 23, 2010, it was reported that NIOSH and the United States Fire Administration (USFA) were partnering to study Cancer among Firefighters.

• NIOSH Bibliography : 139 Titles and Abstracts
B. Research and Literature

1. NIOSH Health Hazard Evaluation Report; Bureau of Alcohol, Tobacco, and Firearms, May 1998

The Bureau of Alcohol, Tobacco, and Firearms (ATF) in April 1996 contacted the National Institute for Occupational Safety and Health (NIOSH) and requested a health hazard evaluation (HHE) regarding respiratory hazards associated with fire investigations.

Report Recommendations

1. The ATF should require their investigators to wear appropriate respiratory protection when performing fire scene investigations.
Report Recommendations

SCBAs would most likely not be practical during most fire scene investigations;

- Half-Face Air-Purifying Respirators combination filter cartridges (high-efficiency particulate, VOCs, acid mists, and formaldehyde)
- Powered Air-Purifying Respirators with the appropriate filter cartridges should be used.
- Non-IDLH Atmospheres

Report Recommendations

2. The ATF should establish a respiratory protection program for their fire investigators and ensure that it complies with the requirements described in 29 CFR 1910.134 (OSHA Standard).

Respiratory Protection Program

a. Written operating procedures
b. Appropriate respirator selection
c. Employee training
d. Effective cleaning of respirators
e. Proper storage
f. Routine inspection and repair
g. Exposure surveillance
h. Program review
i. Medical approval
j. Use of approved respirators

Fit Testing?
Report Recommendations

3. The use of mechanical ventilation equipment that removes the contaminants from the areas where fire investigators are working should be utilized whenever possible.

Ventilation

Alteration of the fire scene (removing windows, doors, etc.) that promotes natural ventilation should also be considered when it would not affect the preservation of the fire scene.

- Inlet and Exhaust remote
- Inlet and Exhaust same location

Report Recommendations

4. The use of other protective clothing should be implemented.

Protective Eye ware   Hearing Protection
Head Protection       Protective Clothing
Safety Shoes/Boots    Hazard Specific Items
Gloves                Report did not include recommendations
Report Recommendations

4. To reduce the potential for contaminants being carried home by fire investigators, the use of disposable coveralls, boots, and gloves should be considered.

- Laundering of any potentially contaminated clothing should be provided by a contractor who is aware of the contamination potential.

Report Recommendations

4. ATF should also train its fire investigators in the use of appropriate decontamination procedures utilized by emergency responders.

ATF request to NIOSH

August 19, 2004, the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) contacted the National Institute for Occupational Safety and Health (NIOSH) requesting an investigation concerning potential exposures during fire scene investigations. Concerns were raised about the presence of contamination of work uniforms upon completion of an investigation, removal of the contamination following home laundering, and contamination of home washing machines from contaminated uniforms. At the time of the request, employees had not reported health effects associated with chemical exposures during fire scene investigations.

Report Conclusions

1. Contamination of a washing machine/dryer used by an ATF fire scene investigator to launder his/her uniform is unlikely.

2. Contamination of subsequent loads of laundry is also unlikely.

3. There is a potential for contamination of other clothing being laundered with soiled uniforms.

4. Due to the number of uncontrolled variables in this study, definitive conclusions cannot be made as to whether a significant amount of PAH contamination was removed during the laundering of soiled field uniforms.
Report Conclusions

5. Additional studies are needed to provide for better comparisons of field samples and known contaminants.

Report Recommendations

1. Due to the potential for exposure to PAHs, some of which may be carcinogenic, NIOSH investigators recommend the use of protective clothing for ATF agents involved in fire scene investigation.

Polynuclear Aromatic Hydrocarbons (PAHs)

Polynuclear Aromatic Hydrocarbons, (PAHs)

<table>
<thead>
<tr>
<th>PAH Compound</th>
<th>Levels Detected (μg/sample)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naphthalene</td>
<td>0.000-0.2</td>
</tr>
<tr>
<td>Acenaphthylene</td>
<td>0.001-0.04</td>
</tr>
<tr>
<td>Acenaphthiophene</td>
<td>0.000-0.04</td>
</tr>
<tr>
<td>Fluoranthene</td>
<td>0.000-0.36</td>
</tr>
<tr>
<td>Pyrene</td>
<td>0.000-0.3</td>
</tr>
<tr>
<td>Chrysene</td>
<td>0.000-0.2</td>
</tr>
<tr>
<td>Benzo(a)anthracene</td>
<td>0.000-0.2</td>
</tr>
<tr>
<td>Benzo(b)flavone</td>
<td>0.000-0.2</td>
</tr>
<tr>
<td>Benzo(a)pyrene</td>
<td>0.000-0.2</td>
</tr>
<tr>
<td>Benzo(a)anthracene</td>
<td>0.000-0.2</td>
</tr>
</tbody>
</table>

Limit of Detection = minimal 0.001 μg/sample Micrograms (μg)
Report Recommendations

2. To reduce the potential for carrying these contaminants home, disposable coveralls should be worn at the fire scene then discarded when the investigation is finished prior to entering a personal or official vehicle.

Cross Contamination

• Alternatively, a professional laundry service could be used to launder the uniforms currently worn by fire scene investigators.

Report Recommendations

3. ATF agents should wear disposable, chemical resistant gloves to further protect themselves from dermal exposures at a fire scene.
C. Additional Research

- “Characterization of Firefighter Exposures During Fire Overhaul”
- “Firefighter Exposure to Smoke Particulates”


Received 20 October 2014
Revised 21 January 2015
Accepted 26 January 2015

Additional Resources

NIOSH Firefighter Cancer Resources:
http://www.cdc.gov/niosh/firefighters/cancer.html

Firefighter Cancer Support Network:
www.firefightercancersupport.org
II. Chapter 13
An Overview and Update

Safety Chapter a Historical Perspective
NFPA 921 1992 Edition
Chapter 10 Safety, 2 Pages
10.1 General
• Investigating the Scene Alone
• Safety Clothing and Equipment
• Fire Scene Hazards
• Personal Health and Safety

Chapter 10 Safety
10.2 Factors Influencing Scene Safety
Structural Stability
Utilities
Standing Water
Safety of Bystanders
Safety of the Fire Scene Atmosphere
Chapter 10 Safety; 1995 Edition

Major re-write (Line in the Margin)
Still 2 pages

Added Sections
  • Investigator Fatigue
  • Electrical Hazards

Chapter 10 Safety; 1998 Edition

• Still 2 pages
• Minor word changes to:
  10.2.3 Utilities
  10.2.4 Electrical Hazards
  10.2.5 Standing Water
  10.2.6 Safety to Bystanders

Chapter 10 Safety; 2001 Edition

• 2.5 Pages
• Major re-write (Line in the Margin)

Added Sections
  10.3 Criminal Acts of Terrorism
  10.3.1 Secondary Devices
  10.3.2 Residual Chemicals
  10.3.3 Biological and Radiological Terrorism
  10.3.4 Exposure to Tools and Equipment
Chapter 12 Safety; 2004 Edition

- 2.5 pages
- Added Sections
  12.1.5 Investigator Fatigue
  12.5.1.2 Discussion of rest, fluids, and nourishment
  12.4 Safety in Off-Scene Investigation Activities

Chapter 12 Safety; 2008 Edition

- 5 pages
- Task Group Formed
- OSHA references added to 12.1 General
- Added Sections
  12.1.2 Hazard and Risk Assessment
  12.2.5 Electrical Hazards revised

Chapter 12 Safety; 2011 Edition

- 9 pages
- Task Group Re-Formed
- Major Changes
  12.1.1 General Injury/Health Statistics
  12.1.2 Health and Safety Programs
  12.1.2.1.2 Hazard and Risk Assessment
  12.3.3.2 Lockout/Tagout
Chapter 12 Safety; 2011 Edition

Major Changes

12.3.7.3 Mechanized Equipment Hazards
12.4 Safety Plans

Chapter 12 Safety; 2011 Edition

Major Changes

12.4.1 Hazard and Risk Assessment, Inclusion of the Form as an Appendix item.

12.4.2 Site Specific Safety Plans

Chapter 12 Safety; 2011 Edition

Major Changes

12.4.3 Management of Plans and Site Safety
Chapter 12 Safety; 2011 Edition

Major Changes
12.5 Chemical and Contaminant Exposure
12.6 Personal Protective Equipment (PPE)
12.7 Emergency Action Plans
12.8 Post Scene Activities
12.10.4 Drug Labs

Chapter 13 Safety; 2014 Edition

• 10 pages

Major Changes
Correction of Editorial Issues
Addition of Color Photographs
First Edition with Photographs in the Safety Chapter

NFPA 921, 2017 Edition

First Draft Meeting; San Antonio, TX
April 28-30, 2015

• 283 Public Inputs have been received.
• Chapters 12, 13 (Safety) and 21 have no public input.
Safety Chapter Changes

Thanks to:
• Two task groups that worked on the 2008 and 2011 Editions
• Those that provided Public Input (Proposals) and Comments
• Dan Churchward for being a Champion of the Safety Chapter during my absence at several important meetings.
• To the Technical Committee on Fire Investigations for their understanding of the importance of Safety.

III. Safety and Health Programs

Question?
Where does Safety and Health Fit in Your Workplace?

Where does Safety and Health Fit in your Workplace?
• Safety and health are an integral part of our operations. __ Yes __ No __ Don’t know
• Teamwork is apparent in all parts of the organization. __ Yes __ No __ Don’t know
• Managers and supervisors are out on the floor frequently and always observe the company safety and health rules. __ Yes __ No __ Don’t know
• Employees are encouraged to identify safety and health hazards and correct them on their own. __ Yes __ No __ Don’t know
• Employees have full and open access to all the tools and equipment they need to do their job safely. __ Yes __ No __ Don’t know
Where does Safety and Health Fit in your Workplace?

Detailed Survey

http://www.osha.gov/SLTC/complianceassistance/safetyhealthquiz.html

Question?

How are we getting injured during the investigation of a fire or explosion scene?

Fire Fighter Fatalities, 2012

- 2012 was the fourth consecutive year in which the total number of firefighter fatalities was below 100.
- 2011 and 2012 had by far the lowest number of firefighter deaths on record, and the annual average number of firefighter deaths has dropped to 88 during the period 2003 to 2012.
- 2012 was the first year in which the on-duty fatalities due to sudden cardiac death dropped below 30.
- The 12 deaths that occurred at structure fires in 2012 was the fewest ever recorded.
The 2012 preliminary total of 4,303 fatal work injuries represents a decrease of 7 percent from the final count of 4,697 fatal work injuries reported for 2011.


More fatal work injuries resulted from transportation incidents than from any other event in the 2012 preliminary counts. Transportation incidents alone accounted for nearly one out of every four fatal work injuries.
Causes of Accidents and Illnesses

Accidents / Illnesses
- Hazardous Acts
- Hazardous Conditions
- Untrained
- Unaware
- Unable
- Unmotivated
- Unidentified
- Uncorrected

Proactive Safety and Health Programs

H. W. Heinrich
Industrial Accident Prevention, A Scientific Approach in 1931

Incident Frequency Analysis
Purpose of Safety and Health Programs?

Objective

• “To ensure every employee works in a safe environment.”
• “To minimize safety risk and health hazards”

Goal of Safety and Health Program

• “To have each employee return home in the same condition as they arrived to work.”

Purpose of OSHA

• Establish Minimum Standards
• Standardization and Benchmark
• Eliminate Imminent Dangers
In a press release he explained the problem this way: OSHA has enough inspectors to visit every workplace in the US for 15 minutes once every 133 years.

David Michaels, PhD, MPH  Assistant Secretary
The current head of OSHA, for over 30 years.

Accidents, Illnesses and Injuries
Why don’t we do tasks safely at work?
Why don’t we do tasks safely at home?

*It will not happen to me!*

Accident Costs

49 Billion Dollars
3.9 Million lost workdays  (Average 20 days per incident)
1 out of 20 will suffer a serious injury or illness
Pain and suffering
Damage to the Environment
Accident Costs!

Direct Costs
- Medical
- Insurance Premiums
- Employee Compensation

Indirect Costs
- Repair/Replacement
- Overtime Pay
- Lost sales
- Hire and Train new employees
- Reduced Production
- Clean Up
- Impact on Employee and Family
Accidents, Illnesses and Injuries

- Near Miss Incident


Safety 3rd!

Job 1 is Profit

Safety

Production

Cost

Quality

Woodworkers Journal
Marc Adams,
Marc Adams School of Woodworking
Franklin, Indiana

“Safety is a culture” or is “Safety is a skill”

Introduction to Fire Investigator
Scene Safety

Questions?
Introduction to Fire Investigator
Scene Safety

Thank You for Your Participation!

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