NIOSH Fire Fighter Fatality Investigation and Prevention Program

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- Approx 1.15 Million Fire Fighters in U.S.
- 71 % are volunteer (814,000)
- 29% are career (336,000)
- Historically 100+ FF fatalities annually
- 75,000+ non-fatal injuries annually

Source – NFPA 2010
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**FFFPP Overview**

- Funded by Congress in 1998 to address the continuing national problem of occupational FF fatalities
- Stakeholder input stressed need for independent investigations of FF LODDs
- Non-Regulatory Federal Agency – recommendations not citations
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**FFFPP Overview**

- **NIOSH Investigations**
  - Don’t find fault or place blame
  - Identify contributory factors

- **NIOSH FF Program guided by input from the fire service**

NIOSH Fire Fighter Fatality Investigation and Prevention Program
Goal: Prevent fatalities

Objectives:
- Investigations
- Identify causal factors
- Recommendations
- Interventions
- Dissemination
Investigation Priorities

- Traumatic
  - Multiple fatalities
  - Structure fire
  - Motor Vehicle
  - New or emerging hazard
- Medical
  - Hyper/hypothermia
  - Seizure, diabetes, overdose
  - Physical fitness or responder training

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http://www.cdc.gov/niosh/fire/pdfs/FFFIP_DecisionChart.pdf
• 501 Investigations by NIOSH
  • 237 Medical
  • 264 Trauma
  • 326 Fatalities
  • 214 Injuries

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Structure Fires

- 122 Structure Fire investigations
  - 72 Residential
  - 50 Commercial
In-Depth Investigations

• Response to stakeholder input
  – Training
  – Organizational Safety Climate / Culture
  – Fire Behavior
  – SCBA / PPE Evaluations
Investigation Reports
www.cdc.gov/niosh/fire

• Tell story
• Make recommendations
• Posted to FFFIPP website
• Mass mailings of illustrative reports

Death in the line of duty...

A summary of a NIOSH fire fighter fatality Investigation
September 13, 2010

One Career Fire Fighter/Paramedic Dies and a Part-time Fire Fighter/Paramedic is Injured When Caught in a Residential Structure Flashover – Illinois

Executive Summary
On March 20, 2010, a 28-year-old male career fire fighter/paramedic (victim) died and a 31-year-old female part-time fire fighter/paramedic was injured when caught in an apparent flashover while operating a hose line within a residence. Units arrived on scene to find heavy fire conditions at the rear of a house and moderate smoke conditions within the uninvolved areas of the house. A search and rescue crew had made entry into the house to search for a civilian who was entrapped at the rear of the house. The victim, the injured fire fighter/paramedic, and a third fire fighter made entry into the home with a charged 2 1/2 inch hose line. Thick, black rolling smoke boiled down to knee level after the hose line was advanced 12 feet into the kitchen area. While ventilation activities were occurring, the search and rescue crew observed fire rolling across the ceiling within the smoke. They immediately rallied the hose line crew to "get out." The search and rescue crew were able to exit the structure safely, then returned to rescue the injured fire fighter/paramedic first and then the victim. The victim was found wrapped in the 2 1/2 inch hose line that had ruptured and without his facepiece on. He was quickly brought out of the structure, received medical care on scene, and was transported to a local hospital where he was pronounced dead.

Contributing Factors
• Well involved fire with entrapped civilian upon arrival
• Incomplete 360 degree situational size-up
• Inadequate risk versus-gain analysis
• Ineffective fire control tactics
• Failure to recognize, understand, and react to deteriorating conditions
• Uncordinated ventilation and its effect on fire behavior

Scene conditions after crews advanced inside. (Photo courtesy of Warren Kiehlke)
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Heart Attacks, 2007
Truss System Failures, 2005
Live fire training, 2004

Preventing Deaths and Injuries to Fire Fighters during Live-Fire Training in Acquired Structures

Summary
Firefighters are subjected to intense physical stress during live fire training. Heat stress, exertion, and physical labor in an immersive training environment can lead to heat exhaustion, heat stroke, and other illnesses. Several recommendations are provided to reduce the risk of injury and death during live fire training.

Description of Exposure
Live fire training exercises are a critical component of firefighter training. Firefighters are exposed to high temperatures, smoke, and other hazards. This exposure can lead to heat-related illnesses such as heat exhaustion and heat stroke. Proper training and preparation are essential to prevent these injuries.

Case Studies
Case 1: During a live fire training exercise, a firefighter experienced severe symptoms of heat exhaustion. He was immediately removed from the training area and treated for dehydration.

Case 2: Another firefighter experienced heat stroke during a live fire training exercise. He was relieved from duty and treated for the condition.

Recommendations
1. Firefighters should be trained in heat stress prevention and response.
2. Firefighters should be provided with appropriate personal protective equipment.
3. Training supervisors should monitor firefighters for signs of heat-related illness.
4. Training environments should be evaluated for potential hazards.

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SCBA / PPE Evaluations
Impact - Improved PASS Devices

- Reports and potential problems to NFPA committee early 2005
- NFPA and others posted notices late 2005
- NFPA PASS device standard revised 2/20/2006; more stringent testing after 8/31/2007
- Product passing testing available in April 2007
Impact- Improved Facepieces to resist Thermal Degradation

- Reports and potential problems to NFPA committee early 2009
- NIOSH / NIST / NFPA and others evaluated degradation issues 2009-2011
- NFPA 1981 SCBA standard enhanced with new tests - 2011
- Product passing testing available in 2013
Future Efforts

• Fireground Radio Performance Issues
  - NIST project

• Turnout Clothing Performance

• NFPA Committee Participation
  • NFPA 1981 Open Circuit SCBA
  • NFPA 1500 Occupational Safety and Health Program
  • NFPA 1582 Comprehensive Occupational Medical Program
  • NFPA 1583 Health-Related Fitness Programs
Comments and Questions can be directed to:

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Questions?

The findings and conclusions in this presentation are those of the authors and do not necessarily represent the official position of NIOSH.