

NIOSH Fire Fighter Fatality Investigation and Prevention Program (FFFIPP) Progress Report and Proposed Future Directions – 2014

The National Institute for Occupational Safety and Health (NIOSH) is committed to ensuring that the NIOSH Fire Fighter Fatality Investigation and Prevention Program (FFFIPP) is meeting the needs and expectations of the U.S. fire service. NIOSH has sought public input to help plan and direct the goals and objectives of the FFFIPP since the program was initiated in 1998. NIOSH received public comments on the FFFIPP in January 1998, March 2006, November 2008, and August of 2011. Records of previous public comment periods are available at:

<http://www.cdc.gov/niosh/fire/programreview.html>.

In 2011, 26 comments were received from a variety of sources. This included 14 fire departments, 4 private individuals, 4 professional organizations, 2 colleges or universities, and 2 Federal agencies. These comments are available at:

<http://www.cdc.gov/niosh/docket/archive/docket063B.html>.

The primary modifications made to the FFFIPP following the August 2011 stakeholder comments are as follows: The FFFIPP is more attentive to selecting reviewers that have experience and expertise matched to the event circumstances of an investigation; in cases where highly specialized issues are identified as contributing factors, external fire service subject matter experts are consulted to assist during the investigation; and the FFFIPP is working closely with the National Volunteer Fire Council in conducting volunteer fire department fatality investigations and in obtaining reviewers for incidents involving volunteer fire departments.

NIOSH is again seeking stakeholder input on the progress and future directions of the NIOSH FFFIPP to ensure that the program is meeting the needs and expectations of the U.S. fire service, and to identify ways in which the program can be improved to increase its impact on the safety and health of fire fighters across the United States.

Background

During fiscal year 1998, Congress identified the need to address the continuing national problem of occupational fire fighter fatalities and funded NIOSH to implement a fire fighter safety initiative. In response to stakeholders, the FFFIPP conducts independent investigations of fire fighter line-of-duty deaths (LODD) and formulates recommendations for preventing deaths and injuries.

Since the FFFIPP was initiated, 1,983 fire fighters have died in the line-of-duty through 2013 (not counting the 343 fire fighters who died on September 11, 2001). During this period the FFFIPP investigated 644 fire fighter LODDs or 32 percent of the total (368 trauma and 276 medical LODDs).

Investigation Priorities

Since NIOSH does not have the resources to conduct investigations of all fire fighter LODDs, each incident is prioritized using a decision logic that can be found on the NIOSH FFFIPP website at http://www.cdc.gov/niosh/fire/pdfs/FFFIP_DecisionChart.pdf. The current priorities for investigating traumatic LODDs include multiple fatality events, structure fires, motor vehicle incidents, and new or emerging hazards. The priorities for investigating medical LODDs include hyper/hypothermia; seizures, diabetes, and drug overdose; sudden cardiac death during physical fitness training; sudden cardiac death during emergency responder training; and sudden cardiac death on the fireground. NIOSH welcomes comments on these priorities along with suggestions for replacing or modifying them.

Program Accomplishments

From January 2011 through April 30, 2014, the FFFIPP has accomplished the following:

- Completed – 48 medical and 47 traumatic injury investigations;
- Published – NIOSH *Workplace Solutions: Preventing Deaths and Injuries of Fire Fighters Operating Modified Excess/Surplus Vehicles*. DHHS (NIOSH) Publication No. 2011-125;
- Published – NIOSH *Workplace Solutions: Preventing Deaths and Injuries to Fire Fighters by Establishing Collapse Zones at Structure Fires*. DHHS (NIOSH) Publication No. 2014-120;
- Published – Estes CR, SM Marsh and DN Castillo (2011). Surveillance of Traumatic Firefighter Fatalities: An Assessment of Four Systems. *Pub Health Rep* 126(4):540-51;
- Released – Fire Fighter Fatality Map Application on the NIOSH website. Available at <http://wwwn.cdc.gov/wisards/ffmap/>;
- Provided information and data from a series of LODD investigations regarding the thermal degradation of Self-Contained Breathing Apparatus face piece lenses to the National Fire Protection Agency (NFPA) Technical Committee on Respiratory Protective Equipment. This contributed to decisions to raise the temperature requirements for heat and flame tests including an additional radiant heat test effective in the 2013 edition of NFPA 1981 *Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services*;
- Provided information and data from several recent cardiovascular disease (CVD) related investigations associated with left ventricular hypertrophy to the NFPA Technical Committee on Fire Service Occupational Safety and Health;

- Provided information and data from heat stroke fatality investigations to the NFPA and the National Wildland Coordinating Group;
- Provided information and data from a recent training-related LODD investigation involving an elevated aerial platform to the NFPA Technical Committee on Automotive Fire Apparatus;
- Provided information and data from recent LODD investigations involving land mobile radio design and operational issues to the NFPA Technical Committee on Electronic Safety Equipment. A new standard is currently being developed entitled NFPA 1802 *Standard on Two-Way, Portable (Hand-held) Land Mobile Radios for Use by Emergency Services Personnel*.
- Provided information and data to NFPA from recent LODD investigations which supported the revision of NFPA 1561 *Standard on Emergency Services Incident Management System and Command Safety (Effective date: December 2, 2013)*. The standard's title now includes "Command Safety" and the addition of a new chapter, *Command Safety*. This chapter will provide a foundation on how to incorporate the incident management system at all emergency incidents;
- Provided information and data to NFPA from recent transportation-related LODD investigations which were used to support the pending NFPA 1091 *Standard for Traffic Control Incident Management Personnel Professional Qualifications*. Final approval by the full committee is anticipated in the Fall of 2014.
- Disseminated findings from NIOSH investigations via presentations at multiple fire service and medical conferences.

In addition, the FFFIPP continues to receive examples of the fire service using program findings and recommendations to improve fire fighter safety. For example:

- During 2011, 2012, and 2013 there were a total of 383,952 visits to the FFFIPP webpage;
- Fire departments regularly report using FFFIPP investigation reports and publications to support fire fighter training and during promotional examinations;
- The 2012 International Residential Code requires the application of a drywall or structural wood membrane to the underside of floor systems in non-sprinkler residential dwellings. The International Association of Fire Fighters (IAFF) proposed this code modification based in part on findings from NIOSH LODD investigations and recommendations that lightweight construction systems be protected with a fire-resistant barrier;
- Fire service publications frequently reference and encourage the use of NIOSH fatality investigation reports and recommendations to improve fire fighter safety.

Strategic Plan

Since 2009, the Strategic Plan for the NIOSH FFFIPP has been used to guide the research and continued implementation of the program (available at <http://www.cdc.gov/niosh/fire/strategicplan2009.html>). The Strategic Plan addresses the mission of the FFFIPP, strategic goals to improve fire fighter health and safety, program activity/output goals, and performance measures by which the program can be evaluated.

Progress Toward Goal Achievement

The following table summarizes the FFFIPP implementation progress since January 2011 related to individual activity/output goals and performance measures in the Strategic Plan.

FFFIPP Progress		
Activity/Output Goals Performance Measures	Progress (January 2011 through April 2014)	Comments
Goal A: Conduct fatality investigations as the principal activity of the FFFIPP	95 fatality investigations completed (48 medical and 47 traumatic)	NIOSH proposes that LODD investigations remain the highest FFFIPP priority
A.1: Investigations will be finalized each year at a minimum of 3 investigations per fulltime investigator.	8 investigators (7 fulltime and 1 half-time) completed 84 investigations (3 per investigator per year for traumatic and 10 per investigator per year for medical)	The program is currently staffed with 7 fulltime investigators, 5 assigned to traumatic investigations.

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A.2: 90% of investigations through 2013 will involve CVDs, structure fires, or motor vehicle accidents (MVA) incidents.	85% of all cases involved CVDs, structure fires, or MVA incidents.	The goal of 90% of investigations involving CVDs, structure fires, or motor vehicles was not met because of NIOSH investigating several incidents involving other serious medical conditions (e.g., heat stroke) and unique trauma events (e.g., training related fatalities, explosions) at the request of the fire service.
A.3: Initial site visits will be conducted within 3 weeks of the fatality in 80% of fatal traumatic injury incidents.	Site visits were conducted for 63% of traumatic injury incidents within 3 weeks.	Site visits are often delayed at the request of the fire department, in deference to funeral and memorial services
A.4: Input will be obtained to improve the design and format of fatality investigation reports by Fiscal Year 2010.	Report format revisions were implemented during 2009 and 2010.	NIOSH continues to welcome stakeholder comment on reports to improve their utility to the fire service.
A.5: Investigation priorities will be revisited and input sought for proposed changes by 2010.	Stakeholder input from the 2011 docket is being addressed.	CVDs, structure fires, and motor vehicle incidents continue to be leading causes of LODD in the fire service.

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Goal B: Individual fatality reports will be generated for each investigation and investigation findings will be reported and summarized in additional publications.	A report is completed for each investigation and additional NIOSH publications are developed as issues are identified.	The Program will continue producing LODD reports and NIOSH publications, such as the recently released Workplace Solutions document on building collapse zones.
B.1: 50% of investigation reports will be completed within 6 months of the site visit, 95% will be within 12 months.	41% of the investigation reports were completed within 6 months and 75% were completed within 12 months.	The Program will continue efforts to reduce the completion time for investigations. Incidents involving larger departments, multiple fatalities, criminal charges, and delays in autopsy reports frequently result in longer completion times.
B.2: One document (other than a fatality report) will be published annually	NIOSH Workplace Solutions were published in 2011 and 2014.	While NIOSH has not released at least one such document annually, several new documents are in various stages of development.
Goal C: Seek peer and stakeholder input to improve the quality of products and the impact of the program.		
C.1: 75% of traumatic fatality reports will be reviewed by external experts and 100% of publications will be reviewed by peers and/or stakeholders	100% of traumatic LODD reports were reviewed by one or more external fire service subject matter experts. Also, 100% of all publications were reviewed by peers and stakeholders.	

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C.2.: Expert consultation and/or testing will be sought on all investigations suggestive of personal protective technology malfunctions or failures.	External expert consultation was sought for 4 cases involving the possibility of equipment malfunctions.	NIOSH's National Personal Protective Technology Laboratory (NPPTL) assesses Personal Protective Equipment (PPE) and SCBA issues.
C.3: Stakeholder input will be sought at least every two years through a public meeting and/or docket.	NIOSH last received written comments from an open docket in 2011.	NIOSH proposes to seek stakeholder input through public meetings and/or dockets every five years.
Goal D: Increase fire service expertise of FFFIPP personnel		
D.1: Each trauma investigator will take at least one fire service training course or attend a fire service conference specifically for training annually.	Each investigator attended one or more fire service training sessions annually.	
D.2: Announcements for investigator positions will require fire service and occupational safety and health experience.	The team includes 4 investigators with fire service experience	
Goal E: Ensure FFFIPP recommendations and products are used to improve fire fighter safety and health		
E.1: The program will be involved in at least 2 outreach activities annually.	The program actively supports the National Volunteer Fire Council Safety and Health Week and the International Association of Fire Chief's Safety, Health, and Survival Week annually.	

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E.2: FFFIPP investigators will meet annually with the National Personal Protective Technology Laboratory (NPPTL) staff to discuss investigation findings related to personal protective technology.	Annual meetings were held to discuss findings related to personal protective equipment (PPE). FFFIPP and NPPTL routinely collaborate on PPE evaluations related to fire fighter LODDs.	NPPTL has established labs at the NIOSH Morgantown site to better support and collaborate with FFFIPP investigators on investigation-related PPE evaluations.
E.3: Investigation findings will be communicated to the National Fire Protection Association (NFPA) and other standards setting agencies annually.	FFFIPP and NIOSH staff members participate on 4 NFPA Technical Committees. NIOSH documented issues involving land mobile (portable hand held) radios to NFPA by letter in 2012. FFFIPP staff also participated in the IAFF/IAFC Wellness Fitness committee meetings	NIOSH proposes continued participation on NFPA committees; however, travel restrictions may limit NIOSH staff face-to-face participation in all meetings.
E.4: Relevant investigation findings will be communicated to PPE manufacturer groups and Certification Organizations as needed, and at least every two years.	Findings related to thermal degradation of SCBA lenses and portable radios were provided to NFPA.	Manufacturers of fire service equipment, including SCBA and radios are represented on the corresponding NFPA committees.
E.5: Implement improved communications strategy to reach small and volunteer departments by 2011.	FFFIPP team members and the National Volunteer Fire Council (NVFC) have discussed ideas for improving outreach to volunteer departments. NVFC is serving as a liaison to facilitate volunteer department LODD investigations.	NIOSH continues to work with NVFC to identify approaches to increase outreach activities with volunteer fire departments in the US. The Division of Safety Research is in the process of hiring a Health Communication Fellow which will help to better address this goal in the future.

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E.6: Implement input from a web publishing consultant to improve the FFFIPP Web site by 2011.		Work has not been completed on this effort because the FFFIPP has focused on competing priorities. The Division of Safety Research is in the process of hiring a Health Communication Fellow which will help to better address this goal in the future.
E.7: Develop a survey that would be provided to all departments following a NIOSH fatality investigation that would provide feedback on the investigation and departmental changes made as a result of the investigation will be developed by Fiscal Year 2011 and implemented by 2013.	A pilot survey was developed and is being pilot tested. An initial assessment has been completed by the medical investigation team.	
E.8: Seek funding to conduct a study assessing the FFFIPP impact on fire department training, policies and practices by Fiscal Year 2012.		Work has not been conducted on this effort because the FFFIPP has focused on competing priorities.

Proposed Future Directions

The FFFIPP proposes to continue the emphasis on independent investigations of fire fighter line-of-duty deaths as it first priority. NIOSH participation on standard-setting committees, such as NFPA technical committees, may take a lessor priority, including not attending meeting in person. Attendance at conferences, workshops, training, and fire service stakeholder meetings may be reduced or eliminated. Electronic versions of reports and publications will continue to be available through the NIOSH and FFFIPP web pages. NIOSH welcomes comments on proposed priorities for the FFFIPP.

Specific Topics for Stakeholder Input in 2014

The NIOSH FFFIPP welcomes comments on any aspect of the FFFIPP. Additionally, specific comments are being solicited on the following topics:

- FFFIPP priorities for conducting investigations;
- Changes to the format of FFFIPP investigation reports;
- Changes to the FFFIPP website;
- Changing the frequency of public meeting/docket solicitation for suggested improvements to the program to five years;
- Examples of how FFFIPP investigation reports and products are used by fire service organizations, fire departments and fire fighters, and fire service safety and health researchers;
- Examples of FFFIPP impact on fire fighter safety and health; and
- Whether NIOSH should contact a family member of the victim to update them on the NIOSH investigation.